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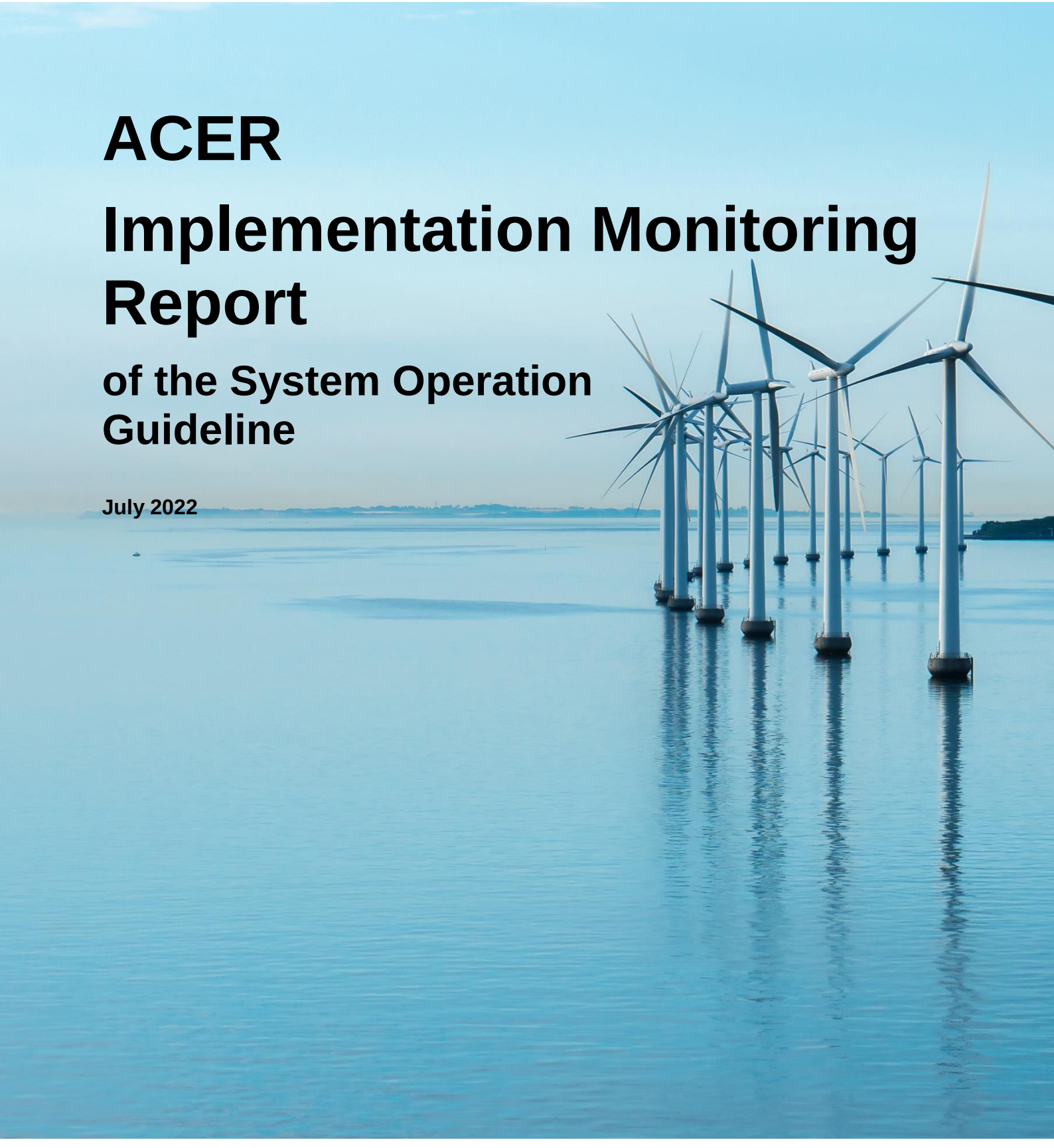

ACER Implementation Monitoring Report

of the System Operation Guideline

July 2022

ACER

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of the System Operation Guideline

July 2022

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1 Purpose, scope and method

1.1 Purpose

1 This is the first Implementation Monitoring Report ('the Report') presenting the progress towards the implementation of Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation ('SO GL').[1]

2 Article 32(1) of Regulation (EU) 943/2019[2] requires the European Union Agency for the Cooperation of Energy Regulators ('ACER') to monitor and analyse the implementation of the network codes and the guidelines adopted by the European Commission. Furthermore, ACER should monitor the effect of network codes and guidelines on the harmonisation of applicable rules aimed at facilitating market integration, as well as on non-discrimination, effective competition and the effective functioning of the market, and report to the European Commission.

3 As part of ACER's monitoring of the implementation of the SO GL, this Report further aims at:

- identifying potential challenges in implementing the SO GL in identified areas, and
- recommending concrete actions and best practices that can lead to a more efficient implementation in those areas.

4 In the remainder of this Report, all the legal references to articles are to be understood as referring to the SO GL, unless specified otherwise.

1.2 Scope

5 In accordance with Article 192, the SO GL entered into force on 14 September 2017.[3] However, Articles 41 to 53 apply since 14 March 2019, pursuant to second paragraph of Article 192, while Article 54(4) applies to power-generating facility owners, and demand facility owners, DSOs and CDSOs since 27 April 2019 and 18 August 2019, respectively.[4]

6 This Report analyses the implementation status of the following areas of the SO GL:

- Applicability and scope of the data exchange referred to in Article 40(5) (Section 3 of the Report);
- Key organisation requirements, roles and responsibilities ('KORRR') in relation to the data exchange referred to in Article 40(6) and proposal of all transmission system operators ('TSOs') of 1 October 2018[5] (Section 4 of the Report);

[1] OJ L 220, 25.8.2017, p. 1 and amended by Article 4 of the Commission Implementing Regulation (EU) 2021/280 of 22 February 2021 amending Regulations (EU) 2015/1222, (EU) 2016/1719, (EU) 2017/2195 and (EU) 2017/1485 in order to align them with Regulation (EU) 2019/943 (OJ L 62, 23.2.2021, p. 24).

[2] Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (OJ L 158, 14.6.2019, p. 54).

[3] Note that Articles 5 to 8 have been amended by the Commission Implementing Regulation (EU) 2021/280 that entered into force on 15 March 2021.

[4] According to Article 41(2) of Regulation (EU) 2016/631 and Article 35(2) of Regulation (EU) 2016/1388 in conjunction with Article 192 paragraph 3 of the SO GL.

[5] https://eepublicdownloads.entsoe.eu/clean-documents/nc-tasks/SOGL/SOGL_A40.6_181001_KORRR_181015.pdf; proposal has been approved by all regulatory authorities (https://www.ceer.eu/documents/104400/-/-/e35e2077-56f1-a02d-92fb-a836e6ba428b) on 19 December 2018.

- Agreements on processes and format for data exchanges between TSOs and relevant distribution system operators ('DSOs') referred to in Article 40(7) (Section 5 of the Report);
- General aspects of the data exchange referred to in Article 1(3) of the KORRR (Section 6 of the Report);
- Provision of data between significant grid users ('SGUs'), TSO and DSOs referred to in Articles 40(5), 40(7), 43 (5), 48, 50 and 53, and Article 3 of the KORRR (Section 7 of the Report);
- Specific aspects of the data exchange concerning TSOs referred to in Articles 3 and 5 to 10 of the KORRR (Section 8 of the Report).

Other areas of the SO GL are not covered in this Report.

1.3 Method

7 In order to perform the task of monitoring the implementation of the SO GL, ACER has requested 28 National Regulatory Authorities ('NRAs') to fill in a survey. The survey included detailed questions on the implementation of specific and general SO GL provisions related to the areas described above in the Scope section. All the questions and NRAs' answers are presented in the Annexes of the Report. ACER circulated the survey on 7 July 2021 to the ACER Electricity Working Group,[6] ensuring that all the European Union ('EU') NRAs and NVE-RME (NO) received the questionnaire.

8 Table 1 lists all the contacted NRAs.[7]

Table 1. List of contacted NRAs

National Regulatory Authorities from EU Member States								
1.	E-Control	*AT*	10.	EV	*FI*	19.	PUC	*LV*
2.	CREG	*BE*	11.	CRE	*FR*	20.	REWS	*MT*
3.	EWRC	*BG*	12.	RAE	*GR*	21.	ACM	*NL*
4.	CERA	*CY*	13.	HERA	*HR*	22.	URE	*PL*
5.	ERO	*CZ*	14.	MEKH	*HU*	23.	ERSE	*PT*
6.	BNetzA	*DE*	15.	CRU	*IE*	24.	ANRE	*RO*
7.	DUR	*DK*	16.	ARERA	*IT*	25.	Ei	*SE*
8.	ECA	*EE*	17.	NERC	*LT*	26.	AGEN-RS	*SI*
9.	CNMC	*ES*	18.	ILR	*LU*	27.	RONI	*SK*
National Regulatory Authorities from EEA Countries								
			28.	NVE-RME	*NO*			

[6] https://www.acer.europa.eu/the-agency/organisation-and-bodies/working-groups-and-task-forces

[7] The complete list of abbreviation and country codes is in Annex 3.

9 The results presented in the Report and the arising conclusions are based on the replies to the questionnaire as provided by the NRAs. Furthermore, NRAs were given the opportunity to amend and update their input to the survey with the cut-off date of 29 June 2022. Annex 1 to this Report includes the responses in full received from the NRAs to each question of the survey on the implementation monitoring of the SO GL

2 Conclusions and recommendations

10 In the light of the NRAs' replies and analysis performed for the Report, ACER has come to the following conclusions and recommendations:

2.1 Conclusions on the implementation status

11 In the majority of the Member States, TSOs determined the applicability and scope of the data exchange based on Articles 44 and 47-53. At the same time, the reported coordination of this process with DSOs and SGUs is satisfactory. Overall, ACER understands that in around 70% of jurisdictions, the determined provisions are either fully or partially implemented pursuant to Article 40(5). It is worth mentioning that in case TSOs did not determine the applicability and scope, the default rules for the data exchange, as prescribed in Articles 44 and 47-53, apply.

12 Over 60% of NRAs reported implementing or approving key organisational requirements, roles and responsibilities (KORRR) in relation to data exchange developed under Article 40(6); some NRAs indicated stepwise implementation of KORRR as the primary reason for declared delays. A similar number of NRAs confirmed that their respective TSOs and DSOs reached agreements on effective, efficient and proportional processes regarding data exchanges and the data exchange format, as per Article 40(7).

13 As for the determination of SGUs required to exchange data, NRAs' replies reveal a wide range of parameters and thresholds in specifying the responsibilities of the SGUs. Power values used as thresholds span from 0.25 MW to 12 MW. In ACER's view, the wide range of power values raises the question as to whether there is a level playing field established in the EU pursuant to the SO GL.

14 Rules on the provision of data between TSOs, DSOs and SGUs are in principle specified. ACER notes that, although SGUs are required to provide data individually in most monitored countries, they are often allowed to delegate a third party to exchange structural data, scheduled data, and real-time data. Nevertheless, the implementation of these specified data exchange schemes is deemed outstanding in over 35% of countries. Also, the implementation of Article 43(5) on DSOs' obligation to provide data on generating capacity of the type A PGMs is not satisfactory.

15 The NRAs survey shows that monitored provisions of KORRR that lay down TSOs obligations have mostly been implemented. The highest implementation levels were reported for Article 10(5) of KORRR (refresh rate for real-time data) and Article 8(1) of KORRR (review of structural data shared with other TSOs) and Article 42(1) of SO GL (exchange of real-time data between TSOs). Some specific KORRR obligations, however, remain outstanding.

16 Lastly, NRAs inputs gathered and analysed in this Report provide a detailed overview of the applicable data exchange regimes across the EU. Moreover, this Report aims to offer clarity and inform the stakeholders on both implementation status and applied changes to the SO GL default rules on the data exchange.

2.2 Policy recommendations concerning data exchange rules

17 ACER highlights that the answers provided by the NRAs do not show a complete and sufficiently uniform EU-wide implementation of the data exchange provisions of the SO GL.

18 The duly implemented data exchange provisions would facilitate operational and scheduling processes required to anticipate real-time operational security difficulties and develop relevant remedial measures. Complete implementation of data exchange would also contribute to the efficiency of operation and system development across the EU and would help identifying necessary improvements.

19 Based on the considerations above, ACER recommends NRAs to perform or promote an expeditious implementation of Title 2 of Part II of the SO GL in their countries. For example, although NRAs might not always represent the entities designated by the Member States to approve the proposals referred to in Article 40(5), it is still the NRAs' duty to ensure that relevant system operators comply with the SO GL.

20 In cases where corresponding TSOs have not developed certain proposals subject to approval (i.e., on the applicability and scope of data exchange as per Article 40(5)) or have not implemented relevant provisions, ACER encourages NRAs to monitor the process or liaise with concerned actors to bring forward a detailed roadmap towards the implementation of the SO GL. In particular, ACER recommends actions on the following issues:

- determination of applicability and scope of data exchange according to Article 40(5) so as to ensure efficient and fit for purpose data exchange;
- complete implementation of the KORRR provisions under Article 40(6) and Article 6(2)(a) of SO GL;
- conclusion of agreements between TSOs and DSOs in accordance with Article 40(7);
- implementation of schemes for the exchange of structural data, scheduled data, real-time data and data provided by the SGUs participating in the demand response as per Articles 48, 49, 50 and 53, respectively;
- specification of content and format of structural and real-time data exchange under Article 7(1) and (2) and Article 10(1) and (2) of KORRR, respectively,
- specification of scheduled data exchange format pursuant to Article 9(2) and (3) of KORRR.

21 ACER additionally notes that a wide range of power thresholds considered to define the SGUs responsible to exchange data limits the level playing field in the EU. Hence, proportionate changes to the data exchange rules aiming at harmonising applicable criteria for SGUs definition should be considered when amending the SO GL, taking into account the non-discrimination and data exchange purposes.

22 Finally, ACER reports that it cannot ascertain the implementation status of Title 2 of Part II of the SO GL in BG and MT due to the lack of response from the relevant NRAs (EWRC and REWS).

3 Applicability and scope of the data exchange

3.1 Objectives

23 Article 40(5) lays down the categories that shall serve as the basis for the data exchange: structural data, scheduling and forecast data, real-time data and provisions in accordance with Articles 51-53. Each TSO has an obligation to determine the applicability and scope of this data exchange in coordination with DSOs and SGUs. Furthermore, the applicability and scope of the data exchange determined at the national level are subject to the approval by the competent authority.

24 In other words, until (and subject to) the determination of the applicability and scope of the data exchange in accordance with Article 40(5), the provisions on the data exchange stipulated in Articles 47-53 are binding in their entirety and directly applicable.

25 This section analyses the implementation status related to the following elements:

a) preparation and status of the proposals pursuant to Article 40(5), including:
   - coordination with the DSOs and SGUs,
   - identification of the competent authority for the approval of the proposals,
   - status of the TSOs' proposals;

b) implementation status of the provisions on applicability and scope of the data exchange pursuant to the Article 40(5);

c) additional provisions on the data exchange adopted by TSOs, pursuant to Articles 44 and 47-53.

26 NRAs' responses in full are included in Section 2 of Annex I.

3.2 Proposals on the provisions on applicability and scope

27 Article 40(5) sets an obligation for TSOs to determine the applicability and scope of the data exchange at the national level in four categories:

a) Structural data in accordance with Article 48;

b) Scheduling and forecast data in accordance with Article 49;

c) Real-time data:
   - provided by DSOs in accordance with Article 44,
   - provided by SGUs which are a power generating facility owners of type B, C or D power generating module in accordance with Article 47(1), and HVDC system or AC interconnector owners in accordance with Article 47(2),
   - provided by SGUs identified in Article 2(1)(a) and (e) connected to the distribution system in accordance with Article 50;

d) Data exchanged between:
   - TSOs and DSOs in accordance with Article 51,

- TSOs and transmission-connected demand facilities in accordance with Article 52,
- TSOs and/or DSOs, and distribution-connected demand facilities or third parties participating in demand response in accordance with Article 53.

3.2.1 Coordination with DSOs and SGUs

28 Article 40(5) stipulates that TSOs shall coordinate the drafting of the proposals on the applicability and scope of the data exchange with the DSOs and SGUs. Hence, ACER asked NRAs to explain how such coordination had been implemented by the respective TSOs.

29 According to the replies from 21 NRAs, DSOs and SGUs were included in the process of the preparation of the proposals in their countries.[8] TSOs often reached out to stakeholders through dedicated or public, open consultations, working groups, meetings, workshops and agreements. NVE-RME (NO) confirmed the establishment of a working group, but pointed out that the work is ongoing.

30 Replies provided by two NRAs (MEKH (HU) and ILR (LU)) seem to imply an outstanding implementation status. MEKH (HU) reported that rules and procedures are already implemented in the national grid code without further elaboration on the coordination with DSOs or SGUs.

31 ILR (LU) explained that its respective TSO combines the function of a DSO as well, and hence, in the absence of other DSOs connected to the transmission grid and absence of identified SGUs in LU, there is no need for the data exchange additional to information on generation and load collected at the substations.

32 AGEN-RS (SI) did not provide a reply to this question.

3.2.2 Competent authority for the approval of the proposals

33 Pursuant to Article 6(4)(b), TSOs proposals on the provisions on applicability and scope referred to in Article 40(5) shall be approved by the competent authority designated by the Member State. ACER inquired the NRAs to indicate which entity had been designated in accordance with Article 6(1).

34 CNMC (ES) reported that the approval of the proposals referred to in Article 40(5) is a competence of the Spanish Ministry for Ecological Transition and Demographic Challenge.

35 ERSE (PT) explained that for the technical conditions for connecting facilities to the transmission or distribution networks, the competent authority is the General Directorate of Energy and Geology, while in all market functioning related issues, namely network access, network operation and system management ancillary services, network operators and users' rights and obligations, the competent authority is the NRA.

36 DUR (DK) and AGEN-RS (SI) did not answer this question.

37 The remaining NRAs confirmed that they were designated as competent authorities for the approval in their countries.

[8] I.e., AT, BE, CZ, DE, DK, ES, FI, FR, GR, HR, IE, IT, LT, LV, NL, NO, PL, PT, RO, SE and SK.

3.2.3 Approval of the proposals

38 Proposals referred to in Article 40(5) shall be submitted by the TSOs to the competent authorities identified in the previous section. In turn, competent authorities shall take a decision within six months following the receipt of the proposals, in accordance with Article 6(9) and paragraph 4 of this Article.

39 ACER inquired NRAs whether proposals were prepared and duly submitted by TSOs and whether competent authorities adopted the decisions referred to in Article 6(4). Where adoption was confirmed by the NRAs, ACER asked NRAs to provide further details concerning the date of the adoption and the link to the decisions.

40 A summary of the findings is presented in Table 2. More details are available in Annex 1. For each of the eight proposals, as referred to in Article 40(5):

- The cells in green indicate that the competent authority has approved a relevant proposal. They include the date of the adoption of the decision, where this information was provided by the NRA;
- The cells in yellow refer to situations when a complete approval of the proposals is pending;
- The cells in blue indicate that a relevant proposal is still in preparation;
- The cells in grey refer to situations when the NRA claimed non-applicability, provided another answer than those mentioned above or the NRA input is inconclusive;
- The cells in red indicate the lack of relevant answer from the NRAs.

Table 2. Status of the proposals

	Proposals on applicability and scope of the data exchange							
	Article 48	Article 49	Article 44	Article 47	Article 50	Article 51	Article 52	Article 53
AT	15/07/2021	15/07/2021	15/07/2021	15/07/2021	15/07/2021	15/07/2021	15/07/2021	15/07/2021
BE				13/02/2021			13/02/2021	
BG								
CZ	17/07/2020	17/07/2020	17/07/2020	17/07/2020	17/07/2020	17/07/2020	17/07/2020	17/07/2020
DE	16/01/2019	16/01/2019	16/01/2019	16/01/2019	16/01/2019	16/01/2019	16/01/2019	20/12/2018
DK		16/03/2021						
EE	01/07/2019		01/07/2019	01/07/2019	01/07/2019	01/07/2019		
ES			19/12/2020	19/12/2020	19/12/2020		19/12/2020	
FI	14/03/2019	14/03/2019	14/03/2019	14/03/2019	14/03/2019	14/03/2019	14/03/2019	14/03/2019
FR	10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
GR								
HR			06/10/2020	06/10/2020			06/10/2020	
HU								
IE	15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
IT	05/05/2017		11/02/2020	11/02/2020	11/02/2020	11/02/2020	11/02/2020	05/05/2017
LT								
LU								
LV								
MT								
NL	03/07/2021	03/07/2021	03/07/2021	03/07/2021	03/07/2021	03/07/2021	03/07/2021	03/07/2021
NO								
PL	15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019	15/03/2019
PT	06/2021	06/2021	06/2021	06/2021	06/2021	06/2021	06/2021	06/2021
RO	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019
SE	01/02/2020	01/02/2020	01/02/2020	01/02/2020	01/02/2020		01/01/2020	01/01/2020
SI								
SK	01/11/2020	01/11/2020	01/11/2020	01/11/2020	01/11/2020	01/11/2020	01/11/2020	01/11/2020

41 Further remarks provided by NRAs are noted below.

42 CREG (BE) replied that proposals concerning Articles 44, 48, 50 and 51 were sent for approval on 30 September 2021 and await the decision of the competent authority.

43 ERO (CZ) confirmed the approval of all the proposals. Nevertheless, ACER noted that in the following point of the questionnaire, the NRA declared that Articles 52 and 53 are not applicable in CZ due to the lack of transmission-connected demand facilities.

44 DUR (DK) replied that the relevant entities handle structural data based on national regulation. The corresponding TSO does not need additional data and has not included structural data in its work for the time being. As regards proposals concerning Articles 44, 47, 50-52, DUR confirmed that they were initially sent for approval in March 2019, but further changes were requested.

45 ECA (EE) indicated that concerning the proposal on structural data exchange, it does not include rules on the protection data (Article 48(1)(e)) for type B power generating modules ('PGMs').[9] Hence, ACER infers that Estonian TSO excluded this data from the mandatory exchange, based on Article 48(1). Besides, ECA noted that the implementation of provisions in accordance with Articles 49, 52 and 53 is under consideration.

46 CNMC (ES) reported that although the implementation of Article 40(5) is pending, the scope of data exchange between TSO and SGUs had already been included in the national grid code that the NRA approved. Therefore, the TSO's proposals sent for approval constitute an update to the existing rules on data exchange. Moreover, regarding Article 51 and 53, CNMC reported partial implementation (provisions concerning real-time data have been approved).

47 HERA (HR) confirmed the approval of the proposals concerning Articles 44, 47 and 52 and noted that proposal on provisions in accordance with Article 51 awaits relevant approval. Remaining proposals have been partially approved.

48 MEKH (HU) argued that the terms and conditions required by Article 40(5) are included in the National Network Code stipulated by the Hungarian Electricity Energy Act and approved by the NRA. Hence, ACER infers that the respective provisions of Articles 44 and 47-53 were implemented in the national legal framework.

49 ILR (LU) claimed non-applicability. As discussed in previous sections, TSO in LU, which also has the role of the only transmission-connected DSO, finds the currently available data sufficient for its operation. ACER acknowledges that Articles 44 and 47-53 allow flexibility in setting provisions on the applicability and scope of the data exchange and understands the position outlined by the ILR.

50 PUC (LV) reported that the data exchange concerning the LV networks is based on agreements between relevant entities – those contracts either are already in place or will be concluded if needed. In addition, the national Network Code for the Electricity Sector specifies the overall conditions regarding Articles 47-50 and 52. ACER infers that the agreements mentioned by PUC include provisions referred to in Article 40(5). However, the SO GL stipulates that TSO should submit the draft proposals to the competent authority for an approval, unless determined otherwise by the Member State as per Article 6(4)(b). It is unclear whether Latvian legislation provides for the use of bilateral or multilateral contracts in that matter. Hence, ACER cannot assess the implementation of Article 40(5).The same conclusion applies to the implementation status in LT. NERC (LT) reported that the corresponding TSO implemented Article 40(5) through a transmission service agreement based on standard terms and conditions approved before the SO GL entered into force. NERC

[9] Power generating modules (PGMs) and their types hereinafter refer to the relevant terms laid down in the Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators, access at: http://data.europa.eu/eli/reg/2017/1485.

stressed that it has not assessed whether these terms and conditions comply with the applicable provisions.

51 Ei (SE) indicated that in its view, provisions in accordance with Article 51 are binding directly through the SO GL. Since the Swedish TSO did not provide otherwise, ACER infers that the scope and applicability of those provisions remain the same as in Article 51. Moreover, Ei noted that Article 44(h) and (i) are not applicable due to the TSO's decision within its discretional power and that the Swedish TSO intends to estimate generation in real-time based on the information on aggregated installed power production per energy source and per connection point in the observability area.-The NRA also pointed out that Article 50(2) applies to SGUs outside TSO's observability area alone. Moreover, regarding Article 50, TSO in SE decides on case-by-case basis whether certain real-time measurement values can be exempted or exempted from delivery for a limited time. The real-time data required from facilities that provide balance services is regulated in individual agreements with the balance service provider.

52 AGEN-RS reported that Articles 49 and 53 are not applicable because no PGM is identified as distribution-connected SGU (Article 49) and the relevant matter is regulated by contracts for the provision of ancillary services (Article 53). Furthermore, AGEN-RS indicated that the provisions of Article 50(1)(a) have not been approved without providing any further explanation over the implementation of the rules on the data exchange concerning status of the switching devices and circuit breakers at the connection point.

3.3 Implementation of the provisions on applicability and scope

53 NRAs were asked to indicate the implementation status of the adopted provisions on applicability and scope pursuant to Article 40(5). ACER could ascertain thereby whether approved provisions are binding or whether derogations and transitional periods apply. Figure 1 below provides a graphical summary of the collected answers.

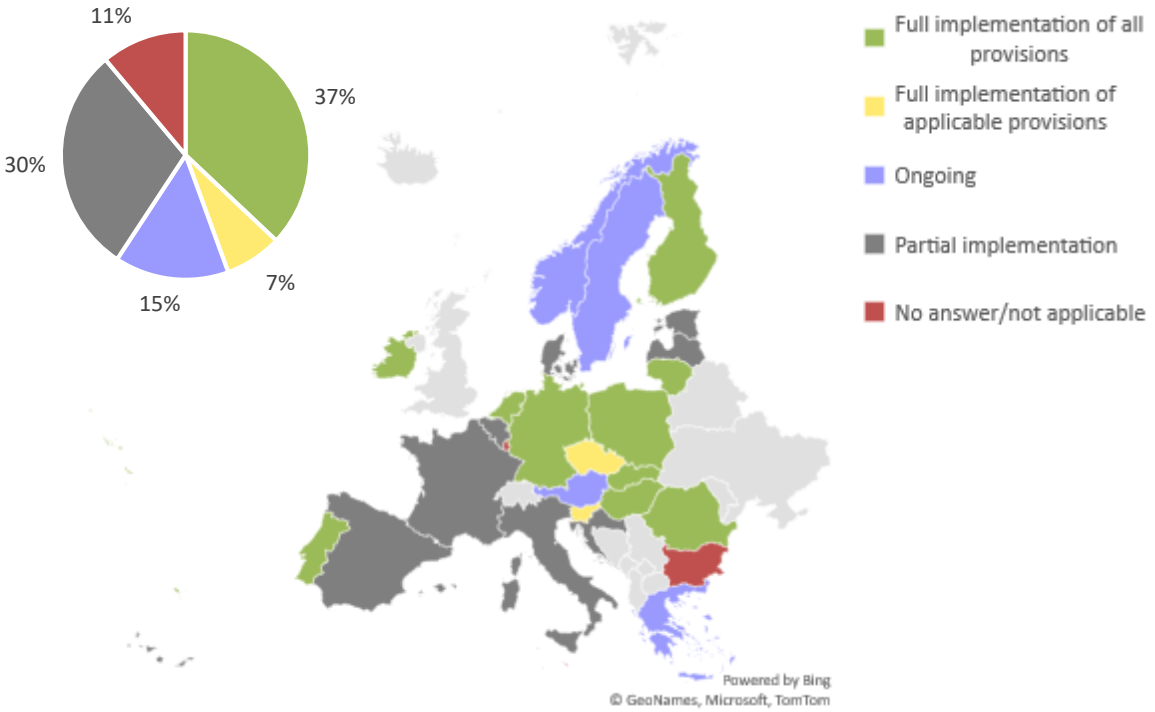


Figure 1. Implementation status of the provisions on applicability and scope

54 Ten NRAs confirmed that the provisions referred to in Article 40(5) are fully implemented (green areas in Figure 1).[10] AGEN-RS (SI) also confirmed full implementation; nevertheless, this NRA claimed non-applicability of Articles 49 and 53 in the reply to the previous question (analysed in Subsection 3.2.3), and hence, ACER understands that the default provisions on the data exchange of Articles 49 and 53 apply.

55 Similarly, ERO (CZ) noted that apart from Articles 52 and 53 that are not applicable, all provisions were implemented. ERO explained that since there are no transmission-connected demand facilities, Articles 52 and 53 do not apply. Nonetheless, as mentioned in Subsection 3.2.3, provisions in accordance with Articles 52 and 53 were approved by ERO, and hence, ACER understands that the approved rules would apply to those facilities, should they be established. CRE (FR) reported implementation with some provisions not binding (blue areas).

56 CREG (BE), DUR (DK), ECA (EE), CNMC (ES), CRE (FR), HERA (HR), ARERA (IT) and PUC (LV) reported partial implementation and further efforts to align national regulation with Article 40(5) (grey colour on Figure 1). CRE (FR) highlighted that the applicable provisions are fully implemented for generators, consumers and the main DSO (i.e., Enedis) but not for all the DSOs (ongoing).

57 E-Control (AT), RAE (GR) and NVE-RME (NO) and Ei (SE) reported that the implementation is ongoing with no provisions in force (yellow areas). E-Control indicated that the provisions are to enter into force on 1 December 2021. Ei confirmed that the approved provisions referred to in Article 40(5) have entered into force[11] and will be fully implemented.

58 Derogation has been only reported by ECA (EE) with regard to data protection. The mentioned derogation applies to type B PGMs in the structural data exchange under Article 48.

59 EWRC (BG) and REWS (MT) did not provide any answers (red areas).

3.4 Changes to the default rules on the data exchange

60 In accordance with Articles 44 and 47-53, TSOs have the right to develop provisions on data exchange diverging from the default rules laid down in those articles. Thus, ACER asked NRAs whether their respective TSOs exercised that right, and if so, how the adopted provisions differ from those of the SO GL.

61 According to the received input, TSOs from 15 Member States decided to apply fit for purpose data exchange rules instead of keeping the SO GL default rules.[12] Relevant answers are presented in Figure 2 below. Green bars indicate the number of Member States where TSOs designed stricter data exchange provisions than the requirements laid down in Articles 44, 47-53. Areas in yellow refer to the number of NRAs that reported less restrictive rules compared to those in the SO GL.

[10] BNetzA (DE), EV (FI), MEKH (HU), CRU (IE), NERC (LT), ACM (NL), URE (PL), ERSE (PT), ANRE (RO) and RONI (SK)

[11] Provisions referred to in Article 40(5) have been adopted in Swedish national secondary legislation (EIFS 2019:7).

[12] E-Control (AT), CREG (BE), ERO (CZ), BNetzA (DE), DUR (DK), ECA (EE), CNMC (ES), CRE (FR), HERA (HR), ARERA (IT), ILR (LU), URE (PL), ANRE (RO), Ei (SE), RONI (SK).

62 Reported additional requirements were largely heterogeneous across the Member States. NRAs indicated that the relevant parties are requested to provide: data regarding the status of the power plant relevant for emergency situations (ERO (CZ)), data on overall production (ARERA (IT)), data on frequency and voltage of DSO substations busbars and type B, C and D PGMs as well as specific data related to renewable generation (ECA (EE) and ANRE (RO)) or data on charging stations for electric vehicles (RONI (SK)).

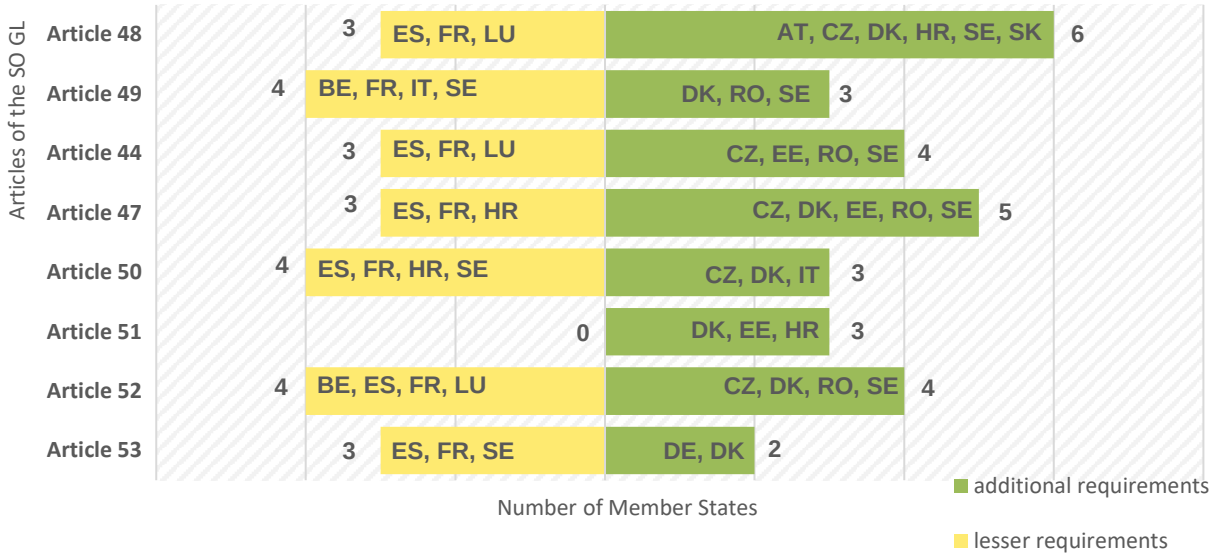


Figure 2. Changes to the default rules of the SO GL

63 Analogously, reported situations where TSOs set fewer requirements compared to the default rules of the SO GL vary to a large degree. NRAs reported that some data are not requested from SGUs (CNMC (ES) and CRE (FR)) or transmission-connected demand facilities only (CREG (BE)). Two NRAs (HERA (HR) and ILR (LU)) stated that since specific data are available to the TSOs, other entities are not requested to provide them.

64 According to Ei (SE), paragraphs (a) to (g) of Article 44 apply to measuring points within the TSO observability area. Moreover, DSOs should provide the data on the automatic voltage control status for shunt reactors and capacitors. At the same time, paragraphs (h) and (i) do not apply in SE. Regarding Article 50(1)(b), Ei replied that the requirements set by the corresponding TSO are lesser than in the SO GL.[13]

65 URE (PL) reported that in some cases, the corresponding TSO set additional data exchange requirements for the purposes of carrying out its processes. URE referred to the attached document on the scope of the data exchange.[14] EV (FI) informed that the national design of the data exchange rules is mostly in line with the SO GL. ACER cannot ascertain from this answer how Articles 44, 47-53 are implemented.

66 Three NRAs (MEKH (HU), NERC (LT) and PUC (LV)) replied that their respective TSOs did not exercise their right to provide for alternative arrangements for the scope of data exchange. As a result, adopted rules are as in the corresponding articles of the SO GL. It is worth noting that although AGEN-

[13] Swedish TSO requires data either on active and reactive power flows or current and voltage. In addition, the applicability is limited to the SGUs outside the TSO observability area, while the remaining SGUs submit the relevant data based on provisions referred to in Article 47(1).

[14] See Section 2.3 of Annex 1.

RS (SI) did not indicate that the data exchange provisions in SI vary from those of the SO GL, the TSO had not required data referred to in Articles 49 and 53 yet. According to AGEN-RS, the scheduled data exchange between TSOs, DSOs and distribution-connected PGMs (Article 49) is not needed as there is no distribution-connected SGU. In case of the data exchange between TSOs and distribution-connected demand facilities or third parties participating in demand response (Article 53), AGEN-RS explained that these data are not necessary at the moment.

67 Some of the NRAs (RAE (GR), ACM (NL), NVE-RME (NO)) indicated that the implementation process is ongoing. Similarly, HERA (HR) reported that the framework is still under preparation; nevertheless, HERA noted which changes to the default rules of the SO GL are envisaged.

3.5 High-level summary

68 ACER understands that Article 40(5) was fully implemented or partially implemented in about 70% of the monitored countries. However, the underlying provisions (Articles 44, 47-53) referred to in Article 40(5) provide for default data exchange requirements should the national implementation skip its implementation intentionally or fail to implement them. It is from this perspective reasonable to state that the legal framework for the data exchange, explained in paragraph 27, exists across all Member States.

4 Key organisation requirements, roles and responsibilities

4.1 Objectives

69 Organisational aspects of the data exchange provisions established in the SO GL are included in the all TSOs proposal on key organisational requirements, roles and responsibilities ('KORRR'). Article 40(6) lists the elements that should be covered by the KORRR (paragraphs (a) to (g)) and stipulates that KORRR shall apply to all the data exchange provisions of Title 2 Part II of the SO GL. The proposal developed in accordance with Article 40(6) is subject to the regulatory authorities' approval under Article 6(2)(a) of SO GL in the wording in force on the date of the KORRR submission.[15]

70 Therefore, ACER asked NRAs whether the KORRR has been approved in their respective Member States and, if so, what the implementation status is.

71 NRAs' responses in full are included in Section 3 of Annex I.

4.2 Implementation of the KORRR

72 Circulating the questionnaire, ACER requested more detailed information from the NRAs. NRAs were to clarify what is the KORRR implementation status, specify approval date or confirm whether the approval is pending, provide a web link, and identify the designated entity for the approval as per Article 6(2)(a). Provided answers concerning the implementation status are graphically presented in Figure 3 below.

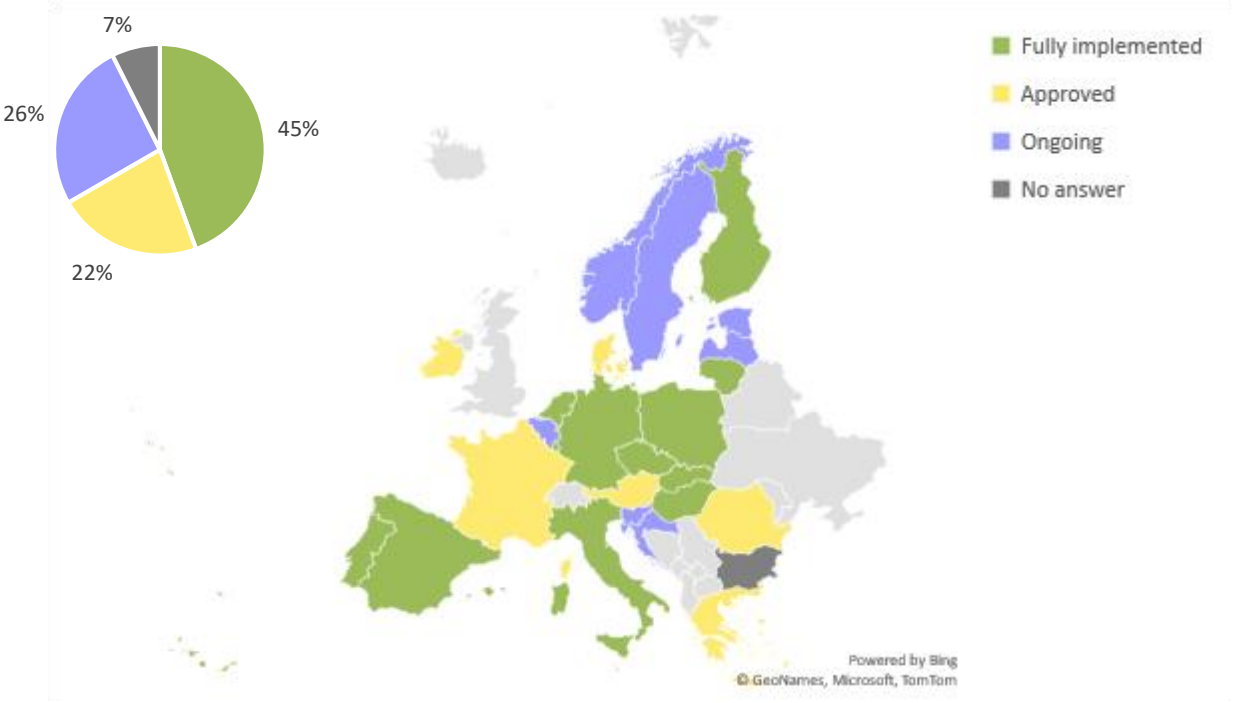


Figure 3. Implementation status of the KORRR

[15] This Article has been changed by Article 4 of the Commission Implementing Regulation (EU) 2021/280 (OJ L 62, 23.2.2021, p. 24) that confers the approval to ACER. In this Section, all references to Article 6(2)(a) refer to the wording in force before 23 February 2021 (OJ L 220, 25.8.2017, p. 1).

73 Further remarks provided by NRAs are noted below.

74 Ten NRAs (ERO (CZ), BNetzA (DE), EV (FI), MEKH (HU), ARERA (IT), ILR (LU), ACM (NL), URE (PL), ERSE (PT) and RONI (SK)) informed ACER of the full implementation of the KORRR with the approval issued within the deadline set by Article 7(1), i.e., 21 January 2019.[16] Full implementation has also been reported by CNMC (ES), however, NRA noted that KORRR has been approved with a significant delay (i.e., exceeding 30 days) (green areas in Figure 3).

75 ILR (LU) answered that in LU, national law on the organisation of the power market transposing the EU electricity directives lays down the legislative basis for the grid operators to impose or develop technical requirements for the connection of the network users. ILR highlighted that these technical requirements have been adapted to the technological progress as well as to the requirements from the different network codes.

76 NERC (LT) replied that KORRR had been implemented through different instruments, including contracts and that it has not reviewed whether the requirements of KORRR were met. Although ACER acknowledges the implementation report, it cannot ascertain whether NERC issued an approval in accordance with Article 6(2)(a) or whether the deadline of Article 7(1) was respected.

77 Six other NRAs[17] confirmed the timely approval of the KORRR, but the implementation process is still ongoing in their respective Member States. Ei (SE) indicated that the development of provisions on the data exchange is based on joint work between the TSO, DSOs and SGUs. Eight working groups were established following several seminars between the relevant parties. Each group drafts a separate report on a specific area of the data exchange and shall contain implementation methods. Ei expects this work to finalise by the end of 2021.

78 Moreover, approval with a significant delay has been reported by E-Control (AT) (yellow areas). CRE (FR) highlighted that the KORRR is fully implemented for generators, consumers and the main DSO (i.e., Enedis) but not for all the DSOs (ongoing).

79 CREG (BE) indicated different implementation phases for specific categories of provisions (dark blue colour on the map). It noted that the regulator had approved the details on the data exchange between SGUs and TSOs, with the latest decision issued in March 2021. Rules concerning the exchange between DSOs and TSOs, as well as the exchange of structural, balancing and real-time data between DSO-connected SGUs and TSOs are sent for approval to the competent entity. However, provisions on the scheduled data exchange between DSO-connected SGUs and TSOs are still in preparation.

80 Concerning Article 40(6)(a)-(g), ECA (EE) reported that the implementation process is in various stages for each element listed in in this article. The only approved provisions pertain to the obligations for TSOs and transmission-connected DSOs to inform of particular data changes as stipulated in paragraphs (a) and (b). ECA noted that the provisions referred to in paragraphs (d) to (g) are still under consideration. Regarding the implementation status of Article 40(6)(c), NRA stated that the Estonian TSO is not to decide on the data exchange between DSOs.

81 The answer provided by AGEN-RS (SI) suggests that the implementation involves coordination with TSOs of some neighbouring Member States (i.e., AT, HR and IT). AGEN-RS declared that KORRR had been fully implemented with Austrian TSO, sent for approval with Croatian TSO and is discussed

[16] For the date of the amended KORRR submission, see Section II of the Approval by all regulatory authorities from 19 December 2018 (https://www.ceer.eu/documents/104400/-/-/e35e2077-56f1-a02d-92fb-a836e6ba428b).

[17] DUR (DK), CRE (FR), RAE (GR), CRU (IE), ANRE (RO) and Ei (SE).

with the Italian TSO. ACER cannot ascertain how this process translates to the approval and implementation of the KORRR at the national level in SI.

82 HERA (HR), PUC (LV), NVE-RME (NO) confirmed that the KORRR is still under consideration in their respective countries without providing an estimated approval date (blue colour in Figure 3).

83 EWRC (BG) and REWS (MT) did not reply to this question (grey areas).

84 Finally, it is worth noting that although most of the NRAs stated that they are competent authorities for the approval as per Article 6(2), three NRAs (CREG (BE), ECA (EE) and AGEN-RS (SI)) answered otherwise. ECA replied that the competent authorities for approval are TSO, DSOs or SGUs,[18] while AGEN-RS defined that the TSOs are competent authorities. ACER notes that Article 6(1) explicitly establishes the obligation for the regulatory authorities to approve KORRR, and hence, the designation of other entities is deemed non-compliant.

4.3 High-level summary

85 ACER understands that KORRR was largely implemented in all the monitored countries. With regard to a few Members States, it is not possible for ACER to ascertain whether there is full implementation of certain KORRR obligations.

[18] Each paragraph (a) to (g) of Article 40(6) has a different set of entities.

5 Agreements between TSO and relevant DSOs

5.1 Objectives

86 According to Article 40(7), each TSO shall reach two agreements with the relevant DSOs. First, concerning effective, efficient and proportional processes for providing and managing data exchanges between the TSO and DSO, and second, on the format for the data exchange, without prejudice to the provisions of Article 40(6)(g).

87 Therefore, ACER asked NRAs three questions:

- First, whether both of these agreements had been concluded by each TSO and relevant DSOs or not – in case of the negative answer, NRAs were invited to motivate it;
- Second, if the agreements had been reached, when did the conclusion happen;
- Third, whether the text of both agreements had been published and if so, what is the web link.

88 NRAs' responses in full are included in Section 4 of Annex I.

5.2 Agreements on data exchanges between TSO and relevant DSOs

89 Article 40(7) establishes an obligation on TSOs to reach the agreements concerning effective, efficient and proportional processes for providing and managing data exchange and on the format for that exchange with the relevant DSOs. Agreements shall be concluded 18 months after the entry into force of the SO GL, i.e., the deadline was on 14 March 2019.

90 ACER queried NRAs whether this obligation had been fulfilled at the national level and whether TSOs and relevant DSOs had reached the agreements in a timely manner. Received answers concerning the conclusion of both agreements are presented in Figure 4 below.

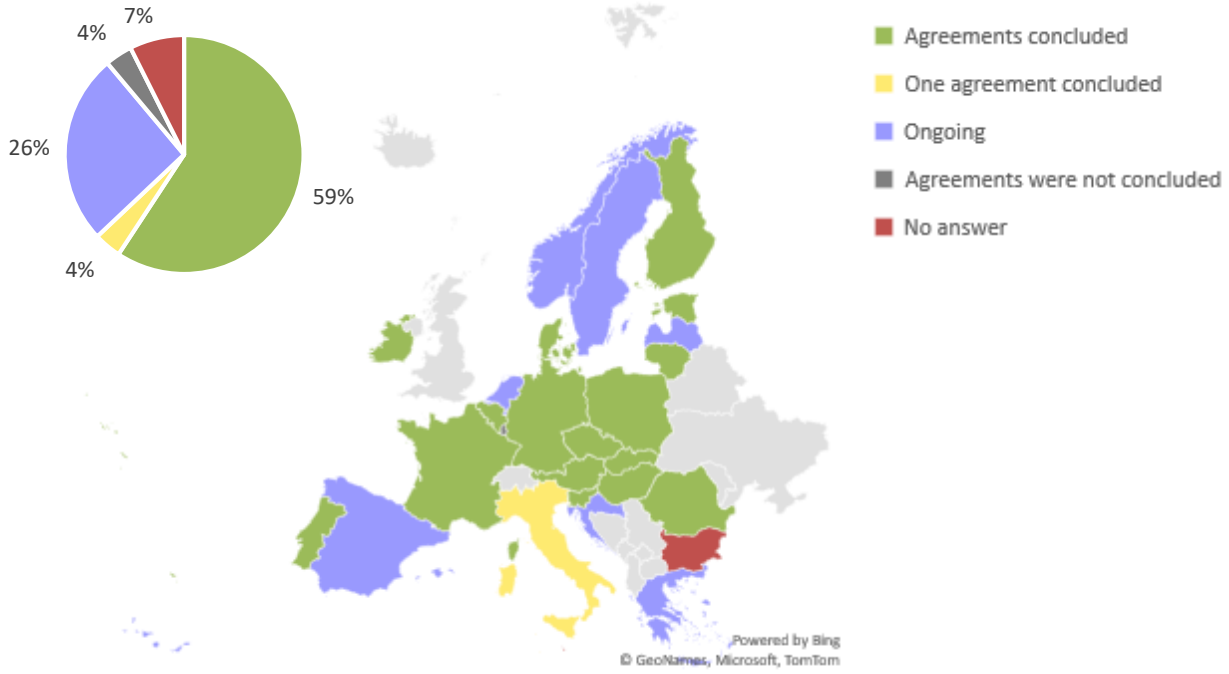


Figure 4. Conclusion of the agreements between TSOs and relevant DSOs

91 NRAs from 16 Member States confirmed the conclusion of both of the agreements referred to in Article 40(7) (green areas in Figure 4).[19] ERO (CZ), BNetzA (DE), DUR (DK), EV (FI) and MEKH (HU) reported that the agreements were reached without a significant delay (i.e., not exceeding 30 days).

92 ARERA (IT) indicated the conclusion of the agreement on managing data only. Thus, ACER infers that the agreement on the format of the data exchange has not been reached yet.

93 Concerning the request to provide a web link to the agreements, seven NRAs did not include any link.[20] E-Control (AT) confirmed that the agreements will be published later. Similarly, CRU (IE) reported that it again requested the relevant TSO to publish the relevant document. ECA (EE), MEKH (HU), NERC (LT) and ERSE (PT) argued that the text of both documents is not public. ERO (CZ) replied that there is no requirement to publish the agreements.

94 Agreements are still under consideration in eight monitored countries, according to the NRAs' input (blue colour in Figure 4).[21] These NRAs elaborated on the implementation efforts in their inputs and most of them foresee the conclusion of agreements in the near term.

95 ILR (LU) reported that its respective TSO (Creos) is a combined TSO and DSO covering 90% of the territory. According to ILR, information about load and generation available at substations connected to the Creos DSO grid are deemed enough to assess the security of the transmission system. Hence, ILR considers that there is no need for additional data transfers between Creos and other DSOs.

96 EWRC (BG) and REWS (MT) did not reply to this question.

5.3 High-level summary

97 In ACER's view, the implementation status concerning agreements on the data exchange between TSO and relevant DSOs is below expectations as the implementation in several countries is still outstanding.

[19] E-Control (AT), CREG (BE), ERO (CZ), BNetzA (DE), DUR (DK), ECA (EE), EV (FI), CRE (FR), MEKH (HU), CRU (IE), NERC (LT), URE (PL), ERSE (PT), ANRE (RO), AGEN-RS (SI) and RONI (SK).

[20] E-Control (AT), ERO (CZ), ECA (EE), MEKH (HU), CRU (IE), ERSE (PT) and AGEN-RS (SI).

[21] CNMC (ES), RAE (GR), HERA (HR), PUC (LV), ACM (NL), NVE-RME (NO) and Ei (SE).

6 General aspects of the data exchange

6.1 Objectives

98 Rules and responsibilities laid down in Part II Title 2 of the SO GL aim to establish a timely and adequate data exchange between TSOs, between TSOs and DSOs, and between TSOs or DSOs and SGUs (recital 11). The implementation of those rules and responsibilities shall be then robust across the Union and implies likely changes to the current national frameworks for the data exchange.

99 In relation to the implementation monitoring in the previous sections, ACER inquired with NRAs as to how significant were the changes implemented pursuant the SO GL provisions in three specific areas:

- *AREA A:* Determining the applicability and scope of the data exchange and the coordination between TSOs, DSOs and SGUs in this process as per Article 40(5);
- *AREA B:* Setting out and applying common key organisational requirements, roles and responsibilities in accordance with Article 40(6);
- *AREA C:* Concluding agreements between TSOs and relevant DSOs on effective, efficient and proportional processes for providing and managing data exchanges between them and on the format for the data exchange as per Article 40(7).

NRAs were invited to provide examples comparing the present setup to the one before the implementation of the SO GL.

100 Furthermore, as the exchange of information is carried out between TSOs, DSOs and SGUs, ACER asked which parameters are considered to define the responsibility of SGUs to exchange data and the level of that exchange.

101 NRAs' responses in full are included in Section 5 of Annex I.

6.2 Main changes following the implementation of the SO GL and the KORRR

102 The implementation of the data exchange framework laid down in the SO GL and KORRR might have led to a significant national change of the concerned rules and responsibilities. Therefore, ACER asked NRAs to assess the significance of the changes in three areas (related to paragraphs (5), (6) and (7) of Article 40, which reflect AREA A, AREA B and AREA C, respectively) in the scale: none, minor, intermediate and major. In addition, NRAs were requested to provide examples of requirements that significantly changed pursuant the SO GL and the KORRR implementation.

6.2.1 Significance of changes

103 Provided answers are summarized in Table 3 below. More details are available in Annex 1. For each defined area (A-C), four degrees of blue shading have been selected to represent the following scale of change significance:

a) Major significance (darkest blue shade)

b) Intermediate significance

c) Minor significance

d) No significance (palest blue shade)

In cases where NRAs indicated that the change could be classified between two degrees of the adopted scale, both colours were used.

Based on the collected results, in the last row of Table 3, ACER included average values for all the replying NRAs.

Table 3. Significance of changes pursuant to the implementation of the SO GL and the KORRR

	Significance of changes		
	AREA A - Article 40(5)	**AREA B** - Article 40(6)	**AREA C** - Article 40(7)
AT	Major / Intermediate	Intermediate	Intermediate
BE	Intermediate / Minor	Minor / None	None
BG	No reply	No reply	No reply
CZ	Intermediate	Minor	Minor
DE	Intermediate	None	None
DK	None	None	Major
EE	Minor	Minor	Minor
ES	Intermediate	Minor	Minor
FI	Minor	Minor	Minor
FR	Intermediate	None	Intermediate
GR	(ongoing process)	(ongoing process)	(ongoing process)
HR	Intermediate	Intermediate	Intermediate
HU	None	None	None
IE	None	None	None
IT	Major	Intermediate	Major
LT	None	None	None
LU	None	None	None
LV	Minor	Minor	Minor
MT	No reply	No reply	No reply
NL	Major / Intermediate	Major / Intermediate	Major / Intermediate
NO	(ongoing process)	(ongoing process)	(ongoing process)
PL	Minor	None	Major
PT	Minor	Minor	Minor
RO	None	Intermediate	Intermediate
SE	Major	Major	Major
SI	None	None	None
SK	Minor	None	None
Avg	Intermediate / Minor	Minor	Minor

104 More detailed insights from the NRAs answers are presented below.

105 E-Control (AT) estimated the adjustments required in AREA A as falling between intermediate and major significance.

106 In the same way, CREG (BE) described changes in AREA B as falling between minor to negligible (or non-existent) degrees. Moreover, CREG reported that in AREA A, the exchange of structural data and real-time data required only minor changes, while the exchange of scheduled data – intermediate changes.

107 Similarly, ACM (NL) assigned different levels of significance to the types of the data exchanged. In all the areas (A-C), changes to the exchange of structural data and scheduling data was assessed as major, while the implementation process related to the real-time data exchange posed a need for intermediate changes.

108 CNMC (ES) informed that the provided assessment of changes in AREA C refers to the existing framework, which is currently under consideration. CNMC indicated that after the review, the TSO and DSOs envisage more efficient exchanges.

109 RAE (GR) and NVE-RME (NO) confirmed that the implementation process in all the areas (A-C) is ongoing and did not indicate the significance of the foreseen changes.

110 Collected answers led ACER to estimate that NRAs found the alignment of existing legal frameworks the most challenging in AREA A, as the average reported degree ranges between minor and intermediate (as presented in the last row). This finding coincides with the analysis presented in previous sections, which found that implementation of the provisions on applicability and scope of the data exchange is outstanding in some cases.

111 On average, changes in the remaining areas (B and C) were assessed as minor with the higher value noted for AREA C. ACER deems that this may be attributed to the need for coordination between TSOs and relevant DSOs to strike both agreements referred to in Article 40(7) and subsequent revision of the DSOs' role.

6.2.2 Examples of changes

112 After examining examples of change provided by NRAs, ACER clustered them into three main groups, based on the most often mentioned changes: extension of the data exchange subject scope, standardisation of data exchange and data resolution.

113 First, concerning the extension of the subject scope, CREG (BE) explained that in AREA A, changes to the scheduled data exchange were more challenging than other types due to the broader scope of SGUs which need to participate. Currently, transmission-connected production synchronous PGMs and power park modules ('PPMs') are required to share scheduled data if their capacity is greater than or equal to 1 MW (lower than the 25 MW threshold prior to adopting the SO GL). Additionally, distribution-connected SPGMs and PPMs and demand facilities directly connected to the transmission system are now required to share the data (or will be required to do so). CREG flagged this change as an intermediate one.

114 ERO (CZ), also referring to AREA A, indicated that all SGUs connected to the 110-kV grid currently need to provide detailed data. In contrast, before, only some of the 110-kV grid users were subject to this obligation. As in the case of BE, ERO considers this change as an intermediate one.

115 CNMC (ES) reported that aggregates of units and demand facilities are now required to exchange data as they can provide system services. The need to widen the subject scope was also reported by ARERA (IT) – inclusion of distribution-connected SGUs and ANRE (RO) – new obligations for demand

response units, HVDC systems and PGMs with the capacity greater than or equal to 1 MW (lower than the previous 5 MW threshold). Similarly, Ei (SE) confirmed that static and dynamic power system models involve more actors.

