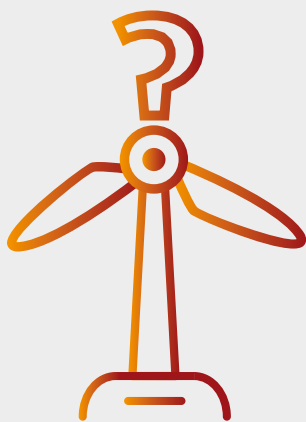


Local authority questions



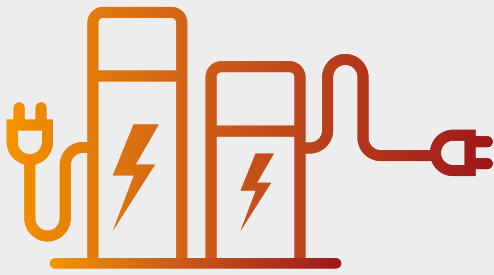
How can we **reduce our energy bill?**



Is renewable generation **cost effective?**



How can we help our **community energy projects?**



Can we have more **roadside electric vehicle charging points** for residents?



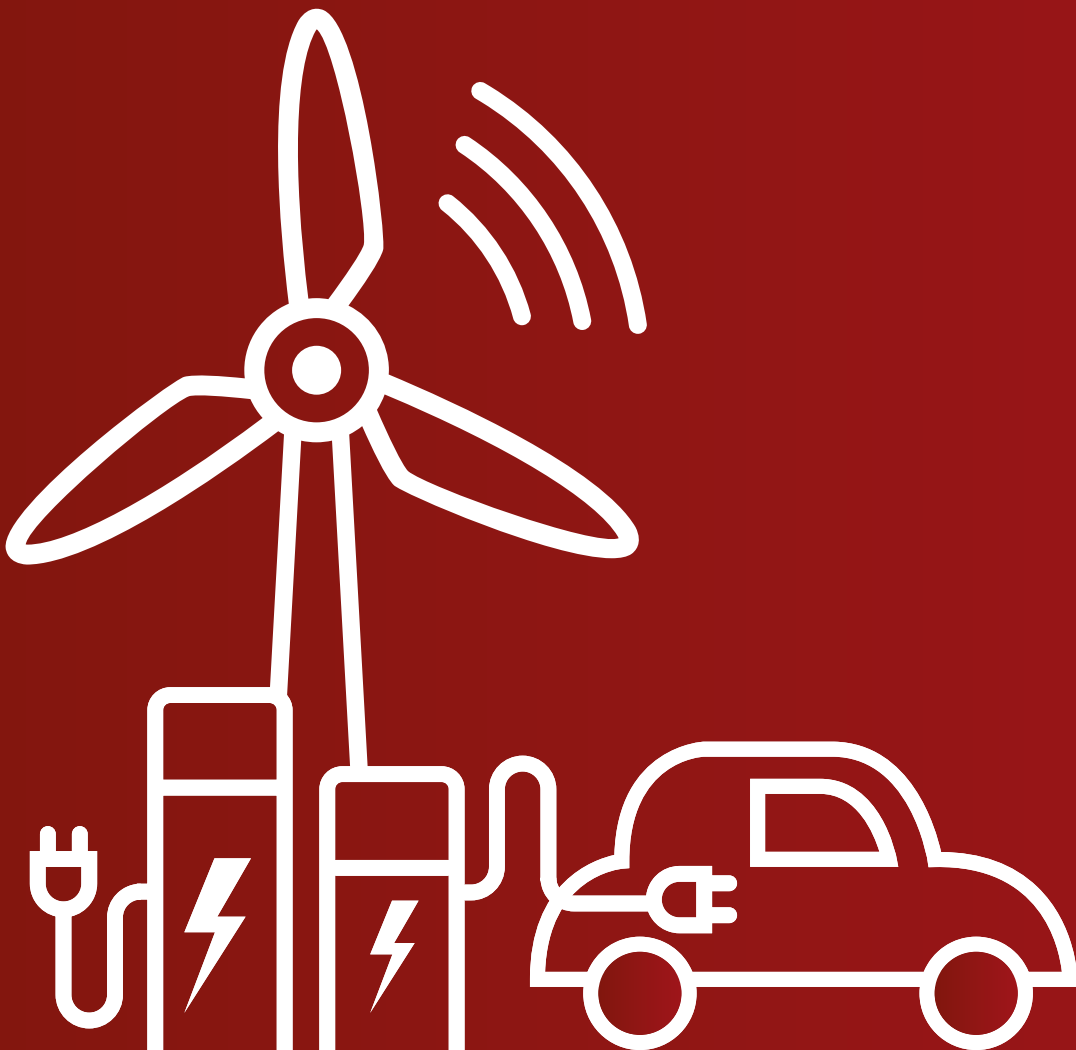
Can smart technology help people **save money**?



