Summary:

Significant investment costs are driven by Articles 50, and to a lesser extent 44.

Significant organization and procedural challenges arise from Articles 48, 49, (and possibly 52), as well as 50 and 44.

Grid Code changes likely to be needed for Articles 44, 48, 49, 51 – and also for 50 in relation to data DNOs collect and how to transfer it.

Art	SOGL Text	D Code Implications	Grid Code Implications
40	**Organisation, roles, responsibilities and quality of data exchange** Art 40.5. In coordination with the **DSO**s and SGUs, each **TSO** shall determine the applicability and scope of the data exchange based on the following categories: Art 40.5.a. structural data in accordance with Article 48; Art 40.5.b. scheduling and forecast data in accordance with Article 49; Art 40.5.c. real-time data in accordance with Article 44, Article 47 and Article 50; and Art 40.5.d. provisions in accordance with Article 51, Article 52 and Article 53. Art 40.7. By 18 months after entry into force of this Regulation, each **TSO** shall agree with the relevant **DSO**s on effective, efficient and proportional processes for providing and managing data exchanges between them, including, where required for efficient **network** operation, the provision of data related to **distribution** systems and SGUs. Without prejudice to the provisions of paragraph 6(g), each **TSO** shall agree with the relevant **DSO**s on the format for the data exchange.	It becomes unclear how Article 40.5 works in relation to Articles 44, 47, 48, 49, 50, 51, 52, 53. Article 40.7 is unlikely to be implemented by March 19 – although agreement might be made – it cannot be implemented in that timescale. Interesting that 40.7 does not specify when the processes agreed upon need to be implemented – nor does KORRR.	Changes are subject to the interpretation of 'Each TSO shall **determine the applicability and scope'** of the data exchange based on articles 44, 47, 48, 49, 50, 51, 52, 53. Article 41 to 53 shall **apply in March 2019**, which is 18 months after the entry into force of SOGL per Article 192 of SOGL. The required changes would need to be agreed and implemented by this date otherwise this will not efficiently discharge the obligations imposed upon the licensee. The necessary data exchange is currently achieved with the TSO's through the STC which covers the whole of the GB Synchronous area (i.e. Scotland and OFTO's). Currently there is no requirement for data from TSO's or DSO's outside of the GB Synchronous area. Neighbouring TSO's in other Synchronous areas are unlikely to require data from us as they are outside our synchronous area – NG operates the system today without this data. These requirements are more applicable in other Synchronous areas where there are many TSO's and Member States. If there is a requirement for this to change in the future this can be managed as a GB mod within the framework of SOGL.

Art	SOGL Text	D Code Implications	Grid Code Implications
			For DNO's we get the data we need although this may be more complex due to the increase in the volume of Embedded Generation.
44	**Data exchange between TSOs and DSOs within the TSO's control area** **Real-time data exchange** Unless otherwise provided by the **TSO**, each **DSO** shall provide its **TSO**, in real-time, the information related to the **observability area** of the **TSO** as referred to in Art 43.1 and Art 43.2, including: (a) the actual substation **topology**; (b) the **active power** and **reactive power** in line bay; (c) the **active power** and **reactive power** in transformer bay; (d) the **active power** and **reactive power** injection in **power generating facility** bay; (e) the tap positions of transformers connected to the transmission system; (f) the busbar **voltage**s; (g) the **reactive power** in reactor and capacitor bay; (h) the best available data for aggregated **generation** per primary energy source in the **DSO** area; and (i) the best available data for aggregated demand in the **DSO** area.	DNOs will have to ensure that transducers etc exist in all substations in the observability area to discharge (a) to (i). This is bound to require some investment. Some information, such as (e) tap positions of transformers (if in fact there are any in the OA) might not exist or be completely inappropriately uneconomic to try to source (ie new tapchanger or even new TX). It is likely that all the substations in question will have SCADA – but both NG and the DNOs will have to agree data transfer arrangements – probably requiring (a) the installation ICC links and (b) potentially new data storage infrastructure. As per 40.7 above it is not clear when the process (that will be agreed by March 2019) will need to be actually implemented.	**New system and process** for data transfer system between TSO and DNO (ICCP or alternatives) will be required to exchange real time data. This would have to be a new requirement requiring a change to the Grid Code and an inclusion of this requirement in the ECC's section 6.4. The requirements are straightforward but the cost and who pays for it is complex and would require a decision from Ofgem. In this case ICCP links could be used in the same way as the Scottish model for both data provided by SGU's and the DNO data itself. It could be more of an issue for IDNO's which are growing in number. The technical impact on observability areas will depend on the outcome of Article 75 of SOGL. Currently we only get operational metering data at the Grid Supply Point which would not really be adequate to meet the requirements of the SOGL requirement. An alignment to the work on open networks will be necessary.

