

Distribution Code Consultation DCRP/20/06/PC

Storage Modification to G98 G99 and DCode(v45)

Removal of Exclusions to Storage from DCode Documentation

Target Audience:

The removal of the exclusions to Storage are intended for persons who:

- Manage the distribution network across the UK.
- Propose to commission Energy Storage devices on or after the proposed implementation date.
- Plan to use Energy storage devices as part of a wider program to deliver a carbon neutral energy network.
- Are involved with Electric Vehicles and the development of vehicle to grid charging systems.

Date Published: Friday 18th December 2020

Deadline for responses: 17:00 Friday 12th February 2021

Summary:

This Distribution Code public consultation is seeking the views from stakeholders on proposed modifications to existing Distribution Code documents to remove the current exclusion of storage and prepare for the requirements of export and vehicle to grid connections and the effects on the distribution network

1. Introduction

Ofgem approved modifications to Grid Code relating to storage devices on the transmission network (GC0096 – Energy Storage) on 20 May 2020. As a result of this decision, storage has been removed from the list of exclusions in existing Grid Code documents. The Distribution Code Review Panel (DCRP) has agreed that the Distribution Code and its associated documents, ie ERECs G98 and G99 should now be amended in line with these changes. A DCRP working group has been convened to consider the changes.

The working group has met four times and has agreed revised drafts of EREC G98, EREC G99 and the Distribution Code to remove the exclusions on storage.

The opportunity has also been taken to formally include electric vehicles (EVs) when operating in vehicle to grid mode (V2G). Note that if an EV does not have V2G capability then the EV is not classed formally as Electricity Storage within the Distribution Code and G99. Modifications for V2G have not been included in G98 as it is not expected that any V2G technology will exist that has a Registered Capacity below 16A (although comments are welcome on this point).

Many of the existing requirements in G98 and G99 stem from the European Network Codes. The European Commission, and ACER¹ received a report from the European Stakeholder Committee's Expert Group formally given the task to review the exclusion of storage from the Network Codes. The Expert Group reported in the June 2020, recommending that storage should be fully included in the European Network Codes. The European Commission accepted the expert group's recommendations and will take them forward at the next legislative opportunity (which is likely to be in the next two or three years given the EU's legislative timetable). The recommendations for modifications to G98 and G99 line up with the expert group's recommendations.

The local Distribution Network Operator (DNO) needs to know when certain low carbon technology (LCT) devices (in this case, an EV charge point, but could also be a heat pump), are to be connected to the DNO's network in order for the DNO to assess its impact to and to plan for it (if necessary).

DNOs currently have a paper application form for customers, or their installer, to submit to the DNO when they wish to install an LCT device. The application forms for EV charge points and heat pumps used to be separate but, in Q2 of 2019, DNOs combined them into one form to streamline the LCT connections process.

The DNOs wish to further streamline this process by including V2G charge points within the form described above. Currently, applying to the DNO for a V2G connection is a separate process from applying for a non-V2G EV charge point. The suggestions for the streamlining of the LCT connections process and the joint application form are included here as appendices 2 and 3 respectively.

The ENA is in the process of digitalising the application form, the process and the associated EV charge point and HP databases in the form of a mobile app to further smooth the customer experience.

Included in this consultation document are the following appendices:

- Appendix 1 Schematic of V2G installations
- Appendix 2 Proposed flow chart for domestic customers connecting V2G (and EVs and heat pumps)
- Appendix 3 Proposed application form EVCP, Heat Pumps and domestic V2G
- Appendix 4 Proposed changes to G98
- Appendix 5 Proposed changes to G99

2. The Defect

The existing Distribution Code and ERECs G98 and G99 exclude Electricity Storage from those technical requirements that flow from the EU Network Code Requirements for all Generators and from the EU Network Code Demand Connexion Code. In accordance with the changes to the Grid Code, it is now considered appropriate to remove these exclusions so that all the technical requirements of ERECs G98 and G99 apply to Electricity Storage devices.

2.1 The proposed changes

2.1.1 Common to all documentation

It is proposed to require that Electricity Storage devices when operating in an import mode switch to an export mode of operation when the system frequency falls below a defined threshold.

Separately there is a DCRP working group [Data Exchange Working Group] reviewing all of the data exchange provisions under the auspices of the Distribution Code. The detailed specification of storage technology types etc falls within their remit. As such, this MP/20/06 working group will not make any specific amendments to the data requirements in G98 or the Distribution Code. G98 and the Distribution Code will be modified in due course as a consequential amendment by the Data Exchange Working Group. EREC G99 facilitates the provision of the data that is prescribed in the Distribution Data Registration Code in the Distribution Code.

2.1.2 Dcode v45

The Distribution Code currently has only one relevant reference to storage. It is proposed to remove the reference of the exclusion of storage in the definition of demand unit:

Demand Unit

An appliance or a device whose Active Power Demand or Reactive Power production or consumption is being actively controlled by the Customer in whose Demand Facility it is installed and which has been commissioned on or after 18 August 2019 in pursuance of a contract to this end with the DNO.

Such an appliance or device commissioned before this date, but which has been materially altered will also be included in this definition.

Where there is more than one Demand Unit in a Demand Facility, these Demand Units shall together be considered as one Demand Unit if they cannot be operated independently from each other.

Demand Units of Customers where the Customer has concluded a final and binding contract for the purchase of a Demand Unit before 07 September 2018 are not included the scope of DPC9. The Customer must have notified the DNO of the conclusion of this final and binding contract by 07 March 2019.

~~Any Demand Unit including storage, with the exception of a pumped storage Power Generating Module, as a component part is also excluded from the requirements of DPC9~~

Note that there is no need to modify the content of DCP9 as the technical requirements are only mandatory subject to an elective contract for services from the services provider, so are not therefore mandatory on all users.

2.2 G98 Modification

2.2.1 Implementation date

Manufacturers of electricity storage devices will need time to ensure their equipment meets the new requirements. It is therefore proposed to include an implementation date a little over 12 months in advance of the expected date of approval of the modification. A date of

01 September 2022 is therefore suggested. The exclusions of Appendix 1 of G98 relating to electricity storage devices would continue to apply up to this date.

2.2.2 Foreword and Scope

The foreword will be clarified to include storage. A new paragraph 2.2 will be added to the Scope to clarify that the document applies to storage following the implementation date, see section 2.3.1 of this document. Until that time the existing storage exclusions detailed in G98's Appendix 1 will still apply.

2.2.3 Regulatory status

The current footnote (1) on page 6 will be amended to remove the exclusion of storage. This will be achieved by re-wording the footnote in its entirety to provide clarity that the G98 electricity storage requirements do not originate in the European network codes. The current version reads:

"This document is a culmination of EREC G83 and the European Network Code Requirements for Generators. The Requirements for Generators Network Code has a number of exclusions, one of which is Electricity Storage. A number of requirements in this document, which originated from the Requirements for Generators Network Code, do not apply to Electricity Storage. Refer to Appendix 1 for full details. All other requirements in this document apply to Electricity Storage. "

The proposed amended footnote will read:

"Electricity Storage devices shall meet the requirements of EREC G98 but are not subject to the requirements of European Regulation (EU) 2016/631, European Regulation (EU) 2016/1388 and European Regulation EU 2016/1485. The requirements of EREC G98 shall therefore be complied with by Electricity Storage devices under EREC G98 (and not under any of the aforementioned European Regulations). Any derogation sought for an Electricity Storage device shall be deemed a derogation from EREC G98 only (and not from the aforementioned European Regulations).