116 Second, with regard to the standardisation of data exchange, ECA (EE) highlighted the importance of enhancing consistency. ECA confirmed the development of new data formats in EE. Nonetheless, the NRA assessed it as a minor change in all the areas (A-C).

117 ACM (NL) reported a shift from ad hoc exchanges to facility-specific questionnaires and indicated that in the future, the web-based platform is envisaged for the data provision. URE (PL) highlighted the difference between submission of the data through an IT system with the previous means of communication, including emails, letters or phone calls. URE recalled that it had been a major change in AREA C.

118 Ei (SE) noted that the Common Information Model (CIM) standard has been introduced and deemed this a major change compared to the previously limited exchange of static power system models.

119 Third, with respect to the data resolution, EV (FI) replied that the real-time data exchange rate was raised from 3 minutes to 1 minute. EV considers this change to be a minor one. The higher resolution of the scheduling and forecast data (15-minute frequency) was reported by ACM (NL).

6.3 Determination of SGUs' responsibility to exchange data

120 The SO GL lays down default rules, minimal requirements, and in some instances, exhaustive rules for the data exchange between TSOs or DSOs and SGUs. In principle, a national legal framework may customise the responsibilities of SGUs to exchange data and the level of that exchange in order to ascertain an appropriate operational security analysis. Hence, ACER asked NRAs to specify parameters considered in the definition of SGUs' responsibilities and the level of data exchange. The circulated questionnaire suggested four parameters – capacity, voltage, type of SGU and service provided. The reported deployment of parameters is presented in Table 5 and Figure 5 below.

121 The power parameter has been used widely to distinguish between SGUs required to provide individual data and aggregated data. However, NRAs declared the application of various thresholds. AGEN-RS (SI) reported that only aggregated data are required below 0.25 MW of installed capacity; above this value, SGUs shall provide individual data. In other Member States, this threshold has been set at the level of: 0.4 MW (CREG (BE)), 0.5 MW ECA (EE)),[22] 1 MW (ERO (CZ) and CNMC (ES)), 1.5 MW (Ei (SE)), 5 MW (NERC (LT)) and 12 MW (CRE (FR)). Power values below which SGUs are generally required to provide aggregated data only are gathered in Table 4.

	Aggregated data only
SI	<0.25 MW
BE	<0.4 MW
EE	<0.5 MW
CZ	<1 MW
ES	≤1 MW
SE	<1.5 MW
LT	≤5 MW
FR	<12 MW

Table 4. Thresholds

Parameter	**AT**	**BE**	**BG**	**CZ**	**DE**	**DK**	**EE**	**ES**	**FI**	**FR**	**GR**	**HR**	**HU**	**IE**
Power	x	x	-	x	x	x	x	x	x	x	-		x	
Voltage	x	x	-	x					x	x	-	x	x	
Type of SGU	x	x	-		x		x	x			-	x	x	x
Service provided		x	-			x			x	x	-	x		

Table 5. Parameters defining relevant SGUs

[22] Only the aggregation of real-time data is envisaged. From type C PGMs, detailed structural data are required.

122 EV (FI) also indicated that the individual data are required if the capacity exceeds 10 MW. However, this NRA noted that below this threshold, SGUs might also be requested to provide individual data.

123 ACM (NL) replied that relevant thresholds were assigned to different kinds of data. Type D PGMs must provide all data individually. Nevertheless, individual real-time data and scheduling data are required from SGUs with installed capacity above 1 MW.

124 The obligation of Type D PGMs to share individual data has also been reported by URE (PL). Moreover, URE confirmed that type B and type C PGMs should provide aggregated data only.

125 HERA (HR) stated that no aggregation is envisaged, while the data exchange requirements are linked to the type of PGMs.

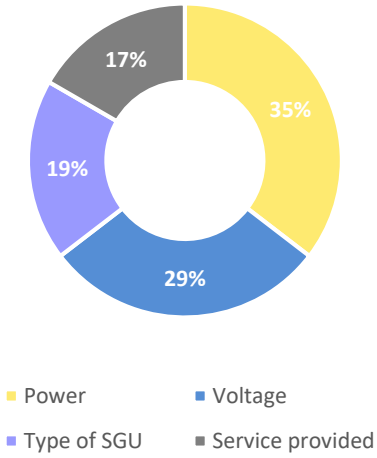


Figure 5. Proportion of the adopted parameters

126 DUR (DK) reported that SGUs with installed power below 3 MW are required to send less data (few signals) compared to SGUs with a capacity larger than or equal to 3 MW and not exceeding 25 MW. The latter SGUs shall send all data outlined in a complete signal list. ERSE (PT) noted that PGMs with installed capacity over 1 MW are responsible to exchange data.

127 ARERA (IT) explained that in IT, the power parameter is linked with the voltage parameter. As a result, in the case of real-time data, medium-voltage connected SGUs with a capacity exceeding 1 MW are required to provide individual data. As for other medium-voltage connected SGUs and low-voltage connected SGUs, only sample units will be defined to provide individual data.

128 Similar to the power parameter, the voltage level is generally considered to define SGUs that should share individual data. NRAs confirmed the adoption of the following thresholds for the mandatory provision of individual, non-aggregated, data: 63 kV (CRE (FR)), 70 kV (Ei (SE)) and 110 kV (EV (FI),[23] NERC (LT), ACM (NL),[24] ERSE (PT), URE (PL) and AGEN-RS (SI)).

129 The type of SGU is the parameter adopted in 13 Member States. Based on the NRAs' input, ACER concluded that the specific criteria and the resulting modifications to SGUs responsibilities vary to a large extent. For instance, particular demand units (in BE, ES and HR), existing users (in AT), SPGMs

IT	LT	LU	LV	MT	NL	NO	PL	PT	RO	SE	SI	SK	*Parameter*
x	x	n/a	x		x	-		x	x	x	x		**Power**
x	x	n/a			x	-	x	x	x	x	x	x	**Voltage**
	x	n/a			x	-	x	x	x				**Type of SGU**
x		n/a				-	x	x	x	x			**Service provided**

[23] EV (FI) stated that the respective individual data concern relevant circuit breaker and disconnector are required.

[24] ACM (NL) confirmed the adoption of a 110-kV threshold for the real-time individual data only.

and certain types of PPMs (in BE) and specific PGMs (in ES, HR,[25] IE, LT[26] and PL[27]) are required to share less data than other types of SGUs. ACM (NL) and RONI (RO) indicated that data exchange requirements were tailored to particular kinds of SGUs (producers and consumers, and generators by the energy source, respectively). ERSE (PT)

130 According to ten NRAs, the kind of data exchange obligations in their respective Member States depend on which services SGU provides. NRAs confirmed that data requirements are different for balancing service providers (CREG (BE), URE (PL), ERSE (PT), ANRE (RO) and Ei (SE)) and ancillary service providers (EV (FI) – for LFC, HERA (HR) and MEKH (HU)). ARERA (IT) mentioned that there are potential differences as well.

131 RAE (GR) and NVE-RME (NO) replied that the implementation process is still pending, while ILR (LU) claimed that since there are no SGUs identified in LU, this process has no applicability.

132 Section 5 of Annex I includes NRAs' answers in full.

6.4 High-level summary

133 The NRAs survey shows a wide range of different parameters considered to define the responsibility of SGUs to exchange data. For example, the threshold for the power parameter, when used to distinguish between SGUs required to provide individual or aggregated data, varies significantly across different countries (from 0.25 MW to 12 MW). This raises the question as to whether there is a level playing field established in the EU pursuant the SO GL.

[25] HERA (HR) reported the criteria differentiating between types B, C and D PGMs under the power parameter. However, for the overall consistency of the Report, and acknowledging voltage thresholds set out in Article 5 of NC RfG, they are classified here under the 'type of SGU' parameter

[26] NERC (LT) reported the criterion differentiating between transmission-connected and distribution-connected SGUs under the 'other' category. However, for the overall consistency of the Report, they are classified here under the 'type of SGU' parameter.

[27] URE (PL) reported the criteria differentiating between types B, C and D PGMs under the power parameter. However, for the overall consistency of the Report, and acknowledging voltage thresholds set out in Article 5 of NC RfG, they are classified here under the 'type of SGU' parameter.

7 Provision of data between TSO, DSOs and SGUs

7.1 Objectives

134 Articles 48-50 and 53 introduce default rules requiring the SGUs to provide data to both the TSO and the DSO to which the user has a connection point. Yet, these default rules may be revised and adjusted at the national level, and other data provision schemes can be adopted. Article 3(2) of the KORRR reiterates this competence and outlines the results of such revision. Furthermore, the SO GL and KORRR also left other aspects of the data exchange between TSOs or DSOs and SGUs to be tailored or decided in the national legal frameworks.

135 Hence, ACER asked NRAs ten questions related to this matter:

- Questions 1, 2 and 3 referred to the choice and implementation of the scheme for the data provision between TSO, DSOs and SGUs and the delegation of a third party for the data exchange;
- Question 4 regarded the aggregation of the SGU real-time data provided to the TSO;
- Question 5 was on the distribution-connected SGUs' data recipients;
- Question 6 concerned responsibility for the data exchange links;
- Question 7 was on the mode of the SGU data provision;
- Questions 8 and 9 regarded the DSOs' and TSO's access to the information; and
- Question 10 regarded the DSOs compliance with the provisions and deadlines referred to in Article 43(5).

136 NRAs' responses in full are included in Section 6 of Annex I.

7.2 Data exchange schemes between TSO, DSOs and SGUs

137 According to the default rule established in Articles 48-50 and 53, SGUs shall provide the relevant data to both the TSO and DSO. This rule applies unless otherwise provided in the national legislation. For this reason, ACER asked NRAs whether this data exchange scheme remained in place or had been modified. Moreover, NRAs were requested to clarify whether a third party is allowed to participate in the data sharing process.

138 In the circulated survey, ACER included three examples of the schemes for the data exchange (Figure 6). These examples consider possible designations of DSO, TSO, or both DSO and TSO as direct recipients of the SGUs data, and further data exchange as per Article 40(7), if necessary.

7.2.1 Implementation of the data exchange schemes

139 NRAs were queried whether the chosen scheme (or schemes) has already been implemented in their respective Member States for the exchange of structural data (Article 48), scheduled data (Article 49), real-time data (Article 50) and data provided by the SGUs participating in the demand response (Article 53). Received answers are presented in Table 6 below.

140 Each cell of Table 6 includes the direct recipients of the data provided by SGUs. In other words, the data exchange scheme adopted in each Member State is identified in Table 6 by the link between a

relevant system operator and SGU – an indication of both TSO and DSO as the direct and simultaneous recipients ('TSO&DSO' label in the table) refers to scheme A in Figure 6. The TSO as the direct recipient is considered in scheme B and conversely, the DSO is a direct recipient according to scheme C. The use of multiple schemes adopted in the Member State is denoted with "/" (e.g., 'TSO / DSO' means that both schemes B and C are applied in a country.

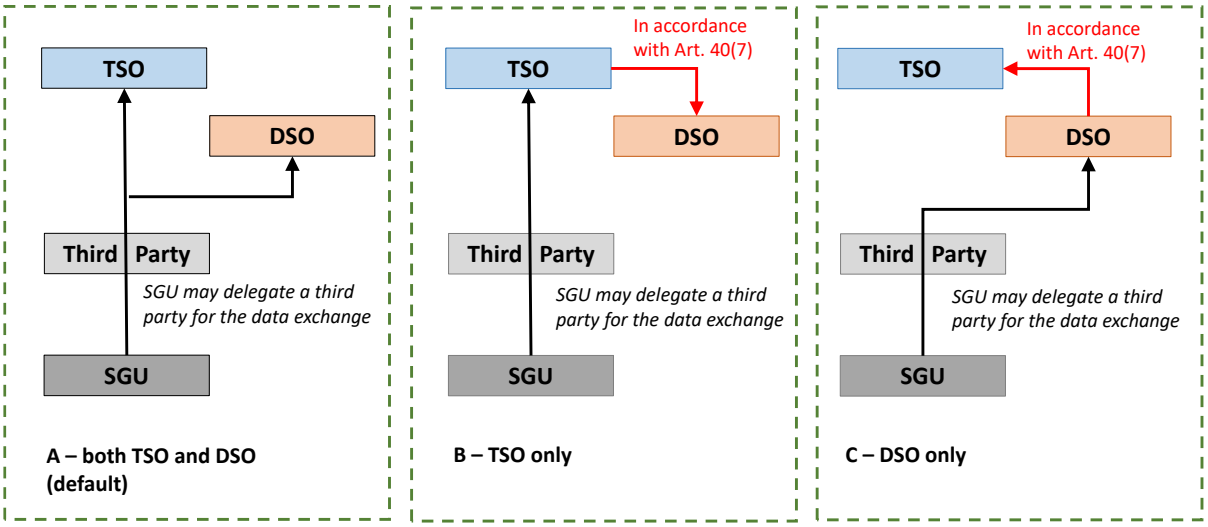


Figure 6. Data exchange schemes

141 Concerning the implementation status, for each of the four types of data presented in the columns of Table 6:

- The cells in green indicate that the data exchange scheme has already been implemented;
- The cells in yellow refer to situations when the scheme was determined in the Member State, but its implementation is ongoing;
- The cells in blue indicate that the potential data exchange schemes are still under consideration;
- The cells in red indicate the lack of relevant communication from the NRAs;
- The white cells refer to situations when NRAs reported no intention to implement any scheme at the national level.

142 ACER understands that in the Member States where no scheme has been put in place (white cells in Table 6), excluding FR, Articles 48-50 and 53 apply automatically. In other words, SGUs should provide the data both to the TSO and to the DSO (scheme A in Figure 6).

143 Based on the collected implementation data, ACER included in the last row of Table 6 a numerical indicator of the average[28] implementation status of data exchange schemes for types of data in each column.[29] The Mean Implementation Index (MII) is expressed in percent units, and it is calculated by dividing the number of the cells in green and white over 27, which accounts for all the monitored countries.

[28] Among the monitored countries.

[29] With the exception of the first from the left column, which simply indicates the monitored country.

Table 6. Implementation of data exchange schemes

	Structural data exchange	Scheduled data exchange	Real-time data exchange	Data exchange pursuant to Article 53
AT	DSO	DSO	DSO	DSO
BE	DSO	DSO	DSO	TSO&DSO / DSO
BG				
CZ	TSO&DSO / DSO	TSO&DSO / DSO	TSO&DSO / DSO	TSO&DSO / DSO
DE	TSO	TSO	DSO	TSO / DSO
DK	DSO	DSO	DSO	DSO
EE	DSO	TSO&DSO	TSO&DSO	TSO&DSO
ES	TSO&DSO / TSO	TSO	other	other
FI	TSO&DSO	TSO&DSO	TSO&DSO	TSO&DSO
FR	DSO	DSO	none	none
GR				
HR	DSO	DSO	DSO	TSO&DSO
HU	TSO&DSO	TSO	other	TSO&DSO
IE	TSO / DSO	TSO / DSO	TSO / DSO	TSO / DSO
IT	TSO&DSO	TSO&DSO	DSO	TSO&DSO
LT	DSO	DSO	DSO	none
LU	none	none	none	none
LV	TSO&DSO	TSO&DSO	TSO&DSO	TSO&DSO
MT				
NL	TSO / DSO	TSO / DSO	TSO / DSO	TSO / DSO
NO				
PL	TSO	TSO&DSO / DSO	TSO&DSO / DSO	other
PT	TSO&DSO	TSO&DSO	TSO&DSO	TSO&DSO
RO	TSO&DSO / DSO	TSO&DSO / DSO	TSO&DSO / TSO / DSO	TSO&DSO / TSO
SE	TSO	TSO	TSO / DSO	TSO / DSO
SI	(TSO / DSO)	(TSO / DSO)	(TSO / DSO)	none
SK	TSO&DSO	TSO&DSO	TSO&DSO / DSO	DSO
MII	70.4%	51.9%	66.7%	62.9%

144 A more detailed analysis of the NRAs' input is presented below and grouped into three most recurrent topics: correlation between adopted data exchange schemes and specific types of SGUs, real-time data exchange particularities and, finally, other arrangements governing data exchange.

145 First, concerning the types of SGUs' connection, two NRAs (CNMC (ES) and ACM (NL)) informed ACER that applied data exchange schemes vary depending on whether SGUs are transmission-connected or distribution-connected. CNMC (ES) specified that the former type of SGUs shall provide the data directly to the TSO, while the latter one to both TSO and DSO. ACM (NL) confirmed that transmission-connected SGUs shall provide the data to the TSO, while distribution-connected SGUs to the DSO; the distinction mentioned above applies to all data types (Articles 48-50 and 53);.

146 Assigning various data exchange models to specific groups of SGUs has also been reported by BNetzA (DE), URE (PL), ANRE (RO) and AGEN-RS (SI). BNetzA (DE) reported that regarding data exchange in accordance with Article 53, SGUs with installed capacity above 50MW, send the data directly to the TSO (in case of scheduled data provided by distribution-connected SGUs and all data transfers from transmission-connected SGUs) or directly to the DSO (in case of distribution-connected SGUs providing structural and real-time data). In PL and RO, the type of PGM is the criterion adopted to differentiate between direct addressees of SGUs data. URE[30] and ANRE[31] informed that type D PGMs should provide data to both TSO and DSO. In contrast, the same data of type B and C PGMs are exchanged according to the 'DSO only' scheme. AGEN-RS (SI) replied that depending on the voltage levels, SGUs are required to provide the data either to the DSO (for type B, C and D PGMs below 110 kV) or TSO.[32] However, ACER cannot ascertain whether the data acquired by the Slovenian TSO from the respective SGUs is shared with the DSO as in the 'TSO only' scheme.

147 ERO (CZ) indicated that the default data exchange scheme is 'DSO only' while 'both TSO and DSO' data exchange scheme is possible for SGUs providing balancing services.

148 Second, regarding distinct elements of the real-time data exchanges, CNMC (ES) reported that concerning the data referred to in Article 50, SGUs choose the direct recipient of the real-time data between providing them directly to both TSO and DSO or DSO only. This rule is without prejudice to the requirement for the SGUs providing ancillary services to share the data at least directly to the TSO. Ei (SE) noted that the choice of the direct real-time data recipient depends on the most suitable way regarding existing infrastructure and costs.

149 The link between direct real-time data recipient and provision of services has also been reported by MEKH (HU). NRA explained that type B PGMs send the data to the DSO only, except those SGUs that provide services. Nevertheless, ACER cannot infer which scheme applies for other types of PGMs and SGUs providing services.

150 Third, on the subject of other arrangements, AGEN-RS (SI) reported that no scheme had been adopted concerning data referred to in Article 53 without further elaboration on that matter. CRE (FR) replied that none of the data referred to in Articles 50 and 53 is required in FR. URE (PL) noted that the technical and commercial condition related to the exchange under Article 53 are subject to bilateral contracts between TSO and the concerned SGU; thus, ACER understands that the

[30] Note that URE (PL) indicated this distinction for the data referred to in Articles 49-50 only.

[31] ANRE (RO) informed of this differentiation in relation to the data referred to in Articles 48-50. ANRE clarified that with regard to the data referred to in Article 50, only distribution-connected type D PGMs should provide the data both to the TSO and DSO while transmission-connected type D PGMs to the TSO ('TSO only' scheme). As regards type C PGMs, power-generating facility owner, DSO and TSO should agree who will be a direct recipient of the data (i.e., DSO-only scheme or TSO-only scheme).

[32] For further details, see figures sent by AGEN-RS included in Annex 2.

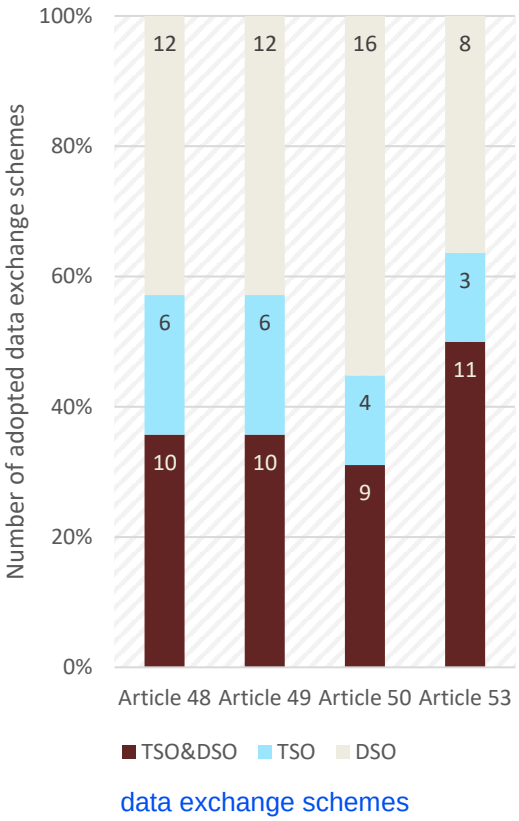
applicable schemes are decided on a case-by-case basis. NERC (LT) reported that since there are no SGUs providing demand response services in LT, there is no data exchange scheme in place.

151 With regard to the answer provided by CNMC (ES), ACER cannot ascertain whether the exchange of scheduled data referred to in Article 49 follows the 'TSO only' scheme or the one involving both TSO and DSO.

152 RAE (GR) and NVE-RME (NO) reported that the data exchange schemes are still under consideration..

153 As for the implementation status, ACER calculated the MII concerning the exchange of data types referred to in Articles 48-50 and 53. The index reached the following values given in the last row of Table 6: 70.4% (structural data), 51.9% (scheduled data), 66.7% (real-time data) and 62.9% (data related to the demand response). On average, it translates to data exchange schemes being adopted in 16 monitored countries (i.e., 59.3%).

154 Furthermore, Figure 7 presents computed proportions of the data exchange schemes applied for each data type. The results hint that the least preferred scheme is a 'TSO only' one. It mainly appears as an alternative to other schemes. Only BNetzA (DE) and Ei (SE) confirmed this scheme as the only applicable option for two types of data (i.e., structural and scheduled). The application of the other two data exchange schemes ('both TSO and DSO' and 'DSO only') are largely comparable. Their distribution is similar both globally (when they are envisaged as single applicable schemes or one of the alternative options) and in cases where they were adopted as the only applicable schemes for specific exchange.



155 Finally, it is apparent from Figure 7 that this comparability is limited in the case of real-time data exchange. Over 50% of possible data sharing arrangements related to Article 50 designates DSO as a direct recipient, and around 31% opt for data provision to both TSO and DSO.

7.2.2 Delegation of the third party by the SGUs

156 ACER asked NRAs whether SGUs may delegate a third party to exchange structural data, scheduled data, real-time data and data related to the demand response. If a third-party delegation was not allowed, NRAs were invited to elaborate on this issue.

157 ERO (CZ) replied that in accordance with the national legal framework, all grid users are responsible for providing all the data directly to the TSO or DSO, and hence, no delegation is allowed. CREG (BE) also reported that SGUs should directly provide the data to the TSO or DSO, but this applies to the structural and real-time data only. Similarly, DUR (DK) informed that third-party delegation is not allowed for structural data exchange because access to the relevant storage system is restricted to system operators only.

158 BNetzA (DE) informed ACER that in case of data exchanges governed by Articles 48, 49 and 50, the data transfer via a third party is allowed only for RES units. In case of data exchange in accordance with Article 53, all concerned SGUs may delegate a third party.

159 ECA (EE) reported that it cannot confirm whether the delegation in the case of structural data exchange is allowed without further explanation.

160 ARERA (IT) and URE (PL) replied that no third-party intermediation is foreseen for structural data exchange. URE argued that it should be provided by the device owner, who is the responsible entity and has complete information.

161 NERC (LT) did not provide any information on the third-party delegation concerning the exchange in accordance with Articles 48-50 and 53, while AGEN-RS (SI) did not report on delegation regarding scheduled data exchange.

162 Finally, the remaining NRAs that provided answers confirmed that SGUs can delegate a third party to exchange the concerned data.

7.3 Direct recipients of the distribution-connected SGUs data

163 Two previous sections pertain to the data exchange schemes and obligation to provide specific entities with relevant data. In this respect, ACER asked NRAs to determine whether distribution-connected SGUs bound to share information under Articles 48-50 may decide who is a direct recipient of their data.

164 The distribution-connected SGUs may decide on the direct data recipients only in four Member States (EE, ES, FI and RO) and may do so to varying degrees. ECA (EE) and EV (FI) did not report any restrictions for SGUs to choose the addressee of their data, and hence, ACER infers that all the distribution-connected SGUs may decide on that matter. CNMC (ES) noted that relevant users have the right to choose the recipient with the only exception for SGUs providing automatic frequency restoration reserves (aFRR), in which case real-time information must be directly sent (at least) to the TSO. Those SGUs could send real-time data to the DSO as well. Lastly, ANRE (RO) confirmed that only type C PGMs may agree with the TSO and DSO on who would receive the data directly. In other cases, provisions adopted at the national level bind SGUs regarding direct data recipients.

165 ILR (LU) replied that there is no SGU connected to CREOS grid[33] neither to a third-party DSO in LU.

166 RAE (GR) and NVE-RME (NO) noted that the matter has not been decided yet in their respective countries.

167 The remaining NRAs confirmed that national legal frameworks preclude the distribution-connected SGUs from deciding on the direct recipient of the data.

7.4 Responsibility for the data exchange links

168 The SO GL and KORRR do not establish which entities are responsible for the installation, configuration, security and maintenance of data exchange links between parties involved according to the schemes analysed in Section 7.2. In the absence of Union-wide harmonisation, those responsibilities shall be laid down in the national legal framework. Therefore, ACER queried NRAs, which parties (SGU, third party ('TP'), DSO or TSO) are required to install, configure, secure and maintain the exchange links.

[33] CREOS is the TSO combined with the only transmission-connected DSO in Luxembourg.

169 Input provided by the NRAs is presented in Table 7 below. NRAs were asked to determine the responsible parties for each exchange link in the predefined five cases (A-E) – see Figure 8.

Each column of Table 7 corresponds to one exchange link indicated by an arrow with the exchange link code, and the responsible parties are set down accordingly.

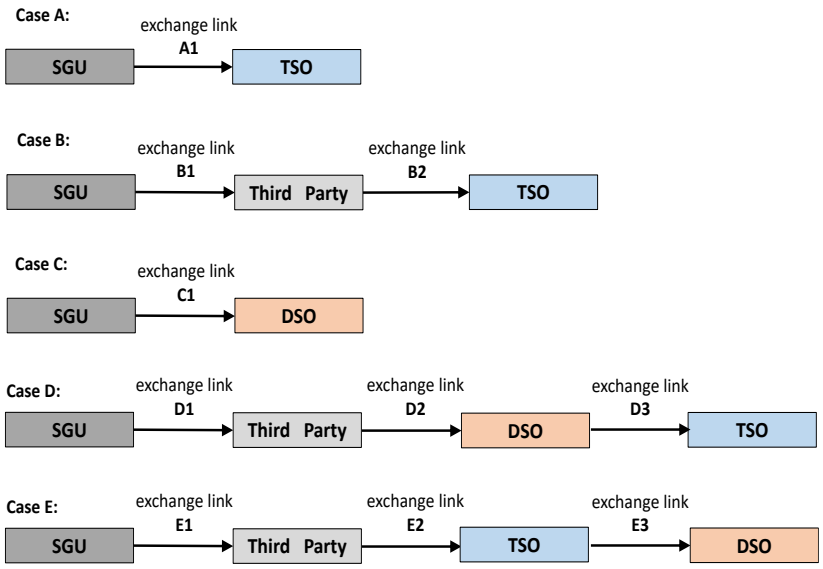


Figure 8. Predefined data exchange cases.

Table 7. Summary of parties responsible for exchange links

	Parties responsible for exchange links			
	SGU → EL A1 → TSO	SGU → EL B1 → TP	TP → EL B2 → TSO	SGU → EL C1 → DSO
AT	TSO	SGU	SGU	DSO
BE				
BG	no reply	no reply	no reply	no reply
CZ	SGU	-	-	SGU
DE	SGU and TSO	SGU and TP	TP and TSO	SGU and DSO
DK	TSO	SGU and TSO	TSO	DSO
EE	SGU	SGU	TP	SGU
ES	-	-	TP	-
FI	SGU and TSO	SGU and TSO	SGU and TSO	SGU and DSO
FR	TSO	SGU	TSO	DSO
GR	pending	pending	pending	pending
HR	SGU	-	-	SGU
HU	TSO	mostly TP	TSO	DSO
IE	SGU	SGU	SGU	SGU
IT	SGU	pending	pending	pending
LT	SGU	SGU	TP	SGU
LU	-	-	-	-
LV	?	-	-	-
MT				
NL	TSO	unknown	TSO	TSO and DSO
NO	pending	pending	pending	pending
PL	SGU	SGU	TP	SGU
PT	SGU	SGU	TP	SGU
RO	SGU and TSO	SGU and TP	TP and TSO	SGU and DSO
SE	TSO	SGU	TSO	DSO
SI	TSO	TP	TSO	DSO
SK	SGU	SGU	TP	SGU

	Parties responsible for exchange links					
	SGU → EL D1 → TP	→ EL D2 → DSO	→ EL D3 → TSO	SGU → EL E1 → TP	→ EL E2 → TSO	→ EL E3 → DSO
AT	SGU	SGU	DSO and TSO	SGU	SGU	TSO and DSO
BE						
BG	no reply	no reply	no reply	no reply	no reply	no reply
CZ	-	-	DSO	-	-	-
DE	SGU and TP	TP and DSO	DSO and TSO	SGU and TP	TP and TSO	TSO and DSO
DK	DSO	DSO	TSO	-	-	-
EE	SGU	TP	DSO	SGU	TP	TSO
ES	-	TP	DSO	-	TP	DSO
FI	-	-	-	-	-	-
FR	SGU and TP	DSO	TSO	SGU	TSO	DSO
GR	pending	pending	pending	pending	pending	pending
HR	-	SGU	DSO	-	-	-
HU	mostly TP	DSO	TSO	mostly TP	TSO	DSO
IE	SGU	SGU	DSO	SGU	SGU	TSO
IT	pending	pending	pending	pending	pending	pending
LT	SGU	TP	DSO	SGU	TP	TSO
LU	-	-	-	-	-	-
LV	-	-	-	-	-	-
MT						
NL	unknown	TSO and DSO	TSO and DSO	unknown	TSO	TSO
NO	pending	pending	pending	pending	pending	pending
PL	SGU	TP	DSO	SGU	TP	TSO
PT	SGU	TP	DSO	SGU	TP	DSO
RO	SGU and TP	TP and DSO	DSO and TSO	SGU and TP	TP and TSO	TSO and DSO
SE	SGU	DSO	TSO	SGU	TSO	TSO
SI	-	-	-	-	TSO	TSO
SK	SGU	TP	DSO	SGU	TP	TSO

170 Further remarks on the NRAs replies are presented below.

171 CREG (BE) reported that the entity providing the data are responsible for the exchange link as a general principle. However, CREG input also outlines specific rules: SGU, third party or service provider are responsible for structural and scheduled data; balancing service providers are responsible for the front-end link for real-time data in the flexibility framework. Responsibility for the metering data exchange lies with TSO or DSO.

172 ECA (EE) mentioned that in its view, the third party should be responsible for D2 exchange link. However, the only third parties currently operating in EE are balancing responsible parties. Should the SGU entitle another party to provide the data to the DSO, it may remain responsible.

173 EV (FI) clarified that identified parties are responsible for the exchange link from their own ends in cases A and B. The NRA noted that in case C, the TSO does not prescribe any data exchange scheme, and it is up to SGU and DSO to define. EV also stated that when it comes to cases D and E, they are not typically used in FI, but this may change in the future once more renewable energy generators connect to the distribution grid.

174 ANRE (RO) specified parties responsible for particular tasks related to the installation, configuration, security and maintenance of data exchange links. ACER notes that similar to situations reported by BNetzA (DE) and EV (FI), ANRE informed of shared responsibility between parties involved in the data exchange across certain links.

175 MEKH (HU) highlighted that parties responsible for links B1, D1 and E1 are determined based on the agreements between SGUs and third parties. However, most often, third parties ensure functioning of the communication link.

176 NERC (LT) reported that the entities listed in Table 7 are responsible up to the relevant connection point. For instance, in exchange link A1, the SGU is responsible up to the connection point to the transmission system.

177 Answer provided by ACM (NL) details parties responsible for each exchange link per data type. ACER notes that concerning scheduled and forecast data, the Dutch TSO is the only responsible party. The TSO is also active in most of the other arrangements, with three exceptions to the DSO that is responsible for structural data in exchange link D3 and real-time data in links C1 and D2. ACER also stresses that ACM (NL) did not identify responsible parties for some exchange links (most notably, C1 and D2).[34]

178 In the course of the analysis, ACER noticed some further issues. Primarily, they pertain to designating SGU as a responsible party for the exchange link between two other parties. This situation has been identified in AT, FI, HR and IE. However, referring to the exchange link B2, E-Control explained that SGU (and not a third party) is legally liable to provide system operators with the data, even if the third party is an actual data provider in cases B, D and E in Figure 8. ACER acknowledges this justification and infers that this is also a motivation behind identifying the SGU as the responsible party for links D2 and E2. EV (FI), HERA (HR) and CRU (IE) did not elaborate on the reasons for designating SGU as a responsible party for the exchange link between two other parties.

179 RAE (GR) and NVE-RME (NO) replied that the implementation is ongoing. Similarly, ARERA (IT) reported that parties responsible for exchange links in cases C-E are to be defined.

[34] Note that Table 7 aggregates NRAs' replies and lists all the reported responsible parties regardless of the exact scope of their responsibility.

180 EWRC (BG) did not respond to this question, while the answer from PUC (LV) does not allow ACER to ascertain which parties are responsible for exchange links.

181 Comparing the NRAs' answers with the input analysed in Section 7.2 ACER also noted some discrepancies. Three NRAs[35] did not identify parties responsible for some links, even though these links are parts of envisaged data exchange schemes. Hence, ACER cannot ascertain which parties are responsible for the following exchange links: A1 and C1 (ES), B1 and B2 (IT), and the link between DSO and third party (SI).[36]

7.5 Provision of SGUs' data to the TSO or to the DSO

182 Data exchange between SGUs and the TSO or DSO may include the individual data provision per SGU or some degree of SGU data aggregation. Hence, ACER asked NRAs how SGUs are required to send their scheduled, real-time and structural data to the TSO or the relevant DSO. The summary of provided answers is presented below in a series of figures (Figure 9 – Figure 11).

183 **Scheduled data.** As shown in Figure 9, the number of Member States with the requirement for individual provision of scheduled data (i.e., 11 countries) is almost the same as the number of Member States where aggregation is allowed in certain circumstances (i.e., eight Member States). Three NRAs reported that in their respective countries aggregation is allowed for specific kind of data: planned production (HR and SE), and market results and specific request for ancillary services provided through pilot project (IT). Three NRAs linked allowed aggregation with certain features of SGUs: type of PGMs (HU), balancing services provision (RO)[37] and connection to the distribution network (SI). CRU (IE) noted that data may be provided by an aggregator in specific cases without further clarification. EV (FI) indicated that it depends on the DSO decision whether data shall be delivered individually or aggregation is allowed.

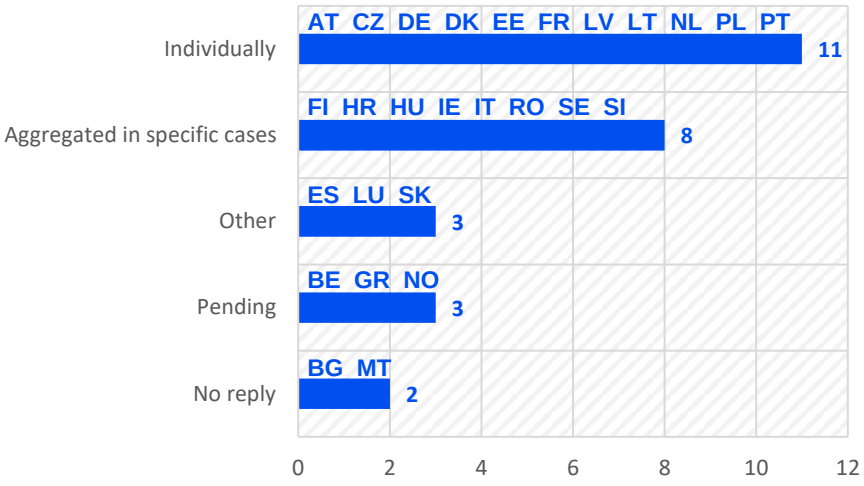


Figure 9. Modes of scheduled data provision by SGUs

[35] CNMC (ES), ARERA (IT) and AGEN-RS (SI).

[36] According to the answer provided by AGEN-RS (SI), scheduled data are transmitted from the DSO to a third party.

[37] ANRE (RO) replied that data aggregation concerns PGMs that do not provide balancing services. In some cases, aggregated data from units providing balancing services under reserve providing unit (RPU) or reserve providing group (RPG) is transmitted by relevant RPU or RPG.

184 CNMC (ES) reported that although scheduled data are provided per market unit and market participant as a general rule, aggregation is based on the power parameter. Further disaggregation is possible but only for operational security reasons and it should be aligned with real-time data disaggregation needs.

185 RONI (SK) replied that the rules adopted nationally include the entire spectrum of aggregation – from disaggregated, individual data per SGU to provision of aggregated data only. However, RONI did not explain in which circumstances those modes apply.

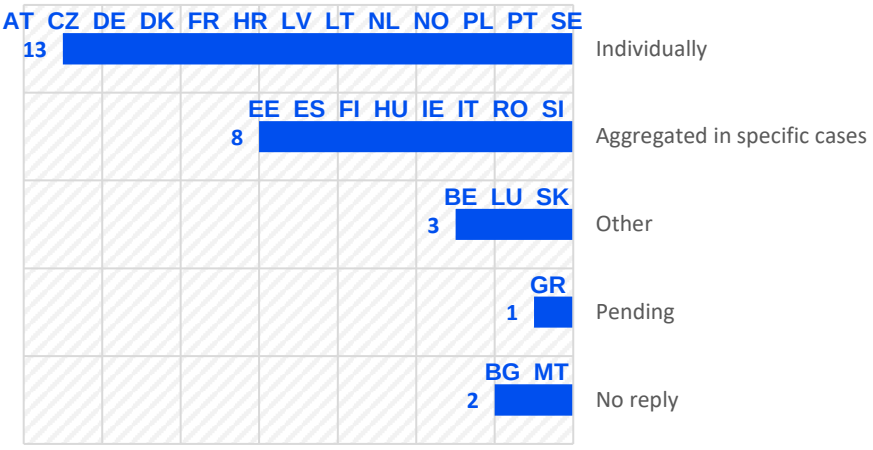


Figure 10. Modes of real-time data provision by SGUs

186 **Real-time data.** Figure 10 shows almost similar proportions between countries where SGU shall provide real-time data individually (i.e., 13 countries) and those which allow aggregation in some instances (i.e., 8 Member States). CNMC (ES) and AGEN-RS (SI) reported the use of power parameter in defining SGUs allowed to provide aggregated data. ECA (EE) answered that the DSO sends aggregated data, but data aggregation is possible only in specific cases. However, those cases were not identified by the NRA. ANRE (RO) reported that aggregation of data applies to type B PGMs connected to a substation, to PGMs with maximum capacity under 1.5 MW and, in some cases, to units providing balancing services. EV (FI), MEKH (HU), CRU (IE) and ARERA (IT) indicated the same circumstances for aggregation as presented in the analysis of Figure 9.

187 CREG (BE) mentioned that metering real-time data are collected through the TSO or DSO-owned metering infrastructure. ACER infers that in these cases SGUs are not required to provide the data. RONI (SK) repeated the answer provided for scheduled data exchange.

188 **Structural data.** Concerning the provision of structural data, NRAs input indicates a noticeable shift towards individual delivery of data per SGU. As presented in Figure 11, 18 countries confirmed this mode of data provision, while only four NRAs reported that in some instances, aggregation is possible. ANRE (RO) outlined that data aggregation is allowed in case of reserve providing unit or reserve

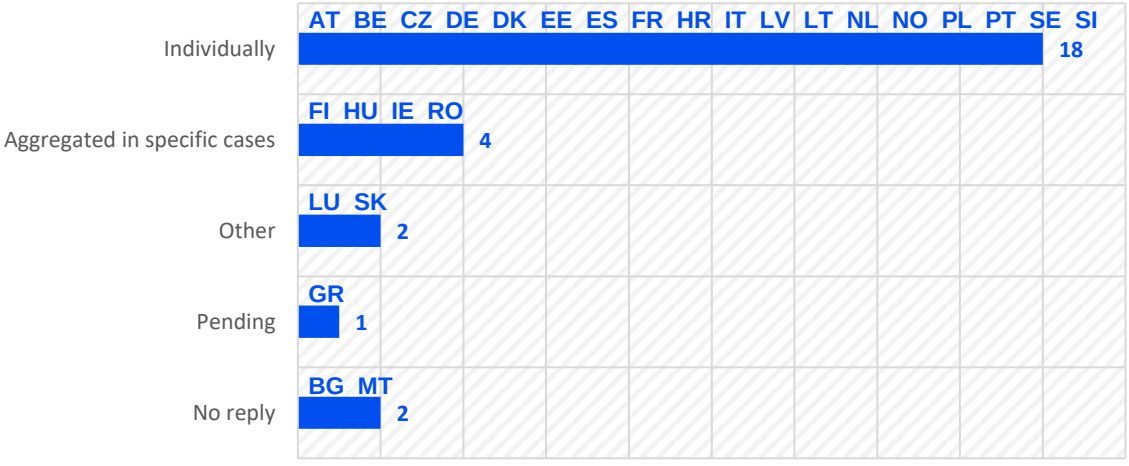


Figure 11. Modes of structural data provision by SGUs

providing group concerning frequency containment reserves ('FCR'), frequency restoration reserves

('FRR') and replacement reserves ('RR'). EV (FI), MEKH (HU) and CRU (IE) repeated replies included in the analysis of Figure 9 above.

189 As already mentioned in this section, RONI (SK) identified a variety of data provision modes in SK without clarifying when each degree of aggregation applies.

190 RAE (GR) and NVE-RME (NO) reported that the modes of data provision by SGUs are still under consideration. EWRC (BG) and REWS (MT) did not reply to this question.

191 ACER notes that none of the responding NRAs reported that SGUs shall aggregate all data subject to the exchange. Where it is allowed, the aggregation has solely been envisaged in specific cases.

7.6 Aggregation of the real-time data provided by SGUs to the TSO

192 According to Article 50(2), in coordination with the responsible DSOs, the TSO shall define distribution-connected SGUs that may be exempted from providing the real-time data as per Article 50(1) directly to the TSO. In such cases, relevant TSOs and DSOs shall agree on the SGUs' aggregated real-time data to be delivered to the TSO. ACER queried NRAs whether this Article has been applied and if so, which aggregated real-time data of the SGUs concerned shall be provided to the TSO.

193 Nine NRAs indicated that Article 50(2) had been applied.[38] E-Control (AT) informed of the use of a power parameter for determining SGUs exempted from providing individual real-time data. The threshold has been set at 1 MW as a general rule and 250 kW for solar power-generating facilities. Similar answers confirming general thresholds were provided by ERO (CZ) – aggregated data for PGMs under 1 MW – and AGEN-RS (SI) – aggregated data for SGUs under 250 kW.

194 MEKH (HU) and ANRE (RO) reported exemptions for type B PGMs. In HU, all type B PGMs are exempted from the obligation established in Article 50(1), and MEKH explained that DSOs send aggregated data to the TSO for each 132kV node, whilst ANRE specified that only type B PGMs connected to a single DSO substation are subject to the exemption in question.

195 URE (PL) confirmed the application of Article 50(2) for type B and C PGMs whilst the DSO sends the TSO individual or aggregated data. Since the latter implies two alternatives, ACER cannot ascertain whether all type B and type C PGMs are exempted from the obligation of Article 50(1).

196 ARERA (IT) reported that all low-voltage and medium-voltage connected SGUs below 1 MW are subject to the exemption. Yet, sample SGUs will be identified and requested to provide individual real-time data.

197 Exemptions have also been applied in DE and IE. According to BNetzA (DE), in specific cases data are aggregated on substation level without providing further elaboration. CRU (IE) set down SGUs subject to the exemption, i.e., all distribution-connected PGMs specified without a Remote Terminal Unit or similar means.

198 Ei (SE) reported that Article 50(1) applies to SGUs outside TSO observability area alone. As regards type B, C and D PGMs identified as SGUs within TSO observability area, they are subject to additional requirements regarding real-time data.

199 In the context of the SGUs' real-time data aggregation, ACER deems that the NRAs input on the question analysed in Section 6.3 is sufficiently detailed to consider it in the context of the application

[38] E-Control (AT), ERO (CZ), BNetzA (DE), MEKH (HU), CRU (IE), ARERA (IT), URE (PL), ANRE (RO) and AGEN-RS (SI).

of Article 50(2). ACER considers that the legal frameworks adopted in five other Member States effectively exempt specific SGUs from providing individual data to the TSO.[39]

200 Three NRAs (RAE (GR), HERA (HR) and NVE-RME (NO)) replied that possible aggregation of real-time data provided by SGUs to the TSO is still under consideration.

201 The remaining NRAs reported that the corresponding TSOs have not applied Article 50(2).

7.7 System operators' access to the information

202 The envisaged level of information accessible to DSOs and TSOs may vary across the Member States. This access, if granted, may cover the data either from the entire observability area of the system operator or only from relevant connection points. Other arrangements are also possible. ACER asked NRAs to what extent DSOs have access to the information of the transmission grid and TSOs to the information of the distribution grid in their countries.

7.7.1 DSOs' access to the information of the transmission grid

203 Answers provided by NRAs show that in eight Member States, DSOs have access only to the data from their connection point with the transmission networks.[40] DSOs in seven other Member States were granted access to all transmission grid information of their observability areas.[41]

204 Eight NRAs indicated other arrangements in place.[42] ERO indicated that DSO data access covers all information from the transmission system. CRU (IE) noted that DSO has access to all relevant transmission data referred to in Articles 48-50, as per Article 51(2).

205 A different data access model was reported by DUR (DK), EV (FI) and ACM (NL). According to the input from these NRAs, data are available to DSOs upon request. However, ACER cannot ascertain what information of the transmission grid may the DSO request and whether every request is granted.

206 ANRE (RO) answered that the DSO has access to the information from the connection point with the transmission network and all information of its observability area. Moreover, the DSO in RO has access to the information required from the TSO. Ei (SE) indicated that all DSOs within the TSO's observability area get access to the whole model.

207 ERSE (PT) replied that DSOs have access to structural, scheduled and real-time data on the connection point.

208 ILR (LU) argued that there are no SGUs in LU, rules outlining DSOs' data access are non-applicable.

209 REA (GR) reported that the issue is still under consideration.

7.7.2 TSO's access to the information of the distribution grid

210 Concerning the access to the distribution network data by TSOs, more NRAs reported full visibility within the relevant observability area, compared to the previous section. According to the NRAs' input, TSOs in 13 Member States have access to all information of their observability area as regards to the

[39] According to the input provided by CREG (BE), ECA (EE), CNMC (ES), EV (FI) and CRE (FR).

[40] EE, FR, HR, IT, LT, LV, NO and SK.

[41] AT, BE, DE, ES, HU, PL and SI.

[42] ERO (CZ), DUR (DK), EV (FI), CRU (IE), ILR (LU), ACM (NL), ANRE (RO) and Ei (SE).

distribution grid data.[43] HERA (HR) reported that in its view, relevant TSO has access to all the information of the observability area upon request.

211 Five other NRAs reported that – in some instances - TSOs are granted access to the information only from their connection point with the distribution network.[44] ECA (EE) mentioned that besides the data from the connection point, the Estonian TSO also receives the SGUs' data. NERC (LT) reported that the corresponding TSO has access to the information only from their connection point with the distribution network. ILR (LU) reiterated that the corresponding TSO has full visibility of the distribution grid operated by the combined TSO-DSO entity while retaining access to the information from connection points with the remaining DSOs in LU. ACM (NL) indicated that the TSO in NL has access to scheduling, forecast and real-time data from the connection point, whilst it might access the structural data upon request.[45] RONI (SK) confirmed that currently, the relevant TSO has access to the information from the connection point, but full visibility of its observability area is envisaged.

212 Similarly, CREG (BE) reported that its respective TSO accesses the real-time data only from the connection point with the distribution network. However, for structural and metering data in the framework of FCR and FRR activation, all information is available to the TSO.

213 According to the input from DUR (DK), the TSO's observability area extends to the primary side of TSO-DSO transformers, including circuit breakers. Moreover, the same NRA replied that all network elements above 10 MW/10 MVA are included. ACER thus infers that the TSO in DK has access to all the data from this extended observability area.

214 EV (FI) replied that information is accessible to the TSO upon request. However ACER cannot ascertain what information of the distribution grid may the TSO request and whether every request shall be followed up by DSOs. CRU (IE) reported that the TSO in IE has the access to all relevant distribution data referred to in Articles 48-50, as per Article 51(1).[46]

215 ERSE (PT) reported that the DSO provides structural, scheduled and real-time data only in special situations.

216 Implementation is still ongoing in GR and IT. Both RAE (GR) and ARERA (IT) confirmed that the matter is under discussion. ARERA indicated that the access to all information of TSO's observability area is envisaged. EWRC (BG) and REWS (MT) did not reply to this question.

7.8 DSOs' obligation to provide generating capacity of the type A power generating modules

217 Article 43(5) stipulates that at least once a year, each transmission-connected DSO shall provide the TSO, per primary energy sources, the total aggregated generating capacity of type A PGMs subject to requirements of the Regulation (EU) 2016/631 ('NC RfG')[47] and the best possible estimates of generating capacity of type A PGMs not subject to or derogated from NC RfG, connected to its distribution system, and the related information concerning their frequency behaviour. Thus, ACER

[43] AT, CZ, DE, ES, FR, HR, HU, LV, NO, PL, RO, SE and SI.

[44] ECA (EE), NERC (LT), ILR (LU), ACM (NL) and RONI (SK).

[45] Note that ACER cannot ascertain which level of structural data of the distribution grid may be covered by the TSO request.

[46] It is worth noting that CRU (IE) indicated that the TSO has access to transmission data. Yet, ACER believes that it was a typo and understands it as a reference to the distribution network data.

[47] See n 6.

asked whether transmission-connected DSOs comply with this provision, respect the applicable deadlines and if the resulting information is publicly available.

218 According to seven NRAs, the respective transmission-connected DSOs comply with the provisions and deadlines concerning the structural data exchange laid down in Article 43(5).[48] Five other NRAs confirmed the implementation of Article 43(5) and noted that relevant DSOs transmit the data more often than annually.[49]

219 ECA (EE) reported that since the corresponding TSO has access to most of the data, the DSO is responsible only to provide information on changes to PGMs at least once a year.

220 Answers from DUR (DK) and ARERA (IT) suggest that the provisions in question were implemented to some extent. DUR (DK) reported that DSOs report structural data when modules are commissioned or changed. Similarly, ARERA (IT) explained that the information is partially available as the corresponding TSO deduces them from the data on compliance with the NC RfG submitted when the plant enters into service. Based on this input, ACER deems that the transmission-connected DSOs in DK and IT do not comply with Article 43(5).

221 BNetzA (DE) reported that this data exchange had not been implemented because there was no need for such exchange in the presence of existing processes covering this information. CRU (IE) claimed that this provision is not applicable in IE as the observability area does not contain any DSO elements. However, ACER notes that Article 43(5) does not foresee these circumstances as a basis for the exemption from transmission-connected DSOs' obligation.

222 ILR (LU) reiterated that the TSO in LU is a combined TSO-DSO entity. Moreover, this entity is the only transmission-connected DSO in the country. ACER acknowledges that in this case, the internal data exchange meets the requirement of Article 43(5).

223 The implementation is still ongoing in five monitored countries.[50] Ei (SE) indicated that the compliance will be reached in 2022.

224 ACER notes that following the request in the survey, only six NRAs included weblinks to the information resulting from the obligation of transmission-connected DSOs to provide structural data under the analysed Article.[51] MEKH (HU) and BNetzA (DE) provided a link where format and data required by the TSO are outlined.

225 Finally, EWRC (BG), REWS (MT) and PUC (LV) did not provide a reply to this question.

7.9 High-level summary

226 ACER recognises considerable differences in the implementation of Articles 48-50 on the exchange of structural, scheduling, forecast and real time data across the EU; however, largely within the flexibilities provided by the SO GL.

227 Nevertheless, the implementation of Article 43(5), on DSOs' obligation to provide generating capacity of the type A power generating modules, remains outstanding in several Member States.

[48] I.e., E-Control (AT), CREG (BE), EV (FI), HERA (HR), ERSE (PT), ANRE (RO) and RONI (SK). Note that E-Control reported that some extensions are still under implementation.

[49] I.e., ERO (CZ), MEKH (HU), NERC (LT), ACM (NL) and URE (PL).

[50] ES, FR, GR, NO and SE.

[51] CREG (BE), ECA (EE), HERA (HR), NERC (LT), ACM (NL) and ANRE (RO).

8 KORRR related provisions

8.1 Objectives

228 Rules on data exchange outlined in the SO GL are further specified in the KORRR, according to Article 40(6) of the SO GL. The KORRR lays down detailed provisions concerning, among others, obligations for parties on the data exchange, contents of the data and information to be shared, including the type of data, communication means, format and standards to be applied, timing and responsibilities. These provisions are meant to compliment the rules set out in the SO GL and apply to relevant data exchange regulated therein.

229 With regard to the implementation of those specific provisions of the KORRR, ACER raised 18 questions in the NRAs' survey:

- Questions 1 and 2 concern the access to the SGU data covered in Article 5(1) and (2) of the KORRR;
- Question 3 relates to Article 6(4) of the KORRR and the real-time data exchange between TSOs as stipulated in Article 42(1) of the SO GL;
- Question 4 focuses on the definition of SGUs that shall provide real-time data in accordance with Article 6(5) of the KORRR;
- Question 5 concerns the exchange between TSO control areas as per Article 6(8) of the KORRR;
- Question 6 aims to monitor whether TSOs employ the Operational Planning Data Environment Platform in accordance with Article 6(9) of the KORRR;
- Question 7 deals with the duration of information storage defined by national legislation in accordance with Article 6(10) of the KORRR;
- Questions 8, 9 and 10 pertain to structural data used by TSOs as per Articles 7 and 8 of the KORRR;
- Questions 11-14 concern scheduled data used by TSOs as per Article 9 of the KORRR; and
- Questions 15-18 concern real-time data exchange in accordance with Article 10 of the KORRR.

230 NRAs' responses in full are included in Section 7 of Annex I.

8.2 Access to the structural information stored by the TSO and DSOs

231 Article 5(1) of the KORRR stipulates that each PGM, demand facility or closed distribution system operators ('CDSO') considered as an SGU according to Article 2(1) shall have access to the structural information referring to its facilities stored by the TSO or DSO. Hence, ACER asked NRAs to explain whether and how this provision has been implemented.

232 Most of the NRAs confirmed that relevant SGUs have access to their structural information. Eleven NRAs indicated that corresponding system operators that store the data, make them available on

demand[52] or through dedicated processes (e.g., online platforms).[53] Six other NRAs reported that SGUs are in the possession of the structural data in question because this information was included in the contracts with system operators and as contracting parties (they have copies).[54]

233 RAE (GR), PUC (LV), NVE-RME (NO), URE (PL) and Ei (SE) replied that implementation is ongoing. PUC, URE and Ei elaborated that the dedicated platform where SGUs can directly access the data are currently under development.

234 NERC (LT) reported that currently, it had not collected information regarding this issue.

235 Finally, ILR (LU) indicated that since there are no SGUs in LU, Article 5(1) of the KORRR is not applicable. EWRC (BG) did not answer this question.

8.3 DSO's access to the information of the SGUs connected to its distribution network

236 Pursuant to Article 5(2) of the KORRR, each DSO shall have access to the structural, scheduled and real-time information of the SGUs connected to its distribution network. Hence, ACER asked NRAs to explain how the respective DSOs may obtain this data.

237 The DSOs' access to the structural, scheduled and real-time data of distribution-connected SGUs has been confirmed by 16 NRAs.[55] However, specific frameworks and tools employed to share the data vary to a large extent among monitored countries. Five NRAs indicated at least a partial employment of dedicated online platforms for the data exchange.[56] Five other NRAs reported that the information is shared directly to the DSOs by SGUs.[57]

238 In seven Member States, the way through which the DSOs access the data depends on their type.[58] According to the NRAs' input, in BE, HR and PL, DSOs access structural data only through connection contracts. Yet, URE (PL) confirmed that exchange through a dedicated portal is envisaged.

239 Similar to the replies analysed in the previous section, ECA (EE) and EV (FI) answered that the data are accessible to DSOs on demand. RONI (SK) also confirmed the availability of information, however, the NRA did not elaborate on how the respective DSOs can access it. E-Control (AT) explained that the data exchange takes place between all DSOs in a cascade. ACER understands that there are embedded DSOs in AT and thus such data exchange seems reasonable. Yet, E-Control did not specify practical aspects of this data exchange.

240 DUR (DK) outlined that although the DSO has access to structural and real-time data, scheduled data are not accessible. The NRA confirmed that this matter is currently under consideration. An ongoing implementation has also been reported by RAE (GR), ARERA (IT) and Ei (SE). ARERA (IT) indicated that the foreseen general solution would be a direct data exchange between SGUs and DSOs. Ei envisages the use of a dedicated platform for structural data exchange with other types of data made available on demand.

[52] ECA (EE), CNMC (ES), EV (FI), CRU (IE), ARERA (IT), ERSE (PT), AGEN-RS (SI) and RONI (SK). CNMC (ES) reported that the TSO in ES is developing a dedicated communication platform.

[53] E-Control (AT), BNetzA (DE), ACM (NL) and ANRE (RO).

[54] CREG (BE), ERO (CZ), DUR (DK), CRE (FR), HERA (HR) and MEKH (HU).

