



Distribution Networks and Innovation Jargon Buster

Helping our communities
get involved in innovation

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1 Introduction



This document aims to explain the terms and background information needed to understand a little more about how Distribution Networks operate and how innovation is carried out within Western Power Distribution.

It should be noted that this document is based on WPD's processes, but the general requirements will be similar across all Distribution Network Operators. The document is laid out in the following sections:



Electricity Sector



Low Carbon Context



Networks and Requirements



Connections



Innovation



Flexibility

Each section is then split into further subsections of terms relating to a specific area. This is to clearly show how processes and components work together and also to help the reader to find the terms they need as they develop their knowledge.

The main aim of the document is to provide background information on networks and their operation, innovation and flexibility.



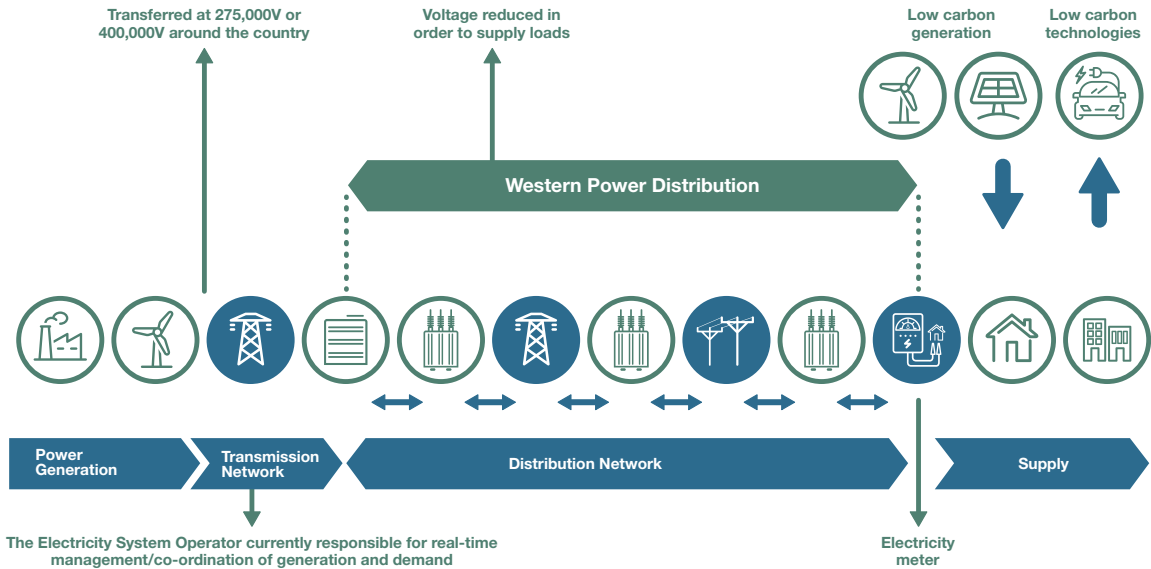
2 Electricity Sector



Before we go into the details of innovation it is important to understand how the electricity industry works and how it is structured. Below is an outline of the roles and responsibilities of each part of the system.