Art	SOGL Text	D Code Implications	Grid Code Implications
47	Art 47.1. 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: Art 47.1.a. position of the circuit breakers at the **connection point** or another point of interaction agreed with the **TSO**; Art 47.1.b. **active power** and **reactive power** at the **connection point** or another point of interaction agreed with the **TSO**; and Art 47.1.c. in the case of **power generating facility** with consumption other than auxiliary consumption net **active power** and **reactive power**.	Only applies to directly connected SGUs	There is an existing real time data exchange provision for all SGUs who are CUSC parties, TSO would have to ensure we are exchanging with all transmission connected SGUs.
48	**Data exchange between TSOs, DSOs and distribution-connected power generating modules** **Structural data exchange** Unless otherwise provided by the **TSO**, each **power generating facility owner** of a **power generating module** which is a SGU pursuant to Art 2.1.a and by aggregation of the SGUs pursuant to Art 2.1.e connected to the **distribution** system shall provide at least the following data to the **TSO** and to the **DSO** to which it has a **connection point**: Art 48.1.a. general data of the **power generating module**, including installed capacity and primary energy source or fuel type; Art 48.1.b. **FCR** data according to the definition and requirements of Article 173 for power generating facilities offering or providing the **FCR** service; Art 48.1.c. **FRR** data for power generating facilities offering or providing the **FRR** service;	1.a, 1.e, 1.h and 1.i exist in the existing DNOs data sets – or can be asked for under existing DDRC requirements. 1.b, 1.c, 1.d can be provided directly to NG via the relevant contracts (I assume). 1.f and 1.g probably need NG to specify in the G Code exactly what is required. Neither of these are thought to be directly captured in the DDRC. For 1.f it is not even clear which CB is meant and although rudimentary information is included in the DDRC for 1.g, this is probably not sufficient.	NG has to work with DNOs to agree exchange of structural data for distribution connected generating modules. Currently this is exchanged directly through contracts but Grid code amendments**, new processes** for exchanging directly between TSO and DNOs and potentially **new roles** will be required. For SGU's with a CUSC contract this would already be covered. For SGU's which are not CUSC parties this is more complex. There are two solutions – we either place requirements on non CUSC parties to provide the data to NG similar to the LEEMPS arrangements or place similar requirements on DNO's in the DDRC and then forward that data to us. We would need to make sure that Generators were comfortable for the DNO's to forward that data to us which would be similar to the arrangements in Schedule 3 of the STC.