[55] AT, BE, CZ, DE, EE, ES, FI, FR, HR, HU, IE, NL, PL, PT, RO and SK.

[56] BNetzA (DE), DUR (DK), ECA (EE), CRE (FR) and ANRE (RO).

[57] ERO (CZ), MEKH (HU), CRU (IE), ACM (NL) and URE (PL). MEKH reported that scheduled data from type C and D PGMs are shared with DSO by the TSO. ACM stressed that data could also be shared via the contracted service provider.

[58] BE, DE, DK, ES, FR, HR and PL.

241 NERC (LT) replied that currently, it does not have the required information.

242 Finally, ILR (LU), PUC (LV) and AGEN-RS (SI) reported that no distribution-connected SGUs have been identified in their respective Member States, and hence, Article 5(2) of KORRR does not apply. NVE-RME (NO) reported that implementation is ongoing. EWRC (BG) and REWS (MT) did not reply to this question.

8.4 Real-time data exchange between TSOs

243 Article 42(1) requires each TSO to exchange with the other TSOs of the same synchronous area ('SA') the following real-time data on the system state of its transmission system: frequency, frequency restoration control error, measured active power interchanges between LFC areas, aggregated generation infeed, system state in accordance with Article 18, setpoint of the load-frequency controller, and power interexchange via virtual tie-lines. This obligation has been reiterated in Article 6(4) of the KORRR. ACER asked NRAs to confirm whether their respective TSOs comply with Article 6(4) of the KORRR. Figure 12 graphically summarises the collected answers. Most of the NRAs (74% of the contacted NRAs, areas in blue in Figure 12) confirmed that the corresponding TSOs exchange real-time data referred to in Article 42(1) with other TSOs of the same SA.

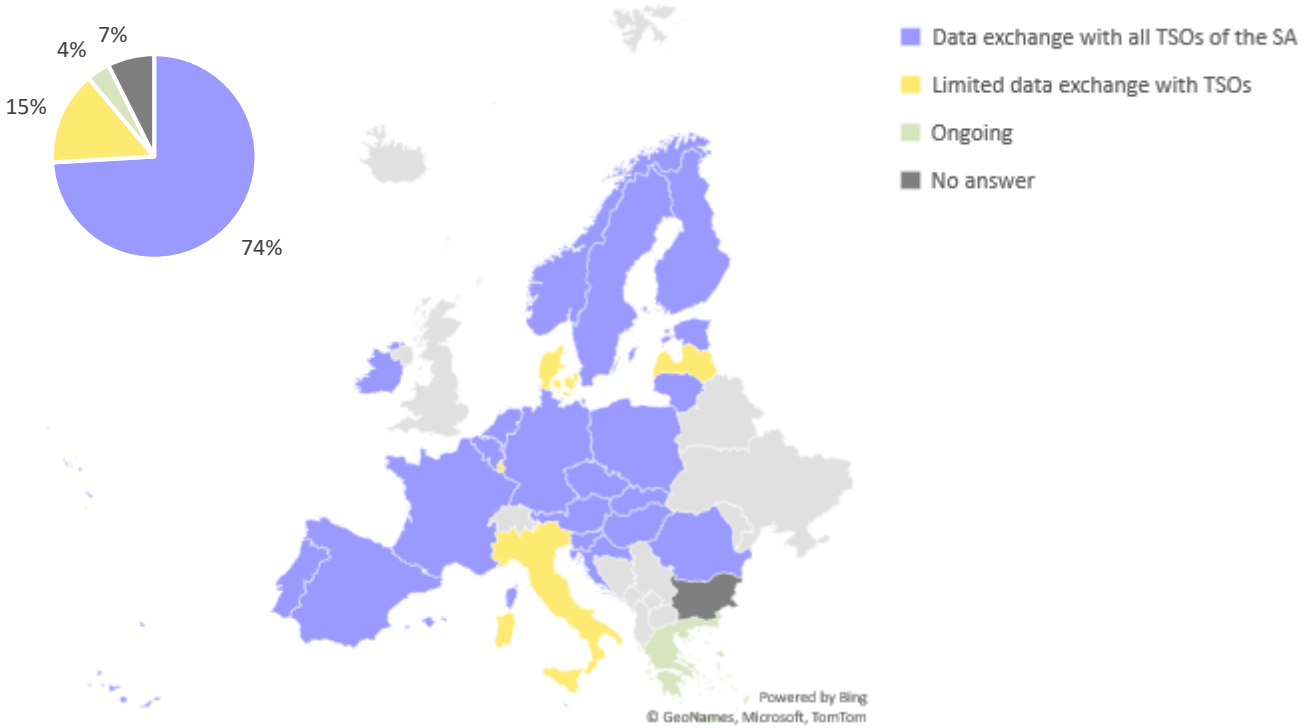


Figure 12. Real-time data exchange between TSOs

244 Replies of four other NRAs indicate a data exchange which does not appear fully compliant with the obligation laid down in Article 42(1) – yellow areas on the map.[59] ARERA (IT) reported that real-time data are exchanged with neighbouring TSOs, which seem not to include all the TSOs of the relevant SA. Similarly, DUR (DK) mentioned that the TSO shares real-time data with those TSOs with whom there is a cross-border connection, which creates a scope narrower than the one in Article 42(1).

[59] DUR (DK) ARERA (IT), ILR (LU) and PUC (LV).

245 ILR (LU) confirmed the real-time data exchange between the corresponding TSO (Creos) and one of the German TSOs (Amprion) takes place as Amprion operates the joint control area.

246 According to PUC (LV), the TSO in LV publishes information on aggregated electricity generation, the electricity system state, electricity exchange in virtual tie-lines and frequency. PUC did not indicate the existence of another data exchange. ACER notes that the reported real-time information sharing is limited to only some elements listed in Article 42(1), and hence, does not seem to comply with the relevant provisions.

247 RAE (GR) replied that the implementation process is ongoing (light green colour).

8.5 Determination of SGUs required to provide real-time data

248 Pursuant to Article 6(5) of the KORRR, each TSO, in coordination with the DSOs and SGUs, shall define which SGUs in its control area shall provide real time data. Definition of responsible SGUs is subject to approval of the competent regulatory authority or approval of the entity designated by the Member State. Hence, ACER asked NRAs:

- what are the criteria that the TSO had adopted to define the SGUs in its control area, which shall provide real time data, and
- whether these criteria had been set in coordination with DSOs and SGUs.

8.5.1 Criteria defining relevant SGUs

249 The establishment of criteria defining SGUs required to provide real-time data has been confirmed in 19 Member States.[60] Based on NRAs' inputs, in principle, ACER found reported criteria to refer to four parameters: capacity, voltage, type of PGMs, and the system of connection (i.e., transmission or distribution system). More detailed information on the criteria is presented in Section 7 of Annex I.

250 E-Control (AT), CNMC (ES),[61] EV (FI) and MEKH (HU) indicated the use of installed capacity as a criterion defining which SGUs shall provide the real-time data in accordance with Article 6(5) of the KORRR. Reported thresholds vary across the Member States; SGUs are required to provide the data if their capacity is: higher or equal to 1 MW (AT[62] and FI), higher than 1 MW (ES),[63] and above 5 MW (HU).

251 AGEN-RS (SI) reported that the criterion applied in SI is related to a voltage level. As a result, SGUs connected to 110 kV or higher voltage are subject to the requirement referred to in Article 6(5) of the KORRR. CREG (BE) and ARERA (IT) declared using both capacity and voltage in setting criteria defining relevant SGUs. CREG noted that decentralized generating units larger than 5 MW and connected to medium voltage (≥30 kV) are required to provide the real-time data, while ARERA replied that this requirement applies to medium voltage-connected units of capacity higher or equal to 1 MW.[64]

[60] AT, BE, CZ, DE, DK, EE, ES, FI, FR, HU, IE, IT, LT, LV, PL, PT, RO, SI and SK.

[61] CNMC (ES) indicated capacity-based criterion as proposed by the TSO and relevant DSOs. However, this proposal awaits the approval of the Ministry (competent authority).

[62] According to E-Control (AT), this threshold applies to the new power plants, excluding solar power plants. More details and other values are reported in Annex I.

[63] According to CNMC (ES), a proposal of this threshold has already been implemented in ES for defining the national data exchange requirements. However, a threshold of 100 kW is also discussed.

[64] ARERA (IT) stressed that the TSO might request some units below these thresholds to provide the real-time data as sample units.

252 DUR (DK), ECA (EE) and URE (PL) confirmed that SGUs required to provide real-time data are defined by PGM type, as per Article 5(2) of the NC RfG. All three NRAs indicated that type B, C and D PGMs are subject to the requirement referred to in Article 6(5) of the KORRR.

253 ERSE (PT) reported another approach, namely, defining SGUs required to provide real-time data based on the inclusion of the concerned PGMs in the restoration plans.

254 CRE (FR) and CRU (IE) replied that all transmission-connected SGUs are required to provide the real-time data. Concerning distribution-connected users, CRE explained that none of them is considered SGU. In contrast, CRU confirmed that PGMs connected to the distribution system are requested to provide the data.

255 Replies provided by ERO (CZ), HERA (HR), NERC (LT) and ANRE (RO) suggest that all SGUs defined in accordance with Article 2 are required to share real-time data.

256 RAE (GR), NVE-RME (NO) and Ei (SE) indicated that the implementation of this Article is ongoing.

257 ILR (LU) reported that since SGUs were not defined, Article 6(5) is not applicable in LU.

258 ACM (NL) did not reply to this question.

8.5.2 Coordination with DSOs and SGUs

259 Article 6(5) of the KORRR sets the requirement for the TSOs to establish relevant criteria in coordination with DSOs and SGUs. Following the analysis of NRAs' input, ACER found that 15 NRAs[65] confirmed involvement of both DSOs and SGUs in the process of the establishment of those criteria. Results are graphically presented in Figure 13.

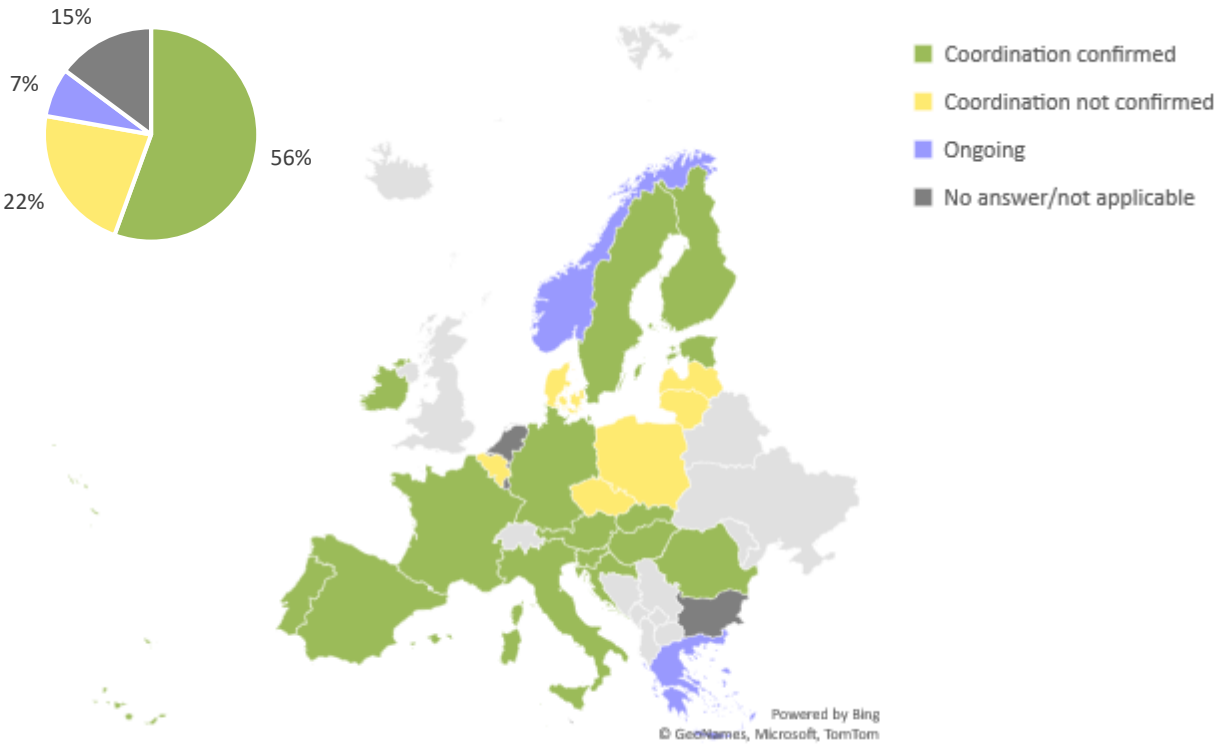


Figure 13. Coordination of criteria establishment in accordance with Article 6(5)

[65] E-Control (AT), BNetzA (DE), CNMC (ES), EV (FI), CRE (FR), ECA (EE), HERA (HR), MEKH (HU), CRU (IE), ARERA (IT), ERSE (PT), ANRE (RO), Ei (SE), AGEN-RS (SI) and RONI (SK).

260 Six NRAs did not confirm that the corresponding TSOs coordinated with both DSOs and SGUs (yellow areas in Figure 13).[66] CREG (BE) reported that the criteria were set in coordination with DSOs.

261 ACM (NL) did not reply to this question. ILR (LU) claimed that the legal obligation to coordinate with DSOs and SGUs does not apply in their respective Member State, as there is no need for real-time data exchange under Article 6(5) of the KORRR.

8.6 Data exchange between TSO control areas

262 According to Article 6(8) of the KORRR, all transmission and distribution data to be exchanged between TSO control areas shall be exchanged only through TSOs unless otherwise required by national legislation or specific agreements. Therefore, ACER queried NRAs whether data are exchanged only through TSOs or applicable rules require otherwise.

263 In all countries where this exchange between TSO control areas was confirmed, data are shared through TSOs exclusively.[67] RAE (GR) answered that this matter is still under consideration, and thus, the implementation is pending.

264 ACER notes that no NRA reported deviation from the default rule set in Article 6(8) of the KORRR.

8.7 Employment of the Operational Planning Data Environment Platform

265 Article 114(1) tasks ENTSO-E with implementing and operating an ENTSO-E Operational Planning Data Environment ('OPDE') for the storage, exchange and management of all relevant information by 24 months after entry into force of the SO GL. Pursuant to Article 6(9) of KORRR, TSOs shall use the OPDE for the exchange of data required in accordance with Articles 114-117 of SO GL. Hence, ACER asked NRAs if corresponding TSOs employed the OPDE to exchange structural and scheduled information.

266 Based on the NRAs' inputs, ACER infers that in 21 monitored countries, the respective TSOs exchange relevant structural and scheduled data with other TSOs through OPDE.[68] However, CNMC (ES), CRE (FR), ILR (LU) and ERSE (PT) commented that the platform is not fully operational yet (the current version is not stable), even though ENTSO-E should implement it by 14 September 2019 in accordance with Article 114(1). Also, the reply provided by CREG (BE) suggests that not all the data referred to in Articles 115-117 are shared through the platform, while the NRA explained that TSO uses OPDE in line with the ENTSO-E recommendations. CRE (FR) indicated that the respective TSO also uses an Outage Planning Coordination Tool which is common to other TSOs concerned.

267 CRU (IE) replied that Irish TSO has an all-island energy management system and an all-island system operations team that deals with matters relating to the exchange of structural and scheduled information on an all-island basis. Thus, the TSO does not consider the use of OPDE beneficial for the all-island purposes and deems that the exclusive use of OPDE would be limiting. ACER notes that the applicable provisions of the SO GL and KORRR refer to the data exchange between TSOs which goes beyond SA arrangements. Additionally, employment of the OPDE does not prevent TSOs from additional data exchanges.

268 Ei (SE) raised that the issues of the information security have to be resolved before OPDE is employed by the TSO. For the time being, the Swedish TSO shares data as per the implementation

[66] CREG (BE), ERO (CZ), DUR (DK), NERC (LT), PUC (LV), URE (PL).

[67] I.e., AT, BE, CZ, DE, DK, EE, ES, FI, FR, HR, HU, IE, IT, LT, LU, LV, NL, NO, PL, PT, RO, SE, SI and SK.

[68] I.e., AT, BE, CZ, DE, DK, EE, ES, FI, FR, HR, HU, IT, LT, LU, LV, NL, NO, PL, PT, RO and SI.

guidelines issued by the Nordic regional security coordinator, which are in line with the harmonised formats, where possible.

269 RONI (SK) reported that the OPDE is not fully implemented yet. Currently, the data are provided manually.

270 RAE (GR) replied that this matter is still under consideration.

8.8 Duration of the electronical storage of information

271 According to Article 6(10) of the KORRR, each TSO shall electronically store the information needed for its processes for the duration defined by national legislation. Hence, ACER asked NRAs to indicate what time period is defined at the national level for electronical data storage.

272 11 NRAs replied that the national legislation defines duration for data storage.[69] Four other NRAs mentioned that even though national legislation does not provide for the storage of information, TSOs follow internal procedures and store the data needed for their processes.[70] Time durations applied in those 14 Member States are summarised in Table 8.

273 In five monitored countries, TSOs are required to store data for ten years (DE, LT, SE and SI) or even longer (HR). MEKH (HU) confirmed that the national legislation provides for the storage of information and requires storing it for at least eight years. ACM (NL) and ECA (EE)[71] reported that the relevant duration is seven years, while CRU (IE) replied that data should be maintained for not less than six years. In DK,[72] FR, PT,[73] RO,[74] and SK, TSOs shall store data for five years, while URE (PL) indicated that the period should be longer than five years. Lastly, duration of at least three years has been reported by CNMC (ES).

	Duration of storage
HR	10 years+
DE	10 years
LT	10 years
SE	10 years
SI	10 years
HU	8 years+
NL	7 years
EE	7 years
IE	6 years+
PL	5 years+
DK	5 years
FR	5 years
PT	5 years
RO	5 years
SK	5 years
ES	3 years+

Table 8. Data storage duration

274 National legislation does not define duration for electronical data in seven monitored countries.[75] Respective NRAs did not mention whether TSOs store the data needed for their processes under other frameworks.

275 RAE (GR) and PUC (LV) reported that the implementation of Article 6(10) of the KORRR is still pending. CREG (BE) did not answer to this question.

8.9 Structural data used by TSOs

276 Article 40(7) lays down general rules for setting requirements for data exchange between TSOs, DSOs and relevant SGUs. These provisions are further specified in Article 7 of the KORRR concerning the format, detailed content and templates for the exchange of structural data used by

[69] I.e., BNetzA (DE), ECA (EE), HERA (HR), MEKH (HU), CRU (IE), NERC (LT), ACM (NL), ANRE (RO), Ei (SE), AGEN-RS (SI) and RONI (SK).

[70] I.e., DUR (DK), CNMC (ES), URE (PL) and ERSE (PT).

[71] ECA (EE) noted that data is stored if needed for accounting.

[72] DUR (DK) reported that national legislation does not specify the duration, but the TSO stores data voluntarily.

[73] ERSE (PT) reported that national legislation does not specify the duration, but the TSO stores data according to its internal procedures for at least five years.

[74] ANRE (RO) specified that structural data are stored for five years, while real-time data for two weeks only.

[75] AT, CZ, FI, IT, LU, PT and NO.

TSOs. Additionally, Article 8 of the KORRR outlines the process of reviewing received data that are later shared with other TSOs.

277 From the implementation monitoring perspective, ACER notes that Article 7 of the KORRR distinguishes between requirements that each TSO ought to fulfil and rules that may be modified by TSOs.

278 The aggregated results of the survey are presented in Table 8. Shading of cells has only been adopted for columns representing mandatory requirements set out in Article 7(1) and (2) of the KORRR (i.e., specification of format and determination of the content of structural data exchange):

- The cells in green indicate that the format or content of structural data exchange have been determined;
- The cells in yellow refer to situations where the implementation is pending;
- The cells in red indicate the lack of relevant communication from the NRAs.

8.9.1 Structural data provided by the DSO

279 ACER inquired NRAs about the implementation status of Article 7(1) of the KORRR concerning requirements for the provision of structural data by DSOs. Regulators were asked to describe the format specified by TSOs and the type of data requested for the exchange and indicate whether the templates for structural data shared by DSOs have been published. In accordance with Article 7(1), publication of templates for the structural data that DSOs shall provide is not mandatory.

280 NRAs' replies are presented in Table 8.

Table 8. Requirements for structural data used by TSOs

	Requirements for structural data exchange					
	Data provided by the DSO			Data directly provided by SGUs		
	Format	Content	Template	Format	Content	Template
AT			not published			not published
BE			published			published
BG			no reply			no reply
CZ			not published			published
DE			published			published
DK			published			published
EE			published			published
ES			published			published
FI			not published			not published
FR			published			published
GR			ongoing			ongoing
HR			ongoing			ongoing
HU			published			published
IE			published			published
IT			published			published
LT			not published			not published
LU	n/a	n/a	n/a	n/a	n/a	n/a
LV			ongoing			
MT			no reply			no reply
NL			not published			not published
NO			published			published
PL			not published			not published
PT			not published			not published
RO			published			published
SE			ongoing			ongoing
SI			published			published
SK			published			published

281 Most of the NRAs confirmed that at least one element of requirements for DSOs' structural data provision had been specified by the respective TSOs. In a number of monitored countries, format and content of data exchange are outlined in national grid codes[76] or directly in contracts between TSO and DSOs.[77]

282 Templates for the structural data that DSOs shall provide have been published in 13 monitored countries.[78] E-Control (AT) and ERO (CZ) replied that the templates had not been published since they are known to the relevant parties through agreements, whereas NERC (LT), ACM (NL) and URE (PL) mentioned that DSOs are informed of the templates through internal processes.

283 According to NRAs' input, the implementation of Article 7(1) of the KORRR is ongoing in GR, HR, LV NO and SE. CNMC (ES) indicated that although the structural data are currently exchanged, the national implementation of relevant rules has not been finalised yet. Similarly, URE (PL) answered that the present format for data exchange would change upon implementing the Portal of Structural Data Exchange.

284 ILR (LU) claimed that Article 7(1) of the KORRR is not applicable in LU since CREOS is a combined TSO-DSO entity. ACER recognises that Article 7 contains provisions ancillary to the general rules establishing the data exchange. And thus, since the TSO in LU decided not to exchange data with distribution-connected DSOs, ACER acknowledges the claim raised by ILR.

8.9.2 Structural data provided directly to the TSO by SGUs

285 As regards structural data exchange, NRAs were also asked about the implementation status of Article 7(2) of the KORRR. According to this provision, TSOs shall specify the format and may publish templates for structural data that transmission-connected SGUs and distribution-connected SGUs exchanging data directly with the TSO shall provide. Moreover, the specified format or template shall include the detailed content of the structural data. In accordance with Article 7(2), publication of templates is not mandatory. Results of the analysis are presented in Table 8 above.

286 Responses from the majority of contacted NRAs confirm the establishment of at least one of two requirements that each TSO shall specify pursuant to Article 7(2) of the KORRR. Relevant format and content of structural data exchange with SGUs are determined in national grid codes[79] or in agreements.[80] ERO (CZ) and ECA (EE) highlighted that depending on whether SGUs are connected to the transmission or distribution system, the basis for data sharing (ERO) or the data exchange process (ECA) varies.

287 According to NRAs' responses, templates for structural data that SGUs exchanging data directly with TSOs shall provide have been published in 14 monitored countries.[81] E-Control (AT), NERC (LT), ACM (NL) and URE (PL) indicated that since relevant parties are aware of templates through some internal communication or coordination, they were not published.

288 Four NRAs (RAE (GR), HERA (HR), NVE-RME (NO) and Ei (SE)) reported that the implementation process is ongoing, while E-Control (AT) indicated that the data format is under development. CNMC (ES) reiterated that although the structural data are currently exchanged, the national implementation

[76] E.g., MEKH (HU), CRU (IE), ARERA (IT) and ACM (NL). ACM reported that the grid code provides a general description of exchanged structural data.

[77] E.g., CREG (BE), ERO (CZ), EV (FI), CRE (FR) and AGEN-RS (SI).

[78] BE, DE, DK, EE, ES, FR, HU, IE, IT, NO, RO, SI and SK.

[79] E.g., MEKH (HU), CRU (IE), ARERA (IT) and ACM (NL). ACM reported that the grid code provides a general description of exchanged structural data.

[80] E.g., EV (FI), CRE (FR) and AGEN-RS (SI).

[81] BE, CZ, DE, DK, EE, ES, FR, HU, IE, IT, NO, RO, SI and SK.

of relevant rules have not been finalised yet. Similarly, URE (PL) answered that the present format for data exchange would change once the Portal of Structural Data Exchange is in operation.

289 ILR (LU) claimed that Article 7(2) is not applicable in LU, since there are no SGUs identified in the control area of the corresponding TSO.

8.9.3 Notification of changes

290 Pursuant to Article 8(1) of the KORRR, each TSO shall review the structural information it shares with other TSOs at least every six months. Each TSO shall provide updated information of the observability area to the neighbouring TSOs as defined in agreements between TSOs involved. If the relevant circumstances are not defined in the agreement, the catalogue of Article 8(1) applies.

291 ACER asked NRAs to outline the process adopted by TSOs that implements provisions of Article 8(1). Moreover, NRAs were asked when did the last review occur.

8.9.3.1 Process adopted by the TSO

292 NRAs from 22 monitored countries confirmed that corresponding TSOs implemented structural data review process as per Article 8(1) of the KORRR.[82] Reported modes of notifying changes vary between Member States, as some TSOs utilise the OPDE (mainly, in the processes delivering individual grid model and common grid model),[83] other resort on the Outage Planning Coordination ('OPC')[84] or even procedures linked to the Ten-Year Network Development Plans ('TYNDPs').[85]

293 Specific regional cooperation arrangements have been indicated by three NRAs.[86] CRU (IE) reported utilisation of an all-island Energy Management System and collaboration in the form of the System Operations team. PUC (LV) replied that Baltic TSOs developed Data Exchange Rules that set out the process of the changes' notification.

294 ILR (LU) claimed that Article 8(1) of the KORRR is not applicable as there are no SGUs identified in LU. In ACER's view, there seems to be no reason for such non-applicability as the provision of Article 8(1) of the KORRR extends beyond the considerations regarding SGUs and provides for the TSOs' review of the structural information exchange before any planned significant modifications in the network elements.

295 RAE (GR) and NVE-RME (NO) indicated that the implementation of Article 8(1) of the KORRR is ongoing. did not provide answer to this question.

8.9.3.2 Last review of the structural data

296 Article 8(1) of the KORRR stipulates that the review of structural data shall be carried out at least every six months. Hence, ACER aimed at ascertaining whether each TSO ran the last review within this period. Answers provided by NRAs were assessed as of 31 August 2021. Results of the monitoring are graphically presented in Figure 14 below.

[82] AT, BE, CZ, DE, DK, EE, ES, FI, FR, HR, HU, IE, IT, LT, LV, NL, PL, PT, RO, SE, SI and SK.

[83] E.g., reported by E-Control (AT), CREG (BE), DUR (DK), MEKH (HU), HERA (HR), URE (PL) and AGEN-RS (SI).

[84] Reported by ERO (CZ) and CRE (FR).

[85] Reported by HERA (HR).

[86] I.e., ECA (EE), CRU (IE) and PUC (LV).

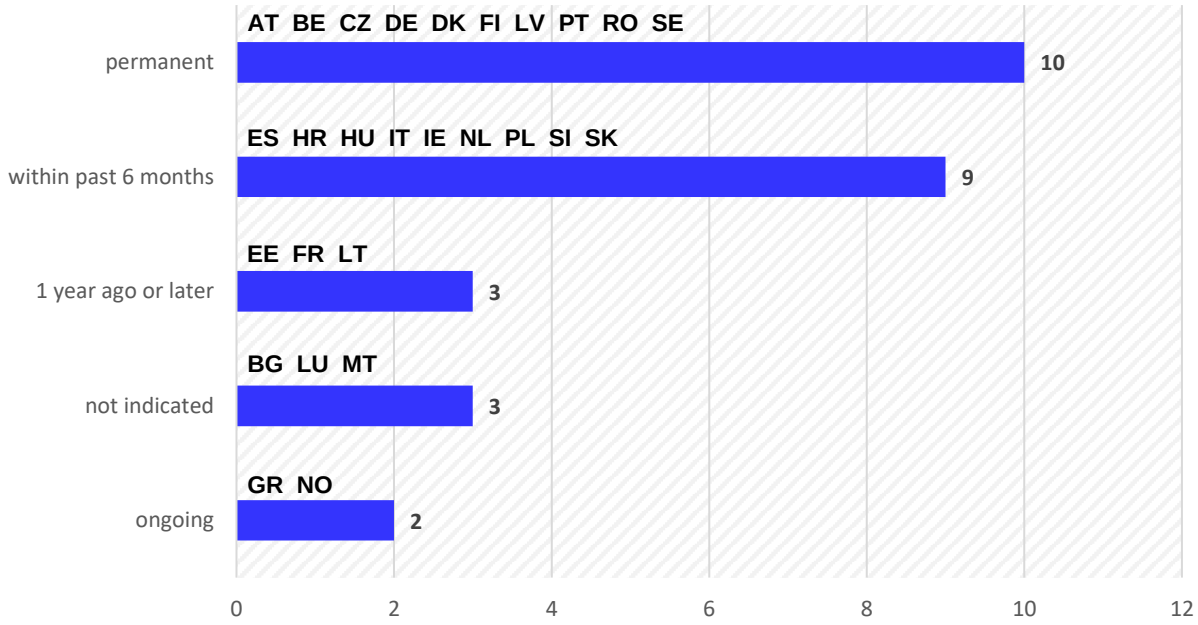


Figure 14. Last review in accordance with Article 8

297 E-Control (AT), CREG (BE), ERO (CZ), BNetzA (DE) DUR (DK), EV (FI), PUC (LV), ERSE (PT), ANRE (RO), and Ei (SE) indicated that corresponding TSOs review structural data occurs regularly.

298 Answers from nine NRAs confirm that the last review occurred within the past six months.[87] However, these reports do not necessarily reflect the general frequency of TSO-ran reviews of structural data. AGEN-RS (SI) noted that Slovenian TSO carries out this process annually in the course of developing a yearly model. A similar answer has been submitted by URE (PL). CNMC (ES)[88] and RONI (SK) reported that their respective TSOs ran reviews every 6 months, while ARERA (IT) and CRU (IE) indicated that the review occurs, at least, every 4 months and 3 months, respectively.

299 ECA (EE) replied that the corresponding TSO ran the last review at the end of 2020, CRE (FR) and NERC (LT) indicated that the process is carried out on annual basis. CRE also reported that the process is performed on demand, while its respective TSO envisages to adapt the review process to be in line with Article 8(1) of KORRR.

300 Input from three NRAs did not allow ACER to ascertain when has the last review occurred nor what is the frequency of this process in each one of those Member States.[89] EWRC (BG) and REWS (MT) did not provide replies to this question.

301 ILR (LU) claimed that the provisions of Article 8(1) are not applicable in LU as there are no SGUs in identified in LU. As elaborated in the previous subsection, there seems to be no reason for such non-applicability in ACER's view.

302 Finally, RAE (GR) and NVE-RME (NO) reported that the implementation is still ongoing in GR and NO.

[87] CNMC (ES), HERA (HR), MEKH (HU), ARERA (IT), CRU (IE), ACM (NL), URE (PL), AGEN-RS (SI) and RONI (SK).

[88] CNMC (ES) mentioned that the reviews of data shared with TSOs in FR and PT occur every 6 months and 2 months, respectively.

[89] I.e., in BG, LU and MT .

8.10 Scheduled data used by TSOs

303 Article 9(1) of the KORRR stipulates that each TSO shall be capable of exchanging scheduled data with TSOs and with SGUs, DSOs or third parties within its control area to whom the exchange of scheduled information may have been delegated. Moreover, it sets minimal requirements concerning the content of shared scheduled data. Other rules shall be detailed by each TSO.

8.10.1 Requirements related to scheduled data

304 According to Article 9(1) of the KORRR, the scheduled data exchange shall at least include:

- Generation and consumption schedules between two days ahead and close to real time,
- Unavailability or limitations to active power production or consumption of SGUs, and
- Unavailability of network elements in the TSO's observability area.

305 Hence, ACER inquired whether the data exchange in each monitored country includes all these elements. Moreover, NRAs were asked if national legislation requires some additional information or longer time durations compared to Article 9(1).

306 As regards the exchange of all required information, only answers from CREG (BE) and ECA (EE) indicate that the scope of shared data is narrower than in Article 9(1). CREG replied that the corresponding TSO has not foreseen requiring schedules for two days ahead. According to ECA, the Estonian TSO does not receive all scheduled data from SGUs.

307 Concerning additional information or time durations, eight NRAs reported that their respective national legal frameworks require additional information or set different time durations compared to Article 9(1).[90]

308 With regards to provisions establishing requirements for additional data, DUR (DK), CNMC (ES) and EV (FI) reported that according to their national legislation, TSOs collect more information. CNMC mentioned that relevant parties shall provide scheduled outage planning.

309 Concerning longer time durations compared to Article 9(1), CREG (BE) informed that the availability or status ("ready-to-run" or not) should be communicated by the scheduling agent several weeks in advance and confirmed week ahead. ERO (CZ) confirmed that national legislation in CZ requires the complete planning data from year-ahead to intraday. Similarly, MEKH (HU) noted that SGUs and DSOs should provide week-ahead and year-ahead availability forecasts. BNetzA (DE) reported that the information of planned unavailability of network elements or SGUs have a longer time duration than one established in the KORRR. URE (PL) highlighted that data requirements apply to 9 days for electricity generators.

310 RAE (GR) and NVE-RME (NO) replied that the implementation of Article 9(1) of the KORRR is ongoing in GR and NO. Answers provided by PUC (LV) and Ei (SE) do not allow ACER to ascertain what the implementation status in their respective Member States is.

8.10.2 Scheduled data provided by the DSO

311 ACER inquired NRAs about the implementation status of Article 9(2) of the KORRR concerning requirements for the provision of scheduled data by DSOs. Regulators were asked to describe the format specified by TSOs and the type of data requested for the exchange and indicate whether the templates for scheduled data shared by DSOs have been published (publication of templates is not

[90] CREG (BE), ERO (CZ), BNetzA (DE), DUR (DK), CNMC (ES), EV (FI), MEKH (HU) and URE (PL).

mandatory). As mentioned in the previous section, Article 9(1) establishes minimum content of the data exchange.

312 Aggregated results of the survey are presented in Table 9. Shading of cells has only been adopted for columns representing mandatory requirements set out in Article 9(2) of the KORRR (i.e., specification of format of scheduled data exchange):

- The cells in green indicate that the format or content of the scheduled data exchange have been determined;
- The cells in yellow refer to situations when the implementation is pending;
- The cells in blue represent situations when TSOs and DSOs have not envisaged dedicated scheduled data exchange; and
- The cells in red indicate the lack of relevant communication from the NRAs.

Table 9. Requirements for scheduled data used by TSOs

	Requirements for scheduled data exchange					
	Data provided by the DSO			Data directly provided by the SGU		
	Format	Content	Template	Format	Content	Template
AT		ongoing	ongoing		ongoing	ongoing
BE		-	-		specified	published
BG		no reply	no reply		no reply	no reply
CZ		specified	not published		specified	partially published
DE		specified	published		specified	published
DK		ongoing	ongoing		specified	published
EE		ongoing	ongoing		ongoing	ongoing
ES		specified	not published		specified	not published
FI		specified	not published		specified	published
FR		specified	published		specified	published
GR		ongoing	ongoing		ongoing	ongoing
HR		ongoing	ongoing		ongoing	ongoing
HU		specified	published		specified	published
IE		ongoing	ongoing		specified	published
IT		-	-		-	-
LT		specified	not published		specified	not published
LU	n/a	n/a	n/a	n/a	n/a	n/a
LV		?	not published		?	not published
MT		no reply	no reply		no reply	no reply
NL		specified	published		specified	published
NO		ongoing	ongoing		ongoing	ongoing
PL		specified	published		specified	published
PT		specified	not published		specified	not published
RO		specified	published		specified	published
SE		ongoing	ongoing		ongoing	ongoing
SI		?	?		?	?
SK		?	published		?	published

313 Responses from 14 NRAs confirmed that the respective TSOs specified the format to exchange the scheduled data between TSOs and DSOs within their control areas.[91]

314 Two NRAs reported that the relevant DSOs do not share scheduled data with corresponding TSOs based on the mutual agreement.[92] CREG (BE) indicated that if either the TSO or DSOs had identified a need for the data exchange for the operational security analysis, scheduled information would be required by the TSO. ARERA (IT) replied that scheduled data are available through market results.

315 Templates for the scheduled data that DSOs shall provide have been published in seven monitored countries.[93] ERO (CZ), CNMC (ES), EV (FI) and PUC (LV) replied that DSOs are informed of the templates through internal processes.

316 According to the NRAs input', implementation of Article 9(2) of the KORRR is ongoing in eight Member States.[94] Additionally, CNMC (ES) indicated that although the information about unavailability of network elements is currently exchanged, the national implementation of relevant rules has not been finalised yet.

317 ILR (LU) claimed that Article 9(2) of the KORRR is not applicable in LU since CREOS is a combined TSO-DSO entity. ACER recognises that Article 9 contains provisions ancillary to the general rules establishing the data exchange. And thus, since the TSO in LU decided not to exchange data with distribution-connected DSOs, ACER acknowledges the claim raised by ILR.

8.10.3 Scheduled data provided directly to the TSO by the SGUs

318 As regards scheduled data exchange, NRAs were also asked about the implementation status of Article 9(3) of the KORRR. According to this provision, TSOs, shall define and publish the format of the information for the exchange of scheduled data, in cooperation with SGUs or third parties. Results of the analysis are presented in Table 9 above.

319 Responses from the majority of contacted NRAs, confirm the respective TSOs established an applicable format for scheduled data exchange between TSOs and SGUs or third parties.

320 ARERA (IT) answered that data are directly provided to the TSO according to market rules and no DSO intermediation is foreseen.

321 According to the NRAs' responses, templates for scheduled data that SGUs exchanging data directly with TSOs shall provide have been published in 11 monitored countries.[95] CNMC (ES), NERC (LT) and PUC (LV) indicated that since relevant parties are aware of templates through some internal communication or coordination, they were not published. ERO (CZ) answer that for yearly and monthly data templates, relevant parties are aware of the templates through the internal procedures, whereas weekly, daily and intraday operational planning templates are published.

322 Six NRAs (E-Control (AT), ECA (EE), RAE (GR), HERA (HR), NVE-RME (NO) and Ei (SE)) reported that the implementation process is ongoing. CNMC (ES) reiterated that although the information about unavailability is currently exchanged, the national implementation of relevant rules has not been finalised yet.

[91] I.e., ERO (CZ), BNetzA (DE), CNMC (ES), EV (FI), CRE (FR), MEKH (HU), NERC (LT), PUC (LV), ACM (NL), URE (PL), ERSE (PT), ANRE (RO), AGEN-RS (SI) and RONI (SK).

[92] Responses from CREG (BE) and ARERA (IT).

[93] DE, ES, FI, FR, NL, PL and RO.

[94] AT, DK, EE, GR, HR, IE, NO and SE.

[95] BE, DE, DK, FI, FR, HU, IE, NL, PL, RO and SK.

323 ILR (LU) claimed that Article 9(3) is not applicable in LU, since there are no SGUs identified in the control area of the corresponding TSO.

8.10.4 Technical requirements for the scheduled data exchange

324 Article 9(4) of the KORRR requires each TSO to 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 line with an international standard recommended by all TSOs and with current technologies to guarantee the security, confidentiality and redundancy of the communications.

325 Thus, ACER asked NRAs to describe the TSO's technical requirements for the data exchange in question and provide relevant links. Moreover, NRAs were inquired whether these requirements comply with international standards.

8.10.4.1 Technical requirements established by the TSO

326 Answers provided by 15 NRAs confirm that the respective TSOs adopted technical requirements and published them as per Article 9(4) of the KORRR.[96] PUC (LV) replied that the technical requirements were specified in the TSO agreement with the relevant SGU. However, ACER notes that Article 9(4) pertains to the data exchange between TSO, SGUs and DSOs, and requires that each TSO publishes the technical requirements. All other NRAs confirming the implementation of Article 9(4) provided relevant links.[97]

327 Additionally, CRE (FR) reported partial implementation, as technical requirements for the exchange of scheduled data had not been established with all DSOs yet.

328 ARERA (IT) marked that relevant data are provided to the TSO directly, according to the market rules, and no DSO intermediation is foreseen. Similarly, ECA (EE) indicated that there is no need for scheduled data from distribution-connected SGUs. However, ECA also mentioned that the TSO is preparing technical requirements for scheduled data exchange with distribution-connected generators.

329 ILR (LU) claimed that Article 9(4) of the KORRR is not applicable in LU since CREOS is a combined TSO-DSO entity. ACER recognises that Article 9 contains provisions ancillary to the general rules establishing the data exchange. And thus, since the TSO in LU decided not to exchange data with distribution-connected DSOs, ACER acknowledges the claim raised by ILR.

330 The remaining NRAs reported that the implementation process is ongoing.

8.10.4.2 Compliance of the technical requirements with the international standards

331 Further, 16 NRAs reporting at least a partial establishment of technical requirements by their respective TSOs were asked whether those rules comply with the international standards. Nearly all of those NRAs confirmed compliance of the requirements in question.[98] Four NRAs referred to the

[96] ERO (CZ), BNetzA (DE), DUR (DK), CNMC (ES), EV (FI), MEKH (HU), CRU (IE), NERC (LT), PUC (LV), ACM (NL), URE (PL), ERSE (PT), ANRE (RO), AGEN-RS (SI) and RONI (SK).

[97] NERC (LT) replied that only requirements for outage scheduling are published, while other requirements are provided with standard terms and condition contracts. ACM (NL) reported that Dutch TSO made technical requirements available through a dedicated customer portal.

[98] I.e., ERO (CZ), BNetzA (DE), DUR (DK), CNMC (ES), EV (FI), CRE (FR) MEKH (HU), CRU (IE), NERC (LT), ACM (NL), URE (PL), ERSE (PT) ANRE (RO), AGEN-RS (SI) and RONI (SK).

XML format that is used for the data exchange.[99] Three NRAs reported compliance with standards approved by ENTSO-E.[100] Three other NRAs referred to international standards (i.e., IEC 60870-5-101 and IEC 62325-504).[101]

332 PUC (LV) did not confirm whether technical rules adopted by the respective TSO for sharing scheduled data comply with international standards or not.

333 Finally, the remaining NRAs declared compliance with standards to guarantee the security, confidentiality and redundancy of the communications as per Article 9(4), without specifying the format or providing further information.

8.11 Real-time data used by TSOs

334 According to Article 10 of the KORRR, each TSO shall establish specific rules concerning real-time data exchange with DSOs and SGUs. Those provisions shall include the list of detailed content for real-time data exchange and applicable format developed in agreement with the DSOs (Article 10(1)) or in coordination with SGUs and DSOs (Article 10(2)), technical requirements (Article 10(3)) and the refresh rate (Article 10(5)).

8.11.1 Real-time data provided by the DSO

335 ACER inquired NRAs about the implementation status of Article 10(1) of the KORRR concerning requirements for the provision of real-time data by DSOs. Regulators were asked to describe the format specified by TSOs and the detailed content requested for the exchange related to the distribution network observability area within the TSOs' control area.

336 Aggregated results of the survey are presented in Table 10:

- The cells in green indicate that the format or content of real-time data exchange have been determined;
- The cells in yellow refer to situations when the implementation is pending;
- The cells in blue represent situations when TSOs have not envisaged dedicated real-time data exchange; and
- The cells in red indicate the lack of relevant communication from the NRAs.

[99] ERO (CZ), EV (FI), ACM (NL), URE (PL) and RONI (SK).

[100] ERO (CZ), BNetzA (DE) and AGEN-RS (SI).

[101] CNMC (ES), ACM (NL) and RONI (SK).

Table 10. Requirements for real-time data used by TSOs

	Requirements for real-time data exchange			
	Data provided by the DSO		Data provided by the SGU	
	Format	Content	Format	Content
AT				
BE				
BG				
CZ				
DE				
DK				
EE				
ES				
FI				
FR				
GR				
HR				
HU				
IE				
IT				
LT				
LU	n/a	n/a	n/a	n/a
LV				
MT				
NL				
NO				
PL				
PT				
RO				
SE				
SI				
SK	?	?	?	?

337 Most of the NRAs reported that at least one element of requirements for DSOs real-time data provision had been specified by the TSOs. In a number of monitored countries, format and content of data exchange are outlined in national grid codes[102] or directly in contracts between TSO and DSOs.[103]

338 According to the NRAs' input, the Implementation of Article 10(1) of the KORRR is ongoing in DK, FR, GR, IE and NO. DUR (DK) indicated that the format and content of real-time data exchanged between the TSO and DSOs are described in the national implementation documents. However, those national instruments await final approval. CRE (FR) indicated that currently, provisions are implemented for the main DSO (Enedis) and the implementation is ongoing with the other DSOs..

339 ILR (LU) claimed that Article 10(1) of the KORRR is not applicable in LU since CREOS is a combined TSO-DSO entity. ACER recognises that Article 10 contains provisions ancillary to the general rules establishing the data exchange. And thus, since the TSO in LU decided not to exchange data with distribution-connected DSOs, ACER acknowledges the claim raised by ILR.

8.11.2 . Real-time data provided directly to the TSO by the SGUs

340 As regards real-time data exchange, NRAs were also asked about the implementation status of Article 10(2) of the KORRR. According to its provisions, TSOs, 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 TSOs' control areas. Results of the analysis are presented in Table 10 above.

341 Responses from the majority of contacted NRAs confirm the establishment of at least one of two requirements that each TSO shall specify pursuant to Article 10(2) of the KORRR. Relevant TSOs determined the format and content of structural data exchange with SGUs in national grid codes[104] or in agreements.[105] MEKH (HU) reported that the required format and content of the exchange are included in the national grid code and bilateral agreements between the TSO and DSOs.

342 HERA (HR) explained that the respective TSO and DSO acquire and collect relevant information themselves and there is no need for SGUs to provide the same data.

343 Three NRAs (DUR (DK), RAE (GR) and NVE-RME (NO)) reported that the implementation process is ongoing, while E-Control (AT) indicated that the data format is under development. CNMC (ES) reiterated that although the structural data are currently exchanged, the national implementation of relevant rules has not been finalised yet. Similarly, URE (PL) answered that the present format for data exchange would change once the Portal of Structural Data Exchange is in operation.

344 NERC (LT) reported that currently, it has not collected information regarding this content and the type of requested data for the relevant real-time data exchange provided by SGUs.

345 ILR (LU) claimed that Article 10(2) is not applicable in LU, since there are no SGUs identified in the control area of the respective TSO.

[102] E.g., MEKH (HU), ARERA (IT), ACM (NL) and URE (PL). URE reported that the grid code specifies applicable format.

[103] E.g., CREG (BE), ERO (CZ), HERA (HR) and AGEN-RS (SI).

[104] E.g., ERO (CZ), MEKH (HU), CRU (IE), ARERA (IT), URE (PL) and ACM (NL). URE reported that grid code specifies applicable format.

[105] E.g., MEKH (HU), PUC (LV) and AGEN-RS (SI).

8.11.3 . Technical requirements for the real-time data exchange

346 Article 10(3) of the KORRR requires each TSO to specify the technical requirements, including time stamping, for real-time data exchange related to the distribution network observability area and to the SGUs within TSO's observability area. The technical requirements should, where possible, be in line with an international standard recommended by all TSOs and with current technologies to guarantee the security, confidentiality and redundancy of the communications.

347 Hence, ACER asked NRAs to describe the TSO's technical requirements for the data exchange in question and provide relevant links. Moreover, NRAs were inquired whether these requirements comply with international standards.

8.11.3.1 Technical requirements established by the TSO

348 Answers provided by 18 NRAs confirm that corresponding TSOs adopted technical requirements as per Article 10(3) of the KORRR.[106] E-Control (AT) described the rules established by the TSO, but mentioned that the relevant provisions were not published yet without further clarification. ACER understands that the technical requirements are in place in AT and only the publication is pending.[107]

349 ILR (LU) claimed that Article 9(4) of the KORRR is not applicable in LU since CREOS is a combined TSO-DSO entity. ACER recognizes that Article 9 contains provisions ancillary to the general rules establishing the data exchange. And thus, since the TSO in LU decided not to exchange data with distribution-connected DSOs, ACER acknowledges the claim raised by ILR.

350 According to the inputs provided by DUR (DK), RAE (GR), HERA (HR), NVE-RME (NO) and Ei (SE), the implementation is pending in their respective Member States. DUR (DK) indicated that requirements for real-time data exchanged between the TSO, DSOs and SGUs are described in the national implementation documents. However, those national instruments await final approval. Additionally, CRU (IE) reported that the national grid code outlines the technical rules, however, requirements are also detailed in the TSO proposal approved by CRU and pending TSO'spublication. Hence, ACER may infer that the implementation process in IE has not been finalised yet.

8.11.3.2 Compliance of the technical requirements with the international standards

351 Further, 18 NRAs reporting at the establishment of technical requirements by respective TSOs were asked whether those rules comply with the international standards. Nearly all of these NRAs confirmed compliance of the requirements in question.[108] Answers from 13 NRAs referred to specific international standards (e.g., IEC 60870-5-104, IEC 61850 or IEC 62351) that were considered in designing technical requirements.[109] E-Control (AT) indicated that the corresponding TSO uses common measuring devices. E-Control replied that technical standards apply between TSO and DSOs.

352 MEKH (HU), PUC (LV) and RONI (SK) did not confirm whether technical rules adopted by their respective TSOs for sharing real-time data comply with international standards or not.

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[106] E-Control (AT), CREG (BE), ERO (CZ), BNetzA (DE), ECA (EE), CNMC (ES), EV (FI), CRE (FR), MEKH (HU), ARERA (IT), NERC (LT), PUC (LV), ACM (NL), URE (PL), ERSE (PT), ANRE (RO), AGEN-RS (SI) and RONI (SK).

[107] Note that according to Article 10(3) of the KORRR, publication is not mandatory, unlike in the case of technical requirements for the exchange of scheduled data (Article 9(4) of the KORRR).

[108] I.e., E-Control (AT), CREG (BE), ERO (CZ), BNetzA (DE), ECA (EE), CNMC (ES), EV (FI), CRE (FR), MEKH (HU), ARERA (IT), NERC (LT), ACM (NL), URE (PL), ERSE (PT), ANRE (RO) and AGEN-RS (SI).

[109] CREG (BE), ERO (CZ), BNetzA (DE), ECA (EE), CNMC (ES), EV (FI), CRE (FR) ARERA (IT), ACM (NL), URE (PL), ERSE (PT), ANRE (RO) and AGEN-RS (SI).

8.11.4 Value of the refresh rate

353 Article 10(5) of the KORRR stipulates that each TSO shall define the refresh rate for the real-time data exchanges in its control area. Moreover, it shall not be longer than 1 minute. Hence, ACER asked NRAs what value of the refresh rate has been established in their respective countries.

354 According to the received input, in the majority of monitored countries, TSOs respected the provision of Article 10(5) and established refresh rate equal to or shorter than 1 minute[110] or set refresh rate well below 1 minute.[111] However, a number of NRAs highlighted that reported values are maximum expected rates. In other words, depending on the type of data, the refresh rate may be shorter than reported.

355 ERO (CZ) indicated that the refresh time is no longer than 1 minute with communication to DSOs and SGUs directly connected to the TSO grid. Nonetheless, the refresh time for communications between TSOs takes more time and can be longer than 15 minutes. ECA (EE) reported that the refresh rate in EE is not regulated and some measurements have dead-band zones.

356 According to RAE (GR), HERA (HR), NVE-RME (NO) and Ei (SE), the implementation of Article 10(5) of the KORRR is ongoing. HERA and Ei reported that the envisioned refresh rate would be shorter than 1 minute.

8.12 High-level summary

357 ACER understands that KORRR was largely implemented in all the monitored countries. Yet, there are still a few Members States where certain obligations stemming from the KORRR remain outstanding.

[110] In AT, DE, FI, FR, HU, IE and IT.

[111] In BE, ES, LT, LU, LV, NL, PL, PT, RO, SI and SK.

Annex 1: NRAs' responses to the questionnaire

1 Overview

358 This annex includes the responses in full received from the NRAs to each question of the survey on the implementation monitoring of the SO GL. Text in red font is added by ACER for the sole purpose of clarification.

2 Applicability and scope of the data exchange

2.1 Proposals on the provisions on applicability and scope

2.1.1 Coordination with DSOs and SGUs

359 ***Q.1.1.B Article 40(5) specifies that a TSO shall determine, in coordination with distribution system operators (DSOs) and significant grid users (SGUs), data exchange applicability and scope based on the a) to d) categories in article 40(5). Applicability is therefore to be determined at national level and is subject to approval by the competent authority:***

How did TSOs coordinate the DSOs and SGUs on the proposals in Article 40(5)(a)-(d)?

360 *Table 1: Coordination with DSOs and SGUs*

MS	Answer
AT	*TSO coordinated in meetings and writing. The NRA consulted publicly.*
BE	*The TSO coordinate with the DSOs through the existing collaboration framework, i.e. Synergrid.* *The TSO coordinate with the SGUs through existing different working groups and via dedicated task forces and, e.g. Working group Balancing, Working Group Belgian Grid, TF Icaros.* *Finally, TSOs need to duly take into account feedback provided by DSOs and SGUs during the public consultation of the TSO proposals.*
BG	*No reply*
CZ	*The proposals were based on existing data exchange. Amendments were discussed in common meetings and a public workshop.*
DE	*Formal consultation*
DK	*Energinet chose to handle implementation by inviting DSO's and SGU's to workshops.* *For Realtime data these workshops were divided into three categories, Production and Demand facilities, Stations and nets, and Communication (Standards, protocols etc.)*
EE	*Existing agreements*
ES	*The TSO launched a working group with the DSOs with the aim of coordinating all SO GL articles related to data exchange subjected to national implementation and approval. Once the draft proposal was agreed, multiple workshops and a public consultation were run in order to coordinate the final proposal with SGUs and the rest of DSOs and grid users.*
FI	*Fingrid has arranged public consultation on the scope of data exchange document and the applicable terms related to the connection, balancing and LFCR agreements specifying detailed requirements for data exchange.*
FR	*RTE has organized between February 5, 2018 and April 1, 2018, in coordination with the association of DSOs, consultations on its proposal with the SGUs concerned. These*

	consultations were merged to the consultation for the implementation of the RfG and DCC connection codes.
GR	*In September 2020, RAE with the letter O-84138/23.09.2020 asked the TSO and the DSO to establish a working group and in collaboration with SGUs to fulfil the requirements of article 40(5) of SOGL. So far, four meetings have taken place but there has been no deliverable by the TSO/DSO and consequently no regulatory decision.*
HR	*Bilateral and multilateral discussions, public consultations*
HU	*Rules and procedures are already implemented in the national grid code*
IE	*The TSO (EirGrid) and DSO (ESB Networks) held a joint consultation in order to enable co-ordination with SGUs. The consultation document can be found at https://www.eirgridgroup.com/site-files/library/EirGrid/190125_SGU-KORRR-Consultation_Ireland_V1.0.pdf*
IT	*By the mean of a public consultation held by the TSO, followed by bilateral interactions with the main DSO e-distribuzione and the relevant association (Utilitalia) representing the other DSOs.*
LT	*Standard terms and condition contracts for connection to the transmission network were prepared and signed with SGUs and DSO.*
LU	*CREOS is a combined TSO-DSO. There are no other DSOs in Luxembourg which are connected to the transmission grid of CREOS. Only information about load & generation from distribution grids available at substations connected to the Creos DSO grid is enough to assess the security of the transmission grid; there is no need for additional active data transfer from DSOs to CREOS TSO and for coordination regarding daily business.* *CREOS considers a production or consumption unit to be significant for the use of its grid when its impact on the transmission network is greater than 10% of the annual peak power in the CREOS network. As such no SGUs have been identified for the grid. There are also no type C or D generation units.*
LV	*TSO coordinates the DSO and SGUs by mutual agreements.*
MT	*No reply*
NL	*The coordination is organised via Netbeheer Nederland, the branch organisation of the electricity and gas grid operators in the Netherlands. Netbeheer Nederland submitted a change proposal for the grid code to implement Article 40(5)(a)-(d) to the Electricity and Gas Network User Platform (Dutch: Gebruikersplatform Elektriciteits- en Gastransportnetten). Following consultation with the SGUs in this platform, the agreed grid code change proposal was sent to ACM, being the competent authority for the Netherlands, for approval. Next, Netbeheer Nederland initiated implementation projects for structural, scheduled and real-time data exchange. Joint TSO-DSO project teams execute the implementation projects.*
NO	*The work is ongoing. A joint working group was established in May 2021 consisting of the TSO and representative DSOs (nr), in addition to SGUs from production (large and small scale hydro + wind) and consumption (large and medium industry).*
PL	*Spotkania OSP z OSD oraz konsultacje publiczne z SGU*
PT	*By principle, TSO proposals are approved by the competent authority and subject to public consultation of all interested parties.*
RO	*First of all coordination was into the process of approval for proposals according to art. 40 (5) and 40 (6).* *Second, most of the requirements contained into article 40 (5) (a) –(d) and concretized by CNTEE TRANSELECTRICA SA (Romanian TSO) into a proposal which was approved by ANRE (ANRE Order 233/2019) was applying in Romanian electrical power system already. It was some unclear problems from Romanian Distribution System Operators if exist obligation of Transelectrica to supply them data if they need. ANRE answered, yes it is legally and according to the KORRR (approved in Romania with ANRE decision no.1/2019). ANRE has required also to CNTEE Transelectrica and DSOs to clarify the aspects from implementation of art. 40 (5), 40 (6)-KORRR and from art. 40(7) and to make necessary correlations between the documents mentioned before for a good implementation. Therefore it was organised in 13.02.2020 a*

	workshop with TSO, DSOs, RSUs, Competition Council and ANRE where these aspects were analysed.
SE	*Svenska kraftnät provided an initial proposal (in Swedish) to DSOs and SGUs, which was published 11 April 2019 and open to consultation until 13 May 2019. A joint meeting for coordination was held on 2 May 2019. After consideration of feedback, a final proposal was submitted to the NRA, which then had an additional consultation before publishing the requirements as a national regulation (Föreskrift EIFS 2019:07).*
SI	*No reply*
SK	*TSO conducts coordination meetings*

2.1.2 Competent authority for the approval of the proposals

361 ***Q.1.1.A Article 40(5) specifies that a TSO shall determine, in coordination with distribution system operators (DSOs) and significant grid users (SGUs), data exchange applicability and scope based on the a) to d) categories in article 40(5). Applicability is therefore to be determined at national level and is subject to approval by the competent authority:***

Confirm that the competent authority for the approval is the National Regulatory Authority (NRA) or specify the name of the designated entity by the Member State.