Where do we start if we want to **connect our own electricity generation projects**?



How can you help us achieve our commitment to **100% clean energy by 2050**?



Contents

Use the interactive contents to navigate the document



Who are UK Power Networks and UK100?

About UK Power Networks

UK Power Networks is the country's biggest electricity distributor, making sure the lights stay on for more than eight million homes and businesses across London, the South East and the East of England. We manage over 187,000 km of power lines and over 120,000 substations in our network area. We are not an energy supplier: we do not buy or sell energy to our customers.

UK Power Networks invests more than £600 million in its electricity networks every year, offers extra help to vulnerable customers at times of need, and is undertaking trials to ensure that electricity networks support the transition to a low carbon future.

You can read more about us here:
<https://www.ukpowernetworks.co.uk>

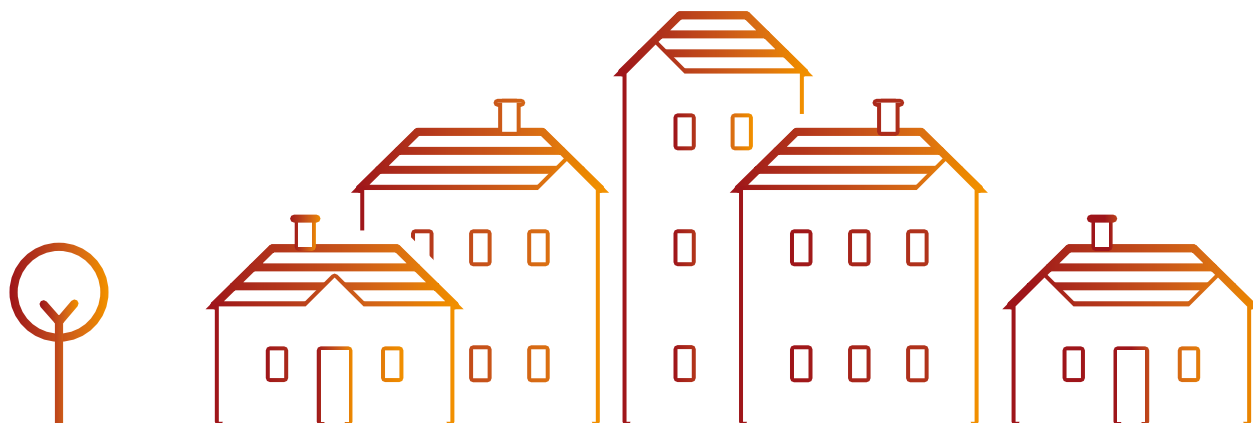
About UK100

UK100 is a highly ambitious network of local government leaders, which supports decision-makers in UK towns, cities and rural areas in their transition to 100% clean energy by 2050. It is the only network for UK local authorities focused solely on climate and clean energy policy.

90 local leaders have already committed to 100% clean energy and more are signing up, as part of the Paris Agreement in 2015. Turning those commitments into reality is the goal of the network.

UK100 connects local leaders to each other, to business and to national government, enabling them to showcase their achievements and learn from each other. It enables them to speak collectively on how to accelerate the transition to clean energy locally and nationally.

You can read more about us here:
<http://www.uk100.org>



How to use this guide

The way energy is generated and supplied can seem complicated, especially when technology, energy sources and the way we consume it are all changing so fast.

We teamed up with UK100 to make sure we are meeting the needs and ambitions of local government when it comes to delivering your energy and climate change policy. We want to listen to you to make sure we are answering the questions you have.

We have tried to make sure that in this guide there is some information and guidance suitable for a range of people within local authorities that have an interest in energy. Examples below:



Elected councillors

This document is designed to enable you to consider the opportunities that changing energy policy could provide to help you meet your wider objectives. You may already have an agreed strategy for your local authority that includes tackling fuel poverty, improving public health and transport and supporting jobs and growth. You may also be thinking about how you can save money and generate income. This guide is intended to help you see how energy policy can help you meet those goals. It's not the whole story, and if you want to engage further there are signposts to more information and ways that UK Power Networks can help.



