Community Connections

A guide to connecting to the electricity network for community energy groups
**About this guide**

This guide is for non-technical people who wish to get an electricity connection for new community generation schemes.

It provides an introduction to the grid and an overview of the application process for different types of new energy generation relevant to community energy groups. If you are not quite sure where to start with getting your project connected and are slightly intimidated by the difference between EREC G83 and G59, this guide is for you.

Community energy projects are becoming more widespread, as communities are recognising the benefits of generating their own energy. Projects tend to take one of two approaches:

- They enable lots of households and businesses to install microgeneration on their premises through bulk-buying schemes
- They issue a share offer to the community for larger scale generation plant either as a fully community-owned project or as a shared ownership scheme in partnership with a commercial developer.

**Who are we?**

We are the electricity distribution network operator for central southern England.

We deliver electricity to over 2.9 million customers across the region, which ranges from rural communities in Hampshire, Dorset, Wiltshire, Gloucestershire and Oxfordshire to towns and cities including Bournemouth, Oxford, Portsmouth, Reading, Southampton, Slough, Swindon and parts of West London.

If you are not in our area, look up the electricity distribution map on the www.energynetworks.org website to find out who your network operator is.

One of our key roles is to provide new connections and modify existing ones for both generation and demand. We aim to make connecting to our network as straightforward as possible, which is why we have worked with Regen SW to produce this guide.
Getting a community energy scheme up and running

There are a number of tasks involved in getting a community energy scheme up and running, of which getting an electricity connection is just one.

To be reading this guide, you’ve probably made a lot of progress already and have an idea of what you want to achieve. But if not, the government’s Community Energy Hub website is a good place to start.

Tips

Are you looking for funding for your initiative?

Do you need more volunteers, technical or business planning support?
Regen SW runs a free community energy accelerator programme (www.regensw.co.uk/communities) which offers bespoke support and a network of over 200 community energy groups sharing learning.

Do you need help setting up as a legal entity or undertaking a share issue?
There is a list of organisations that can help communities in the Shared Ownership Taskforce report (www.gov.uk/government/groups/shared-ownership-taskforce).

Does the opportunity of shared ownership with a commercial business interest you?
Regen SW has a Grid and Communities Collaboration service (www.regensw.co.uk) which could help you to establish a viable partnership.

Do you need to find a local MCS certified installer?
Microgeneration Certification Scheme (MCS) is a quality assurance scheme supported by the Department of Energy and Climate Change. Have a look through the directory (www.microgenerationcertification.org).

Do you need planning consent?
Speak to your local planning authority about whether you need to obtain planning permission.
Introduction to the electricity network

It’s good to start with a basic understanding of how the electricity network works and how your project fits into the bigger picture.

In general, electricity flows from the power stations into the transmission network, run by the National Grid, which transports electricity over long distances at a high voltage (275 kV or 400 kV). It then flows into the distribution network, run by us and other distribution network operators (DNOs), to loads, such as homes and businesses. The voltage is reduced in the distribution network to be able to supply loads (from 132 kV down to 230 V).

An increasing number of smaller generators feed energy into the distribution network (only the very large schemes connect to the transmission network). They are known as distributed generation (or DG). They can range from microgeneration installations on homes and businesses up to megawatt-scale schemes.

The diagram below illustrates how the electricity network operates.
Introduction to the electricity network (continued)

Distributed generation can connect to the network through:
- an existing connection, for example the supply line to your house or business
- a modification to an existing connection
- a new connection.

The connection may be to single phase or three phase distribution lines: single phase supply is used for light loads such as household lighting and heating; whereas three phase electric power is used for heavier loads, distribution and transmission.

The electricity network was not designed to have high volumes of distributed generation connected to it, the recent increase in generation connections has introduced new challenges for DNO’s. For instance, it can:
- Make the direction of electricity flows in the distribution network more dynamic and unpredictable, which can cause:
  - Thermal limits\(^1\) to be exceeded
  - Reverse power flows\(^2\)
- Contribute to fault levels\(^3\) and cause the network to exceed safe levels if it is already close to its fault level limit
- Effect power quality\(^4\) limits from distorting the shape of the voltage waveform, for example by increasing the level of harmonics.

To make sure we avoid these problems, it’s important that we look at what impact your project may have on the network and, where necessary, carry out reinforcement work to protect the system and existing customers.