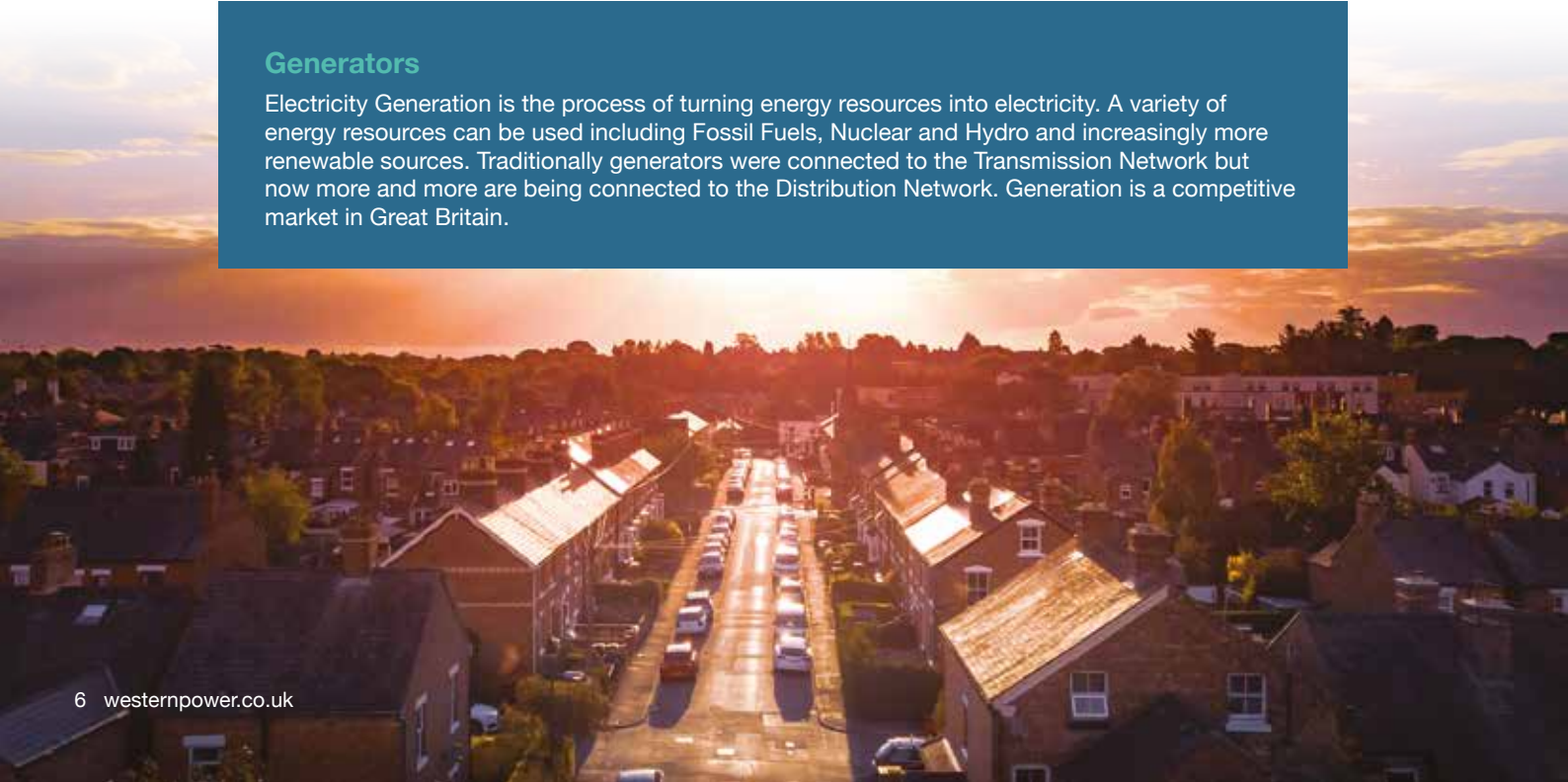
2.1 Key Roles and Actors

This section outlines each part of the system involved in the movement of electricity from where it is generated to the consumers. The way these fit together is shown in the figure below:



Generators

Electricity Generation is the process of turning energy resources into electricity. A variety of energy resources can be used including Fossil Fuels, Nuclear and Hydro and increasingly more renewable sources. Traditionally generators were connected to the Transmission Network but now more and more are being connected to the Distribution Network. Generation is a competitive market in Great Britain.



Transmission Operator (TO)

The Transmission Network is in place to carry electricity across the country at high voltages (typically 275kV and 400kV). Transmission Operators (TO) are responsible for this infrastructure. There are three monopoly Transmission Operators in Great Britain that pass electricity on to the Distribution Networks. These are National Grid Electricity Transmission, Scottish Hydro Electric Transmission and Scottish Power Transmission.

Electricity System Operator (ESO)

The Electricity System Operator (ESO) is responsible for the management of the real time electricity system. Once supply and demand have been matched commercially, the ESO takes over to ensure that the wider system remains balanced and within operational parameters on a second by second basis. There is one ESO in Great Britain (National Grid Electricity System Operator) who is responsible for balancing supply and demand across the various TOs.

Distribution Network Operators (DNO)

The Distribution Network is in place to take electricity from the Transmission Network to the end customers over a variety of voltage levels. The result of this is a low voltage feed to customers which can be used in their homes. The Distribution Network Operator (DNO) operates, maintains and improves the Distribution Network with a key focus on ensuring reliability of supply. DNOs take the energy through overhead lines and underground cables to homes and business in the network which they own and operate. The UK is split into 14 monopolised licence areas operated by 6 organisations. DNOs are regulated by Ofgem with expected performance, targets and costs set via price controls. The current price control runs until 2023.

Distribution System Operator (DSO)

With the rapidly changing requirement for both generation and consumption on the Distribution Network, as well as the development of new technologies, the new term of Distribution System Operator (DSO) has emerged. The Distribution System Operator is the evolution of the DNO, evolved to operate and develop an active distribution system, therefore enabling response to demand, generation and other distributed energy resources. This adds new functions and responsibilities to the DNO. It should be noted that in Europe the term DSO is simply used to cover what the UK would refer to as a DNO.

Suppliers

Electricity Suppliers buy energy at a wholesale level to sell it to customers. Suppliers are the main point of contact between most consumers and the electricity system in what is known as the Supplier Hub Principle. To this end it is Suppliers that pay for the various charges needed to keep the various Network Operators and System Operators going, as well as various environmental levies. Suppliers aggregate all the costs of the system and consolidate them for their customers. The supply market is competitive due to customers having the choice of which supplier they wish to use.

Consumers

Electricity consumers can include both domestic and business customers. They purchase electricity from suppliers in an approved way for their own usage. Each consumer has a unique identification number known as their Metering Point Administration Number (MPAN).

Office of Gas and Electricity Markets (Ofgem)

Ofgem is the industry regulator. It is a non-ministerial government department with the role of protecting the interests of existing and future electricity and gas consumers. They issue licences to the relevant regulated parties. Network companies are regulated via price controls. These are set periods of time for which expected outputs, performance and costs are set. Ofgem currently use a framework called RIIO (Revenue = Incentives + Innovation + Outputs).

Aggregators

Aggregators are organisations who specialise in coordinating and aggregating Flexibility Services from customers. Their role is to send signals to their customers to adapt their demand in response to system operators or market prices, as well as to represent them commercially.

Independent Distribution Network Operator (IDNO)

Independent Distribution Network Operators build, operate and maintain their own local distribution networks. These are directly connected to the DNO or connected by a further IDNO. These IDNOs are licensed by Ofgem and are regulated in the same way as a DNO and they create competition in the operation of Distribution Networks.

The Energy Networks Association (ENA)

The Energy Networks Association (ENA) is the trade body representing the transmission and Distribution Network Operators for gas and electricity in the UK and Ireland.

3 Low Carbon Context



This section outlines some of the terminology used in the move towards a low carbon economy and the associated impact on electricity networks.

Net Zero

Net Zero is the cutting of net greenhouse gas emissions by 100% of those found in 1990. In 2019 the UK committed to achieving Net Zero by 2050. Gross Zero would mean reducing all emissions to zero, however Net Zero allows for some emissions as long as they can be offset.

Distributed Generation (DG)

Distributed Generation (DG) is generation that is connected to Distribution Networks, rather than traditional Transmission Network connected large generation. These include renewable generation such as wind, solar and fossil fuel-based assets.

Distributed Energy Resources (DERs)

Distributed Energy Resources (DER) are small assets that are connected to Distribution Networks that can be utilised in flexibility. DERs are a subset of DG.

Low Carbon Technologies (LCTs)

Low Carbon Technologies (LCTs) are technologies with significantly reduced carbon impact. These are able to carry out a function that could normally rely on fuels such as Fossil Fuels to work. These can include Electric Vehicles, Heat Pumps and Solar Panels.