Finance officers

We understand the challenge of balancing the books, and this guide is designed to help you see how you can cut costs and generate income. You may want to know more detail and there are signposts to further guidance and advice.



Energy/sustainability officers

You may already be in contact with us, but with so much change in the energy landscape it can be challenging to keep up. This guide will enable you to identify ways in which decisions about energy can help meet your authority's strategic goals. As the in-house experts you will already have a range of solutions at your fingertips. If you need more, we are on hand to help.



Introduction to the energy revolution

The way we generate, distribute and use energy is changing

There has already been a vast amount of change in the last few years. Coal is in decline and renewable forms of generation are on the increase. Not only is the way we generate power changing, but where it connects to the electricity system is changing as well. Increases in solar and wind power mean more and more electricity is generated locally at the same time as demand is growing. Battery storage and electric vehicles are also changing the way we use and manage electricity.

The energy world that your residents will experience by 2030 will be very different to what exists today. More and more people will use electric and autonomous vehicles, use smart appliances in their homes and they could use heat pumps for their homes.

These changes are creating new opportunities for organisations, communities and households to generate, store, and even sell energy. To make this energy future work for everyone, councillors and officers in local government are essential partners. Local leadership is important to harness the potential to save money and generate income.

Some of this future is already here: a few local authorities and residents are already taking advantage of the opportunities it presents.

We have created this guide to help councillors and council officers understand how the shift to a more decentralised energy system can improve the lives of residents, and the local economy.

What's Local Energy?

Put simply local energy is electricity and heat produced by individuals, businesses and communities that is either consumed at source or sold onto the electricity distribution network or a local heat network.

Why UK Power Networks?

We are your local electricity distribution network operator carrying the electricity from local or national generators to your buildings, homes and customers. Our job is to ensure our network is smart and flexible to support everyone to benefit from these new technologies.

UK Power Networks is changing

Local distribution network operators like UK Power Networks are changing to enable a decentralised and decarbonised energy system. Previously our role has been to maintain the cables and substations. Now we need to do that and take a more active role in managing the demand and supply of electricity to the communities we serve.

The changes happening in electricity offer some specific opportunities for local government to save money and generate income by adopting new approaches and technologies that can benefit local residents.

We want to ensure that all communities in our license areas are aware of these emerging opportunities and are able to shift to a clean energy future in the most cost-effective way.

OLD WORLD



Centralised (few large generators)

Predominantly fossil fuel based

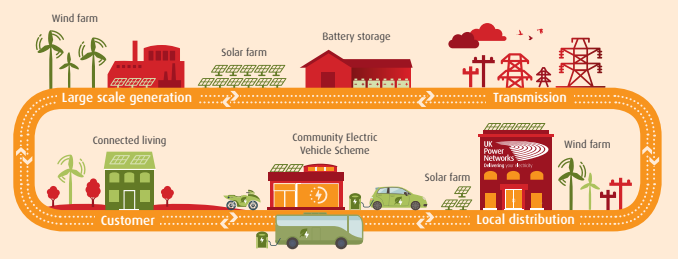
One-way power flows

Predicatable – Planned

Customers consume

Flexibility from generators

NEW WORLD



Decentralised (thousands of distributed generators)

Hybrid – much more renewables

Bidirectional power and information flows

Intermittant – Managed

Consumers self-produce and consume

Flexibility form demand, storage and generation

Why engage with your local distribution network operator?

You may own a lot of buildings: there are opportunities to generate clean energy and provide services to UK Power Networks, which we will pay for.

You may want to future-proof your new developments. If you want to power that development it is more than likely you will need to involve UK Power Networks.

You may have community energy schemes that are being developed in your area. By working with UK Power Networks you may be able to help them to achieve more cost-effective solutions that could benefit your residents, or you can direct them straight to us.

You may want to generate energy in order to increase your revenue or to deliver cost savings for your authority.

Why now?

Up to 200,000 local generators are connected to our network. Many of these generators produce electricity from renewable sources, helping the UK meet its climate change commitments. Advances in technology – in electricity storage and power electronics – mean that we can use more of that electricity when we need it.

UK Power Networks is developing a number of technical and commercial solutions to help its customers connect more local electricity generation. We are also interested in purchasing that electricity in certain circumstances to help to manage our network more cost-efficiently.

Some of these solutions are available now, some are at the product development phase and some are in the pilot phase.



Where UK Power Networks can help you

The changes happening in our energy system offer some specific opportunities for local authorities:

To save money

To generate income

To adopt new technologies that improve the lives of your community

To support your residents to develop community energy schemes

We know our local electricity network and are happy to share our knowledge with you to help you realise these opportunities.