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1 Thermal limit – the maximum reliable capacity of the cable determined by the heating effect caused by electrical losses.
2 Reverse power flows – the flow of energy in the opposite direction from consumers, i.e. back up the network.
3 Fault levels – the highest electric current that can exist in a particular electrical system under short-circuit conditions.
4 Power quality – the quality of the voltage, which determines the fitness of electrical power to consumer devices.
Network constraints

Much of the electricity network is now constrained or at capacity due to the amount of distributed generation that has been connected.

It is still possible to get an electricity connection, but it might take longer and be at a higher cost due to the need to modify or reinforce the network. To get an idea of the availability to connect large scale generation to our network, you can view our availability map www.ssepd.co.uk/generationavailability.

If work is required on the grid before you can connect, there may be a one-off charge which will depend on your requirements and may include:

- Cost of modifying an existing part of the network
- A portion of the cost of reinforcement to increase the electrical capacity of the network.

The cost of your connection will depend on the location, size of your project and specific constraints in your local area. We will set out any costs in your connection offer.

If these costs make your project unaffordable, we may be able to offer a ‘Flexible Connection’. This means your export may be reduced under certain conditions when the network is under pressure.

You may also want to explore other innovative solutions to reduce your connection cost, such as storage options, private wire opportunities or collaboration with other generators. This is something Regen SW will be able to help you with through its community and grid collaboration services.
How to use this guide

The way we deal with applications fall into a number of categories:

- Connecting microgeneration
- Connecting microgeneration on multiple premises
- Connecting large scale microgeneration
- Connecting major schemes.

The size of your scheme and the engineering classification of your technology determine which application process you should follow. The cut-off points for the size and the different engineering classifications are explained in the blue boxes on the following page.

Follow the flow chart overleaf to find out which application process applies to your project and what section of the guide is relevant to you.

The following sections then set out the steps you need to take to apply for an electricity connection.

And don’t forget the glossary at the back for any terms you don’t understand (see pages 38–39) and to get in touch with our community connections manager if you have any questions.

Introducing the community connections manager

We now have a dedicated Account Manager for community groups that wish to connect to the network, which was put in place as part of our plans and commitments 2015/16.

Paul Munday is responsible for looking after all community projects in the SEPD area, including speaking to you face-to-face to ensure that all aspects of your quote have been explained and understood prior to work commencing.

Paul said that his role helps to streamline the connections process and make a real difference to the local community groups applications: “I’m hoping to make the whole process, from start to finish, more simplified and customer-focussed.”

You can contact Paul on community.energy.champion@sse.com
The right process for your application

**Size** – Does your generating unit have a rating of 16 A per phase or less?

- **YES**
- **NO**

**Engineering classification**
Does your generating unit meet the engineering recommendation G83?

- **YES**
- **NO**

**Number of premises**
Is this the only premises within a radius of 500 metres that has an installation being commissioned within 28 days before or after yours?

- **YES**
- **NO**

**Size**
Does your generating unit have a rating of 75 A per phase or less?

- **YES**
- **NO**

**Engineering classification**
Does your generating unit meet the engineering recommendation G59?

- **YES**
- **NO**

**Size**
There are two cut-off points:
1. **16 Ampere per phase or less:**
   - 3.68 kW or less connected to single phase
   - 11.04 kW or less connected to three phase
2. **75 Ampere per phase or less:**
   - 17 kW or less connected to single phase
   - 50 kW or less connected to three phase

**Engineering classification**
There are two main engineering recommendations (ERE)

1. **ERE G83 for generators that are:**
   - Small-Scale Embedded Generation (SSEG) i.e. rated up to and including 16 A per phase (see box above)
   - Type tested and installed in accordance with the latest version of EREC G83 (G83/2 from 1 December 2012)
2. **ERE G59 for generators that are:**
   - Rated above 16 A per phase or that do not meet the requirements of EREC G83
   - Type tested and installed in accordance with the latest version of EREC G59 (G59/3 from 1 December 2014)

For a step by step guide to connecting microgeneration visit www.ssepd.co.uk

See page 18 for a guide to connecting microgeneration on multiple premises

See page 22 for a guide to connecting large scale microgeneration

See page 26 for a guide to connecting major schemes
Microgeneration on multiple premises

Many community energy groups have set up bulk-buying schemes for small scale renewable energy generation on homes and commercial buildings.