2.2.4 Removal of Storage Exclusions

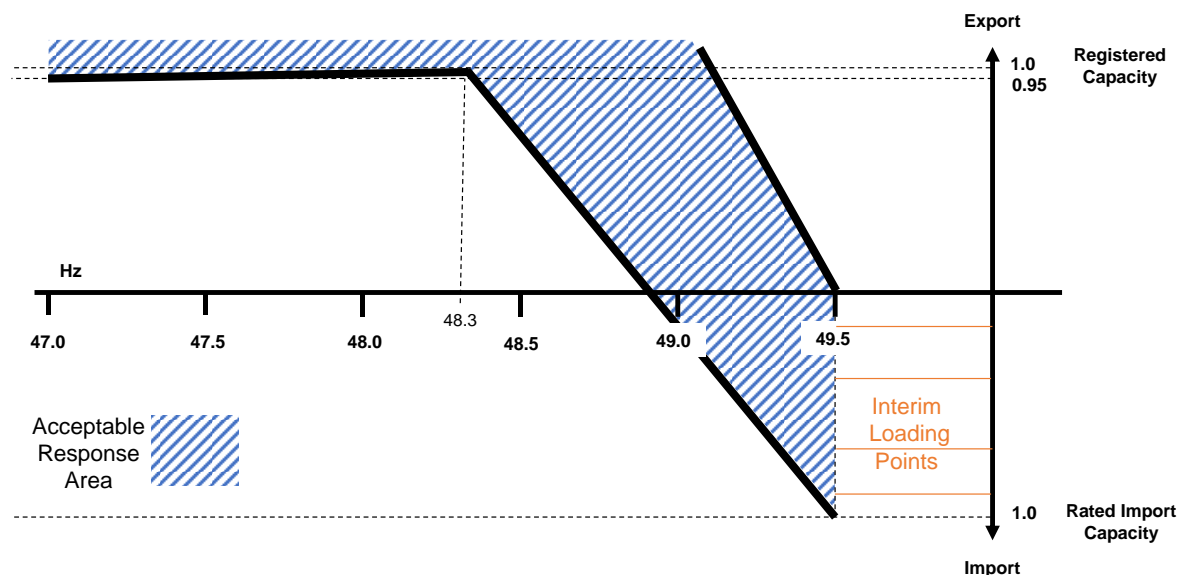
Paragraph 2.15 (now 2.16) will be modified to remove the storage exclusions. Appendix 1, Other Exceptions will be modified in respect of the implementation date for storage.

2.2.5 Changing to the production of active power import on falling frequency

Some stakeholders have expressed their wish that the frequency response of electricity storage devices is appropriately future proofed, and that an appropriate requirement is included. A suitable requirement is believed to exist in both a work group alternative that was developed for GC0096 but not taken forward in the final proposal, and a very similar proposal in the report of the European Stakeholder Committee Expert Group on Storage which reported in June 2020, and which is expected to be included in a revision of the RfG in the next couple of years.

The requirement will apply to any electricity storage device which is in a charging, ie import, mode when the frequency falls outside its normal managed range. Note also that the required response will be of short duration, measured in seconds, or at most a minute or two. Within this time the system frequency will recover by other actions and the storage device can resume its previous operation immediately. The proposal, based on

requirements articulated by National Grid Electricity System Operator, is that when the frequency has declined as far as 49.5Hz the storage device should switch to exporting, ie discharging. The storage device should have moved to maximum export by the time the frequency reaches 48.3Hz, if its fall has not been arrested before then. If the required output has not been achieved with 20s of the frequency falling to 49.2Hz, the import must be reduced to zero immediately. Similarly if the import has not ceased by 48.9Hz, it must also then cease immediately. The required performance is represented in the proposed text and the accompanying diagram:



Provision has therefore been made in the frequency response requirements of Section 9 and the associated testing record and Annexes.

2.3 G99 Modification

2.3.1 Implementation Date

Manufacturers of energy storage devices will need time to ensure their equipment meets the changed requirements. It is therefore proposed to include an implementation date a little over 12 months in advance of the expected date of approval of the modification. A date of 01 September 2022 is therefore suggested. The exclusions of Appendix A4 of G99 relating to storage would continue to apply up to this date.

2.3.2 Foreword

Clarity on Energy Storage device applicability and V2G export has been included, dependant on the date the device has been commissioned. A new paragraph outlining the proposed requirement for devices to switch from import to export in the event of falling frequency has been added.

2.3.3 As for G98 the foreword will be clarified to include storage. Active Power Frequency Response

Clarification will be made to paragraph 13.2.6.4(e) in respect of Type C and Type D devices to add general storage to the existing text in respect of pumped-storage devices disconnecting their demand during an underfrequency event.

2.3.4 Regulatory status

As for G98 the current footnote (1) on page 12 will be amended to remove the exclusion of storage. This will be achieved by re-wording the footnote in its entirety to provide clarity that the G99 storage related requirements do not originate in the European network codes.

2.3.5 Removal of storage exclusions

The exclusion of the storage technical requirements following the implementation date will be detailed in paragraph 1.2, paragraph 11.1.1, paragraph 12.1.1, paragraph 13.1.1 and Annex A.4.2 (Storage exclusions). The exclusion of the storage technical requirements will be removed from paragraph 5.19 and paragraph 6.2.2.4 (Integrated Micro Generation and Storage procedure).

2.3.6 Modification to definitions

The definition of Generating Unit will be revised to remove the reference to storage exclusions.

The definition of Synchronous Power Generating Module will be revised to specifically include Electricity Storage devices.

A new definition of Rated Import Capacity will be added to provide clarity on the active power requirements of storage that is initially importing during a downward frequency excursion (see 2.3.11 below).

2.3.7 Clarification in respect of non-controllable Storage technology

Paragraph 7.1.3 will be added to consider the applicability of G99 to non-controllable storage technology. This paragraph follows similar logic to that in the previous paragraph 7.1.2 which considered short term sources of energy such as regeneration and the ability of a device to support a power island for more than a few seconds.

2.3.8 Demonstration of compliance

A new paragraph 15.1.3 will be added to consider demonstration of compliance in respect of both the combined capability and individual capability (when the devices may operate independently) at a site with any combination of storage and / or non-storage Power Generating Units.

2.3.9 Illustrative examples of Power Generating Modules types and categorisation and examples of connection scenarios

The removal of the RfG exclusions means electricity storage devices will be part of the Type consideration following the storage implementation date and hence be considered as a Synchronous Power Generating Module or contribute to the make-up of a Power Park Module depending on the technology employed. Section 4.2 contains a number of illustrations of the make-up of a Power Generating Facility from Synchronous Power Generating Modules, Power Park Modules and Storage. Figure 4.6 has been updated to take the changes to Storage into account.