We have developed some specific products to make it easier for you to connect things like electric vehicles and solar farms.

If you are already connected you may be able to provide us with services that we will be willing to pay for.

Services we offer

Keeping the cost of connection down

We facilitate connections of local generation and renewables to the network, offering a range of connection options that you can choose to suit your project, be that electric vehicle charge points, heat pumps, new housing, solar generation and/or battery storage. The cost of connecting to the electricity network can vary significantly and often depends on where you are connecting and when you want power. There are three products that may help.

Timed Connection

If you know when you need power and you can avoid the times we have a peak in demand, it is more likely that we will be able to provide your power requirement from the existing network. We can help you understand when those peaks are.

Active Network Management – on OUR network

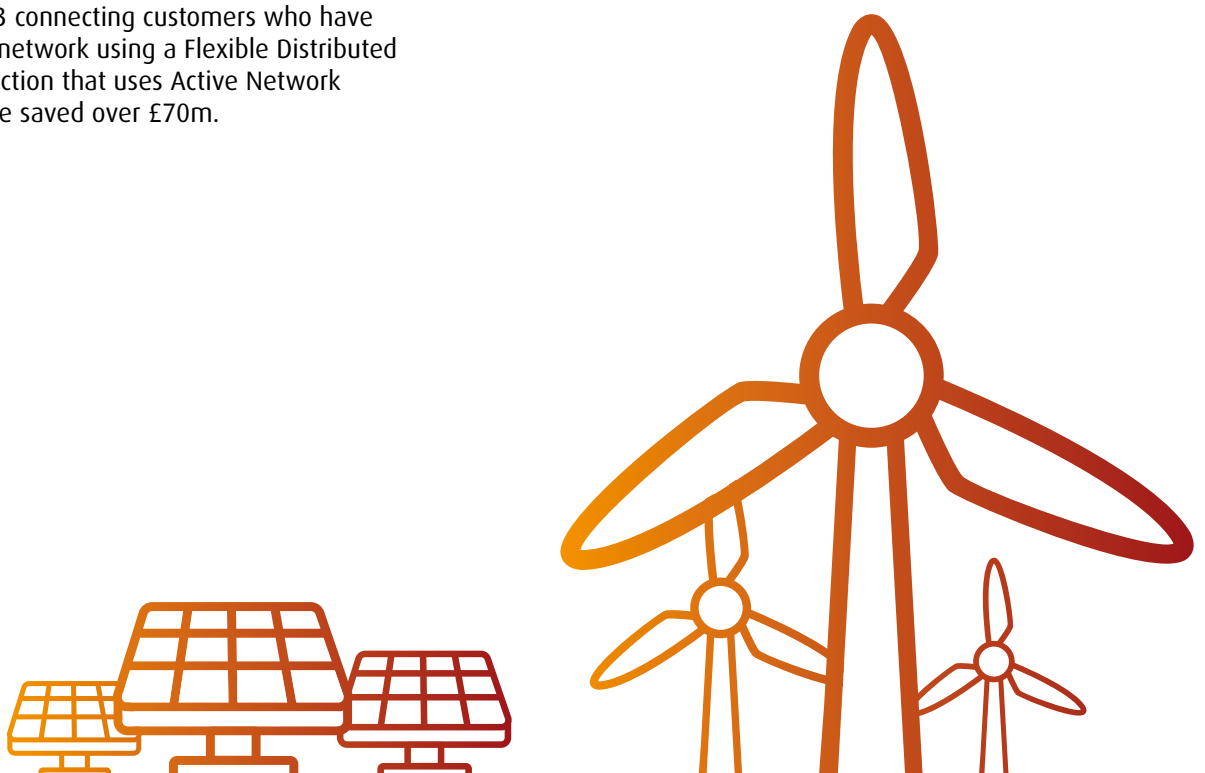
If you are generating electricity, we might need you to avoid generating at certain times but we may not need you to do that every day. Our network can be highly utilised at certain times in the year so you might be able to help us manage that. In this instance we may see if you are willing to let us reduce the amount you export when we need to. We will undertake a study to let you know how likely this is in any given year.

Collectively the 23 connecting customers who have connected to the network using a Flexible Distributed Generation Connection that uses Active Network Management have saved over £70m.