- **Heat Pumps (HP)**

Heat Pumps (HP) are a form of space heating which are becoming popular in the decarbonisation of heat. They can be Air Source Heat Pumps (ASHP) or Ground Source Heat Pumps (GSHP) and can be scaled for installations in domestic and commercial property.

- **Electric Vehicles (EV)**

Electric Vehicles (EV) are becoming the primary technology used in the decarbonisation of transport. Battery Electric Vehicles operate with no form of internal combustion engine therefore are not reliant on fossil fuels.

- **Photovoltaics (PV)**

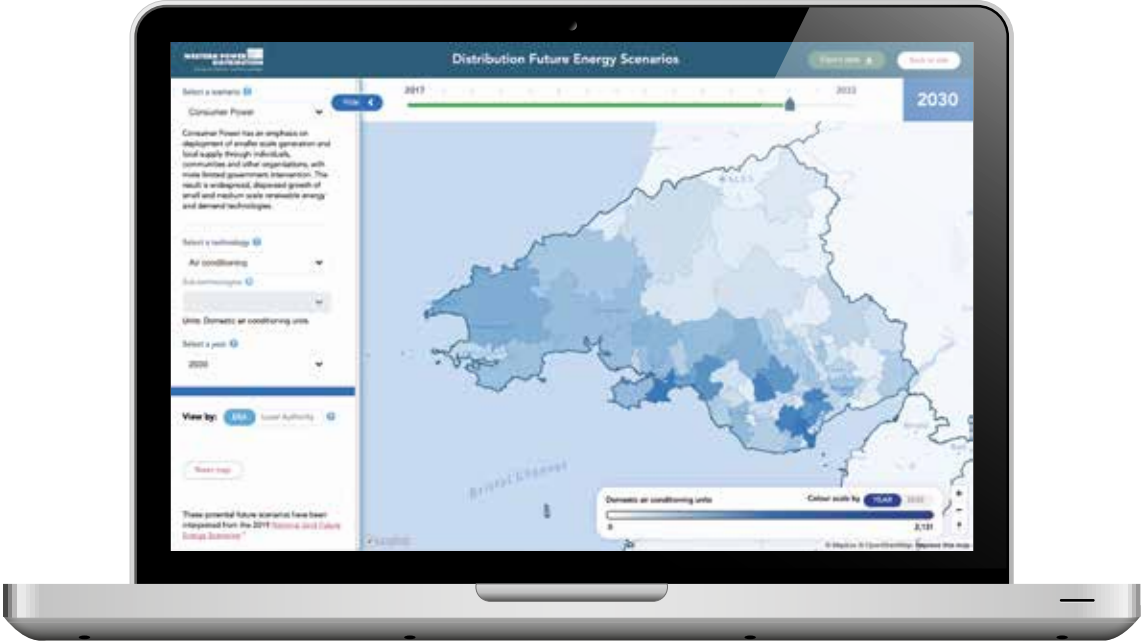
Photovoltaics (PV) generally refers to solar panels. These convert solar energy into electricity.

Future Energy Scenarios (FES)

The Future Energy Scenarios (FES) are developed by National Grid ESO and outline multiple paths for the future of energy in the next thirty years and beyond. They look at the changes that may come for the industry and consumers and are used as the base for other future looking work. These scenarios are on a whole system basis so incorporate gas and electricity at transmission and distribution levels. More detail can be found at fes.nationalgrid.com

Distribution Future Energy Scenarios (DFES)

The Distribution Future Energy Scenarios (DFES) outline a range of credible future growths on Distribution Networks. These look to understand how generation and demand will change at a local level.



At WPD these are created for each regional area and more information can be found at: www.westernpower.co.uk/smarter-networks/network-strategy/distribution-future-energy-scenarios

Open Networks Project

The Open Networks Project (www.energynetworks.org/electricity/futures/open-networks-project) is run by the Energy Networks Association and aims to change the way energy networks operate. Its intention is to facilitate more DERs by transitioning the networks to a smart and flexible system.

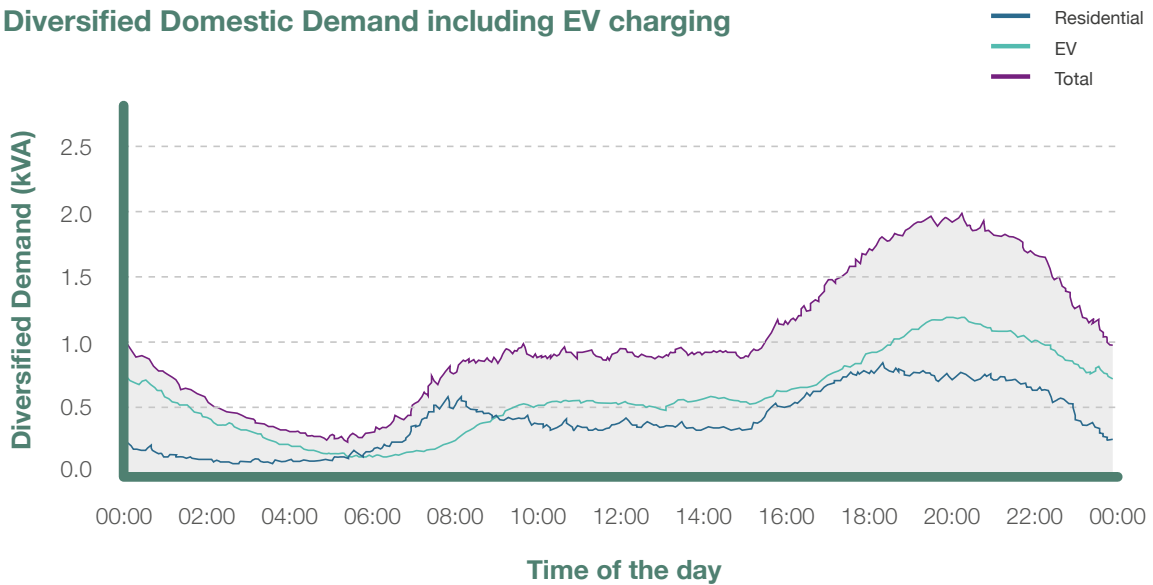
4 Networks and Requirements



This section aims to help you understand the conditions that are present on the network that can lead to a need for innovation and Flexibility Services by outlining what network operators need to monitor and manage in order to meet the increasing Electricity Demand.