Table 6.1 contains some connection scenario examples, additional scenarios consider the connection of storage to an existing Power Park Modules, these will be updated as the storage now adds to the Power Park Modules' capacity.

There are five new connection scenarios considering:

- (1) additional electricity storage devices to a site with existing storage installed under EREC G83 or G59;

- (2) additional electricity storage devices to a site with existing electricity storage devices installed under EREC G98 or G99;
- (3) a V2G installation where the EV is connected at AC;
- (4) a V2G installation where the EV is connected via DC; and
- (5) a combined V2G and solar PV installation connected to a site with an existing electricity storage device

These will be added to Table 6.1 with associated illustrations.

2.3.10 Vehicle to Grid

Three typical examples of V2G installations will be added to section 6, and repeated for convenience in Appendix 1 to this consultation paper.

The text in section 6 explains that the vehicle charging equipment, whether accommodated in the vehicle or in a static post, is, legally in the UK, a power generating module and therefore (a) this equipment has to comply with G99 and (b) the owner of the installation formally becomes a generator and the generator and the generator's installation also have to fully comply with G99.

For V2G installations that will comprise or be part of a Type A Power Generating Module, power quality issues will still need to be addressed as part of the application for the installation of a V2G charger point(s).

EV Connection Process

Although it is not proposed to include this detail in G99 itself it is probably helpful to seek views on the broad connection process that DNOs have produced for owners of V2G EVs or V2G charge points, and which installers will need to follow. The DNOs have developed this connection process for EVs (whether V2G enabled or not) and Heat Pumps (HPs), for all domestic customers in the form of the flow chart in Appendix 2. This revised process, which we are consulting on here, includes the addition of V2G applications to the existing HP and EV application form, a proposed new draft of which is attached as Appendix 3. That means that this form can be used instead of Form A1 from G99 for V2G installations.

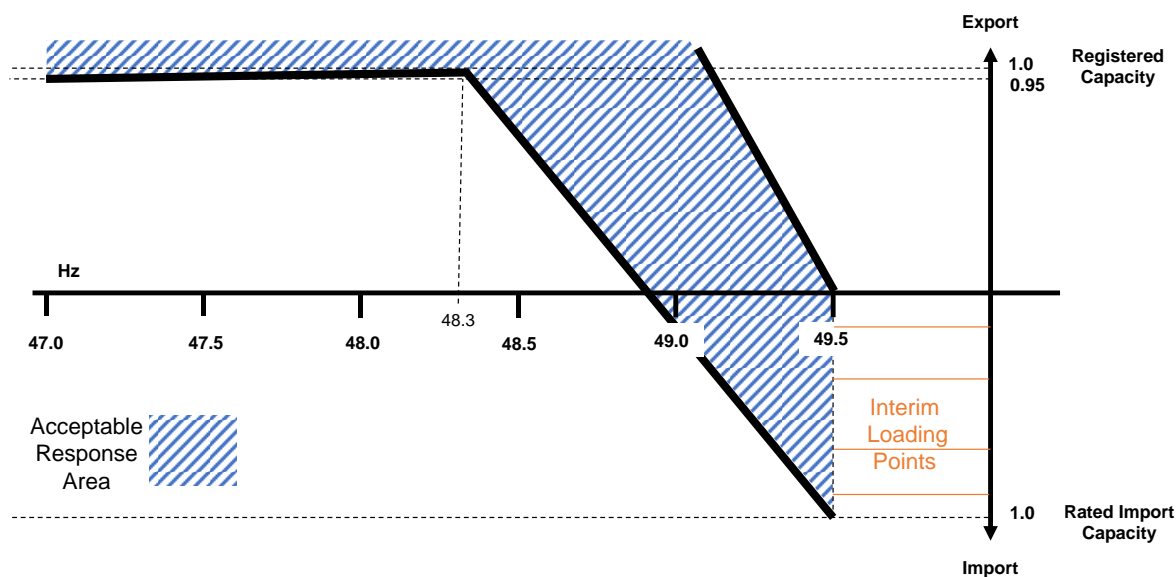
This consolidation means EV connections can now use the same flowchart and application form, reducing the amount of paperwork for installers. Once this consultation is complete, a subsequent approach will be produced for multiple installations, as Appendix 3 simply covers single installations.

2.3.11 Changing to the production of active power import on falling frequency

Some stakeholders have expressed their wish that the frequency response of storage devices is appropriately future proofed, and that an appropriate requirement is included. A suitable requirement is believed to exist in both a work group alternative that was developed for GC0096 but not taken forward in the final proposal, and a very similar proposal in the report of the European Stakeholder Committee Expert Group on Storage which reported in June 2020, and which is expected to be included in a revision of the RfG in the next couple of years.

The requirement will apply to any electricity storage device which is in a charging, ie import, mode when the frequency falls outside its normal managed range. Note also that the required response will be of short duration, measured in seconds, or at most a minute or two. Within this time the system frequency will recover by other actions and the storage

device can resume its previous operation immediately. The proposal, based on requirements articulated by National Grid Electricity System Operator, is that when the frequency has declined as far as 49.5Hz the storage device should switch to exporting, ie discharging. The storage device should have moved to maximum export by the time the frequency reaches 48.3Hz, if its fall has not been arrested before then. If the required output has not been achieved with 20s of the frequency falling to 49.2Hz, the import must be reduced to zero immediately. Similarly if the import has not ceased by 48.9Hz, it must also then cease immediately. The required performance is represented in the proposed text and the accompanying diagram:



This requirement has therefore been added in the frequency response requirements of Sections 11, 12 and 13 as well as the associated testing procedures in Annexes A.7.1.7, A.7.2.3.2, B.5.4, B.6.3, C.8.8 and C.9.6 and Forms A2-1, A2-2 and A2-3 and the PGMDs.

2.3.12 Application Forms

An application to connect generation greater than 50 kW must be made to the DNO using the DNO's Standard Application Form (SAF) which has already been updated to record the technology type as set out in the Grid Code. However, it is observed that the detailed list of technologies which the DNOs are required to compile was not included in Annex A.1, Forms A1-1 and A1-2 for < 50 kW Power Generating Modules, or for Integrated Microgeneration and Storage installations. The new detailed list will be included with these forms.

As discussed in 2.3.10 for V2G connected to domestic properties it is proposed to include the details in the revised HP and EV application form that has been updated and is being consulted on here. The proposed draft is attached as Appendix 3.