Active Network Management – on YOUR network

There are ways that you can provide additional power to your project or absorb excess generation without the need for traditional reinforcement by UK Power Networks. You might do this, for example, by using battery storage to capture excess electricity generation or provide additional power. This is emerging technology but there are a number of electrical consultants who can help you.

Come to us at the earliest opportunity to discuss your plans. Check out our connections pages: www.ukpowernetworks.co.uk/DER



Giving you money for your electricity

You could get paid for providing **flexibility services**. Residents and businesses can change the way they use or generate electricity to help us balance demand on the network. This can also apply to you as a local authority. For example, large-scale batteries can store renewable energy when demand on the network is low, and release it during the evening peak, or a major energy user can shift its operations to a time when there is lower demand on the network.

If you have energy projects such as solar farms, wind farms, **Combined Heat and Power**, **District Heating Networks** or storage you might be able to generate income through getting involved in our flexibility services market.

Flexibility Services

UK Power Networks is looking at alternatives to digging more holes and laying more cables to provide extra power to homes and businesses. We believe customers can provide us with that power at peak times. You may have electricity consuming assets or electricity generation assets or even battery storage assets, and so could be an important participant in this new market. The new market opens up new revenue opportunities to you and your residents.

As an indicative example, a local authority could generate up to £30,000 per year for four years by helping us defer building new substations through offering us flexibility services from its electricity generation and storage.

Flexibility Services can help local businesses cut costs too. All that is required is access to electricity consuming assets (air conditioning, compressors, refrigeration plant) or electricity generation assets (standby generators, **combined heat and power** plant) or even battery storage assets.

Check out our Flexibility Roadmap, to find out more about how you and your local businesses might be able to get involved:
<http://futuresmart.ukpowernetworks.co.uk/>

Find out where we are seeking flexibility services on the Piclo Flex platform: <https://picloflex.com/>

Case study: Piclo Flex: Online marketplace for local flexibility

Piclo Flex is an independent marketplace for flexibility buyers (Distribution System Operators like UK Power Networks) and flexibility sellers (**aggregators**, suppliers, community groups etc.) to find and contract with each other.

It will make it easier for local authorities, businesses and community groups to advertise the amount of electricity generation and demand that they have which is controllable. It will then match-make them to UK Power Networks' system needs. If contracted they will receive payment.

If you need to know more

- If you've got a question, comment or idea about Flexibility Services email us at flexibility@ukpowernetworks.co.uk
- If you want to know where we are advertising opportunities and where we are looking for flexible services then check out our platform <https://picloflex.com/>
- Information on our Flexibility Roadmap can be found at our website: <http://futuresmart.ukpowernetworks.co.uk/>

Collaborating and innovating to create a smart grid for all

Innovation Funding Incentive and Low Carbon Networks Fund

Ofgem has a range of funds designed to find solutions to the challenges of managing the electricity network with more renewable, decentralised generation and increased demand. We are keen to talk to local authorities and other customers with low carbon ambitions to see if we can secure funding from Ofgem to develop solutions together.

Please see our Innovation link:
<http://innovation.ukpowernetworks.co.uk/innovation/en/why-we-innovate/>

4.1

If you own buildings, such as social housing, community amenities...



Elected councillors

Your priorities probably include ensuring your residents can afford to keep their homes warm and that they do not fall into debt. Therefore, when it comes to the financial pressures involved in managing assets, keeping energy bills down is key.

Twinning solar power with battery storage offers real opportunities to help with these challenges. However, it can do more than that: adopting these measures can enable residents to understand more about the way smart energy is changing the way we use electricity.



Finance officers

Energy generation and storage, combined with flexibility services, can mean the financial benefits can be shared between the residents and the local authority. If you are responsible for buildings such as schools or leisure centres, adopting these measures can keep costs down. And over time, these projects can generate income for the local authority.



Energy/sustainability officers

The assets the local authority owns are the biggest opportunity to reduce energy consumption and cut carbon. Flexibility services, as well as battery storage and energy generation can help you meet these targets. It will improve the resilience of your power supply and helps in the management of outages.

Have you considered...

Battery storage especially when **twinned with solar panels**, can offer a range of advantages. It can reduce your energy costs and it can generate revenue if you choose to provide **flexibility services**. It also helps you reaching your CO₂ emissions targets by making the most of your renewables (it can work with wind too). And it improves security of supply.

