

# Requirement for Generators – ‘Emerging Technology’ application guidance

## Guidance Document

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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 provides guidance for manufacturers that intend to apply for their technology to be classified as an ‘emerging technology’ here in Great Britain<sup>1</sup> (GB).

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<sup>1</sup> 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.

## Context

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The Requirement for Generators (RfG) network code is one of a suite of European network codes and guidelines<sup>2</sup> that have been developed following implementation of the Third Package.<sup>3</sup> 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 Grid Connection 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 GB from 2018 onwards - it is likely that you will be required to comply with the requirements of the RfG.<sup>4</sup>

The RfG allows manufacturers to submit a request 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.

In order to make the ‘emerging technology’ application process as simple as possible, we have published this short guidance document for potential applicants, as well as a template for applicants to use.

## Associated documents

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The Requirement for Generators network code:  
<http://eur-lex.europa.eu/eli/reg/2016/631/oj>

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<sup>2</sup> Referred henceforth in this document as ‘network codes or ‘codes’.

<sup>3</sup> More information on the Third Package can be found on our website:  
<https://www.ofgem.gov.uk/gas/wholesale-market/european-market/eu-legislation>

<sup>4</sup> 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

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The Requirement for Generators (RfG) network code outlines the requirements that apply to future generators wanting to connect to the electricity network (at transmission or distribution level). The RfG allows manufacturers to submit a request for their generation 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.

A generator must meet three criteria to be eligible to be classified as an ‘emerging technology’:

- a. The generator technology must be “Type A” in GB;<sup>5</sup>
- 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).

Each application must contain the manufacturer’s name, address and contact information, a description of the generation technology, as well as evidence that the generation technology complies with all three of the eligibility criteria above. The application must also provide a detailed explanation to justify why the generation technology should be classified as an ‘emerging technology’, as well as consideration of the wider impacts of classifying them as an ‘emerging technology’. Manufacturers wishing to apply must submit their application to us by 17 November 2016. All applications should be sent to [connections@ofgem.gov.uk](mailto:connections@ofgem.gov.uk) and should clearly identify any information that you consider to be confidential.

By 17 May 2017, we will decide which generators’ technologies, if any, are classified as an ‘emerging technology’, for the purposes of the GB synchronous area. Alongside our decision, we will publish a list of ‘emerging technologies’ and the cumulative maximum capacity of generators classified as ‘emerging technologies’. In our decision, we will also provide additional information on the ongoing reporting requirements for manufacturers of these generators.

In the event that the cumulative maximum capacity of all generators classified as ‘emerging technologies’ connected to the network exceeds 58.023 MW, the ‘emerging technology’ classification will be withdrawn for all new generators seeking a connection after the threshold has been reached.

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<sup>5</sup> The RfG identifies four types of generators. Type ‘A’ generators are the smallest generators identified in the code and have the most basic technical requirements.

# 1. Background

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## Chapter Summary

This chapter provides background information on the Requirement for Generators code and the ‘emerging technology’ classification.

## The Requirement for Generators (RfG)

1.1. The RfG network code is one of a suite of European network codes that have been developed following implementation of the Third Package. The RfG outlines the requirements that apply to power-generating modules (PGMs)<sup>6</sup> wanting to connect to the electricity network (at transmission or distribution level). The requirements depend on the size of the PGM – the smallest PGMs (Type A) incur the minimum set of requirements and the requirements gradually build up as PGM size increases. The code outlines tasks and responsibilities for generation owners, network operators and system operators.

1.2. The RfG should help make it easier and more efficient to operate the electricity system, by introducing a common, clear set of requirements which every new generator connecting to the electricity network across Europe will need to meet. The RfG should also assist the creation of a pan-European market for PGM technology, by increasing the commonality of PGM requirements. This should help improve competition between manufacturers and make it cheaper to build PGM technology, thus reducing costs for consumers.

1.3. There are similar connection codes that will apply for both demand and High Voltage Direct Current (HVDC) connection customers. The Demand Connection Code (DCC) will apply to new distribution networks connecting to the transmission system, new demand users wanting to connect to the electricity system and new customers wanting to provide demand side response services. The HVDC Code will apply requirements for new long distance DC connections, new links between different synchronous areas (eg interconnectors) and new DC-connected generation (eg offshore wind farms).

1.4. The RfG will apply to the majority of new generation connections that are made from 2018 onwards. The RfG does not apply to ‘existing’ generators.<sup>7</sup>

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<sup>6</sup> 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.