362 *Table 2: Competent authority for the approval of the proposals*

MS	Answer
AT	*Yes, the NRA is the competent authority.*
BE	*Competent authority for the approval is indeed the NRA (CREG).*
BG	*No reply*
CZ	*Yes, the competent authority is the NRA.*
DE	*NRA (Bundesnetzagentur)*
DK	*No reply*
EE	*Estonian Competition Authority*
ES	*No, it is not. The approval of the national implementation of Article 40(5) is competence of the Spanish Ministry for the Ecological Transition and the Demographic Challenge*
FI	*NRA / Energy Authority*
FR	*CRE is the competent authority.*
GR	*The competent authority for the approval is RAE.*
HR	*Yes, HERA is competent authority for the approval.*
HU	*MEKH (NRA) is the competent authority.*
IE	*The CRU is the designated competent authority for approval in Ireland.*
IT	*Arera is the competent NRA*
LT	*Confirmed.*
LU	*NRA is the competent authority*

LV	*The Public Utilities Commission of Latvia (PUC) confirms that the competent authority for the approval is the National Regulatory Authority (NRA).*
MT	*No reply*
NL	*Confirmed.*
NO	*Reguleringsmyndigheten for energi (the Norwegian NRA NVE-RME) is the competent authority.*
PL	*No reply*
PT	*It depends on the issue. For the technical conditions for connecting facilities to the transmission or distribution networks, the competent authority is the General Directorate of Energy and Geology, and it applies the Transmission Network Code (RRT), or the Distribution Network Code (RRD) approved by the Government.* *For all market functioning related issues, namely network access, network operation and system management ancillary services, network operators and users' rights and obligations, the competent authority is the NRA, and it applies the Network Operation Code (ROR - approved by ERSE on 18 December2017.* *https://www.erse.pt/en/activities/regulations-electricity-pt/networks-operation/#code), or the complementary Procedures Manual of the Global System Management (MPGGS), approved by ERSE.*
RO	*YES, ANRE is the competent authority for the approval.*
SE	*Yes, the NRA (Energimarknadsinspektionen – EI) is the competent authority for the approval. In Sweden the process was that the TSO (Svk), after coordination, provided a document with proposals for the requirements on data exchange applicability and scope in accordance to 40(5) and the NRA (EI) then, after further consultation, published this as a national regulation (Föreskrift EIFS 2019:07).*
SI	*No reply*
SK	*NRA (URSO)*

2.1.3 Approval of the proposals

363 ***Q.1.1.C Article 40(5) specifies that a TSO shall determine, in coordination with distribution system operators (DSOs) and significant grid users (SGUs), data exchange applicability and scope based on the a) to d) categories in article 40(5). Applicability is therefore to be determined at national level and is subject to approval by the competent authority:***

Fill in the Table on the status, relevant dates and weblinks of the proposals referred to in Article: 40(5)(a)-(d).

364 *Table 3: Approval of the proposals*

Answer			
MS	***Paragraph***	***Status: choose between:*** ***- not applicable (motivate),*** ***- in preparation,*** ***- sent for approval,*** ***- approved, or*** ***- other (elaborate).***	***Include relevant dates and web-link***

AT	**(a)** structural data in accordance with Article 48	*approved*	*https://www.ris.bka.gv.at/Dokumente/BgblAuth/BGBLA_2021_II_316/BGBLA_2021_II_316.html*
	(b) scheduling and forecast data in accordance with Article 49	*approved*	*see above*
	(c) real time data in accordance with Article 44	*approved*	*see above*
	(c) real time data in accordance with Article 47	*approved*	*see above*
	(c) real time data in accordance with Article 50	*approved*	*see above*
	(d) provisions in accordance with Article 51	*approved*	*see above*
	(d) provisions in accordance with Article 52	*approved*	*see above*
	(d) provisions in accordance with Article 53	*approved*	*see above*
BE	**(a)** structural data in accordance with Article 48	*Sent for approval (30/09/2021)* *Art.48(1)a),f), i) Applicable* *Art.48(1)b)-d) Applicable, if unit participates to balancing services* *Art.48(1)e)-h): Not applicable*	*Collaboration agreement TSO Annex 7(see footnote [112])* *DSOs: structural data of all PGMs > 0.4 MW on individual level, and of PGMs <0.4 MW on aggregated level;*
	(b) scheduling and forecast data in accordance with Article 49	*In preparation* *Art.49(a) in accordance with DSOs and SGU different implementation phases have been agreed, taking into account the needs of the TSO and DSOs as well as the implementation constraints of SGUs. (iCAROS – phase 3)* *Art.49(b): Not applicable, Elia does not require this data*	*Taskforce iCAROS (elia.be)* *Alleviating congestion risk (https://www.elia.be/en/electricity-market-and-system/system-services/alleviating-congestion-risk)*
	(c) real time data in accordance with Article 44	*Sent for approval (30/09/2021)* *Art.44 Applicable for a) until g)*	*Collaboration agreement TSO-DSOs, Annex 11[113]* *Collaboration agreement TSO-DSOs, Annex 7*

[112] Collaboration agreement, Annex 7 (2021) www.synergrid.be/download.cfm?fileId=07_FR_2_1_Annexe7_Planification_des_réseaux_Draft2021_20210616.pdf

[113] Collaboration agreement, Annex 11 (2021) www.synergrid.be/download.cfm?fileId=11_FR_2_1_Annexe11_Entretien_exploitation_Draft2021_20210616.pdf

		Art. 44 Applicable for (h),(i), received ex-post	
	(c) real time data in accordance with Article 47	*Approved (13/09/2021)* *Art.47 Applicable*	*Connection contract*[114]
	(c) real time data in accordance with Article 50	*Sent for approval (30/09/2021)* *Art.50(1)a) Not applicable* *Art.50(1)b) Not applicable*	*Collaboration agreement TSO-DSOs, Annex 11*
	(d) provisions in accordance with Article 51	*Sent for approval (30/09/2021)* *Art.50(1): Applicable*	*Collaboration agreement TSO-DSOs, Annex 7*
	(d) provisions in accordance with Article 52	*Approved* *Art. 52(1) Applicable* *Art. 52(2)a) Not applicable, Elia has indicated not to require these data* *Art. 52(2)b) Currently not applicable* *Art. 52(2)c) if participating in balancing services, according to T&C BSP* *Art. 52(3)a): Applicable* *Art.52(3)b): if participating in balancing services, according to T&C BSP*	1. *Structural data: Connection contract Annex 1 (approved on 13/09/2021)* 2. *Scheduled data: T&C BSP aFRR*[115] *(approved on 22/04/2021), T&C BSP mFRR*[116] *(approved on 20/12/2019)* 3. *Real-time data: Connection contract Annex 4 (approved on 13/09/2021)*
	(d) provisions in accordance with Article 53	*Art.53(1,2)if participating in balancing services, according to T&C BSP*	*T&C BSP*
BG	*No reply*		
CZ	**(a)** structural data in accordance with Article 48	*Approved*	*17/07/2020*
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		

[114] Connection contract (16-07-2009): https://www.elia.be/en/customers/connection/connection-contract. An amended version with changes linked to the introduction of a Capacity Remuneration Mechanism in Belgium has been approved by the CREG on 13/09/2021: https://www.creg.be/fr/publications/decision-b2283

[115] T&C BSP aFRR (22-04-2021): https://www.elia.be/en/electricity-market-and-system/system-services/keeping-the-balance/afrr; CREG decision (B)2210 on 22/04/2021: https://www.creg.be/fr/publications/decision-b2210

[116] T&C BSP mFRR (03-02-2020): https://www.elia.be/en/electricity-market-and-system/system-services/keeping-the-balance/mfrr; CREG decision (B)2000/2 on 20/12/2019: https://www.creg.be/fr/publications/decision-b20002

	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		
DE	**(a)** structural data in accordance with Article 48	*Approved*	*16/01/2019, https://www.bundesnetzagentur.de/DE/Beschlusskammern/1_GZ/BK6-GZ/2018/BK6-18-122/BK6-18-122_beschluss_2018_12_20.pdf?__blob=publicationFile&v=2*
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53	*Not applicable*	
DK	**(a)** structural data in accordance with Article 48	*Structural data are handled by Energistyrelsen on the basis of national regulation, Energinet didn't need additional data here and have not included structural data in its work for the time being.*	*Structural data as subject is only commented here and in table below, not in the later questions.*
	(b) scheduling and forecast data in accordance with Article 49	*Approved*	*2021-03-16 Forsyningstilsynets afgørelse om Energinets metoder for krav om køreplansdata og tidsserier for tilgængelighed* *Development of IT-system is ongoing*
	(c) real time data in accordance with Article 44	*Initially sent for approval March 2019, with later changes.*	
	(c) real time data in accordance with Article 47	*Initially sent for approval March 2019, with later changes.*	
	(c) real time data in accordance with Article 50	*Initially sent for approval March 2019, with later changes.*	
	(d) provisions in accordance with Article 51	*Initially sent for approval March 2019, with later changes.*	
	(d) provisions in accordance with Article 52	*Initially sent for approval March 2019, with later changes.*	

	(d) provisions in accordance with Article 53	*Initially sent for approval March 2019, with later changes. Additional data required from these facilities are covered in the market-based contract.*	
EE	**(a)** structural data in accordance with Article 48	*Approved*	*Only missing protection data for B type (https://elering.ee/sites/default/files/public/Teenused/Liitumine/06%20-%20Kliendi%20elektriosa%20projekti%20koostamise%20ja%20modelleerimise%20n%C3%B5uded_2019.05.30.pdf)*
	(b) scheduling and forecast data in accordance with Article 49	*In preparation*	
	(c) real time data in accordance with Article 44	*approved*	*https://elering.ee/sites/default/files/public/Teenused/Liitumine/06%20-%20Kliendi%20elektriosa%20projekti%20koostamise%20ja%20modelleerimise%20n%C3%B5uded_2019.05.30.pdf*
	(c) real time data in accordance with Article 47	*approved*	*https://elering.ee/sites/default/files/public/Teenused/Liitumine/05%20-%20Kliendi%20elektripaigaldisega%20seotud%20and mevahetuse%20n%C3%B5uded_2019.05.30.pdf*
	(c) real time data in accordance with Article 50	*approved*	*https://elering.ee/sites/default/files/public/Teenused/Liitumine/05%20-%20Kliendi%20elektripaigaldisega%20seotud%20and mevahetuse%20n%C3%B5uded_2019.05.30.pdf*
	(d) provisions in accordance with Article 51	*approved*	*https://elering.ee/liitumistingimused*
	(d) provisions in accordance with Article 52	*In preparation*	*Implementation under discussion*
	(d) provisions in accordance with Article 53	*In preparation*	*Implementation under discussion*
ES	**(a)** structural data in accordance with Article 48	*Sent for approval.* *National 'operational procedures'*[117] *are being updated, with the development of a new 'operational procedure' 9.3 related to*	

[117] 'operational procedures' is the literal translation of Spanish 'Procedimientos de Operación', that conceptually could be assimilated to a 'national grid code'.

		structural data exchange to implement article 40.5 and to include structural data exchange from demand facilities, which is a need for allowing their participation in system services. This new 'operational procedure' 9.3 shall also be approved by the Ministry.	
	(b) scheduling and forecast data in accordance with Article 49	*Sent for approval.*	*Even though the approval of Art.40(5) national implementation is still pending, the scope of data to be exchanged between the TSO, and SGUs has already been included in the national grid code ('operational procedures' number 9.3) in order to ease and allow the participation for all agents in new system services (such as demand facilities participating in ancillary services). This regulation was approved by the Spanish NRA.* *A new update has already been sent for approval in order to include data exchange with DSOs.* *Disposición 16964 del BOE núm. 335 de 2020 (https://www.ree.es/sites/default/files/01_ACTIVIDADES/Documentos/ProcedimientosOperacion/PO_9_1_BOEA2020_16964_1base.pdf)*
	(c) real time data in accordance with Article 44	*Approved*	*The real time data exchange operational procedure (9.2) does also include requirements from the national implementation of Art. 40(6).* *Disposición 16549 del BOE núm. 330 de 2020 (https://www.ree.es/sites/default/files/01_ACTIVIDADES/Documentos/ProcedimientosOperacion/PO_9_2_BOEA2020_16549.pdf)*
	(c) real time data in accordance with Article 47	*Approved*	

	(c) real time data in accordance with Article 50	*Approved*	
	(d) provisions in accordance with Article 51	*Approved for real time information.* *Sent for approval for structural and scheduled information.*	
	(d) provisions in accordance with Article 52	*Approved*	*This section was not included in the proposal that was sent to the Ministry, but directly into the previously mentioned national 'operational procedures' 9.1, 9.2 and 9.3 (already approved), consistently with the data exchange of power generation modules.*
	(d) provisions in accordance with Article 53	*Approved for real time information.*	
FI	**(a)** structural data in accordance with Article 48	*approved*	*14/03/2019, https://www.fingrid.fi/globalassets/dokumentit/fi/sahkomarkkinat/verkkosaantofoorumi/fingrid-oyj_-kayttotoiminnan-tiedonvaihdon-laajuus.pdf*
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		
FR	**(a)** structural data in accordance with Article 48	*approved*	*10/09/2020, https://www.cre.fr/Documents/Deliberations/Approbation/applicabilite-et-champ-des-echanges-de-donnees-entre-rte-et-les-utilisateurs-de-son-reseau*
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		

	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		
GR	**(a)** structural data in accordance with Article 48	*In preparation*	-
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		
HR	**(a)** structural data in accordance with Article 48	*approved* *waiting for approval*	*17. March 2021* *https://www.hera.hr/hr/docs/2021/Odluka_2021-03-17_08.pdf* *Rules on data exchange between transmission system operators and SGU – public consultation closed on 29. November 2021.* *https://www.hops.hr/obavijesti/poziv-na-javno-savjetovanje-vezano-uz-prijedlog-pravila-o-razmjeni-podataka-izmedu-operatora-prijenosnog-sustava-operatora-distribucijskog-sustava-i-proizvodnih-modula-prikljucenih-na-distribucijski-sustav*
	(b) scheduling and forecast data in accordance with Article 49	*approved* *waiting for approval*	*23. March 2020* *https://www.hera.hr/hr/docs/2020/Odluka_2020-03-23_02.pdf*

		Rules on data exchange between transmission system operators and SGU – public consultation closed on 29. November 2021. *https://www.hops.hr/obavijesti/poziv-na-javno-savjetovanje-vezano-uz-prijedlog-pravila-o-razmjeni-podataka-izmedu-operatora-prijenosnog-sustava-operatora-distribucijskog-sustava-i-proizvodnih-modula-prikljucenih-na-distribucijski-sustav*
(c) real time data in accordance with Article 44	*approved*	*NC HOPS approved on 6. October 2020.* *https://www.hera.hr/hr/docs/2020/Odluka_2020-10-06_05.pdf*
(c) real time data in accordance with Article 47	*approved*	*NC HOPS approved on 6. October 2020.* *https://www.hera.hr/hr/docs/2020/Odluka_2020-10-06_05.pdf*
(c) real time data in accordance with Article 50	*approved* *waiting for approval*	*NC ODS approved on 17. April 2020.* *https://www.hera.hr/hr/docs/2020/Odluka_2020-04-17_01.pdf* *Rules on data exchange between transmission system operators and SGU – public consultation closed on 29. November 2021.* *https://www.hops.hr/obavijesti/poziv-na-javno-savjetovanje-vezano-uz-prijedlog-pravila-o-razmjeni-podataka-izmedu-operatora-prijenosnog-sustava-operatora-distribucijskog-sustava-i-proizvodnih-modula-prikljucenih-na-distribucijski-sustav*
(d) provisions in accordance with Article 51	*waiting for approval* *waiting for approval*	*Rules on data exchange between transmission system operators and SGU – public consultation closed on 29. November 2021.*

		https://www.hops.hr/obavijesti/poziv-na-javno-savjetovanje-vezano-uz-prijedlog-pravila-o-razmjeni-podataka-izmedu-operatora-prijenosnog-sustava-operatora-distribucijskog-sustava-i-proizvodnih-modula-prikljucenih-na-distribucijski-sustav *Agreement on mutual relations governing system operation and the exchange of data at TSO-DSO interface (in preparation)*
(d) provisions in accordance with Article 52	*Approved** *Approved** **In preparation new versions of the documents* *Approved by HOPS*	*NC HOPS approved on 6. October 2020.* *https://www.hera.hr/hr/docs/2020/Odluka_2020-10-06_05.pdf* *23. March 2020* *https://www.hera.hr/hr/docs/2020/Odluka_2020-03-23_02.pdf* *September 2018* *https://www.hops.hr/verifikacijski-postupak*
(d) provisions in accordance with Article 53	*Approved by HOPS* *waiting for approval* *Approved*	*September 2018* *https://www.hops.hr/verifikacijski-postupak* *Rules on data exchange between transmission system operators and SGU – public consultation closed on 29. November 2021.* *https://www.hops.hr/obavijesti/poziv-na-javno-savjetovanje-vezano-uz-prijedlog-pravila-o-razmjeni-podataka-izmedu-operatora-prijenosnog-sustava-operatora-distribucijskog-sustava-i-proizvodnih-modula-prikljucenih-na-distribucijski-sustav*

			26. November 2019 *https://www.hera.hr/hr/docs/2019/Odluka_2019-11-26_02.pdf*
HU	**(a)** structural data in accordance with Article 48	*Other: The terms and conditions required by Article 40 (5) of the SOGL are contained in the National Network Code stipulated by the Hungarian Electricity Energy Act and approved by the Hungarian National Regulatory Authority (NRA).*	*https://www.mavir.hu/web/mavir/uzemi-szabalyzat*
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		
IE	**(a)** structural data in accordance with Article 48	*Approved*	*15/09/2020, documents attached in e-mail as not yet published by TSO as requested*
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		
IT	**(a)** structural data in accordance with Article 48	*Approved*	*Arera Decision 124/10* *Arera Decision 300/2017/R/eel – 05 May 2017*
	(b) scheduling and forecast data in accordance with Article 49	*already available through market results (art. 49 point c) applies)*	

	(c) real time data in accordance with Article 44	*Approved (mere confirmation of an already existing requirement)*	*Arera Decision 36/2020/R/eel – 11 February 2020*
	(c) real time data in accordance with Article 47	*Approved (mere confirmation of an already existing requirement)*	*Arera Decision 36/2020/R/eel – 11 February 2020*
	(c) real time data in accordance with Article 50	*Approved*	*Arera Decision 36/2020/R/eel – 11 February 2020*
	(d) provisions in accordance with Article 51	*Approved*	*Arera Decision 36/2020/R/eel – 11 February 2020*
	(d) provisions in accordance with Article 52	*Approved (mere confirmation of an already existing requirement)*	*Arera Decision 36/2020/R/eel – 11 February 2020*
	(d) provisions in accordance with Article 53	*Simple data based on the pilot projects for demand response*	*Arera Decision 300/2017/R/eel – 05 May 2017*
	https://www.arera.it/allegati/docs/20/036-20.pdf - Decision 36/2020 *https://www.arera.it/allegati/docs/17/300-17ti.pdf - Decision 300/2017* *https://arera.it/allegati/docs/10/124-10ti.pdf Decision 124/10*		
LT	**(a)** structural data in accordance with Article 48	*Other. Requirements regarding Article 40 (5) (a)-(d) are implemented on contractual basis (transmission service agreement). Requirements were not approved by separate, individual NERC decision, but TSO states that these requirements were implemented within standard terms and conditions for transmission service agreement which was approved by NERC pre-SOGL. However, NERC have not yet assessed if T&C approved in the past are harmonized with SOGL.*	
	(b) scheduling and forecast data in accordance with Article 49	*Other. Same as mentioned above*	
	(c) real time data in accordance with Article 44	*Other. Same as mentioned above*	
	(c) real time data in accordance with Article 47	*Other. Same as mentioned above*	
	(c) real time data in accordance with Article 50	*Other. Same as mentioned above*	
	(d) provisions in accordance with Article 51	*Other. Same as mentioned above*	
	(d) provisions in accordance with Article 52	*Other. Same as mentioned above*	
	(d) provisions in accordance with Article 53	*Other. Same as mentioned above*	

LU	**(a)** structural data in accordance with Article 48	*Not applicable*	*See Q.1.1.B*
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		
LV	**(a)** structural data in accordance with Article 48	*other* *Partial data exchange, data necessary for TSO processes is received based on agreements between entities.*	*The overall conditions are specified in national Network Code for the Electricity Sector (https://likumi.lv/ta/id/257943-tikla-kodekss-elektroenergijas-nozare). Agreements are not publicly available.*
	(b) scheduling and forecast data in accordance with Article 49	*other* *Partial data exchange, data necessary for TSO processes is received based on agreements between entities.*	*The overall conditions are specified in national Network Code for the Electricity Sector (https://likumi.lv/ta/id/257943-tikla-kodekss-elektroenergijas-nozare). Agreements are not publicly available.*
	(c) real time data in accordance with Article 44	*other* *TSO receives specified data from the entire substations including the parts owned by the distribution system and specified data for line bay, transformer bay and the busbars based on agreement with DSO.*	*Agreement is not publicly available.*
	(c) real time data in accordance with Article 47	*other* *Partial data exchange, data necessary for TSO processes received based on agreements between entities.*	*The overall conditions are specified in national Network Code for the Electricity Sector (https://likumi.lv/ta/id/257943-tikla-kodekss-elektroenergijas-nozare).*

			Agreements are not publicly available.
	(c) real time data in accordance with Article 50	*other* *Partial data exchange, data necessary for TSO processes received based on agreements between entities.*	*The overall conditions are specified in national Network Code for the Electricity Sector (https://likumi.lv/ta/id/257943-tikla-kodekss-elektroenergijas-nozare). Agreements are not publicly available.*
	(d) provisions in accordance with Article 51	*other* *Based on agreement between TSO and DSO.*	*Agreements are not publicly available.*
	(d) provisions in accordance with Article 52	*other* *There are no transmission-connected demand facilities yet. If there are, then the initial data exchange will be carried out based on agreements between entities.*	*The overall conditions are specified in national Network Code for the Electricity Sector (https://likumi.lv/ta/id/257943-tikla-kodekss-elektroenergijas-nozare).* *Agreements will not be publicly available.*
	(d) provisions in accordance with Article 53	*other* *There are no distribution--connected demand facilities yet. If there are, then Information will be provided by DSO*	*Not applicable.*
MT	*No reply*		
NL	**(a)** structural data in accordance with Article 48	*approved*	*https://wetten.overheid.nl/jci1.3:c:BWBR0037940&hoofdstuk=13&paragraaf=13.1&z=2021-07-03&g=2021-07-03*
	(b) scheduling and forecast data in accordance with Article 49	*approved*	*https://wetten.overheid.nl/jci1.3:c:BWBR0037940&hoofdstuk=13&paragraaf=13.2&z=2021-07-03&g=2021-07-03*
	(c) real time data in accordance with Article 44	*approved*	*https://wetten.overheid.nl/jci1.3:c:BWBR0037940&hoofdstuk=13&paragraaf=13.3&artikel=13.25&z=2021-07-03&g=2021-07-03* *https://wetten.overheid.nl/jci1.3:c:BWBR0037940&hoofdstuk=13&paragraaf=13.3&artikel=13.26&z=2021-07-03&g=2021-07-03*
	(c) real time data in accordance with Article 47	*approved*	*https://wetten.overheid.nl/jci1.3:c:BWBR0037940&hoofdstuk=13&paragraaf=13.3&*

		artikel=13.21&z=2021-07-03&g=2021-07-03 *https://wetten.overheid.nl/jci1.3:c:BWBR0037940&hoofdstuk=13&paragraaf=13.3&artikel=13.23&z=2021-07-03&g=2021-07-03* *https://wetten.overheid.nl/jci1.3:c:BWBR0037940&hoofdstuk=13&paragraaf=13.3&artikel=13.28&z=2021-07-03&g=2021-07-03*
(c) real time data in accordance with Article 50	*approved*	*https://wetten.overheid.nl/jci1.3:c:BWBR0037940&hoofdstuk=13&paragraaf=13.3&artikel=13.22&z=2021-07-03&g=2021-07-03* *https://wetten.overheid.nl/jci1.3:c:BWBR0037940&hoofdstuk=13&paragraaf=13.3&artikel=13.24&z=2021-07-03&g=2021-07-03* *https://wetten.overheid.nl/jci1.3:c:BWBR0037940&hoofdstuk=13&paragraaf=13.3&artikel=13.27&z=2021-07-03&g=2021-07-03*
(d) provisions in accordance with Article 51	*approved*	*https://wetten.overheid.nl/jci1.3:c:BWBR0037940&hoofdstuk=13&z=2021-07-03&g=2021-07-03* *Art. 51.1:* *-for structural data see art. 13.5* *-for scheduling and forecast data see art. 13.15* *-for real time data see art. 13.25* *Art. 51.2:* *-for structural data see art. 13.6* *-for scheduling and forecast data see art. 13.16* *-for real time data see art. 13.26*
(d) provisions in accordance with Article 52	*approved*	*https://wetten.overheid.nl/jci1.3:c:BWBR0037940&hoof*

			dstuk=13&z=2021-07-03&g=2021-07-03 *Art 52.1 (structural data): see* *art. 13.3* *Art 52.2 (scheduling and* *forecast data): see art. 13.13* *Art 52.3 (real-time data): see* *art. 13.23*
	(d) provisions in accordance with Article 53	*approved*	*https://wetten.overheid.nl/jci1.3:c:BWBR0037940&hoofdstuk=13&paragraaf=13.2&artikel=13.14&z=2021-07-03&g=2021-07-03*
NO	**(a)** structural data in accordance with Article 48	*In preparation*	
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		
PL	**(a)** structural data in accordance with Article 48	*Approved*	*Initial approval 15.03.2019. Update 16.03.2021*
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		

	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		
PT	**(a)** structural data in accordance with Article 48	*approved*	*MPGGS , last approval by ERSE on June 2021.* *https://www.erse.pt/en/activities/regulations-electricity-pt/networks-operation/#other-norms*
	(b) scheduling and forecast data in accordance with Article 49	*approved*	*MPGGS*
	(c) real time data in accordance with Article 44	*approved*	*MPGGS*
	(c) real time data in accordance with Article 47	*approved*	*MPGGS*
	(c) real time data in accordance with Article 50	*approved*	*MPGGS*
	(d) provisions in accordance with Article 51	*approved*	*MPGGS*
	(d) provisions in accordance with Article 52	*approved*	*MPGGS*
	(d) provisions in accordance with Article 53	*approved*	*MPGGS*
RO	**(a)** structural data in accordance with Article 48	*Approved*	*16/12/2019, ANRE Order 233/2019 (https://www.anre.ro/ro/energie-electrica/legislatie/coduri-paneuropene1476186098/regulamentul-ue-nr-1485-2017)*
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		
SE	**(a)** structural data in accordance with Article 48	*Approved*	*Modified and implemented via national secondary legislation EIFS 2019:7 (kap. 3 kap. 2 3 §§)* *from the 1st of February 2020,*

		Link
(b) scheduling and forecast data in accordance with Article 49	*Approved*	*Modified and implemented via national secondary legislation EIFS 2019:7 (3 kap. 5 §)* *from the 1st of February 2020,* *Link*
(c) real time data in accordance with Article 44	*Approved (regarding 44 h and i, these two points are not applicable in Sweden. Svk only need aggregated installed power production per primary energy source and per connection point in the observability area. For its needs, Svk intends to estimate that production in real time based on the installed power.* *Svk does not need information on aggregate consumption.)*	*44 a-g modified and implemented via national secondary legislation EIFS 2019:7 (kap. 3 kap. 7§)* *from the 1st of February 2020,* *Link*
(c) real time data in accordance with Article 47	*Approved*	*Modified and implemented via national secondary legislation EIFS 2019:7 (kap. 3 kap. 8 10 §§) from the 1st of February 2020,* *Link*
(c) real time data in accordance with Article 50	*Approved (regarding 50(2), Svk decides from case to case whether certain real-time measurement values can be exempted or exempted from delivery for a limited time. The real-time data required for facilities that provide balance services is regulated in individual agreements with the balance service provider.)*	*50(1) is modified and implemented via national secondary legislation EIFS 2019:7 (kap. 3 kap. 9 §)* *from the 1st of February 2020,* *Link*
(d) provisions in accordance with Article 51		*Binding directly through SOGL*
(d) provisions in accordance with Article 52	*Approved*	*52(1)(2)(3) are modified and implemented via national secondary legislation EIFS 2019:7 (kap. 3 kap. 4 6 11 §§§)* *from the 1st of February 2020,* *Link* *52(4) is binding directly through SOGL.*

	(d) provisions in accordance with Article 53	*Approved*	*Modified and implemented via national secondary legislation EIFS 2019:7 (kap. 4 kap. 1 §)* *from the 1st of February 2020,* *Link*
SI	**(a)** structural data in accordance with Article 48	*approved*	
	(b) scheduling and forecast data in accordance with Article 49		*not applicable* *No PGM is recognized as distribution-connected SGU*
	(c) real time data in accordance with Article 44	*approved*	
	(c) real time data in accordance with Article 47	*approved*	
	(c) real time data in accordance with Article 50	*approved (b)*	
	(d) provisions in accordance with Article 51	*approved*	
	(d) provisions in accordance with Article 52	*approved*	
	(d) provisions in accordance with Article 53	*not applicable*	*Regulated by contracts for the provision of ancilary services*
SK	**(a)** structural data in accordance with Article 48	*Approved*	*https://www.sepsas.sk/media/4670/dokument-d-tp-ucinnost-nov-2020.pdf*
	(b) scheduling and forecast data in accordance with Article 49		*detto*
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		

2.2 Implementation of the provisions on applicability and scope

365 ***Q.1.1.D Article 40(5) specifies that a TSO shall determine, in coordination with distribution system operators (DSOs) and significant grid users (SGUs), data exchange applicability and***

scope based on the a) to d) categories in article 40(5). Applicability is therefore to be determined at national level and is subject to approval by the competent authority:

Fill in the Table on the implementation, relevant dates and weblinks of the proposals referred to in Article: 40(5)(a)-(d).

366 *Table 4: Implementation of the provisions on applicability and scope*

MS	Answer		
MS	***Paragraph***	***Level of implementation:*** ***Is it fully implemented and binding or do derogations, transitional periods apply?***	***If not approved, explain and elaborate on the corresponding requirements in the national regulation***
AT	**(a)** structural data in accordance with Article 48	*Under implementation*	*entry into force on 01/12/2021*
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		
BE	**(a)** structural data in accordance with Article 48	*Fully implemented*	
	(b) scheduling and forecast data in accordance with Article 49	*- Fully implemented for PGMs participating to balancing services* *- For PGMs B, C and D not participating to balancing services, if either the TSO or the DSO identifies a need (currently no need identified)*	
	(c) real time data in accordance with Article 44	*Fully implemented*	
	(c) real time data in accordance with Article 47	*Fully implemented*	

	(c) real time data in accordance with Article 50	*Not applicable*	
	(d) provisions in accordance with Article 51	*Fully implemented*	
	(d) provisions in accordance with Article 52	*Fully implemented*	
	(d) provisions in accordance with Article 53	*Fully implemented*	*For medium/low voltage connected SGUs (>1kV), these provisions are fully implemented (FCR, aFRR, mFRR);* *For voltage levels below 1kV, not yet for aFRR and mFRR.*
BG	*No reply*		
CZ	**(a)** structural data in accordance with Article 48	*Fully implemented**	
	(b) scheduling and forecast data in accordance with Article 49	*Fully implemented**	
	(c) real time data in accordance with Article 44	*Fully implemented**	
	(c) real time data in accordance with Article 47	*Fully implemented**	
	(c) real time data in accordance with Article 50	*Fully implemented**	
	(d) provisions in accordance with Article 51	*Fully implemented**	
	(d) provisions in accordance with Article 52	*N/A (no transmission-connected demand facilities)*	
	(d) provisions in accordance with Article 53	*N/A (no transmission-connected demand facilities)*	
	* *quality of the data are still subject to improvement*		
DE	**(a)** structural data in accordance with Article 48	*Fully implemented*	
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		

	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53	*Not applicable*	
DK	**(a)** structural data in accordance with Article 48	*Not directly implemented.*	*Since Energinet already have the necessary data indirectly via Energistyrelsen, we have postponed the specific use of the EU-regulation, with respect to the stakeholders keeping focus on fewer changes at a time.*
	(b) scheduling and forecast data in accordance with Article 49	*Implemented*	*Development of IT-system is ongoing*
	(c) real time data in accordance with Article 44	*Awaiting approval*	
	(c) real time data in accordance with Article 47	*Awaiting approval (Transition periods apply)*	
	(c) real time data in accordance with Article 50	*Awaiting approval (Transition periods apply)*	
	(d) provisions in accordance with Article 51	*Awaiting approval (Transition periods apply)*	
	(d) provisions in accordance with Article 52	*Awaiting approval*	
	(d) provisions in accordance with Article 53	*Awaiting approval*	
EE	**(a)** structural data in accordance with Article 48	*Derogation on protection data for B type generating unit*	
	(b) scheduling and forecast data in accordance with Article 49	*Currently missing DSO connected B-, C- and D-type and TSO connected B-, C- type*	*New format in preparation*
	(c) real time data in accordance with Article 44	*aggregated generation per primary energy source in DSO area currently incomplete*	
	(c) real time data in accordance with Article 47	*implemented*	
	(c) real time data in accordance with Article 50	*implemented*	
	(d) provisions in accordance with Article 51	*implemented*	
	(d) provisions in accordance with Article 52	*Not regulated*	*Implementation under discussion*
	(d) provisions in accordance with Article 53	*Not regulated*	*Implementation under discussion*
ES	**(a)** structural data in accordance with Article 48	*Implemented*	*Even though the national implementation of Art. 40(5) has not been approved, structural information to be exchanged is already*

			included in the national 'operational procedures' 9.3, which is being updated.
	(b) scheduling and forecast data in accordance with Article 49	*Scheduling and forecast data to be exchanged with the TSO already implemented.* *Pending for approval of updated national 'operational procedure' 9.1 for exchanges with DSOs (through SIOS platform).*	
	(c) real time data in accordance with Article 44	*Implemented by means of the national 'operational procedure' 9.2.*	
	(c) real time data in accordance with Article 47	*Implemented by means of the national 'operational procedure' 9.2.for units > 1MW and type B <= 1 MW providing system services*	
	(c) real time data in accordance with Article 50	*Implemented.*	
	(d) provisions in accordance with Article 51	*Real time data: Implemented* *Structural data: Implemented* *Scheduled data: Already implemented in SIOS platform but waiting for the approval of national operational procedure 9.1. to start using it to exchange data with DSOs.*	
	(d) provisions in accordance with Article 52	*Partially implemented*	*This information was already included in the national 'operational procedures' 9.0, 9.1 and 9.3.* *Since demand facilities connected to the transmission grid were directly exchanging information with the TSO (not by means of a third party), an adjustment period for real time data exchange for this kind of facilities is being applied.*
	(d) provisions in accordance with Article 53	*Implemented.*	

FI	**(a)** structural data in accordance with Article 48	*Fully implemented and binding.*	*Requirements defined in applicable agreements*
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		
FR	**(a)** structural data in accordance with Article 48	*Only 48(a) and 48(i) are binding*	
	(b) scheduling and forecast data in accordance with Article 49	*Only 49(a) and 49(c) are binding*	
	(c) real time data in accordance with Article 44	*Only 44(c), 44(d), 44(f) and 44(g) are binding*	
	(c) real time data in accordance with Article 47	*Only 47(1)(a), 47(1)(b), 47(2)(a) and 47(2)(c) are binding*	
	(c) real time data in accordance with Article 50	*Not binding*	
	(d) provisions in accordance with Article 51	*Implemented according to the implementation of articles 48, 49 and 50*	
	(d) provisions in accordance with Article 52	*Only 52(1)(a), 52(1)(b), 52(1)(c), 52(3)(a) and 52(3)(b) are binding*	
	(d) provisions in accordance with Article 53	*Not binding*	
	The applicable provisions according to the TSO's proposal pursuant to article 40(5) of SOGL are fully implemented for generators, consumers and the main DSO (Enedis) but not for all the DSOs (ongoing).		
GR	**(a)** structural data in accordance with Article 48	*In preparation*	-
	(b) scheduling and forecast data in accordance with Article 49		

	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		
HR	**(a)** structural data in accordance with Article 48	*No derogation envisaged; however technical data delivery preparations are not fully completed*	
	(b) scheduling and forecast data in accordance with Article 49	*No derogation envisaged; technical data delivery preparations are not fully completed*	
	(c) real time data in accordance with Article 44	*Fully implemented*	
	(c) real time data in accordance with Article 47	*HOPS receives data directly from SGU's metering points, SGU are not obliged to deliver data*	
	(c) real time data in accordance with Article 50	*HEP ODS receives data directly from SGU's metering points, no need for SGU data delivery* *Data delivery from SGUs connected in substations which are not joint ownership of HOPS and HEP ODS still not established*	
	(d) provisions in accordance with Article 51	*No derogation envisaged, but technical preparation for data exchange is not full ready yet*	
	(d) provisions in accordance with Article 52	*Fully implemented*	
	(d) provisions in accordance with Article 53	*Fully implemented*	
HU	**(a)** structural data in accordance with Article 48	*Fully implemented*	*The terms and conditions required by Article 40 (5) of the SOGL are contained in the National Network Code stipulated by the Hungarian Electricity Energy Act and approved by the Hungarian National Regulatory Authority (NRA).*
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		

	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		
IE	**(a)** structural data in accordance with Article 48	*Fully implemented*	
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		
IT	**(a)** structural data in accordance with Article 48	*Implemented*	*Reserve data defined for pilot projects units providing ancillary services to the TSO*
	(b) scheduling and forecast data in accordance with Article 49	*implemented*	
	(c) real time data in accordance with Article 44	*Fully implemented*	
	(c) real time data in accordance with Article 47	*Fully implemented*	
	(c) real time data in accordance with Article 50	*In implementation*	*Format, means of communication under definition by the standardisation body and Arera.*
	(d) provisions in accordance with Article 51	*Partially implemented (real time data exchange in implementation)*	
	(d) provisions in accordance with Article 52	*Fully implemented*	

	(d) provisions in accordance with Article 53	*Fully implemented*	*Data available for pilot projects*
LT	**(a)** structural data in accordance with Article 48	*Fully implemented*	*Requirements were not approved by separate, individual NERC decision, but TSO states that these requirements were implemented within standard terms and conditions for transmission service agreement which was approved by NERC pre-SOGL. However, NERC have not yet assessed if T&C approved in the past are harmonized with SOGL.*
	(b) scheduling and forecast data in accordance with Article 49	*Fully implemented*	*Same as mentioned above.*
	(c) real time data in accordance with Article 44	*Fully implemented*	*Same as mentioned above.*
	(c) real time data in accordance with Article 47	*Fully implemented*	*Same as mentioned above.*
	(c) real time data in accordance with Article 50	*Fully implemented*	*Same as mentioned above.*
	(d) provisions in accordance with Article 51	*Fully implemented*	*Same as mentioned above.*
	(d) provisions in accordance with Article 52	*Fully implemented*	*Same as mentioned above.*
	(d) provisions in accordance with Article 53	*Fully implemented*	*Same as mentioned above.*
LU	**(a)** structural data in accordance with Article 48	*Not applicable*	*See Table [Q.1.2]*
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		

LV	**(a)** structural data in accordance with Article 48	*Partial implementation - the applicability and scope of the structural data exchange is specified in the TSO agreement with the relevant entity.*	*The overall conditions are specified in national Network Code for the Electricity Sector (https://likumi.lv/ta/id/257943-tikla-kodekss-elektroenergijas-nozare). Further amendments possible.*
	(b) scheduling and forecast data in accordance with Article 49	*Partial implementation - the applicability and scope of the scheduled data exchange is specified in the TSO agreement with the relevant entity.*	*The overall conditions are specified in national Network Code for the Electricity Sector (https://likumi.lv/ta/id/257943-tikla-kodekss-elektroenergijas-nozare). Further amendments possible.*
	(c) real time data in accordance with Article 44	*Partial implementation – according to TSO-DSO agreement DSO provides TSO in real-time the information related to the active and reactive power in line bay, the active and reactive power in transformer bay and the busbar voltages.*	*The overall conditions are specified in national Network Code for the Electricity Sector (https://likumi.lv/ta/id/257943-tikla-kodekss-elektroenergijas-nozare). Further amendments possible.*
	(c) real time data in accordance with Article 47	*Partial implementation – according to TSO-DSO agreement DSO provides TSO in real-time the information related to the active and reactive power in line bay, the active and reactive power in transformer bay and the busbar voltages.*	*The overall conditions are specified in Network Code for the Electricity Sector (https://likumi.lv/ta/id/257943-tikla-kodekss-elektroenergijas-nozare). Further amendments possible.*
	(c) real time data in accordance with Article 50	*Partial implementation – according to TSO-DSO agreement DSO provides TSO with aggregated real time date including data of SGUs connected to the distribution system.*	*The overall conditions are specified in national Network Code for the Electricity Sector (https://likumi.lv/ta/id/257943-tikla-kodekss-elektroenergijas-nozare). Further amendments possible.*
	(d) provisions in accordance with Article 51	*Partial implementation – the applicability and scope of the data exchange concerning significant power generating modules is specified in the TSO-DSO agreement.*	*The overall conditions are specified in national Network Code for the Electricity Sector (https://likumi.lv/ta/id/257943-tikla-kodekss-*

			elektroenergijas-nozare). Further amendments possible.
	(d) provisions in accordance with Article 52	*Not applicable since there are no transmission-connected demand facilities yet.*	*The overall conditions are specified in national Network Code for the Electricity Sector (https://likumi.lv/ta/id/257943-tikla-kodekss-elektroenergijas-nozare). Further amendments possible.*
	(d) provisions in accordance with Article 53	*Not applicable since there are no transmission-connected demand facilities yet.*	*The overall conditions are specified in Network Code for the Electricity Sector (https://likumi.lv/ta/id/257943-tikla-kodekss-elektroenergijas-nozare). Further amendments possible.*
MT	*No reply*		
NL	**(a)** structural data in accordance with Article 48	*Fully implemented*	
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		
NO	**(a)** structural data in accordance with Article 48		*Energilovforskriften (enf)[118] § 6-1 - Rapportering av anleggsdata før idriftsettelse (Gjeldende 21.12.2020)*

[118] Energilovforskriften (enf) and forskrift om systemansvar (fos) are national regulations

	(b) scheduling and forecast data in accordance with Article 49		*fos (forskrift om systemansvar) § 8.a.* *fos § 17*
	(c) real time data in accordance with Article 44		*NVF 2020 (nasjonal veileder funksjonskrav, in accordance with fos § 14). Fos § 18*
	(c) real time data in accordance with Article 47		*Fos § 18*
	(c) real time data in accordance with Article 50		*Fos § 18*
	(d) provisions in accordance with Article 51		*Fos § 23 Opplysningsplikt*
	(d) provisions in accordance with Article 52		*Enl. 6.1 (and fos §14), fos § 18*
	(d) provisions in accordance with Article 53		*Enl. 6.1 (and fos §14), fos § 18*
PL	**(a)** structural data in accordance with Article 48	*Fully implemented*	*Does not apply*
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		
PT	**(a)** structural data in accordance with Article 48	*Fully implemented and binding*	
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		

	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		
RO	**(a)** structural data in accordance with Article 48	*Fully implemented*	
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		
SE	**(a)** structural data in accordance with Article 48	*Will be fully implemented and binding. No derogation on this subject has been decided by Ei yet.*	*Via EIFS 2019:7*
	(b) scheduling and forecast data in accordance with Article 49	*Will be fully implemented and binding. No derogation on this subject has been decided by Ei yet.*	*Via EIFS 2019:7*
	(c) real time data in accordance with Article 44	*Will be fully implemented and binding. No derogation on this subject has been decided by Ei yet.*	*Via EIFS 2019:7* *Regarding 44 h and i, these two points are not applicable in Sweden. Svenska kraftnät will only need aggregated installed power production per primary energy source and per connection point in the observability area. For its needs, Svenska kraftnät intends to estimate that production in real time based on the installed power.* *Svenska kraftnät does not need information on aggregate consumption.*
	(c) real time data in accordance with Article 47	*Will be fully implemented and binding. No derogation on this subject has been decided by Ei yet.*	*Via EIFS 2019:7*

	(c) real time data in accordance with Article 50	*Will be fully implemented and binding. No derogation on this subject has been decided by Ei yet.*	*Via EIFS 2019:7* *Regarding 50(2): Svk decides from case to case whether certain real-time measurement values can be exempted or exempted from delivery for a limited time.*
	(d) provisions in accordance with Article 51	*Will be fully implemented and binding. No derogation on this subject has been decided by Ei yet.*	*Directly via SOGL*
	(d) provisions in accordance with Article 52	*Will be fully implemented and binding. No derogation on this subject has been decided by Ei yet.*	*52(1)(2)(3): Via EIFS 2019:7* *52(4): Directly via SOGL*
	(d) provisions in accordance with Article 53	*Will be fully implemented and binding. No derogation on this subject has been decided by Ei yet.*	*Via EIFS 2019:7* *The requirements in Article 53 shall apply only to SGUs participating in demand flexibility relating to services contracted with DSOs or TSO.*
SI	**(a)** structural data in accordance with Article 48	*Fully implemented*	*Grid code*
	(b) scheduling and forecast data in accordance with Article 49		*No PGM is recognized as distribution-connected SGU*
	(c) real time data in accordance with Article 44		*Grid code*
	(c) real time data in accordance with Article 47		
	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		*Grid code*
	(d) provisions in accordance with Article 53		
SK	**(a)** structural data in accordance with Article 48	*Fully implemented*	
	(b) scheduling and forecast data in accordance with Article 49		
	(c) real time data in accordance with Article 44		
	(c) real time data in accordance with Article 47		

	(c) real time data in accordance with Article 50		
	(d) provisions in accordance with Article 51		
	(d) provisions in accordance with Article 52		
	(d) provisions in accordance with Article 53		

2.3 Changes to the default rules on the data exchange

367 ***Q.1.2 The categories (a)-(d) in Article 40(5) refer to Articles 44, 47-53 where the TSO has the possibility to provide alternatives to the relevant data exchange between the entities laid down in these articles. With respect to this possibility, fill the following Table 3: Did the TSO adopt the provisions on the data exchange as in the corresponding article or the TSO provided otherwise (e.g. additional data to be communicated or different data exchange process)?***

If otherwise provided, explain the differences between TSOs' requirements and those in the articles.

368 *Table 5: Changes to the default rules on the data exchange*

MS		Answer
AT	(a) structural data in accordance with Article 48	*adopted; additional details specified in an associated national regulation (see https://www.ris.bka.gv.at/Dokumente/BgblAuth/BGBLA_2021_II_316/BGBLA_2021_II_316.html)*
	(b) scheduling and forecast data in accordance with Article 49	*adopted*
	(c) real time data in accordance with Article 44	*adopted*
	(c) real time data in accordance with Article 47	*adopted*
	(c) real time data in accordance with Article 50	*adopted*
	(d) provisions in accordance with Article 51	*adopted*
	(d) provisions in accordance with Article 52	*adopted*
	(d) provisions in accordance with Article 53	*adopted*
BE	(a) structural data in accordance with Article 48	*No*
	(b) scheduling and forecast data in accordance with Article 49	*The type of data exchange that will be requested is dependent of the impact of the SPGM or PPM per primary energy source on the system operational security. As such requirements will be simplified for SPGM and PPM per primary energy source < 25 MW and ≥1 MW if acceptable from a system operational security for instance review of Active power schedules from a MW schedule towards an ON/OFF-format is considered. The*

		actual simplifications will be discussed during workshops with all impacted parties.
	(c) real time data in accordance with Article 44	*No*
	(c) real time data in accordance with Article 47	*No*
	(c) real time data in accordance with Article 50	*No*
	(d) provisions in accordance with Article 51	*No*
	(d) provisions in accordance with Article 52	*Art.52(2)a) TSO-connected demand facilities are not required to submit active power schedules but if they participate in system services the TSO can request active power schedules*
	(d) provisions in accordance with Article 53	*No*
BG	*No reply*	
CZ	(a) structural data in accordance with Article 48	*Yes, the adopted provisions provide more details especially on Art.48(1)(a) "general data of the PGM"*
	(b) scheduling and forecast data in accordance with Article 49	*No*
	(c) real time data in accordance with Article 44	*Yes, the adopted provisions provide more details especially on Art.44(a) "substation topology" and the methodology of aggregation (h) and (i)*
	(c) real time data in accordance with Article 47	*Yes, the adopted provisions provide more details especially on Art.47(1)(a) "position of circuit breakers" and require additional data regarding the status of the power plant relevant for emergency situations (e.g LFSM-U or -O on/off).*
	(c) real time data in accordance with Article 50	*Yes, the adopted provisions provide more details especially on Art.47(1)(a) "position of circuit breakers" and require additional data regarding the status of the power plant relevant for emergency situations (e.g LFSM-U or -O on/off) for units of type D.*
	(d) provisions in accordance with Article 51	*No*
	(d) provisions in accordance with Article 52	*Yes, the adopted provisions provide more details especially on the connection to the transmission system (Art. 52(1))*
	(d) provisions in accordance with Article 53	*No*
DE	(a) structural data in accordance with Article 48	*The TSO adopt the provision on the data exchange as in the corresponding articles.*
	(b) scheduling and forecast data in accordance with Article 49	
	(c) real time data in accordance with Article 44	
	(c) real time data in accordance with Article 47	
	(c) real time data in accordance with Article 50	
	(d) provisions in accordance with Article 51	

	(d) provisions in accordance with Article 52	
	(d) provisions in accordance with Article 53	-
DK	(a) structural data in accordance with Article 48	*Additional data will be required, while the national security calculation includes all power generating modules, also type A.*
	(b) scheduling and forecast data in accordance with Article 49	*Additional data are required through national law, while the national security calculation includes all power generating modules, also type A (used as sums pr bidding zone pr balance responsible party).*
	(c) real time data in accordance with Article 44	*No additional data required*
	(c) real time data in accordance with Article 47	*Additional data:* - *Possible active- and reactive power regulating abilities* - *Active- and reactive power limitation (Activated/Disabled)* - *Active- and reactive power limit (Setpoint)* - *Current and voltage in POC* - *Voltage regulation (Activated/Disabled)* - *Powerfactor (measurement/calculation)* - *Powerfactor (Activated/Disabled)* - *System protection (Activated/Disabled)* *System protection (level/setpoint)*
	(c) real time data in accordance with Article 50	*Additional data:* - *Possible active- and reactive power regulating abilities (≥25MW)* - *Active- and reactive power limitation (Activated/Disabled)* - *Active- and reactive power limit (Setpoint)* - *Current and voltage in POC* - *Powerfactor (measurement/calculation)* - *Powerfactor (Activated/Disabled)* - *System protection (Activated/Disabled)* - *System protection (level/setpoint)* - *Voltage regulation (Activated/Disabled) (≥3MW)* - *Voltageregulation droop (≥3MW)* - *POC voltage setpoint (≥3MW)* - *Stop signal (<3MW)* - *Hold signal (<3MW)* *High Wind limitation (for windpower)*
	(d) provisions in accordance with Article 51	*Additional data:* - *Possible active- and reactive power regulating abilities (≥25MW)* - *Active- and reactive power limitation (Activated/Disabled)* - *Active- and reactive power limit (Setpoint)* - *Current and voltage in POC* - *Powerfactor (measuremen/calculation)* - *Powerfactor (Activated/Disabled)* - *System protection (Activated/Disabled)* - *System protection (level/setpoint)*

		- *Voltage regulation (Activated/Disabled) (≥3MW)* - *Voltageregulation droop (≥3MW)* - *POC voltage setpoint (≥3MW)* - *Stop signal (<3MW)* - *Hold signal (<3MW)* *High Wind limitation (for windpower)*
	(d) provisions in accordance with Article 52	*Additional data:* - *Circuit breakers (status) (Primary- and secondary side)* - *Isolators (status) (Primary- and secondary side)* - *Earthing (status) (Primary- and secondary side)* - *Variable transformer settings* - *Voltage in POC* - *Current in POC* *Powerfactor (measurement/calculation)*
	(d) provisions in accordance with Article 53	*For aFFR in DK1:* - *Status Facility in or out* - *Power measurement production/demand (MW)* - *Possible reserve up* - *Maximum droop up (MW/min)* - *Time constant for regulation up (sec.)* - *Possible reserve down* - *Maximum droop down (MW/min)* - *Time constant for regulation down (sec.)* *For mFRR:* - *Status Facility in or out* *Power measurement production/demand (MW)* *Net production/demand in POC* *Balance responsible net production*
EE	(a) structural data in accordance with Article 48	*Mostly as in the article*
	(b) scheduling and forecast data in accordance with Article 49	*Update provided by ECA:* *Yes [there are additional requirements set by the TSO]. 44-47 real time data: from type B there is needed power control and emergency power control signals, also for solar plant is needed solar irradiance and ambient temperature also for wind plants wind speed and ambient temperature. From type C there is also needed FCR control and position signals and FCR main settings control (deadband, droop), also from type C PSS(Power System Stabilizers) position is needed, also (LFSM-O) and (LFSM-U) actions signals are needed.* *51 Article: From type C PSSe, PSCAD models are needed.*
	(c) real time data in accordance with Article 44	
	(c) real time data in accordance with Article 47	
	(c) real time data in accordance with Article 50	
	(d) provisions in accordance with Article 51	
	(d) provisions in accordance with Article 52	*Not regulated*
	(d) provisions in accordance with Article 53	*Not regulated*
ES	(a) structural data in accordance with Article 48	*The TSO, in coordination with DSO, decided not to request from SGUs:* *(g) the capability of remote access to the circuit breaker.*

	(b) scheduling and forecast data in accordance with Article 49	*Provisions adopted in line with the article (P.O. 9.1 and 3.6)*
	(c) real time data in accordance with Article 44	*The TSO does not request from the DSOs: (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.*
	(c) real time data in accordance with Article 47	*Even though Type B generators in Spain are those ones with a power capacity of 0,1 MW < P <= 5 MW, in line with the current status of adoption of article 40(5), data exchange requirements for Type B generators below 1 MW (threshold pending for final approval and subject to review every 2 years) apply only in aggregation, if the units provide system services, the same as for Type A generators (requirement of article 47 has been relaxed). The currently applied data exchange requirements threshold might be reduced or adopted fully in line with article 47 if considered of need by national authorities.*
	(c) real time data in accordance with Article 50	*The same differentiated requirements with regards to applicable thresholds for type B generators as described in previous point (ar. 47). In Spain, SGUs connected to the distribution grid are free to choose if they want to send the information directly to the TSO or through the connecting DSO, no matter the type of SGU. If providing aFRR, information must be directly sent to the TSO, although SGUs can also send it directly to the connecting DSO.* *The TSO does not request from power generation modules: (a) For power generation modules with a power capacity between 1 MW and 5 MW that do not participate in system services (congestion management and ancillary services), the position of circuit breakers. (b) current and, in case of not participating in power reactive control, voltage at the connection point.*
	(d) provisions in accordance with Article 51	*Adopted in line with article even if pending of final adoption of national act implementing article 40.5.*
	(d) provisions in accordance with Article 52	*With regards real time data, the TSO does not request from transmission connected demand facilities: (3.b) the minimum and the maximum power range to be curtailed in real time.*
	(d) provisions in accordance with Article 53	*In Spain, SGUs connected to the distribution grid are free to choose if delivering the information through connecting DSO or TSO, no matter the type of SGU. If providing balancing services, information must be directly sent to the TSO, although SGUs can also send it directly to the connecting DSO.* *In this case, if SGUs are participating in demand response services by means of aggregates, some data exchange requirements have been lighter defined. The reason is that the specific location of these aggregates is not known, and some data do not seem to be relevant anymore.*
FI	(a) structural data in accordance with Article 48	*Mostly in line with SO GL. However, Fingrid only requires data needed for its processes but has the possibility to request additional data, on demand, as described by the SO GL.*
	(b) scheduling and forecast data in accordance with Article 49	

	(c) real time data in accordance with Article 44	
	(c) real time data in accordance with Article 47	
	(c) real time data in accordance with Article 50	
	(d) provisions in accordance with Article 51	
	(d) provisions in accordance with Article 52	
	(d) provisions in accordance with Article 53	
FR	(a) structural data in accordance with Article 48	*RTE does not identify any need for data that is not required (see previous table [Q.1.1.D])*
	(b) scheduling and forecast data in accordance with Article 49	
	(c) real time data in accordance with Article 44	
	(c) real time data in accordance with Article 47	
	(c) real time data in accordance with Article 50	
	(d) provisions in accordance with Article 51	
	(d) provisions in accordance with Article 52	
	(d) provisions in accordance with Article 53	
GR	(a) structural data in accordance with Article 48	*No TSO proposal made yet*
	(b) scheduling and forecast data in accordance with Article 49	
	(c) real time data in accordance with Article 44	
	(c) real time data in accordance with Article 47	
	(c) real time data in accordance with Article 50	
	(d) provisions in accordance with Article 51	
	(d) provisions in accordance with Article 52	
	(d) provisions in accordance with Article 53	
HR	(a) structural data in accordance with Article 48	*Additional data envisaged, but complete list is still under preparation*
	(b) scheduling and forecast data in accordance with Article 49	*No additional data envisaged*

