Connecting Community Energy

A guide to getting a network connection

regensw
delivering sustainable energy

2016 edition

WESTERN POWER DISTRIBUTION
Serving the Midlands, South West and Wales

Contents

Introduction

Who is this guide for?

This guide is for people developing community energy projects who want to get a connection to the electricity network. It provides an introduction to the electricity network 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 confused about 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:

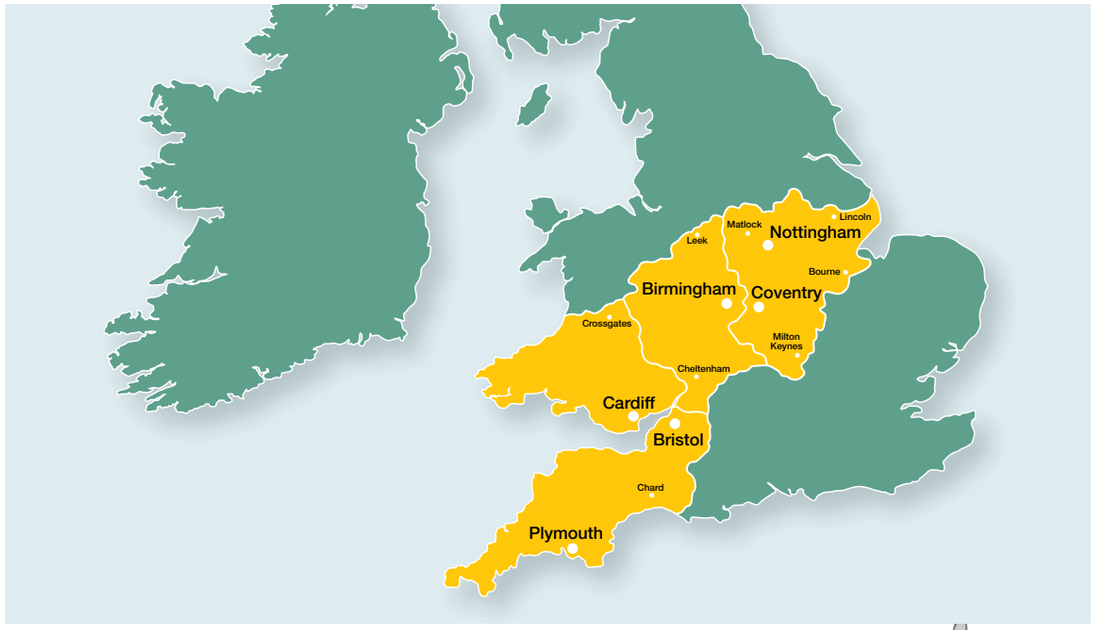
- They enable lots of households and businesses to install microgeneration on their premises through bulk-buying schemes
- They issue a share offer to the community for larger scale generation plant.

Who are we?

We are the electricity distribution network operator for the Midlands, South West and Wales. See the map opposite. If you are not in our area, look up the 'electricity distribution map' on **www.energynetworks.org** to find out who to contact.

One of our key roles is to provide new connections and modify existing ones for both new generation and demand. We deliver electricity to over 7.8 million customers and by the end of 2015 we had connected over 8,000 MW of new generation capacity with a further 11,000 MW in the pipeline.

We aim to make connecting to our network as straightforward as possible, which is why we have worked with Regen to produce this guide. Regen is an independent not-for-profit organisation that uses its expertise to work with industry, communities and the public sector to revolutionise the way we generate, supply and use energy.



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 One Stop Shop for community energy will be a good place to start. You will clearly be dealing with a range of issues in parallel with applying for an electricity connection, so here are some tips to help.

Tips

Are you looking for funding for your initiative?

In England, take a look at the **Rural** or **Urban** Community Energy Funds.

Do you need more volunteers, technical or business planning support?

Regen runs a free **community energy accelerator** programme in the UK. In Wales, further support is available from **Community Energy Wales** and **Renew Wales**.

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.

Does the opportunity of shared ownership with a commercial business interest you?

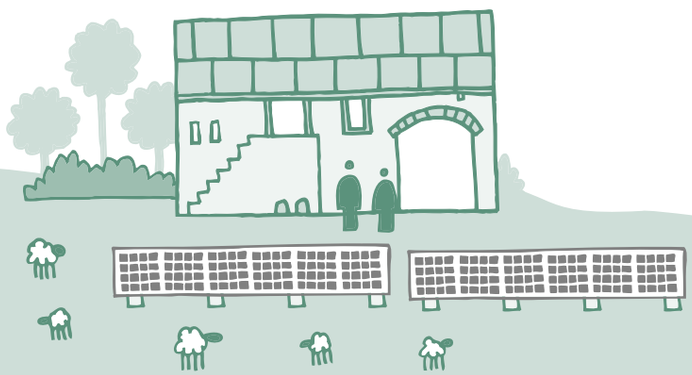
Western Power Distribution has a **facilitating generation connection service** which could help you establish a viable partnership.