3. Applicable Distribution Code Objectives

The applicable Distribution Code Objectives are to:

- (a) permit the development, maintenance, and operation of an efficient, co-ordinated, and economical system for the distribution of electricity; and
- (b) facilitate competition in the generation and supply of electricity; and
- (c) 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; and

(d) promote efficiency in the implementation and administration of the Distribution Code

4. Consultation Questions

1. Do you agree with the general intent of the proposed modification? If not, please explain your views.
2. Do you agree that the proposed modifications satisfy the applicable Distribution Code objectives? If not, please explain your concerns.
3. Do you agree with the approach to a timed future implementation and do you agree with the suggested date?
4. Do you agree with the inclusion of mandatory cessation of active power import, and change to generating mode, on falling frequency and do you agree with the thresholds suggested? If you disagree, please explain why
5. Do you agree with the general approach taken to V2G requirements? If not, please state what you think is incorrect and inappropriate and please suggest any alternative approaches.
6. Do you foresee that V2G will be needed for EVs of under 3.6kW registered generating capacity? If so, this would require appropriate drafting to be included in G98.
7. Do you have any comments on the proposed EVCP, Heat Pumps, V2G application form (Appendix 3) or the proposed connection process flowchart (Appendix 2) for all domestic customers?
8. What do you think of the proposed digitalisation plan outlined in the introduction and do you have any feedback or suggestions on the minimum functional requirements the app should have?
9. Do you agree that the data requirements relating to storage technologies etc should be left to the DCRP working group [Data Exchange Working Group] on data exchange provisions to resolve?
10. Do you have any comments on the proposed legal text drafting?
11. Do you have any other comments?

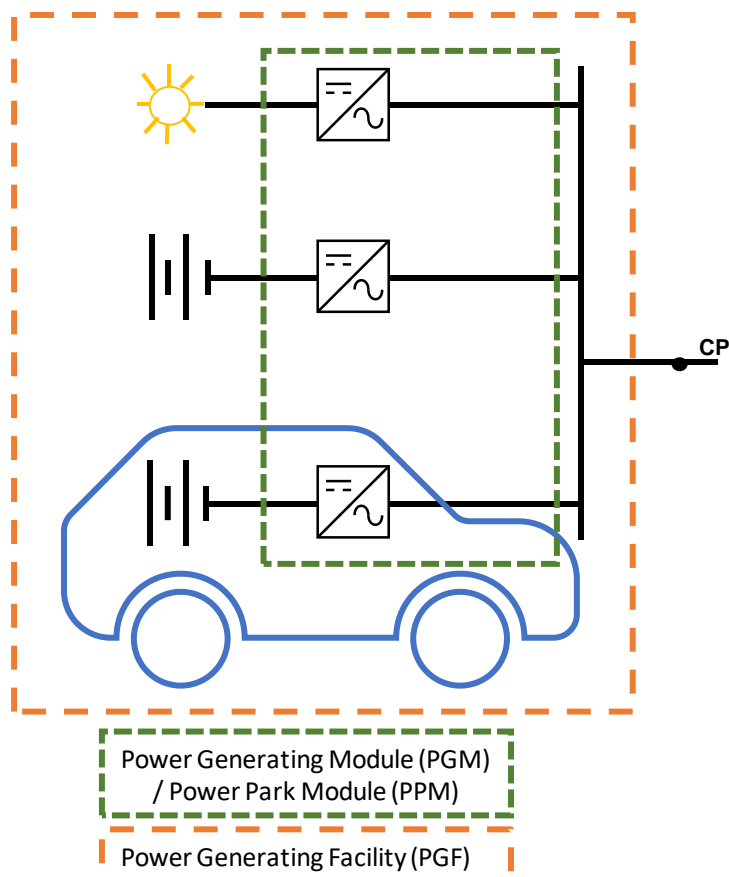
5. Next Steps

Responses to this consultation should be sent to the Distribution Code Review Panel Secretary at dcode@energynetworks.org by [1700 on 12th February 2021] on the pro-forma provided expressly for the purpose, or via any other convenient means. Responses after this date may not be considered.

Please note for this consultation EREC G98 and G99 have been marked up solely for the purposes of storage. There are a number of other modifications and corrections that have been noted in respect of these documents which will be incorporated into the revised version

along with the storage modifications. If you have already informed the ENA drafting team of any errors in the current versions of G98 and G99, there is no need to do so again at this stage.

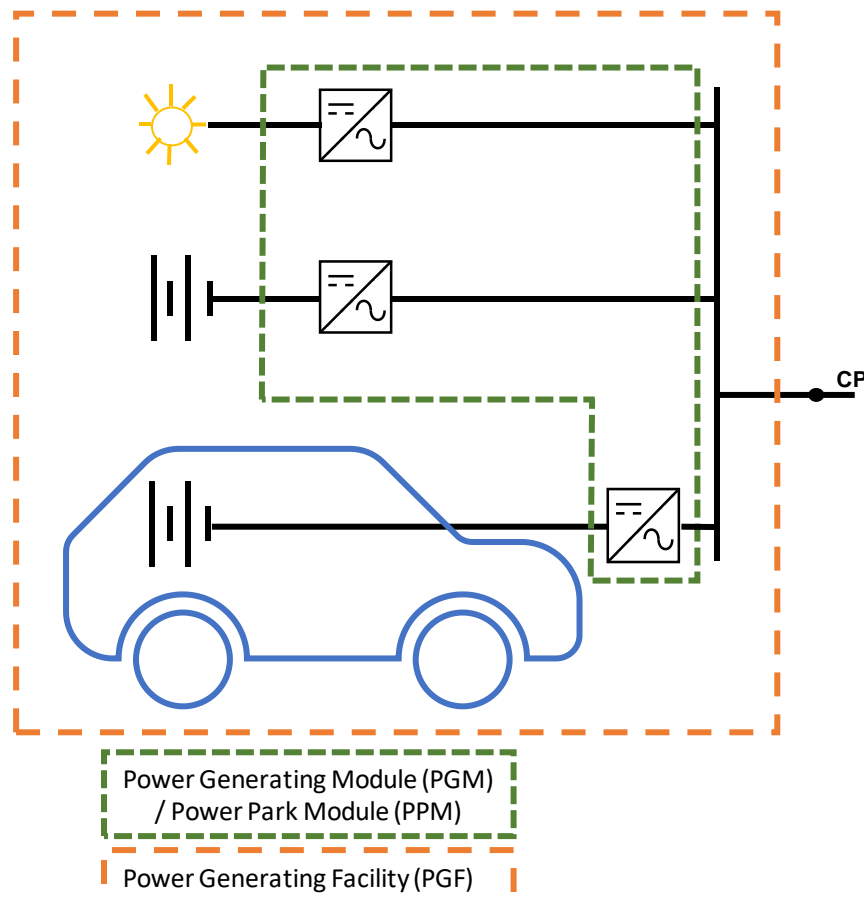
6. Appendix 1 Schematic of V2G installations Example of a V2G where the charger is included in the EV)



The **Vehicle to Grid Electric Vehicle** is a **Power Generating Unit**. The **Power Generating Module** is comprised of the stationary **Electricity Storage** device, the solar **PV Power Park Module** and the **Vehicle to Grid Electric Vehicle**.

Before a **Vehicle to Grid Electric Vehicle** is connected to the fixed installation the **Customer** must ensure there is an appropriate **Connection Agreement** with the **DNO** and that the whole **Power Generating Module** is compliant with this EREC G99.