<sup>7</sup> Article 4 of the RfG states when the code will apply to existing PGMs (eg if a PGM is modified

## ‘Emerging technology’ classification

1.5. Articles 66-70 of the RfG allow manufacturers of PGMs 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.

1.6. During the development of the RfG, there was uncertainty about what the future requirements for new PGMs would be. To ensure that this uncertainty did not stop new generator technologies being developed, the RfG included transitional arrangements for ‘emerging technologies’. 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 PGM technology to meet the requirements of the RfG.

1.7. The ‘emerging technology’ articles only provides for a limited application window. Applications from manufacturers may only be submitted within six months of RfG’s entry into force. Going forward we would expect electricity generator manufacturers to develop technology that is consistent with the RfG now that these have been finalised and are readily available for manufacturers to take into consideration during the development of new technology. We have 12 months from the date of entry into force to decide which applications, if any, should receive an ‘emerging technology’ classification.

1.8. From the date of our decision, the manufacturer of any PGM classified as an ‘emerging technology’ is required to submit sales data to us every two months. If the cumulative maximum capacity of all PGMs classified as ‘emerging technologies’ connected to the network exceeds 58.023MW, the ‘emerging technology’ classification will be withdrawn. From that time onwards, all new PGMs of that generator technology will have to conform to the RfG Type A requirements.

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to the extent that the connection agreement must be substantially revised). National Grid have published an open letter on the applicability of the European Network Codes in GB; <http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=44989>

## 2. Who is eligible to apply and what are the eligibility criteria?

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### Chapter Summary

This chapter provides information on who can apply for GB ‘emerging technology’ status and the eligibility criteria that need to be met.

### Who can apply?

2.1. Only manufacturers of Type A PGMs may apply to have their generator technology classified as an ‘emerging technology’.

2.2. We require separate applications for each PGM technology. We require separate applications from each manufacturer of a PGM technology. We do not require separate applications for each product that uses exactly the same PGM technology.

### What are the criteria?

2.3. To be eligible to apply to be classified as an ‘emerging technology’, the PGM must meet all three of following criteria. The criteria are;<sup>8</sup>

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

2.4. More information on the criteria is outlined below.

### The PGM must be Type A in GB

2.5. The RfG identifies four types of PGMs – Type ‘A’, ‘B’, ‘C’ and ‘D’. PGMs are classified by Type based on their connection voltage and installed unit capacity range

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<sup>8</sup> Articles 66 to 68 of the RfG set out the criteria for a PGM technology to be classified as an emerging technology.

(MW). Type ‘A’ PGMs are the smallest PGMs identified in the RfG and have the most basic technical requirements.<sup>9</sup>

2.6. The RfG outlines the maximum possible capacity threshold of each generator unit between a Type A and Type B generator in GB - this is 1MW. Individual Member States can lower the Type A to B capacity threshold value below 1MW (up to a maximum of 0.8kW), but they cannot increase the capacity threshold value above 1MW. The GB industry is currently developing a joint Grid Code/Distribution Code modification to confirm the Type A-D thresholds in GB. This joint Grid Code/Distribution Code modification is likely to come to us for decision in early autumn 2016.<sup>10</sup> More information on this modification can be found on National Grid’s website.<sup>11</sup>

**Table 1: The maximum PGM thresholds for GB, as outlined in the RfG**

	Type A	Type B	Type C	Type D
Connection point	≤ 110 kV	≤ 110 kV	≤ 110 kV	>110 kV
Unit Capacity	0.8kW – 1 MW	1 MW – 50 MW	50 MW – 75 MW	75 MW +

2.7. None of the options that the modification working group is currently considering would reduce the GB capacity threshold between Type A and B PGMs. On this basis, generator manufacturers applying for ‘emerging technology’ classification in GB should therefore assume minimum capacity is 800W and that the maximum capacity will be 1MW for a Type A PGM in GB. Therefore, we require generator manufacturers to provide evidence to us, in their application to demonstrate that their PGM technology unit size is between 800W and 1MW.

2.8. If we ultimately decide that the capacity threshold between Type A and B PGMs should be lower than 1MW, we will contact all applicants and ask them to provide any additional information required.

**The PGM technology must be commercially available in GB**

2.9. We require generator manufacturers to provide evidence to us, in their application, to demonstrate that the PGM technology:

- has the necessary safety, health, environmental and technical certifications and accreditations required to be bought, leased or licensed in GB (eg an EU Declaration of Conformity); and,

<sup>9</sup> Article 13 of the RfG outlines the technical requirements of Type A generators.

<sup>10</sup> Based on working group’s current timetable.

<sup>11</sup> This modification is being developed as part of the GC0048 working group ; <http://www2.nationalgrid.com/UK/Industry-information/Electricity-codes/Grid-code/Modifications/GC0048/>





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- is commercially available for customers to buy, lease, or license in GB (eg evidence of sales, product listings or a product guide). Manufacturers have discretion about the type of evidence that they use to prove that a PGM is commercially available.

