WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

A beginner's guide to the electricity network

For community energy groups

westernpower.co.uk

Introduction

Who is this guide is for?

This guide is for new and existing community energy and climate action groups who want to find out more about our electricity network and work with Western Power Distribution (WPD) on the transition to net zero. In this guide, we summarise the key areas where you might want to work with us, and we signpost you to where to get more information and support.

Who are we?

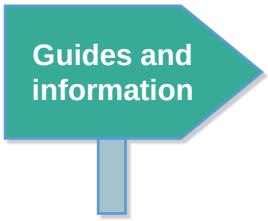
Figure 1: The area covered by the WPD network

WPD is one of the six Distribution Network Operators (DNOs) in the UK, our cables and wires *deliver* electricity to homes and businesses. We are not a supplier, we do not buy and sell electricity, or directly bill customers. Our network stretches from the Lincolnshire coast, across the Midlands, South Wales, and the South West to the Isles of Scilly.

The way we manage the network is changing. We are working to evolve from a DNO to a Distributed System Operator (DSO), actively managing electricity flows to enable more low carbon generation to connect and to better reflect the changing ways our customers use the network. As we and the network evolve, there will be further opportunities for businesses, communities, and households to play a more active role in how the electricity network is operated, for example, by providing generation or services to manage the network more efficiently. Follow this link for more on the shift from DNO to DSO.

What will you find in this guide?

1	**Building knowledge and capability**	The energy sector Accessing expertise and support Events and networking
2	**Connecting to the network and Preparing the networks for net zero**	Breakdown of the electricity network The effect of renewable generation What to think about when getting a connection Achieving net zero Your voice in our plans Effect of connections rules
3	**Flexibility and low carbon technologies**	What flexibility is and what the benefits are Who can participate in flexibility The rise of low carbon technologies
4	**Innovation**	The net zero challenge The power of locally led innovation Funding innovation trials
5	**Supporting vulnerable customers and the fuel poor**	Providing trusted advice Vulnerable customers and power cuts Alleviating fuel poverty



These chapters introduce five areas where community energy groups might interact with us in our role as DNO. Your community's location, aims, and capacity will influence which topics are of most interest to you, but we still recommend reading the guide in chronological order, and in full. Signposts along the way link to our relevant publications. For example, to see all our publications on community energy (including a guide on getting a connection, community innovation and a jargon buster), click the signpost. We have also included links to publications and information from other groups we think will be helpful. We have included some case studies from community groups to highlight best practice and useful learning.

We have also produced podcasts and animations for community energy groups that feature interviews with community energy representatives, cover how the electricity system is changing, and look at the role communities play in supporting that change. To find all our podcasts and animations, follow the links by clicking the buttons below. Throughout this guide, these buttons will take you to specific podcasts and animations on the topic.

Building knowledge and capability

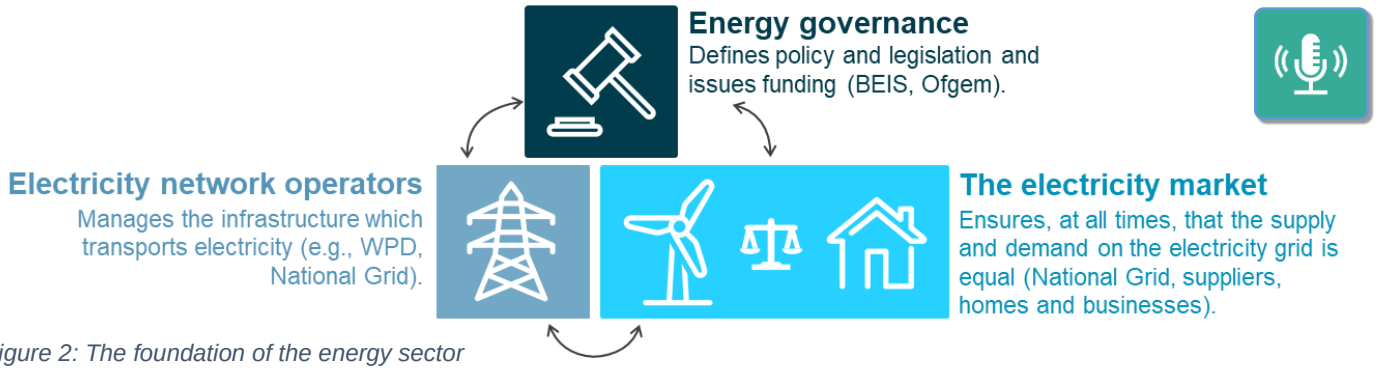


Figure 2: The foundation of the energy sector

Participation from all… will be necessary to overcome the technical, political, and social barriers to achieve net zero. As a community group, you can provide an essential link between people in their homes and small businesses, and the energy industry, acting as a trusted local intermediary, helping local people understand the changing energy system and their role in it. We know that community groups also often act as a collective voice for the community, feeding local views to the networks, and holding the wider energy sector to account.

