

Electricity Supplies in Whitchurch-on-Thames, A Rough Guide for Residents

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This Rough Guide has been compiled to provide information for village residents about their electricity supply. The idea of a guide developed from the need to provide information for the Community Emergency Plan, a link to which can be found near the top of [this page](#) of the village website.



1 The Big Picture

The UK electricity supply is managed by the Electricity Supply Operator (ESO). Their [website](#) explains their role as follows:

“The ESO moves high voltage electricity from where it’s generated, such as a wind farm, through the energy system.

Using the infrastructure owned by the 3 transmission companies - National Grid Electricity Transmission, Scottish Hydro Electric Transmission Ltd. and SP Energy Networks, this high voltage electricity is passed onto one of the fourteen Distribution Network Operators across the country.

They own the local networks and convert it into a more manageable voltage that's suited for domestic use. Your local distribution network operator then feeds low voltage electricity through to your home or business property.”

The ESO [website](#) also carries an excellent graphic of the British electricity system which is reproduced in Appendix 1

Information about where our electricity is coming from in real time can be found [here](#). A typical screen shot is reproduced in Appendix 2.

2 Our DNO (Distribution Network Operator)

Our DNO for Whitchurch-on-Thames is Scottish and Southern Electricity Networks (SSEN). SSEN bring the power from the National Grid into Whitchurch and manage the infrastructure to deliver that power to our electricity meters in our properties. This includes:

- Power supply into the village from the national grid
- Local substations
- Distribution network to all properties
- Distribution network to all street lights (but not the street lights themselves). A faulty street light should be reported to Oxfordshire County Council on [FixMyStreet](#) or by phone - 0800 317802: you'll need its white-painted number and postcode.

3 Power supply into the village

Power comes into the village via a network of underground cables at 11 kV (11,000 volt) 3 phase electricity (see Wikipedia or other resources for an explanation of 3 phase electricity).



These cables are routed underground as follows:

East - South:	Along Hardwick Road, down the High Street and over Whitchurch Bridge.
North - West	Down Whitchurch Hill, then along Hartslock Bridleway
Other	1 From Hardwick Road, going north near Shepherd's Close and 2 Joining the East - South cable near Manor Road, then along the northern part of Manor Road and westwards under the farmland with a connection to the cable under Hartslock Bridleway.

There is no 11kV cable through the upper narrows connecting the East - South and North - West 11kV cables.

Within the village there is a short length of 11 kV overhead cable from the pole mounted transformer at the top of Muddy Lane to the pole mounted transformer at the bottom of Muddy Lane, near the Primary School. This is the only pole-mounted 11kV cable in the village.

SSEN also manage a 33kV cable (actually 3 separate cables) which runs over Whitchurch Bridge, under the High Street, and up Whitchurch Hill. There is no electrical connection with this cable within the village and is not referred to further.

4 Local Substations - Input

The 11kV cables are connected to local substations that use transformers (see Wikipedia etc) to reduce the 11kV 3 phase incoming supply to 415V 3 phase output for distribution to local properties. These are located as follows:

Ground based



- In private land at Thames Bank
- Eastfield Lane, near Mayflower
- In front of Old Barn Cottages
- By the Village Hall
- In Hardwick Road, near Whiteways
- Somewhere along Hartslock Bridleway (to be confirmed)

Pole mounted



- North end of Muddy Lane
- South End of Muddy Lane

The substations are normally connected so that there are two 11kV input cables available for use: only 1 is normally used, the other can act as a backup in case the first one fails. This does not happen automatically - there are switches on the transformers which SSEN staff have to come to site to switch manually.

The single exception to this “2 supplies” model is the pole mounted transformer at the south end of Muddy Lane, which supplies most of Eastfield Lane. This is fed only by a single 11kV pole-mounted supply from the north end of Muddy Lane – as mentioned earlier, the only pole mounted 11kV cable in the village.

5 Local substations - output

The substations deliver an AC (alternating current) 3 phase output with 3 live wires and 1 neutral wire. 415V refers to the 3 phase output: The output from one phase plus the neutral is 240 V (see Wikipedia etc).

