

Requirement for generators - 'emerging technology' decision document

Final decision

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Overview:

The Requirement for Generators (RfG) network code sets out the technical requirements that all future new electricity generators must adhere to. The RfG allows generator manufacturers to apply for their generator technology to be classified as an 'emerging technology'. New generators connected to the network that are classified as an 'emerging technology' will not have to comply with the requirements introduced as a result of the RfG.

This document specifies our decision on which generators are classified as an 'emerging technology' here in Great Britain (GB).

Context

The Requirement for Generators (RfG) network code is one of a suite of European network codes and guidelines¹ that have been developed following implementation of the Third Package.² These European network codes intend to deliver a harmonised set of rules for the operation of the gas and electricity sector in Europe. The network codes aim to help ensure security of supply, facilitate the decarbonisation of the energy sector and create a competitive, pan-European market which benefits customers.

The RfG code is one of three connections codes that specify the requirements for customers wanting to connect to the electricity network (at transmission or distribution level). The RfG sets out the technical requirements that all new electricity generators must adhere to. There are similar codes that apply to demand and high voltage direct current (HVDC) connections.

The requirements of the RfG code only apply to new generation connection customers; they do not apply to existing generation connection customers. If you are proposing to connect a new generator to the electricity network in GB³ from 2018 onwards - it is likely that you will be required to comply with the RfG code.⁴

The RfG allows manufacturers to apply for their generator technology to be classified as an 'emerging technology'. Generators that are classified as an 'emerging technology' will not have to comply with the new requirements introduced as a result of the RfG. The intent of the 'emerging technology' provisions is to provide manufacturers of generator technologies that were being developed during the drafting of the RfG, additional time to adapt their Power Generating Module (PGM) technology to meet the requirements of the RfG.

This document specifies our decision on which generator technologies are classified as an 'emerging technology' in GB.

Associated documents

The Requirement for Generators network code:

<http://eur-lex.europa.eu/eli/reg/2016/631/oj>

Requirement for Generators – 'emerging technology' application guidance:

https://www.ofgem.gov.uk/system/files/docs/2016/08/RfGs_emerging_technologies_guidance.pdf

¹ Referred henceforth in this document as 'network codes or 'codes'.

² More information on the Third Package can be found on our website:

<https://www.ofgem.gov.uk/gas/wholesale-market/european-market/eu-legislation>

³ Classification, under the RfG is per synchronous area. Great Britain is, for this purpose, a 'synchronous area' and 'GB' in this document should be read accordingly.

⁴ National Grid have published further information on the applicability of the RfG - <http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=44989>

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Executive Summary

The RfG 'emerging technology' requirements

The RfG network code sets out the technical requirements that all future new PGMs⁵ must adhere to. The RfG specifies that some PGM manufacturers may apply for 'emerging technology' status to be exempt from complying with the requirements of the RfG. The exemption is viewed as transitional and therefore is only a temporary exemption which is removed when sales of the 'emerging technology reach a specified threshold.

Applications we have received

On the 16 August 2016, we published [guidance](#) on how interested parties could apply for 'emerging technology' status.

We received four applications from manufacturers of micro-Combined Heat and Power (CHP) boilers, one of which has now withdrawn their application:

- Baxi Heating Ltd (Baxi),
- SenerTec GmbH (SenerTec),
- OkoFEN Forschungs- und EntwicklungsgesmbH (OkofEN) and
- KD Navien Co., Ltd (KD Navien).

Microgen Engine Corporation (MEC) also initially submitted an application for its micro-CHP boilers. MEC withdrew their application before we made a decision.

All the applicants use the MEC linear free piston sterling engine; the engine is capable of generating electricity when exposed to a suitable heat source.

Decision we have made

Our decision is to grant 'emerging technology' status to all the applicants as the applications presented suitable evidence and complied with the criteria to be a 'Type A' PGM.

⁵ A 'Power-generating module' is defined in the RfG as either a 'synchronous power-generating module' or a 'power park module'. A 'synchronous power generating module' means an indivisible set of installations which can generate electrical energy such that the frequency of the generated voltage, the generator speed and the frequency of network voltage are in constant ratio and thus in synchronism. A 'power park module' means a unit or ensemble of units generating electricity which is either non-synchronously connected to the network or connected through power electronics, and that also has a single connection point to the transmission system, distribution system including closed distribution system or HVDC system.