Do you need to find a local MCS certified installer or a consultant?

Have a look through the **national** and **local** company directories.

Do you need planning consent?

Speak to your local planning authority about whether you need to obtain planning permission.

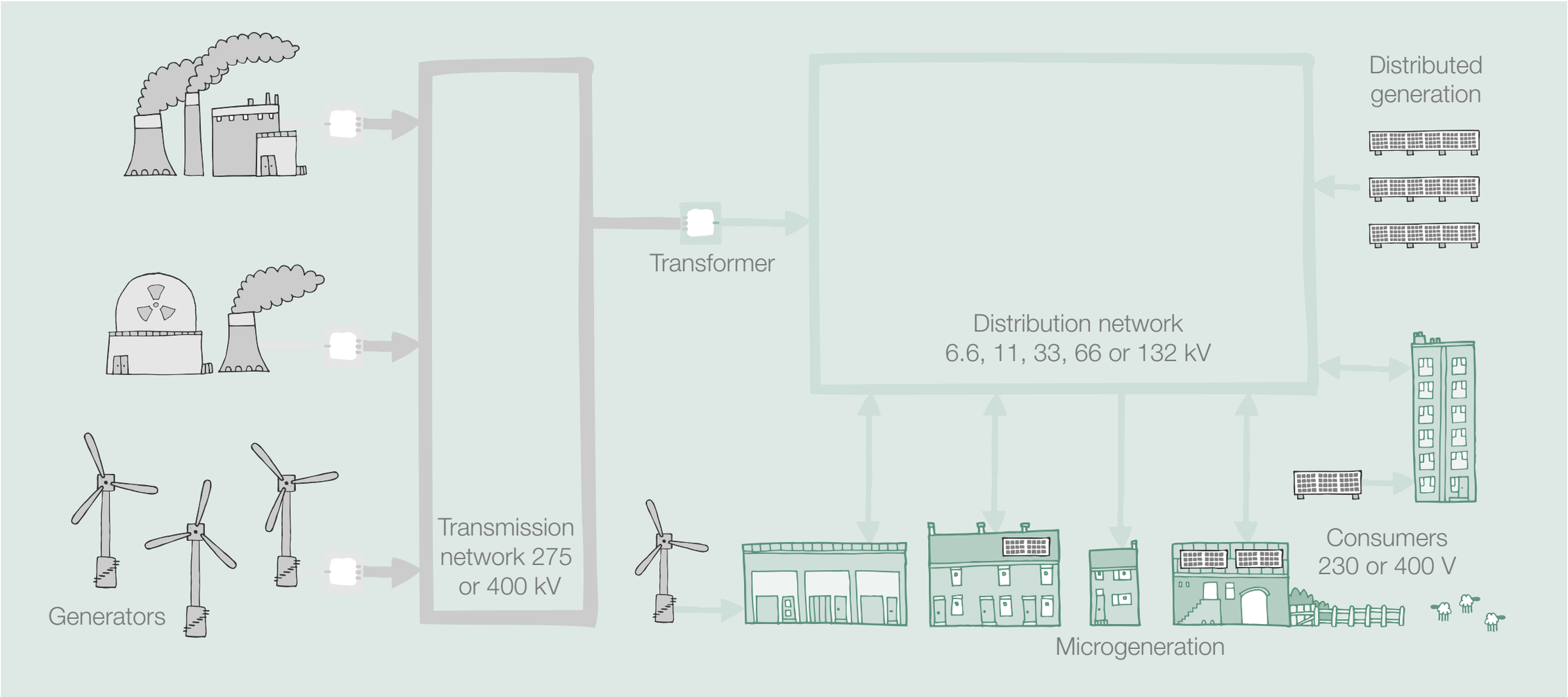


Introduction to the electricity network

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 picture below illustrates how the electricity network operates.



Introduction to the electricity network

Distributed generation can connect to the network through:

- an existing 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. Schemes larger than 50 kW would generally be connected to three phase.

The electricity network was not designed to support high levels of distributed generation and so the increase has introduced new challenges. For instance, it can:

- Make the power flow 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 levels 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.

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.

Is there capacity available?

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.