Expertise and guidance… are available in a variety of formats from the community energy section of our website, including guides, podcasts, innovation guidance and case studies to help you in developing your ideas. You can also book a free community energy appointment with one of our engineers. Support is also available from other local, regional and national organisations. For example, local authorities can be a key partner in renewable energy projects, regional energy hubs can fund project feasibility studies, and charities like National Energy Action can support fuel poverty work. Other groups such as Community Energy England, Community Energy Wales, the Energy Saving Trust, and Regen also share important information for community groups. Lessons learned from existing community energy organisations are also invaluable and the Carbon Co-op has set up a community forum for this. See the signposts for more information, funding, and upcoming events.

Check out…

- **WPD's community energy events page**
- Community Energy England
- Community Energy Wales
- Rural Community Energy Fund
- Regen's blogs on local and community energy support

Events… will help you build knowledge and network with other communities and potential partners. WPD run regular engagement events, such as our 'communities and the smart energy revolution' series in 2020, where leading community energy groups shared lessons from their projects and explored the role of communities in a smart energy system, with our experts on hand to answer questions.

Devon Community Energy Network

WPD supported the Community Energy Spring Gathering in Devon in 2017 and 2018, a two-day residential event open to all community energy groups to build networks, share experiences, and support each other. The Devon Community Energy Network acts collectively to support groups and their goals across Devon, working together to secure resources and deliver projects collaboratively. The network's aim is to influence new energy development, reduce energy consumption, fight fuel poverty and deploy new renewable energy projects, for a sustainable future.


Source: Devon community energy network

Connecting to the network

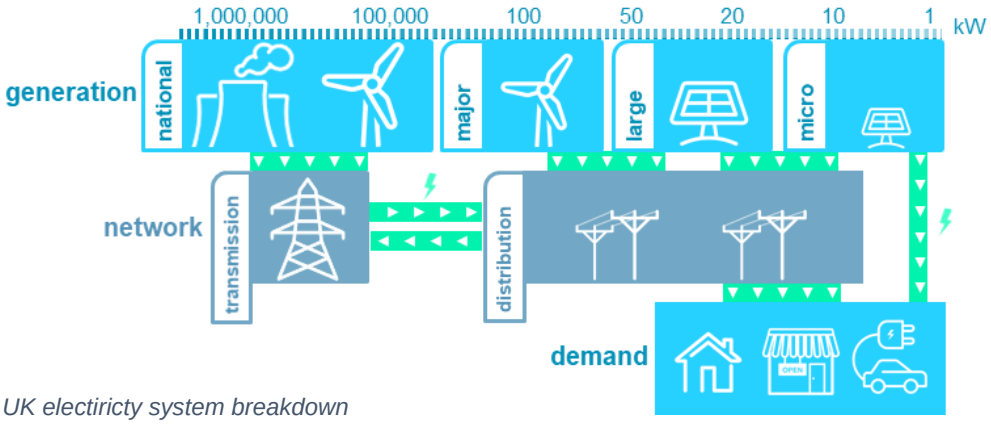


Figure 3: The UK electiricty system breakdown

The electricity system… is made of energy generators, networks and energy consumers (demand), all at various sizes and scales. The transmission network connects national scale generation and transports this electricity across the length of the country at very high voltages. The distribution networks operate at a more local level and at lower voltages. At this level, electricity reaches consumers, and a range of major, large, and micro generation, such as roof top solar, can be connected.

Renewable energy generation… is essential for achieving net zero and WPD is committed to facilitating more renewables to connect. Renewable electricity is dependent on the wind blowing, river flow or sunshine. Because of this, our renewables need to be diverse (have different types of energy generation in different locations) and interconnected. The smarter and more flexible the system is, the more certain we can be of everyone always having access to electricity when they need it.

To connect… a new electricity generation project to the distribution network, you will need to connect to either a modified or new line and we might also need to upgrade the local network. Calling us for a free budget estimate can give you an idea of the cost of securing a connection. This is essential to find out early because it can significantly impact the viability of your project. 'Alternative connections' (see video icon) may be available if these costs are prohibitive. We welcome early discussions before you submit your application. You can follow the signposts to get an appointment with us. The type of technology and size of your scheme will determine the application process to follow, as set out in our connecting community energy guide (see the signpost). Once your connection application is accepted, we'll continue to talk to you during construction so we can run tests and checks.