Reporting and withdrawal of classification

The manufacturers of 'emerging technologies' are required to submit a bi-monthly report of the number of 'emerging technology' sales. This cumulative capacity will be publically available.

In the event that the cumulative capacity of all 'emerging technology' PGMs exceeds the maximum threshold, the 'emerging technology' status will be withdrawn.

1. Introduction

Requirement for Generators

1.1. The RfG network code is one of a suite of European network codes that have been developed under the Third Package. The RfG outlines the requirements that apply to PGMs wanting to connect to the electricity network (at transmission or distribution level). The PGMs are divided into four types (A-D) and the requirements that they must meet are determined by the band they are classified under.

1.2. Under the provisions of Articles 66-70 manufacturers of PGMs are able to apply for a limited MW volume of PGMs to be classified as an 'emerging technology'. PGMs classified as an 'emerging technology' will not have to comply with the new requirements introduced as a result of the RfG. The criteria to be eligible to be exempt are listed below:

- a) The generator technology must be 'Type A' in GB;
- b) The generator technology must be commercially available in GB; and
- c) The accumulated sales of the generator technology, at the time of application, within GB, must not exceed 25 per cent of the maximum level of cumulative capacity of 58.023 MW (ie 14.50MW).

'Emerging technology' applications

1.3. We published guidance on the 16 August 2016 for manufacturers seeking to apply for their technology to be classified as an 'emerging technology' here in GB.⁶ This document outlined how we would assess the applications received. The deadline for submitting applications to us for 'emerging technology' status was 17 November 2016. In total, we received four applications from manufacturers and this excludes MEC's application as this was withdrawn during the review process. All of the manufacturers that applied used MEC's linear free piston stirling engine technology as a component of their PGM.

1.4. We assessed the applications using the criteria outlined in our guidance document. We assessed the applications on a case-by-case basis using the evidence submitted as part of their application, as well as additional evidence submitted in response to our supplementary questions. We adopted a standard assessment process to ensure all the applications were treated consistently and fairly. This document explains our assessment of each application.

⁶https://www.ofgem.gov.uk/system/files/docs/2016/08/RfGs_emerging_technologies_guidance.pdf

2. Assessment of the applications

Description of PGM technologies

2.1. We received applications from the following PGM manufacturers:

Manufacturer	PGM
Baxi	Baxi Ecogen generators (the specific products are the Baxi Ecogen 24/1.0, Baxi Ecogen 24/1.0 LPG and Baxi Ecogen System).
KD Navien	KD Navien stirling engine m-CHP (Hybrigen SE) (the specific products that use this PGM are the 'NCM-1130HH – 1 kWel' and the 'NCM-2030HH – 2 kWel').
OkofEN	Pellematic Smart_e device
SenerTec	Dachs Stirling SE Erdgas and Dachs Stirling SE Flussiggas (will be referred to as Dachs Stirling SE

2.2. MEC also initially submitted an application for its micro-CHP boiler. MEC withdrew their application before we made a decision, we therefore do not address it further in this decision document.

2.3. All of the applications are for micro-CHP generators that use a linear free piston stirling engine that was built by MEC.

Reason for application

2.4. Article 13 of the RfG identifies the 'General requirements for 'Type A' power-generating modules'. Paragraph 1(a)(i) of Article 13 states that a 'Type A' PGM must be capable of remaining connected to the network, and operating within, the frequency ranges specified in Table 2 of the RfG. The table states that, in the GB synchronous area, a 'Type A' PGM must be capable of operating if the frequency decreases to 47 Hz or increases to 52 Hz, for the time periods identified.

2.5. As identified above, all of the applicants use MEC's linear free piston stirling engine. The linear free piston stirling Engine has a restricted frequency range of between 49.5 Hz and 50.5 Hz and therefore is not capable of operating within the full range required in paragraph 1(a)(i) of Article 13 of the RfG (ie it is unable to operate if the frequency is between 47 to 49.5 Hz or between 50.5 to 52 Hz).

2.6. All of the applicants state that they have applied for 'emerging technology' status to avoid the additional costs that would arise from trying to making their technology compliant with the requirements of the RfG. All of the applicants have estimated that making their PGM compliant with the RfG would increase production costs by 10-20 per cent. The manufacturers have also estimated that it would take considerable time (approximately six years).