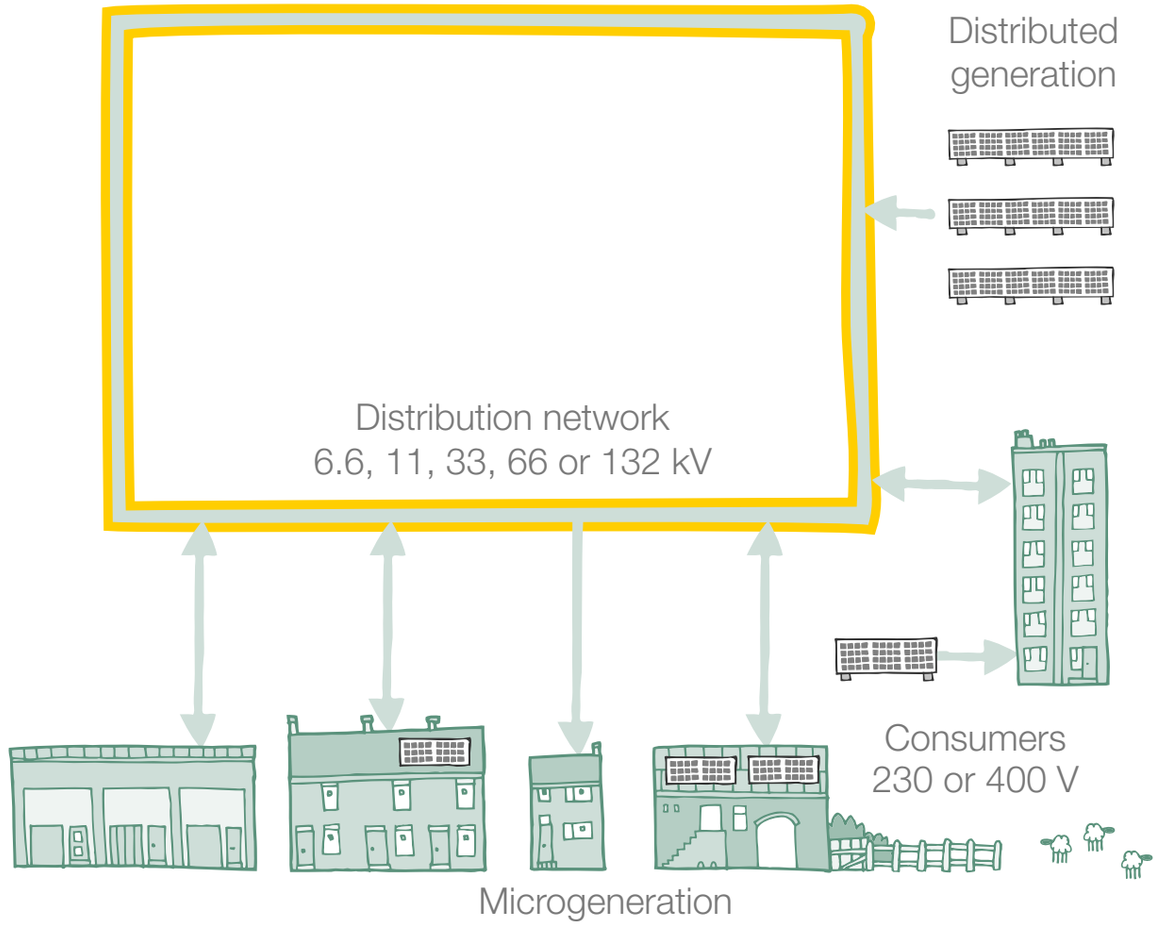
If work is required on the grid before you can connect, there may be a one-off charge depending on your requirements, which may include:

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

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, you may want to consider an ‘alternative connection’. These allow us to temporarily reduce your capacity, known as curtailment, at times when the network is under pressure. **See page 22** for more information. 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.

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**.



Innovation

The role of a Distributed Network Operator (DNO), such as Western Power Distribution, is changing. The higher levels of distributed renewable generation has to put a strain on the current system. More flexibility is needed to manage peaks in demand and supply at minimum cost. The DNOs are likely to take a more active role in balancing their networks and move towards become Distributed Systems Operators (DSOs). This transition has already begun and could accelerate as more distributed generation and energy storage connects to the network, and the electrification of heat and transport continues.

Community energy groups could become providers of flexibility services in this system. Perhaps using their engagement within communities on the ground to deliver demand-side response, where demand is turned up, down or shifted to other periods, in response to a signal.

How to engage with us on innovation projects

Community energy groups have an important role to play in the transformation of our energy networks. Their unique position as a trusted local contact for energy consumers in a given area, provides a useful community engagement opportunity for innovation projects. Community energy groups can act as a partner organisation in innovation projects looking to involve consumers or enable change at the community scale. This is likely to be via a third party organisation or aggregator.