Check out …

Connecting community energy

Community energy appointments

Awel Aman Tawe Co-op

The Awel Aman Tawe co-operative was set up to take forward a community desire for onshore wind in the local area. Awel Co-op owns and runs two 2.35 MW turbines on Mynydd y Gwrhyd, 20 miles north of Swansea, which were commissioned in 2017.

It took 19 years for the project to develop from the initial idea to an operational wind farm. With significant community involvement and regular communication with WPD, Awel Co-op are also looking to develop a solar farm to sit alongside the turbines and are seeking ways to make the most of their grid connection.

Source: Awel Co-op

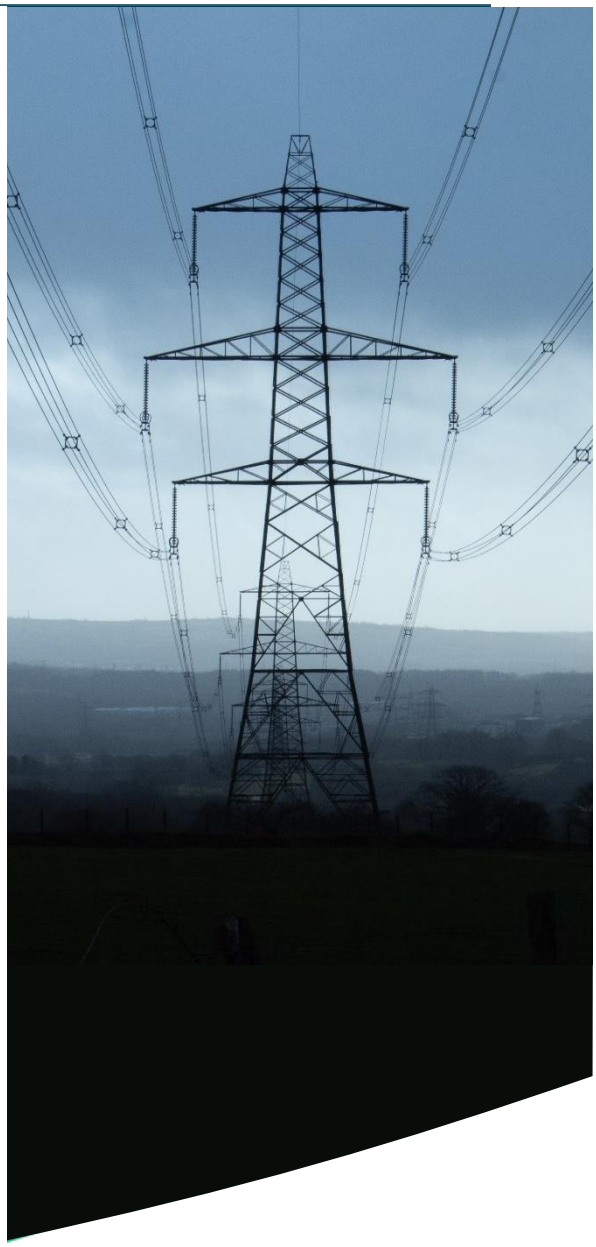
Preparing the network for net zero

Achieving net zero... requires huge changes in how we generate and use electricity. WPD, like all DNOs, plans the investment that is needed in the electricity network to enable changes, such as the shift to electric cars. Those investments are paid for by customers through their electricity bills. Our regulator, Ofgem, scrutinises our business plans to ensure that investment in the network is cost effective, so that the bills come at a fair price.

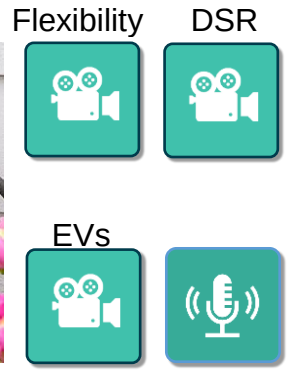
You can have a strong voice in our plans... throughout 2021, when we will be consulting on our 2023-2028 Business Plan. Each year we also develop 'Distribution Future Energy Scenarios' that help us understand the changes that net zero might lead to and how they will affect our network. We are always looking for better ways to share information about the usage of the network and the investments we're planning. The more you can tell us about your plans to use our network, the better we can plan for the investments needed.