These schemes enable people in the community to install renewables at cheaper prices with additional advice and support from the local community energy group. Microgeneration projects on multiple premises fall under the G83 application process.

When more than one microgenerating unit is installed within a 28 day period in a local area, it is important that we check it will not put too much pressure on the local grid network. Sometimes it is necessary to modify the network to make sure it can handle the additional energy generation, which is why you have to get approval from us before you can connect.

The installer you use to roll out the scheme is responsible for completing the ‘G83 multiple premises connection’ application form and liaising with us, but it is important that you to discuss your plans with us as early as possible, to be aware of the process and to identify any connection issues.

See the overleaf for the main tasks for getting connected.

This section is relevant to projects where:

- You are connecting more than one installation within a close geographical region within a 28 day period
- Each installation has a total rating up to 16 A per phase or less
- All the generation complies with the requirements of Engineering Recommendation G83/2.
Microgeneration on multiple premises

Getting connected

Getting started
Find an installer(s), start promotional activities and gauge interest

Discuss your plans with us
Find out if the grid is already constrained in your area and let us know where and at what scale you plan to roll out your scheme

Submit an application form
Details of each installation will need to be included and submitted by the installer

Accept or reject the offer
We will come back to you with an offer which will include the relevant assessment design fees, expected connection date for your project, any reinforcement works required and the terms and conditions.

Installation and commissioning
We will complete any work on the network and your installer will ensure compliance with EREC G83 and notify us within 28 days of commissioning

Top tip
Check that your installer uses ‘type tested’ equipment according to EREC G83, which simplifies the connection process.

Checklist
For your conversation with us:
- Total number of installations
- Location and size of each installation
- Rough timescale.

Find the form
Use the G83/2 application form, find it on www.ssepd.co.uk/GenerationConnectionsHome or apply online.

What to expect from us – We will be able to tell you:
- Whether the grid is likely to be able to handle the additional energy generation, and if not;
- What the cost of designing your connection will be if applicable to your scheme.

Offer explained
If work is required on the grid before you can connect, the offer will breakdown the following:
- The cost of the assessment and design fee associated with your project
- The timescale for the delivery of reinforcement works to the grid before the connection can be made which will be dependent on the complexity of the works.

Step by step:
- Your installer will ensure that construction and commissioning is in line with EREC G83
- We will complete any work on the network
- Your installer will notify us within 28 days of commissioning each installation by filling in the G83/2 commissioning confirmation form at www.ssepd.co.uk/GenerationConnectionsHome.
Applications for
Large scale microgeneration

Larger microgeneration installations fall under the G59 simplified application process.

For example, a large domestic solar PV system (over 3.68 kW or about 18 panels) on single phase or a large agricultural or commercial solar PV system (over 11 kW or about 54 panels) on three phase would fall into this category.

This may apply to installations on community buildings and small commercial sites that are funded through a community share offer or come forward through a bulk-buying scheme. The installation may be building-mounted or free-standing, and could be up to 17 kW on single phase or up to 50 kW on three phase.

See the next page for the main tasks for getting connected.

This section is relevant to projects where:

- The technology is type tested according to EREC G59 or G83
- The installation has a total rating of between 16 and 75 A per phase
- It claims the Feed-in Tariff scheme.
Large scale microgeneration

Getting connected

Checklist for your conversation with us:
- Location of site
- Size of installation
- Rough project timeline

Tip
It is really important you fully understand your connection offer. Please ask questions if anything is unclear.

Find an installer
Ideally find one that uses type tested equipment and is MCS certified.

Discuss your plans with us
Find out if the grid is already constrained in your area and whether there will be charges on your connection.

Submit an application form
It requires details of your site and equipment you intend to install. Your installer will submit this on your behalf.

Accept or reject the connection offer
We will come back to you with an offer including any conditions or charges for your connection.

Construction and commissioning
Once installation and connection is complete, tests and checks are required.

Tip
If your capacity is over 30 kW and you want to export energy, you need a Half Hourly meter and to appoint a meter operator (more on page 36).

Testing explained
Your installer must complete tests in section 12.3 of EREC G59/3-1. If we request to witness the test, you must inform us of the scope, time and date of testing at least 15 days before commissioning.