Domestic properties, with relatively light energy demands, normally use a single phase (see Wikipedia etc) supply, so they use just one of the 3 live outputs and the neutral. A third of the properties will be fed from each live output to help balance the load on the transformer.

Commercial properties with heavier energy demands use a 3 phase supply. The power supply to The Ferryboat is being upgraded from single phase to 3 phase because of the higher power demands of the new equipment in the refitted kitchen.

6 Power supply from the substations to individual properties.

A network of cables fans out from each substation to each property – normally a property is only supplied from its “own” substation” and cannot be switched to another substation.

In Whitchurch-on-Thames these cables are mostly underground, but a few stretches of pole mounted cables exist including parts of:

- Eastfield Lane
- Manor Road

6 Resilience Issues

6.1 11kV into the village

The fact that we have 11kV supplies coming into the village from all 4 directions should help ensure that there is some resilience against 11kV faults. However, further up the distribution network they may come from the same distribution point, so a fault here could knock out all the 11kV supplies to the village.

6.2 Input to sub-stations – 11kV

As mentioned above, all substations bar one have duplicate 11kV supplies to them, which allows for the possibility of switching from one input to another in the event of a fault.

However, there are other considerations which may not allow switching including:

- the power limitations of the undamaged 11kV cables in the vicinity which may be exceeded if connected to an additional transformer.
- long term faults on 11kV cables in the vicinity which may get de-prioritised by SSEN and not fixed promptly because they do not cause any immediate power outages to properties. This may lead to reduced options for switching when a new fault occurs. (This happened in 2020 when a mobile generator had to be brought in to supply Hillside and Swanston Field after an 11kV cable fault near Old Barn Cottages).

The only substation without a duplicate 11kV input supply is the pole mounted transformer at the south end of Muddy Lane, which supplies some properties in Eastfield Lane (and eastwards).

6.3 Output from sub-stations to properties - 240V (single phase) or 415V (3 phase)

As mentioned above, most 240V supplies to individual properties are routed underground. Underground 415/240V cable faults do occur occasionally, but they are rare.

However, some properties in Eastfield Lane and Manor Road are supplied wholly or in part by pole-mounted cables. These are vulnerable to storm damage, either with poles being blown down or because of debris etc from nearby trees. In some locations there are cables passing through trees that have grown up around them, particularly at the eastern end of Eastfield Lane and Manor Road between the High Street and Village Hall.

Eastfield Lane



Manor Road



The author considers the potential damage to overhead cables passing through trees to be a safety hazard and a key risk to the resilience of electricity supplies to some properties.

7 Action recommended

SSEN usually become aware of a safety issue or damage to a local 415/240V cables because of repeated faults, and not through on-site inspections etc. However, if a local resident (or the Parish Council) reports a safety or resilience concern SSEN will arrange a site meeting with them. If trees are involved SSEN may decide remedial action is necessary as follows:

- **Undergrounding.** This is the term used to describe replacing pole-mounted cables with underground cables. It is expensive and may be disruptive and SSEN are averse to this solution unless someone else pays for them to do the work.
- **Cutting back the trees.** This is what normally happens. SSEN will approach the landowner to explain and discuss how their trees need to be cut back so there is no risk of damage to their cables. The details may be subject to consultation with Oxfordshire County Council and/or South Oxfordshire District Council. However, SSEN have the legal right to ensure trees are cut back around their cables if they perceive there is a safety hazard. This will normally be at the landowner's expense.