Electricity Demand – The electricity required to meet the needs of all consumers on the network.

Diversified Domestic Demand including EV charging



Real Power

Real Power (measured in Watts, **W**) is the magnitude of power that can be used by customers to power their electrical devices. This is measured and charged to the customer as the energy used. Traditionally Real Power impacts the thermal constraints on the network.

Reactive Power

Reactive Power (measured in Volt Ampere reactive, **VA_r**) is the magnitude of power that cannot be used by customers to power their devices. The source of this can be in generation or electrical machinery such as motors. Reactive Power has an impact on the Voltage Levels on the network.

Apparent Power

Apparent Power (measured in Volt Ampere, **VA**) represents both real and reactive power as it is made up of a component from both values.

Diversified Demand

Diversified Demand is the expected peak demand on the network during the period and is the expected proportion of the maximum demand.

Voltage Levels

Electricity Networks operate at a range of voltage levels. Higher voltage levels allow for the distribution of more power with lower losses over longer distances. However, the associated equipment is more expensive. The Voltage Levels operated in local areas can differ depending on the historical development on the network in that location. It should also be noted that UK terminology for network levels doesn't always align with that used by our European colleagues.

• Low Voltage (LV)

Networks operating at less than 1000V, in Great Britain this is typically 230/400V. This is the network that connects directly to most consumers. An LV network could feed anywhere from a single customer to a few hundred.

• High Voltage (HV)

Networks operating at between 1kV and 22kV, in Great Britain this is primarily 11kV but there are a few 6.6kV and 20kV networks. These Voltage Levels feed into the LV networks from higher voltage networks and distribution substation step the voltage down to LV.

• Extra High Voltage (EHV)

Networks operating at above 22kV, in Distribution Network this will be 33kV, 66kV and 132kV. Grid substations will take electricity from Transmission Networks and voltage will be stepped down to 132kV. Usually Tower Lines then take this across the distribution area to Bulk Supply Points where the voltage will be stepped down again to 33kV. The 33kV network comprises of Overhead Lines and Underground Cables and feeds into Primary Substations.

Voltage Limits

Statutory Voltage Limits are in place on UK DNOs to ensure that customer's assets can work safely and as expected. If these were not maintained the equipment would be operating outside of its rated voltage range and it could cause failure. The limits for LV networks in the UK are +10% -6%. This is a range of between 216.2V and 253.0V. At 11kV and 33kV the limits are $\pm 6\%$ and at 132kV the limits are $\pm 10\%$. This is the driver for voltage constraints as the level must remain in the limits set. The voltage limits depend on the voltage level.

Network Considerations and Constraints

A Network is considered Constrained when it reaches the upper limit of its technical capability. Should additional load need to be connected, the local network may need to be Reinforced. Constraints stem from the characteristics of the network and the three main types are Thermal, Voltage and Fault Level.

• Thermal

Current flow in conductors produces heat that increases as the current magnitude increases. The conductors have a maximum operating temperature and excess current can lead to this being reached or exceeded. Exceeding this reduces the asset life and can be seen as the Demand along the network increases or further generation is being distributed.

• Voltage

Voltage Levels on the network must remain within the statutory limits set for each Voltage Level. This makes sure that consumer's equipment operates correctly. Voltage Levels drop along the length of lines and as the proximity of Demand to supply changes the levels can be greatly impacted. More sources along the network increase voltage and more Demand decreases voltage.

• Fault Level

The magnitude of current that flows under network fault conditions is known as fault current. Fault Level is based on this. Fault current is supplied by generation connected to the network by an increase in DERs can lead to an increased fault level. Although protection systems are in place to act when a fault occurs, an increase in fault level can lead to the assets used for disconnection not being rated for use.

Network Reinforcement

Installing or upgrading assets on the network to increase capacity and make the network more secure. For DNOs this can include Power Transformer capacity upgrades or the development of new substations. This can be costly and may need to take place in a large number of network sections.

Network Resilience

A networks ability to operate in all conditions and the ease of recovery following fault conditions.

Balancing

Balancing is carried out by the ESO to ensure supply and demand is met and operation is within limits, including electrical frequency. The challenge of balancing is very different to managing the physical Network Constraints.

Protection

Network Operators are obliged to operate their network safely and this is achieved using electrical protection. Protection is in place to keep those operating the network and customers safe, as well as ensuring that assets are operating correctly. The protection schemes will monitor parameters on the network and if found to be outside of the acceptable level the network may be disconnected.

Power Transformer

Power Transformers are used on the network to step down voltage to different Voltage Levels to avoid losses as it passes through the network. The change is proportional to the ratio of the Transformer.

Switchgear

Switchgear is found on the network to operate as switches when removing assets, sections of network, or changing the network topology. This can include assets that are capable of acting under normal operation e.g. disconnectors or assets that can also act under fault conditions e.g. circuit breakers.

Cables

Underground Cables are used in urban networks to transfer power and run between substations and to customers properties. These can be found at all Voltage Levels.

Overhead Conductor

Overhead Conductor is primarily used in rural networks to connect parts of the network and connect to customers. This will be found mounted on poles and associated pole mounted equipment can be utilised with it including transformers and switchgear.

Distribution Substation

Distribution Substations are found all across the network and are the point where voltage is stepped down to Low Voltage for use by customers. The main components of these are a Power Transformer, Switchgear and Protection.

Voltage Transformer

Voltage Transformers are used on the network to step down the voltage to a measurable level. The change is proportional to the ratio of the transformer. Their aim is to feed into protection and monitoring devices.