Assessment against 'emerging technology' criteria outlined in Articles 66-68 of the RfG

2.7. Articles 66 to 68 of the RfG set out the criteria for a PGM technology to be classified as an emerging technology. These are listed below

- The generator technology must be 'Type A' in GB;
- The generator technology must be commercially available in GB; and
- The accumulated sales of the generator technology, at the time of application, within GB, must not exceed 25 per cent of the maximum level of cumulative capacity of 58.023 MW (ie 14.50MW).

2.8. Our assessment of whether each of the applications meets the 'emerging technology' eligibility criteria is outlined below:

Manufacturer:	Baxi	
PGM:	'Baxi Ecogen' generators (the specific products are the Baxi Ecogen 24/1.0, Baxi Ecogen 24/1.0 LPG and Baxi Ecogen System).	
Criteria	Assessment	Reason
The PGM must be 'Type A' in GB	✓	The Baxi Ecogen has a maximum capacity of 2kW. The Baxi Ecogen is therefore a 'Type' A generator.
The PGM technology must be commercially available in GB	✓	<p>To demonstrate that it is commercially available, Baxi has provided a product guide and two EC Type Examination Certificates and a Microgeneration Certification Scheme (MCS) certificate.</p> <ul style="list-style-type: none"> • The two EC Type Examination Certificates were issued in accordance with Directive 2009/142/EC. This relates to appliances burning gas fuels. The directive states that all appliances must comply with Annex I, and requires that all appliances are designed and built to operate safely and to present no danger. • An EC Type Examination is a part of the procedure to check compliance and this involves a notified body undertaking checks and issuing a certificate. <p>The MCS certification provided by Baxi Heating Ltd is to certify approval of complying with the MCS which is a nationally recognised quality assurance scheme.</p>

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The accumulated sales in GB must not exceed 14.50MW	✓	Baxi has confirmed that the total accumulated sales (in MW) of its Baxi Ecogen in GB is 0.50MW.
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Manufacturer:	KD Navien	
PGM:	KD Navien stirling engine m-CHP (Hybrigen SE) (the specific products that use this PGM are the 'NCM-1130HH - 1 kWel' and the 'NCM-2030HH - 2 kWel').	
Criteria	Assessment	Reason
The PGM must be 'Type A' in GB	✓	The Navien stirling engine m-CHP (Hybrigen SE) has a maximum capacity of 2kW. The Baxi Ecogen is therefore a 'Type A' generator.
The PGM technology must be commercially available in GB	✓	To demonstrate that the Navien stirling engine m-CHP (Hybrigen SE) is commercially available, KD Navien have provided an installation instruction guide for registered installers and an EC Type Examination Certificates issued in accordance with Directive 2009/142/EC and 92/42/EEC.
The accumulated sales in GB must not exceed 14.50MW	✓	KD Navien has confirmed that the total accumulated sales (in MW) of its Navien stirling engine m-CHP (Hybrigen SE) in GB is 0.1 MW.

Manufacturer:	OkoFEN	
PGM:	Pellematic Smart_e device	
Criteria	Assessment	Reason
The PGM must be 'Type A' in GB	✓	The Pellematic Smart_e has a maximum capacity of 2Kw.
The PGM technology must be commercially available in GB	✓	The Pellematic Smart_e is commercially available in GB. OkoFEN has provided an installation guide which includes details of their EU Declaration of Conformity CE mark.
The accumulated sales in GB must not exceed 14.50MW	✓	OkoFEN has confirmed that the total accumulated sales is 1 Kw in GB through the installation of the PGM as a field test.

Manufacturer:	SenerTec	
PGM:	Dachs Stirling SE	
Criteria	Assessment	Reason
The PGM must be 'Type A' in GB	✓	The Dachs Stirling SE has a maximum capacity of 2kW.

The PGM technology must be commercially available in GB	✓	SenerTec has provided a certificate that states the Dachs Sterling SE is the same as Baxi's Ecogen. We therefore consider that could be capable of being installed in GB. SenerTec also submitted a Dach Sterling SE product catalogue and price list to demonstrate that the product is commercially available.
The accumulated sales in GB must not exceed 14.50MW	✓	SenerTec has confirmed that the total accumulated sales of the Dachs Stirling SE in GB is 0kw.