To find out more contact **wpdinnovation@westernpower.co.uk**.

A list of the innovation projects involving Western Power Distribution is available **here.**

Register for innovation website updates **here.**

Project	Aims	Overview
Community Energy Action (Less is more) **Partners**: Western Power Distribution, Centre for Sustainable Energy (CSE), Marches energy Agency, National Energy Foundation, Severn Wye Energy Agency, Community Energy Plus	To determine if demand response using information and incentives is viable for communities, to avoid the cost of upgrading the grid	Communities were encouraged to use less and/or shift their electricity use to off-peak times Ten different communities were selected and their substation monitored Up to £5,000 reward was available for each community
SoLa Bristol **Partners**: Western Power Distribution, Siemens, Bristol City Council, University of Bath, Knowle West Media Centre	To address the issues associated with the impact of solar PV on the low voltage network using battery storage and variable tariffs	26 homes, one office and five schools in North West Bristol participated in the trial Solar PV panels, batteries and a control system were installed into properties A direct current (DC) electricity system was installed in the homes and a tablet PC used to provide information on energy usage and savings Participants made use of a smart tariff so they could sell excess energy from the battery back to the grid at peak hours, gaining an income
SYNC (Solar Yield Network Constraints) **Partners**: Western Power Distribution, Smart Grid Consultancy	To match local demand with generation to reduce the impact of existing generation and allow more renewable energy to connect	A number of different incentives and methods were used to try and increase demand and reduce generation including pay as you go and penalties for under performance Engaged high energy users to shift their demand to times of high solar generation

Local Supply

To date, much of the focus for community energy groups has been on setting up their own renewable electricity generation projects. The natural progression from community owned generation is to use and sell that energy within the local community. Below is a list of potential models for community energy groups.

Local Supply model	Large community group	Small community group
Licence Lite		
Licence Exempt		
Energy Supply Company (ESCO)		
White Label		
Supplier led local tariff		
Sleeving		
Fully licenced supplier		
Private wire		
Microgeneration		
Future:		
Microgrid		
Peer to peer		
Local balancing		

Local balancing case study: Energy Local

A group of domestic customers come together under an entity called a Community Energy Services Company (CESCo). Their half-hourly smart meter readings are grouped together (or 'virtually aggregated'). This forms one demand curve showing the energy used at different times of day. Local generation is then 'netted off' this aggregated demand curve and a set price is paid to the generator. The CESCo negotiates with a licensed supplier for a time of use tariffs for the remaining demand. Customers are no longer settled on a profile but on half-hourly data based on what they actually use and when.

More details available at www.energylocal.co.uk.

Find out more in the Local Supply: options for selling your energy locally paper **here**.

Key:

Suitable	
Potentially suitable	
Not suitable	

Shared Ownership

In April 2015 the government announced a new policy for a shared ownership model under the Feed-in Tariff (FIT) to support community energy. This allowed two new projects, up to 5 MW each, to share one network connection and meter connection point (MPAN) and receive separate tariffs – as long as at least one of the sites was owned by a community organisation.

Community energy projects tend to be embedded within a developer led scheme. The developer will enter in to a connection agreement with us covering a single connection point but an additional metering point can be created for the community energy project to allow it to trade seperately.

Case study – split sites

Portworthy solar farm

This is a split site solar farm, with an adjacent commercially-owned solar farm, that share a grid connection. Positioned on a brownfield site associated with a china clay works, the project was bought post construction by Bath & West Community Energy using a mix of share, bond and loan capital from Anesco for £5 million. A local community energy group – South Dartmoor Community energy – has recently been formed with the intention of buying all or part of the project from Bath & West Community energy in 2017.

Capacity: 4.3 MW community-owned (and 5 MW privately owned)

Benefits: 4,300 MWh renewable electricity per annum or enough for 1,300 typical homes, and community ownership.

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 central boxes on the following page.

Follow the flow chart below 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 26-27.**

The right application process for your project

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

See our website for a guide to connecting microgeneration

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 (EREC):

1. **EREC 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. **EREC 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)

See page 13 for a guide to connecting microgeneration on multiple premises

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

See page 15 for a guide to connecting large scale microgeneration

See page 17 for a guide to connecting major schemes

Applications for 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 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. If you are not sure which process is right for you, **go back to page 12**.