2.10. We consider that our interpretation of “commercially available” is consistent with a minimum Technology Readiness Level<sup>12</sup> of approximately 8.<sup>13</sup>

### **The accumulated sales of the PGM technology within GB at the time of application must not exceed 25 per cent of the maximum level of cumulative maximum capacity**

2.11. Any application we receive from a generator manufacturer seeking GB ‘emerging technology’ classification must contain evidence of the total number of sales of the PGM technology in GB at the time of application (in MW).

2.12. The accumulated sales of each PGM technology in GB must not exceed 14.50MW.<sup>14</sup>

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<sup>12</sup> The Technology Readiness Level (TRL) is a system that assesses the level of maturity of a technology (material, components, peripheral devices, etc.), particularly with a view to funding its research and development, or to build this technology into an operational system or sub-system.

<sup>13</sup> Technology Readiness Level 8 means that the technology has been proven to work in its final form under the expected conditions. In most cases, this level represents the end of true system development.

<sup>14</sup> 25 per cent share of the maximum level of cumulative maximum capacity. The maximum level of cumulative maximum capacity is 58.023MW. Article 67 of the Code states how this maximum level must be established.

## 3. Your ‘emerging technology’ application

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### Chapter Summary

This chapter provides guidance on what we expect to see in an application for a generator technology to be classified as an ‘emerging technology’ in GB. It also states the closing date for applications and provides information on how to submit applications.

### Contents of an application

3.1. Each application must contain:

- a. The generator manufacturer’s name, address and contact information.
- b. A description of the PGM technology.
- c. Evidence that the PGM technology complies with all three of the eligibility criteria (see Chapter 2 for more information).
- d. A detailed explanation to justify why the manufacturer is applying for their PGM technology to be classified as an ‘emerging technology’ in GB.
- e. Consideration of the wider impacts of classifying their PGM technology as an ‘emerging technology’.

3.2. Failure to provide any of this information may result in us rejecting the application. When making an application, we advise using the attached application template to ensure all the relevant information is supplied.

3.3. More information on what we require from each section of your application can be found below.

#### **The generator manufacturer’s name, address and contact information**

3.4. The generator manufacturer’s name, address and contact information (ie telephone number and email address).

#### **A description of the PGM technology**

3.5. A description of the PGM technology and the name of the current products that use this PGM technology.

### **Evidence that the PGM technology complies with the eligibility criteria**

3.6. The manufacturer needs to provide evidence that the PGM technology complies with all three of the eligibility criteria outlined in paragraph 2.3 of this document. Chapter 2 of this document provides further information on the type of evidence that the applicants will need to provide to us.

### **A detailed explanation to justify why the manufacturer is applying for their PGM technology to be classified as an ‘emerging technology’**

3.7. As part of this, the applicant should identify the specific requirements in the RfG that the PGM technology is unable to comply with. The manufacturer should identify the alternative options to applying for ‘emerging technology’ status that have been considered and explain why applying to be an ‘emerging technology’ is the best solution.

3.8. Those manufacturers that cite the cost of complying with the RfG as one of the reasons why they are applying for their PGM technology to be classed as an ‘emerging technology’ should include evidence in their application to demonstrate this. This evidence should include information on the cost of adapting the PGM technology to make it compliant with the requirements of the RfG and the amount of money invested in the PGM technology to date, compared with the amount of revenue and profit generated from sales of the PGM technology to date.

### **Consideration of the wider impacts of classifying their PGM technology as an ‘emerging technology’**

3.9. When making a decision to classify a technology as an ‘emerging technology’, we will need to give consideration to protect the interests of existing and future consumers.

3.10. To help us make a decision, we require applicants to provide a comprehensive, and where possible, quantitative assessment<sup>15</sup> of the impact of classifying their PGM technology as an ‘emerging technology’ on;

- Consumers: we will consider the extent to which classifying a PGM technology as an ‘emerging technology’ impacts on consumers, for example through reduced costs.
- Competition: for example, any competitive advantage that may arise from classifying the PGM technology as an ‘emerging technology’.
- Sustainable development: Where relevant and possible, we would expect the manufacturer to identify the potential environmental costs or

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<sup>15</sup> Please also include the methodology used to calculate these values.



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benefits of classifying the PGM technology, as an ‘emerging technology’ (eg the impact on carbon emissions).

- Health and safety: If health and safety implications have been identified by the applicant, we may seek expert advice from the relevant government bodies and other organisations, for example, the Health & Safety Executive (HSE).
- Other parties affected by the non-compliance, including the ability of the system operator to operate its system.