	(c) real time data in accordance with Article 44	*No additional data envisaged*
	(c) real time data in accordance with Article 47	*HOPS receives data directly from SGU's metering points, no need for SGU data delivery*
	(c) real time data in accordance with Article 50	*HEP ODS receives data directly from SGU's metering points, no need for SGU data delivery*
	(d) provisions in accordance with Article 51	*Additional data envisaged, but complete list is still under preparation*
	(d) provisions in accordance with Article 52	*No additional data envisaged*
	(d) provisions in accordance with Article 53	*No additional data envisaged*
HU	(a) structural data in accordance with Article 48	*MAVIR adopted the provisions.*
	(b) scheduling and forecast data in accordance with Article 49	
	(c) real time data in accordance with Article 44	
	(c) real time data in accordance with Article 47	
	(c) real time data in accordance with Article 50	
	(d) provisions in accordance with Article 51	
	(d) provisions in accordance with Article 52	
	(d) provisions in accordance with Article 53	
IE	(a) structural data in accordance with Article 48	*Adopted*
	(b) scheduling and forecast data in accordance with Article 49	*Adopted*
	(c) real time data in accordance with Article 44	*From Section 3.3 of attached KORRR proposal (attached to e-mail):* *"The methodology to determine the observability area in accordance with Article 75 of SOGL was approved by ACER in June 2019. Studies have shown that the Observabilty Area currently contains no DSO elements. This is subject to review every three years.* *Therefore it is agreed by TSO and DSO, to limit the scope and applicability of Article 44 to the existing extent of visibility of real-time data provided to the TSO by the DSO which allows the TSO to operate the system safely and securely."*
	(c) real time data in accordance with Article 47	*Adopted*
	(c) real time data in accordance with Article 50	*Adopted*
	(d) provisions in accordance with Article 51	*Adopted*

	(d) provisions in accordance with Article 52	*Adopted*
	(d) provisions in accordance with Article 53	*Adopted*
IT	(a) structural data in accordance with Article 48	*Adopted*
	(b) scheduling and forecast data in accordance with Article 49	*Adopted*
	(c) real time data in accordance with Article 44	*From Section 3.3 of attached KORRR proposal (attached to e-mail):* *"The methodology to determine the observability area in accordance with Article 75 of SOGL was approved by ACER in June 2019. Studies have shown that the Observabilty Area currently contains no DSO elements. This is subject to review every three years.* *Therefore it is agreed by TSO and DSO, to limit the scope and applicability of Article 44 to the existing extent of visibility of real-time data provided to the TSO by the DSO which allows the TSO to operate the system safely and securely."*
	(c) real time data in accordance with Article 47	*Adopted*
	(c) real time data in accordance with Article 50	*Adopted*
	(d) provisions in accordance with Article 51	*Adopted*
	(d) provisions in accordance with Article 52	*Adopted*
	(d) provisions in accordance with Article 53	*Adopted*
LT	(a) structural data in accordance with Article 48	*No difference*
	(b) scheduling and forecast data in accordance with Article 49	*No difference*
	(c) real time data in accordance with Article 44	*No difference*
	(c) real time data in accordance with Article 47	*No difference*
	(c) real time data in accordance with Article 50	*No difference*
	(d) provisions in accordance with Article 51	*No difference*
	(d) provisions in accordance with Article 52	*No difference*
	(d) provisions in accordance with Article 53	*No difference*
LU	(a) structural data in accordance with Article 48	*Structural data are available through CREOS Asset Management Department as every connection request to the MV and HV grid has to be verified and approved by CREOS.*

	(b) scheduling and forecast data in accordance with Article 49	*Not applicable as no SGUs in Luxembourg*
	(c) real time data in accordance with Article 44	*This data are available as CREOS is a combined TSO-DSO (see 1.1.B).*
	(c) real time data in accordance with Article 47	*Not applicable as no SGUs in Luxembourg*
	(c) real time data in accordance with Article 50	*Not applicable as no SGUs in Luxembourg*
	(d) provisions in accordance with Article 51	*No such units connected to the CREOS grid or to a third-party DSO grid.*
	(d) provisions in accordance with Article 52	*The relevant data of customers connected to the transmission grid of CREOS is available in real time in the CREOS SCADA system.*
	(d) provisions in accordance with Article 53	*No such units connected to the CREOS grid or to a third-party DSO grid.*
LV	(a) structural data in accordance with Article 48	*TSO adopt the provisions as in the corresponding Article*
	(b) scheduling and forecast data in accordance with Article 49	
	(c) real time data in accordance with Article 44	
	(c) real time data in accordance with Article 47	
	(c) real time data in accordance with Article 50	
	(d) provisions in accordance with Article 51	
	(d) provisions in accordance with Article 52	
	(d) provisions in accordance with Article 53	
MT	*No reply*	
NL	(a) structural data in accordance with Article 48	*The joint network operators (i.e. including the TSO) decided to collect the data exchange requirements of all EU codes, ENTSO-E all TSO implementation proposals and the existing Dutch grid code, to produce one list. This list was approved as chapter 13 of the revised Dutch grid code. (The Dutch grid code was completely revised to implement the new EU codes.) In ongoing implementation projects these requirements are detailed even further, down to data point level.* *The list includes all data exchange requirements as in art 48.*
	(b) scheduling and forecast data in accordance with Article 49	*Idem (a).* *The list includes all data exchange requirements as in art 49.*
	(c) real time data in accordance with Article 44	*Idem (a).* *The list includes all data exchange requirements as in art 44.*
	(c) real time data in accordance with Article 47	*Idem (a).* *The list includes all data exchange requirements as in art 47.*

	(c) real time data in accordance with Article 50	*Idem (a).* *The list includes all data exchange requirements as in art 50.*
	(d) provisions in accordance with Article 51	*Art. 51.1 implemented as defined.* *Art. 51.2 not implemented. Each SGU submits its data to the grid operator it is connected to.* *Art. 51.3 partially implemented. The grid code mandates exchange of data on the aggregated production.* *Implementation of data exchange on individual PGMs in the DSO system to the TSO, and vice versa, is under discussion in the implementation projects.*
	(d) provisions in accordance with Article 52	*Idem (a).* *The list includes all data exchange requirements as in art. 52.*
	(d) provisions in accordance with Article 53	*Idem (a).* *The list includes all data exchange requirements as in art. 53.*
NO	(a) structural data in accordance with Article 48	*Under discussion and in preparation*
	(b) scheduling and forecast data in accordance with Article 49	
	(c) real time data in accordance with Article 44	
	(c) real time data in accordance with Article 47	
	(c) real time data in accordance with Article 50	
	(d) provisions in accordance with Article 51	
	(d) provisions in accordance with Article 52	
	(d) provisions in accordance with Article 53	
PL	(a) structural data in accordance with Article 48	*As in SO GL, additional data defined in „Scope of data exchange" document (https://www.pse.pl/documents/20182/ed8e6365-4983-40a7-afed-814b7f12eea4?safeargs=646f776e6c6f61643d74727565)* *Jako że zapisy SO GL są w swojej naturze dość ogólne, PSE na potrzeby realizacji swoich procesów musiało doprecyzować jakie informacje są wymagane od poszczególnych użytkowników systemu.*
	(b) scheduling and forecast data in accordance with Article 49	
	(c) real time data in accordance with Article 44	
	(c) real time data in accordance with Article 47	
	(c) real time data in accordance with Article 50	
	(d) provisions in accordance with Article 51	
	(d) provisions in accordance with Article 52	
	(d) provisions in accordance with Article 53	
PT	(a) structural data in accordance with Article 48	*As in the corresponding article*

	(b) scheduling and forecast data in accordance with Article 49	*As in the corresponding article*
	(c) real time data in accordance with Article 44	*As in the corresponding article*
	(c) real time data in accordance with Article 47	*As in the corresponding article*
	(c) real time data in accordance with Article 50	*As in the corresponding article*
	(d) provisions in accordance with Article 51	*As in the corresponding article*
	(d) provisions in accordance with Article 52	*As in the corresponding article*
	(d) provisions in accordance with Article 53	*As in the corresponding article*
RO	(a) structural data in accordance with Article 48	*There are no additional data*
	(b) scheduling and forecast data in accordance with Article 49	*There are no additional data (only specification about what has to do a PGM owner, concerning data exchange, in case that its PGM is affected by an incident/event).*
	(c) real time data in accordance with Article 44	*YES, additional data are only frequency voltage of DSO substations busbars. Art. 44 was already respected in Romania before of R1485/2017 implementation with requirement of frequency voltage of DSO busbars. Therefore, with this minor differences, art. 44 from SOGL was implemented.*
	(c) real time data in accordance with Article 47	*YES, additional data are (improper expression additional data because 47(1) allows thus):* *-for B, C and D type PGM (with consupmtion different towards household load –only in this case): voltage, frequency and current. Art. 47 was already respected in RO before of R1485/2017 implementation and remains according to provisions of 47(1) - 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 (…)* *- for renewables:* *1.wind average speed and direction at the level of eolian power park modules* *2.average solar radiation at the level of photovoltaic power park modules* *3.available power of eolian/solar power park modules* *- for HVDC is no additional data*
	(c) real time data in accordance with Article 50	*There are no additional data (art. 50(2) was implemented by Transelectrica. For PGM owners connected to DSO, TSOs : PGM owners will send data both TSO and DSO (i.e power from connection point), for C and D type PGMs (in Romania B type is between 1-5 MW), direct or indirect. If there are more than 1 units (B type units) connected to a single substation data are sending -aggregated values- by DSO to TSO.)*
	(d) provisions in accordance with Article 51	*There are no additional data.*
	(d) provisions in accordance with Article 52	*YES, additional data are (it is improper said additional data because it is specified - Unless otherwise provided by the TSO) -single line diagram (it is essential in power systems/for*

		OTS), data concerning manual demand switch and restrictions concerning demand limitation (on bands), power interval for demand response.
	(d) provisions in accordance with Article 53	*There are no additional provisions.*
SE	(a) structural data in accordance with Article 48	*Additional data to be communicated in addition to the data referred to in Article 48.1 (for power generating module type B/C: data needed for the calculation of short-circuit current and for power generating module type D: some additional structural data such as data on the technical design of the power generation plant, data on transformers in the production plant…) (See EIFS 2019:07 chapter 3 2§ and 3§ for full text in Swedish.)*
	(b) scheduling and forecast data in accordance with Article 49	*The applicability of article 49 is extended to both transmission- and distribution-connected power generation modules. Additional data to be communicated in addition to the data specified in Article 49 (data on active output power, the size of the active reserves and availability on the day ahead and intraday timeframes, as well as the planned control mode for the components that are relevant for reactive power) to both DSO and TSO. (See EIFS 2019:07 chapter 3 5§ for full text in Swedish.)*
	(c) real time data in accordance with Article 44	*The applicability applies to measuring points within the observability area for 44 a-g. In addition to what DSOs must communicate in accordance with Article 44 a-g, the status on automatic voltage control functionality for shunt reactors and capacitors must be communicated.* *44 h and I are not applicable in Sweden. Svenska kraftnät will only need aggregated installed power production per per primary energy source and per connection point in the observability area. For its needs, Svenska kraftnät intends to estimate that production in real time based on the installed power. Svenska kraftnät does not need information on aggregate consumption either.* *I summary, while data referred to in 44h and 44 I are excluded (not applicable in Sweden) more data compared to SOGL is required.*
	(c) real time data in accordance with Article 47	*Article 47 (1): other data than those in 47(1) shall be communicated. The proposed data are almost the same as those stated in 47(1) plus additional data. The applicability is extended to also include power generation modules that are SGUs and that are connected in the observability area. (See EIFS 2019:07 chapter 3 8§ for full text in Swedish.)* *Article 47 (2): other data than those in 47(2) shall be communicated. The data are almost the same as those stated in 47(2) plus additional data (such as active and reactive power measurements, operational status, topology, regulating positions of transformers, voltage measurements on busbars, status for automatic voltage control settings for reactors and capacitors. (See EIFS 2019:07 chapter 3 10§ for full text in Swedish.)*
	(c) real time data in accordance with Article 50	*50(1): The application is limited to SGUs that are outside the observability area (SGUs within observability area are covered by 47(1)'s corresponding requirements in EIFS 2019:7 chapter 3 9§). In summary this states that SGUs outside the TSOs observability area shall provide the TSO and the DSO with*

		real-time data on active and reactive power measurements as well as data on the topology at the point of connection. *The requirements in 50 (1) has been modified however mostly I form of wording:* *For example 50(1) a, is almost the same compared to SOGL but 50(1) b has been modified by changing "and" with "or" :* *SOGL 50(1)(b): active and reactive power flows, current, and voltage at the connection point.* *EIFS 2019:7:active and reactive power flows or current and voltage at the connection point.*
	(d) provisions in accordance with Article 51	*No changes - data exchange as in the corresponding article*
	(d) provisions in accordance with Article 52	*52(1) : The applicability is extended to also include demand facilities that are connected within the observability area. The owner of a demand facility shall provide Svk with the information required by Article 52 (1). In addition, they shall provide the relevant DSOs and the TSO with some additional structural data such as information on busbars, lines, transformers.* *52(2): The applicability is extended to also include demand facilities that are connected within the observability area. However, the same data requirements as referred to in 52(1).* *52(3): The applicability is extended to also include demand facilities that are connected within the observability area. In addition, they shall provide the relevant DSOs and the TSO with some additional real time data such as information on regulating positions of transformers and voltage measurements on busbars.* *(See EIFS 2019:07 chapter 3 4§, 6§, and 11§ for full text in Swedish.)* *52 (4): same requirements as in article 52(4).*
	(d) provisions in accordance with Article 53	*The applicability is limited to demand facilities which participate in providing demand response as agreed services to TSO or DSOs. (See EIFS 2019:07 chapter 4 1§ for full text in Swedish.)*
SI	(a) structural data in accordance with Article 48	*implemented*
	(b) scheduling and forecast data in accordance with Article 49	*In this moment TSO does not required those data since this are not needed - no PGM is recognized as distribution-connected SGU*
	(c) real time data in accordance with Article 44	*implemented*
	(c) real time data in accordance with Article 47	*implemented*
	(c) real time data in accordance with Article 50	*implemented*
	(d) provisions in accordance with Article 51	*implemented*
	(d) provisions in accordance with Article 52	*implemented*
	(d) provisions in accordance with Article 53	*In this moment TSO does not required those data since this are not needed*
SK	(a) structural data in accordance with Article 48	*Yes, Requirements from DSOs for structural data on charging stations - development of electromobility.*

	(b) scheduling and forecast data in accordance with Article 49	*No*
	(c) real time data in accordance with Article 44	*No*
	(c) real time data in accordance with Article 47	*No*
	(c) real time data in accordance with Article 50	*No*
	(d) provisions in accordance with Article 51	*No*
	(d) provisions in accordance with Article 52	*No*
	(d) provisions in accordance with Article 53	*No*

3 Key organisation requirements, roles and responsibilities

3.1 Implementation of the KORRR

369 ***Q.2.1 Report the status of the national implementation of the provisions of the KORRR methodology (in accordance with Article 40(6)) by filling the following Table - Choose between: under discussion, sent for approval, approved, fully implemented, or other (elaborate). Include relevant dates and web-link.***

370 *Table 6: Implementation of the KORRR*

MS	Answer			
	Status (choose one)**:** **-under discussion** **-sent for approval**, **-approved**, **-fully implemented**, **-other** (elaborate).	**Approval date (or estimate) and web link**	**Designated entity for approval**	**Relevant Article in the KORRR**
AT	*approved*	*15.07.2021, https://www.ris.bka.gv.at/Dokumente/BgblAuth/BGBLA_2021_II_316/BGBLA_2021_II_316.html*	*NRA*	*?*
BE	*approved*	*- T&C SA (12/11/2020) –(mandatory for SPGM and PPM per primary energy source ≥ 25 MW – default values for other units)*	*Regulator: CREG*	*- Details on data-exchange between SGUs and TSOs*

		https://www.creg.be/fr/publications/decision-b2057 -T&C OPA (12/11/2020) (mandatory for SPGM and PPM per primary energy source ≥ 25 MW – default values for other units) https://www.creg.be/fr/publications/decision-b2058 -Coordination Rules (04/03/2021) https://www.creg.be/nl/publicaties/beslissing-b2056 -T&C BSP mFRR (20/12/2019): https://www.creg.be/nl/publicaties/beslissing-b20002 -T&C BSP aFRR (22/04/2021): https://www.creg.be/sites/default/files/assets/Publications/Decisions/B2210NL.pdf -Connection contracts (13/09/2021): https://www.creg.be/fr/publications/decision-b2283		- SOGL Article 46
	sent for approval	Collaboration Agreement (sent for approval 30/09/2021)	Competent regulators (federal and regional)	Exchange between DSOs and TSOs, SOGL Art 43 and 44
	Sent for approval (structural, balancing, RT) In preparation (schedules)	-Collaboration Agreement (sent for approval 30/09/2021) -T& C BSP -Amendment of T&C SA, T&C OPA and Coordination Rules in accordance towards extension of mandatory compliance for SPGM and PPM per primary energy source < 25 MW) (in preparation)	Competent regulators (federal and regional)	Exchange between DSO-connected SGUs and TSOs, SOGL Art 48, 49, 50, 51 and 53
BG	No reply			
CZ	fully implemented	18/01/2019	NRA	-
DE	fully implemented	18/01/2019 https://www.bundesnetzagentur.de/DE/Beschlusskammern/1_GZ/BK6-GZ/2018/BK6-18-071/BK6-18-071_beschluss_2019_01_18.pdf?__blob=publicationFile&v=2	NRA	all
DK	Approved	2019-01-18	Forsyningstilsynet	-

EE	*approved*	*Not public document, document shall be updated by Q4 2022*	*TSO*	*40(6)a SOGL*
	approved	*https://elering.ee/sites/default/files/public/Teenused/Liitumine/06 - Kliendi elektriosa projekti koostamise ja modelleerimise n%C3%B5uded_2019.05.30.pdf*	*TSO and DSO*	*40(6)b SOGL*
	other	*-*	*DSO*	*40(6)c SOGL*
	under discussion	*needs some follow up, https://elering.ee/sites/default/files/public/Teenused/Liitumine/06 - Kliendi elektriosa projekti koostamise ja modelleerimise n%C3%B5uded_2019.05.30.pdf*	*TSO, SGU*	*40(6)d SOGL*
	under discussion	*needs some follow up, https://elering.ee/sites/default/files/public/Teenused/Liitumine/06 - Kliendi elektriosa projekti koostamise ja modelleerimise n%C3%B5uded_2019.05.30.pdf*	*TSO, SGU, DSO*	*40(6)e SOGL*
	under discussion	*needs some follow up, https://elering.ee/sites/default/files/public/Teenused/Liitumine/06 - Kliendi elektriosa projekti koostamise ja modelleerimise n%C3%B5uded_2019.05.30.pdf*	*TSO, SGU, DSO*	*40(6)f SOGL*
	under discussion	*needs some follow up, https://elering.ee/sites/default/files/public/Teenused/Liitumine/06 - Kliendi elektriosa projekti koostamise ja modelleerimise n%C3%B5uded_2019.05.30.pdf*	*TSO, SGU, DSO*	*40(6)g SOGL*
ES	*fully implemented*	*13/11/2019* *Resolución de 13 de noviembre de 2019, de la CNMC, por la que se aprueban las especificaciones para la implementación nacional de la metodología prevista en el artículo 40.6 del Reglamento (UE) 2017/1485 (https://www.boe.es/boe/dias/2019/11/28/pdfs/BOE-A-2019-17178.pdf)*	*Spanish NRA (CNMC)*	
FI	*fully implemented*	*18/01/2019* *https://www.fingrid.fi/globalassets/dokumentit/fi/sahkomarkkinat/verkkosaantofoorumi/ev_paatos-ehdotukseen-yhteisista-tiedonvaihdon-vaatimuksista-rooleista-ja-vastuista-korrr.pdf*	*NRA*	
FR	*approved*	*17/01/2019*	*CRE*	
	The methodology is fully implemented for generators, consumers and the main DSO (Enedis) but not for all the DSOs (ongoing).			
GR	*approved*	*17/01/2019*	*RAE*	
HR	*other*	*Agreement TSO-DSO in preparation, lists, formats, and delivery way of*		

		exchanged data for each type of data and for each type of SGU are in preparation		
HU	*fully implemented*	*15/01/2019* *https://www.mavir.hu/documents/10258/229138212/4.3.KORRR_ENG_osszefuzve.pdf/f5d29bfa-f542-65f8-26bf-07703a518bfc?version=1.0*	*MEKH (NRA)*	
IE	*approved*	*21/01/2019* *https://www.cru.ie/wp-content/uploads/2019/01/CRU19005-Final-signed-KORRR-approval-letter.pdf*	*CRU*	
IT	*other*	*15/01/2019*	*ARERA*	*All KORRR document*
LT	*Other*			*3.1*
	Other			*3.2*
	Other. Requirements are listed in Electricity network rules approved by the Order of Energy Minister of the Republic of Lithuania by Resolution No 1-116 of 18 June 2012 (art. 79.1.4 Link) and Imbalance purchase-sales contract with BRPs (annex 1 paragraph 3.4) (link)			*3.3*
	Other			*3.4*
	Other			*3.5*
	Other			*3.6*
	Other			*3.7*
	Other. Requirements are listed in Standard terms and conditions of transmission agreement (Link) which is signed individually with SGU			*3.8*
	Other			*3.9*
	Other			*5.1*
	Other			*5.2*

	Other. Requirements are listed in Remote control requirements approved by TSO annex 5, chapter 2, paragraph 12 (Link) (TSO's internal document).			*5.3*
	Other. Requirements are listed in Standard terms and conditions of transmission agreement which is signed individually with SGU annex 6.			*5.4*
	Other.			*5.5*
	Other.			*5.6*
	Other. Requirements are listed in Data exchange (Annex 1) rules between Baltic TSOs and in System operational agreements with Polish and Swedish TSOs.			*6.1*
	Other. Requirements are listed in Standard terms and conditions of transmission agreement between TSO and DSO Annex 3			*6.2*
	Other. Applied according to the Individual grid model (IGM) methodology, which is SO GL document, also in accordance with KORRR 8.1 (d)			*6.3*
	Other. Real-time data are being exchanged according to system operational agreements and Real-time data exchange lists.			*6.4*

	Other. Requirements are listed in Standard terms and conditions of transmission agreements Annex 3 paragraph 18			*6.5*
	Other. No DSO in Lithuania falls under the observability area of other TSO, not applied.			*6.6*
	Other. No SGUs in Lithuania falls under the observability area of other TSO, not applied			*6.7*
	Other. Requirements are listed in Electricity network rules paragraph 78.12			*6.8*
	Other. OPDE is used under SOGL requirements.			*6.9*
	Other. Requirements are listed in Electricity network rules paragraph 92.4.			*6.10*
	Requirements are listed in Terms and condition for connection to the transmission grid and in Electricity network rules paragraph 73.7. Necessary to add a template			*7.1*
	Other. Fulfilled, data exchange is ensured, template is missing			*7.2*
	Currently planning and data revision is done once a year. Needs to be done once every six months. Six months ahead. Processes are being reviewed. Requirements are listed in system operational			*8.1*

	agreements with TSOs			
	Other. Requirements are listed in Operational control provisions document chapter 3 section 3 *Section nr 4 (Link)* *Imbalance purchase-sales contract with BRPs (annex 1 3.4 paragraph)* *Data exchange rules document Annex 1*			*9.1*
	Other. Scheduled data are exchanged, templates must be prepared and published			*9.2*
	Other. Scheduled data are exchanged, templates must be prepared and published			*9.3*
	Other. Requirements are listed in Remote control requirements document (Link)			*9.4*
	Other. Requirements are listed in Operational control provisions document chapter 3 section 31 (Link)			*9.5*
	Other. Requirements are listed in Remote control requirements document annex 5 (Link)			*10.1*
	Other. Requirements are listed in Remote control requirements document annex 5 (Link)			*10.2*
	Other. Requirements are listed in Remote			*10.3*

control requirements document annex 3 (Link)			
Other. Fulfilled or applied in accordance with other requirements of the Entso-e documents			*10.4*
Other. Requirements are listed in Remote control requirements document annex 7 (Link)			*10.5*
Other. Requirements are listed in Operational control provisions document chapter 3 section 3 (Link)			*11.1*
Other. DSOs responsibility to specify the format			*11.2*
Other. Applied to DSOs			*11.3*
Other. Operational control provisions document chapter 3 section 4 (Link)			*12.1*
Other. Same as mentioned above			*12.2*
Other. Requirements are listed in Operational agreement with DSO annex 3			*13.1*
Other. Requirements are listed in Remote control requirements document annex 7 (Link)			*13.2*
Other. DSOs responsibility			*13.3*
Other. KORRR paragraph 7.2			*14.1*
Other. KORRR paragraph 7.1			*14.2*
Other. Currently planning is done once a year			*15.1*

	Requirements are listed in Electricity network rules paragraph 69.2			
	Other. Imbalance purchase-sales contract with BRPs (annex 1 3.4 paragraph)			*16.1*
	Other. Imbalance purchase-sales contract with BRPs (annex 1 3.4 paragraph) (Link)			*16.2*
	Other. Requirements are listed in Remote control requirements document annex 3 (Link)			*17.1*
	Other. Requirements are listed in Remote control requirements document annex 7 (Link)			*17.2*
LU	*other*	*January 2019*	*ILR*	*-*
LV	*under discussion*	*-*	*PUC*	*1(3)*
	under discussion	*-*	*PUC*	*1(4)(b)*
	under discussion	*-*	*PUC*	*3(2)*
	under discussion	*-*	*PUC*	*3(3)*
	under discussion	*-*	*PUC*	*3(4)*
	under discussion	*-*	*PUC*	*3(6)*
	under discussion	*-*	*PUC*	*6(10)*
	under discussion	*-*	*PUC*	*10(5)*
	under discussion	*-*	*PUC*	*11(1)*
	under discussion	*-*	*PUC*	*12(1)*
	under discussion	*-*	*PUC*	*15(1)*
	under discussion	*-*	*PUC*	*16(1)*
	under discussion	*-*	*PUC*	*17(1)*
MT	*No reply*			
NL	*fully implemented*	*01/01/2019* *https://www.acm.nl/nl/publicaties/goedkeuringsbesluit-methodologie-over-gegevensuitwisseling-artikel-40-lid-6-so-verordening*	*ACM (NRA)*	
NO	*under discussion*			
	other			

PL	*fully implemented*	*21/01/2019* *https://www.pse.pl/documents/20182/857636b7-6954-4042-95bf-7639fd087efa?safeargs=646f776e6c6f61643d74727565*	*URE*	
PT	*fully implemented*	*17.01.2019, https://mercado.ren.pt/PT/Electr/ActServ/ProjInter/NCs/SO/BibSO/Anexo_KORRR.pdf*	*ERSE*	
RO	*approved*	*16/01/2019* *https://www.cru.ie/wp-content/uploads/2019/01/CRU19005-Final-signed-KORRR-approval-letter.pdf*	*NRA*	
SE	*other: Implementation methods are under elaboration in 8 working groups* *Ei has approved KORRR. Web link to the decision (beslut):* *Artikel 40.6 Viktiga organisatoriska krav, roller och ansvarsområden när det gäller datautbyte - Energimarknadsinspektionen (https://ei.se/bransch/eu-direktiv-och-forordningar/kommissionsforordningar-natkoder/drift-av-eloverforingssystem-so/artikel-40.6-viktiga-organisatoriska-krav-roller-och-ansvarsomraden-nar-det-galler-datautbyte)*	*Total 2021-12-31* *Power system hub* *Until now,* *2021-04-19 Unavailability plans* *2021-06-21 Static power system model* *2021-07-07 Information security*	*Development of provisions is based on joint work and general consensus between TSO, SGUs, and DSOs. However final approval is by TSO.* *8 reports,* *- Static power system model* *- Dynamic power system models* *- Real-time data* *- Production and consumption plans* *- Balancing services* *- Structural information for data exchange* *- Unavailability plans* *- Information security*	
SI	(a) fully implemented with APG, sent for approval with HOPS, under discussion with TERNA	17.6.2020 (APG)	TSO - TSO	

SK	*fully implemented*	*21/01/2019* *https://www.urso.gov.sk/65328-sk/00032019e-eu/*	*URSO (NRA)*	*all*

371 ***Q.2.2 If "Other" was chosen in the Table 4 (question 2.1), provide detailed motivation, also highlighting the requirements and rules currently applicable in the national legislation that refer to those in Article 40(6) and the KORRR.***

372 *Table 7: Implementation of the KORRR (further details)*

MS	Answer
AT	-
BE	-
BG	*No reply*
CZ	-
DE	-
DK	-
EE	*Estonian TSO not to decide DSO-DSO data exchange*
ES	-
FI	-
FR	-
GR	*Non-applicable*
HR	*Transmission grid code, Transmission grid connection rules, Distribution grid code and Distribution grid connection rules contain legal basis for all data exchanges. KORRR application is more the introducing of obligation to start permanently deliver data*
HU	-
IE	-
IT	*KORRR was approved in January 2019, following the agreement at EU level. KORRR national implementation is done by updating the National Grid code by Terna. Arera approved the relevant provisions on 11 February 2020 along with 40(5) and 40(7) ones.*
LT	*Note: NERC would like to inform that KORRR methodology is implemented throughout number of different legislations. Some of the requirements are set by Orders of Minister of Energy, some are implemented through contracts. Currently we have not reviewed mentioned documents to ensure that KORRR requirements are fulfilled. In future we do plan to review documents mentioned above and request TSO to submit a proposal for a methodology regarding KORRR implementation.*
LU	*The national law relative to the organisation of the power market from August 1st 2007 as modified and transposing the EU electricity directives into national law, forms the legislative basis for the grid operators to impose and where necessary to develop technical requirements for the connection of the network users. As a matter of fact these technical requirements have been in place for a while and have been adapted to the technological progress as well as to the requirements from the different network codes. From our point of view, this article has been implemented.* *The KORRR methodology was approved by ILR in January 2019.*

LV	-
MT	*No reply*
NL	-
NO	*Elaborate on the process: Mapping coherence, identifying potential gaps and translating the defined roles into a Norwegian context.*
PL	-
PT	-
RO	-
SE	*Svenska kraftnät invited DSOs and SGUs to several seminars where the data exchange were presented and implementation methods discussed. After these seminars Svenska kraftnät presented an implementation report and suggested templates to be confirmed by the DSOs and SGUs. As the report generated several remarks regarding details, implementation methods and time schedules Svenska kraftnät decided to initiate a profounder initiative in order for agreement to be reached. Eight working groups with specialists from Svenska kraftnät, DSO and SGU were founded. Each working group represent a specific topic and are elaborating a detailed implementation report. This work is ongoing and all reports are to be finished by the end of this year.*
SI	-
SK	-

4 Agreements between TSO and relevant DSOs

4.1 Agreements on data exchanges between TSO and relevant DSOs

373 ***Q.3.1 Pursuant to Article 40(7), each TSO shall agree with the relevant DSOs on effective, efficient and proportional processes for providing and managing data exchanges between them. In addition, each TSO shall agree with the relevant DSOs on the format for the data exchange. Confirm the following information:***

A. Both the agreements above have been reached (YES – NO) - If NO, motivate the answer

B. When the agreements were reached? Indicate a relevant date, if available.

C. Web links to the relevant agreements

374 *Table 8: Agreements between TSO and relevant DSOs*

MS	Answer
AT	*A. YES* *B. Recently agreed between TSOs and DSOs – no exact date available* *C. So far agreements between TSO/DSOs; official (web published) information including all necessary details under development; expected release date end of 2021*
BE	*A. YES. An agreement has been reached between TSO and DSOs and has been subject to a public consultation organised by Synergrid. (http://www.synergrid.be/index.cfm?PageID=16824&language_code=NED). The agreement is being prepared for approval to the CREG, based on national legislation.* *B. 2021* *C. http://www.synergrid.be/index.cfm?PageID=16824&language_code=NED*

BG	*No reply*
CZ	*A. YES* *B. April 2019* *C. No requirement to publish the agreements.*
DE	*A. YES* *B. 14/03/2019* *C. https://www.netztransparenz.de/EU-Network-Codes-und-CEP/SO-Verordnung/Datenaustausch*
DK	*A. YES – Implementation pending approval* *B. Q4 2018* *C. The agreement was a bilateral discussion between Energinet, DSO's and the DSO association. The result was not written down as such, but carried over to the workgroup for Information exchange – Communication in its ToR* *It is consolidated in the National Implementation FK5.8.12, that, at the moment, is pending approval.*
EE	*A. YES* *B. Grid agreement, needs some follow up* *C. Not publicly available*
ES	*A. NO.* *Most of points (mainly those ones related to the national implementation of KORRR) have already been agreed and included in the document after being discussed in the frame of the TSO-DSO working group. Nevertheless, since Art. 40(7) is dependent on the approval of the national implementation of Art. 40(5), it was not possible to agree all data exchange provisions related to this article. The final implementation of implementing Art. 40(7) will mainly imply an update of formats and procedures of communication that is meant to improve the efficiency and effectiveness of the already in place data exchange process between TSO and the DSOs.* *B. The agreement is continuously discussed within the TSO-DSO working group in an effort to ease and accelerate its signing as soon as the national implementation of Art. 40(5) is approved and into force.* *C. N/A*
FI	*A. YES* *B. Agreements were already reached before KORRR implementation. [ACER: KORRR implementation on 18/01/2019, see Q.2.1.]* *C. https://www.fingrid.fi/en/grid/power-transmission/Main_grid_contract/*
FR	*A. YES* *B. 10 September 2020* *C. https://www.cre.fr/Documents/Deliberations/Approbation/applicabilite-et-champ-des-echanges-de-donnees-entre-rte-et-les-utilisateurs-de-son-reseau*
GR	*A. NO - In September 2020, RAE with the letter O-84138/23.09.2020 asked the TSO and the DSO to establish a working group and in collaboration with SGUs to fulfil the requirements of article 40(7) of SOGL. So far, four meetings have taken place but there has been no deliverable by the TSO/DSO and consequently no regulatory decision.* *RAE continuously sends official (letter O-85047/24.11.2020, email 22.03.2021, email O-88108/10.06.2021) and unofficial reminders regarding this subject.* *B. Non-applicable* *C. Non-applicable*
HR	*A. NO. Formal agreement under preparation, but data exchange is already partly implemented* *B. N/A* *C. The publication is not planned*
HU	*A. YES* *B. 14/03/2019* *C. These agreements are not public because it is a part of bilateral operational agreement between the TSO and the related DSO.*

IE	*A. YES* *B. Roughly when TSO submitted proposal to CRU under Article 6(4)(b) of SOGL on 3 September 2020, as referenced in Section 3.4 of their proposal* *C. TSO is yet to publish the aforementioned document as requested. See attachment in e-mail for copy of this document* *Update provided by CRU:* *We have again asked the TSO to publish.*
IT	*A. Agreement about managing data reached;* *B. On 29 October 2019 in a meeting between Terna, e-distribuzione and Utilitalia (representing the other DSOs) the agreement was reached; Terna reflected the agreement in the grid code proposal sent to Arera that approved the provisions with Decision 36/2020/R/eel on 11 February 2020, clarifying better that all data shall be primarily sent to the DSO and they can be directly sent to the TSO only if the connecting DSO refuses to collect them either by itself or by delegating a third DSO* *C. https://www.arera.it/allegati/docs/20/036-20.pdf*
LT	*A. Yes. Both agreements were reached.* *B. Agreements were reached in the past based on pre-SOGL national legislation.* *C. All details are listed contract that is signed between TSO and DSO. This contract is confidential.*
LU	*A. NO. CREOS is a combined TSO-DSO (see 1.1.B) Creos being a TSO-DSO, and the biggest DSO of Luxembourg covering 90% of the territory, it is considered that information about load & generation available at substations connected to the Creos DSO grid is enough to assesess the secutirty of the trnasmission grid. There is thus non need for additional active data trnasfer from other DSOs to Creos TSO. There is also no SGU identified in Luxembourg.* *B. Not applicable* *C. Not applicable*
LV	*New TSO and DSO agreement is under discussion. TSOs and DSOs is planning to update the data required by TSO and IT solutions for data acquisition. According to the existing agreement TSO and DSO exchange the information for geographical information system (Supervisory control and data acquisition system - SCADA), issuance of guarantees of origin, imbalance settlement, commercial flow (DSOs), statistical data collection, dispatch control and for relay protection and automation operation.*
MT	*No reply*
NL	*A. • Yes, a process was agreed between TSO and DSOs. This is defined in chapter 13 of the Dutch grid code (Netcode) and an implementation approach approved by the Domain Council System & Infrastructure of Netbeheer Nederland, the trade organisation of the electricity and gas grid operators in the Netherlands.* *• 1b No, the implementation of projects is still ongoing.* *o Structural data: For the moment data exchange still uses pre-SOGL processes.* *o Scheduling and forecast data: Implementation started in 2017 in the GLDPM project and will finalize by 2025.* *o Real time data: Through the SCADA/EMS system and the grid connection compliance track.* *B. Chapter 13 of the Netcode on 22 December 2018, Netbeheer Nederland Domain Council on 17 December 2020* *C. chapter 13 of the Netcode via https://wetten.overheid.nl/jci1.3: c:BWBR0037940&hoofdstuk=13&z=2021-07-03&g=2021-07-03, Netbeheer Nederland Domain Council minutes of meeting not published.*
NO	*A. No, aim to be approved /sent for approval May 2022.* *B. -* *C. -*
PL	*A. YES* *B. Update CK/12/2020 of the Transmission Grid Code of 24.07.2020, came into force on 01.01.2021*

	C. https://www.pse.pl/documents/20182/bf5fb017-416a-4cf2-a3f1-01e0c9b60148?safeargs=646f776e6c6f61643d74727565
PT	*A. YES* *B. RRT and RRD foresees that the TSO and the DSO should prepare one or more protocols aimed at ensuring coordination operating the facilities under its responsibility and designated by operating and conducting protocols.* *C. Not public*
RO	*A. YES.* *Before like R1485/2017 to be implemented in Romania, TSO and relevant DSOs agreed concerning the process for providing and managing data exchanges between them by internal procedures. The data exchange was not very different towards what is specified into R1485/2017 due to processes are similar into Europe concerning power systems operation are similar.* *After approval of 233/2019 where data exchanges are according to R1485/2017, OTS and DSOs are respecting requirements specified.* *B. Meeting from 13.02.2020 workshop with TSO, DSOs, RSUs, Competition Council and ANRE where these aspects were analysed and it was a common idea to respect the shape mentioned into ANRE Order no. 233/2019.* *C. https://www.transelectrica.ro/ro/web/tel/reglementarea-europeana-linii-directoare-privind-securitatea-operationala-nc-os-* *NB: At the link mentioned could be find details concerning the meeting from 13.02.2020 and the ANRE Order no.1/2019 and no.233/2019.*
SE	*A. NO. See above for article 40(6) the work is ongoing. Three (of eight) reports are published and approved.* *B. 2021-04-19 Unavailability plans* *2021-06-21 Static power system model* *2021-07-07 Information security* *C. Power system hub (https://www.svk.se/utveckling-av-kraftsystemet/systemansvar--elmarknad/kraftsystemhubben/)*
SI	*A. YES* *B. 23/06/2020* *C. Not published*
SK	*A. YES* *B. 20/08/2019* *C. 0019/2019/E-EU | Úrad pre reguláciu sieťových odvetví (gov.sk) - https://www.urso.gov.sk/00192019e-eu/*

5 General aspects of the data exchange

5.1 Main changes following the implementation of the SO GL and the KORRR

5.1.1 Significance of changes

375 ***Q.4.1 Which requirements of SO GL / KORRR have implied, or are expected to imply, important changes in the national requirements or rules?***

376 *Table 9: Significance of changes*

MS	Answer	
	Article	**Significance of changes**

AT	**40(5)**	2 (intermediate) - 3 (major)
	40(6) and KORRR	2 (intermediate)
	40(7)	2 (intermediate)
BE	**40(5)**	1) No or minor changes for exchange on structural data and on real-time data. 2) Intermediate changes for scheduled data, largely related to extended scope of SGUs which need to participate
	40(6) and KORRR	0/1
	40(7)	0
BG	*No reply*	
CZ	**40(5)**	2 (intermediate) (SOGL data exchange requirements together with the methodology for creating CGMs (SOGL Art. 67 and 70) meant that the entire 110 kV grid shall be a part of the IGM. Therefore, a detailed data of that grid and SGUs connected there are required.)
	40(6) and KORRR	1 (minor)
	40(7)	1 (minor)
DE	**40(5)**	2 (intermediate)
	40(6) and KORRR	0 (none)
	40(7)	0 (none)
DK	**40(5)**	0 (none)
	40(6) and KORRR	0 (none)
	40(7)	3 (major)
EE	**40(5)**	1 (minor)
	40(6) and KORRR	1 (minor)
	40(7)	1 (minor)
ES	**40(5)**	2 (intermediate)
	40(6) and KORRR	1 (minor)
	40(7)	1 (minor) - Under current scenario
	New Regulations implementing SOGL / KORR include changes from previous Regulations not derived directly from European Regulation but from energy sector development (storage, demand participation in system services, hybrid installations, etc). *- All SGUs are required to exchange real time data with the DSO or the TSO by means of a third party, which was not a requirement before KORRR national implementation.*	

	- Data exchange with distributed demand facilities was not a requirement before. Since these facilities are now allowed to participate in system services (in the same conditions as generation modules), the same data exchange requirements have been stablished for them. *- National regulation for aggregates providing system services has been much more developed and the participation of this kind of units has been eased.*	
FI	**40(5)**	1 (minor)
	40(6) and KORRR	1 (minor)
	40(7)	1 (minor)
FR	**40(5)**	2 (intermediate)
	40(6) and KORRR	0 (none)
	40(7)	2 (intermediate)
GR	**40(5)**	In preparation
	40(6) and KORRR	In preparation
	40(7)	In preparation
HR	**40(5)**	2 (intermediate)
	40(6) and KORRR	2 (intermediate)
	40(7)	2 (intermediate)
HU	**40(5)**	0 (none)
	40(6) and KORRR	0 (none)
	40(7)	0 (none)
IE	**40(5)**	0 (none)
	40(6) and KORRR	0 (none)
	40(7)	0 (none)
IT	**40(5)**	3 (major)
	40(6) and KORRR	2 (intermediate)
	40(7)	3 (major)
LT	**40(5)**	0 (none)
	40(6) and KORRR	0 (none)
	40(7)	0 (none)

LU	**40(5)**	0 (none)
	40(6) and KORRR	0 (none)
	40(7)	0 (none)
LV	**40(5)**	1 (minor)
	40(6) and KORRR	1 (minor)
	40(7)	1 (minor)
MT	*No reply*	
NL	**40(5)**	-Structural data: major -Scheduling and forecast data: major -Real time data: intermediate
	40(6) and KORRR	-Structural data: major -Scheduling and forecast data: major -Real time data: intermediate
	40(7)	-Structural data: major -Scheduling and forecast data: major -Real time data: intermediate
NO	**40(5)**	Not completed
	40(6) and KORRR	Not completed
	40(7)	Not completed
PL	**40(5)**	1 (minor)
	40(6) and KORRR	0 (none)
	40(7)	3 (major)
PT	**40(5)**	1 (minor)
	40(6) and KORRR	1 (minor)
	40(7)	1 (minor)
RO	**40(5)**	0 (none)
	40(6) and KORRR	2 (intermediate)
	40(7)	2 (intermediate)
SE	**40(5)**	3 (major)
	40(6) and KORRR	3 (major)
	40(7)	3 (major)
SI	**40(5)**	0 (none)

	40(6) and KORRR	0 (none)
	40(7)	0 (none)
SK	**40(5)**	1 (minor)
	40(6) and KORRR	0 (none)
	40(7)	0 (none)

5.1.2 Examples of changes

377 ***Q. Fill Table by providing specific examples of main differences between applicable requirements before and after the implementation of the SO GL and the KORRR.***

378 *Table 10: Examples of changes*

MS	Answer		
	Article	**Before**	**After**
AT	***40(5)***	*unspecified data submission for individual plants; market schedules of smaller plants only submitted to clearing authority*	*real time data of PV systems above 250 kWp; market schedules of plants above 1 MW also submitted to TSO and to all affected DSOs*
	40(6) and KORRR	*exchange of most important data between TSO and directly connected DSOs*	*seamless data transfer for data relevant for TSO planning and operation – via DSO*
	40(7)	*exchange of most important data between TSO and directly connected DSOs*	*seamless data transfer for data relevant for TSO planning and operation – via DSO*
BE	***40(5)***	*Only mandatory availability planning and scheduling requirement on transmission-connected production SPGM and PPM per primary energy source ≥ 25 MW*	*Availability planning and scheduling requirements will be gradually extended in accordance to system operational security needs of TSO and DSOs and aligned with the implementation constraints of SGU to on all transmission connected SPGM and PPM per primary energy source of ≥1 MW similar for all distribution connected SPGM and PPM per primary energy source of that size. Demand facilities directly connected to the transmission grid will be also required to provided their availability planning in a timeline set in accordance with these SGUs and when needed for system operation security reasons.*

	40(6) and KORRR		
	40(7)	*Non-regulated*	*Regulated based on legal provisions at national level*
BG	*No reply*		
CZ	***40(5)***	*Only parts of 110 kV grid in IGM*	*Whole 110 kV grid and SGUs connected there need to provide detailed data*
	40(6) and KORRR		
	40(7)		
DE	***40(5)***		*grid data exchange with DSO*
	40(6) and KORRR		
	40(7)		
DK	***40(5)***		
	40(6) and KORRR		
	40(7)	*- TSO could communicate with all users on the electricity grid.* *- Communication protocol could be IEC 60870-5-104, IEC 60850-6/TASE.2 or similar agreed between TSO, DSO and/or Grid User*	*- TSO needs to communicate through the DSO if a grid user must be contacted.* *- Communication protocol is now agreed to be moved to IEC 61850*
EE	***40(5)***	*scheduling and forecast data*	*New format for scheduling data* *New formats for real time data*
	40(6) and KORRR	*Inconsistent formats*	*New formats*
	40(7)		*Have to agree on new formats, new rules for acceptance test*
ES	***40(5)***	*Not all the data exchange requirements applied to aggregates of units neither to demand facilities connected to the distribution grid.*	*Since aggregates of units and demand facilities can provide system services, data exchange requirements do also apply to them.*
	40(6) and KORRR	*Same as above.* *Most SGUs (even connected to distribution grid) were directly sending real time information.*	*Same answer. Demand facilities and generation units are mandated now to send information by means of a third party.*
	40(7)	*Under discussion.*	*Under discussion.* *From the already carried out discussions, data exchange processes between TSO and DSOs are expected to be more efficient.*
FI	***40(5)***	*Real-Time data exchange rate was 3 minutes*	*Real-Time data exchange rate 1 minute*

	40(6) and KORRR	*Real-Time data exchange rate was 3 minutes*	*Real-Time data exchange rate 1 minute*
	40(7)	*Real-Time data exchange rate was 3 minutes*	*Real-Time data exchange rate 1 minute*
FR	***40(5)***		*real time data in accordance with Article 44* *real time data in accordance with Article 47*
	40(6) and KORRR		
	40(7)		*real time data in accordance with Article 44*
GR	***40(5)***	*(in preparation)*	
	40(6) and KORRR	*(in preparation)*	
	40(7)	*(in preparation)*	
HR	***40(5)***	*a smaller amount of scheduled data are exchanged*	*a bigger amount of scheduled data are exchanged*
	40(6) and KORRR	*a smaller amount of scheduled data are exchanged*	*a bigger amount of scheduled data are exchanged*
	40(7)	*a smaller amount of scheduled data are exchanged*	*a bigger amount of scheduled data are exchanged*
HU	***40(5)***	-	
	40(6) and KORRR	-	
	40(7)	-	
IE	***40(5)***	-	
	40(6) and KORRR	-	
	40(7)	-	
IT	***40(5)***	*Scope of data exchange limited to TSO connected facilities*	*Scope of data exchange (especially for real time data) extended to DSO-connected SGUs Existing units refurbishment is needed*
	40(6) and KORRR	*Format and data exchange with TSO already in place*	*Improved role for DSO*
	40(7)	*DSO with role in gathering data from DSO connected facilities*	*DSO as primary actor for collecting and sharing with TSO DSO connected facilities data*
LT	***40(5)***	-	
	40(6) and KORRR	-	
	40(7)	-	

LU	*40(5)*	-	
	40(6) and KORRR	-	
	40(7)	-	
LV	*40(5)*	-	
	40(6) and KORRR	-	
	40(7)	-	
MT	*40(5)*	*Note: there were no important changes in the national requirements or rules, because the basic principles and rules of data exchange and transparency were already in place and continuously improved since the beginning of MIBEL in 2007.*	
	40(6) and KORRR		
	40(7)		
NL	*40(5)*	*-Structural data: based on more or less ad hoc exchanges typically via Excel and email* *-Scheduling and forecast data: exchanging forecast for nett exchange of power on aggregated connection level* *-Real time data: the data was already available in the SCADA system for the direct connection on the transmission system.*	*-structural data: currently on facility-specific Excel questionnaire. Intended is web-based data provision app combined with electronic messages (e.g. for DSOs).* *-scheduling and forecast data: exchange via modern web services system, data at connection point level with higher level of detail (15 minute resolution, fuel types, reactive power etc.)* *-real time data: Now also data available from connections on the grid of the DSO.*
	40(6) and KORRR	*-structural data: informal process, also for data changes, non-binding time scales* *-scheduling and forecast data: basic process with only most crucial data* *-real time data: only data from connections on the transmission system was available through the SCADA system*	*-structural data: formal process with binding time scales* *-scheduling and forecast data: processes with large amount of data at high detail level* *-real time data: Now also data available from connections on the grid of the DSO on a structured manner*
	40(7)	*-structural data: informal process, also for data changes, non-binding time scales* *-scheduling and forecast data: basic process with only most crucial data* *-real time data: only data from connections on the transmission system was available through the SCADA system*	*-structural data: formal process with binding time scales* *-scheduling and forecast data: processes with large amount of data at high detail level* *-real time data: Now also data available from connections on the grid of the DSO on a efficient and effective manner*
NO	*40(5)*	*Not completed*	

	40(6) and KORRR	*Not completed*	
	40(7)	*Not completed*	
PL	***40(5)***	*Scheduling data collected as an aggregate for the whole country*	*Divided into DSO branches and ultimately into network nodes.*
	40(6) and KORRR	-	-
	40(7)	*Email, mail, phone*	*IT system*
PT	*No reply*		
RO	***40(5)***	*Real time information -Data for demand response, HVDC systems, was not required, PGM with power less than 5 MW was not obliged to send direct information to TSO*	*According to Orders ANRE 233/2019 and 89/2021 there are solicited like demand respose, HVDC systems, B type PGM (in Romania between 1-5MW) data has to supply data to TSO*
	40(6) and KORRR	*TSO had no obligations to send to a DSO with a connection point to a transmission system 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.*	*According to Order ANRE no. 1/2019, DSO has right 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.*
	40(7)	*Data exchange between TSO-DSO and DSO-DSO*	*Art. 40 (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.*
SE	***40(5)***	*Real-time data, Static and dynamic power system models - limited extent*	*Real-time data, Static and dynamic power system models involves more actors*
	40(6) and KORRR	*Limited exchange of static power system models*	*Introducing of CIM-standard*
	40(7)	*Limited real-time data communication options*	*Introducing new real-time data communication options for minor DSOs and SGUs*
SI	***40(5)***	*data exchange was implemented based on agreements, at the moment no need for changing the national legislation was identified*	
	40(6) and KORRR		
	40(7)		
SK	***40(5)***		*Modification in the legislative procedure for the provision of real-time data.*

	40(6) and KORRR		
	40(7)		

5.2 Determination of SGUs' responsibility to exchange data

379 ***Q.4.2 Which parameter is considered to define the responsibility of SGUs to exchange data and the level of data they shall exchange? In other words, are there relevant thresholds above/below which the type and level of data exchange differs? Fill the Table providing the values of the thresholds depending on the given answers. When answering, please delete the "examples" in the corresponding rows of the Table.***

380 *Table 11:*

MS	Answer	
	Parameter	**Description**
AT	Power	*real time data if P ≥ 250 kWp for PV plants; P ≥ 1MW for other technologies*
	Voltage	*real time data if V ≥ 110 kV*
	Type of SGU	*some exceptions for existing SGUs*
	Service provided	
	Other or none	
BE	Power	*if P< 0.4 MW only aggregate data; if P> 0.4 MW individual data*
	Voltage	*Depending on the type of data, see answers above*
	Type of SGU	*Less requirements on demand facilities and SPGM and PPM Type B. - Except if they participate to system services, TSO-connected demand facilities are not and will not be required to provide schedules or forecasts on active and reactive power. The TSO does not make use of the possibility provided in SOGL Article 52(2) to ask these data except if they provide system services. At a later phase when relevant for operational system security also availability plans will be requested. - For SPGM and PPM per primary energy source of less than 25 MW but more than 1 MW simplifications will be implemented as much as possible (less strict delivery of information regarding availability, simplification in the delivery of schedules if possible)*
	Service provided	*requirements related to limits for curtailment, FRR, FCR provision … only for balancing providing units*
	Other or none	
BG	*No reply*	
CZ	Power	*if P< 1MW only aggregate data; if P≥1MW individual data*
	Voltage	*if V< 110 kV only basic data; if V≥110 kV detailed data*
	Type of SGU	*n/a*
	Service provided	*N/A – data exchange required for providing balancing services is out of scope of general data exchange*
	Other or none	
DE	Power	*real data P>1MW, scheduled data P>10 MW, structural data*
	Voltage	*all*
	Type of SGU	*conventional PGMs, renewables, demand units*

	Service provided	*all*
	Other or none	
DK	Power	*P < 3MW few signals, 3 ≤ P < 25MW and ≤ 25MW full signal list*
	Voltage	*N/A*
	Type of SGU	*N/A*
	Service provided	*Small SGU's providing services may be required to deliver additional data compared to nonservice providing same.*
	Other or none	
EE	Power	*P< 500kW only aggregate real time data; if P>500kW individual data; from type C detailed structural data*
	Voltage	*-*
	Type of SGU	*renewables, demand units, synchronous machine, inverter*
	Service provided	*SGU might provide balancing services*
	Other or none	
ES	Power	*For SGUs:* *If P > 1 MW, individual data.* *If P <= 1 MW and providing system services, aggregated data. In case it is relevant for the operational security, further disaggregated data might be requested by the TSO or the DSO for smaller aggregates of generation modules / demand facilities.*
	Voltage	*-*
	Type of SGU	***For generation modules:*** *- All type C and D generators are subjected to data exchange requirements.* *- Type B generators with a P > 1 MW are subjected to data exchange requirements.* *If 0,1 MW < P <= 1 MW, type B generators are subjected to data exchange requirements only if providing system services.* *- Type A generators (0,8 kW < P <= 0,1 MW): Only if providing system services.* ***For demand facilities:*** *- If connected to the transmission grid: All SGUs* *- If connected to the distribution grid: All SGUs providing system services (f or non-f ancillary services and redispatching services / congestion management). Aggregation depends on the consumption capacity, according to the description of the Power parameter above given.*
	Service provided	*All units providing system services are SGUs subjected to data exchange requirements.*
	Other or none	
FI	Power	*if P< 10 MW aggregated or individual data; if P>10 MW individual data*
	Voltage	*if connection point voltage >110 kV individual data about relevant circuit breaker and disconnector are required*
	Type of SGU	*n/a*
	Service provided	*In addition to above requirements, LFC providers have additional requirements.*
	Other or none	*none*
FR	Power	*- TSO connected SGU : If P > 12 MW individual data (below 12 MW, SGUs are connected to the distribution grid)* *- DSO connected SGU : aggregated information by DSO*

	Voltage	*- TSO connected SGU : If V > 63 kV individual data (below 63 kV, SGUs are connected to the distribution grid)* *- DSO connected SGU : aggregated information by DSO*
	Type of SGU	-
	Service provided	*RTE proposal deals only with data used in forecast studies and in real time operational security analyses*
	Other or none	
GR	Power	*In preparation*
	Voltage	*In preparation*
	Type of SGU	*In preparation*
	Service provided	*In preparation*
	Other or none	*In preparation*
HR	Power	*Types B, C and D are determined by power, so obligations are according to the power (type B > 0,5 MW, type C > 5 MW, type D > 10 MW). No aggregation envisaged*
	Voltage	*Types B, C and D are determined by voltage, so obligations are according to the voltage level (MV or HV, type D >= 110 kV). No aggregation envisaged*
	Type of SGU	*For demand units less data required*
	Service provided	*For ancillary services providers more data required*
	Other or none	*none*
HU	Power	*Above 5 MW*
	Voltage	*If the connection voltage level above 132 kV.*
	Type of SGU	*Above type "C"*
	Service provided	*Any kind of ancillary services.*
	Other or none	
IE	Power	*SGUs without RTUs would instead of providing real-time data instead provide data to the connected SO to enable a real-time approximation model, unless otherwise agreed. No other differences are present among requirements for SGUs.*
	Voltage	
	Type of SGU	
	Service provided	
	Other or none	
IT	Power	*For real time data, MV connected > 1 MW individual data (compulsory); MV connected < 1 MW or LV connected individual data from sample units only; sample units group to be defined at a later stage based on statistical criteria*
	Voltage	
	Type of SGU	*No differences*
	Service provided	*Potential differences on the basis of service provided*
	Other or none	*N/A*
LT	Power	*If P>5MW individual data, else aggregated.*
	Voltage	*V<110kV only aggregated data, V≥110kV individual data*
	Type of SGU	*No difference in type of SGU*
	Service provided	*At the moment there are no difference.*
	Other or none	*If SGU connected to transmission system individual data, else aggregated*
LU	Power	*Not applicable, as no SGUs identified in Luxembourg*
	Voltage	
	Type of SGU	