Case study: Subsidy free solar in Milton Keynes
It is still possible to make **grid scale solar** electricity generation work in the right locations even in the absence of subsidies. Clayhill solar farm in Milton Keynes, combines the latest in solar and energy storage technology, with 10MW of solar PV co-located with five energy storage units totalling 6MW. It is a major step change for the industry: it has saved 4,452 tonnes of CO₂ annually so far and was the first large subsidy free solar farm in the UK.
<https://anesco.co.uk/clayhill-uks-first-subsidy-free-solar-farm/>



Case study: Powervault

Local residents are saving on their energy and will earn money thanks to our flexibility services in Barnet where batteries and solar panels are installed in nearly forty homes. UK Power Networks will call on the power stored in the batteries if needed (reducing the need to upgrade the grid) as part of a flexibility contract negotiated with manufacturer and **aggregator** Powervault.

If you need to know more

- If you've got a question, comment or idea about connecting renewables email us at:
DG-Q&A@ukpowernetworks.co.uk
- Information to help if you are considering connecting wind turbines, solar panels, storage or **combined heat and power**:
www.ukpowernetworks.co.uk/DER

Thinking about storage?

- Please check out our guide:
www.ukpowernetworks.co.uk/guidetostorage
- UK Power Networks also offers surgeries, which are an opportunity to discuss with our Design teams BEFORE you apply to connect:
www.ukpowernetworks.co.uk/haveyoursay/connections
- If you want to see where best to connect your renewable energy project register for our mapping tool/heat map:
www.ukpowernetworks.co.uk/internet/en/our-services/list-of-services/electricity-generation/find-out-where-our-overhead-network-is/
- If you are considering setting up and connecting a renewable energy project then please get in touch with us:
www.ukpowernetworks.co.uk/asktheexpertform



4.2

If there are community energy groups or projects in your area...



Elected councillors

Community energy has the potential to harness the most committed pioneers in your area to deliver renewable and low carbon schemes, and build a wider case for the shift to the new energy system. We can help Community Energy Groups navigate the connection process. Community energy can help us increase the resilience of our network, as well as increasing awareness and contributing to the shift to clean energy. It can also help you meet your own climate plans.



Finance officers

Community Energy projects often establish a Community Fund which is used for activities which currently local authorities are not in a position to fund. Investment from the local authority can often be matched by crowd funding, meaning your money goes further.



Energy/sustainability officers

Community energy can help us to balance the local grid, and while helping make the new energy system a reality, it can help to pave the way for local authority-owned projects at scale that will enable to you to meet your wider sustainability goals.

Have you considered...

What help community energy projects need?

We enable new markets for flexible services where we will pay community energy projects for their surplus energy to support the management of our networks.

We have approximately 25% of community energy organisations in England & Wales located across London,

the South and South East (Source: State of the Sector Report 2018, Community Energy England).

We have collaborated with Community Energy England and the regional hubs to ensure our services respond to the needs of community energy organisations and explore new ways to support community energy growth.

Case study: North Kensington Community Energy

Installing solar panels on a number of local schools is intended to reduce their energy bills and those of the community centre. Excess energy will be sold to the grid and the income should cover maintenance and management, pay a return to investors and provide for a community fund over the 20-year life of the project.

Case study: Kelsale-cum-Carlton Community Energy Ltd

This community benefit co-operative is based in a small Suffolk town of around 400 homes. They have a 32-panel, 8KW ground-mounted solar panel array in a field adjacent to the village hall. The panels provide electricity to the village hall and the village social club. The installation cost around £18,000 funded through a community share offer that attracted more than 100 investors – most of them residents in the village – who bought shares at £20 each. The money raised through the share offer also provided the ‘match funding’ which enabled the group to receive a grant of £15,000 from Suffolk County Council, to pay for improved insulation and secondary double glazing in the village hall.

For more see: www.power4kcc.org

If you need to know more

- Please visit our dedicated web page to support community energy:
www.ukpowernetworks.co.uk/communityenergy
- If you’ve got a question, comment or idea about community energy email us at:
communityenergy@ukpowernetworks.co.uk

Community Energy England

Useful guidance on how communities can get involved in community energy:

<https://hub.communityenergyengland.org/resources/resource/157/connecting-community-energy-a-guide-to-getting-a-n/>

<https://hub.communityenergyengland.org/resources/resource/10/community-renewables-grid-connection-module/>



4.3

If you want more electric vehicle charging infrastructure...



Elected councillors

Air pollution is a growing problem, not only in our big cities but in our towns too. Shifting the local authority fleet to electric vehicles and working with bus operators to do the same could significantly help to tackle this issue. Taxi drivers may need some help making the shift too. Helping them, and other businesses and residents to make the same move, will require putting charging points in the right place, in existing streets, estates and buildings as well as new developments. As the UK government has committed to phase out petrol and diesel car sales by 2040, UK Power Networks can help you connect the electric vehicle-charging infrastructure your community will need.