Current Transformer

Current Transformers are used to reduce current levels on the network so that they can be monitored and metered. In a similar way to voltage transformers, ratios are set to enable a measurable value. Current Transformers are also used in network protection which is in place to maintain a safe network for the public and operators.

Supervisory Control and Data Acquisition (SCADA)

Supervisory Control and Data Acquisition (SCADA) is a system in place on networks to collect data and feed it back to control centres. It is in place to control and monitor assets on the network.

Long Term Development Statement (LTDS)

The Long Term Development Statement (LTDS) is written to help current or future users of the network find opportunities for additional use. Within the statement a design overview can be found, as well as asset detail data for 132kV, 66kV and 33kV assets. Each license area has a separate statement.

More detail can be found at: www.westernpower.co.uk/our-network/long-term-development

System Wide Resource Register (SWRR)

The System Wide Resource Register (SWRR) is in place to provide information to electricity network stakeholders on connected resources and network services. Using an industry agreed format it provides information on generation and storage resources that are currently or will be connected to our network.

More detail can be found at: www.westernpower.co.uk/our-network/system-wide-resource-register

Data Portal 2

The aim of the portal is to provide third parties with access to asset information data and mapping for planning purposes. Examples of users include IDNOs and ICPs.

More detail can be found at: dataportal2.westernpower.co.uk

Shaping Subtransmission Reports

Analysis is carried out every two years on the subtransmission network for each license area. This is made up of 132kV and 66kV networks and the associated substations. This analysis is based on the Distribution Future Energy Scenarios. The aim of this is to assess the networks ability to accommodate new demand and generate new connections. A report for each area is then published and a webinar is hosted to pass on the information found.

More detail can be found at: www.westernpower.co.uk/smarter-networks/network-strategy/strategic-investment-options-shaping-subtransmission



5 Connections



Connections to the network will need to be applied for using the processes provided by DNOs or Independent Connection Providers (ICPs). This section outlines the types of document that an applicant will become familiar with and some of the conditions that may apply.

A guide has been produced by Regen and can be found at:
www.energynetworks.org/assets/files/news/publications/1500108_ENA_WPD_guide_AW_110416.pdf

Budget Estimate

A Budget Estimate is an early, free of charge indication of the likely cost when the full details of the scheme are not known or the connection isn't needed in the near future. The fees for design and assessment may be payable when a connection offer is made.

Connection Offer

A Connection Offer will be carried out once a full application has been received. This will involve a number of studies to assess the connections impact on the network. The offer will contain details of the connection charges. These charges will include the cost of any new assets, reinforcement of existing networks and recovery costs from previous works. Options available and any conditions that must be met will also be included.

Connection Agreement

A Connection Agreement is made between the applicant and the DNO and details terms and conditions for connection to and remaining connected to the network. These can include Export Limiting, Timed Connections, Soft-Intertrips or Active Network Management.

Timed Connection

A Timed Connection is a generation connection where the output is curtailed during specific times. The curtailment times will be considered for different times of the year. These are for small connections.

Soft-Intertrip

Soft-Intertrip is designed to allow the connection of assets that may exceed a network limit but can operate under some conditions if monitored. The connection is curtailed when no further capacity is available.

Active Network Management (ANM)

Active Network Management (ANM) systems monitor the limits on the network to ensure that generation is provided to meet the level of demand. This makes use of distributed control systems.

Export Limitation

Export Limitation Schemes are in place to allow customers to increase their amount of generation or energy storage installed when this would normally lead to the need for reinforcement. This involves limiting the net export on their connection and this is achieved by monitoring their apparent power.

Sole Use Asset

When costing an asset to be installed on the network the use of it must be considered. If the asset is only for use at one site it is known as a Sole Use Asset.

Cost Apportionment Factor (CAF)

The Cost Apportionment Factor is the proportion of costs that a new customer is required to pay for the network reinforcement needed for their connection. This is calculated by looking at how much of the new network capacity their connection will make use of.

Contestable Work

Contestable Work is work that is open to competition and can be carried out by Independent Connection Providers.

Independent Connection Providers (ICP)

Independent Connection Providers (ICP) are companies that have the accreditation needed to provide new connections in competition with DNOs. These providers must be registered.

Point of Common Coupling (PoCC)

A Point of Common Coupling (PoCC) is a point at which more than one customer or generator is connected to the network.

6 Innovation



Innovation is a key part of our business. As a company we always seek to find the best ways of working and have taken many innovative ideas into day to day operation. The way innovation is carried out and the process involved are defined in this section.

More information on WPD Innovation can be found at: www.westernpower.co.uk/innovation



6.1 Strategy

WPD Innovation Strategy

Our Innovation Strategy describes our approach to innovation and how we continue to innovate within our business to improve efficiency and set the foundations for smarter network operation and the transition to a Distribution System Operator. It is reviewed and updated annually.

More information can be found at:
www.westernpower.co.uk/innovation/innovation-strategy

ENA Electricity Innovation Strategy

The ENA has created its Innovation Strategy as a voice for electricity networks as part of the gas and electricity transmission and distribution licensees joint innovation strategy. The strategy outlines the network innovation themes and principles to be used.

ENAs Innovation Strategy can be found at: www.energynetworks.org/electricity/futures/network-innovation/electricity-networks-innovation-strategy.html

Innovation Forward Plan

The Innovation Forward Plan is in place to build on our Innovation strategy and explain in detail how the innovation strategy is being implemented through our wide portfolio of projects.

WPDs Innovation Forward Plan can be found at:
www.westernpower.co.uk/innovation/innovation-forward-plan



6.2 Funding

Innovation project funding has been made available through different mechanisms introduced by Ofgem and the wider industry. Over the years the structure and scope of this has changed and a number of mechanisms have been in place.

6.2.1 Current Funding Mechanisms

Network Innovation Allowance (NIA)

The Network Innovation Allowance (NIA) was introduced by Ofgem as part of its RIIO price controls. It is a set allowance each network licensee receives as part of their price control allowance. Its aim is to fund the smaller technical, commercial or operational projects and it is to benefit customers and networks financially.