Costs explained
If work is required on the grid before you can connect, there will be a one-off charge, which may include:
- Cost of modifying an existing part of the network
- A portion of the cost of reinforcement to increase the electrical capacity of the network.

Find the form
You need the G59/3 Simplified Application Form, you can find this and apply online at www.ssepd.co.uk/GenerationConnectionsHome

Find the form
You need the G59/3 Commissioning Confirmation form, find it on www.ssepd.co.uk/GenerationConnectionsHome

Tip
Stay in close contact with us throughout construction so you’re aware of the timeline for any reinforcement works.
Applications for Major schemes

More and more communities across the UK are recognising the benefits of investing in and building large scale community owned energy generation projects.

The feed-in tariff has been a highly successful policy for incentivising community energy projects up to 5 MW and larger projects are likely to come forward as the ambitions of community energy groups grow and shared ownership with industry becomes commonplace.

If you are developing a shared ownership scheme and have particular requirements as to how the connection is provided - for example, more than one metering point - let us know at the time of application and we will provide details of the options available to you.

You can find more detailed information about the connection process in our Connections Charging Statements at www.ssepd.co.uk/Library/ChargingStatements/SEPD and in the Electricity Network Association guides available at www.energynetworks.org.

This section is relevant to projects that either:

- Have an aggregate rating of over 75 A per phase
- Have not been type tested according to EREC G59 or G83.

The main tasks for getting connected are shown below with more detail on the following pages:

Pre-application
Project planning; information gathering; discussions with us (see page 28).

Application
Submit formal connection application and we will prepare connection design and connection offer (see page 30).

Connection offer
Assess options and conditions and accept or reject connection offer (see page 32).

Legal considerations
Contracts; wayleaves and waivers (see page 34).

Construction and commissioning
Connection infrastructure construction; testing and commissioning of equipment (see page 36).
There are various actions that you can take before you submit your application form that can help make the application process smoother.

- Consider whether you have the time and resource to go through the application process yourselves, or whether you need the help of external consultants to get you through. If you have partnered with a developer, they will probably handle the application process in-house.
- Look at our generation capacity maps online to get an idea of whether we will be able to connect your project without reinforcement work. You can find them here: www.ssepd.co.uk/generationavailability
- Discuss your plans with us at an early stage. We can talk about:
  - How close your proposed project is to the network and whether there is any ‘spare’ capacity
  - The process of applying and connecting to the network
  - The choices you will need to make about who will carry out any connection works and the type of connection you go for
- Consider commissioning us to carry out an initial budget estimate to get more information on connection layouts and indicative costs.
- Decide who will construct the connection: Some of the work is non-contestable1 and some is contestable2. You will need to decide whether to appoint an Independent Connection Provider (ICP) to do the contestable work or whether you’d like us to do it all – this will affect the connection process. The flow diagram opposite might help you decide.
- We also run monthly connections surgeries where you can discuss your project with a designer and a commercial manager, see our online events calendar at www.ssepd.co.uk/stakeholderevent/basicsearch for more information.

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1 Non-contestable – work must be carried out by the DNO and is not open to competition.
2 Contestable – work is open to competition and can be carried out by Independent Connection Providers (ICPs).
Once you have planned the project and spoken to us, it’s time to submit your application form.

- Submit a formal connection application, which can be downloaded from [www.ssepd.co.uk/GenerationConnectionsHome](http://www.ssepd.co.uk/GenerationConnectionsHome) or can be made via our online application facility.
- You may need support from us or a consultant to help you complete the form, which requires comprehensive data about your generating equipment and its location.
- If you want us to do all the work – both the contestable and non-contestable – then you will submit the application form. If you appoint an Independent Connection Provider (ICP), they will liaise with us on your behalf. For a list of active ICP’s you can view our website [www.ssepd.co.uk/AlternativeProviderSearch](http://www.ssepd.co.uk/AlternativeProviderSearch).

### Information checklist

- ✔ Contact details and site address
- ✔ Whether you need a budget or a formal offer
- ✔ A site layout plan showing where the connection is required
- ✔ The capacity of the connection
- ✔ Export and import capacities
- ✔ Any special equipment characteristics
- ✔ Letter of authority

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1. **Letter of authority** – when you do not own the site, you will need a signed letter from the owner of the land granting permission for you to apply for a grid connection on their behalf.
Once we have received your application form, we carry out a number of studies to assess the impact of your generation on the network, which may include looking further up the system at higher voltage levels, at the direction of flow of energy from your generating project and at the impact on fault levels.