Assessment of wider considerations

2.9. All of the applicants considered that classifying their PGM as an emerging technology will have no significant impact on security of supply because the quantity of the PGMs connected to the network is currently very low and these PGMs are evenly spread across the country. All of the applicants also suggested that classifying their appliances as an 'emerging technology' may actually be beneficial to system security because it will increase the diversity of generators connected to the network (eg micro-CHPs can operate at times when other renewables cannot (ie times with no wind or no sun)). The applicants also consider that classifying their PGMs as an 'emerging technology' may also have environmental benefits because micro-CHPs contribute to reductions in Green House Gas emissions and energy efficiency improvements in the built environment.

Decision

2.10. We have reviewed the information provided by the applicants.

2.11. Based on the information provided, we consider that all the applicants meet the criteria required to be eligible to be classified as an 'emerging technology', as outlined in paragraph 2 of the Article 66 of the RfG. Based on the information provided, we consider that classifying these PGMs as 'emerging technologies' will have no negative impact on the interests of existing and future consumers.

2.12. Accordingly, we have therefore decided to classify the following PGMs as an 'emerging technology':

Manufacturer	PGM
Baxi	'Baxi Ecogen' generators (the specific products are the Baxi Ecogen 24/1.0, Baxi Ecogen 24/1.0 LPG and Baxi Ecogen System).
KD Navien	KD Navien stirling engine m-CHP (Hybrigen SE) (the specific products that use this PGM are the 'NCM-1130HH - 1 kWel' and the 'NCM-2030HH - 2 kWel').
OkofEN	Pellematic Smart_e
SenerTec	Dachs Stirling SE Erdgas and Dachs Stirling SE Flussiggas

3. Reporting requirements

Reporting requirements

3.1. All manufacturers of PGMs classified as an 'emerging technology' are required to submit an update to us every two months on the total sales of the PGM in GB for the preceding two months.

3.2. Manufacturers should submit the update to connections@ofgem.gov.uk using the template outlined in Appendix 1.

3.3. The first update should be sent on 17 July 2017. The subsequent updates are due to be submitted to us on the following dates every year:

Submission number	Submission date	Reporting period
1	17 July each year	17 May – 16 July
2	17 September each year	17 July – 16 September
3	17 November each year	17 September – 16 November
4	17 January each year	17 November – 16 January
5	17 March each year	17 January – 16 March
6	17 May each year	17 March – 16 May

3.4. Manufacturers are required to continue to update us on the total sales of PGMs classified as 'emerging technology' in GB until the status has been withdrawn (as described below).

Publish list of 'emerging technology' and maximum cumulative capacity

3.5. We are required to monitor the sales of the 'emerging technologies' in GB and publish data on the cumulative maximum capacity of PGMs classified as emerging technologies.

3.6. We will publish a list of power-generating modules approved as emerging technologies and data on the cumulative maximum capacity of PGMs classified as 'emerging technologies' in GB. Data on the cumulative maximum capacity of PGMs classified as emerging technology will be updated every two months, once we have received the updated information from the manufacturers. We will publish this information on the following page of our website: [Distributed Generation](#).

Process for withdrawing 'emerging technology' status

3.7. In the event that the cumulative maximum capacity of all PGMs classified as 'emerging technologies' connected to the network exceeds 58.023MW⁷, the 'emerging technology' classification will be withdrawn.

3.8. If this occurs, we will inform all manufacturers of any 'emerging technologies' of this and a withdrawal decision will be published on our website. From that time onwards, all new PGMs connecting to the GB electricity network will have to conform to the 'Type A' requirements of the RfG.

3.9. If a manufacturer fails to comply with the reporting requirements outlined above, we will withdraw the 'emerging technology' classification for that specific PGM technology.

3.10. If we become aware of any evidence that is incorrect or if new evidence comes to light that indicates that the applicant is not commercially available, the emerging technology status will be revoked and it will no longer apply to them.

⁷ Established in accordance with paragraph 1 of Article 67

Appendix 1 – Update on 'emerging technology' from manufacturers template

Manufacturer:	
emerging technology:	
Submission date:	
Reporting period:	
Cumulative capacity of sales of 'emerging technology' in GB (in MW) during reporting period:	
Cumulative total capacity of sales of 'emerging technology' in GB of emerging technology in GB (in MW):	