More information can be found at: www.ofgem.gov.uk/network-regulation-riio-model/network-innovation/electricity-network-innovation-allowance

Network Innovation Competition (NIC)

The Network Innovation Competition (NIC) was also introduced by Ofgem as part of its RIIO price controls. The NIC is an annual opportunity for electricity network companies to compete for funding for the development and demonstration of new technologies, at a higher cost than those funded by NIA.

More information can be found at:
www.ofgem.gov.uk/network-regulation-riio-model/current-network-price-controls-riio-1/network-innovation/electricity-network-innovation-competition

Collaborative Energy Portfolio (CEP)

The Collaborative Energy Portfolio (CEP) is a procurement framework is in place to ensure the running of timely and effective projects that are run by members of their board. It allows for the collaboration of organisations to address common industry challenges. This framework is in place for both innovation projects and business as usual projects.

6.2.2 Previous Funding Mechanisms

Low Carbon Networks Fund (LCNF) (tier 1, tier 2)

The Low Carbon Networks Fund (LCNF) was an innovation funding mechanism that ran as part of Ofgem's price review period finishing in 2015. This made up to £500m available to help DNOs try out new technology and operating and commercial arrangements. There were two tiers in this fund, the first helped DNOs recover some of the cost incurred on small projects, and the second ran as an annual competition to help fund flagship projects.

Innovation Funding Incentive (IFI)

The Innovation Funding Incentive (IFI) was a funding mechanism put in place by Ofgem to accommodate research and development activities which provide benefits to customers. It was replaced by the NIA in 2013 but continued to be active for DNOs until April 2015.

6.3 Knowledge Sharing

A key element of DNO Innovation is knowledge sharing. There is a key focus on ensuring that learning is shared between DNOs as well as with wider industry.

Smarter Networks Portal

The Smarter Networks Portal (www.smarternetworks.org) acts as a place for the publishing of innovation work carried out under the LCNF and IFI funding mechanisms as well as NIA and NIC. The aim is to demonstrate the project learning, news and dissemination events. The portal provides an overview of technical and commercial coverage of current projects as well as identifying areas and gaps in what has been achieved. The Smarter Networks Portal hosts the following formal documents which are required as part of the funding governance:

- **Project Registration and Project Eligibility Assessment (PEA)**

The Project Registration document is in place for NIA governed projects and follows a set format to ensure sufficient details and comparability with other projects. It outlines the problems that influenced the project's development and then outlines how the project will solve the issue and how its success will be judged. An NIA project must meet one of the specific requirements outlined in the Project Eligibility Assessment (PEA) and have learning that can be applied by all relevant networks.

- **Closedown Report**

At the completion of an innovation project a Closedown Report will be produced. This covers the scope and plans for the project and then outlines what happened in the project. This includes details of work carried out and the results compared to the original success criteria. It is also important to display the learning from the project within this report and the outcomes gained.

- **Annual Summary**

An NIA Summary Report is produced annually to give highlights of the projects that have been active within the year and demonstrate how this fits into the overall innovation strategy. It is also important within this report to show how the findings have been implemented on the network and what the plans are for the future following on from work carried out.

Additionally, within WPD we try and share as much as we can and therefore supplement the information on the Smarter Networks Portal (www.smarternetworks.org) with more details on our website www.westernpower.co.uk/smarter-networks

• **Webinars** • **6 monthly reports** • **Full Closedown reports** • **All other relevant project documentation**

We also share data via the Energy Data Hub. www.westernpower.co.uk/our-network/energy-data-hub

6.4 Getting involved

It is important to make it easy for industry, academia, consumers and communities to get involved in innovation and therefore opportunities to do so are made available including the annual calls. More information on this is given in the community innovation guide by Regen. www.regen.co.uk/publications/electricity-network-innovation-guide-for-communities-2018

Network Innovation Collaboration Portal

The Collaboration Portal (www.nicollaborationportal.org) helps achieve two important aspects of NIC and NIA funded projects. These are the identification of external partners and the establishment of communication between network licensees and operators. To achieve this the portal includes the details of partners and emails alerts with details of new proposals that are relevant.

Annual Innovation Calls

Annual Innovation Calls are in place to help initiate work with partners by giving them the chance to meet a number of challenges. These calls will be published on our website and include specific challenges. When a call is made responses can be submitted using the form found on our website.

7 Flexibility Services



The procurement of Flexibility Services is a significant new area of work for WPD built on a number of innovation projects. The following sections will help you to understand how Flexibility Services work and how all of the systems around it are carried out. Inherently DNO Flexibility Services are procured to help change local load patterns and push back the need for Reinforcement. This can range from supermarkets turning off their freezers to reduce demand to Generators increasing their electricity output to help meet demand.

7.1 Providing Flexibility Services

This section explains who provides the Flexibility Services, either commercially or at a domestic level and how Demand Response works to aid the network.

Flexibility Provider

Providers of flexibility will be those who are able to help manage demand in response to network conditions. They will include Generators or customers with controllable loads. For example a supermarket could control their refrigeration, or a domestic customer could alter when they charge their Electric Vehicle.

Demand Response

Demand Response stems from the recognition that customers can reduce or increase their electricity demand or increase their generation using existing power generation assets. The change in demand will coincide with peak times and any changes will lead to financial reward.