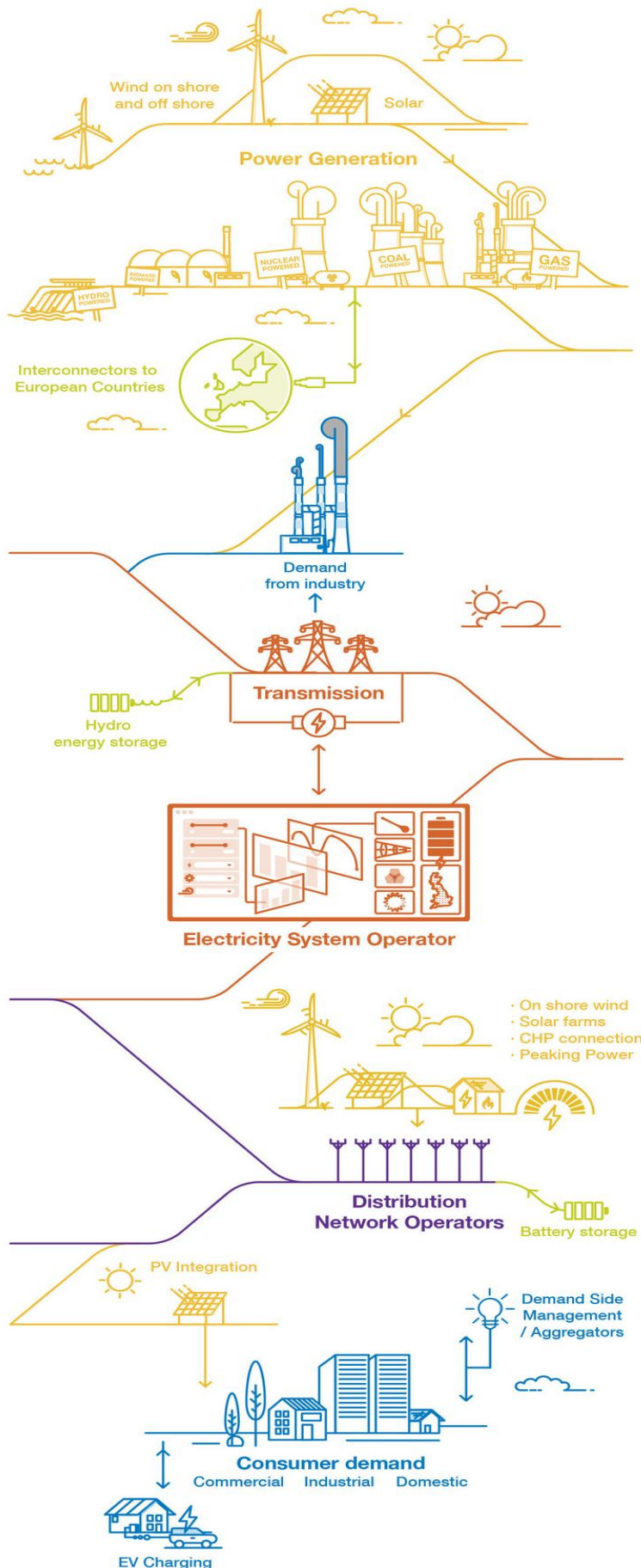
Extensive cutting back of the trees involved in Eastfield Lane and Manor Road may be controversial, particularly for residents living close to them.

It is recommended that the Parish Council initiates a consultation with local residents in Manor Road and Eastfield Lane who are supplied by pole mounted cable to explain the issue of safety, supply resilience and the trees and seek views.

Geoff Weir

Please inform the author by [email](#) of any errors or omissions.

Appendix 1 - The British Electricity System



Great Britain's electricity system is one of the most sophisticated in the world, it's a complex machine with many moving parts.

From energy suppliers to aggregators, we each have a part to play - and **ESO** sits at the heart of it all.

But who does what exactly?

Great Britain shares electricity with our neighbours from abroad, using **interconnectors** – cables which can transfer energy back and forth between countries.

Once generated, electricity is then transported through the UK's nationwide transmission network.

ESO then move the electricity to where it is needed, balancing supply and demand second by second, 24/7.

We operate the system but we are not responsible for the infrastructure, for example the pylons and cables, needed to carry the electricity.

Distribution Network Operators provide the local wires which take the electricity from the grid and move it through their own network of power lines and underground cables, taking it to homes and businesses.

As they do this, they convert the high voltage electricity that's in the network to the lower voltage electricity that homes and businesses use.

Aggregators are businesses that work with industrial and commercial energy consumers, who are able to flex their energy use to reduce or increase their demand in response to price signals.

For example, they could work with supermarkets to adjust their freezers to come on and off at different times rather than taking a steady supply.

Energy suppliers buy electricity from generators and then sell it on to customers, competing to supply homes and businesses.

After its journey from the generation stations through the grid, the DNOs and into the ownership of energy suppliers, it's ready for use across businesses and homes.

Appendix 2 – Screenshot from <https://grid.iamkate.com>