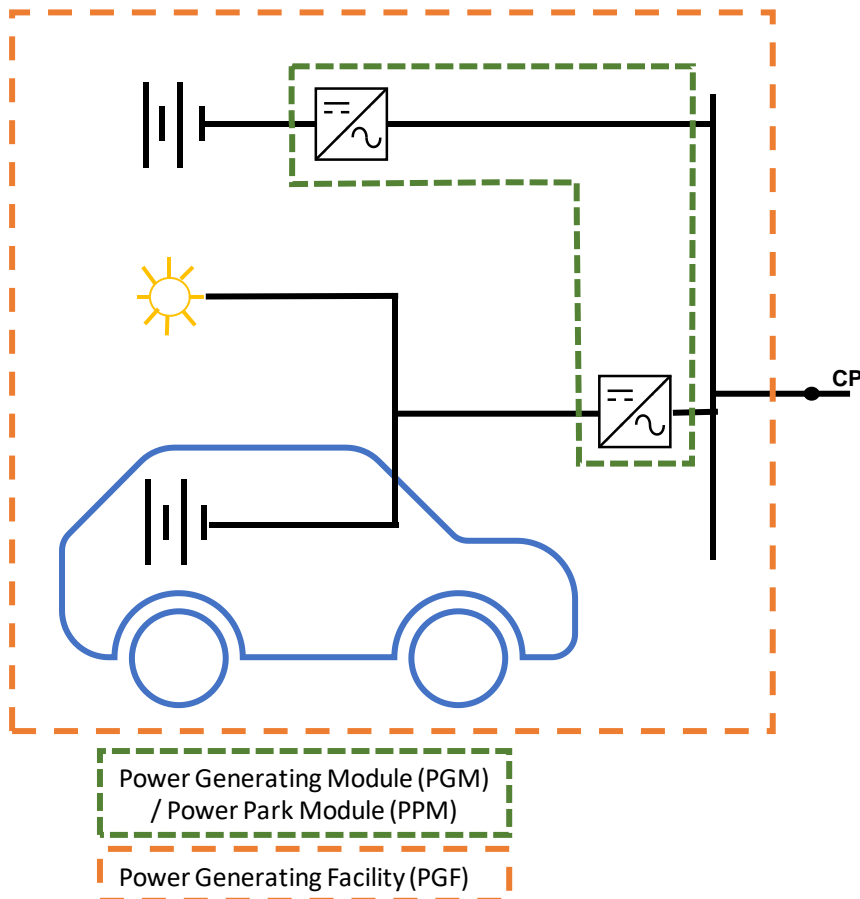
7. Example of a V2G where the charger is located in the Customer's Installation



The **Vehicle to Grid Electric Vehicle** in the **Customer's Installation** is a **Power Generating Unit**. The **Power Generating Module** is comprised of the stationary **Electricity Storage** device, the solar **PV Power Park Module** and the **Vehicle to Grid Electric Vehicle Power Generating Unit**.

Before an **Vehicle to Grid Electric Vehicle** is connected to the fixed installation the **Customer** must ensure there is an appropriate **Connection Agreement** with the **DNO** and that the whole **Power Generating Module** is compliant with EREC G99.

8. Example of a Vehicle to Grid Electric Vehicle where the charger is located in the Customer's Installation with a combined inverter also facilitating solar PV and there is a stationary Electricity Storage device at the same premises



The **Inverter** in the **Vehicle to Grid Electric Vehicle** is combined with the solar PV and is a **Power Park Unit**. The **Power Generating Module** is comprised of the stationary **Electricity Storage** device and the combined **Vehicle to Grid Electric Vehicle** and solar **PV Power Park Unit**.

Before an **Vehicle to Grid Electric Vehicle** is connected to the fixed installation the **Customer** must ensure there is an appropriate **Connection Agreement** with the **DNO** and that the **Power Generating Module** is compliant with EREC G99.

Electric Vehicle Charge Point & Heat Pump Connections Process

Note 15: When the existing Maximum Demand of a premises is above 60A, i.e. prior to any new electric vehicle chargepoints or heat pumps being installed, network operators will permit a "Connect & Notify" installation for a new EV chargepoint or Heat Pump under the following conditions:

-No issues with the existing connection (i.e. no safety concern, looped supply, unknown cut-out capacity, unmetered supply, insufficiently sized cut-out, etc – see Notes 1-6)

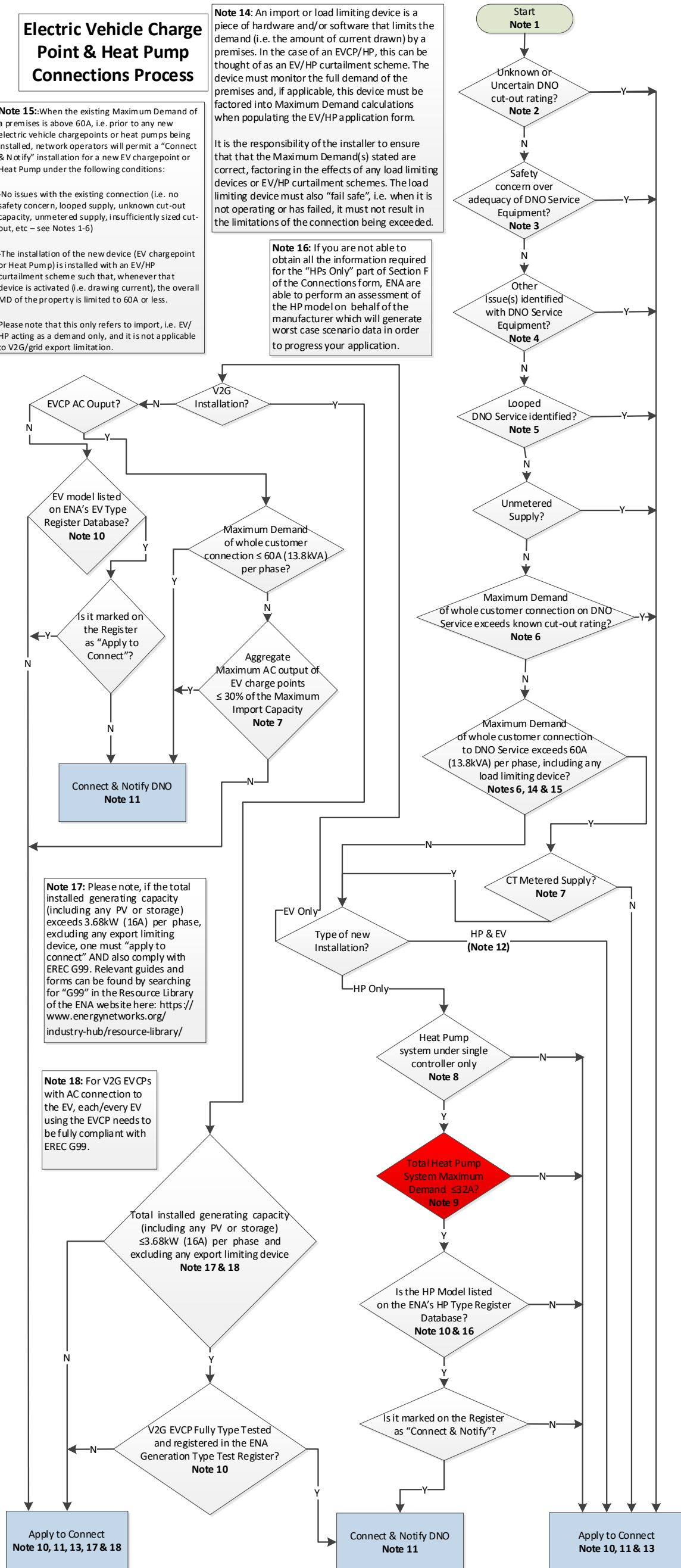
-The installation of the new device (EV chargepoint or Heat Pump) is installed with an EV/HP curtailment scheme such that, whenever that device is activated (i.e. drawing current), the overall MD of the property is limited to 60A or less.