Art	SOGL Text	D Code Implications	Grid Code Implications
	Art 48.1.d. **RR** data for **power generating module**s offering or providing the **RR** service; Art 48.1.e. protection data; Art 48.1.f. **reactive power** control capability; Art 48.1.g. capability of remote access to the circuit breaker; Art 48.1.h. data necessary for performing dynamic simulation according to the provisions in Regulation (EU) 2016/631; and Art 48.1.i. **voltage** level and location of each **power generating module**. Art 48.2. Each **power generating facility owner** of a **power generating module** which is a SGU in accordance with Art 2.1.a and Art 2.1.e shall inform the **TSO** and the **DSO** to which it has a **connection point**, within the agreed time and not later than the first commissioning or any changes to the existing installation, about any change in the scope and the contents of the data listed in paragraph 1		The section on FCR, FRR and RR will require new sections of Grid Code and D Code drafting.
49	**Scheduled Data Exchange** Unless otherwise provided by the **TSO**, each **power generating facility owner** of a **power generating module** which is a SGU in accordance with Art 2.1.a and Art 2.1.e connected to the **distribution** system shall provide the **TSO** and the **DSO** to which it has the **connection point**, with at least the following data: (a) its **schedule**d unavailability, **schedule**d **active power** restriction and its forecasted **schedule**d **active power** output at the **connection point**; (b) any forecasted restriction in the **reactive power** control capability; and	For (a) the D Code only applies to HV customers/generators – and to generators >1MW currently – and will need modifying to line up fully with Art 49 requirements (ie Type B generators; demand SGUs probably already covered – although the MW threshold might need removing in DOC1.3 and DOC1.5.4. However this data in general from small power stations is not specified in the Grid Code so it is not clear if all the data that DNOs collect should just be sent to NG, or if NG need to specify what they want per site. For (b) this is probably not asked for specifically – unless it is part of Output Usable – so again NG will need to specify what is required and which will then need to be reflected in the D Code.	NG has to work with DNOs to agree exchange of all scheduled data for distribution connected generating modules. Currently this is exchanged directly through contracts but Grid code amendments**, new processes** for exchanging directly between TSO and DNOs and potentially **new roles** will be required. The issue could be resolved if the DDRC was updated to reflect similar requirements to the DRC (Sched 2 and 3) and then forwarded on to NG.

Art	SOGL Text	D Code Implications	Grid Code Implications
	(c) as an exception to paragraphs (a) and (b), in regions with a central dispatch system, data requested by the **TSO** for the preparation of its **active power** output **schedule**.		
50	**Real-time data exchange** Art 50.1. Unless otherwise provided by the **TSO**, each **power generating facility owner** of a **power generating module** which is a SGU in accordance with Art 2.1.a and Art 2.1.e connected to the **distribution** system shall provide the **TSO** and the **DSO** to which it has the **connection point**, in real-time, at least the following data: Art 50.1.a. status of the switching devices and circuit breakers at the **connection point**; and Art 50.1.b. active and **reactive power** flows, **current**, and **voltage** at the **connection point**. Art 50.2. Each **TSO** shall define in coordination with the responsible **DSO**s which SGUs may be exempted from providing the real-time data listed in paragraph 1 directly to the **TSO**. In such cases, the responsible **TSO**s and **DSO**s shall agree on the aggregated real-time data of the SGUs concerned to be delivered to the TSO.	The first challenge is to agree if the data is to be cascaded via the DNO or provided direct. All the existing assumptions are cascaded – this needs confirming. There is little existing D Code text dealing with this – see DPC6.7. This needs to be reviewed in the light of applying retrospectively to approximately 50k existing installations. How is this information to be handled/managed? How will it be passed between DNO and NG? ie both NG and the DNOs will have to agree data transfer arrangements – probably requiring (a) the installation ICC links and (b) potentially new data storage infrastructure. Or should the current DPC6.7 approach be ceased; DNOs to provide a technical spec and customers provide the data and data coms to the DNO – maybe via the internet? 50.1.a – it is a moot point if this information is of any use at all. 50.1.b is reasonable data once the basic infrastructure (ie site comms) is in place, but all sites will need fitting with the relevant transducers in addition. 50.2 – this might be a sensible approach to adopt in GB – but it will need NG to specify what is required to satisfy this, and then for DNOs and NG to agree the IT etc and systems implications. This would be a significant non-trivial project. Will need some appropriate expertise to cost it, but needs a high level requirement first from NG.	NG has to work with DNOs to agree exchange of all real time data for distribution connected generating modules. A cascading approach would allow for data to be exchanged through Grid code amendments, **new systems** and **new data storage** arrangements, **new roles** would be required to deal with these changes. This issue can be solved by ICCP links as noted for Art 44. This can be addressed by adding a new section to the Grid Code in Section 6.4. Ofgem would need to be involved in apportioning costs.
51	**Data exchange between TSOs and DSOs concerning significant power generating modules**	NG needs to specify this to the DNOs	For structural this would follow the week 24 / week 48 and the proposed submission for week 50.

