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Modification proposal:	**Grid Code GC0042: Information on Embedded Small Power Stations**		
Decision:	The Authority[1] directs that the proposed modifications to the Grid Code and Distribution Code be made[2]		
Target audience:	National Grid Electricity Transmission PLC (NGET), Grid Code users, Distribution Code users and other interested parties		
Date of publication:	7 August 2014	Implementation Date:	10 working days following the publication of the Authority's decision

Background to the modification proposal

The Grid Code[3] places obligations on Distribution Network Operators (DNOs) to submit data to National Grid Electricity Transmission (NGET) about Embedded Small Power Stations (ESPSs). The submission of data about ESPSs is important because distributed generation (DG) constitutes a growing share of total generation impacting on the National Electricity Transmission System (NETS) and affects the safe, efficient and economic planning and operation of the NETS. The obligations on DNOs to provide data on ESPSs are set out in the Grid Code[4].

The current obligations on DNOs require them to provide high-level information to NGET such as:

- the registered capacity of each ESPS
- the number of Small Power Stations
- the number of generating units or Power Park Modules within these power stations.

NGET identified in the final report for GC0042[5] three ways that the growth in DG affects the planning and system operation of the NETS:

- First, the impact of ESPSs on the NETS is accounted for in the process of evaluating system boundary capacity requirements. Accurate boundary flow requirements are essential for planning when, and if, network reinforcements are needed. The current arrangements do not provide sufficient information necessary to accurately plan such reinforcements, thereby adversely affecting the efficient planning of the NETS.

- Second, NGET does not currently receive sufficient information necessary to allow an assessment of the impact ESPSs have on both reactive and active demand. ESPSs

[1] References to the 'Authority', 'Ofgem', 'we' and 'our' are used interchangeably in this document. The Authority refers to GEMA, the Gas and Electricity Markets Authority. The Office of Gas and Electricity Markets (Ofgem) supports GEMA in its day to day work. This decision is made by or on behalf of GEMA.
[2] This document is notice of the reasons for this decision as required by section 49A of the Electricity Act 1989.
[3] The Grid Code can be accessed at the following link: http://www2.nationalgrid.com/UK/Industry-information/Electricity-codes/Grid-code/The-Grid-code/
[4] In PC.A.3.2.1(b), PC.A.3.1.4(a) and PC.A.4.3.2(a) of the Planning Code, and Schedule 11 of the Data Registration Code (DRC).
[5] Grid Code proposals, final reports and representations can be viewed on NGET's website at: http://www2.nationalgrid.com/UK/Industry-information/Electricity-codes/Grid-code/Modifications/GC0042/

are believed to be contributing to a decline in both types of demand when viewed from the transmission system perspective.

- Third, ensuring that the right amount of generation is contracted in the daily operation of the NETS requires accurate demand forecasting. Demand forecasting errors have been increasing, potentially due to a growing share of generation coming from ESPSs. NGET has presented evidence[6] showing a positive bias in the mean transmission demand forecast error. NGET considers that this may be due to demand suppression resulting from the growing share of generation coming from ESPSs. Whether demand suppression is caused by ESPSs cannot be forecast effectively by NGET with the level of information currently provided.

The issue of whether DNOs should provide additional information about ESPSs to NGET was examined by a Workgroup established on the recommendation of the Grid Code Review Panel (GCRP) following a paper submitted to the GCRP in January 2012. The Workgroup concluded its work in February 2014 and a full report of its work is published on NGET's website.[7] Following completion of the Workgroup report, both the GCRP and the Distribution Code Review Panel (DCRP) recommended that proposed changes to both the Distribution and Grid Codes should be progressed in a single modification proposal.

The modification proposal

Modification proposal GC0042 was formally raised following the Workgroup's report. It seeks to address the three issues outlined above by requiring DNOs to provide additional information to NGET that it can use to more accurately plan and operate the NETS.

The Workgroup concluded that changes should be made to both the Grid Code and Distribution Code to facilitate the collection of additional information for each ESPS with a registered capacity of 1 MW or above. GC0042 therefore seeks to amend both the Grid Code[8] and the Distribution Code.[9]

The Workgroup recommended that DNOs provide seven additional pieces of information about ESPSs to NGET, namely, for each ESPS:

1. a reference unique to each Network Operator
2. fuel type or technology type
3. registered capacity in MW
4. lowest voltage level node on the existing week 24 single line diagram to which it connects or exports most of its power
5. geographical location of each wind and PV based ESPS whose outputs are location dependent
6. control mode, and
7. loss of mains protection type and relay settings.