Finance officers

There are different commercial models for the ownership and operation of electric vehicle charging points. The cost of connecting the charging infrastructure to the electricity network will influence the viability of charging infrastructure in different locations. UK Power Networks can support you in identifying the most cost effective locations to install these charging points. We can also offer other products, such as timed connections, which can reduce the capital cost of such installations.



Energy/sustainability officers

We are keen to share with you the learning that we have generated from existing electric vehicle projects and trials. This includes helping you to understand predicted uptake and usage patterns of electric vehicles as well as the practical challenges and opportunities for connecting everything from slow chargers on street furniture to rapid charging infrastructure for businesses and fleets.

.....

Have you considered...

- What types of charge points you are considering?
- Your budget and timescale?
- Is there sufficient capacity in the electricity network in the area where you want to install charge points?

Read our guide "Getting electric vehicles moving" for some of the answers:
www.ukpowernetworks.co.uk/electriccharging

If you've got a question, comment or idea about electric vehicles email us at:
electricvehicles@ukpowernetworks.co.uk

Case study: Street lights to charge points

Retro-fitting street lamps with charging technology allows drivers to recharge their electric vehicles closer to their homes. It can provide a cost-effective solution with minimal additional street furniture.

Kensington & Chelsea have converted street furniture into electric vehicle charge points. In many built up areas, some residents do not have access to off-street parking to charge an electric vehicle at their home.

The charging points produce next to no running costs and can be installed practically anywhere: a wall, a bollard or integrated into an existing streetlight.

Case study: Vehicle-to-Grid Technology

UK Power Networks are involved in a series of innovation projects investigating whether electric vehicles can act as 'batteries on wheels' to add capacity to the network with their spare charge. Electric vehicles can generate revenue for their owners by supplying electricity stored in their batteries to the network at times of high electricity demand.

UK Power Networks are already working with local authorities across our regions, carmakers, bus and taxi companies, energy suppliers and charge-point companies to make sure the infrastructure we need is in place. Vehicle-to-Grid projects that UK Power Networks will be taking part in involve vehicle fleets, a bus garage, domestic customers and a public charging network for those without off-street parking.

If you need to know more

- Information to help if you are considering connecting electric vehicle charging points:
www.ukpowernetworks.co.uk/electricity/distribution-energy-resources

Thinking about electric vehicles?

Please check out our guides:

- Getting electric vehicles moving
www.ukpowernetworks.co.uk/electriccharging
- Turning your fleet electric
www.ukpowernetworks.co.uk/evfleet
- Help for Taxi and private hire vehicles (London)
www.ukpowernetworks.co.uk/evtaxi
- Connecting on the public highway
www.ukpowernetworks.co.uk/evhighway
- UK Power Networks also offers surgeries, which are an opportunity to discuss with our Design teams BEFORE you apply to connect an Electric Vehicle charging point:
www.ukpowernetworks.co.uk/haveyoursay/connections
- If you are considering setting up and connecting an Electric Vehicle charging point then please get in touch with us:
www.ukpowernetworks.co.uk/asktheexpertform



4.4

If you are considering new developments such as housing, or regenerating your town centre...



Elected councillors

All new developments place demands on the electricity network and it is important that local authority planners as well as commercial developers talk to UK Power Networks as early as possible during the design of the development. Incorporating electricity generation and storage into new developments could lower the cost of connection as well as offering income-generating opportunities.



Finance officers

The upfront capital cost of electrical connection infrastructure for new developments can be significant. Exploring new ways to reduce this upfront cost, and the opportunities to earn revenue from that infrastructure over the long-term, will become more important as we move to a smart, flexible energy system. We are happy to talk to stakeholders at our pre-application surgeries to discuss all these options.



Energy/sustainability officers

Regeneration and new developments necessitating changes to the electricity grid can create opportunities for cost effective investment in local energy projects involving renewable electricity generation, battery storage and electric vehicle charging infrastructure to enable reduced CO2 emissions and cut costs.

.....

Have you considered...

integrating new energy technologies?

- If you want to see where best to connect your renewable energy project register for our mapping tool/heat map:
www.ukpowernetworks.co.uk/internet/en/our-services/list-of-services/electricity-generation/find-out-where-our-overhead-network-is/
- If you are considering setting up and connecting a renewable energy project then please get in touch with us:
www.ukpowernetworks.co.uk/asktheexpertform

Case study: Park & Ride site in Cambridgeshire
Cambridgeshire County Council is developing a Smart Energy Grid at the site in St Ives, linked to a solar carport system that will generate electricity.