Industry regulations require us to provide you with a quote within the following guaranteed timescales:

1. For both contestable and non-contestable work:
   - 45 working days for LV^1 generation
   - 65 working days for HV^2 and EHV^3 generation
2. For non-contestable services only:
   - 30 working days for LV generation
   - 50 working days for HV and EHV generation

The quote will contain details of the connection charges, which are broken into categories in the box below, as well as options available to you and any conditions that you must agree to.

### Connection charges

The cost of connection can be broken into three categories:

1. New infrastructure for the equipment to connect your generating project (the point of supply) to the point of connection to the network. These are sole use assets and so are paid for by you in full
2. Reinforcement of the existing network to increase the electrical capacity and enable the flow of electricity onto the network. You will pay a portion of this cost which is relative to the capacity of your project
3. Recovery of costs from previous works carried out for other connections. This will only apply if you use assets provided for other connection customers within a prescribed time period.

There are several options that you will need to consider:

- **On the quotation you receive from us you will see that two options are provided for the contestable and non-contestable works quote. You will need to decide if you will accept the quote for all connection works or whether you would like an ICP to carry out the contestable works.**

- **If your connection requires expensive reinforcement work, it is worth considering a flexible connection. This allows us to temporarily reduce your capacity, known as curtailment, at times when the network is under pressure. You will need to weigh up the pros and cons as your connection cost could be lower, but you may not be able to export as much electricity.**

- **When we have more than one application for a connection to the same part of the network, the applications become interactive connection applications. If this happens, we will let you know in writing along with your position in the queue and the process for accepting interactive connection offers.**

1. LV – Low Voltage = less than 1 kV i.e. 230/400 V
2. HV – High Voltage = 1 kV to 22 kV i.e. 11 kV
3. EHV – Extra High Voltage = above 22 kV i.e. 33 kV or 132 kV
4. Interactive connection applications – when two or more applications for connection are made that are competing for limited capacity on the same part of the network or otherwise have a material operational effect on that network.
Major schemes

Legal considerations

There are a number of agreements and contracts that need to be put in place before we can connect your generation to the network. You may wish to seek professional advice if you are in any doubt.

- You, or your ICP, will have a set period of time to formally accept the connection offer, as long as it does not become interactive. The offer then becomes the contract between you, or your ICP, and us to meet the terms, conditions and payments specified.
- You will also be required to enter into a connection agreement with us. This is the lifetime agreement for the connection once it is energised and includes our rights and obligations to one another. For instance, you will be required to comply with the Distribution Code (see www.dcode.org.uk for more information).
- Where the connection works are carried out by an ICP, an adoption agreement is put in place for us to adopt the assets constructed and will be between either:
  - us and you
  - us and your appointed ICP
  - us, you and your appointed ICP
- When the equipment required to connect your generation to the network (e.g. cables, substations) is on someone else’s land, we will need to secure land rights through an easement¹, wayleave² or land transfer³. We may also require consents for overhead lines, environmental restrictions and planning.

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¹ Easement – a right to cross or otherwise use someone else’s land for a specified purpose.
² Wayleave – a right of way granted by a landowner.
³ Land transfer – transfer of ownership from the landowner to us.
Major schemes

Construction and commissioning

Once you have accepted our connection offer and dealt with any legal requirements, it’s time to build and connect your project.

- Stay in touch with us and your ICP (if you have one) during the construction phase. It is essential that we are working to the same timelines and that all work meets the required standards.
- Once construction is complete, it is your responsibility to carry out full commissioning tests which we may need to witness. You need to:
  - Submit registered data\(^1\) to us
  - Put commercial arrangements in place and keep your supplier informed of when you expect to start generating
  - Make sure you have metering arrangements in place (see box below).
  - Send us a completed commissioning form within 30 days of completing the commission tests.

\(^1\) Registered data – the final confirmed parameters of the generation equipment, including the location, export and import requirements.