The rules for connecting to the network... require new projects to pay for a proportion of the cost of any network upgrades needed to enable them to connect. We cannot currently charge bill payers for the cost of investing ahead in the network to create capacity for new generation projects. Areas of our network where capacity is constrained can, therefore, be expensive to connect to. We can help you identify less constrained areas and consider alternative connections.

The rules for what you pay to connect to the network are currently being looked at by Ofgem. You can find out more here. Ofgem will set out the result of their review later this year and ask for feedback. We will publish a guide to their proposed approach to help you understand what it means for you and help you have your say.



Flexibility and Low Carbon Technologies

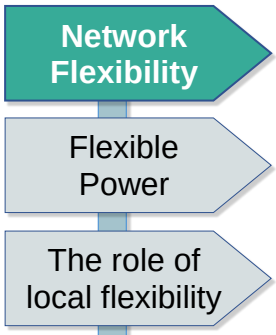


Flexibility is... the ability to increase or decrease generation or demand at certain times to help manage the flow of electricity on the network. Some of the network is already operating at full capacity, meaning the wires do not have space for further electricity flows, during peak generation times. To enable further generation to connect in these areas, we would need to upgrade the network. However, these upgrades take time, are expensive, and we all pay through our energy bills. We need an energy system transformation which is both affordable and fast. This is where flexibility can help.

Low carbon technologies… such as electric vehicles, and heat pumps are critical to decarbonisation. Many groups have run successful projects encouraging the uptake of these technologies in their communities. These technologies also have the capability to be flexible (their time of use can be shifted) and, because of their extra power demand on the network, it is essential that they are. By fitting them with smart technology, grouping (aggregating) them together, and dispersing their use over time, they can have a valuable impact on the readiness of the network for net zero. Home batteries and local renewable generation fitted with batteries can also be programmed to behave flexibly.

Participants in the flexibility market… vary in scale and type. Big generators, batteries and industrial customers (e.g., supermarkets and factories) already provide flexibility to the network and get paid to do so because it is so valuable. Big generators can turn on to support peak times or turn off when demand is low. Batteries can discharge at times of peak demand. Customers can reduce their demand during peaks by shifting when they use appliances to another time of day and they can even supply energy back to the grid with on-site backup generators. When a demand customer behaves flexibly it is known as demand side response (DSR). Smaller groups can also now participate in flexibility and generate income through Flexible Power (see the signpost), by managing energy consumption or their generation assets in response to signals from the network at specific times.

Check out…



Nadder Community Energy

The group are designing and piloting an electric vehicle car club in Tisbury, Wiltshire. Funded by Power to Change and following the principles of a sharing economy, they are developing a business model which gives access to low carbon transport through hire in their rural setting.
Following a successful project installing solar PV on many schools in the area, the group are also currently running a renewable heat in schools project, with a grant awarded by the government's Rural Community Energy fund. This includes looking at low carbon technologies such as ground source heat pumps.

Innovation

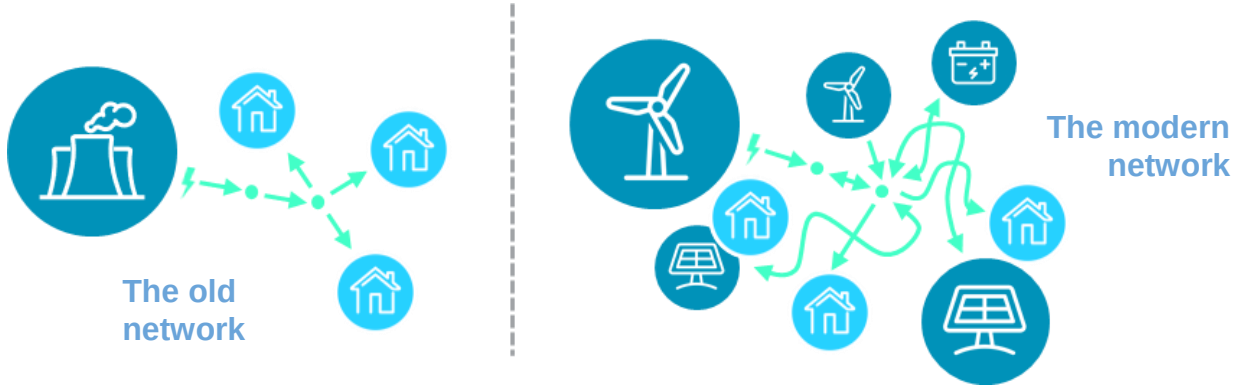


Figure 4: The network was originally designed for one way electricity flow, which doesn't suit the highly interconnected modern network

The net zero challenge… is not as simple as just switching from dirty fuels to renewable energy sources. Decarbonising solutions must be reliable, cost-effective, and fair. There has been, and needs to be further, fundamental shifts in how electricity is used, supplied, generated, and stored. For example, transportation and most of the UK's heating will need to be electrified: transformations that present social, technical, and economic obstacles that we will need to work collaboratively to overcome. As the UK moves from the old centralised, fossil fuelled network to a clean, distributed and smart network, we are committed to ensuring that no customer is left behind.