Please note that this only refers to import, i.e. EV/HP acting as a demand only, and it is not applicable to V2G/grid export limitation.

Note 14: An import or load limiting device is a piece of hardware and/or software that limits the demand (i.e. the amount of current drawn) by a premises. In the case of an EVCP/HP, this can be thought of as an EV/HP curtailment scheme. The device must monitor the full demand of the premises and, if applicable, this device must be factored into Maximum Demand calculations when populating the EV/HP application form.

It is the responsibility of the installer to ensure that that the Maximum Demand(s) stated are correct, factoring in the effects of any load limiting devices or EV/HP curtailment schemes. The load limiting device must also "fail safe", i.e. when it is not operating or has failed, it must not result in the limitations of the connection being exceeded.

Note 16: If you are not able to obtain all the information required for the "HPs Only" part of Section F of the Connections form, ENA are able to perform an assessment of the HP model on behalf of the manufacturer which will generate worst case scenario data in order to progress your application.



Note 1: This process should be used for premises with an existing DNO connection. For new DNO connections, this process should be followed in addition to a new electricity connection application. This process may also be used for the installation of vehicle-to-grid (V2G) EVCPs.

DNO Service Equipment comprises DNO service cable, DNO cut-out (service head) and DNO earth terminal.

Note 2: If the cut-out rating is unknown or uncertain, it can be established by raising an enquiry with the DNO. If the supply capacity still cannot be established, the 'Apply to Connect' process must be followed. Please note that the cut-out should not be opened. Guidance on cut-out ratings is available on the ENA website.

The rating of the DNO service equipment must be established as adequate. BS 7671 – the Wiring Regulations – gives 132-16 'Additions or alterations to an installation': 'No addition or alteration, temporary or permanent, shall be made to an existing installation, unless it has been ascertained that the rating and condition of any existing equipment, **including that of the distributor**, will be adequate for the altered circumstances.'

Note 3: Safety concern over adequacy of DNO Service Equipment
Safety concerns over adequacy of DNO Service Equipment should be reported to the DNO in accordance with the MOCOPA Service Termination Issues Guidance available on the MOCOPA website: <https://mocopa.org.uk/documents/>

The guide gives specific examples of issues that can give rise to danger, classed as "Category A Situations", and how these should be reported to the DNO. All emergency issues (Category A Situations) must be reported to the DNO using telephone number 105 (GB only).

Note 4: Other Issue(s) identified with DNO Service Equipment
Other issues with DNO equipment that do not necessarily give rise to danger are described in the MOCOPA Service Termination Issues Guide: <https://mocopa.org.uk/documents/>

These issues are covered in the Category B and Category C Situations sections of the guidance document where specific examples are given of what is reportable to the DNO. All Category B and Category C Situations (non-emergency issues) should be reported to the DNO using their general enquiries number found on the customer's bill or online.

Note 5: Some DNO cut-outs have more than one DNO service cable terminated in the DNO cut-out. Such a situation indicates a 'Looped Service' where there are one or more services connected via the cut-out. Note this may impact on the adequacy of the DNO Service Equipment. Looped services can be found anywhere, but are often found in housing estates from the 1970s & 1980s, rural areas and terraced housing.

Note 6: Maximum Demand is the highest level of new demand that could occur on the whole customer connection, and includes all new HP and EV devices. The maximum cut-out rating may be visible on the cut-out. Ratings below 60A are possible (e.g. 30A, 40A and 45A), especially in rural areas. Note that the cut-out rating will be reduced from its stated value if the ambient temperature at the cut-out location is high e.g. due to inadequate ventilation, adjacent heat sources etc.

IET Guidance Note 1, Appendix H gives qualified electricians guidance on the assessment of Maximum Demand for the whole customer connection.

Note 7: CT Metering is typically any meter rated at over 100A. This rating should be found on the meter name plate. CT metered installations are typically subject to a Maximum Import Capacity (also known as Agreed Supply Capacity).

Note 8: Multiple heat pump systems or DC Electric Vehicle charge point installations above 3.68kW (16A) must be 'Apply to Connect.'

This means a single heat pump system under a single controller (but potentially with multiple devices) being installed in one property in isolation, as opposed to a cluster of separate heat pumps in the same or adjacent properties.

Note 9: Including any additional components, i.e. boost, back-up or immersion heaters. A boost heater is a Direct Electric Resistance (DER) heater to supplement heat output when the HP cannot provide the necessary heat located in the primary heating circuit. A water heater/immersion heater is a DER heater located in the sanitary hot water cylinder and used to top up heat or pasteurise for legionella control. A back-up heater is a DER heater that is capable of replacing all or some of the heat output from the heat pump in the event of the heat pump not being operational. This would be positioned in the primary heating circuit.

Note 10: Please see ENA HP Type Register, Generation Type Test Register (V2G EVCPs) and EV (non V2G, DC Only) Type Register Databases on the ENA website here: <https://www.energynetworks.org/industry-hub/databases>. Furthermore, for V2G EVCPs, the charge point must be installed, commissioned and fully type tested in accordance with EREC G98. Also, please note that the EVCP needs to be fully type tested if the inverter is onboard. It is the installers responsibility to provide all information required to populate the Heat Pump Type Register Database, as well as ensure any existing information within the Database is correct.

If the EVCP or heat pump is not registered on our databases you must gather all of the required information and submit to ENA for inclusion in the Database.

NB: the Registers are not an endorsement or recommendation of a particular EV/heat pump model but is a means of simplifying the application and connection process.

Note 11: Please note that to ensure you comply with GDPR requirements, applications and notifications should only be sent to the relevant DNO that corresponds to the MPAN.

Note 12: With combined Heat Pump and Electric Vehicle Charge Point installations, the DNO will need to consider the Power Quality implications, and hence one must 'Apply to Connect.'

Note 13: Depending on the size and/or number of devices being connected, the DNO may ask for additional information to be supplied.

For non V2G connections where the maximum demand of the whole customer connection is less than 100A (23kVA), the DNO will respond within ten working days, assuming the complete set of required information has been provided. V2G timelines will be as per applications for generation as required by ERECs G98 or 99.

10. Cover Page

Completing this form accurately will help DNOs process your application as quickly as possible. Please read the following information thoroughly before starting to ensure you have all information required to complete the relevant sections.