Domestic Flex

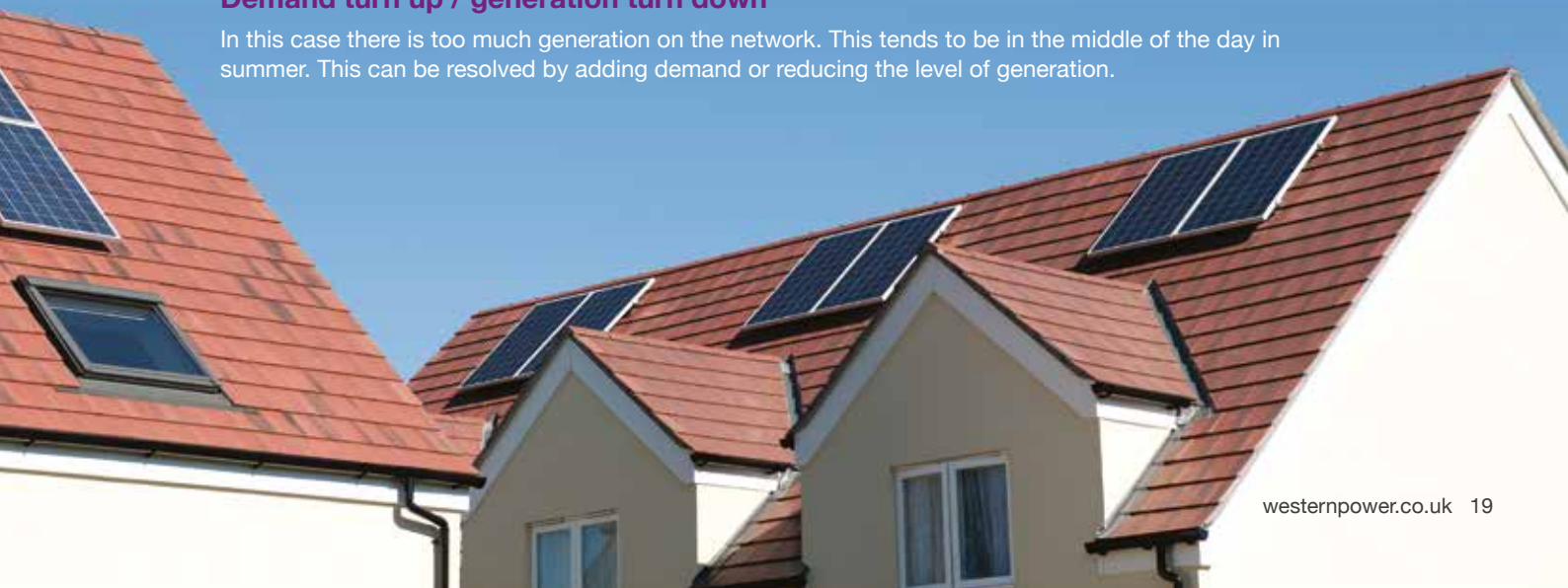
Domestic Flex is flexibility provided by domestic customers rather than larger scale commercial assets. These can include household LCTs including renewable generation, Heat Pumps and battery storage.

Demand turn down / generation turn up

In this case there is too much demand on the network. This tends to be on winter evenings. This can be resolved by reducing the amount of demand or by adding generation.

Demand turn up / generation turn down

In this case there is too much generation on the network. This tends to be in the middle of the day in summer. This can be resolved by adding demand or reducing the level of generation.



7.2 Types of Flexibility Services

The Flexibility in Great Britain website (www.energynetworks.org/electricity/futures/flexibility-in-great-britain.html) details the flexibility services in use by electricity network operators. These electricity network operators make use of Distributed Energy Resources. This section outlines the types of Flexibility Services currently available and why they are used.

Flexible Power

Flexible Power was created by Western Power Distribution for the procurement of Flexibility Services. The Flexible Power website is a key source for further information on WPD's procurement of Flexibility Services. www.flexiblepower.co.uk.



Constraint Management Zone (CMZ)

A geographic area in which a Flexibility Service is needed. The current WPD Constraint Management Zones (CMZ) are displayed at www.flexiblepower.co.uk/map-application

DNO Flexibility Services

There are currently 4 standard DNO flexibility products. Each CMZ will seek to use a number of these services. WPD currently procures 3 of the 4 services. Full details can be found at www.flexiblepower.co.uk/flexibility-services

- **Sustain Service**

This is a scheduled service, used to manage periods of peak demand on the network. The DERs required availability windows, and in some cases utilisation windows, are fixed at the point of contract for the full contract period.

- **Secure Service**

This service is required to manage peak demand on the network, usually on weekday evenings. The DERs required availability and utilisation windows are fixed week-ahead to reflect a more accurate forecast of demand.

- **Dynamic Service**

The Dynamic Service is required to support the network during fault conditions, often during maintenance work. The DERs required availability windows are fixed week-ahead to reflect a more accurate forecast of demand. Utilisation requirements are decided in-day to reflect real network conditions.

- **Restore Service**

This is a utilisation only product needed to support the network during network faults that occur as a result of equipment failure.

Signposting

Signposting is the proactive publishing of information to help customers understand where and how flexibility can help the system to maximise efficiency. This includes a map of where resources are needed, an expected timeframe for required services, and a suggested energy magnitude.

Balancing Services

Balancing Services, also known as Ancillary Services are services bought by the ESO to help maintain a reliable system and overcome imbalance in supply and demand.

There are a number of different services looking to address different issues. These range from very fast acting services, used for managing system frequency, to Reactive Power services, used to help manage voltage levels. Balancing Services are one set of tools that the ESO uses.

These sit alongside the Balancing Mechanism.

Balancing Mechanism

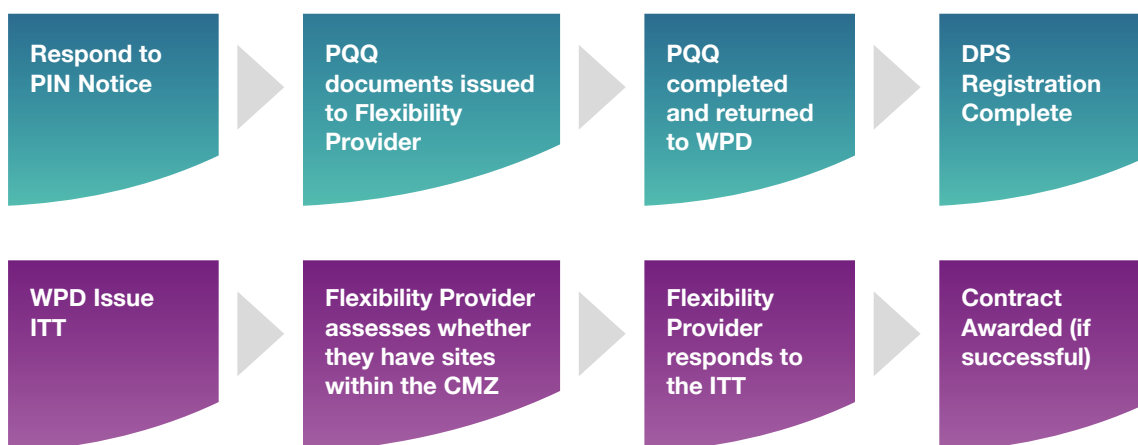
The Balancing Mechanism is one of the tools used by the ESO to balance supply and demand close to real time. Participants in the Balancing Mechanism submit bids and offers to either increase or decrease their generation or consumption.