	Service provided	
	Other or none	
LV	Power	*SGUs with a capacity of 15MW or more are obliged to exchange information*
	Voltage	
	Type of SGU	
	Service provided	
	Other or none	
MT	*No reply*	
NL	Power	*-Structural data: all Type D individual data (type D being connected to 110 kV or higher or connected on grid DSO with P> 60 MW). -Scheduling and forecast data: P<1 MW aggregated data, P>= 1 MW individual data. -Real time data: all type D and P> 1 MW individual data.*
	Voltage	*-Structural data: all Type D individual data -Scheduling and forecast data: no specific requirement -Real time data: U > 110 kV individual data*
	Type of SGU	*-Structural data: data set tailored to type of SGU -Scheduling and forecast data: data set tailored to type of SGU (producer or consumer) -Real time data: no distinction between SGU's*
	Service provided	*no specific requirements based on additional services provided*
	Other or none	
NO	Power	*In preperation*
	Voltage	*In preperation*
	Type of SGU	*In preperation*
	Service provided	*In preperation*
	Other or none	*In preperation*
PL	Power	*MWE type B and C data aggregated, MWE (power generation module) D type individually*
	Voltage	*V < 110 kV only aggregate data; if V >= 110 kV individual data*
	Type of SGU	-
	Service provided	*Providing balancing services and participation in the capacity market – individual data*
	Other or none	
PT	Power	*PGM > 1MW*
	Voltage	*V>110 kV*
	Type of SGU	*PGMs included in Restoration Plans*
	Service provided	*balancing services*
	Other or none	
RO	Power	*PGM owners and TSO -For PGM NB1 –in real time, for RCF, FRR and RR, data (i.e. power from connection point or from other point agreed with TSO) will be send at the level of reserve providing unit and reserve providing group NB2 – According to art. 154 (9)- SOGL Each FCR provider shall have the right to aggregate the respective data (i.e.power) 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*

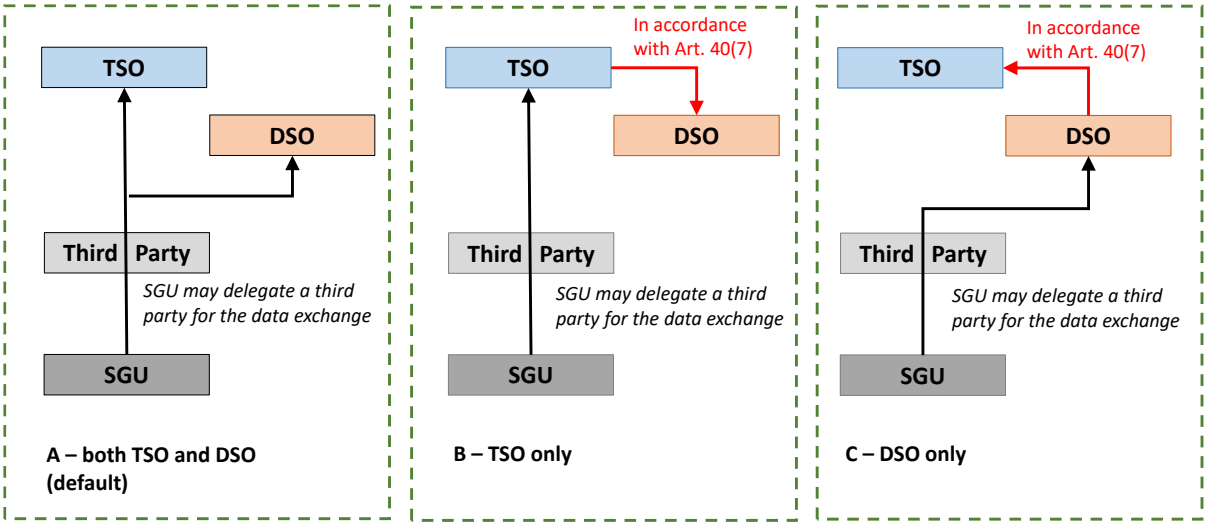
	possible. *For HVDC, i.e. real time power from connection point or from other point agreed with TSO, no threshold.* *PGM owners connected to DSO, TSOs – PGM owners will send data both TSO and DSO (i.e power from connection point), for C and D type PGMs (in Romania B type is between 1-5 MW). The information is send direct or indirect (by DSO)* *If there are more than 1 units (B type units) connected to a single substation and PGMs are not supplying balancing services data are sending -aggregated values- by DSO to TSO.*
Voltage	*It is used criteria function of PGM type (B,C and D) – see parameter Power. If is A category PGM owner will not send to OTS, DSO* *The PGM owners connected to DSO, TSO – PGM owners will send data both TSO and DSO (i.e voltage from connection point) , for C and D type PGMs (in Romania B type is between 1-5 MW)* *If there are more than 1 units (B type units) connected to a single substation, data are sending (bus substation voltage) by DSO to TSO (voltage to the bus substation is the same for all B type PGMs).*
Type of SGU	*A) Data exchange -PGM owner connected to DSO, TSO* *Real time-Data exchange* *Conventional* *(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.* *Renewables (additional)- (C,D type power-i.e. more than 5 MW)* *(c)wind average speed and direction at the level of eolian power park modules* *(d) average solar radiation at the level of photovoltaic power park modules* *(e) available power of eolian/solar power park modules* *Structural data:* *PGM modelled detailed (not aggregated)- maximum/minimum active power, active power in synchron compensator regime, control type (non-active, voltage control, reactive power control, power factor control, buses where control is operated), maximum/minimum reactive power for maximum/minimum active power according to capability curve, household load)* *PGM and distribution –connected demand modelled by aggregation – technical data by primary energy sources and separated by load, with specifications of substations where are connected into the equivalent model or real substations where are connected* *PGM gestionated by an aggregator (third party- and their data are used for reginal operational security), third party has to supply aggregation (by primary energy sources) for generation, separated by his household, with specifications of substations where are connected into the equivalent model or real substations where are connected.* *B) Data exchange between transport connected demand/demand response owner and TSO in case of participation in demand response, a schedule of its structural minimum and maximum power range to be curtailed (art. 52 from SO GL)* *C) Data exchange OTS- PGM, transport-connected demand, demand response owner* *Data exchange distribution connected demand response(demand*

		response owner) according to art. 53 from SO GL shall provide scheduled and real-time data to the TSO and to the DSO, and third party 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. *Towards PGM, for demand response owner is send only – minimum/maximum available for demand response and maximum/minimum time, prognose af active power (without restriction) and demand response scheduled, active/reactive power at connection point, a confirmation that the estimations of the actual values of demand response are applied (according to art. 53 from SO GL).*
	Service provided	*D1-In case there are provided balancing services (RRF,RR) and RCF power is sending per reserve providing unit and reserve providing group, taking into account SOGL specifications 154 (9), 158(1)e) ii), 161, (1), f), ii) – Each provider have the right to aggregate the respective data (i.e.power from connection point or other point agreed with TSO) for more than one FCR/RRF/RR providing unit/ reserve providing group if the maximum power of the aggregated units is below 1,5 MW and a clear verification of activation of FCR/RRF/RR is possible.* *D2- Ordered active power (net value), state signal to stabilisation frequency proces, active power from each PGM, from RCF/RRF/RR reserve providing unit/reserve providing group if is not send aggregated (mandatory if maximum power produced/consummed by unit is more or equal than 1. 5 MW).*
	Other or none	
SE	Power	*P< 1,5 MW only aggregated installed power; if P≥1,5MW individual data*
	Voltage	*V< 70 kV only real-time data; if V≥70 kV individual data, real-time static and dynamic parameter data*
	Type of SGU	-
	Service provided	*If the SGU provides balancing services, individual data, real-time static and dynamic parameter data, production/consumption plan data*
	Other or none	
SI	Power	*P< 250 kW only aggregate data; P>250 kW individual data*
	Voltage	*U< 110 kV aggregate and individual data ; if U>110 kV individual data*
	Type of SGU	
	Service provided	
	Other or none	
SK	Power	*none*
	Voltage	*Observability area setting from 110 kV>=110 kV for DSOs*
	Type of SGU	*none*
	Service provided	*none*
	Other or none	

6 Provision of data between TSO, DSOs and SGUs

6.1 Data exchange schemes between TSO, DSOs and SGUs

381 ***Q.5.1 Considering Article 3(2) of the KORRR, fill Table with the relevant information on the scheme that is planned to be implemented, or is already implemented for exchanging each type of data in Table. Please consider the possible schemes illustrated in Figure.***



382 *Table 11: Implementation of the data exchange schemes*

MS	Answer			
AT	**Structural - Art. 48**	C	to be implemented by 01/12/2021	allowed
	Scheduled - Art. 49	C	to be implemented by 01/12/2021	allowed
	Real time - Art. 50	C	to be implemented by 01/12/2021	allowed
	All - Art. 53	C	to be implemented by 01/12/2021	allowed
BE	**Structural - Art. 48**	C	already implemented	not allowed
	Scheduled - Art. 49	C	to be implemented	allowed
	Real time - Art. 50	C	already implemented	not allowed
	All - Art. 53	A&C	already implemented	allowed
BG	*No reply*			
CZ	**Structural - Art. 48**	C (for SGUs providing balancing services, A is possible due to existing data exchange)	already implemented	not allowed
	Scheduled - Art. 49	C (for SGUs providing	already implemented	not allowed

		balancing services, A is possible due to existing data exchange)		
	Real time - Art. 50	C (for SGUs providing balancing services, A is possible due to existing data exchange)	already implemented	not allowed
	All - Art. 53	C (for SGUs providing balancing services, A is possible due to existing data exchange)	already implemented	not allowed
DE	**Structural - Art. 48**	B	already implemented	data transfer via third party is allowed only for RES units.
	Scheduled - Art. 49	B	already implemented	data transfer via third party is allowed only for RES units.
	Real time - Art. 50	C	already implemented	data transfer via third party is allowed only for RES units.
	All - Art. 53	The Article 53 SOGL is implemented for SGU > 50MW (independent from grid connection). The implementation varies with respect to the kind of data:	already implemented	The data transfer via third party is allowed.

		a.for SGU connected to TSO: i.Structural: Scheme B ii.Schedules: Scheme B iii.Real-time: Scheme B b.For SGU connected to DSO: i.Structural: Scheme C (related to schedules -> Scheme B) ii.Schedules: Scheme B iii.Real-time: Scheme C		
DK	**Structural - Art. 48**	C	already implemented	not allowed
	Scheduled - Art. 49	C	already implemented	allowed
	Real time - Art. 50	C	already implemented	allowed
	All - Art. 53	C	already implemented	allowed
EE	**Structural - Art. 48**	C	already implemented	not sure if allowed
	Scheduled - Art. 49	A	to be implemented	allowed
	Real time - Art. 50	A	already implemented	allowed
	All - Art. 53	A	to be implemented	allowed
ES	**Structural - Art. 48**	Other. SGUs connected to the transmission system shall submit structural information directly to the TSO. SGUs connected to the distribution system shall submit structural	Already implemented.	allowed

	information directly to both, the connection DSO and the TSO.		
Scheduled - Art. 49	B. Scheduled information is sent to both through the TSO platform (SIOS).	Being implemented. DSOs can already log into the platform and download the relevant scheduled information. As observability for DSOs is dependent on the national implementation of Art. 40(5), once it is approved, it will also be added to the platform.	allowed
Real time - Art. 50	Other. The SGUs are free to choose the scheme they want to implement. The third party can send the information directly to the TSO, directly to the DSO or directly to both. SGUs providing ancillary services are forced to send real time data at least directly to the TSO.	Implemented	allowed
All - Art. 53	Other. Information shall be directly sent (at least) to the TSO. For structural and scheduled information, same as for	Being implemented	allowed

		the previous articles.		
FI	**Structural - Art. 48**	A	already implemented	allowed
	Scheduled - Art. 49	A	already implemented	allowed
	Real time - Art. 50	A	already implemented	allowed
	All - Art. 53	A	already implemented	allowed
FR	**Structural - Art. 48**	C	already implemented	allowed
	Scheduled - Art. 49	C	being implemented	allowed
	Real time - Art. 50	none	-	-
	All - Art. 53	none	-	-
	None of the data listed in articles 50 and 53 is required, see answer to question 1.1.D			
GR	**Structural - Art. 48**	Under discussion	Implementation behind schedule	Under discussion
	Scheduled - Art. 49	Under discussion	Implementation behind schedule	Under discussion
	Real time - Art. 50	Under discussion	Implementation behind schedule	Under discussion
	All - Art. 53	Under discussion	Implementation behind schedule	Under discussion
HR	**Structural - Art. 48**	C	To be implemented until end of the year	Allowed if foreseen in some separate document
	Scheduled - Art. 49	C	To be implemented until end of the year	Allowed if foreseen in some separate document
	Real time - Art. 50	C	To be implemented until end of the year	Allowed if foreseen in some separate document
	All - Art. 53	A	already implemented	Allowed if foreseen in some separate document
HU	**Structural - Art. 48**	A	already implemented	allowed
	Scheduled - Art. 49	B	already implemented	allowed
	Real time - Art. 50	none/other	already implemented	allowed
	All - Art. 53	A	already implemented	allowed
IE	**Structural - Art. 48**	none/other	already implemented	allowed
	Scheduled - Art. 49	none/other	already implemented	allowed
	Real time - Art. 50	none/other	already implemented	allowed
	All - Art. 53	none/other	already implemented	allowed

IT	**Structural - Art. 48**	A (data of art. 48.1 point b-c and d are provided directly to TSO by units which provides ancillary services through pilot project)	already implemented	no third party intermediation is foreseen
	Scheduled - Art. 49	A	Already implemented	allowed
	Real time - Art. 50	C	To be implemented (no estimated date available)	allowed (a delegated DSOs or event the TSO if no DSO is available)
	All - Art. 53	A	For pilot project on ancillary services	allowed
LT	**Structural - Art. 48**	C	already implemented	
	Scheduled - Art. 49	C	already implemented	
	Real time - Art. 50	C	already implemented	
	All - Art. 53	none	none	
LU	**Structural - Art. 48**	none/other		
	Scheduled - Art. 49	none/other		
	Real time - Art. 50	none/other		
	All - Art. 53	none/other		
LV	**Structural - Art. 48**	A	to be implemented	allowed
	Scheduled - Art. 49	A	to be implemented	allowed
	Real time - Art. 50	A	to be implemented	allowed
	All - Art. 53	A	to be implemented	allowed
MT	*No reply*			
NL	**Structural - Art. 48**	none/other	already implemented	allowed
	Scheduled - Art. 49	none/other	already implemented	allowed
	Real time - Art. 50	none/other	already implemented	allowed
	All - Art. 53	none/other	already implemented	allowed
NO	**Structural - Art. 48**	In preparation		
	Scheduled - Art. 49			
	Real time - Art. 50			
	All - Art. 53			
PL	**Structural - Art. 48**	B	Implemented (automatization planned through the Portal of Structural Data Exchange)	not allowed
	Scheduled - Art. 49	MWE (power generation	already implemented	allowed

		module) D – A types MWE (power generation module) B i C – C types		
	Real time - Art. 50	MWE (power generation module) D – A types MWE (power generation module) B i C – C types	already implemented	allowed
	All - Art. 53	none/other	-	-
PT	**Structural - Art. 48**	A	already implemented	allowed
	Scheduled - Art. 49	A	already implemented	allowed
	Real time - Art. 50	A	already implemented	allowed
	All - Art. 53	A	already implemented	allowed
RO	**Structural - Art. 48**	- For B and C type PGM - Scheme C - For D type PGM - Scheme A	already implemented	allowed
	Scheduled - Art. 49	- For B and C type PGM - Scheme C - For D type PGM - Scheme A	already implemented	allowed
	Real time - Art. 50	-For D type PGM connected to DSO – Scheme A For type D connected to TSO (or B and C type connected to TSO) – Scheme B -For B and C type PGM – Scheme C -HVDC – it isn't in Romanian system	already implemented	allowed

	All - Art. 53	- transport connected demand/demand response – OTS (art. 52) -Scheme B - distribution connected demand/demand response (art. 53) – OTS – Scheme A	to be implemented	allowed
SE	**Structural - Art. 48**	B	Successive implementation - 2023	allowed
	Scheduled - Art. 49	B	Successive implementation - 2023	allowed
	Real time - Art. 50	B, C	Mostly already implemented. Successive completion - 2025	allowed
	All - Art. 53	B, C	Successive implementation - 2023	allowed
SI	**Structural - Art. 48**	other (DSO-TSO)	already implemented	allowed
	Scheduled - Art. 49	other	-	-
	Real time - Art. 50	other (DSO-TSO)	already implemented	allowed
	All - Art. 53	none	already implemented	allowed
	See relevant figure in Annex 2			
SK	**Structural - Art. 48**	A	already implemented	allowed
	Scheduled - Art. 49	A	already implemented	allowed
	Real time - Art. 50	A or C	already implemented	allowed
	All - Art. 53	C	already implemented	allowed

383 ***Q.5.2 Provide detailed motivation if the option "none/other" in the second from the left column of Table (question 5.1) has been selected for each of the type of data and reference articles of the SO GL***

384 *Table 12: Implementation of the data exchange schemes (further details)*

MS	Answer
AT	-
BE	-
BG	*No reply*
CZ	-
DE	-
DK	-

EE	-
ES	*Find the answers in the table.*
FI	-
FR	-
GR	*Under discussion - To be decided*
HR	*historical reasons, price, speed, and ease of implementation*
HU	*Regarding type "B" SGUs send real time data only for DSO except the SGUs which provide service to TSO*
IE	*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 (Section 4.1 - https://www.eirgridgroup.com/site-files/library/EirGrid/190125_SGU-KORRR-Consultation_Ireland_V1.0.pdf)*
IT	-
LT	*Currently there are no SGUs providing demand response services.*
LU	*See answer to question 1.1.B: no SGUs*
LV	-
MT	*No reply*
NL	*SGUs connected to TSO system provide to TSO (option B in Figure 1), while SGU connected to DSO system provides to DSO (option C in Figure 1)*
NO	*Under discussion - To be decided*
PL	*The technical and commercial conditions for the provision of the service of reducing the demand at the request of the TSO as part of the regulatory system services in the field of the intervention reserve is a service contract concluded between the TSO and the system users (service contractors), taking into account the principles contained in the Transmission Grid Code and the Terms and Conditions.*
PT	-
RO	*It is no case*
SE	*Structural information and unavailability information will be exchanged thru a website, where authorized and concerned actors can register and take part of the information.* *Real-time data will be delivered in the most suitable way regarding existing infrastructure and costs. Therefore it will differ from plant to plant. Svk offers a variety of possible solutions for concerned parties. DSOs, SGUs and Svk have to agree on which solution is suitable/possible. The facility owner is always responsible to deliver the data even if agreement is not possible.*
SI	*Due to mixed existing technical solutions data are exchanged as shown in provided scheme of structural and real time data and scheme of scheduled data.*
SK	-

385 ***Q.5.3 Provide detailed motivation if the option "not allowed" in rightmost column of Table (question 5.1) has been selected for each of the type of data and reference articles of the SO GL***

386 *Table 13: Delegation of the third party (further details)*

MS	Answer
AT	-
BE	*Directly to be provided by the SGU to the DSO/TSO, no third party* *Note: structural & RT data managed in connection contract*
BG	*No reply*
CZ	*In accordance with Czech law, all grid users are responsible for providing the data directly to the TSO or DSO they are connected to.*
DE	-
DK	*The system into which the data are stored has limited access to only system operators, this is primarily to ensure that data stored here has been properly validated and is being service by parties for whom correct data are essential.*
EE	-
ES	*N/A*
FI	-
FR	-
GR	*Under discussion - To be decided*
HR	*N/A*
HU	*N/A*
IE	*N/A*
IT	-
LT	-
LU	-
LV	-
MT	*No reply*
NL	-
NO	*Under discussion - To be decided*
PL	*Structural data are provided by the device owner as an entity that has complete information about the devices and is responsible for this information.*
PT	-
RO	*It is no case*
SE	*Not allowed has not been selected.*
SI	-
SK	-

6.2 Direct recipients of the distribution-connected SGUs data

387 ***Q.5.5 Can SGUs connected to the distribution grid decide to whom they shall directly send their data? Please, choose between: A) Yes, B) No, C) not decided and D) other (provide explanations).***

388 *Table 15: Direct recipients of the distribution-connected SGUs data*

MS	Answer
AT	*B) no (real-time data usually measured by DSO connecting the SGU; data are intended to be transferred via DSO)*
BE	*B) no*
BG	*No reply*
CZ	*B) no (please see answer to question #3)*
DE	*B) no*
DK	*B) no*
EE	*A) yes*
ES	*A) yes. The only exception are SGUs providing aFRR, in which case real time information must be directly sent (at least) to the TSO. In this case and if desired, they can also send real time data directly to the DSO as well.*
FI	*A) yes*
FR	*B) no*
GR	*Under discussion - To be decided*
HR	*B) no*
HU	*B) no*
IE	*D) Other. Must provide to the TSO or DSO depending on who they are connected to, which can be done via a third party*
IT	*B) no*
LT	*B) no*
LU	*D) Other. No SGU is connected to the CREOS grid neither to a third party DSO*
LV	*B) no*
MT	*No reply*
NL	*B) No. Data should be sent to the DSO to which the SGU is connected*
NO	*Under discussion - To be decided*
PL	*B) no*
PT	*B) no*
RO	*D) Other: i.e. only for type C (in Romania means 5-20 MW), TSO and DSO can agree with SGU to whom SGU shall directly send their data. For other cases the requirements are clear (B).*
SE	*B) no*
SI	*B) no*

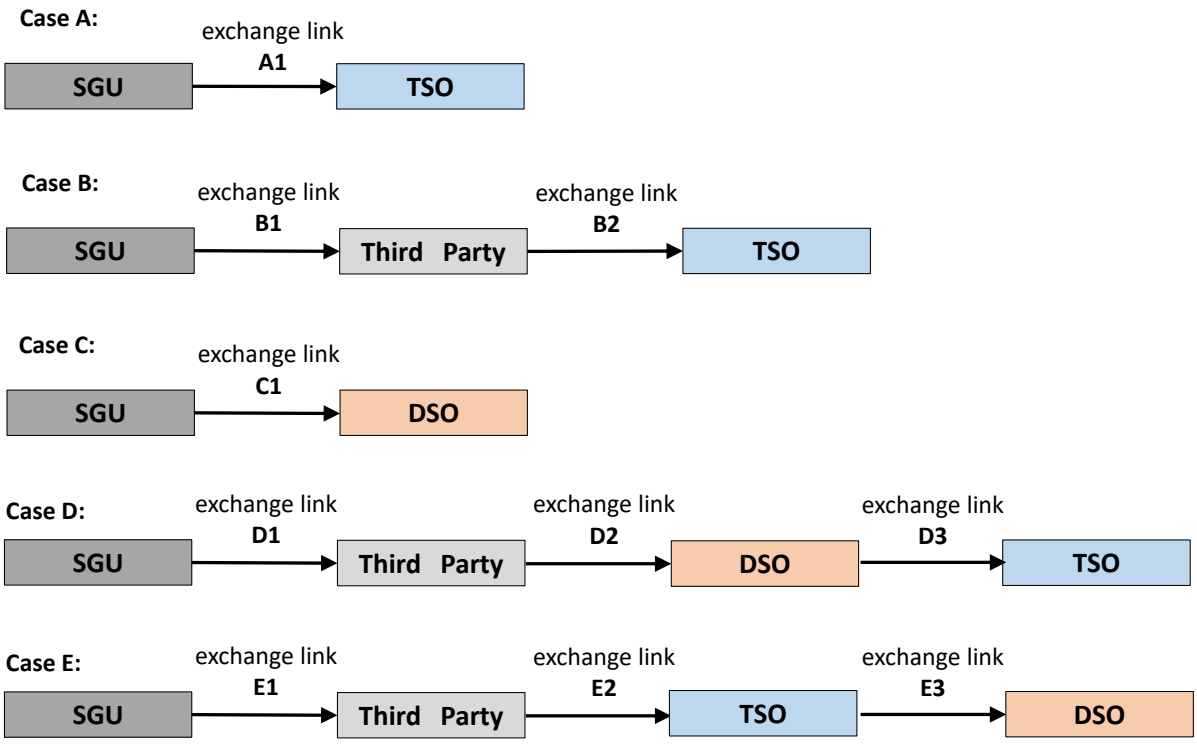
SK	*B) no*

6.3 Responsibility for the data exchange links

389 ***Q.5.6 The responsibilities related to the installation, configuration, security and maintenance of data exchange links were not fully harmonised by KORRR and were left to be decided at national level.***

Please, fill the Table, indicating the entity(ies) (e.g. SGU, Third Party, DSO, TSO) that is(are) responsible for the installation, configuration, security and maintenance of each of the data exchange links in accordance with Figure.

If none of the cases in Table is applicable, provide a short motivation.



390 *Table 16: Responsibility for the data exchange links*

MS	Answer									
	Case A	Case B		Case C	Case D			Case E		
	EL **A1**	EL **B1**	EL **B2**	EL **C1**	EL **D1**	EL **D2**	EL **D3**	EL **E1**	EL **E2**	EL **E3**
AT										

BE

General principle is that the entity providing the data are responsible for the exchange link.

- Communication requirements of service providers: responsibility of the service providers

- For structural and scheduled data, it is the grid user, agent or service provider

- For real-time data in the framework of flexibility, it is the BSP (for the front-end link)

- For all metering data, it is the TSO or DSO, via the TSO- or DSO-owned metering infrastructure (classic, AMR, digital).

BG

No reply

CZ

SGU	N/A	N/A	SGU	N/A	N/A	DSO	N/A	N/A	N/A

DE

TSO and SGU	SGU and Third Party	Third Party and TSO	SGU and DSO	SGU and Third Party	Third Party and DSO	DSO and TSO	SGU and Third Party	Third Party and TSO	TSO and DSO

DK

TSO	SGU/ TSO	TSO	DSO	DSO	DSO	TSO	N/A	N/A	N/A

The PCOM (point of communication) is primarily defined as the same as the POC and this is where the SGU has to deliver the data.

EE

SGU	SGU	Third Party	SGU	SGU	Third Party	DSO	SGU	Third Party	TSO

ES

N/A	out of scope	Third Party	N/a	out of scop e	Third Party	DSO	out of scop e	Third Party	DSO

FI

SGU, TSO*	SGU, TSO*	SGU, TSO*	N/A	N/A	N/A	N/A	N/A	N/A	N/A

** Case A, Case B: Each party is responsible for the exchange link from their own ends. I.e. TSO is responsible for its own end and other party is responsible for its own end.*

Case C: TSO does not have requirements for data exchange between DSO and third parties.

Case D, E: These are not typically used in Finland at the moment. However, these might be used in future as new renewable energy is connected more to DSO networks.

FR

TSO	SGU	TSO	DSO	Third Party /SGU	DSO	TSO	SGU	TSO	DSO

GR

Under discussion - To be decided

HR

SGU	-	-	SGU	-	SGU*	DSO	-	-	-

** In this case, in HERA's opinion 3rd Party should be responsible. However, there are no aggregators (or other 3rd Parties exept BRP managers) at the moment present so SGUs are sending data directly to DSO.*

In HOPS opinion if the SGU entitles 3rd Parties for data delivery, TSO still holds SGU responsible for data delivery.

At the moment Balancing Responsible Party (BRP manager), which can be regarded as the 3rd Party) is responsible for delivering production schedules to the TSOs.

HU	TSO	it is based on their agreement (mostly 3rd party ensures the communication link)	TSO	DSO	it is based on their agreement (mostly 3rd party ensures the communication link)	DSO	TSO	it is based on their agreement (mostly 3rd party ensures the communication link)	TSO	DSO
IE	SGU	SGU	SGU	SGU	SGU	SGU	DSO	SGU	SGU	TSO
IT	SGU (by using dedicated providers)			To be defined (Case C is the standard one. Case D enters in place in case the DSO refuses to gather data by itself and mandates a third DSO on behalf. Case E is the last resort situation in case no DSO can be mandated.)						
LT	SGU up to connection point to TSO	SGU up to connection point to Third Party	Third Party up to connection point to TSO	SGU up to connection point to DSO	SGU up to connection point to Third Party	Third Party up to connection point to DSO	DSO up to connection point to TSO	SGU up to connection point to Third Party	Third Party up to connection point to TSO	TSO up to connection point to DSO
LU	No SGU is connected to the CREOS grid neither to a third-party DSO.									
LV	Case A									
MT	*No reply*									

NL	Structural data: TSO Scheduled and forecast data: TSO Real time data: TSO	Structural data: unknown Scheduled and forecast data: unknown.Real time data: unknown	Structural data: TSO Scheduled and forecast data: TSO.Real time data: TSO	Structural data: unknown Scheduled and forecast data: TSO Real time data: DSO	Structural data: unknown Scheduled and forecast data: unknown. Real time data: unknown	Structural data: unknown Scheduled and forecast data: TSO. Real time data: DSO	Structural data: DSO Scheduled and forecast data: TSO. Real time data: TSO	Structural data: unknown Scheduled and forecast data: unknown. Real time data: unknown	Structural data: TSO Scheduled and forecast data: TSO. Real time data: TSO	Structural data: TSO Scheduled and forecast data: TSO. Real time data: TSO
NO	Under discussion - To be decided									
PL	SGU	SGU	Third Party	SGU	SGU	Third Party	DSO	SGU	Third Party	TSO
PT	SGU	SGU	TP	SGU	SGU	TP	DSO	SGU	TP	DSO

RO
I) SGU-installation (including compatibility with TSO communication infrastructure). C)OTS -configuration (architecture communication network) S)SGU – security (physically equipment) and OTS (security requirements) SGU – physical maintenance of equipment, M)TSO – data maintenance (checking quality of data received)
I) SGU/Third party (depend on SGU-Third party agreement) – installation communication infrastructure between SGU and third party M)SGU– physical maintenance of equipment,
I) Third party (depend on SGU-Third party agreement) -installation (communication infrastructure). C)OTS -configuration (architecture communication network). S) Third party – security (physically equipment) and OTS (security requirements). M)Third party – physical maintenance of equipments, M) TSO – data maintenance (checking quality of data received)
I) SGU-installation (including compatibility with DSO communication infrastructure). C) DSO -configuration (architecture communication network) S) SGU – security (physically equipment) and DSO (security requirements) M) SGU – physical maintenance of equipment, ODS– data maintenance (checking quality of data received)
I) SGU/Third party (depend on SGU-Third party agreement) - installation (including communication infrastructure between SGU and Third Party)
I) Third party (depend on SGU-Third party agreement) –installation (including compatibility with DSO communication infrastructure). C) ODS -configuration (architecture communication network). S) Third party – security (physically equipment) and ODS (security requirements). M) Third party – physical maintenance of equipments, M) ODS– data maintenance (checking quality of data received)
I) DSO –installation (if is not exist a communication link). C) DSO+OTS configuration (architecture communication network). S) DSO– security (physically equipment) and OTS+DSO (security requirements). M) ODS or TSO (depend on who is the owner of communication link) OTS - data maintenance (checking quality of data received)
I) SGU/Third party (depend on SGU-Third party agreement) -installation (including compatibility with communication infrastructure between SGU and Third party) M) SGU/Third party – physical maintenance of equipment,
I) Third party (depend on SGU-Third party agreement) -installation (including compatibility with TSO communication infrastructure). C) OTS -configuration (architecture communication network). S) Third party– security (physically equipment) and OTS (security requirements). M) Third party – physical maintenance of equipments, M) TSO +ODS– data maintenance (checking quality of data received)
I) OTS –installation (if is not exist a communication link). C) DSO+OTS configuration (architecture communication network). S) OTS – security (physically equipment) and OTS+DSO (security requirements).M) ODS or TSO (depend on who is the owner of communication link) ODS - data maintenance (checking quality of data received)

	Requirements are included into ANRE order no. 233/2019, ANRE orders for RFG Code implementation – information sending articles (i.e. 72/2017, 208/2018, 214/2018, 51/2019), DCC Code implementation (ANRE orders no. 67/2019, 176/2019) and HVDC Code implementation (ANRE orders no. 185/2019, 220/2019), Distribution Code (Order ANRE no.128/2008), Transport Code (Order ANRE no.20/2004).									
SE	TSO	SGU	TSO	DSO	SGU	DSO	TSO	SGU	TSO	TSO
SI	TSO	Third Party	TSO	DSO	-	-	-	-	TSO	TSO
SK	SGU	SGU	Third Party	SGU	SGU	Third Party	DSO	SGU	Third Party	TSO

6.4 Provision of SGUs' data to the TSO or to the DSO

391 ***Q.5.7 How do SGUs send their data to the TSO or to the DSO? Please choose between the options***

A) Individually per SGU, B) Individually per SGU and aggregated in some specific cases (please specify), C) Aggregated, D) Still under discussion E) other (elaborate). for:

392 *Table 17: Provision of SGUs' data to the TSO or to the DSO*

MS	Answer		
	Scheduled data	Real-time data	Structural data
AT	A) Individually per SGU	A) Individually per SGU	A) Individually per SGU
BE	B) Individually per SGU and aggregated in some specific cases or D) Still under discussion	E) Other. Metering data are collected through TSO or DSO-owned metering infrastructure	A) Individually per SGU
BG	*No reply*		
CZ	A) Individually per SGU	A) Individually per SGU	A) Individually per SGU
DE	A) Individually per SGU	A) Individually per SGU	A) Individually per SGU
DK	A) Individually per SGU through a PBA	A) Individually per SGU	A) Individually per SGU
EE	A) Individually per SGU	e) Other. Metering data are collected through TSO or DSO-owned metering infrastructure	A) Individually per SGU
ES	E) Scheduled information is provided per market unit and market participant. In case the market unit is composed of SGUs with P > 1 MW, a further disaggregation of scheduled information is required for each SGU that is part of the market unit. In case the market unit is composed of SGUs with P <=	B) If P > 1 MW, individually per SGU. If P <= 1 MW, aggregated (although further disaggregation might be requested for operational security reasons).	A), no matter the SGU's power

	1 MW, participating as aggregates, the scheduling information is requested for the set of SGUs that compound the market unit. A further disaggregation of scheduled information shall be requested for operational security reasons, but this disaggregation should be aligned with real time data disaggregation needs.		
FI	A) Individually per SGU	A) Individually per SGU	A) Individually per SGU
	B) Individually per SGU and aggregated in some specific cases	B) Individually per SGU and aggregated in some specific cases	B) Individually per SGU and aggregated in some specific cases
	DSO may decide itself what data they collect and how.		
FR	Individually per SGU for TSO connected SGU	Individually per SGU for TSO connected SGU	Individually per SGU for TSO connected SGU
GR	Under discussion - To be decided		
HR	B) Individually per SGU and aggregated in some specific cases (planned production aggregated)	A) Individually per SGU	A) Individually per SGU
HU	B) Individually per SGU and aggregated in some specific cases (Aggregation is allowed below type “C” (< 5 MW))		
IE	B) Individually per SGU and aggregated in some specific cases (eg. through an aggregator) Update provided by CRU: From initial KORRR TSO/DSO consultation paper: “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.” While there is no definition of an Aggregator in Ireland (end of Section 3.2 here), there are parties that engage in aggregation activities: •Demand Side Units (DSUs) •Aggregated Generator Unit (AGU): a collection of Generators each with a capacity of no greater than 10MW. In conclusion, where SGUs are aggregated (e.g. under a DSU or AGU), data can be exchanged via the third party aggregator.		
IT	B) Individually per SGU and aggregated in some specific cases (aggregated data for market results and specific request for ancillary services provided through pilot project -ex. For RR provided by aggregated resources, real time active power not available at the connection point)		A) Individually per SGU
LT	A) Individually per SGU	A) Individually per SGU	A) Individually per SGU

	Notice: question answered from TSO point of view. Please refer this question to competent authorities at Lithuanian DSO.		
LU	E) Other. Not applicable, as no SGU is connected to the CREOS grid neither to a third-party DSO.		
LV	A) Individually per SGU	A) Individually per SGU	A) Individually per SGU
MT	*No reply*		
NL	A) Individually per SGU	A) Individually per SGU	A) Individually per SGU
NO	Under discussion - To be decided		
PL	A) Individually per SGU	A) Individually per SGU	A) Individually per SGU
PT	A) Individually per SGU	A) Individually per SGU	A) Individually per SGU
RO	B) aggregated data in case the total power is less than 1.5 MW and in some cases aggregated for balancing services (at present there are not qualified all participants for new balancing platforms))	B) aggregated for : a) for B type PGMs connected into a substation and b) for maximum power of PGM/demand under 1.5 MW, separated after generation/load with primary energy specifications and in some cases aggregated for balancing services (at present there are not qualified all participants for new balancing platforms)).	B) individual and aggregated data in case of reserve providing unit/reserve providing group (RSF/RRF/RR)
SE	B) Unavailability plans individually, production plans might be aggregated	A) Individually per SGU	A) Individually per SGU
SI	B.), data from SGU connected to DSO are not required at the moment	B.), data from SGU connected to DSO (Pmax< 250 kW are aggregated)	A) Individually per SGU
SK	A or B or C	A or B or C	A or B or C

6.5 Aggregation of the real-time data provided by SGUs to the TSO

393 ***Q.5.4 Has the relevant TSO(s) applied Article 50(2)? If so, provide information on the aggregated real-time data of the SGUs concerned to be delivered to the TSO.***

394 *Table 14: Aggregation of the real-time data provided by SGUs to the TSO*

MS	Answer
AT	*Individual real-time data from P > 250 kW only for PV; all other production types from P > 1 MW*
BE	*No exemptions foreseen*
BG	*No reply*
CZ	*Yes. All PGMs under 1 MW shall be aggregated.*
DE	*Yes. In specific cases data are aggregated on substation level.*

DK	*No*
EE	*No*
ES	*No. All Type A generation modules providing system services or other providers are meant to send aggregated data. In case of need (operational security reasons), the DSO or the TSO may request information with certain level of disaggregation.*
FI	*No*
FR	*No*
GR	*Under discussion - To be decided*
HR	*Still under discussion*
HU	*Regarding Type "B" units (according 631/2016 EU regulation) DSOs send aggregated data for each 132 kV node.*
IE	*It is applicable to all distribution connected power generating modules specified without an RTU or similar, with the scope of data exchange including that required to necessitate the operation of an approximation model (Section 3.3 of Attached TSO proposal)*
IT	*Yes. All LV connected and all MV connected < 1 MW are exempted from providing real time data. Among the exempted units, sample ones will be identified to a later stage: the selected units will be requested to provide real time data.*
LT	*Not applied.*
LU	*No. No SGU is connected to the CREOS grid neither to a third-party DSO.*
LV	*No*
MT	*No reply*
NL	*No*
NO	*Not yet decided.*
PL	*Yes. DSO transmits individual or aggregated real-time data for MWE (power generation module) type B and C.*
PT	*NO. TSO follows existing rules about SGU.*
RO	*Yes, Transelectrica applied Article 50(2).* *B type PGMs owner connected into a single DSO substation are exepmted from art. 50 (1). DSO are sending to TSO active/reactive power aggregated from B type PGM, connected into his substation, frequency and busbar voltage.*
SE	*Indirectly this has been applied as SGUs are exempted of 50(1) in EIFS 2019:07. However, similar requirements to 50(1) is then applied to SGUs outside the TSOs observability area in EIFS 2019:07 chapter 3 §9, and additional requirements are applied to all SGUs inside the TSOs observability area in EIFS 2019:07 chapter 3 §8. EIFS 2019:07 chapter 3 §8 includes requirements for: active and reactive power measurements, topology, regulating positions of transformers, voltage measurements on busbars, status and setpoint of generators voltage regulation mode, reactive power in reactor and capacitor bay, status for automatic voltage control settings for reactors and capacitors.*
SI	*Yes, aggregated data exchange is allowed of SGU rated power under 250 kW.*
SK	*No*

6.6 System operators' access to the information

6.6.1 DSOs' access to the information of the transmission grid

395 ***Q.5.8 Which level of information of the transmission grid do DSOs have access to?***

A) Only from their connection point with the transmission network, B) All information of its observability area, C) No information is available to them, E) other (elaborate).

396 *Table 18: DSO's access to the information*

MS	Answer
AT	*B) All information of its observability area*
BE	*B) All information of its observability area*
BG	*No reply*
CZ	*E) Other. All information from the transmission system.*
DE	*B) All information of its observability area*
DK	*There is no defined observability area concerning the DSO's. DSO's request needed data at the TSO and data are exchanged as needed.*
EE	*A) Only from their connection point with the transmission network*
ES	*B) All information of its observability area*
FI	*D) or E) Other, information is agreed and exchanged based on the needs of TSO and DSO*
FR	*A) Only from their connection point with the transmission network*
GR	*Under discussion - To be decided*
HR	*A) Only from their connection point with the transmission network*
HU	*B) All information of its observability area*
IE	*D) Other. The DSO has access to all relevant transmission data in Articles 48-50, as per Article 51(2) of SOGL.*
IT	*A) Only from their connection point with the transmission network. The DSOs receive information on their connection point upon request.*
LT	*A) Only from their connection point with the transmission network*
LU	*E) Other. Not applicable. CREOS is a combined TSO-DSO + see 1.1.B*
LV	*A) Only from their connection point with the transmission network*
MT	*No reply*
NL	*E) Other. Data available on request*
NO	*A) Only from their connection point with the transmission network*
PL	*B) All information of its observability area*
PT	*E) Other. Real time information on the connection point. This data includes also structural and schedule data. On special cases, an observability are is defined.*
RO	*E) Other. Information from their connection point with the transmission network/ all information of its (DSO) observability area and information required from TSO previous (i.e. to respect capacity limit of TSO to send data to ODS- function of existing communication links etc.)*

SE	*E) Static power system model of TSOs observability area. All DSO:s within Svk:s observability area get access to the whole model*
SI	*B) All information of its observability area*
SK	*A) Only from their connection point with the transmission network*

6.6.2 TSO's access to the information of the distribution grid

397 ***Q.5.9 Which level of information of the distribution grid does the TSO have access to?***

A) Only from their connection point with the distribution network, B) All information of its observability area, C) No information is available to them, D) other (elaborate).

398 *Table 19: TSO's access to the information*

MS	Answer
AT	*B) All information of its observability area*
BE	*For real-time data, only A) (in the context of operational planning, see Collaboration Agreement Annex 11).* *http://www.synergrid.be/index.cfm?PageID=16824&language_code=NED#;* *For structural and metering data in the framework of activation of FCR and FRR, all information of the distribution grid connected participating delivery points is available to the TSO as well (in the context FlexHub Operational Contract).*
BG	*No reply*
CZ	*B) All information of its observability area*
DE	*B) All information of its observability area*
DK	*The TSO observability area extends to the primary side of TSO/DSO transformers, including circuit breakers. Additionally, all network elements above 10 MW/10MVA is included (actual size and circuit breaker position).*
EE	*A) Only from their connection point with the distribution network* *D) Other. We can see also SGU data*
ES	*B) All information of its observability area*
FI	*D) Other, information is agreed and exchanged based on the needs of TSO and DSO*
FR	*B) All information of its observability area*
GR	*Under discussion - To be decided*
HR	*d) Other. Data about the part of medium voltage network available* *Update provided by HERA:* *In HERA's opinion B). HOPS can request from ODS many data (structural, for.eg. HV/MV shemes, some SCADA measurement, etc..)*
HU	*B) All information of its observability area*
IE	*D) Other. The TSO has access to all relevant transmission data in Articles 48-50, as per Article 51(1) of SOGL.*
IT	*B) is the target. At this stage, due to the implementation taking some time, only a subset of data are available*

LT	*A) Only from their connection point with the distribution network*
LU	*D) Other. For 90% of the territory of Luxembourg, CREOS has full visibility of the distribution grid (option B). For the small remaining DSOs (4), option A is applicable.*
LV	*B) All information of its observability area*
MT	*No reply*
NL	*Structural data: option D – all data are made available at request* *Scheduling and forecast data: option A – information provided by the DSO at the DSO-TSO connection point* *Real time data: option A – information provided by the DSO at the DSO-TSO connection point*
NO	*B) All information of its observability area*
PL	*B) All information of its observability area*
PT	*D) Other. Only in special situations real time information is provided by the DSO. This data includes also structural and schedule data. Until now, special situations are limited to closed loops connecting substations in the transmission network boundary.*
RO	*B) All information of DSO observability area (see art. 53 SOGL etc.)*
SE	*B) All information of its observability area*
SI	*B) All information of its observability area*
SK	*A and in progress B*

6.7 DSOs' obligation to provide generating capacity of the type A power generating modules

399 ***Q.5.10 Explain how transmission-connected DSOs comply with the provisions and deadlines concerning the structural data exchange described in Article 43(5). Are the resulting information publicly available (if, so provide reference and web link)?***

400 *Table 20: DSOs' obligation to provide generating capacity of the type A power generating modules*

MS	Answer
AT	*DSOs comply via contract with TSO and periodical data exchange (some extensions under implementation); these information are not publicly available.*
BE	*1) Deadline concerning structural exchange is on an annual basis, send by email.* *2) An aggregated overview of the installed capacities at transmission level and distribution level (regional resolution) is made public in the National Report of Belgium sent to the European Commission and to ACER (https://www.ceer.eu/documents/104400/6959701/C20_NR_Belgium_NL/1ee85997-9b70-6656-0129-f148fa0e7351)*
BG	*No reply*
CZ	*Through regular (monthly) reporting. The information is not public.*
DE	*No need for this data exchange because existing processes cover this already.* *Information related to data exchange (scope & format etc.) according to Art. 40(5)-40(7) SOGL is published here:* *https://www.netztransparenz.de/EU-Network-Codes-und-CEP/SO-Verordnung/Datenaustausch* *Link to platform on basic and technical (structural) data:* *https://www.marktstammdatenregister.de/MaStR*

DK	*Indirectly.* *DSOs report structural data for all power generating modules (including type A) to Energistyrelsen according to Danish regulation both for new modules and when modules are changed.* *These data are accessible to Energinet directly in a database.* *Data are not publicly available.*
EE	*https://elering.ee/sites/default/files/public/Teenused/Liitumine/06 - Kliendi elektriosa projekti koostamise ja modelleerimise n%C3%B5uded_2019.05.30.pdf* *Update provided by ECA:* *Estonian TSO Elering owns also 110 kV network, because of that they do not need reactor and capacitor data from DSO side, other main data they get from technical project in the grid connection processes (transformers, connecting lines, voltage, installed generating modules etc.) , if there are changes then then costumer or distribution company has to report it. Concerning generating modules changes then DSOs are sharing the relevant data at least once a year.*
ES	*Nowadays, the TSO does not receive this information from the DSO. In the future, this information shall be exchanged through the TSO platform.*
FI	*DSOs have provided this information to the NRA (Energy Authority) already before the implementation of KORRR. The information is reported by the Energy Authority annually.*
FR	*Ongoing implementation. Publication of resulting information under discussion with DSO*
GR	*Under discussion - To be decided*
HR	*Data provided in DSO' 10YNDP:* *https://www.hep.hr/ods/UserDocsImages/dokumenti/Desetogodisnji%20plan/10g_2020_2029.pdf* *Data provided in annual report of DSO:* *https://www.hep.hr/ods/UserDocsImages//publikacije/godisnje_izvjesce//godisnje2020.pdf*
HU	*DSOs provide the referred structural data on monthly basis.* *The required format and data are available on the following link (Annex 7.5):* *https://www.mavir.hu/documents/10258/239609830/USz_M24.+kiad%C3%A1s_Mell%C3%A9kletek_2021.04.27_clean.pdf/f83727b8-2196-1e7e-f1b4-e01c94a1cfcd?t=1619605252601*
IE	*N/A – Observability area currently contained no DSO elements (see 'Section 3.3 – Article 44' of TSO Proposal)*
IT	*Information partially available. Some information on compliance with RFG is deduced on the basis of the date of entry into service of the plant*
LT	*Transmission-connected DSO sends structural data two times a year. Information is provided in excel sheets and contains information about aggregated generating capacity per primary energy sources. Information is publicly available at https://www.litgrid.eu/index.php/energetikos-sistema/elektros-energetikos-sistemos-informacija/irengtoji-galia/502* *Other data are not published or NRA is not aware at the moment regarding publication of this data.*
LU	*CREOS is a combined TSO-DSO + see 1.1.B*
LV	*No reply*
MT	*No reply*
NL	*The provisions are stated in the national (Dutch) grid code article 13.5 (https://wetten.overheid.nl/jci1.3:c:BWBR0037940&hoofdstuk=13&paragraaf=13.1&artikel=13.5&z=2021-07-03&g=2021-07-03)* *and the deadlines are stated in de national grid code article 13.9 (https://wetten.overheid.nl/jci1.3:c:BWBR0037940&hoofdstuk=13&paragraaf=13.1&artikel=13.9&z=2021-07-03&g=2021-07-03)*
NO	*Not implemented at this point.*

PL	*DSO provide the data once per month. Those data are not publicly available.*
PT	*No information publicly available. Real time information exchange is accorded between TSO and DSO, upon power grid evolution and on a regular timeframe basis.* *We confirm that every year the DSO provides the information needed to support the coordination with the TSO.*
RO	*YES, DSO are sending to 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 link with A-PGM which are connected to the network:* *Link - https://www.transelectrica.ro/ro/web/tel/avize-contracte*
SE	*It is planned to be realized in the web-site for structural data that will be in operation in 2022*
SI	*Information are not publicly available.*
SK	*The data are sent to the required extent, with an upgrade once a year. They are not public.*

7 KORRR related provisions

7.1 Access to the structural information stored by the TSO and DSOs

401 ***Q.6.2 Provide information on the process through which the entities referred to in Article 5(1) of the KORRR have access to the structural information referring to their facilities stored by the TSO or DSO.***

402 *Table 21: Access to the structural information*

MS	Answer
AT	*Inter-TSO-agreements (contracts), weekly telcos, RSC process, CGM process*
BE	*The scheduled data are defined in the connection contract, the BRP contract (a full implementation of the iCAROS design will result in the abolishment of the link with the BRP contract. For this however a fundamental review of the connection contract is needed. As such today the modalities foreseen in the transitory phase in the federal grid code are valid that a BRP of a SPGM or PPM per primary energy source of 25 MW or more is also the OPA and the SA) , the OPA contract and/or the SA contract. This ensures de facto that each SGU has access to the structural information referring to its facilities stored by the TSO or DSO.*
BG	*No reply*
CZ	*For TSO-connected SGUs, the structural information is an annex of the Connection Agreement. Both parties have a copy.* *For DSO-connected SGUs, Structural data acc. Operating instructions, Decree on dispatching control, document MS Word.*
DE	*TSO, DSO, SNN have an access to common platform with structural data hosted by NRA.*
DK	*The entities are providing the data themselves and as such have full access to the data.*
EE	*No special environment, but all data available on request by e-mail*
ES	*In case the SGU requires access to its own information, this shall be done by an email request. The TSO is developing a platform (PASOS) so that communication can be much faster both with DSOs and SGUs. By means of this platform, SGUs will directly have access to its own information, without the need of requesting it, and will be able to modify it in case of need.*
FI	*Entities may request the information from TSO.*

FR	*Structural information are stored in contract documents co-signed by RTE and the entities referred to in Article 5(1) of the KORRR.*
GR	*Under discussion - To be decided*
HR	*the process has not been implemented because, as a rule, SGU submits structural data to the operator, so far there has been no case of SGU requesting data on itself*
HU	*These information are the part of bilateral agreements between TSO and SGUs and between DSO and SGUs.*
IE	*OC.7.2.8.4 of the National Grid Code states: "The TSO shall afford Users access to its records (and copies thereof) of Operational Data and/or data required to be maintained under OC.7.2.8.3 on reasonable notice." (https://www.eirgridgroup.com/site-files/library/EirGrid/GridCodeVersion9.pdf)*
IT	*Access to information stored by TSOs and DSOs is regulated by the provisions included in the Regulation 2016/679 (GDPR) and the related national legislation. In particular each entity has the right to access to any information stored by TSOs and DSOs related to its facilities.*
LT	*Currently NERC have not collected information regarding this issue.*
LU	*Not applicable due to absence of SGUs in Luxembourg.*
LV	*Structural information provided by SGUs will be stored by a single electricity market data exchange and storage platform which is under development. SGUs will have access to the stored information they provide and store on the platform.*
MT	*No reply*
NL	*SGU receives a copy of the Excel data sheet they completed as part of the connection process at request. Future: SGU has access to data via customer portal.*
NO	*Under discussion - To be decided*
PL	*Those entities will have access to those data after the Portal of Structural Data Exchange will be implemented. This access will be available through an IT system.*
PT	*Information can be accessed and delivered by request from the user*
RO	*For basic structural data, SGUs has access the platform EMFIP: https://transparency.entsoe.eu/* *For detailed structural data, SGU has access on his request to relevant system operator.*
SE	*Structural information will be exchanged thru a website, where authored and concerned actors can register and take part of the information.*
SI	*The data are not available online, but they are available on demand.*
SK	*Information is provided on request only - it is not an automatic process.*

7.2 DSO's access to the information of the SGUs connected to its distribution network

403 ***Q.6.3 Concerning Article 5(2), explain how each DSO has access to the structural, scheduled and real-time information of the SGUs connected to its distribution network.***

404 *Table 22: DSO's access to the information of the SGUs connected to its distribution network*

MS	Answer
AT	*Via data exchange between all DSOs "in a chain" in the cascade*
BE	*Similar as for transmission connected assets, through the connection contracts (structural data), service provisions (scheduled data and real-time data for units participating in balancing services) and DSO-owned metering infrastructure (real-time data).*

BG	*No reply*
CZ	*Data of connected SGUs are provided directly (Case C) of Fig. 2)*
DE	*Access to structural data via common platform or bilateral activities.* *Access to real-time data directly from SGUs.* *Access to scheduled data: for SGUs > 10 MW from TSO, for SGUs < 10 MW if available then via data provider (third party)*
DK	*The DSO is responsible for updating the information on structural data, and as such has access to the data both from the SGU directly, but also through their access to the database where the data are stored.* *Scheduled data are not accessible for the DSO. As the data are not requested by the DSO for the time being. Preliminary work is considered.* *Real-time data are provided by the DSO to the TSO.*
EE	*No special environment, but all data available on request by e-mail to the TSO*
ES	*- Structural information: SGUs connected to the distribution grid shall send their structural information directly to the DSO and to the TSO, so no further communication between the TSO and the corresponding DSO is required.* *- Scheduled information: the SGUs send their scheduled information to the TSO's platform (SIOS) by means of the one DSOs can directly download the information of those SGUs connected to their grid.* *- Real time information: The SGU is free to choose to send the information directly to the TSO, to the corresponding DSO or to both. In case real time data are only sent to the TSO, the DSO needs to send a formal request via email to the TSO asking for this information. The TSO needs to resort to the same process for requesting real time information when the SGU sends the information directly to the DSO. This process is being treated within the TSO/DSO working group when discussing the agreement for the national implementation of Art. 40(7).*
FI	*DSO may request information from TSO.*
FR	*ENEDIS set up a web portal to exchange with SGU (DISPO RESEAU) and, for real-time information, use telemetry an information exchange tool : DEIE ('Dispositif d'Échange d'Informations d'Exploitation').*
GR	*Under discussion - To be decided*
HR	*Structural and scheduled data has to be sent by SGU (structural data are sent during request for connection to the grid), HEP ODS has own real time data, no need for SGU data delivery*
HU	*Structural data: DSO get this information directly from SGUs if they need these.* *Scheduled data: DSO get this information directly from SGUs if they need these, or above type "C" they can get it from the TSO (below this threshold the scheduled data are mostly aggregated).* *Real time data: DSO get this information directly from SGUs if they need these.*
IE	*DCG4.1 of the Distribution Code states: "The DSO Licence imposes a duty upon the DSO to implement and enforce the Distribution Code. In order to do this the DSO may need access across boundaries, services, and facilities from User or to issue instructions to Users" (https://www.esbnetworks.ie/docs/default-source/publications/distribution-code-version-7.0.pdf?Status=Master&sfvrsn=6ac3c597_6/%20Distribution-Code-Version-7.0%20.pdf)*
IT	*Real time information will be in principle collected directly by the connecting DSO (or by a mandated DSO): gathering is limited to the MV units > 1 MW and to sample MV units < 1 MW and sample LV units. As last resort, real time data may be directly gathered by Terna and shared with the DSOs: the ways of communication are defined in the national grid code and will be complemented by the provisions to be defined by Arera.* Update provided by ARERA: *The implementation is on going, a retrofit is required and a grace period needs to be granted*

LT	*NRA does not have required information at the moment.*
LU	*Not applicable due to absence of SGUs in Luxembourg.*
LV	*Not applicable.*
MT	*No reply*
NL	*Scheduling and forecast data: Scheduling and forecast data are directly send to the DSO by the SGU.* *DSO's receive structural, forecast and real time data directly from their SGU (or via contracted service provider)*
NO	*Under discussion - To be decided*
PL	*For structural information it is through connection and distribution agreements, after implementing the Portal of Structural Data Exchange, the access will be available through an IT system.* *For the scheduled and real-time information the SGUs send those information to DSOs.*
PT	*Structural Information is provided during the process of connection. DSO access SGU real time data directly. Schedule data is provided by the TSO.*
RO	*DSO has access to structural data – by platform EMFIP, to scheduled data – by CREFECHIP platform, to real-time – by DMS-SCADA.*
SE	*Structural information and unavailability information will be exchanged thru a website, where authored and concerned actors can register and take part of the information. Real-time data can be requested and forwarded from the TSO. Production plans will be possible to request from the TSO.* *Today in addition to the website this can also be done bilaterally as needed. Outage plans and availability plans are currently exchanged only by agreement between TSO/DSO and TSO/SGU.*
SI	*No PGM is recognized as distribution-connected SGU.*
SK	*Yes, DSOs have access to these dates.*

7.3 Real-time data exchange between TSOs

405 ***Q.6.4 With respect to Article 6(4) of the KORRR, confirm if the relevant TSO has exchange real-time data with the other TSOs of the same synchronous area. Provide motivations if these data are not shared.***