What is eligible	This form is for Electric Vehicle Charge Points (EVCP) or Heat Pumps (HP) being installed in a premises with an existing Distribution Network Operator (DNO) connection electricity supply. This form may also be used for the installation of vehicle-to-grid (V2G) EVCPs where the total aggregated capacity of generating/storage equipment on site is up to 17kW (single phase) or 50kW (3-phase). To apply for a new connection to the network, please contact your relevant DNO.
When to complete	This form should always be reviewed prior to installation of new equipment to determine whether the installation requires an application or whether it is eligible for the notification process.
When to submit	If the installation meets all the notification criteria (Section B) the DNO must be notified within 28 days of installation. If all the criteria in Section B cannot be met, you should submit an application to the DNO with this form before connecting the new equipment to ensure the safe and effective operation of the electricity network.
What to submit	Depending on the nature of the new equipment, the DNO may require additional information. For multiple devices (including multiple devices under one controller) or multiple properties, please use the multiple installations spreadsheet, also available on the ENA website ² .
Finding your DNO	For help identifying the correct DNO and their contact details please visit the ENA website ³ .
Cost	Any reinforcement costs associated with this installation may be recharged to the customer.

Required Information

To populate this form, you will need information about the following.

Device to be installed	Details of EVCPs or HPs to be installed. Where equipment is not registered in the relevant ENA database, additional information will be required (Section E). A link to the HP database can be found on the Databases page on the ENA website ¹ . Type tested V2G EVCPs can be found in the ENA Type Test Register
Existing devices at the premises	If you are installing a V2G EVCP, we will need details of any existing EVCPs, electric heating, battery storage, generation (e.g. solar PV), storage or other large load drawing/generating devices.
Maximum demand (MD)	A load survey is required to calculate the maximum demand. This should comprise the proposed device/equipment as well as any import or load limiting devices for the whole customer connection to a DNO service. Further guidance on such devices are available in the FAQ section of the Connecting to the networks page on the ENA website ¹ .
Supply Capacity / cut-out rating	If the cut-out rating is unknown or uncertain, it can be established by asking the DNO. The supply capacity MUST be confirmed with the DNO where the MD is greater than the cut-out rating or where the new MD is >60A (13.8kVA single phase) for residential properties. If the cut-out rating is unknown, a photograph of the cut-out can be provided to the DNO alongside this application. Please note that one MUST NOT open the cut-out unless authorised to do so. Further Guidance on cut-out ratings is available on the ENA website.
Adequacy of supply	An 'adequacy of the supply' assessment is required by the new device installer prior to installing any electrical device. The DNO must be contacted in advance of installation

² <https://www.energynetworks.org/industry-hub/resource-library/?search=multi-install&id=267>

³ <https://www.energynetworks.org/info/faqs/who-is-my-network-operator.html>

where there is an identified issue with adequacy or a safety concern with the premises existing DNO service equipment.

Timelines

Providing that this form is fully and correctly completed, the following timeframes are applicable.

Notifications	Provided the installation meets all the relevant notification criteria (i.e. all the checkboxes in Section B that are relevant to the installation are ticked) installers can connect the new device(s) and notify the DNO using this form within 28 days of the installation.
Application (60A < MD ≤ 100A)	The DNO will assess the supply capacity and confirm, within 10 working days of receiving the completed form, if the new equipment can be connected.
Application (MD > 100A)	Timescales as per the Electricity Distribution Licence, Electricity Guaranteed Standards of Performance (GSoP) Regulations 2010 ⁴ .

Declaration

Once populated, please remove the cover page, sign below and submit to the relevant DNO with any attachments.

I confirm that the information I have given in this form is true to the best of my knowledge. If applying (i.e. not notifying), the customer has been advised that the installation may only take place following approval from the DNO.

Name:

Signature:

Date:

11.

Section A – Contact Details

Installer Contact Details

Name	
Company	
Address line 1	
Address line 2	
Town	
Postcode	
Contact Number	
Email	

If necessary, are we able to contact the customer directly e.g. to arrange a fuse upgrade

☐ Yes ☐ No

Customer Contact Details

Name	
Contact Number	
Email	

Installation Location Address

Address line 1	
Address line 2	
Town	
Postcode	

12.

Section B – Notification Criteria

⁴ <https://www.ofgem.gov.uk/ofgem-publications/47616/connections-qsoP-guidance-sept0809.pdf>. See local DNO connections GSoP for specific response timescales in your area.

All Equipment Types	<input type="checkbox"/> Only connecting one additional device (EV charge point or heat pump)
	<input type="checkbox"/> DNO cut-out rating known
	<input type="checkbox"/> No safety concerns over adequacy of DNO service equipment
	<input type="checkbox"/> No other issues identified with adequacy of DNO service equipment
	<input type="checkbox"/> Not identified as a looped Service
	<input type="checkbox"/> Metered supply
	<input type="checkbox"/> Maximum Demand less than the known cut-out rating
	<input type="checkbox"/> Maximum Demand less than 13.8kVA per phase OR CT metered OR load limited to below the known cut-out fuse rating
HP only	<input type="checkbox"/> Heat pump under single controller only
	<input type="checkbox"/> Total heat pump maximum demand $\leq 32A$
	<input type="checkbox"/> Model marked at 'Connect and Notify' on the ENA's HP Type Tested Registered Database
EVCP only	<input type="checkbox"/> AC Output
	MD ≤ 13.8 kVA per phase OR <input type="checkbox"/> Where CT metered: Maximum AC output of EV charge point $\leq 30\%$ of the maximum import capacity
V2G only	<input type="checkbox"/> Total installed generating capacity (including any PV or storage) $\leq 3.68kW$ (16A) per phase and excluding any export limiting device
	<input type="checkbox"/> V2G charge point Fully Type Tested and registered in the ENA Generation Type Test Register
Does the installation meet all notification criteria? If yes, you can connect the device and notify the DNO within 28 days	
<input type="checkbox"/> No – Apply to the DNO before installation <input type="checkbox"/> Yes – Notification Date installed:	
V2G notify requirements	<input type="checkbox"/> Confirmation that the charge point was installed and commissioned in accordance with EREC G98 ⁵ – this is V2G only
	<input type="checkbox"/> Electrical schematic of the installation and site layout showing location of the charge point attached

Section C – Electricity Supply Details

Type of premises	<input type="checkbox"/> Residential house	<input type="checkbox"/> Residential flat
	<input type="checkbox"/> Commercial	<input type="checkbox"/> Public
	<input type="checkbox"/> Other – Please detail:	
MPAN⁶ 11 digit MPRN if Northern Ireland	-- - - - - - - - - -	
Smart Meter installed on site	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Declared Voltage at Connection Point Volts	
Number of Phases	<input type="checkbox"/> Single Phase	<input type="checkbox"/> Three Phase
	<input type="checkbox"/> Split/two Phase	
Maximum Demand (MD) of premises See page 1 for guidance	<input type="checkbox"/> Whole Current Metered Amps
	<input type="checkbox"/> CT Metered kVA
Supply Capacity	<input type="checkbox"/> Whole Current Metered Amps per phase

⁵ G98 and G99 forms are not required in addition to this form – this form replaces the need to fill in G98 and G99 forms for V2G if "connect and notify"

⁶ See <https://www.energynetworks.org/operating-the-networks/connecting-to-the-networks> for details. If the supply is unmetered, the 'Apply to Connect' process is applicable and the local DNO must be contacted.