By having the additional information outlined above, NGET considers that it will be better able to deal with the three issues identified relating to boundary flow requirements, the impact of reactive and active demand and demand forecasting errors.

[6] Page 6 of the final report: Grid Code proposals, final reports and representations can be viewed on NGET's website at: http://www2.nationalgrid.com/UK/Industry-information/Electricity-codes/Grid-code/Modifications/GC0042/
[7] http://www2.nationalgrid.com/UK/Industry-information/Electricity-codes/Grid-code/Modifications/GC0042/
[8] PC.A.3.1.2, PC.A.5.1.3, PC.A.5.1.4, DRC.6.1.11 and Schedule 11 of the DRC.
[9] DPC7.4.2 and DDRC Schedules 5a and 5b. The Distribution Code can be accessed at the following link: http://www.dcode.org.uk/the-distribution-code/

NGET's and the distribution licensees' recommendation

NGET submitted the final report to the Authority on 3 July 2014 recommending, alongside the distribution licensees, that the modification proposal is accepted. The final report states the views of NGET and the distribution licensees who consider that the modification proposal better facilitates Applicable Grid Code Objectives (i), (iii) and (iv)[10] and Applicable Distribution Code Objectives (i), (ii) and (iii).[11] NGET considers that the modification proposal better facilitates the Grid Code Objectives by providing the information necessary to better forecast the demand presented to the transmission system. Both NGET and the distribution licensees that responded to the consultation consider that the modification proposal will also better facilitate the Distribution Code Objectives for the same reason, as well as clarifying the information to be provided by ESPSs to the DNOs.

NGET also considers that the modification proposal facilitates the provision of some of the information required as part of the European Union's Transparency Regulation.[12]

The Authority's decision

We have considered the issues raised by the modification proposal and in the final report dated 3 July 2014. We have considered and taken into account the responses to NGET's consultation on the modification proposal which are included in the final report. We have concluded that:

1. implementation of the modification proposal will better facilitate the achievement of the applicable objectives of the Grid Code
2. implementation of the modification proposal will also better facilitate the achievement of the applicable objectives of the Distribution Code, and
3. approving the modification is consistent with the Authority's principal objective and statutory duties.[13]

Reasons for the Authority's decision

We consider the modification proposal to be helpful in addressing the issues identified by NGET, notably the need for accurate boundary flow requirements, the need to reduce demand forecasting errors and to better assess the impact of changes in both active and reactive demand. We therefore agree that the relevant parts of both the Grid Code and Distribution Code should be revised to facilitate the provision of the additional information recommended by the Workgroup.

We note that there were five responses to the industry consultation on GC0042 issued in February 2014. Four of the five responses supported the modification proposal. A fifth response, although agreeing with the principle of NGET having greater information on

[10] As set out in standard condition C14(1)(b) of the electricity transmission licence (https://epr.ofgem.gov.uk//Content/Documents/Electricity%20transmission%20full%20set%20of%20consolidated%20standard%20licence%20conditions%20-%20Current%20Version.pdf).
[11] As set out in standard condition 21.4 of the electricity distribution licence (https://epr.ofgem.gov.uk//Content/Documents/Electricity%20Distribution%20Consolidated%20Standard%20Licence%20Conditions%20-%20Current%20Version.pdf).
[12] Commission Regulation (EU) No 543/2013 of 14 June 2013 on submission and publication of data in electricity markets and amending Annex I to Regulation (EC) No 714/2009 of the European Parliament and of the Council (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:163:0001:0012:EN:PDF)
[13] The Authority's statutory duties are wider than matters which NGET and the distribution licensees must take into consideration and are detailed mainly in the Electricity Act 1989 as amended.

ESPSs, raised concerns over the potential costs. The response questioned who should pay for gathering the relevant information and also whether demand data should be captured alongside generation data. We have reviewed all responses and agree with the Workgroup's conclusions[14] that there is not a strong case for collecting more granular demand data nor are the costs of implementing this modification likely to be significant given most of the data requested is already collected by the Network Operators.

We set out our views against the Applicable Grid Code and Distribution Code objectives relevant to our decision below. We consider that the modification proposal has a neutral impact on the other Grid Code and Distribution Code objectives.

Applicable Grid Code objective (i) 'to permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity'

With ESPSs providing a greater share of generation, it is important that NGET is able to accurately forecast and map their impact on the NETS. Without this ability, the planning and operation of the NETS by NGET will be adversely impacted. We consider that this objective is therefore better facilitated by the modification proposal through the provision of the proposed additional information about ESPSs. This will assist NGET to better forecast the demand impacting the NETS and thereby allow for more efficient planning and operation of the NETS.