This section is relevant to projects where:

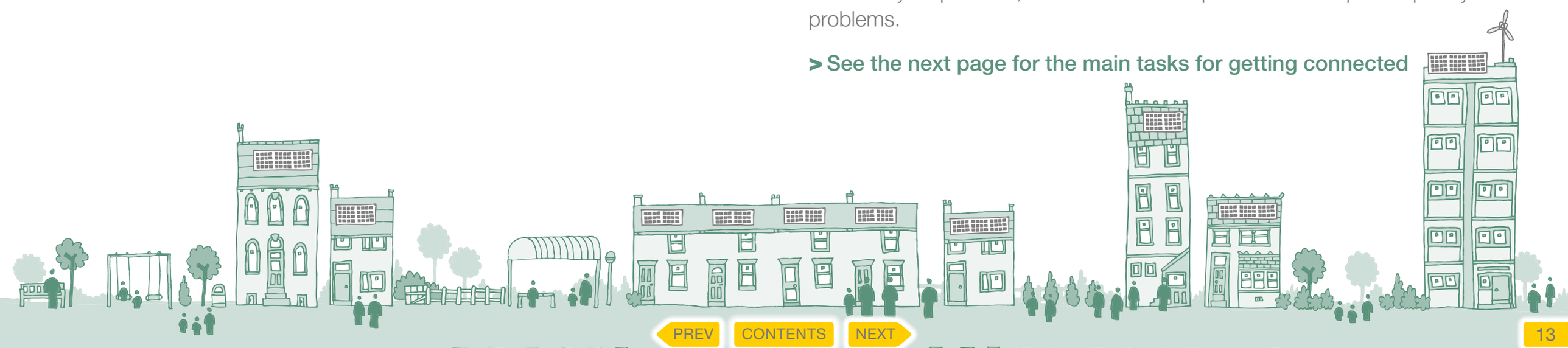
- You are connecting more than one installation within 500 metres from each other within a 28 day period
- Each installation has a total rating to 16A per phase or less
- All the generation complies with the requirements of Engineering Recommendation G83/2.

If you have a single installation on one property your installer is responsible for contacting us.

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 discuss your plans with us as early as possible, to be aware of the process and to pre-empt any problems.

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



Getting connected - microgeneration on multiple premises

Top tip

Check that your installer uses 'type tested' equipment according to EREC G83, which simplifies the connection process.

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 costs of reinforcing the network might be if applicable to your scheme.

Costs explained

If we need to modify the existing connection or reinforce the wider network to increase the electrical capacity, we may make a one off charge although this is dependent on the circumstances.

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 connection offer – we will come back to you with an offer including any conditions or charges for your connection

↓

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

Checklist for your conversation with us:

- Total number of installations
- Location and size of each installation
- Rough timescale

Find the form

You need the G83/2 application form, **available on our website**.

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 **available on our website.**

Applications for large scale microgeneration

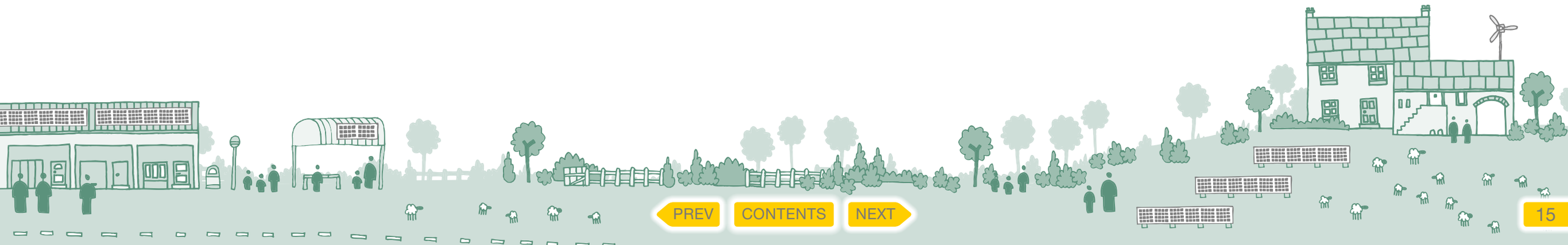
Larger microgeneration installations fall under the G59 simplified application process. For example, a large domestic solar PV system (over 3.68 kW or about 18 panels) on single phase or a large agricultural or commercial solar PV system (over 11 kW or about 54 panels) on three phase would fall into this category. If you are not sure which process is right for you, **go back to page 12**.

This section is relevant to installations that meet all of the following criteria:

- Type tested according to EREC G59/3 or G83/2
- A total rating of up to 75 A per phase
- The connection requires a minimum amount of network extension
- Makes use of the Feed-in Tariff scheme rather than Renewable Obligation Certificates.

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



Getting connected - large scale microgeneration

Checklist for your conversation with us:

- Location of site
- Size of installation
- Rough project timeline

Find an installer – ideally 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

Find the form

You need the G59/3 Simplified Application Form, **available on our website.**

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 Commissioning Confirmation form, **available on our website**.