406 *Table 23: Real-time data exchange between TSOs*

MS	Answer
AT	*Yes (confirmed)*
BE	*Yes, confirmed*
BG	*No reply*
CZ	*Yes*
DE	*Yes, the German TSOs shared data with other TSOs.*
DK	*Energinet shares real time data with all TSO's, to whom there is a cross border connection.*
EE	*Yes, real time data shared*
ES	*Yes*

FI	*Data are exchanged.*
FR	*This real-time data is sent to ENTSO-E Awareness System (EAS) and therefore accessible to all TSOs in the synchronous area.*
GR	*Under discussion - To be decided*
HR	*Confirmed*
HU	*Yes we confirm it.*
IE	*PC.A8.4 of the National Grid Code states: "The dynamic Models, supporting documentation and associated data are provided to the TSO in order to carry out its duties to meet its statutory and legal requirements. In that regard the TSO is entitled to share the information with third party consultants, other TSOs or DSOs working for or with the TSO to perform coordinated operational and/or planning studies."* *Update provided by CRU:* *"EirGrid as per the approved Synchronous Area operational agreement and the Load Frequency Control Block operational agreement , works jointly with SONI to operate the system and as per the SEM (Single Electricity Market) design also works with SONI to jointly operate the wholesale market. Joint operation and data sharing is one of the core principles of the EirGrid/SONI relationship."*
IT	*Real time data are exchanged with neighbouring TSOs, based on the contractual arrangements in place between the involved TSOs.*
LT	*All information is shared on EAS platform as well as directly via ICCP to neighbouring TSOs. All real time data exchanged between TSOs is described and listed in system operation agreements (SOA).*
LU	*YES. CREOS is part of the LFC area of the German TSO Amprion. The real-time data required from the Creos grid are taken into account by Amprion which operates the DE/LU control area.*
LV	*Latvian TSO is publishing in ENTSO-E Awareness System information on aggregated electricity generation, the electricity system state, electricity exchange in virtual tie-lines and frequency. TSOs does not publish data of frequency restoration control error and measured active capacity exchanges between LFC areas (no LFC area and capacity exchange).*
MT	*No reply*
NL	*Confirmed*
NO	*Yes. Relevant real-time data are shared with other TSOs in the same synchronous area, regulated in the Nordic System Operation Agreement (SOA).*
PL	*Confirmed, through the EAS system.*
PT	*Real time Information is exchanged between SCADAs using dedicated private communication channels.*
RO	*YES, Transelectrica has exchange real-time data with other TSO of the same synchronous area by EMS-SCADA and EAS (ENTSO-E wide Awareness System).*
SE	*Accomplished*
SI	*Yes, the relevant data are exchanged.*
SK	*YES*

7.4 Determination of SGUs required to provide real-time data

407 ***Q.6.5 With respect to Article 6(5) of the KORRR, what are the criteria that the TSO adopted to define the SGUs in its control area, which shall provide real time data? Were these criteria set in coordination with DSOs and SGUs? Provide reference to decisions and web link.***

408 *Table 24: SGU's obligation to provide real-time data*

MS	Answer
AT	*Existing power plants with P≥25 MW or P<25 MW if they are remote controlled. New power plants if P≥ 1MW or P≥0,25 MW for PV plants. The criteria were set in coordination with DSOs and SGUs.*
BE	*For decentralized production larger than 5 MW connected to medium voltage (≥ 30kV): status of the circuit breaker and active power measurements are shared by the DSO to the TSO, at least to the extend that the DSO has this information (Collaboration Agreement, Annex 11, page 13). This criteria was set in coordination with DSOs.*
BG	*No reply*
CZ	*The criteria were defined following provisions of the relevant articles of SOGL. SOGL data exchange requirements are addressed to SGUs, which are defined in Art. 2. The level of detail of data to be provided is driven by the CGM methodologies (in acc. with Art. 67 and 70 of SOGL).*
DE	*Yes, the German TSO described the criteria in SOGL implementation guide https://www.netztransparenz.de/portals/1/Content/EU-Network-Codes/SO%20Verordnung/SOGL_40-7_2020_04_21_A_fuer_die_implementierung.zip* *This agreement was reached at the level of the Bundesverband der deutschen Energiewirtschaft (BDEW) in cooperation with the DSOs and SGUs:* *-Criterion 1: detailed data for all grid users within the TSO Observability Area (OA), without any limits to capacity.* *-Criterion 2: as of 1MW capacity (also applicable outside the OA), under the assumption that all facilities beyond this capacity are equipped with professional devices capable of providing the TSOs with recommended RT data. For other reference units < 1MW only when possible and deemed applicable.*
DK	*All SGU's type-B and up must deliver real time data*
EE	*Criteria - from type B https://elering.ee/sites/default/files/public/elekter/elektris%C3%BCsteem/Oluliste%20v%C3%B5rgukasutajate%20nimekiri.pdf* *Update provided by ECA:* *Coordination [with DSO and SGUs] was done in the process of implementing RFG into the grid connection requirements. Data exchange requirements are here: https://elering.ee/sites/default/files/public/Teenused/Liitumine/05%20-%20Requirements%20for%20data%20exchange%20related%20to%20the%20electrical%20installations%20of%20clients_2019.05.30.pdf*
ES	*The requirements for data exchange stemming from Art. 40(5) SO GL shall still be adopted by publication of Ministry decision (competent Authority). An agreed proposal from the TSO and the relevant DSOs was sent to the competent Authority, including two different thresholds for establishing data exchange requirements for individual units:* *- P > 1 MW: proposed by the TSO.* *- P > 100 kW: proposed by the DSOs (The TSO did not oppose to this proposal and expressed the capability of adapting all systems to this new threshold in case of being approved).* *The Ministry has not published the final decision yet, but a first approach was launched to public consultation on 12th April 2019 (https://energia.gob.es/es-es/Participacion/Paginas/propuesta-normativa-codigos-red-europeos.aspx). This proposal took into consideration the comments that*

	grid users provided regarding the two different suggested thresholds during the public consultation and the multiple organized workshops of the national implementation of Art. 40(5). SGUs expressed their concerns on the cost that reducing the threshold would imply. For this reason, the draft proposal that the Ministry published considered 1 MW. Still, the Spanish NRA asked the TSO to provide a biannual report on the evolution of the installed capacity in Spain (per connection grid), in an effort to analyse if a further reduction of the threshold becomes a need and shall be proposed. *Even though the threshold has not yet been approved, the value of 1 MW has already been implemented in Spain for defining the national data exchange requirements (considering that this threshold was already into force). It was included in the national grid code ('operational procedures'), keeping in mind that they shall be modified once the final approval is reached. The SGUs data to be exchanged between the TSO and the DSOs was also agreed when drafting the proposal of the national implementation of Art. 40(5), and all the additional information that the DSO requested was included, even if the TSO did not requested it.*
FI	*If SGU maximum power is higher or equal to 1 MW, they shall provide real-time data. The requirements are defined in the national Scope of data exchange which has been consulted with the stakeholders.* *https://www.fingrid.fi/globalassets/dokumentit/fi/sahkomarkkinat/verkkosaantofoorumi/fingrid-oyj_-kayttotoiminnan-tiedonvaihdon-laajuus.pdf*
FR	*In France, any transmission connected generation unit is considered as a SGU and is required to provide real-time data. Distribution connected generation units are not considered as SGU.* *This has been consulted with third parties and the results of the consultation is available on the following website : Mise en œuvre des codes de réseau européens | RTE (rte-france.com) (see the paragraph about Article 40.5 and especially CRE's decision)*
GR	*Under discussion - To be decided*
HR	*HOPS and HEP ODS has own real time data in SGU connection points* Update provided by HERA: *Yes, DSO has real time data from SCADA.* *However it is prescribed that the SGU have obligation to send real time data to DSO which than sends data to TSO. If the real time data are available from DSO SCADA they are not obliged to send the data. (Rules on data exchange between transmission system operators and SGU – public consultation closed on 29. November 2021.)*
HU	*Above 5 MW (which is the upper threshold of type "B" units) is required to provide real time data. Below this threshold the requirements are laid down in the grid code of the DSOs and the bilateral agreements between the parties.* *Requirements above 5 MW are available in the following link:* *https://www.mavir.hu/documents/10258/239156022/Folyirelv+V-4_2021.02.01_clean.pdf/73dc54ef-ea34-6ed2-550a-bbf962245f65?t=1610952613802* Update provided by MEKH: *Yes, these criteria are laid down in the National Grid Code and the representatives of DSOs and SGUs are the members of the Committee.*
IE	*Taken from Section 3.3 of the attached TSO proposal:* *"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 the table below."* *The TSO and DSO reached the position above and consulted with SGUs as part of this process.*
IT	*As clarified above, gathering is compulsory from MV units ≥ 1 MW, while for LV units and MV units < 1 MW only sample units will be requested to provide real time data. The provision were approved by Arera (see https://www.arera.it/allegati/docs/20/036-20.pdf - Decision 36/2020),*

	based on a proposal by Terna following a public consultation and a specific agreement with the DSOs reached under Arera facilitation
LT	*The requirements for real-time data provision from SGUs is defined in Requirements for remote control and SGUs are issued connection requirements, which include the data that is required by TSO to provide. In general, according to requirements every SGU connected to transmission network is obliged to provide real time data.*
LU	*CREOS considers a production or consumption unit to be significant for the use of its grid when its impact on the transmission network is greater than 10% of the annual peak power in the CREOS network. As such no SGUs have been identified for the grid.*
LV	*The criteria that the TSO adopted to define the SGUs in its control area are defined in the national Network Code for the Electricity Sector (https://likumi.lv/ta/id/302775-grozijumi-sabiedrisko-pakalpojumu-regulesanas-komisijas-2013-gada-26-junija-lemuma-nr-1-4-tikla-kodekss-elektroenergijas-nozare-).*
MT	*No reply*
NL	*No reply*
NO	*Under discussion - To be decided*
PL	*Following the SO GL provisions (art. 40(5)) as well as the decisions of the President of the Energy Regulatory Office approving power threshold for MWE (power generation modules) B, C and D types.*
PT	*Adopted criteria was to consider PGMs included in restoration plans. DSO and SGU were involved in the process.*
RO	*Criteria established into art. 2 from SOGL.* *Example1 -ANRE Order no. 233/2021, art. 7(1) art. (8)(1) – Every generation power facility owner, connected to the TSO (type B, C and D) or to DSO, which has SGU specified to the art.2 (1) a) and e) from SOGL (…)* *Example 2 – ANRE order no. 89/2021 (real time data exchange from connection point for RCF,RRF and RR providers) – art 20 (j), art. 33 (i), art. 38 (h), art. 43 (g).* *Link:* *https://www.anre.ro/ro/energie-electrica/legislatie/coduri-paneuropene1476186098/regulamentul-ue-nr-1485-2017* *ANRE, TSO/DSO/SGU follow provision of article 2(1) from SO GL which establishes SGU due to the reason that these SGUs already supply information to TSO in the way recommended by SOGL at the data when art. 40(5) entered into force.* *It was specified that for demand response (it didn't exist in 2017 qualified demand response in Romania and nor in this moment) it will be implemented at 1.10.2021- it is an estimation in case in first semester of 2021 appear a demand response.* *For exemplification art 8(1) from ANRE Order no.233/2021 stipulates that:* *Art 8(1) – each power generating facility owner of a power generating module which is a SGU in accordance with Article 2(1)(a) and (e) from SO GL 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: (…)* *According to provisions of art 47(1), 50(1) from SO GL - Unless otherwise provided by the TSO, it was specified which information from PGM are required to be send to the TSO and how information from B type are collected (aggregated in the same substation and send it, not individually from each B type PGM if there are connected more units B type in the same substation) and send it aggregated to the TSO.* *Similar art. 7(1) from ANRE Order no. 233/2019.*

	ANRE order no.89 specify more aditional information concerning SGUs which supply RRFa,RRFm, RR.
SE	*Implementation is ongoing. For full implementation the website, Kraftsystemhubben, and the communication solutions must be in place. Coordination with DSOs and SGUs has been done through public consultation in connection with issuing national secondary legislation EIFS 2019:7.*
SI	*According to national legislation TSO in Slovenia is responsible for operating of 400/220 and 110 kV level based on operational security limits criteria. Based on operational experience monitoring of SGU-s on those voltage limits proved to be sufficient for maintaining security of operation therefore we choose to observe SGU-s connected to 110 kV and higher. This assessment was done in coordination with DSOs, CDSOs and SGUs. Reference are agreements with DSOs, CDSOs and SGUs.*
SK	*The criteria were coordinated with SGU and DSOs - https://www.sepsas.sk/sk/dokumenty/technicke-podmienky/*

7.5 Data exchange between TSO control areas

409 ***Q.6.6 Considering Article 6(8) of the KORRR, all transmission and distribution data to be exchanged between TSO control areas shall be exchanged only through TSOs. Do the national legislation or specific agreements require otherwise? If so, provide explanations and reference through web link.***

410 *Table 25: Data exchange between TSO control areas*

MS	Answer
AT	*No.*
BE	*Yes, this data are exchanged only through TSOs.*
BG	*No reply*
CZ	*No.*
DE	*Yes, the data are exchanged only through TSOs.*
DK	*No.*
EE	*Not required otherwise*
ES	*No.*
FI	*No.*
FR	*No. Any data exchange is processed through the TSO.*
GR	*Under discussion - To be decided*
HR	*No.*
HU	*No other requirements.*
IE	*N/A* *Update provided by CRU:* *There is nothing in national legislation that states otherwise.*
IT	*No specific national legislation is in place. Standard KORRR rules apply*

LT	*No specific agreements or national legislation contradicts 6(8) Article.*
LU	*No deviating legislation or agreements in place.*
LV	*No, national legislation does not provide otherwise.*
MT	*No reply*
NL	*No.*
NO	*All data exchanged between TSO control-areas are exchanged only through the TSO.*
PL	*According to art. 6(8) of KORRR.*
PT	*Only TSOs*
RO	*National legislation doesn't specify otherwise.*
SE	*No.*
SI	*No.*
SK	*None*

7.6 Employment of the Operational Planning Data Environment Platform

411 ***Q.6.7 With respect to Article 6(9) of the KORRR, is the relevant TSO employing the Operational Planning Data Environment Platform for the exchange of structural and scheduled information with other TSOs? If no, provide motivations and explain the data format adopted and the differences with the harmonised ones?***

412 *Table 26: Employment of the OPDE*

MS	Answer
AT	*Yes.*
BE	*Yes, the Belgian TSO uses the OPDE platform today, in line with the recommendations of Entso-E, for the following processes:* *• IGM (indivual Grid Model)* *• OPC (Outage Planning Coordination)* *• STA (Short Term Adequacy)*
BG	*No reply*
CZ	*Yes.*
DE	*Yes (the German TSO use the OPDE Platform for data exchange with other TSOs as stipulated by Article 144-117 of the System Operation Guideline)*
DK	*Yes.*
EE	*Yes, but Elering is connected to RU synchronous area (BRELL), we have also other agreements and procedures to exchange structural and scheduled information.*
ES	*OPDE stable version is only foreseen at the end of 2021. REE is exchanging all data in prescribed format CGMES and via OPDE, continuously updating the communication protocols of OPDE (currently v.4 is under implementation).*
FI	*Yes.*
FR	*Yes, RTE uses Outage Planning Coordination (OPC) Tool which is common to other TSOs concerned and foresees use of OPDE.*

	Update provided by CRE: *RTE uses OPDE but the platform is not fully operational yet.*
GR	*Under discussion - To be decided*
HR	*HOPS' implementation is up to date as process is implemented at ENTSO/E level*
HU	*MAVIR uses the OPDE platform for the exchange of data with other TSOs.*
IE	*Assumption is yes – relevant contact in EirGrid yet to respond to query.* *Update provided by CRU:* *From the TSO: "We have an all-island EMS and an all-island System Operations (SO) team. Our SO team deals with matters relating to the exchange of structural and scheduled information on an all-island basis. For these reasons there are yet no observable pragmatic benefits in making use of OPDE on the island of Ireland for such purposes. (To exclusively use OPDE for such purposes instead would be far more limiting)."*
IT	*Yes.*
LT	*Operational Planning Data Environment (OPDE) is used for the exchange of structural and scheduled information with other TSOs. Individual grid models (IGMs) that contain aforementioned information are uploaded to OPDE for each hour for two days ahead (D-2), day ahead (D-1) and intraday (ID) processes.*
LU	*This question seems to refer to CGMES. In this respect it should be noted that the OPDE Platform is still in a testing phase. CREOS participates in these tests and is also connected to the OPDE platform via the PCN network. Go-Live is expected at the end of 2021. Currently the exchange of IGMs is done in the existing UCTE-DEF format.*
LV	*Yes.*
MT	*No reply*
NL	*Yes.*
NO	*Operational Planning Data Environment Platform: OPDE is a platform for storage, exchange and management of information made available to all Transmission System Operators who are members of ENTSO-E and all RSCs.* *The CGM service also includes the use of a harmonised data format (CGMES) allowing precise descriptions of the networks. The exchange of files is supported by the OPDE which also contains central business applications to support RSC services.*
PL	*Yes.*
PT	*Yes. Under development. Presently, OPDE is in a consolidation phase and several services are into migration to this infrastructure.* *Therefore, it is expected that OPDE become fully operational in the near future.*
RO	*Transelectrica are using for data exchange of structural and scheduled information with other TSOs: OPDE, OPC, STA, Verification Platform, AMICA și SEE RSC TOOL.*
SE	*No – issues on information security have yet to be resolved. Nordic TSOs have shared data as per implementation guidelines issued by the Nordic RSC. Where possible these are in line with the harmonised ones.*
SI	*Yes. OPDE is used.*
SK	*The OPDE platform at SEPS is not yet fully implemented, data are provided manually.*

7.7 Duration of the electronical storage of information

413 ***Q.6.8 What is the duration defined by national legislation concerning the electronically storage of information in accordance with Article 6(10) of the KORRR?***

414 *Table 27: Electronical storage of information*

MS	Answer
AT	*Not defined.*
BE	*No information received*
BG	*No reply*
CZ	*Not defined by national legislation.*
DE	*10 years*
DK	*There is no national legislation for this, but Energinet stores data for 5 years.*
EE	*When needed for accounting, then 7 years.*
ES	*For structural, scheduled and real time information, the electronically storage duration is, at least, 3 years. This is not defined by national legislation, but by internal TSOs' procedures.*
FI	*Not defined.*
FR	*The duration defined in FR is 5 years.*
GR	*Under discussion - To be decided*
HR	*10 years or longer*
HU	*Having regard to Act LXXXVI of 2007 on Electric Energy, MAVIR stores the information needed for its processes in line with periods defined in national electricity supply codes.* Update provided by MEKH: *At least 8 years according to Hungarian Accounting Act 2000. C 169.§* *https://net.jogtar.hu/jogszabaly?docid=a0000100.tv*
IE	*OC.7.2.8.3 of National Grid Code: "All Operational Data shall be so maintained for a period of not less than six (6) years commencing from the date the Operational Data was first supplied (or first created, if earlier)."*
IT	*National legislation does not provide any duration.*
LT	*According to national legislation information must be stored of 10 years.*
LU	*As these are not personal information, GDPR is not applicable and there is no other legislative provision in this respect.*
LV	*Not yet defined.*
MT	*No reply*
NL	*7 years*
NO	*National legislation does not define duration of electronically storage of information*
PL	*There are no national regulations in this regard. The data are stored for a period longer than 5 years.*

PT	*Durations defined by national legislation depends on the issues. For the case of KORRR, one could not identify any duration defined by national legislation.* *Despite not having the duration defined by national legislation, the TSO keeps the information electronically stored according to internal practices, at least during 5 years.*
RO	*5 years (5 years are for structural data, 2 weeks for real time data).*
SE	*This varies on type of data, but for example state estimator network models are stored up to 10 years.*
SI	*10 years.*
SK	*5 years*

7.8 Structural data used by TSOs

7.8.1 Structural data provided by the DSO

415 ***Q.6.9 Concerning Article 7(1) of the KORRR,***

A.Describe the TSO's format and the type of requested data for the data exchange.

B.Where has the relevant template been published (provide links)?

C.If the relevant template has not been published, motivate this choice and explain how the data exchange process is carried out between the relevant parties.

416 *Table 28: Structural data provided by the DSO*

MS	Answer
AT	*A. CGMES (common grid model exchange standard)* *B. No* *C. Known and available to all relevant parties*
BE	*A. Elia provides an excel template to DSOs for the share information about generation units in a structured way and which can be uploaded through the PISA Web Tool into the PISA database (https://www.elia.be/en/customers/customer-tools-and-extranet/pisa-web-tool). This is in line with the TSO-DSO Collaboration Agreement, Annex 7, Art.2.4.2).* *B. Only upon password access via: https://www.elia.be/en/customers/customer-tools-and-extranet/pisa-web-tool* *C. -*
BG	*No reply*
CZ	*A. The structural data used by ČEPS are saved in SQL database inside integrated datastore ČEPS. The templates of DSO devices structural data format are described in Appendix 2 of multilateral agreement between ČEPS and three DSOs ČEZ Distribution, EG.D and PREdistribution.* *Changes of one pole schemes are realized via operational short time planning data exchanges. Actual state of whole structural data including grid schema is exchange with DSOs periodically each month.* *ČEPS uses the format conversion from ČEPS model format to RAW, UCTE and CGMES formats.* *B. Not published.* *C. The template is a part of the agreement in accordance with Art. 40(7), therefore available to both TSO and DSOs.*
DE	*A. The requested data can be found here: https://www.netztransparenz.de/portals/1/Content/EU-Network-Codes/40-5-Antrag_vom_2019_09_20.pdf* *The TSO's format can be found here: https://www.netztransparenz.de/portals/1/Content/EU-*

	Network-Codes/SO%20Verordnung/SOGL_40-7_2020_04_21_A_fuer_die_implementierung.zip *B. It is published here: https://www.netztransparenz.de/portals/1/Content/EU-Network-Codes/SO%20Verordnung/SOGL_40-7_2020_04_21_A_fuer_die_implementierung.zip* *C. It is not relevant.*
DK	*A. Dansk Energi manages this template for the DSO's.* *B. Bilag 1: https://www.danskenergi.dk/vejledning/nettilslutning/aftaler-vedroerende-tilslutning-til-elnettet* *C.*
EE	*A. No reply* *B. https://elering.ee/sites/default/files/public/elekter/elektris%C3%BCsteem/Oluliste v%C3%B5rgukasutajate nimekiri.pdf* *C. -* *Update provided by ECA:* *TSO get most of data from grid connection processes with technical project and if there are changes, DSO will inform TSO. All formats are in here: https://elering.ee/en/connection-conditions* *generating modules data: Oluliste võrgukasutajate nimekiri.pdf (https://elering.ee/sites/default/files/public/elekter/elektris%C3%BCsteem/Oluliste v%C3%B5rgukasutajate nimekiri.pdf)*
ES	*A. Even though the national implementation of Art. 40(7) has not yet been finally agreed, because it is strongly dependent on the final decision regarding the national implementation of Art 40(5), the TSO and DSOs are already exchanging this information. Right now, the information is exchanged via email and the format that is used is an Excel form. This form will be added to the common platform that the TSO is developing and will be accessible for all the corresponding DSOs and SGUs. In case the format is re-defined, it will be included in the national implementation of Art. 40(7).* *B. All Excel forms can be found in the TSO's public web page, navigating through the menus depending on the information that has to be provided (demand facilities, generation modules, DSOs…) Normativa, guías, formularios y otra documentación | Red Eléctrica de España (https://www.ree.es/es/clientes/generador/acceso-conexion/normativa-guias-formularios-y-otra-documentacion). The final agreed format shall also be published in the DSOs' web pages.* *C. N/A*
FI	*A. No specific format. Data are listed in the agreement appendices. Data are typically provided as technical lists and diagrams.* *B. Data lists may be found at:* *https://www.fingrid.fi/kantaverkko/liitynta-kantaverkkoon/* *https://www.fingrid.fi/en/grid/power-transmission/Main_grid_contract/* *C. -*
FR	*A. Format and type of requested data are described in RTE Reference Technical Documentation (The library - RTE Services Portal (services-rte.com)) and formalized and stored in contract documents co-signed by RTE and the DSO.* *B. The library - RTE Services Portal (https://www.services-rte.com/en/the-library.html)* *C.*
GR	*A. Under discussion - to be decided* *B. Under discussion - to be decided* *C. Under discussion - to be decided*
HR	*A. In preparation* *B. No* *C. Only one DSO in Croatia, it will be part of mutual agreement*
HU	*A. DSOs provide it in excel format* *The required format and data are available on the following link (Annex 7.5):* *https://www.mavir.hu/documents/10258/239609830/USz_M24.+kiad%C3%A1s_Mell%C3%A9klet ek_2021.04.27_clean.pdf/f83727b8-2196-1e7e-f1b4-e01c94a1cfcd?t=1619605252601*

	B. See previous answer. *C. -*
IE	*A. In its KORRR consultation document, the TSO lists the following as types 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.* *Although not explicitly defined in either Grid or Distribution Code, the TSO and DSO both confirmed that they were satisfied that both codes contained all types of structural data outlined in SOGL (see Conclusion of attached CRU KORRR Decision).* *B. The template is contained in section PC.A of the National Grid Code (https://www.eirgridgroup.com/site-files/library/EirGrid/GridCodeVersion9.pdf). PC.A8 in particular may apply to DSOs.* *C. N/A*
IT	*A. see Annex A 65 to national grid code attached for convenience* *B. https://download.terna.it/terna/Allegato%20A.65%20%E2%80%93%20Dati%20tecnici%20strutturali_8d7b56bbb3f45fe.pdf – Terna website published on 19 February 2020 following Decision 36/2020 by Arera* *C. -*
LT	*A. TSO prepares template during the process of issuing requirements for connection to the transmission system. Template includes the parameters that are necessary for modelling purposes.* *B. Not published, provided with requirements for connection to the transmission network.* *C. Templates are provided with requirements for connection to the transmission network*
LU	*A. Not applicable. CREOS is a combined TSO-DSO + see 1.1.B* *B. Not applicable* *C. Not applicable*
LV	*New TSO and DSO agreement is under discussion.*
MT	*No reply*
NL	*A. Excel data sheet filled out by DSO as part of the Connection and Compliance Process for new DSO connections (future: electronic message). Type of data are generally speaking nameplate data for transmission-connected distribution facility plus aggregated representation of the composite load at that point of connection.* *B. Not published; is provided to DSO as part of Connection and Compliance Process. General description of structural data to be provided is specified in article 13.5 of the Dutch Grid Code.* *C. The data sheet is provided to the DSO as part of Connection and Compliance Process.*
NO	*A. Under discussion - To be decided* *B. Templates for structural data are published on the TSO webpage: https://www.statnett.no/for-aktorer-i-kraftbransjen/systemansvaret/fosweb/kraftsystemdata/* *C. Under discussion - To be decided*
PL	*A. The type is defined by the „Scope of Data Exchange", format will be defined along with implementing the Portal of Structural Data Exchange.* *B. -* *C. The data exchange is carried out using email and DSOs' agreed Excel sheets.*
PT	*A. Structural data (switching equipment, protection settings and electrical characteristics of power grid elements) is provided in Office Word and Excel formats.* *B. Not public* *C. The data is exchanged on a regular basis and when power grid changes occur.*

RO	*A. Data format and the type of requested data for the data exchange are into internal procedures of Transelectrica for SCADA implementation and other data exchange procedures, based on:* *-ANRE Order no. 233/2019 for approval of Data exchange between TSO, DSO and SGUs.* *-ANRE Order no.72/2017 for approval of Technical Norm concerning connection requirements for synchronous generators to electrical public networks (see Anexes).* *-ANRE Order no. 208/2018 for approval of Technical Norme concerning connection requirements for power-generating modules, power park modules and offshore power park modules to electrical public networks (see Annexes).* *-ANRE Order no. 67/2019 for approval of Technical Norme concerning connection requirements for Demand to electrical public networks (see Annexes).* *B. Both ANRE and Transelectrica webpage* *https://www.transelectrica.ro/documents/10179/3992478/Ordinul+72_2017+privind+aprobarea+NT+GS/d0058fee-8a3d-488e-ae81-cee63549ff59* *https://www.transelectrica.ro/documents/10179/3992478/Ordinul+208_2018+pentru+aprobarea+Normei+Tehnice+MG%2CCfMG%2CCMGO/42de08da-8c14-4240-8051-66f73de5632* *https://www.transelectrica.ro/documents/10179/3992480/Ordin+67_2019+pentru+aprobarea+Normei+Tehnice+DCC/ed0e1b19-4aec-4237-8fcc-3d2e4ea698ae* *Link:https://www.anre.ro/ro/energie-electrica/legislatie/coduri-paneuropene1476186098/regulamentul-ue-nr-1485-2017* *https://www.anre.ro/ro/energie-electrica/legislatie/coduri-paneuropene1476186098/regulamentul-ue-nr-631-2016-rfg* *And according to the internal procedures of Transelectrica and DSO which are implementing data exchange between them.* *C. No case*
SE	*A. CIM-format is going to be used for static power system models. Main input will be through a defined web service.* *B. Initial templates were provided here:* *https://www.svk.se/aktorsportalen/mot-svenska-kraftnat/genomforda-konsultationer/genomforda-samrad-om-datautbyte/* *Final templates to be agreed.* *C. Main input will be through a defined web service. Templates are under development for parameter data that not is included in the web-site.*
SI	*Format and criteria of data are defined with bilateral agreements, the template of structural data are published as an annex of national grid code and is added to agreements.*
SK	*A. https://www.sepsas.sk/media/4670/dokument-d-tp-ucinnost-nov-2020.pdf (chapter 3.1) and https://www.sepsas.sk/sk/dokumenty/technicke-podmienky/ (part E) - format XLSx* *B. https://www.sepsas.sk/media/4670/dokument-d-tp-ucinnost-nov-2020.pdf (chapter 3.1)* *C. -*

7.8.2 Structural data provided directly to the TSO by the SGUs

417 ***Q.6.10 Concerning Article 7(2) of the KORRR,***

A.Describe the TSO's format and the type of requested data for the data exchange.

B.Where and when has the relevant template been published (provide links)?

C.If the relevant template has not been published, motivate this choice and explain how the data exchange process is carried out between the relevant parties.

418 *Table 29: Structural data provided directly to the TSO by the SGU*

MS	Answer

AT	*A. xml format under development together with all relevant parties* *B. No* *C. Known and available to all relevant parties*
BE	*A. These formats are in detailed described in the technical guides that are made available to market parties that need to deliver the data.* *B. https://www.elia.be/-/media/project/elia/elia-site/ug/workshop/20210714_dedicated-workshop-on-it-implementation-slides-minutes.zip* *C.*
BG	*No reply*
CZ	*A. The structural data used by ČEPS are saved in SQL database inside integrated datastore ČEPS. The structural data of SGUs included straight into ČEPS grid is part of SGU connection agreement to ČEPS grid and templates are in the ČEPS Grid Code. The other SGU devices structural data format is described in a part of Appendix 2 of multilateral agreement between ČEPS and DSOs.* *B. For TS-connected SGUs, the template is in the TSO's Grid Code (in Czech: https://www.ceps.cz/cs/kodex-ps). First published in 2005.* *For DS-connected SGUs, the template is in the DSO's Grid Code (in Czech: https://www.cezdistribuce.cz/webpublic/file/edee/distribuce/ppds/ppds-2011_priloha-1.pdf).* *C.*
DE	*A. The requested data can be found here: https://www.netztransparenz.de/portals/1/Content/EU-Network-Codes/40-5-Antrag_vom_2019_09_20.pdf* *The TSOs' format can be found here: https://www.netztransparenz.de/portals/1/Content/EU-Network-Codes/SO%20Verordnung/SOGL_40-7_2020_04_21_A_fuer_die_implementierung.zip* *B. It is published here: https://www.netztransparenz.de/portals/1/Content/EU-Network-Codes/SO%20Verordnung/SOGL_40-7_2020_04_21_A_fuer_die_implementierung.zip* *C. It is not relevant.*
DK	*A. Data are delivered to connection team at Energinet using both word and excel files, the team then makes sure the data are stored in the national system* *B. All templates have been placed here: https://energinet.dk/El/Nettilslutning-og-drift/Regler-for-nye-anlaeg#Nyeproduktionsanlaeg* *C.*
EE	*A. No reply* *B. https://elering.ee/sites/default/files/public/elekter/elektris%C3%BCsteem/Oluliste v%C3%B5rgukasutajate nimekiri.pdf* *C. -* *Update provided by ECA:* *TSO get most of data from grid connection processes and if there are changes, SGU will inform TSO* *Data that DSO connected generating modules have to coordinate with TSO: https://elering.ee/en/endorsements*
ES	*A. Same answer as for Q.6.9.* *B. Same answer as for Q.6.9.* *C. N/A*
FI	*A. No specific format. Data are listed in the agreement appendices. Data are typically provided as technical lists and diagrams.* *B. Data lists may be found at: https://www.fingrid.fi/kantaverkko/liitynta-kantaverkkoon/ https://www.fingrid.fi/en/grid/power-transmission/Main_grid_contract/* *C. -*
FR	*A. Format and type of requested data are described in RTE Reference Technical Documentation (The library - RTE Services Portal (services-rte.com)) and formalized and stored in contract documents co-signed by RTE and the SGU.* *B. The library - RTE Services Portal (https://www.services-rte.com/en/the-library.html)* *C.*

GR	*A. Under discussion - to be decided* *B. Under discussion - to be decided* *C. Under discussion - to be decided*
HR	*A. In preparation* *B. No* *C. During initial connection process all data are exchanged*
HU	*A. The required format and data are available on the following link (Annex 7.5 and 9.1): https://www.mavir.hu/documents/10258/239609830/USz_M24.+kiad%C3%A1s_Mell%C3%A9kletek_2021.04.27_clean.pdf/f83727b8-2196-1e7e-f1b4-e01c94a1cfcd?t=1619605252601* *B. See previous answer.* *C. -*
IE	*A. In its KORRR consultation document, the TSO lists the following as types 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.* *Although not explicitly defined in either Grid or Distribution Code, the TSO and DSO both confirmed that they were satisfied that both codes contained all types of structural data outlined in SOGL (see Conclusion of attached CRU KORRR Decision).* *Structural data exchange for Article 48 will be facilitated by the connection application/project delivery process and the various sub-processes, documents and other information transfer components therein. For new or modified connections, the structural data requirements will be deemed to be completely discharged when commissioning and or/compliance testing will begin.* *B. The template is contained in section PC.A of the National Grid Code (https://www.eirgridgroup.com/site-files/library/EirGrid/GridCodeVersion9.pdf)* *C. N/A*
IT	*A. see Annex A 65 to national grid code attached for convenience* *B. https://download.terna.it/terna/Allegato%20A.65%20%E2%80%93%20Dati%20tecnici%20strutturali_8d7b56bbb3f45fe.pdf – Terna website published on 19 February 2020 following Decision 36/2020 by Arera* *C. -*
LT	*A. TSO prepares template during the process of issuing requirements for connection to the transmission system. Template includes the parameters that are necessary for modelling purposes. Distribution connected SGUs are not included.* *B. Not published, provided with requirements for connection to the transmission network.* *C. Templates are provided with requirements for connection to the transmission network*
LU	*A. Not applicable (no SGUs in Luxembourg)* *B. Not applicable* *C. Not applicable*
LV	*The format for the structural data exchange is specified in the TSO agreement with the relevant entity.*
MT	*No reply*
NL	*A. Excel data sheet filled out by SGU as part of the Connection and Compliance Process for new connections (future: web portal). Type of data are generally speaking nameplate data for key assets and operational capabilities of connected facility.* *B. Not published; is provided to SGU as part of Connection and Compliance Process. General description of structural data to be provided is specified in articles 13.1, 13.3 and 13.8 of the Dutch Grid Code.* *C. The data sheet is provided to the SGU as part of Connection and Compliance Process.*

NO	*A. Under discussion - To be decided* *B. Templates for structural data are published on the TSO webpage: https://www.statnett.no/for-aktorer-i-kraftbransjen/systemansvaret/fosweb/kraftsystemdata* *C. Under discussion - To be decided -*
PL	*A. The type is defined by the „Scope of Data Exchange", format will be defined along with implementing the Portal of Structural Data Exchange.* *B. -* *C. The data exchange is carried out using email and DSOs' agreed Excel sheets.*
PT	*A. Structural data (switching equipment, protection settings and electrical characteristics of power generation facilities) is provided in Office Word and Excel formats.* *B. Not public* *C. The data is exchanged on a regular basis and when generation facilities changes occur.*
RO	*A. Data format and the type of requested data for the data exchange (OTS-SGU, DSO-SGU) are into internal procedures of Transelectrica for EMS SCADA/DMS SCADA implementation and other data exchange procedures, based on:* *-ANRE Order no. 233/2019 for approval of Data exchange between TSO, DSO and SGUs.* *-ANRE Order no.72/2017 for approval of Technical Norm concerning connection requirements for synchronous generators to electrical public networks (see Annexes).* *-ANRE Order no. 208/2018 for approval of Technical Norm concerning connection requirements for power-generating modules, power park modules and offshore power park modules to electrical public networks (see Annexes).* *-ANRE Order no. 67/2019 for approval of Technical Norm concerning connection requirements for Demand to electrical public networks (see Annexes).* *B. Both ANRE and Transelectrica webpage* *https://www.transelectrica.ro/documents/10179/3992478/Ordinul+72_2017+privind+aprobarea+NT+GS/d0058fee-8a3d-488e-ae81-cee63549ff59* *https://www.transelectrica.ro/documents/10179/3992478/Ordinul+208_2018+pentru+aprobarea+Normei+Tehnice+MG%2CCfMG%2CCMGO/42de08da-8c14-4240-8051-66f73de5632* *https://www.transelectrica.ro/documents/10179/3992480/Ordin+67_2019+pentru+aprobarea+Normei+Tehnice+DCC/ed0e1b19-4aec-4237-8fcc-3d2e4ea698ae* *Link:https://www.anre.ro/ro/energie-electrica/legislatie/coduri-paneuropene1476186098/regulamentul-ue-nr-1485-2017* *https://www.anre.ro/ro/energie-electrica/legislatie/coduri-paneuropene1476186098/regulamentul-ue-nr-631-2016-rfg* *C. No case*
SE	*A. Main input will be through a defined web service.* *B. Initial templates were provided here:* *https://www.svk.se/aktorsportalen/mot-svenska-kraftnat/genomforda-konsultationer/genomforda-samrad-om-datautbyte/* *Final templates to be agreed.* *C. Templates are under development for parameter data that not is included in the web-site.*
SI	*Format and criteria of data are defined with bilateral agreements, the template of structural data are published as an annex of national grid code and is added to agreements.*
SK	*A. https://www.sepsas.sk/media/4670/dokument-d-tp-ucinnost-nov-2020.pdf (chapter 3.1) and https://www.sepsas.sk/sk/dokumenty/technicke-podmienky/ (part E) - format XLSx* *B. https://www.sepsas.sk/media/4670/dokument-d-tp-ucinnost-nov-2020.pdf (chapter 3.1) and https://www.sepsas.sk/sk/dokumenty/technicke-podmienky/ (part E) - format XLSx* *C. -*

7.8.3 Notification of changes

419 ***Q.6.11 What is the process adopted by the TSO to perform the actions requested in Article 8(1) of the KORRR? When did the last review occur?***

420 *Table 30: Notification of changes*

MS	Answer
AT	*Permanent update via CGM process*
BE	*Elia shares the data related to the outage planning coordination with the other TSOs through the OPDE platform.* *On top, Elia shares this information through the Elia Group Inside Information Platform, listed as an Inside Information Platform under evaluation by ACER. This also includes the possibility to exchange data (with other TSOs) as soon as there is a change in the observability area through UMM (d).*
BG	*No reply*
CZ	*The model is reviewed continuously and TSOs are informed of any changes well-ahead in operational planning phase, also utilizing the OPC process.* *The structural data reviews occur each minute and are based on State Estimation algorithm of ČEPS observability area (lists of false injections and suspicious states of breakers and disconnectors). If the lists are not empty we contact our partners.*
DE	*The data exchange process between TSOs is a standard process and already established.* *The last review occurred with KORRR implementation.* Update provided by BNetzA: *In fact the provisions of Article 8 governing the exchange of structural data between TSOs (TSO-TSO) had already been implemented much earlier, including a continuous process that stipulates the constant verification of this structural data periodically.* *The last TSO-DSO process on the other hand was started with the implementation of the KORRR in January 2019.* *The structural information are being reviewed according to Article 8(1)a - e KORRR.*
DK	*Individual Grid Model is updated once every day and shared with TSO's and RSC's on OPDE.* *Significant changes that are relevant for adjoining TSO's is discussed during bilateral meetings.*
EE	*At the end of 2020. Elering is connected to RU synchronous area (BRELL), we have also other agreements and procedures to exchange structural, scheduled and real time information.*
ES	*REE has bilateral agreements with their neighbouring TSOs related to system information exchanges. Those agreements establish the review process of the observability area information and the information exchange process between TSOs. There are also periodic bilateral meetings between TSOs in which that information is updated.* *The frequency of the meetings and the last review have been:* *• REE-RTE: Regular meetings each 6 months, last review of structural information: May 2021.* *• REE-REN: Regular meetings each 2 months, last review of structural information: July 2021*
FI	*TSOs inform each other about the relevant upcoming changes in their grid in advance. TSOs also have common regional groups where the significant issues may be discussed.* Update provided by EV: *Regional groups, where these issues are typically discussed, meet several times a year. This is more like a continuous process.*
FR	*Structural information concerning the commissioning, the final removal or the significant modifications of a network element or SGU is shared with other TSOs using Outage Planning Coordination (OPC) process on a yearly basis. Otherwise information can be shared through Network Model and Forecast Tool (NMFT) ENTSO-E group or through bilateral meeting.* *The process is currently performed by default once a year or anytime on demand. To be in line with article 8(1) of KORRR, the process will be adapted by RTE.*
GR	*Under discussion - To be decided*

HR	*Data are exchanged with neighbouring TSOs according to mutual operational agreements and 10YNDPs. Some data are exchanged through IGMs as well.* Update provided by HERA: *General review is done with the update of the contracts. In bilateral review with neighbouring TSOs is usually stated that all changes should be reported immediately (not every 6 months). The expected changes in the network are reported through CSO SG and ENTSO/E to all parties in the synchronous area, significantly earlier than 3 months so that possible impact on the neighbouring networks can be estimated.* *Contracts dates:* *ELES: 11.10.2021.* *MAVIR: 23.4.2021.* *EMS: 26.02.2021.* *NOSBiH: 10.02.2019.*
HU	*Every significant change triggers the change of structural data which is shared via OPDE platform.* Update provided by MEKH: *During the year-ahead operational planning process, partner TSOs are regularly informed each other about the planned commissionings (and decommissionings) of relevant elements of the power system. Last time this happened in November 2021. During the year, TSOs are notified as soon as new information on new elements is available.*
IE	*The TSO gathers data concerning 8(1)(a)-(c) every three months. Concerning (8)(1)(d), no changes are envisioned to the observability area since the Decision on Article 75 (CSAM). The aforementioned CSAM is the only review we are aware of regarding this Article, which is subject to review every 3 years (next due June 2022).* Update provided by CRU: *From TSO: We have an all-island Energy Management System (EMS) and System Operations team and in effect both SONI and EirGrid comply with Article 8(1) on an ongoing basis with respect to how they notify each other of such changes*
IT	*Terna provides to all TSO, involved in "online data exchange process" implemented in accordance to SOGL , the updates structural data (if they are) inside of the Observability Area (defined according to CSA Methodology) at least every 4 months. In particular, for every new network element or changes, Terna provides updated single line diagram of substation and the electrical parameters. The last review occurred at the beginning of August.*
LT	*Currently the review of the structural information that is shared with other TSOs is reviewed once in a year. Such deadlines and rate of review are agreed between TSOs and listed in system operational agreements (between Litgrid-PSE and Litgrid-Svk) and in data exchange rules (between Baltic TSOs). The last review was performed in November 2020 for year 2021.*
LU	*Not applicable; there are non SGUs identified in LU, and article 8(1) of KORRR refers to notification of changes in SGUs*
LV	*Baltic TSOs Data Exchange Rules obligate each TSO to provide updated information as soon as possible in case there is a change in the observability area (planned commissioning of a new network element or significant modification of existing network element) and if an error in the data set provided earlier is detected.* *TSOs and DSOs have agreed that TSO is provided with information on significant modification of existing facilities or the installation of new facilities.* *See relevant figure in Annex 2*

MT	*No reply*
NL	*National grid code article 13.9. [Last review:] April 2021*
NO	*Under discussion - To be decided*
PL	*The process has been accepted. The reviews are carried out annually in accordance with the method of defining and describing scenarios for CGM for 2022, in accordance with Article 65 of the SO GL. The last review took place on 07/15/2021. https://eepublicdownloads.azureedge.net/clean-documents/SOC%20documents/Incident_Classification_Scale/2021/210623_Year_Ahead_Scenario_Description_SOGL_Article_65_Final.pdf*
PT	*Exchange of information occurs every time there is schedule power grid change. Changes occur almost every month.*
RO	*Structural data exchange between TSOs are realised within operational task forces from ENTSO-E and by exploitation convention updated between TSOs.* *Structural data exchanges between TSOs is realized by Transelectrica:* *-At the end of each year, in the outage planning harmonization for the next year (every TSO presents new projects which will be developed in the next year)* *-It is sent individual models on various time framework (spring, summer, autumn, winter) which are considering new network equipments, new PGMs etc.* *-Anytime when there are new data concerning an network element relevant for other neighbour TSO (i.e. substation EMS Serbia, interconnection lines between SK-HU, new OHL from Bulgaria) these data are shared by email between OTS.* *There are weekly WOPT teleconferences within SEE and CORE regions where are shared relevant information regarding structural data modification .* *Transelectrica updated Operational Agreement with EMS Serbia and Ukrenergo at the end of 2021 and it is planified for 2022 Operational Agreement with ESO EAD Bulgaria and with MAVIR Hungary.*
SE	*The process in now manual thru mail communication. The actors are advised to report changes continuously. The web-site structural data system is going to include a notification function.*
SI	*Review is done on annually bases and before any relevant change. Last review was made this summer during the process of creating yearly model for 2022.*
SK	*The process is inspected every six months and any change is notified to the TSOs if necessary.*

7.9 Scheduled data used by TSOs

7.9.1 Requirements related to scheduled data

421 ***Q.6.12 Concerning Article 9(1) of the KORRR, do the scheduled data include all the requirements and information in this Article? Does the national legislation require additional information or longer time durations as part of the structural data?***

422 *Table 31: Requirements related to scheduled data*

MS	Answer
AT	*Yes; no additional information required*
BE	*The Belgian TSO has not foreseen and currently does not foresee to include the requirement on two days ahead schedules. Instead, only the availability or status ("Ready-to-Run" or not) is to be communicated by the Scheduling agent several weeks in advance and confirmed in week-ahead.*
BG	*No reply*

CZ	*Yes. Yes, national legislation requires the full planning data from year-ahead to intraday.*
DE	*Yes, the scheduled data include all the requirements of this Article.* *Generally, the information of planned unavailability of network elements or SGU have different, longer time duration than mentioned in KORRR.*
DK	*The approved requirements include the relevant data, but the necessary IT-system hasn't been fully established.* *National legislation requires more information, while type A power generators also provide both structural and scheduled data, scheduled data as a part of a sum through Balance responsible party.*
EE	*Not all scheduled data are received from SGUs. No additional information needed.*
ES	*Yes. This information is shared by means of the TSO's platform (SIOS). SGUs and DSOs have access to this information. With regard to unavailability of network elements, TSO exchange this information with SGUs and DSOs by email.* *No additional information is required apart from the scheduled outage planning.*
FI	*In the agreements, there are national detailed requirements for data exchange. KORRR does not cover all aspects.*
FR	*Yes, the schedules data include all the requirements and informations in this article, for data used in forecast studies and in real time operational security analyses.*
GR	*Under discussion - To be decided*
HR	*All data are exchanged with other TSOs and Croatian energy market operator HROTE*
HU	*Regarding the availability data the SGUs and DSOs provide week ahead and year ahead forecast as well.*
IE	*While not explicitly defined in Grid Code, the TSO and DSO were content that all types of scheduled data outlined in SOGL are contained in the Grid or Distribution Codes (see Question 1 of 'Decision' in attached CRU Decision).*
IT	*Scheduled data are exchanged according to the dispatching and market rules. Small RES and all load units provide data in an aggregated manner, as allowed since Italy adopts a central dispatch system. D-2 data are provided within the day-ahead market, D-1 data can be derived by the first intraday auctions, while intraday data close to real time are currently given by the most recent intraday auctions and then, from 22nd September 2021, by Xbid closing at H-1. Units providing ancillary services are subject to schedule changes according to Terna dispatching orders.*
LT	*Scheduled data includes all the requirements and information according to Article 9(1). National legislation does not foresee any additional information or longer duration times.*
LU	*Not applicable, as there are no SGUs, DSOs nor third parties connected to the CREOS transmission grid.*
LV	*No*
MT	*No reply*
NL	*Yes [, scheduled data include all the requirements and information in this Article]. No [, national legislation does not require additional information or longer time durations as part of the structural data]*
NO	*Under discussion - To be decided*
PL	*For electricity generators, the requirements apply to 9 days. For customers, only load profiles for specific days of the year are required.*
PT	*Scheduled data includes the information of this article.*
RO	*There are no additional data, only specification what has to do a PGM owner, concerning data exchange, in case that its PGM is affected by an incident/event (ANRE order no. 233/2019).* *Schedule data exchange are done by CREFECHIP application and balancing market platform.*
SE	*No*

SI	*Yes, the scheduled data include all the requirements and information.* *No, national legislation require additional information or longer time durations.*
SK	*YES*

7.9.2 Scheduled data provided by the DSO

423 ***Q.6.13 Concerning Article 9(2) of the KORRR,***

A.Describe the TSO's format and the type of requested data for the data exchange.

B.Where and when has the relevant template been published (provide links)?

C.If the relevant template has not been published, motivate this choice and explain how the data exchange process is carried out between the relevant parties.

424 *Table 32: Scheduled data provided by the DSO*

MS	Answer
AT	*A. Under development between TSO/DSO* *B. -* *C. Expert working group involving TSO/DSO, coordination with NRA*
BE	*A. At the moment the TSO and the DSOs in mutual agreement do not request schedules on individual distribution-connected units yet. However, if either the TSO or DSOs would identify a value added for the operational security analysis this information will be requested through a data exchange format which is compatible with the one described for iCAROS phase 1. The objective of the TSO and DSOs is to by customer oriented and to avoid that grid users will need to provide data using different platforms and different formats for different SO. This position is a common starting point of the TSO and DSOs.* *B. NA* *C. NA*
BG	*No reply*
CZ	*A. Data are provided by predefined excel sheets that are automatically processed by our systems. Requested data are: Expected Consumption, Expected Import/export on 110kV lines, expected Production on units within DSO area.* *B. Template is a part of Operational procedure related to data exchanges for operational planning. Procedure is shared with concerned parties and is not public.* *C. Data exchange via CIM XML is expected from 1/4/2022. When new data exchange is set its description is shared on ČEPS website. As today´s process is not fully automated, details of exchanges are not public to avoid possible disruptions in the process.*
DE	*A. The format used is described in the implementation guide according to 40(7) SO GL and GLDPM.* *B. https://www.netztransparenz.de/portals/1/Content/EU-Network-Codes/SO%20Verordnung/SOGL_40-7_2020_04_21_A_fuer_die_implementierung.zip" from 21.04.2020 and https://www.netztransparenz.de/EU-Network-Codes/CACM-Verordnung/Common-Grid-Model-Methodology-CGMM from 17.05.2015* *C. It is not relevant.*
DK	*A. No scheduled data exchanged with the DSO for the time being.* *B. N/A* *C.*
EE	*A. New formats in preparation* *B. No reply* *C. No reply*

ES	*A. The scheduled data are shared with DSOs by means of the TSO's platform (SIOS). DSOs can download files with the requested SGUs' scheduled information in XML format. The formats of the templates that are used for the exchange of data related to network elements' unavailability are Excel and pdf.* *As established in the national regulation, the format shall be the one that the TSO publishes in the platform. In case the implemented electronic means are modified, all users shall be informed of implementation deadlines in advance.* *Even though the national implementation of Art. 40(7) has not yet been agreed the TSO and DSOs are already exchanging information about unavailability of network elements. Right now, the information is exchanged via email and the format that is used are Excel and pdf.* *B. The template that is used for exchanging scheduled information with DSOs is not published, but directly used when exchanging scheduled information in the TSO's platform.* *C. N/A*
FI	*A. Planned outages are typically exchanged using emails.* *B. N/A* *C. Please refer to (A.)*
FR	*A. Format and type of requested data used in forecast studies and in real time operational security analyses have been co-developped by RTE and Enedis. They are based on xml format.* *B.* *C. Discussions are ongoing with other DSOs and may require when necessary some adjustments of the templates.*
GR	*A. Under discussion - to be decided* *B. Under discussion - to be decided* *C. Under discussion - to be decided*
HR	*A. In preparation* *B. Not published* *C. Only one DSO, template is part of mutual agreement which is being prepared*
HU	*A. The requirements regarding the scheduled date (both the format and type) are defined in the National Commercial Code and International Network Code.* *B. https://www.mavir.hu/web/mavir/kereskedelmi-szabalyzat* *(Chapter IV./3.)* *https://www.mavir.hu/documents/10258/239895577/EBGL_BSP-BRP+Felt%C3%A9telek_Mod09_HU_EIFazonnali_aggreg%C3%A1tor_ENG.pdf/4ef09e71-e8cf-96c8-3cc6-f3600bc6cba7?t=1628517538203* *(Article 66.)* *C. -*
IE	*A. The DSO will provide the TSO with access to a relevant Distribution Outage Plan (DOP) owned and managed by the DSO.* *SGUs will be required to submit an Outage Request form to both TSO and DSO. This concerns outages at or within the SGU itself, which cause losses of generation capacity greater than or equal to 5 MW, at least 3 weeks in advance of real-time.* *The TSO will also notify the DSO of potential outages to the distribution system, once they have been assessed by the TSO, that may affect distribution connected SGUs and/or distribution network to enable system and customer preparations.* *The TSO shall inform the DSO if and when it shares information about an SGU's distribution system network elements.* *B. The text in 13A is taken from 'Section 3.4 – Scheduled' in the attached TSO proposal.* *C. N/A*
IT	*A. see previous answer, scheduled data are available through market results* *B.* *C.*
LT	*A. The type and format for exchange of scheduled data are described in standard terms and conditions contract that is signed between TSO and DSO.* *B. Templates are not published.* *C. Templates are provided in the standard terms and conditions contract with DSO.*

LU	*A. Not applicable. CREOS is a combined TSO-DSO + see 1.1.B* *B. Not applicable* *C. Not applicable*
LV	*The scheduled data exchange is specified in the TSO agreement with the relevant entity.*
MT	*No reply*
NL	*A. Data of art. 9(1) via XML messages* *B. Customer portal at TSO* *C. -*
NO	*Under discussion - To be decided*
PL	*A. The type is defined in the „Scope of Data Exchange" in .xml format.* *B. PSE website, version 3 of 27.10.2020, coming into force on 01.01.2021: https://www.pse.pl/documents/20182/7e6139ec-b907-4f42-95ce-7d4b82e00fa8?safeargs=646f776e6c6f61643d74727565* *C. -*
PT	*A. Schedule data is sent in CSV format from TSO to DSO.* *B. Not public* *C. Information is sent in CSV format*
RO	*A. It is defined into CREFECHIP application and into balancing market platform.* *B. https://crefechip.teletrans.ro/crefechip/ https://www.markets.transelectrica.ro/Cfrmset.asp* *C. No case*
SE	*A. Structural data will be exchanged in the web-site system.* *B. Initial templates were provided here: https://www.svk.se/aktorsportalen/mot-svenska-kraftnat/genomforda-konsultationer/genomforda-samrad-om-datautbyte/* *Final templates to be agreed.* *C. Structural data will be exchanged in the web-site system. Templates are under development.*
SI	*Format of exchanged scheduled is in line ENTSO-E defined data exchange standards available on https://www.entsoe.eu/publications/electronic-data-interchange-edi-library/*
SK	*A. Format - xlsx* *B. https://www.sepsas.sk/media/4670/dokument-d-tp-ucinnost-nov-2020.pdf (chapter 3) and https://www.sepsas.sk/sk/dokumenty/technicke-podmienky/ (part E) (last update - 15.1.2021)* *C. -*

7.9.3 Scheduled data provided directly to the TSO by the SGUs

425 ***Q.6.14 Concerning Article 9(3) of the KORRR,***

A.Describe the TSO's format and the type of requested data for the data exchange.

B.Where and when has the relevant template been published (provide links)?

C.If the relevant template has not been published, motivate this choice and explain how the data exchange process is carried out between the relevant parties.