Solar panels will be installed on canopies above the cars to generate electricity and used to power highly efficient LED lighting, support electric vehicle charging while additional energy will be stored and exported back to the grid.

Case study: Waterloo bus garage

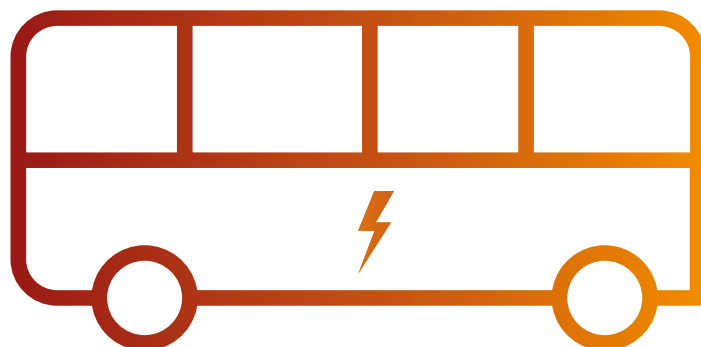
Electric buses are key to improving air quality and significantly reducing carbon emissions.

Traditionally UK Power Networks would upgrade the power supply to provide the maximum power requirement at any time of the day – but that would have been expensive and taken too long for the customer. Instead, we offered our new Timed Connections approach.

This results in savings for customers as they don't have to pay for costly network upgrades in order to achieve the maximum power requirement at all times of the day. The bus operator gets the power it needs in the off-peak hours and gets less during the day, when its needs less. A fleet of 51 single decker electric buses now charges up at Waterloo bus garage.

If you need to know more

- If you've got a question, comment or idea about connecting renewables email us at:
DG-Q&A@ukpowernetworks.co.uk
- Information to help if you are considering a new connection:
www.ukpowernetworks.co.uk/electricity/new-connection
- UK Power Networks also offers surgeries, which are an opportunity to discuss with our Design teams BEFORE you apply to connect:
www.ukpowernetworks.co.uk/haveyoursay/connections



Glossary of terms

Aggregator is any organisation or individual that brings energy customers together as a group and this can be to obtain better energy prices, provide flexibility services such as Demand Side Response, or other benefits when acquiring or providing energy related services.

Clean Energy is generated without fossil fuels. Solar and wind and biomass are becoming a bigger part of our energy mix, but as a neutral market facilitator we connect other sources such as energy from waste plants, gas fired combined heat and power and generators in our bid to make the network smarter and more resilient.

Combined Heat and Power is the process of a heat engine or power plant that captures and utilises the heat that is a by-product of the electricity generation process. The heat generated during this process is supplied to an appropriately matched heat demand that would otherwise be met by a conventional boiler.

Distribution System Operator (DSO) securely operates and develops an active distribution system comprising networks, demand, generation and other flexible distributed energy resources, it will enable competitive access to markets and the optimal use of DER on distribution networks to deliver security, sustainability and affordability in the support of whole system optimisation. A DSO enables customers to be both producers and consumers; enabling customer access to networks and markets, customer choice and great customer service.

District Heating Networks is a distribution system of insulated pipes that takes heat from a central source and delivers it to a number of domestic or non-domestic buildings. The heat source might be a facility that provides a dedicated supply to the heat network, such as a combined heat and power plant; or heat recovered from industry and urban infrastructure, canals and rivers, or energy from waste plants.

Flexible Distributed Generation Connection is a point of connection without the need to carry out extra work on the electricity network.

Flexibility Services is where a customer can shift, reduce or increase how much they consume or generate to meet their own energy needs or to support the local distribution network in turn for payment. Flexibility services provides an alternative to network upgrades and drives lower energy bill costs.

Grid scale solar is a Solar project connected direct to the network, not connected to a building.

Smart grid brings together successful innovations and new technologies that work together to make full use of the flexibility on the distribution network, for efficient management of the network and for wider network stakeholders to realise a decentralised, digitalised and decarbonised future.





Contact Details

Public Contact Details

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(both free from landlines and mobile phones)
- 🌐 ukpowernetworks.co.uk
- 🐦 [@UKPowerNetworks](https://twitter.com/UKPowerNetworks)
- 📘 facebook.com/ukpowernetworks