Metering explained

There are two categories of meter:

- Non-Half Hourly (NHH) for generation less than 30 kW. It is the responsibility of the supplier to appoint the meter operator and collect the data
- Half Hourly (HH) for generation over 30 kW. You must appoint a meter operator. See the Association of Meter Operators for a list of accredited providers and further information on the services they can provide.

Checklist of other tasks

Whilst we (or your ICP) are constructing your connection, you should be:

- Completing the construction of your generation project
- Working with us to negotiate easements or wayleaves
- Appointing a meter operator (see box on the left)
- Finalising negotiations with a supplier who will purchase your energy
# Glossary

**Active Network Management (ANM)**
The use of distributed control systems to continually monitor all the limits on the network, along with systems that enable the correct level of generation to meet demand.

**Adoption Agreement**
An agreement which sets out the terms and conditions for the DNO to adopt assets which have been constructed by an ICP.

**Community energy**
Community projects or initiatives focused on reducing energy use, managing energy better, generating energy or purchasing energy, with an emphasis on community ownership, leadership or control where the community benefits.

**Connection agreement**
An agreement between you and the DNO detailing terms and conditions for connecting to and remaining connected to the DNO’s network.

**Connection offer**
A formal offer from the DNO containing terms, conditions and charges to enable connection to the DNO Network. Issued either to you or the ICP where applicable.

**Contestable**
Work that is open to competition and can be conducted by Independent Connection Providers (ICPs).

**Curtailment**
A temporary reduction in electricity generation imposed on the generator.

**Distributed generation (DG)**
A generating scheme that is connected to the distribution network.

**Distribution network**
A network of electricity lines and equipment that connects the transmission network and distributed generation to end users. In England and Wales the distribution systems are the lines with a voltage less than or equal to 132 kV.

**Distribution network operator (DNO)**
The DNO owns, operates and maintains a distribution network and is responsible for confirming requirements for the connection of distributed generation to that network.

**EHV**
Extra High Voltage = networks operating above 22 kV, i.e. 33 kV or 132 kV.

**Engineering recommendations (EREC)**
The technical standards developed by the Energy Network Association.

**Fault level**
The highest electric current that can exist in a particular electrical system under short-circuit conditions.

**Harmonics**
Distortions to a current or voltage wave shape. Harmonic frequencies in the power grid are a frequent cause of power quality problems.

**HV**
High Voltage = networks operating between 1 kV and 22 kV, i.e. 11 kV. Companies that have the necessary accreditation to provide new connections in competition with the DNOs. See the see the Lloyds Register website for a list.

**Independent Connection Provider (ICP)**
When two or more applications for connection are made that are competing for limited capacity on the same part of the network or otherwise have a material operational effect on that network.

**Interactive connection applications**
Low Voltage = less than 1 kV networks, i.e. 230/400 V.

**LV**
Work must be carried out by the DNO and is not open to competition.

**Non-contestable**
The quality of the voltage, which determines the fitness of electrical power to consumer devices.

**Power quality**
The final confirmed parameters of the generation equipment, including the location, export and import requirements supplier meter operator.

**Registered data**
Increasing the electrical capacity of those parts of the network that are affected by the introduction of new generation or demand.

**Reinforcement**
The flow of energy in the opposite direction from end users in the network.

**Reverse power flow**
Defined in EREC G83 as “A Generating Unit together with any associated interface equipment that can be used independently, rated up to and including 16A per phase, single or multi-phase 230/400V AC and designed to operate in parallel with a public low voltage Distribution System”. I.e. up to 3.68 kW on a single-phase supply and 11.04 kW on a three-phase supply.

**Small-Scale Embedded Generation (SSEG)**
The voltage at which the network is operated.

**System voltage**
The current carrying capacity of the cable determined by the heating effect caused by electrical losses.

**Thermal rating**
A network of electricity lines and equipment that connects power stations and substations. In England and Wales the transmission system is rated above 132 kV.

**Transmission network**
Deviations in system voltage.

**Voltage unbalance, fluctuation or flicker**
Contact us

For projects less than 50 kW
call 0345 078 6770
or email south.microgen@sse.com

For projects greater than 50 kW
call 0345 072 4319
or email mcc@sse.com

Email community.energy.champion@sse.com
Website www.ssepd.co.uk
Twitter @southernelecPD
Facebook www.facebook.com/southernelecpd
LinkedIn SSEPD Connections Engagement

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