Art	SOGL Text	D Code Implications	Grid Code Implications
	Art 51.1. Unless otherwise provided by the **TSO**, each **DSO** shall provide to its **TSO** the information specified in Article 48, Article 49 and Article 50 with the **frequency** and level of detail requested by the **TSO**. Art 51.2. Each **TSO** shall make available to the **DSO**, to whose **distribution** system SGUs are connected, the information specified in Article 48, Article 49 and Article 50 as requested by the **DSO**. Art 51.3. A **TSO** may request further data from a **power generating facility owner** of a **power generating module** which is a SGU in accordance with Art 2.1.a and Art 2.1.e connected to the **distribution** system, if it is necessary for the **operational security analysis** and for the validation of models.		For real time data the requirements are covered in TS.3.24.100 and the Bilateral Agreement which covers issues such as refresh rate and accuracy etc.
52	**Data exchange between TSOs and distribution-connected demand facilities or third parties participating in demand response** Art 53.1. Unless otherwise provided by the **TSO**, each SGU which is a **distribution**-connected **demand facility** and which participates in demand response other than through a third party shall provide the following **schedule**d and real-time data to the **TSO** and to the **DSO**: Art 53.1.a. structural minimum and maximum **active power** available for demand response and the maximum and minimum duration of any potential usage of this power for demand response; Art 53.1.b. a forecast of unrestricted **active power** available for demand response and any **planned** demand response; Art 53.1.c. real-time active and **reactive power** at the **connection point**; and	A first assumption might be that this data could be included in any contract that NG let with a demand service provider. It is a moot point, since this only applies to T contracted DSR, if there is any need at all to include in the D Code. If there is a need to include these provisions in the D Code then it is probably a simple modification to DOC 1.3 to remove the 5MW limit on Suppliers and Customers – and probably to add in aggregators. However there would need to be a Grid Code or similar modification to cause the DNO to then forward this to NG.	Art 52 applies to demand facilities that are directly connected and hence would be a CUSC party. They would be treated as a Non Embedded Customer where the data required is already submitted under the current Grid Code provisions. . If demand response services are to be provided this would be caught under the C16 process. Art 53 is more complex but would be caught under the C16, Standard Contract terms. There is however provision within the DRSC (as introduced for DCC implementation) to add in these additional data items..

Art	SOGL Text	D Code Implications	Grid Code Implications
	Art 53.1.d. a confirmation that the estimations of the actual values of demand response are applied. Art 53.2. Unless otherwise provided by the **TSO**, each SGU which is a third party participating in demand response as defined in Article 27 of Regulation (EU) 2016/1388, shall provide the **TSO** and the **DSO** at the day-ahead and **close to real-time** and on behalf of all of its **distribution**-connected **demand facilit**ies, with the following data: Art 53.2.a. structural minimum and maximum **active power** available for demand response and the maximum and minimum duration of any potential activation of demand response in a specific geographical area defined by the **TSO** and **DSO**; Art 53.2.b. a forecast of unrestricted **active power** available for the demand response and any **planned** level of demand response in a specific geographical area defined by the **TSO** and **DSO**; Art 53.2.c. real-time active and **reactive power**; and Art 53.2.d. a confirmation that the estimations of the actual values of demand response are applied.		