These can then be accepted by the ESO as needed to manage the amount of energy on the network.

7.3 Procurement

To buy services from Flexibility Providers, DNOs need to follow formal procurement rules. These can often seem like complex terms, however the core process is relatively simple.

The flexibility procurement process takes place in three main stages: a register of interest, a response to tender, followed by the building and operation. The processes involved in this registration, the understanding of where services are needed and the steps that follow are outlined in this section.



Periodic Indicative Notice (PIN)

The Periodic Indicative Notice (PIN) is an official notice of our intent to procure services. Responding to the PIN is the first step of the registration process. This requires only very basic confirmation and triggers the issue of the PQQ to flexibility providers.

Pre-Qualification Questionnaire (PQQ)

Pre-Qualification Questionnaire (PQQ) is in place to check that applicants meet the minimum eligibility criteria of the services. Once completed, Flexibility Providers are added to the DPS. The PQQ is not a commitment to deliver services, but simply pre-qualifies flexibility providers so that they can receive the formal procurements information (ITT).

The Utilities Contracts Regulations (UCR)

The Utilities Contracts Regulations (UCR) 2016 are the rules that DNO procurement processes are governed by. These regulations drive the process and must be accepted by registrants at the PQQ stage in order to qualify onto the DPS.

Dynamic Purchasing System (DPS)

WPD operates a Dynamic Purchasing System (DPS) for the procurement of flexibility services. This is one of the procurement mechanisms set out in the UCRs. In simple terms it is in place to hold records of all potential suppliers that have passed the basic qualification questions (PQQ) and will be informed of the procurements (via ITTs).

Invitation to Tender (ITT)

An Invitation to Tender (ITT) triggers the procurement of services within specific zones. WPD launches ITTs on a 6 monthly basis.

The planned dates can be found at: www.flexiblepower.co.uk/downloads/397

7.4 Operations

The interfaces and environments that will be encountered when operating a flexibility service for WPD are outlined within this section.

Flexible Power Portal

The Flexible Power Portal is a key hub for the provision of services to WPD. The primary role of the portal is to allow the communication of availability from flexibility providers, and acceptance of that availability from WPD. The portal also contains a lot of reporting information. The portal can be found at www.flexiblepowerwpd.co.uk

An overview is provided at: www.flexiblepower.co.uk/downloads/409

Application Programme Interfaces (APIs)

Application Programme Interface (APIs) is a software link that enables applications to communicate with each other. These are in place to avoid the need for specific hardware as they allow metering data to be collected and control requests to be sent.

The Flexible Power API is defined on the Flexible Power Portal and can be found at: www.flexiblepowerwpd.co.uk

User Acceptance Testing (UAT)

User Acceptance Testing Environment (UAT) is one of the environments (versions) of the Flexible Power Portal. It is aimed to be a safe space for new flexibility providers to test and establish the technical aspects of their Flexible Power service. Once flexibility providers are ready they are provided access to the “live” environment where real dispatch happens.



7.5 Settlement

The following terms will be seen in the payment processes taking place for flexibility services. The payment mechanisms are based on the type of service that has been provided and to what level energy generation or demand reduction has been carried out.

Baselines

A Baseline is a view of what would have happened had the service not been called. This is used to value the service provided.

This document (www.flexiblepower.co.uk/downloads/31) highlights how the Flexible Power Baseline is calculated.

Payment Mechanic

The Payment Mechanic is the process by which we calculate what to pay the Flexibility Provider. This looks to compare the actual response given versus the expected response and then calculate the appropriate payment.

This document (www.flexiblepower.co.uk/downloads/52) provides detail on the Flexible Power Payment Mechanic.

Arming Payments

Arming Payments are paid to secure service providers and are in place to provide certainty of income. This is payable whether or not a flexibility event takes place and once armed the expectation is to utilise. The payment may be reduced if flexibility providers under-deliver on their commitments.

Availability Payments

Availability Payments are made to dynamic service providers instead of arming due to the reduced likelihood of utilisation. This is a payment for the readiness of an asset. The payment may be reduced if the level of utilisation is lower than their commitments.

Utilisation Payments

Utilisation Payments are in place as reward for meeting the percentage of committed demand reduction or power generation supplied or delivered. The payment amount depends on the percentage of the energy change delivered. For restore providers the utilisation payments are high to reflect their lack of initial payment.

Reports

Flexible Power produces a range of reports to help flexibility providers understand how they have performed.

- **Earning Statements**

An Earning Statement is created at the end of each month to act as an invoice for services. It summarises the events that have taken place, the volume delivered, the availability and the payments that are due.

- **Performance Reports**

Performance Reports outline the events seen graphically and give highlights in comparing expected volumes with actual volumes provided, as well as a percentage value of the contracted capacity.

- **Invoice**

A monthly self-billing invoice will be generated at the last stage of settlement and this can be downloaded for financial records. A duplicate is automatically sent to WPD for processing and payment. Following this payment will be made within 60 days.



Involving communities

Within WPD we are working to make it easier for communities to get involved and this document is just one of the ways that we are doing this. We have produced our Net Zero Communities strategy which outlines the work we are doing.

www.westernpower.co.uk/downloads/112141

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