Agreed supply/maximum import capacity	<input type="checkbox"/> CT Metered kVA
Supply capacity confirmed by the DNO? Must be confirmed with DNO if MD>60A	<input type="checkbox"/> Yes Reference No/Date: <input type="checkbox"/> No
Premises Cut-out Rating If known. See page 1 for guidance	Whole Current Metered only Amps
Import or load limiting device on premises	<input type="checkbox"/> Yes If yes, please detail what amperage this is set to: <input type="checkbox"/> No
G100 export limiting scheme on premises	<input type="checkbox"/> Yes Please detail: <input type="checkbox"/> No
Any issues identified with the existing supply equipment?	<input type="checkbox"/> Yes Please detail: <input type="checkbox"/> No
Final or Proposed Earthing Arrangements⁷	<input type="checkbox"/> TN-C-S (PME) <input type="checkbox"/> TT (Direct) <input type="checkbox"/> Customer Substation (HV CT metered) <input type="checkbox"/> TN-S (SNE)
Is the service looped⁸?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure

Section D – Existing device(s) at premises if applicable (this section is for V2G applications only)

Technology Type	Approximate date of installation	Manufacturer	Manufacturer's Ref No. where available	Registered Capacity (kW)		Phase (if known)	Power Factor	Device to be removed
				Import	Export			
<i>Example</i>	DD/MM/YYYY	CompanyX	1234	6.2	6.2			No
Heat Pump								
EVCP								
V2G EVCP								
Solar PV								
Battery Storage								

Section E – Device(s) to be installed

Type of device Tick all that apply (if selecting multiple this must be an application)	<input type="checkbox"/> Heat Pump <input type="checkbox"/> Electric Vehicle Charge Point (EVCP) <input type="checkbox"/> Vehicle-to-grid (V2G) EVCP
Maximum Current Demand of proposed equipment⁹	<input type="checkbox"/> Single phase Amps <input type="checkbox"/> Three phase Amps

⁷ As per BS 7671 and the IET Code of Practice: <https://www.theiet.org/resources/standards/cop-electric.cfm>

⁸ Some DNO cut-outs have more than one DNO service cable terminated in the DNO cut-out. Such a situation indicates a 'Looped Service' where there are one or more services connected via the cut-out. Note this may impact on the adequacy of the DNO Service Equipment. Looped services can be found anywhere, but are often found in housing estates from the 1970s & 1980s, rural areas and terraced housing.

⁹ Additional equipment/reconfiguration not included in this application is not permitted after installation one as appropriate

Include any associated additional components. The maximum simultaneous demand must be stated.

EV Charge Points

Charge Point Manufacturer

EV Charge Point Model

Model in the ENA EV Database (DC Only)

☐ Yes Product ID:
☐ No If no, fill in Section F

V2G EVCP

Export Capacity

Model Fully Type Tested and registered in the ENA Type Test Register

☐ Yes Product ID:
☐ No If no, fill in Section F

Heat Pumps

Manufacturer

Model

How will the Heat Pump be used?
Please tick one

The Heat Pump model stated will provide: ☐ Heating only
☐ Heating and cooling

Does the Heat Pump have additional components installed?

Back-up heater: ☐ On-board ☐ External
Boost Heater: ☐ On-board ☐ External
Immersion heater: ☐ On-board ☐ External

Model in the ENA Heat Pump Type Test Database

☐ Yes Register No:
☐ No If no, fill in Section F

Section F – Devices not currently in ENA Databases

EVCP (DC Only)

You must provide the required data for EVCP models not currently in the ENA Type Register Database. It is the installer's responsibility to ensure all information required to populate the EVCP Type Register Database is provided.

Datasheet and Power Quality documentation for the EVCP
(Rated power, harmonic emission data & test standard applied for harmonic emission data)

Must attach with application

V2G EVCP Only

If part of the V2G EVCP is not Fully Type Tested and registered with the ENA Type Test Verification Report Register, Form A2-1 or A2-2 or A2-3 (as appropriate) should be submitted to the DNO with this form. These forms can be downloaded from the ENA website Resource Library: <https://www.energynetworks.org/industry-hub/resource-library/>

G99 Form A2-3

Must attach with application

Heat Pumps Only

You must fill in the following Power Quality details required for non-registered Heat Pump Models. It is the installer's responsibility to ensure all information required to populate the Heat Pump Type Register Database is provided.

Datasheet and Power Quality documentation for the Heat Pump.

Must attach with application

Microgeneration Certificate Scheme¹⁰ Product Requirements met

☐ Yes ☐ No

Technical requirements of BS EN/IEC 61000-3-2
(harmonics)

☐ Yes ☐ No

¹⁰ <https://www.microgenerationcertification.org/mcs-standards/product-standards/heat-pumps/>

Proposed installation complies with:	BS EN/IEC 61000-3-12 (harmonics)	<input type="checkbox"/> Yes ($R_{sce} = 33$)
		<input type="checkbox"/> Yes, subject to minimum short-circuit power (S_{sc})
		<input type="checkbox"/> No
	Technical requirements of BS EN/IEC 61000-3-3 (flicker)	<input type="checkbox"/> Yes <input type="checkbox"/> No
	BS EN/IEC 61000-3-11 (flicker)	<input type="checkbox"/> Yes (meets 61000-3-3 tech. requirements)
		<input type="checkbox"/> Yes, subject to a service current capacity $\geq 100A$ per phase
		<input type="checkbox"/> Yes, subject to a Z_{max} value at point of supply
		<input type="checkbox"/> No
Microgeneration Certificate Scheme¹¹ Product Requirements met		<input type="checkbox"/> Yes <input type="checkbox"/> No
Proposed installation complies with:	Technical requirements of BS EN/IEC 61000-3-2 (harmonics)	<input type="checkbox"/> Yes <input type="checkbox"/> No
	BS EN/IEC 61000-3-12 (harmonics)	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Technical requirements of BS EN/IEC 61000-3-3 (flicker)	<input type="checkbox"/> Yes <input type="checkbox"/> No
	BS EN/IEC 61000-3-11 (flicker)	<input type="checkbox"/> Yes <input type="checkbox"/> No

11. Appendix 4

Proposed changes to G98 – See Separate Document

12. Appendix 5

Proposed changes to G99 – See Separate Document

13. Consultation Pack

The DCRP/20/06/PC Consultation pack can be found here - <http://www.dcode.org.uk/consultations/open-consultations/>

The Consultation Pack includes:

- This Consultation Paper
- Supporting Documentation
 - Proposed V2G connection schematics
 - Proposed Connection Process Flow Diagram
 - Proposed EVCP & Heat Pump Connection Form
- Response Proforma

¹¹ <https://www.microgenerationcertification.org/mcs-standards/product-standards/heat-pumps/>

14. Consultation Dissemination Events

Due to current Covid 19 restrictions we are unable to hold any dissemination events. All feedback and enquiries will need to be provided via the response proforma provided as part of the consultation pack.

For more information, please contact:

Christopher McCann – Distribution Code Administrator - dcode@energynetworks.org