Tip

Stay in close contact with us throughout construction so you're aware of the timeline for any reinforcement works.

Tip

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

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 22)**

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.

Applications for major schemes

More and more communities across the UK are recognising the benefits of investing in and building 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.

The application process for larger projects is more complex and can take longer. Major schemes fall under the G59/3 standard application process, which applies to installations that:

- Have an aggregate rating of over 75 A per phase

or

- Have not been type tested according to EREC G59/3 or G83/2.

If you are not sure which application is right for you, go to page 12.

You can find more detailed information about the connection process in our Connections Charging Statements **on our website** and in the Electricity Network Association guides available at **www.energynetworks.org**.

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 18)**.

↓

Application – submit formal connection application and we will prepare connection design and connection offer **(see page 20)**.

↓

Connection offer – assess options and conditions and accept or reject connection offer **(see page 21)**.

↓

Legal considerations – contracts; wayleaves and waivers **(see page 24)**.

↓

Construction and commissioning – connection infrastructure construction; testing and commissioning of equipment **(see page 25)**.

Pre-application

- 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 expensive reinforcement work. You can find them **on our website**. You can also request plans through **our website** for exact locations of underground cables, overhead lines and other electrical equipment
- 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 asking us for an **initial budget estimate** to get an early indication of the likely cost when the full details of the scheme are not known or the timescales are uncertain.

Contact us on:

- Midlands – 0845 724 0240
- South Wales – 0845 601 3341
- South West – 0845 601 2989

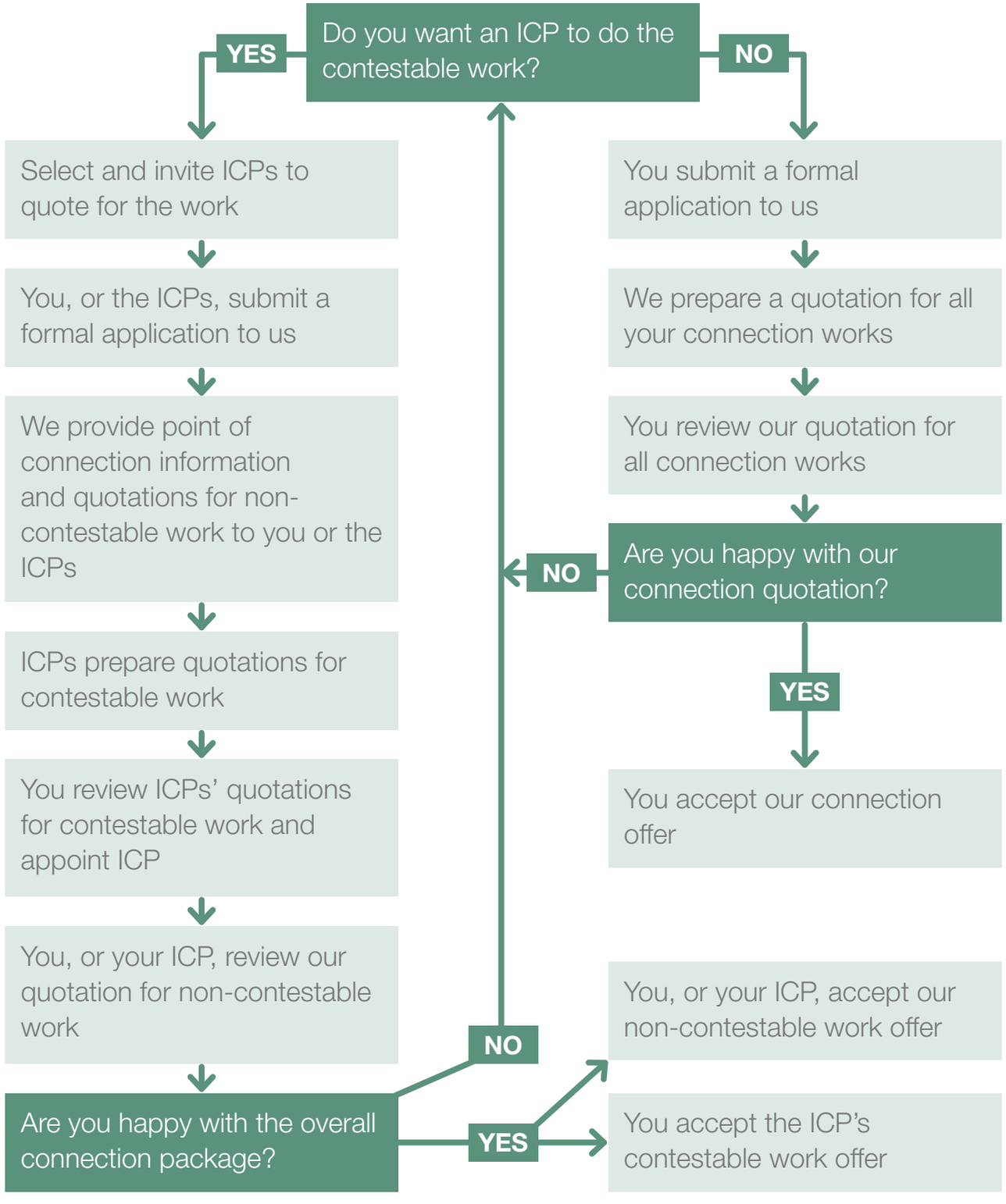
Or come along to one of the connection surgeries held three times a year in each of our regional distribution offices.