Locally led innovation… that enables community participation is vital to address some of the net zero challenges. For example, as a local group, you may have links within your community that will help you to create effective approaches to domestic DSR or ideas on how to go about engaging households in a rapid and widespread programme of improving home energy efficiency. Innovation is also needed to develop new business models for community energy groups that are financially viable without subsidies and retain revenues locally. Data, such as from Open LV (see the case study below), can raise awareness and help stimulate ideas for new innovation projects.

Innovation funding… is available for new ideas that have unproven business cases and can demonstrate financial, environmental and/or social benefits. Collaborating with WPD or other organisations such as smart tech companies, renewable generators, and universities/research organisations can help your group to access this funding, technical expertise and expand your capacity. See the signposts for information on eligibility, funding streams and focus areas.
streams and focus areas.

Check out…

- **WPD's guide on Community Based Network Innovation**
- **WPD's Distribution Networks and Innovation – Jargon Buster**
- Electricity Network Innovation Guide for Communities

Bath & West Community Energy (BWCE)

BWCE have worked as part of the innovative OpenLV project to find out how a community approach can help reduce costs and carbon emissions by shifting or reducing electricity demand at certain times of the day. BWCE used local electricity substation data to measure the impact of domestic solar panels and battery systems that they were installing.
This innovative approach demonstrated how community groups can engage with WPD substation data, as well as with flexibility and demand-shifting requests that may be needed by WPD.


Source: Open LV

Supporting vulnerable customers and the fuel poor

Alleviating fuel poverty… is a primary goal for many groups to ensure a just transition. By recognising unique local issues, effective strategies have been developed like creating jobs locally through home energy advice and retrofit services, using profits from renewables for energy bills or insulation, and building shared assets for community resilience.

Providing trusted advice and support… can cut costs for individuals and reduce their carbon footprint. Smart meters with a time of use tariff can not only save the customer money, but also help us progress towards net zero by reducing energy use. Community groups can provide valuable advice regarding how to choose the best suppliers and tariffs, affordable energy efficiency measures, grants for home insulation improvements, and more. This list is only increasing as we accelerate into the energy transition (see the Energy Saving Trust and Smart Energy GB). Groups have organised schemes in schools, pop-up events, and door knocking efforts to reach the wider community. Free and impartial advice is an effective way of reaching those who are isolated, might be uncomfortable with new and smart technologies, or find accessing online information difficult.

Vulnerable customers… are likely to need extra guidance and support in the event of a power cut. Our Priority Services Register (PSR) ensures those who need this extra support can access it and we would welcome you as a referral partner. We supply funding for this, and some community groups have combined this funding with energy redress funding and supplier referral fees to pay for community energy outreach services they provide. For more information on becoming a referral partner, who the PSR is for, and additional power cut advice, see the power cuts signpost.

Check out…

- **Power cut support**
- Smart energy GB
- Open LV: local electricity data
- Energy Saving Trust
- Bringing local energy benefits to deprived communities

Bristol Energy Network (BEN)

After leading on community engagement for the REPLICATE project, working with locally based member organisations to help Bristol City Council reach a wider audience for 'smart homes' and retrofit, BEN joined the WHAM project (Warmer Homes, Advice and Money) with a similar role, further developing their team of energy champions. WHAM aims to reduce financial, food, and fuel poverty in Bristol & North Somerset, which BEN supports through workshops and outreach activities. During the pandemic, engagement methods have had to continuously adapt, meanwhile BEN and partners have launched an Emergency Covid Winter fund which is redistributed, via groups running emergency food hubs, to those struggling to pay their energy bills.

Southern Staffordshire Community Energy

In partnership with the NHS and Beat the Cold, the group installed over 1,000 solar PV panels on seven hospital roofs. The project was funded by local investors and the profit from surplus energy supports patients living in fuel poverty and suffering with conditions caused or worsened by the cold.

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