### Closing date for applications

3.11. Manufacturers of a PGM technology wishing to apply to be classified as an ‘emerging technology’ in GB must submit their application to us by 17 November 2016.<sup>16</sup>

### Submitting an application

3.12. All applications should be sent to [connections@ofgem.gov.uk](mailto:connections@ofgem.gov.uk). As part of your application, please mark any information that you consider to be confidential.

### When will we make a decision on ‘emerging technology’ applications?

3.13. We will decide by 17 May 2017<sup>17</sup> which generator technologies, if any, are classified as an ‘emerging technology’ in GB.

3.14. Alongside our decision, we will publish on our website a list of GB ‘emerging technologies’. We will also publish at the time of our decision, and thereafter at least once every two months after our decision, the cumulative maximum capacity of all PGMs classified as ‘emerging technologies’.

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<sup>16</sup> This is within 6 months of entry into force of the Code.

<sup>17</sup> This is within 12 months of entry into force of the Code.

## 4. Additional questions

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### Chapter Summary

This chapter provides guidance on the ongoing requirements for manufacturers of those PGMs classified as an ‘emerging technology’ in GB and the requirements that will be placed on generation customers connecting a PGM classified as an ‘emerging technology’ in GB. This chapter also provides information on when the ‘emerging technology’ status will be withdrawn.

### What are the ongoing reporting requirements for manufacturers of PGMs classified as ‘emerging technologies’?


- 4.1. From the date of our decision, the manufacturer of any PGM classified as an ‘emerging technology’ is required to submit an update to us every two months on the total sales of the PGM in GB for the preceding two months. This will allow us to monitor the sales of the ‘emerging technologies’ in GB and update the cumulative maximum capacity of PGM technologies classified as ‘emerging technologies’.
- 4.2. Further information on this process (eg where manufacturers should send updated sales information) will be outlined in our decision document.

### How will the ‘emerging technology’ classification be implemented in the GB codes?

- 4.3. The GB industry intends to implement the requirements of the RfG (and the other Grid Connection Codes) through modification to the existing domestic connection codes (ie the Grid Code, the Distribution Code and associated Engineering Recommendations G83 and G59).
- 4.4. These modifications will ensure that PGMs classified as an ‘emerging technology’ in GB and connected to the electricity network prior to the date of withdrawal of the emerging technology classification shall be considered an existing PGM, for the purposes of the Distribution Code. This is enabled within the revised Engineering Recommendations.
- 4.5. In the future, if a customer connects a PGM to the GB electricity network that is non-compliant with the RfG and has not been classified as an ‘emerging technology’, the connecting customer will be in breach of European law, their connection agreement and the Distribution Code.

### Can the ‘emerging technology’ classification be withdrawn?

- 4.6. In the event that the cumulative maximum capacity of all PGMs classified as ‘emerging technologies’ connected to the network exceeds 58.023MW (0.1 per cent



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of the annual maximum in 2014 in GB), the ‘emerging technology’ classification will be withdrawn.

4.7. 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 of that generator technology connecting to the GB electricity network will have to conform to the Type A requirements of the RfG.

4.8. If a manufacturer fails to comply with the reporting requirements set out in Chapter 4 (ie submitting an update of sales of their modules in GB every two months) we will withdraw the ‘emerging technology’ classification for that specific PGM technology.

# Appendices

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# Appendix 1 – ‘Emerging technology’ application template

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<b>Part A – Contact details</b>		
<i>Manufacturer name:</i>		<i>Date of application (dd/mm/yyyy):</i>
<i>Manufacturer address:</i>		
<i>Primary contact number:</i>	<i>Secondary contact number:</i>	<i>Email address:</i>
<b>Part B – Description of PGM technology</b>		
<i>Power generating module (PGM) technology name:</i>		
<i>Description of PGM technology:</i>		
<i>Current products that use the PGM technology:</i>		
<b>Part C – Evidence that PGM technology meets criteria</b>		
<i>Is the PGM of Type A in size (800W to 1MW)? Please provide detail (eg maximum capacity):</i>		



*Is the PGM technology commercially available? Please provide evidence to support this:*

*Please state the total accumulated sales (in MW value) of the PGM technology in GB (noting it must not exceed 14.50MW to be classified as an emerging technology):*

**Part D – Explanation of application**

*Please explain why you are applying for your PGM technology to be classified as an emerging technology:*

**Part E – Consideration of the wider impacts**

*Please provide information on the wider impacts of classifying your PGM technology as an emerging technology. For example, what is the impact on competition, security of supply and sustainable development?*

**Part F – Any additional information**

*Please provide any other information relevant to your application not included above:*

We reserve the right to seek further evidence from the applicant if, in our view, insufficient information is available to us to enable us to make a decision on the application.