Pre-application

Decide who will construct the connection. Some of the work is **non-contestable**[1] and some is **contestable**[2]. 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 (on the right) might help you decide.

1 **Non-contestable** – work must be carried out by us and is not open to competition.

2 **Contestable** – work is open to competition and can be conducted by ICPs.



Application

- Submit a formal connection application, the G59/3 Standard Application Form which you can **download from our website.**
- 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 ICP, they will liaise with us on your behalf.

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

Connection offer

- 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.

- Timescales for us to provide you with a quote:

  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 on the right, as well as options available to you and any conditions that you must agree to.

1 **Low Voltage** = less than 1 kV
2 **High Voltage** = 1 kV to 22 kV
3 **Extra High Voltage** = above 22 kV

Connection charges

The cost of connection can be broken into three catetgories:

- 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
- 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
- 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 the last 5 years.

Connection offer

There are several options that you will need to consider:

- If your connection requires expensive reinforcement work, it is worth considering an ‘alternative 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. More details on **next page**.
- If you have asked us to quote for both the contestable and non-contestable work, 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
- When we have more than one application for a connection to the same part of the network, the applications become **interactive connection applications**[1]. 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 **Interactive connection applications** – when two or more applications for connection are made that make use of the same part of the existing or committed network or otherwise have a material operational effect on that network.

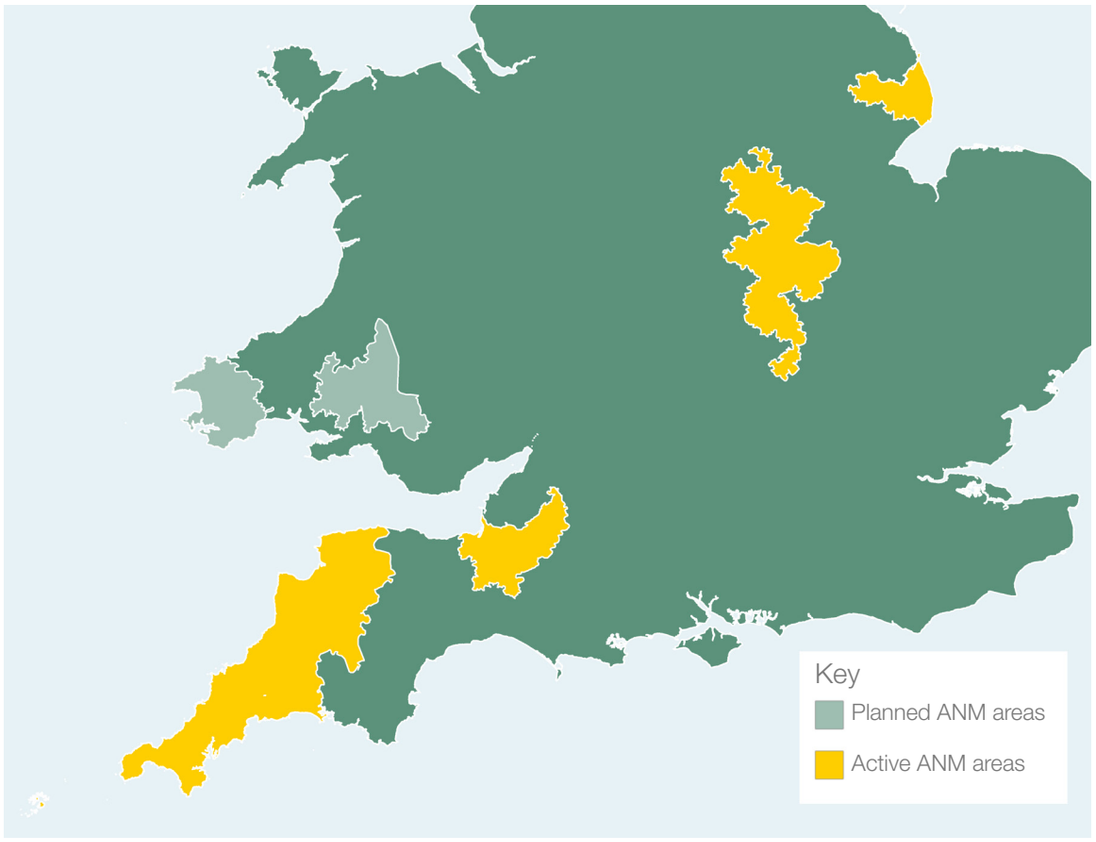
Alternative connections

Alternative connections are being rolled out in our area and can be a viable option for projects which are prepared to have their export capacity reduced. There are four alternative connection types available:

- **Export Limiting** – available across our network. The use of hardware to limit the export capacity to an agreed set maximum for a given connection. The hardware must meet specified requirements and relevant power quality standards.
- **Timed** – available across our network. We will give you an operating schedule that says when you can generate and at what capacity, based on predictable loads and generation patterns.
- **Soft-intertrip** – available in all our 'non-complex networks' not due to be opened for ANM within two years – see our **website** for a list. Through real-time monitoring of specific assets or limits, we can reduce your generating capacity at times when the asset is under pressure or the limit is close to being exceeded.
- **Active Network Management** (ANM) – being rolled out in 'complex networks' – see our **website** for a list – between 2014 and 2021. ANM allows real time monitoring of all the limits on the network and allows us to allocate the maximum amount of capacity to you based on the date your connection was accepted within the area.

The terms and conditions that we will allow you to connect under one of the above scenarios will be captured under an enduring connection agreement. An example alternative connection offer is available **on our website.**

For more details on alternative connections see our **website.**



Last-in First-Out (LIFO) – If there is more than one connection in a given area of ANM, then curtailment of generators is managed in a Last-In-First-Out (LIFO) procedure. This means that a given project is provided a place according to when they applied to connect. This position will dictate when they are curtailed and when this is lifted in comparison to other generators. Those who applied first will be curtailed last and restored first. Those generators who applied last will be curtailed first and restored last.

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 90 days 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
- 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 **easement**[1], **wayleave**[2] or **land transfer**[3] for the asset over the long term. We may also require **consents** for overhead lines, environmental restrictions and planning.

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.

Construction and commissioning

- 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:
  - Provide us with detailed information about the test scope at least 15 working days before the proposed commissioning date
  - 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 the box on the right)
  - Send us a completed commissioning form within 30 days of completing the commission tests. This is called the G59/3 Commissioning Confirmation Form and is **available on our website**.

1 **Registered data** – the final confirmed parameters of the generation equipment, including the location, export and import requirements.

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 below)
- Finalising negotiations with a supplier who will purchase your energy
- If required, we will issue you with an export MPAN that the supplier can register against.

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.

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.

Alternative connections – A collection of four different connection types which temporarily reduce the export capacity of a project in a fixed or varied approach.

Connection offer – A formal offer from the DNO containing terms, conditions and charges for the DNO to make the connection. Issued either to you or the ICP where applicable.

Connection Agreement – An agreement between you and the DNO detailing terms and conditions for connecting to and remaining connected to the DNO's network.

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

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.

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

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.

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

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.

Independent Connection Provider (ICP) – 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.

Interactive connection applications – When two or more applications for connection are made that make use of the same part of the existing or committed network, or otherwise have a material operational effect on that network.

Network – In this case we are referring to the electricity distribution network. In general it is a system of electricity lines and equipment that connects the transmission system 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.

Non-contestable – Work that must be carried out by us and is not open to competition.

Glossary continued

Power quality – The quality of the voltage, which determines the fitness of electrical power to consumer devices.

Registered data – The final confirmed parameters of the generation equipment, including the location, export and import requirements supplier meter operator.

Reinforcement – Increasing the electrical capacity of those parts of the network that are affected by the introduction of new generation or demand.

Reverse power flow – The flow of energy in the opposite direction from end users in the network.

Small-Scale Embedded Generation (SSEG) – 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.

Storage – technologies which are able to absorb and release energy when required and provide a number of services to the distribution network.

System voltage – The voltage at which the network is operated.

Thermal rating – The current carrying capacity of the cable determined by the heating effect caused by electrical losses.

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

Voltage unbalance, fluctuation or flicker – Deviations in system voltage.

LV – Low Voltage = less than 1 kV networks, i.e. 230/400 V.

HV – High Voltage = networks operating between 1 kV and 22 kV, i.e. 6.6 kV or 11 kV.

EHV – Extra High Voltage = networks operating above 22 kV, i.e. 33 kV, 66 kV or 132 kV.

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