Applicable Grid Code objective (iii) 'subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole'

We consider that the modification proposal better facilitates this objective by providing NGET with the ability to more accurately forecast the demand impacting the NETS. The additional information provided to NGET should help it improve the accuracy of its forecasts. In addition, more accurate forecasts should reverse the current trend of increasing demand forecast errors identified and help NGET better assess historical and future changes in both active and reactive system demand. Overall, this promotes security and efficiency of the electricity generation, transmission and distribution systems.

Applicable Grid Code objective (iv) 'to efficiently discharge the obligations imposed upon the licensee by this licence and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency'

We consider that this modification proposal better facilitates this objective as it facilitates the provision of information that is required by Article 14 of the European Union's Transparency Regulation. We have reached this view after discussions with NGET about the alternative data submission option for ESPSs connected before 1 January 2015.[15] NGET has assured us that it has processes in place to provide the production type data required under the Transparency Regulation for parties that use this alternative data submission option.

[14] See workgroup response, page 64 of the final report: Page 6 of the final report: Grid Code proposals, final reports and representations can be viewed on NGET's website at: http://www2.nationalgrid.com/UK/Industry-information/Electricity-codes/Grid-code/Modifications/GC0042/

[15] See annex, PC.A.3.1.4 (a)(ii)(2)(b) and Note 1.

Applicable Distribution Code objective (i) 'permit the development, maintenance, and operation of an efficient, co-ordinated, and economical system for the distribution of electricity'

We consider that this modification proposal better facilitates this objective by clarifying the information provided by ESPSs to DNOs and the provision of more accurate ESPS data. We consider that the threshold relating to generators of 1MW or above is reasonable and takes into account the trade off between having more accurate and detailed information with the cost and time involved in having to manage data collection processes.

Applicable Distribution Code objective (ii) 'facilitate competition in the generation and supply of electricity'

The provision of additional information to Network Operators about ESPSs does not automatically result in an improved level of competition. There is no clear explanation with appropriate supporting evidence for the distribution licensee's view that this objective is better facilitated. Also there does not appear to be a clear link between the effect of this modification proposal and the facilitation of competition in generation and supply. We therefore do not consider that it has been demonstrated that the modification better facilitates this objective.

Applicable Distribution Code objective (iii) 'efficiently discharge the obligations imposed upon distribution licensees by the distribution licences and comply with the Regulation and any relevant legally binding decision of the European Commission and/or the Agency for the Co-operation of Energy Regulators.'

We consider that this modification proposal better facilitates this objective by clarifying the provision of information required by Article 14 of the European Union's Transparency Regulation. We have reached this view after discussions with NGET about the alternative data submission option for ESPSs connected before 1 January 2015. NGET has assured us that it has processes in place to provide the production type data required under the Transparency Regulation for parties that use this alternative data submission option.

Other Issues

Following the submission of the final report for decision, we suggested some amendments to the proposed legal text together with NGET (the proposer). We consider these minor amendments to the proposed legal text are appropriate, add clarity and should be made. We have set out in the annex to this letter the changes to the legal text compared to that included in the final report.

Decision notice

In accordance with standard condition C14 of the electricity transmission licence and standard condition 21 of the electricity distribution licence, the Authority, hereby directs that modification proposal GC0042: *'Information on Embedded Small Power Stations'* (including the amendments to the proposed legal text set out in the annex to this letter) be made.

Gareth Evans
Head of Profession Engineering
Signed on behalf of the Authority and authorised for that purpose

Annex

This annex contains the proposed legal text as submitted in the final report, with a number of minor clarifying amendments in blue. Additions are underlined, deletions are in strikethrough.

Pages 26-27

PART 1 – STANDARD PLANNING DATA

…
PC.A.3 GENERATING UNIT AND DC CONVERTER DATA
…
Embedded
…
PC.A.3.1.4

(a)

PC.A.4.2.4(b) and PC.A.4.3.2(a) explain that the forecast **Demand** submitted by each **Network Operator** must be net of the output of all **Small Power Stations** and **Medium Power Stations** and **Customer Generating Plant** and all installations of direct current converters which do not form a **DC Converter Station**, **Embedded** within that **Network Operator's System**. The **Network Operator** must inform **NGET** of:

i) the number of such **Embedded Power Stations** and such **Embedded** installations of direct current converters (including the number of **Generating Units** or **Power Park Modules** or **DC Converters**) together with their summated capacity; and

ii) beginning from the 2015 Week 24 data submission, for each **Embedded Small Power Station** of registered capacity (as defined in the **Distribution Code**) of 1MW or more:

1) A reference which is unique to each **Network Operator;**

2) The production type as follows:

a) In the case of an **Embedded Small Power Station** first connected on or after 1 January 2015, the production type must be selected from the list below derived from the Manual of Procedures for the ENTSO-E Central Information Transparency Platform:

- Biomass;
- Fossil brown coal/lignite;
- Fossil coal-derived gas;
- Fossil gas;
- Fossil hard coal;
- Fossil oil;
- Fossil oil shale;
- Fossil peat;
- Geothermal;
- Hydro pumped storage;

- Hydro run-of-river and poundage;
- Hydro water reservoir;
- Marine;
- Nuclear;
- Other renewable;
- Solar;
- Waste;
- Wind offshore;
- Wind onshore; or
- Other;

together with a statement as to whether the generation forms part of a CHP scheme;

b) In the case of an **Embedded Small Power Station** first connected to the **Users' System** before 1st January 2015, as an alternative to the production type, the technology type(s) used, selected from the list set out at paragraph 2.23 in Version 2 of the Regulatory Instructions and Guidance relating to the distributed generation incentive, innovation funding incentive and registered power zones, reference 83/07, published by Ofgem in April 2007;~~,~~ ~~may be submitted as an alternative to the production type~~

3) The registered capacity (as defined in the **Distribution Code**) in MW;

4) The lowest voltage level node that is specified on the most up-to-date **Single Line Diagram** to which it connects or where it will export most of its power;

5) Where it generates electricity from wind or PV, the geographical location using either latitude or longitude or grid reference coordinates of the primary or higher voltage substation to which it connects;

6) The reactive power and voltage control mode, including ~~The control mode, i.e. if it operatoes in voltage control or **Power Factor** mode. Where it operates in voltage control mode,~~ the voltage set-point and reactive range, where it operates in voltage control mode, or the ~~and where it operates in Power Factor mode, the~~ target **Power Factor**, where it operates in Power Factor mode; ~~and~~

7) Details of the types of loss of mains **Protection** in place and their relay settings which in the case of **Embedded Small Power Stations** first connected to the **Users' System** before 1st January 2015 shall be provided on a reasonable endeavours basis.

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PC.A.5.1.4

PC.A.4.2.4(b) and PC.A.4.3.2(a) explained that the forecast **Demand** submitted by each **Network Operator** must be net of the output of all **Medium Power Stations** and **Small Power Stations** and **Customer Generating Plant Embedded** within that **User's System**. In such cases ~~(PC.A.3.1.4 also refers)~~, the **Network Operator** must provide ~~inform~~ **NGET** with the relevant information specified under PC.A.3.1.4 ~~of the number of summated capacity~~. On receipt of this data further details may be required at **NGET's** discretion as follows:

Changes to the Distribution Code: Distribution Planning and Connection Code (DPC), Generating Plant Performance Requirements

DPC7.4.2 **Control Arrangements**

DPC7.4.2.1

The **DNO** will specify in writing if a continuously acting fast response automatic excitation control system is required to control the **Generating Set** voltage without instability over the entire operating range of the **Generating Set** or **Power Station**. This will be dependent on the size and type **Generating Set** or **Power Station** and the adjacent part of the **DNO's Distribution System** to which it is connected.

DPC7.4.2.2

The **Generator** will notify, and keep notified, the DNO of the set points of the control scheme for voltage control or **Power Factor** control as appropriate and which have previously been agreed between the Generator and DNO. The information to be provided is detailed in **Schedules ~~in~~ 5a and 5b**.

Notes:

1. ~~The Technology Type should be selected from the list set out at paragraph 2.23 in Version 2 of the Regulatory Instructions and Guidance relating to the distributed generation incentive, innovation funding incentive and registered power zones, reference 83/07, published by Ofgem in April 2007.~~
The Production Type should be quoted for all new connections on or after 1st January 2015 and selected from the list below derived from the Manual of Procedures for the ENTSO-E Central Information Transparency Platform:

- Biomass;
- Fossil brown coal/lignite;
- Fossil coal-derived gas;
- Fossil gas;
- Fossil hard coal;
- Fossil oil;
- Fossil oil shale;
- Fossil peat;
- Geothermal;
- Hydro pumped storage;
- Hydro run-of-river and poundage;
- Hydro water reservoir;
- Marine;
- Nuclear;
- Other renewable;
- Solar;
- Waste;
- Wind offshore;
- Wind onshore; or
- Other.

For connections made before 1 January 2015, the technology type(s) used, selected from the list set out at paragraph 2.23 in Version 2 of the Regulatory Instructions and Guidance relating to the distributed generation incentive, innovation funding incentive and registered power zones, reference 83/07, published by Ofgem, in April 2007, may be submitted as an alternative to the production type.