426 *Table 33: Scheduled data provided directly to the TSO by the SGUs*

MS	Answer
AT	*A. Under development between TSO/DSO* *B. -* *C. Expert working group between TSO/DSO - under discussion*

BE	*A. Currently the requested data exchange is referred to in the annexes of T&C OPA and T&C SA and additional technical information is provided during bilateral contacts between the SGUs and its KAM Energy at TSO side.* *This data exchange is under serious review to bring it up to date and using state of the art communication exchanges (asynchronous communication layers, JSON formats, …). The data exchange that will be applicable as of go-live iCAROS phase 1 is described in a technical guide made already available to the impacted SGUs (SPGM and PPM per primary energy source of 25 MW and more). This information can also be found on the Elia website.* *https://www.elia.be/-/media/project/elia/elia-site/ug/workshop/20210714_dedicated-workshop-on-it-implementation-slides-minutes.zip* *B. § TODAY for transmission connected SPGM and PPM per primary energy ≥ 25 MW : T&C SA and T&C OPA available at Elia.be and additional technical information provided by KAM energy (current exchange)* *§ To be implemented evaluative in the future up to transmission connected SPGM and PPM per primary energy ≥ 1MW : T&C SA and T&C OPA that will be available at Elia.be but extensive technical information will be made available through technical guides that will be made publicly available on a location easily accessible for SGUs (could be elia.be, EPIC website – without login, …). At the moment the information is at elia.be.* *§ https://www.elia.be/-/media/project/elia/elia-site/ug/workshop/20210714_dedicated-workshop-on-it-implementation-slides-minutes.zip To be implemented in the future for distribution connected SPGM and PPM per primary energy ≥ 1MW: to be assessed but a constellation similar to what is described above is the most probable.* *§ To be implemented evaluative in the future for transmission connected demand facilities: () T&C OPA (no T&C SA if not offering system services) that will be available at Elia.be but extensive technical information will be made available through technical guides that will be made publicly available on a location easily accessible for SGUs.* *C. Currently explained during bilateral contacts between the SGUs and its KAM energy at TSO side.*
BG	*No reply*
CZ	*A. For long-term planning (yearly, monthly) data are exchanged via predefined excel sheets that are automatically processed by our system. For weekly, daily and intraday operational planning, data are exchanged via TTSD XML or GUI in Market management system. Exchanged data per unit are: expected production per hour, expected outages and reasons for outages, disponible production, expected balancing reserves* *B. For Yearly, monthly data template is a part of Operational procedure related to data exchanges for operational planning. Procedure is shared with concerned parties and is not public. For weekly, daily and intraday operational planning templates are published in Web services specification on ČEPS website https://www.ceps.cz/cs/mms since 2018 and are frequently updated along with changes of specification, GUI access is explained in Operational rules MMS (Market management system)* *C. Data exchange via CIM XML is expected from 1/4/2022 for all the timeframes. When new data exchange is set its description is shared on ČEPS website. As today´s process is not fully automated, details of exchanges are not public to avoid possible disruptions in the process.*
DE	*A. and B. https://www.netztransparenz.de/portals/1/Content/EU-Network-Codes/SO%20Verordnung/SOGL_40-7_2020_04_21_A_fuer_die_implementierung.zip* *C. It is not relevant.*
DK	*A. CIM* *As described under "implementation guide Køreplaner" on Køreplaner og tilgængelighed | Energinet* *B. Se above link under "ENTSO-E Schemafiler", published 2/7-2021* *C.*
EE	*A. New formats in preparation* *B. No reply* *C. No reply*
ES	*A. The scheduling data exchange platform is the same for all system users (DSOs, TSO and SGUs). The template and format of the exchanged information is then the same (see Q.6.13.A) TSO and DSOs are already exchanging information about unavailability of network elements.*

	Right now, the information is exchanged via email and the format that is used are Excel and pdf. *B. The template that is used for exchanging scheduled information with SGUs is not published, but directly used when exchanging scheduled information in the TSO's platform.* *C. N/A*
FI	*A. SGU scheduled data (e.g. planned production schedules) are exchanged on dedicated information systems.* *B. https://www.esett.com/handbook/* *C. -*
FR	*A. Format and type of requested data are described in RTE Balance Mechanism – Scheduling documentatation (The library - RTE Services Portal (services-rte.com))* *B. The library - RTE Services Portal (https://www.services-rte.com/en/the-library.html)* *C.*
GR	*A. Under discussion - to be decided* *B. Under discussion - to be decided* *C. Under discussion - to be decided*
HR	*A. Partly implemented (delivery of planned production), the rest in preparation* *B. https://narodne-novine.nn.hr/clanci/sluzbeni/2019_11_107_2146.html* *http://files.hrote.hr/files/PDFen/OTEE/Agreement_Trader_BRP_HROTE_ENG.pdf* *C. in preparation*
HU	*A. The requirements regarding the scheduled date (both the format and type) are defined in the National Commercial Code and International Network Code.* *B. https://www.mavir.hu/web/mavir/kereskedelmi-szabalyzat* *(Chapter IV./3.)* *https://www.mavir.hu/documents/10258/239895577/EBGL_BSP-BRP+Felt%C3%A9telek_Mod09_HU_EIFazonnali_aggreg%C3%A1tor_ENG.pdf/4ef09e71-e8cf-96c8-3cc6-f3600bc6cba7?t=1628517538203* *(Article 66.)* *C. -*
IE	*A. 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. For example, section OC.2.4 of the Grid Code contains requirements for outage planning for SGUs.* *B. Scheduled data requirements are contained in the Grid Code. For example, section OC.2.4 lists outage planning requirements for SGUs. Summary of outage data for SGUs in Ireland can be found at https://www.eirgridgroup.com/customer-and-industry/general-customer-information/outage-information/transmission-outages/* *C. N/A*
IT	*A. Data are directly provided to the TSOs according to market rules. No DSO intermediation is foreseen* *B. See national grid code by Terna available on www.terna.it and the market rules available on www.mercatoelettrico.org* *C.*
LT	*A. The type and format for exchange of scheduled data are described in standard terms and conditions contract that is signed between TSO and transmission connected SGUs.* *B. Templates are not published.* *C. Templates are provided in the standard terms and conditions contract with SGUs.*
LU	*A. Not applicable, as there are no SGUs nor third party within Creos' control area* *B. Not applicable* *C. Not applicable*
LV	*The format for the scheduled data exchange is specified in the TSO agreement with the relevant SGU.*
MT	*No reply*
NL	*A. Data of art. 9(1) via XML messages* *B. Customer portal at TSO* *C. -*

NO	*Under discussion - To be decided*
PL	*A. The type is defined in the „Scope of Data Exchange" in .xml format.* *B. PSE website, version 3 of 27.10.2020, coming into force on 01.01.2021: https://www.pse.pl/documents/20182/7e6139ec-b907-4f42-95ce-7d4b82e00fa8?safeargs=646f776e6c6f61643d74727565* *C. -*
PT	*A. Requested data is sent in CSV format between TSOs.* *B. Not public* *C. Information is sent in CSV format*
RO	*A. It is defined into CREFECHIP application and into balancing market platform.* *B. https://crefechip.teletrans.ro/crefechip/ https://www.markets.transelectrica.ro/Cfrmset.asp* *C. No case*
SE	*A. Structural data will be exchanged in the web-site system.* *B. Initial templates were provided here: https://www.svk.se/aktorsportalen/mot-svenska-kraftnat/genomforda-konsultationer/genomforda-samrad-om-datautbyte/* *Final templates to be agreed.* *C. Structural data will be exchanged in the web-site system. Templates are under development.*
SI	*Format of exchanged scheduled is in line ENTSO-E defined data exchange standards available on https://www.entsoe.eu/publications/electronic-data-interchange-edi-library/*
SK	*A. https://www.sepsas.sk/media/4670/dokument-d-tp-ucinnost-nov-2020.pdf (chapter 3.2) and https://www.sepsas.sk/sk/dokumenty/technicke-podmienky/ (part E) - format XLXs, xml* *B. https://www.sepsas.sk/media/4670/dokument-d-tp-ucinnost-nov-2020.pdf (chapter 3.2) and https://www.sepsas.sk/sk/dokumenty/technicke-podmienky/ (part E) - format XLXs, xml (last update 15.1.2021)* *C. -*

7.9.4 Technical requirements for the scheduled data exchange

427 ***Q.6.15 Concerning Article 9(4) of the KORRR:***

A.Describe the TSO's technical requirements for the data exchange relevant to Article 9(4) of the KORRR.

B.Where and when have the requirements been published (provide links)?

C.Describe how these requirements are in accordance with international standards.

D.If the relevant requirements have not been published, motivate this choice and explain how the data exchange process is carried out between the relevant parties.

428 *Table 34: Technical requirements for the scheduled data exchange*

MS	Answer
AT	*A. Under development between TSO/DSO* *B. -* *C. xml format; Expert working group between TSO/DSO* *D. Expert working group between TSO/DSO - under discussion*
BE	*A. Approved and implemented: Today, only transmission-connected production units > 25 MW are expected to exchange scheduled data on outages and generation schedules. The technical requirements for data exchange are included in Annex X of the T&C OPA and T&C SA and explained by the Key Account Manager of the respective unit. Depending on the time frame and*

	the process considered, schedules are sent in Excel via e-mail or in XML via https. See Annex 9 of the T&C OPA/SA contracts (see link below). *In preparation: In the framework of the iCAROS-project (https://www.elia.be/en/users-group/wg-balancing/task-force-icaros) these technical requirements are now being revised to become fully SOGL compliant and to align with the technical requirements for mFRR data exchange within the MARI platform. The proposed new technical requirements are explained in the "Dedicated workshop on IT implementation of data exchange for iCAROS and explicit mFRR (MARI)" of 11/03/2021 (see link below), amongst others:* *- External communication layer relaized by a queue manager located at Elia.* *- Communication protocol: AMQPS 0.9.1 and 1.0* *- Standard security protocols* *- Messages based on ENTSOe CIM (Common Information Model)* *- Content and timing and time stamping are dependent on the different types of information flows (typically quarter hour resolution from D-1 on)* *B. Approved and implemented: Annex 9 "IT-Rules" of the T&C OPA Contract: https://www.elia.be/-/media/project/elia/elia-site/electricity-market-and-system/system-services/how-to-become-an-outage-planning-scheduling-agent/20201229tc-opaopa-contractannexesencleanv3.pdf* *See also Annex 9 of the T&C SA Contract (identical)* *In preparation: "Dedicated workshop on IT implementation of data exchange for iCAROS and explicit mFRR (MARI)" of 11/03/2021: https://www.elia.be/nl/users-group/werkgroep-balancing/20210311-meeting* *C. The iCAROS implementation project has as objective also to use data exchanges that are up to date with the international standards. As such the external communication layer that is being build for iCAROS phase 1 has the following features :* *• The External Communication Layer will be realized by a queue manager located at Elia. No hosting required by the External Stakeholders* *• Using international communication protocol : AMQPS* *• Standard security protocol in place (Security will be ensured : StakeHolder A won't have permission to read Messages to/from StakeHolder B)* *• Queues will be dedicated for each specific message types (Scheduling, Bidding, Activation, ….)* *• A queue has one orientation in (Elia to External Stakeholder) or out (External Stakeholder to Elia)* *• Each queue (in and out) will be accompanied by a failure queue which will be used for messages that cannot be processed* *• Exact scenario's will be defined in the Technical Guides* *D. New format and data exchange process is being discussed with relevant parties in the context of Phase 1 of the iCAROS-project and MARI. Expected go-live end Q32022 together with the go-live of the European balancing platform for manual FRR (MARI). The requirements for these data exchanges are available at the elia website. https://www.elia.be/-/media/project/elia/elia-site/ug/workshop/20210714_dedicated-workshop-on-it-implementation-slides-minutes.zip*
BG	*No reply*
CZ	*A. Technical requirements for data exchanges via Web services are described in Operational rules MMS, data security is ensured by PKI certificates provided by Certification authority, that each user must have. Furthermore, username and password are required for each xml message* *B. https://www.ceps.cz/cs/mms - since 2018 and are frequently updated along with changes of specification* *C. Communication is carried out based on SOAP protocol XML formats are created based on the formats defined by ENTSO-E. CIM format is expected to be used from 01/04/2022.* *D.*
DE	*A. https://www.netztransparenz.de/portals/1/Content/EU-Network-Codes/SO%20Verordnung/SOGL_40-7_2020_04_21_A_fuer_die_implementierung.zip*

	B. https://www.netztransparenz.de/portals/1/Content/EU-Network-Codes/SO%20Verordnung/SOGL_40-7_2020_04_21_A_fuer_die_implementierung.zip *C. German TSOs have used existing ENTSO-E Formats.* *D. It is not relevant.*
DK	*A. Data exchange is done through ECP/EDX as described in MADES-standard.* *B. Køreplaner og tilgængelighed | Energinet, published 2/7-2021* *C. See A. above* *D. -*
EE	*A. in preparation* *B. in preparation* *C. Formats according to ENTSO-E standards* *D. No reply* *Update provided by ECA:* *TSO Elering also owns 110 kV, because of that there has not been a need for schedule data from DSO connected SGU-s. Elering is preparing technical requirements to get schedule data also from DSO connected power plants.*
ES	*A. Technical requirements, including time stamping, for the exchange of scheduled data with SGUs, DSOs and third parties within the TSO's control area are established in the national 'operational procedure' 9.1 on scheduled data exchange.* *Scheduled data exchange is carried out by means of SIOS platform, which fulfils the following technical requirements:* *a) Remote accessibility, high system speed, reliability, and easy use.* *b) Guarantee of complete and proved confidentiality of data* *c) All data that is sent to the platform shall be automatically replied by the platform with an acknowledgement message with the exact date and time.* *d) The electronic documents that shall be exchanged with the different users of the platform, their content, format, and terms are described in a single document that is organized in a series of volumes. These volumes and their review or updates must be published in advance and before their entry into force on the TSO's website.* *B. Requirements related to the exchange of scheduled data can be found in the national operational procedure 9.1: see page 7 at Disposición 16964 del BOE núm. 335 de 2020 (https://www.ree.es/sites/default/files/01_ACTIVIDADES/Documentos/ProcedimientosOperacion/PO_9_1_BOEA2020_16964_1base.pdf).* *C. The platform e.sios uses different communication protocols to exchange scheduled data with clients. E.sios mainly uses:* *- WebServices: which complies with the international standard "IEC 62325-504"* *- SFTP: in this case the security is included in their own protocol.* *- SMTP: which uses only Electronic Highway that guarantees redundancy and confidentiality of the communications.* *D. N/A*
FI	*A. These are specified in the format used in the information systems.* *B. https://www.esett.com/handbook/* *C. eSett handbook (https://www.esett.com/app/uploads/2022/01/NBS-Handbook-v3.3.pdf) Chapter 10 discusses the applied communications standards. For example, widely used XML schemas are available at https://ediel.org/common-ediel-documents/. IEC CIM XMLS schemas are industry standards that are widely used in such data exchange.* *D. -*
FR	*A. Technical requirements for the exchange of scheduled data with SGUs are described in RTE Balance Mechanism – Scheduling documentation (The library - RTE Services Portal (services-rte.com))* *Technical requirements for the exchange of scheduled data with DSOs are ongoing.* *B. The library - RTE Services Portal (https://www.services-rte.com/en/the-library.html)* *C. The rules comply with international standards (HTTPS with mutual authentication).* *D. –*

	Update provided by CRE: *It had been established with Enedis, the main DSO, and the establishment is ongoing for the other DSOs.*
GR	*A. Under discussion - to be decided* *B. Under discussion - to be decided* *C. Under discussion - to be decided* *D. Under discussion - to be decided*
HR	*A. In preparation* *B. In preparation* *C. In preparation* *D. In preparation*
HU	*A. The technical requirements for scheduling data exchange are published on the website of MAVIR, where all other relevant and useful information is available to partners.* *B. https://www.mavir.hu/web/mavir-en/schedule-management1* *C. The national requirements fit with the international standards.* *D. -*
IE	*A. 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.* *Instruments such as the NC5 generator application form (https://www.esbnetworks.ie/docs/default-source/default-document-library/new-generator-connection-application-(nc5).pdf?sfvrsn=146106f0_0) may be the primary source of communication of data requirements from the generator to the relevant system operator, and additionally instruments such as signal lists (https://www.eirgridgroup.com/customer-and-industry/general-customer-information/grid-code-compliance-test/compliance-testing/system-services-testing/) convey more technical data requirements than the Distribution Code.* *B. Section 4.6 (https://www.eirgridgroup.com/site-files/library/EirGrid/190125_SGU-KORRR-Consultation_Ireland_V1.0.pdf). Section CC.12.2 of the Grid Code (https://www.eirgridgroup.com/site-files/library/EirGrid/GridCodeVersion9.pdf) lists the information to be provided in signal lists.* *C. Section CC.6.1 of National Grid Code states:* *"All User Plant and Apparatus associated with the connection to the Transmission System shall comply with the:* *(a) Irish and EU Law and* *(b) the relevant European standards; or* *(c) if there is no relevant European standards, such other relevant standard which is in common use in the European Union;"* *D. N/A*
IT	*A. Data are directly provided to the TSOs according to market rules. No DSO intermediation is foreseen* *B. See national grid code by Terna available on www.terna.it and the market rules available on www.mercatoelettrico.org* *C. See previous answers* *D.*
LT	*A. The requirements for provision of outage schedules to TSO are published and publicly available. Outage planning is performed yearly, monthly and weekly. Outage schedules are coordinated between TSO, DSO and SGUs. Other information is provided in standard terms and conditions for balancing services.* *B. Requirements for outage scheduling are published https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/8ba9efa0bba711e4a939cd67303e5a1f/asr* *Additional requirements are not published, they are provided with standard terms and conditions contracts for balancing services.* *C. All IT systems and data exchange requirements applied by TSO have to fulfil international standards for security, confidentiality and redundancy of the communication links.*

	D. Additional requirements are not published, they are provided with standard terms and conditions contracts for balancing services.
LU	*A. Not applicable. CREOS is a combined TSO-DSO + see 1.1.B* *B. Not applicable* *C. Not applicable* *D. Not applicable*
LV	*The technical requirements for the scheduled data exchange are specified in the TSO agreement with the relevant SGU.*
MT	*No reply*
NL	*A. Encrypted XML messages via web services* *B. Customer portal at TSO* *C. Based on IEC 62325 standard* *D. -*
NO	*Under discussion - To be decided*
PL	*A. Defined in the „Scope of Data Exchange".* *B. PSE website, version 3 of 27.10.2020, coming into force on 01.01.2021: https://www.pse.pl/documents/20182/7e6139ec-b907-4f42-95ce-7d4b82e00fa8?safeargs=646f776e6c6f61643d74727565* *C. Data exchange format is .xml.* *D. -*
PT	*A. Data exchange is performed using SFTP protocol* *B. https://mercado.ren.pt/PT/Electr/InfoMercado/DocReg/BibRegrAd2/Anexo%20-%20Fluxos%20Informacao_v20220105.pdf* *C. SFTP is already a standard* *D. NA*
RO	*A. It is defined into CREFECHIP application and into balancing market platform.* *B. https://crefechip.teletrans.ro/crefechip/ https://www.markets.transelectrica.ro/Cfrmset.asp* *C. Application and web platform are developed in conformity with international standards in force concerning cybersecurity, communication redundancies etc.* *D. No case*
SE	*The technical requirements are not decided yet. Will be published in 8 separate reports (Static power system model, Dynamic power system models, Real-time data, Production and consumption plans, Balancing services, Structural information for data exchange, Unavailability plans, Information security).*
SI	*A. The exchanged data regarding the schedule of production and consumption should be in line with format described in previous answer, other parameters are in line with the rules of market operator.* *B. See answer above.* *C. The standard is approved by ENTSOE and is in line with CIM.* *D. -*
SK	*A. No reply* *B. https://www.sepsas.sk/media/4670/dokument-d-tp-ucinnost-nov-2020.pdf (chapter 2), (Last update - 1.11.2020)* *C. IEC-870-5-101, and xml* *D. -*

7.10 Real-time data used by TSOs

7.10.1 Real-time data provided by the DSO

429 ***Q.6.16 Concerning Article 10(1) of the KORRR:***

A.Describe the content, the format and the type of requested data for the relevant real-time data exchange between TSO and DSOs.

B.Where and when has the format of the data exchange been published (provide links)?

C.If the relevant format of the requested data has not been published, motivate this choice and explain how the data exchange process is carried out between the relevant parties.

430 *Table 35: Real-time data provided by the DSO*

MS	Answer
AT	*A. Common format as usual within the DSO/TSO community (control network standards IEC 60870-5-101/104)* *B. e.g. https://webstore.iec.ch/preview/info_iec60870-5-101%7Bed2.0%7Den.pdf* *C. -*
BE	*A. Content & type:* *- All real-time data as specified in SOGL Article 44(a – g),* *- For decentralized production > 5 MVA, the real-time data on the status of the circuit breaker and the active power (to the extent this information is available to the DSO).* *Format: Direct communication link between the inter-calculators of the TSO and DSO ("ICCP")* *B. Collaboration agreement, Annex 11* *www.synergrid.be/download.cfm?fileId=11_FR_2_1_Annexe11_Entretien_exploitation_Draft2021_20210616.pdf* *C.*
BG	*No reply*
CZ	*A. The ČEPS real-time database id Dispatch Control System contains 32000 measurements and 31000 signalisations of breakers and disconnectors from DSOs and then describes whole 110 kV grid of the Czech Republic. The Multilateral agreement from 2019 specifies the protocol IEC 60870-5-104 for real time data exchange between dispatch control systems ČEPS and DSOs. The agreement describes data templates in annexes 3, 4, 5, 6, 7 and 8. The content of exchanged real time data are set in Chapter VI. the methodology acc. Art. 40 (5).* *B. Not published.* *C. The information is a part of the agreement in accordance with Art. 40(7), therefore available to both TSO and DSOs.*
DE	*A. The content exchanged is described in the following Link (letter B), appendix 6A (https://www.netztransparenz.de/portals/1/Content/EU-Network-Codes/SO%20Verordnung/SOGL_40-7_2020_04_21_A_fuer_die_implementierung.zip)* *B. The publication took place on March 20, 2019 on the website netztransparenz.de. The link to the document:* *https://www.netztransparenz.de/portals/1/Content/EU-Network-Codes/SO%20Verordnung/SOGL_40-7_2020_04_21_A_fuer_die_implementierung.zip* *C. not applicable since published (concerning the real-time data exchange IEC-format is mandatory)*
DK	*A. The real-time data content and format is described in the relevant national implementation documents for SOGL Article 40* *B. The documents are not yet publicly available, as they are awaiting final approval.* *C. They will be published as soon as they have been approved.*
EE	*A. ICCP channel* *B. https://elering.ee/sites/default/files/public/Teenused/Liitumine/06 - Kliendi elektriosa projekti koostamise ja modelleerimise n%C3%B5uded_2019.05.30.pdf* *C.* *Update provided by ECA:* *All the data exchange requirements are described in here. Data what is required from DSO is under page 30.*

	https://elering.ee/sites/default/files/public/Teenused/Liitumine/05%20-%20Requirements%20for%20data%20exchange%20related%20to%20the%20electrical%20installations%20of%20clients_2019.05.30.pdf
ES	*A. The content of real time data to be exchanged between DSOs, SGUs and the TSO considers the data exchange requirements included in Art. 42, Art. 44, Art. 47, Art 50, Art. 52 and Art. 53 of SO GL.* *This information is exchanged by means of ICCP communication links (using IEC-60870-6-503) that are established between the TSO's, DSOs' and SGUs' control centres.* *DSOs shall receive from the TSO real time data coming from:* *- SGUs connected to the distribution grid which are not directly sending real time data to the corresponding DSO.* *- SGUs not connected to their distribution grid but proving to have certain impact on it.* *- Transmission system elements that are relevant for the DSO.* *TSO shall receive from the DSOs real time data coming from:* *- SGUs connected to the distribution grid which are not directly sending real time data to the TSO.* *- Distribution system elements that are relevant for the TSO.* *B. Data exchange format and requirements were published in the NRA's Decision regarding the national implementation of KORRR, dated 13th November, 2019 (BOE.es - BOE-A-2019-17178 Resolución de 13 de noviembre de 2019, de la Comisión Nacional de los Mercados y la Competencia, por la que se aprueban las especificaciones para la implementación nacional de la metodología prevista en el artículo 40.6 del Reglamento (UE) 2017/1485, https://www.boe.es/eli/es/res/2019/11/13/(2)). In this Decision, the NRA requested to the TSO and DSOs a review of the communication channels to improve their flexibility and to reduce the associated cost that SGUs shall assume.* *The TSO developed a new proposal that was included in the national operational procedure 9.2 (on real time data exchange), that the NRA approved on 10th December, 2020. BOE.es - BOE-A-2020-16549 Resolución de 10 de diciembre de 2020, de la Comisión Nacional de los Mercados y la Competencia, por la que se aprueba el procedimiento de operación 9.2 "Intercambio de información en tiempo real con el operador del sistema", https://www.boe.es/eli/es/res/2020/12/10/(1).* *C. Currently, there is a defined protocol and technical requirements related to communication links for exchanging real time information.* *On the other hand, the TSO provides DSOs and third parties Excel forms which contain the list of real time data that needs to be exchanged.*
FI	*A. Common SCADA protocols ELCOM and IEC-60870-5-104 may be used. IEC may be used to receive data only.* *B. https://www.fingrid.fi/globalassets/dokumentit/en/customers/power-transmission/real-time-information-exchange_.pdf* *C. -*
FR	*A. Format and type of requested data have been co-developped with Enedis and are under discussions with DSOs.* *B.* *C. Format and type of requested data will be published in RTE Reference Technical Documentation after consultation with the DSOs.* *Update provided by CRE:* *Provisions are implemented for the main DSO (Enedis) and the implementation is ongoing with the other DSOs.*
GR	*A. Under discussion - to be decided* *B. Under discussion - to be decided* *C. Under discussion - to be decided*
HR	*A. The content is according to the SOGL provisions, exchanged via standard ICCP protocols* *B. https://narodne-novine.nn.hr/clanci/sluzbeni/2017_07_67_1585.html* *C. Only one DSO in Croatia, everything agreed directly HOPS-HEP ODS*

HU	*A. The required format and content is part of the related guideline of the national grid code.* *B. https://www.mavir.hu/documents/10258/239156022/Folyirelv+V-4_2021.02.01_clean.pdf/73dc54ef-ea34-6ed2-550a-bbf962245f65?t=1610952613802 (Chapter 10.)* *C. -*
IE	*A. The TSO and DSO will exchange relevant data related to an SGU upon request by a SO, to comply with the requirements of SOGL provisions.* *B. The TSO discusses the type of real-time data to be exchanged in 'Section 3.3, Article 51, Real-time' of the attached TSO Proposal.* *C. N/A*
IT	*A. Detailed data are available on Annex A6 to national grid code (attached for convenience).* *B. https://download.terna.it/terna/Allegato%20A.6%20%E2%80%93%20Criteri%20di%20acquisizione%20dati%20per%20il%20telecontrollo_8d7b569e02f59ac.pdf – Terna website published on 19 February 2020 following Decision 36/2020 by Arera* *C.*
LT	*A. Data that is requested contains information about the relay protection* *B. Format is published on Litgrid's website: https://www.litgrid.eu/uploads/files/dir560/dir28/dir1/7_0.php* *C. -*
LU	*A. Not applicable. CREOS is a combined TSO-DSO + see 1.1.B* *B. Not applicable* *C. Not applicable*
LV	*TSO receives specified data from the entire substations including the parts owned by the distribution system and specify data for line bay, transformer bay and the busbars.*
MT	*No reply*
NL	*A. Content and type: National grid code article 13.25* *Format according to document: "Functionele afspraken secundaire interfacing nieuwe RNB transformatorvelden"* *B. Customer portal at TSO* *C. -*
NO	*Under discussion - To be decided*
PL	*A. The content is defined in the „Scope of Data Exchange" dokument. Format is defined in the Transmission Grid Code.* *The IEC60870-5-104 protocol is basically used to transfer data directly from power facilities to the TSO's SCADA system. Upon consent of the TSO, it is temporarily allowed to use DNP3 or IEC60870-5-101 protocols operating on serial lines.* *B. https://www.pse.pl/documents/20182/ed8e6365-4983-40a7-afed-814b7f12eea4?safeargs=646f776e6c6f61643d74727565; 16/03/2021* *C. -*
PT	*A. Content: switching equipment and measurements. Format: ICCP* *B. Not public* *C. For safety reasons, the information is not public.*
RO	*A. According to ANRE Order no. 233/2019 for approval of Data exchange between TSO, DSO and SGUs. (relevant articles art. 6, art.7, art. 12) and internal TSO procedures for integration into EMS SCADA.* *B. https://www.transelectrica.ro/documents/10179/3992484/Ord+233_2019+Metodologia+pentru+schimbul+de+date+intre+OTS%2C%20ODuri+si+URSi/99cb4405-e869-4a11-8c3a-9bc8fe85244a https://www.anre.ro/ro/energie-electrica/legislatie/coduri-paneuropene1476186098/regulamentul-ue-nr-1485-2017* *C. No case*

SE	*A. Real-time data format presently used is ICCP and Elcom.* *B. ICCP - https://www.sis.se/api/document/preview/559181/* *Elcom - https://www.ipcomm.de/protocol/Elcom90/en/sheet.html* *Svk after consultation with DSOs and SGUs has published a document that guides the content and type of requested data and the format (publication date: 2021-10-22). This document will continue to evolve after publication, as the introduction of data exchange progresses. New versions will be published regularly as the introduction becomes more detailed.* *Link to the website:* *https://www.svk.se/press-och-nyheter/nyheter/natkoder/2021/rapport-beskriver-realtidsdatautbyte-av-systemdriftsinformation/* *Link to the document:* *https://www.svk.se/siteassets/2.utveckling-av-kraftsystemet/systemansvar-o-elmarknad/kraftsystemhubben/realtidsdata---processer-format-och-vagledning-v1.0.pdf* *C. Other formats might also be used later. Where applicable, details will be published in the reports listed in the answer to question 15.*
SI	*A. All data of P, Q, U, I, f, transformer tap position, mode of voltage control, switch gear position.* *B. -* *C. Defined in agreement between TSO and DSOs.*
SK	*A. https://www.sepsas.sk/media/4670/dokument-d-tp-ucinnost-nov-2020.pdf (chapter 3.3), (Last update - 1.11.2020)* *B. https://www.sepsas.sk/media/4670/dokument-d-tp-ucinnost-nov-2020.pdf (chapter 3.3), (Last update - 1.11.2020)* *C. -*

7.10.2 Real-time data provided by the SGUs

431 ***Q.6.17 Concerning Article 10(2) of the KORRR:***

A.Describe the content, the format and the type of requested data for the relevant real-time data exchange between TSO and DSOs.

B.Where and when has the format of the data exchange been published (provide links)?

C.If the relevant format of the requested data has not been published, motivate this choice and explain how the data exchange process is carried out between the relevant parties.

432 *Table 36: Real-time data provided by the SGUs*

MS	Answer
AT	*A. Common format as usual within the DSO/TSO community (control network standards IEC 60870-5-101/104)* *B. e.g. https://webstore.iec.ch/preview/info_iec60870-5-101%7Bed2.0%7Den.pdf* *C. -*
BE	*A. Content & type:* *- All real-time data as specified in SOGL Article 47* *- Format: As specified in the connection contract, Appendix 4* *B. https://www.elia.be/en/customers/connection/connection-contract* *16 July 2009* *C.*
BG	*No reply*
CZ	*A. The content is described in the proposal in accordance with Art. 40(6). The protocol IEC 60870-5-101 is used in real time communication with terminals of SGUs.*

	B. The format and type of data are described in the TSO's Grid Code (in Czech: https://www.ceps.cz/cs/kodex-ps). *C.*
DE	*A. The content exchanged is described in the following Link (letter B), appendix 6A (https://www.netztransparenz.de/portals/1/Content/EU-Network-Codes/SO%20Verordnung/SOGL_40-7_2020_04_21_A_fuer_die_implementierung.zip)* *B. The publication took place on March 20, 2019 on the website netztransparenz.de. The link to the document: https://www.netztransparenz.de/portals/1/Content/EU-Network-Codes/SO%20Verordnung/SOGL_40-7_2020_04_21_A_fuer_die_implementierung.zip* *C. not applicable since published (concerning the real-time data exchange IEC-format is mandatory)*
DK	*A. The real-time data content and format is described in the relevant national implementation documents for SOGL Article 40* *B. The documents are not yet publicly available, as they are awaiting final approval.* *C. They will be published as soon as they have been approved.*
EE	*A. ICCP channel* *B. https://elering.ee/sites/default/files/public/Teenused/Liitumine/06 - Kliendi elektriosa projekti koostamise ja modelleerimise n%C3%B5uded_2019.05.30.pdf* *C.* *Update provided by ECA:* *All the data exchange requirements are described in here. Main data what is required from SGU is under page 6-29 .* *https://elering.ee/sites/default/files/public/Teenused/Liitumine/05%20-%20Requirements%20for%20data%20exchange%20related%20to%20the%20electrical%20installations%20of%20clients_2019.05.30.pdf*
ES	*Same answers as for Q.16.*
FI	*A. Active and Reactive Power, Voltages and switching device status information.* *B. https://www.fingrid.fi/globalassets/dokumentit/en/customers/power-transmission/real-time-information-exchange_.pdf* *C. -*
FR	*A. Format and type of requested data are described in RTE Reference Technical Documentation (The library - RTE Services Portal (services-rte.com))* *B. The library - RTE Services Portal (https://www.services-rte.com/en/the-library.html)* *C.*
GR	*A. Under discussion - to be decided* *B. Under discussion - to be decided* *C. Under discussion - to be decided*
HR	*A. HOPS and HEP ODS has their own measurements, no need for "same" data from SGU* *B. Not published* *C. HOPS and HEP ODS has their own measurements, no need for "same" data from SGU*
HU	*A. The required format and content is part of the related guideline of the national grid code and the bilateral agreements between TSO and DSOs* *B. https://www.mavir.hu/documents/10258/239156022/Folyirelv+V-4_2021.02.01_clean.pdf/73dc54ef-ea34-6ed2-550a-bbf962245f65?t=1610952613802 (Chapter 10.)* *Bilateral agreements are not public.* *C. -*
IE	*A. 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 (https://www.eirgridgroup.com/site-files/library/EirGrid/190125_SGU-KORRR-Consultation_Ireland_V1.0.pdf)* *B. The list and format of real-time data for these SGUs will be as per Section CC.12.2 of Grid Code (https://www.eirgridgroup.com/site-files/library/EirGrid/GridCodeVersion9.pdf) and the signals list issued by the RSO. Published signal lists can be found at https://www.eirgridgroup.com/customer-and-industry/general-customer-information/grid-code-compliance-test/compliance-testing/system-services-testing/* *C. N/A*
IT	*A. Detailed data are available on Annex A6 to national grid code (attached for convenience).* *B. https://download.terna.it/terna/Allegato%20A.6%20%E2%80%93%20Criteri%20di%20acquisizione%20dati%20per%20il%20telecontrollo_8d7b569e02f59ac.pdf – Terna website published on 19 February 2020 following Decision 36/2020 by Arera* *C. -*
LT	*A. Currently NERC have not collected information regarding this issue.* *B. Format is published on Litgrid's website: https://www.litgrid.eu/uploads/files/dir560/dir28/dir1/7_0.php* *C. -*
LU	*A. Not applicable (no SGUs in Luxembourg)* *B. Not applicable* *C. Not applicable*
LV	*The requirements are specified in the TSO agreement with the relevant SGU.*
MT	*No reply*
NL	*A. Content and type: National grid code article 13.21, 13.22, 13.23 and 13.24* *Format according to document:" TenneT Telemetry IEC 60870-5-104 Protocol Implementation Document"* *B. Customer portal at TSO* *C. -*
NO	*Under discussion - To be decided*
PL	*A. The content is defined in the „Scope of Data Exchange" document.* *Format is defined in the Transmission Grid Code.* *The IEC60870-5-104 protocol is basically used to transfer data directly from power facilities to the TSO's SCADA system. Upon consent of the TSO, it is temporarily allowed to use DNP3 or IEC60870-5-101 protocols operating on serial lines.* *B. https://www.pse.pl/documents/20182/ed8e6365-4983-40a7-afed-814b7f12eea4?safeargs=646f776e6c6f61643d74727565; 16/03/2021* *C. -*
PT	*A. Content: switching equipment and measurements. Format: ICCP* *B. Not public* *C. For safety reasons, the information is not public.*
RO	*A. According to:* *-ANRE Order no. 233/2019 for approval of Data exchange between TSO, DSO and SGUs. (relevant articles art. 8 and art. 12)* *-ANRE Order no. 89/2021 for approval of prequalification for ancillary services (art. 21, art. 33, art. 38, art. 43)* *-internal TSO/DSO procedures for integration into DMS/EMS SCADA.* *B. https://www.transelectrica.ro/documents/10179/3992484/Ord+233_2019+Metodologia+pentru+schimbul+de+date+intre+OTS%2C%20ODuri+si+URSi/99cb4405-e869-4a11-8c3a-9bc8fe85244a https://www.anre.ro/ro/energie-electrica/legislatie/coduri-paneuropene1476186098/regulamentul-*

	ue-nr-1485-2017 *C. No case*
SE	*A. Real-time data format presently used is ICCP and Elcom.* *B. ICCP - https://www.sis.se/api/document/preview/559181/* *Elcom - https://www.ipcomm.de/protocol/Elcom90/en/sheet.html* *Svk after consultation with DSOs and SGUs has published a document that guides the content and type of requested data and the format (publication date: 2021-10-22). This document will continue to evolve after publication, as the introduction of data exchange progresses. New versions will be published regularly as the introduction becomes more detailed.* *Link to the website:* *https://www.svk.se/press-och-nyheter/nyheter/natkoder/2021/rapport-beskriver-realtidsdatautbyte-av-systemdriftsinformation/* *Link to the document:* *https://www.svk.se/siteassets/2.utveckling-av-kraftsystemet/systemansvar-o-elmarknad/kraftsystemhubben/realtidsdata---processer-format-och-vagledning-v1.0.pdf* *C. Other formats might also be used later. Details will be published in the earlier mentioned reports.*
SI	*A. All data of P, Q, U, I, f, transformer tap position, switch gear position.* *B. Defined in agreement between TSO and SGUs.* *C. -*
SK	*A. https://www.sepsas.sk/media/4670/dokument-d-tp-ucinnost-nov-2020.pdf (chapter 3.3), (Last update - 1.11.2020)* *B. https://www.sepsas.sk/media/4670/dokument-d-tp-ucinnost-nov-2020.pdf (chapter 3.3), (Last update - 1.11.2020)* *C. -*

7.10.3 Technical requirements for the real-time data exchange

433 ***Q.6.18 Concerning Article 10(3) of the KORRR:***

A.Describe the TSO's technical requirements for the real time data exchange relevant to Article 10(3) of the KORRR.

B.Where and when have the requirements been published (provide links)?

C.Describe how these requirements are in accordance with international standards.

434 *Table 37: Technical requirements for the real-time data exchange*

MS	Answer
AT	*A. Wired control network measuring devices (no data transfer over the internet); some exceptions for small plants under development (e.g. radio transmission between measuring device and control network of DSO)* *B. Not published yet* *C. Use of common measuring devices (technical standard between TSO/DSO)*
BE	*A. For each Metering Point of a transmission-connected SGU, characterised by a unique EAN – GSRN – Code, the metering equipment shall comply to the EN – IEC standards listed below (see point C.).* *The periodicity of the metering data (time interval) is 15 minutes.* *The precision class of the meters for active energy is 0,2s and for reactive energy 0,5s.* *Calibration shall take place prior to entry into service and subsequently every 5 years.* *B. https://www.elia.be/en/customers/connection/connection-contract, Appendix 4* *C. EN – IEC 60687 : Alternating current static watt-hour meters for active energy (classes 0,2 s*

	and 0,5 s) *EN – IEC 61268 : Alternating current static var-hour meters for reactive energy (classes 2 and 3)* *EN – IEC 60044 - 1 Instrument transformers – Part 1: Current transformers* *EN – IEC 60044 – 2 Instrument transformers – Part 2: Inductive voltage transformers* *EN – IEC 61107 Data exchange for meter reading, tariff and load control – Direct local data exchange*
BG	*No reply*
CZ	*A. Technical requirements are specified in the agreement and contain:* *- Standard protocols for real time data exchange, IEC 60870-5-104 for communication between control systems and IEC 60870-5-101 for communications with power plant terminals,* *- The rules of measurement lists and signal lists setting of each bays in substations and of each devices with respect to border between TSO and DSOs,* *- Methods and ways of actualisation of data with respect of habit from one side, cyber and physical security from the second side.* *B. The information is a part of the agreement in accordance with Art. 40(7), therefore available to both TSO and DSOs.* *C. The data exchange is happening in accordance with IEC … standard*
DE	*A. The technical requirements for the real time data exchange are described in the following document: Link (letter B), appendix 6A (https://www.netztransparenz.de/portals/1/Content/EU-Network-Codes/SO%20Verordnung/SOGL_40-7_2020_04_21_A_fuer_die_implementierung.zip)* *B. The publication took place on March 20, 2019 on the website netztransparenz.de. The link to the document:* *https://www.netztransparenz.de/portals/1/Content/EU-Network-Codes/SOGL_40-7_2019_03_20_B_nachbereitung_der_konsultation_vom_herbst_2018.zip* *C. IEC is an internationally used standard data format*
DK	*A. The real-time data content and format is described in the relevant national implementation documents for SOGL Article 40* *B. The documents are not yet publicly available, as they are awaiting final approval.* *C. They will be published as soon as they have been approved.*
EE	*A. https://elering.ee/sites/default/files/public/Teenused/Liitumine/06 - Kliendi elektriosa projekti koostamise ja modelleerimise n%C3%B5uded_2019.05.30.pdf* *B. https://elering.ee/sites/default/files/public/Teenused/Liitumine/06 - Kliendi elektriosa projekti koostamise ja modelleerimise n%C3%B5uded_2019.05.30.pdf* *C. ICCP and IEC 104 standard* *Update provided by ECA:* *Same all the data exchange requirements are described in here. Main technical descriptions are described in pages 2-5.* *https://elering.ee/sites/default/files/public/Teenused/Liitumine/05%20-%20Requirements%20for%20data%20exchange%20related%20to%20the%20electrical%20installations%20of%20clients_2019.05.30.pdf* *ICCP and 60870_5_104 are internationally used standards. Also IPSec-based virtual private network (VPN) is international used method to to ensure cyber security.*
ES	*A. Technical requirements related to real time data exchange are included in the Decision on the national implementation of KORRR and in the national operational procedure 9.2:* *- Information shall be exchanged between control centres (meaning that the SGU needs to exchange its real time information by means of a third party).* *- Communication links with the TSO control centres must be duplicated, only used for data exchange purposes, secured and completely isolated from Internet.* *- Further technical requirements related to real time data exchange communication links can be found in the TSO website: Especificación técnica: Enlaces para el intercambio de información en tiempo real con el OS (https://www.ree.es/sites/default/files/01_ACTIVIDADES/Documentos/20211501_Especificaciones_Tecnicas_Enlaces_Comunicaciones_OS.pdf). This document went through a public consultation and addressed by the NRA before its publication (no approval was required).* *- Time stamping is 12 seconds for all units unless providing aFRR or voltage control services, in*

	which case it goes down to 4 s. *B. - Decision on the national implementation of KORRR: 13th November, 2019. BOE.es - BOE-A-2019-17178 Resolución de 13 de noviembre de 2019, de la Comisión Nacional de los Mercados y la Competencia, por la que se aprueban las especificaciones para la implementación nacional de la metodología prevista en el artículo 40.6 del Reglamento (UE) 2017/1485, https://www.boe.es/eli/es/res/2019/11/13/(2).* *- Decision on the national operational procedure 9.2 (real time data exchange): 10th December, 2020. BOE.es - BOE-A-2020-16549 Resolución de 10 de diciembre de 2020, de la Comisión Nacional de los Mercados y la Competencia, por la que se aprueba el procedimiento de operación 9.2 "Intercambio de información en tiempo real con el operador del sistema", https://www.boe.es/eli/es/res/2020/12/10/(1).* *- Technical requirements on real time data exchange links: This document has been published for years and it is continuously being updated. Last review: 15th January, 2021. Especificación técnica: Enlaces para el intercambio de información en tiempo real con el OS, https://www.ree.es/sites/default/files/01_ACTIVIDADES/Documentos/20211501_Especificaciones_Tecnicas_Enlaces_Comunicaciones_OS.pdf* *C. - Real time data are exchanged by means of ICCP communication links, using IEC-60870-6-503 protocol.* *- Communication links are ethernet circuits (level 2, EVPL), that corresponds to MEF standard definition (Metro Ethernet Forum).* *- The local interconnection interface at the line delivery point follows the standard IEEE 802.3z.*
FI	*A. Common SCADA protocols such as ELCOM and IEC-60870-5-104 may be used. IEC may be used to receive data only.* *B. https://www.fingrid.fi/globalassets/dokumentit/en/customers/power-transmission/real-time-information-exchange_.pdf* *C. The rules comply with the international standards (NF EN 60870-5-104:2007 or TASE2 IEC-60870-6).*
FR	*A. Technical requirements for the real time data exchange are described in RTE Reference Technical Documentation (The library - RTE Services Portal (services-rte.com))* *B. The library - RTE Services Portal (https://www.services-rte.com/en/the-library.html)* *C.*
GR	*A. Under discussion - to be decided* *B. Under discussion - to be decided* *C. Under discussion - to be decided*
HR	*A. In preparation. It will be part of HOPS-HEP ODS agreement* *B. Not published* *C. International standards are always applied*
HU	*A. The requirements are part of the related guideline of the national grid code and the bilateral agreements between TSO and DSOs.* *B. https://www.mavir.hu/documents/10258/239156022/Folyirelv+V-4_2021.02.01_clean.pdf/73dc54ef-ea34-6ed2-550a-bbf962245f65?t=1610952613802 (Chapter 10.)* *Bilateral agreements are not public.* *C. The requirements are based on international standards.*
IE	*A. 'Section 3.3, Article 50, Real-time' in the attached TSO proposal details requirements for real-time data exchange for SGUs.* *B. Requirements can be found in the Grid Code. For example, PC.A3.6.1 asks SGUs for Active and Reactive Power Flows.* *C. Section CC.6.1 of National Grid Code states:* *"All User Plant and Apparatus associated with the connection to the Transmission System shall comply with the:* *(a) Irish and EU Law and* *(b) the relevant European standards; or* *(c) if there is no relevant European standards, such other relevant standard which is in common use in the European Union;"*
IT	*A. Information are available on Annex A6 to national grid code (attached for convenience).* *B.*

	https://download.terna.it/terna/Allegato%20A.6%20%E2%80%93%20Criteri%20di%20acquisizione%20dati%20per%20il%20telecontrollo_8d7b569e02f59ac.pdf – Terna website published on 19 February 2020 following Decision 36/2020 by Arera *C. The technical requirements are available on Annex A.13 to national grid code which provides the application of international protocols and standards defined in IEC 60870-5-104 and IEC62351 according to IEC Technical Committee (TC) 57 "Power Systems Management and Associated Information Exchange"*
LT	*A. For substations with highest (330kV substations and 110 kV transit substations) priority data exchange channels and equipment must be fully redundant.* *B. Requirements are published on Litgrid's website: https://www.litgrid.eu/index.php/tinklo-pletra/standartiniai-techniniai-reikalavimai/telekomunikacijos/2643* *and* *https://www.litgrid.eu/uploads/files/dir560/dir28/dir1/7_0.php* *C. All IT systems and data exchange requirements applied by TSO have to fulfil international standards for security, confidentiality and redundancy of the communication links.*
LU	*A. Not applicable (no SGUs in Luxembourg)* *B. Not applicable* *C. Not applicable*
LV	*The requirements are specified in the TSO agreement with the relevant SGU and DSO.*
MT	*No reply*
NL	*A. IEC 61850: 'Communication networks and systems for power utility automation'* *B.* *https://wetten.overheid.nl/jci1.3:c:BWBR0037940&hoofdstuk=13&paragraaf=13.5&artikel=13.37&z=2021-07-03&g=2021-07-03* *C. IEC 61850: 'Communication networks and systems for power utility automation'*
NO	*Under discussion - To be decided*
PL	*A. The content is defined in the „Scope of Data Exchange" document.* *Format is defined in the Transmission Grid Code.* *The IEC60870-5-104 protocol is basically used to transfer data directly from power facilities to the TSO's SCADA system. Upon consent of the TSO, it is temporarily allowed to use DNP3 or IEC60870-5-101 protocols operating on serial lines.* *B. https://www.pse.pl/documents/20182/ed8e6365-4983-40a7-afed-814b7f12eea4?safeargs=646f776e6c6f61643d74727565;* *16/03/2021* *C. -*
PT	*A. Is used a standard communication protocol named as IEC60870-5-104.* *B.* *https://www.googleadservices.com/pagead/aclk?sa=L&ai=DChcSEwjt1ZntjsX4AhUIiNUKHZRNDVQYABABGgJ3cw&ohost=www.google.com&cid=CAASE-RoOoY59ye8ZlBl68h5ALtjBmQ&sig=AOD64_3SJ3J7vfY5x0OK237h_FxGtZPGpQ&q&adurl&ved=2ahUKEwiQz5DtjsX4AhUS-xoKHS3ECqEQ0Qx6BAgDEAE* *C. IEC60870-5-104 is a standard protocol itself.*
RO	*A. According to* *-ANRE Order no. 233/2019 for approval of Data exchange between TSO, DSO and SGUs. (relevant articles art. 6)* *B.* *https://www.transelectrica.ro/documents/10179/3992484/Ord+233_2019+Metodologia+pentru+schimbul+de+date+intre+OTS%2C%20ODuri+si+URSi/99cb4405-e869-4a11-8c3a-9bc8fe85244a* *https://www.anre.ro/ro/energie-electrica/legislatie/coduri-paneuropene1476186098/regulamentul-ue-nr-1485-2017* *C. There are respecting requirements from SR EN 60870-5-101, -104, SR EN 60870-1, SR EN 60870-2 etc.*

SE	*The technical requirements are not decided yet. Where applicable, details will be published in the reports listed in the answer to question 15.*
SI	*A. Switch mode: on change,* *Measurements: change is higher than pre-defined threshold or on 60 s which occur earlier.* *B. Defined in agreement between TSO and DSOs, CDSOs and SGUs.* *C. IEC 60870-5-104 and TASE.2 (ICCP, Secure ICCP)*
SK	*A. https://www.sepsas.sk/media/4670/dokument-d-tp-ucinnost-nov-2020.pdf (chapter 3.3), (Last update - 1.11.2020)* *B. https://www.sepsas.sk/media/4670/dokument-d-tp-ucinnost-nov-2020.pdf (chapter 3.3), (Last update - 1.11.2020)* *C. -*

7.10.4 Value of the refresh rate

435 ***Q.6.19 With respect to Article 10(5) of the KORRR, what is the value of the refresh rate for the real-time data?***

436 *Table 38: Value of the refresh rate*

MS	Answer
AT	*1 minute*
BE	*For active power, 0.2 seconds,* *For reactive power, 0.5 seconds*
BG	*No reply*
CZ	*The refresh time no longer than 1 minute is accomplished with communication to DSOs and SGUs directly connected to TSO grid (We do not fulfil the expectation with TASE communications between TSOs. The refresh time (USAN) to TASE communications takes minutes. It can be refresh time longer than 15 minutes.)*
DE	*The content exchanged is described in the following Link (letter B), appendix 6A (https://www.netztransparenz.de/portals/1/Content/EU-Network-Codes/SOGL_40-7_2019_03_20_B_nachbereitung_der_konsultation_vom_herbst_2018.zip)* *The refresh rate for the real time data are requested to be less than or equal to 60 seconds* *A threshold value transmission is also applicable, in which a new value gets transmitted as soon as a given threshold is exceeded.*
DK	*Refresh rate in point of communication is a maximum of 500ms.*
EE	*Not regulated, some measurements have dead band zones.*
ES	*Time stamping is 12 seconds for all units unless providing aFRR or voltage control services, in which case it goes down to 4 s.*
FI	*Refresh rate shall be 60 seconds or less.*
FR	*10 secondes for TSO connected SGU* *1 minute for TSO connected DSO*
GR	*Under discussion - To be decided*
HR	*It is planned to have 1 minute refresh rate regarding distribution connected SGUs measurements. Measurements from joint HOPS-HEP ODS substations are refreshed every 2-4 seconds*
HU	*Less or equal than 1 minute depending on the content of the data. (2 sec regarding the most frequently changing data)*
IE	*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. *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.*
IT	*Variable between 1 sec and 1 min depending on the type of data. See Annex A6 for details (attached for convenience)*
LT	*TSO uses Energy management system to collect all data from Power system and to display it for operational personnel. The refresh rate of the displays in Energy management system are 4s, however refresh of real-time data might be even higher, but it is much higher than 1min.*
LU	*Exchanges with other TSOs are quasi instantaneous via the communication protocol TC/IP. Communication within Creos DSO about the status of network connections (including data from DSOs available at substations) is also quasi instantaneous.* *The refresh rate is generally lower than 1 second.*
LV	*TSO has defined that refresh rate for real time data exchange is from 2sek till 10sek.*
MT	*No reply*
NL	*4 sec*
NO	*Under discussion - To be decided*
PL	*Pursuant to Art. 10 (5) KORRR, the refresh rate is less than 1 minute, the data are sent on an event basis, and the data refresh is usually every 1-2 seconds.*
PT	*Refresh rate is, at maximum, 4 seconds*
RO	*Refresh rate for the real-time data are 2 seconds (for f-P central controller and interconnection lines) and 4 seconds (for others).*
SE	*It will probably be attempted to 5 sek. Where applicable, details will be published in the reports listed in the answer to question 15.*
SI	*Refresh rate for real time data are 2s (AGC) and other up to 10s.*
SK	*One second*

Annex 2: Figures

Latvia

4. **Exchange of information on changes in power transmission system affecting operations in other Baltic TSOs**

4.1 TSO inform on planned changes in its Power System 330 kV network topology (and changes concerning 110 kV cross-border lines) or in case of connection of new generating plant (larger then 10MVA)) and provide corresponding operational schemes and technical data (see p 3.1.3) at least 30 days before new topology (new power transmission object) or new major generating plant become operational.

4.2 In case there are more than one stage of development or reconstruction process in 330kV grid, operational schemes and technical data (p 3.1.3) must be provided for each stage.

Figure 15. (related to question 6.11)

Slovenia

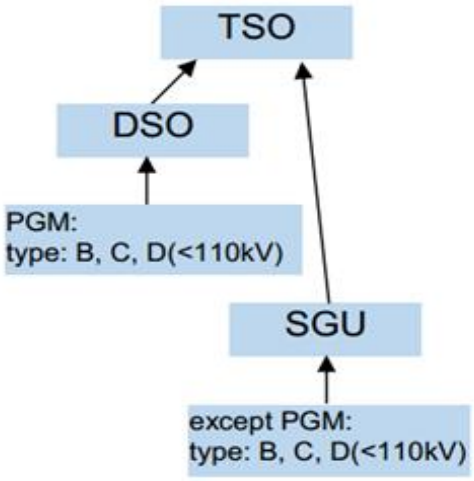
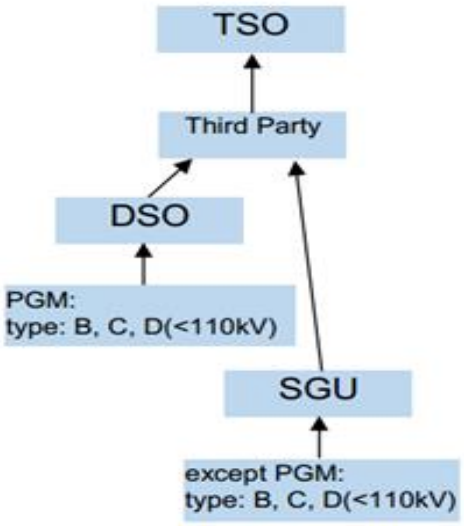
	Scheme for structural and real-time data exchange
	Scheme for scheduled data exchange

Figure 16. (related to question 5.1)

Annex 3: List of abbreviations & country codes

Acronym	Definition
ACER	Agency for the Cooperation of Energy Regulators
DSO	Distribution System Operator
ENTSO-E	European Network of Transmission System Operators for Electricity
EU	European Union
GL	Guideline
KORRR	Key Organisational Requirements, Roles and Responsibilities
OPDE	Operational Planning Data Environment
NRA	National Regulatory Authority
SGU	Significant Grid User
SO	System Operation
TSO	Transmission System Operator
RSC	Regional Security Coordinator

ISO code	Country
AT	Austria
BE	Belgium
BG	Bulgaria
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
ES	Spain
FI	Finland
FR	France
GR	Greece
HR	Croatia
IE	Ireland
LT	Lithuania

ISO code	Country
LV	Latvia
HU	Hungary
IT	Italy
LU	Luxembourg
MT	Malta
NL	Netherlands
NO	Norway
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovakia

Abbreviation	NRA
ACM	Autoriteit Consument & Markt/Authority for Consumers & Markets
AGEN-RS	Agencija za Energijo/Energy Agency
ANRE	Autoritatea Naţională de Reglementare în Domeniul Energie/Regulatory Authority for Energy
ARERA	Autorità di Regolazione per Energia Reti e Ambiente
BNetzA	Bundesnetzagentur/Federal Network Agency for Electricity, Gas, Telecommunications, Posts and Railways
CNMC	La Comisión Nacional de los Mercados y la Competencia/The National Commission on Markets and Competition
CRE	Commission de régulation de l'énergie
CREG	Commission de Régulation de l'Électricité et du Gaz/Commissie voor de Regulering van de Elektriciteit en het Gas
CRU	The Commission for Regulation of Utilities
DUR	Forsyningstilsynet/Danish Utility Regulator
ECA	Konkurentsiamet/Estonian Competition Authority
E-Control	Energie-Control Austria
Ei	Energimarknadsinspektionen/Swedish Energy Markets Inspectorate
ERO	Energetický regulační úřad/Energy Regulatory Office
ERSE	Entidade Reguladora dos Serviços Energéticos/Energy Services Regulatory Authority
EV	Energlavisto /Energy Authority
EWRC	комисия за енергийно и водно регулиране (КЕВР)/Energy and Water Regulatory Commission
HERA	Hrvatska energetska regulatorna agencija/Croatian Energy Regulatory Agency
ILR	Institut Luxembourgeois de Régulation
MEKH	Magyar Energetikai és Közmű-szabályozási Hivatal/The Hungarian Energy and Public Utility Regulatory Authority
NERC	National Energy Regulatory Council
NVE-RME	Norges vassdrags- og energidirektorat - Reguleringsmyndigheten for energi/The Norwegian Energy Regulatory Authority
PUC	Sabiedrisko pakalpojumu regulēšanas komisija/Public Utilities Commission
RAE	Ρυθμιστική Αρχή Ενέργειας/The Regulatory Authority for Energy
REWS	Regulator for Energy and Water Services
RONI	Úrad pre reguláciu sieťových odvetví/Regulatory Office For Network Industries
URE	Urząd Regulacji Energetyki/Energy Regulatory Office

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