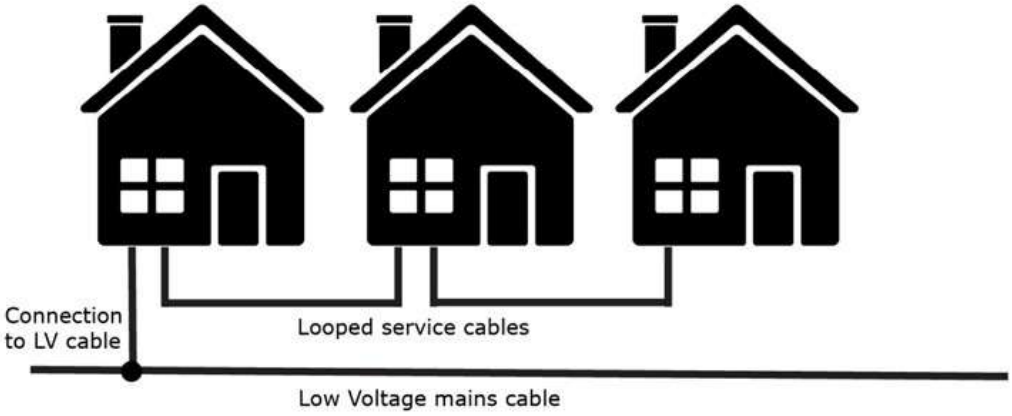
Unlooping of electricity supplies for installation of low carbon technologies



Andy Heald, Paul Rogers and Michael Hamer

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Background

National Energy Action (NEA), the fuel poverty charity, campaigns so everyone can afford to live in a warm, safe and healthy home. This is something denied to millions because of poor housing, low incomes, and high bills.

Working across England, Wales and Northern Ireland, everything we do aims to improve the lives of people in fuel poverty. We directly support people with energy and income maximisation advice, and we advocate on issues including improving the energy efficiency of our homes.

We do not work alone. Partnerships and collaboration have been at our heart for over 40 years, helping us drive better health and well-being outcomes for people struggling to heat their homes.

The Innovation and Technical Evaluation team at NEA worked with Energise Barnsley to produce this report. They previously carried out the evaluation of the 'Smart solar in Barnsley' project where 75 battery systems were installed.

Energise Barnsley was setup by Generation Community Ventures and Barnsley Metropolitan Borough Council in 2015 and aims to deliver community owned renewable energy and heating projects across the borough. It developed through the partnership of several organisations and individuals who have been collectively working together to help deliver lasting social impact across the Barnsley area. These partners include Berneslai Homes, Generation Community Ventures and Barnsley Metropolitan Borough Council.

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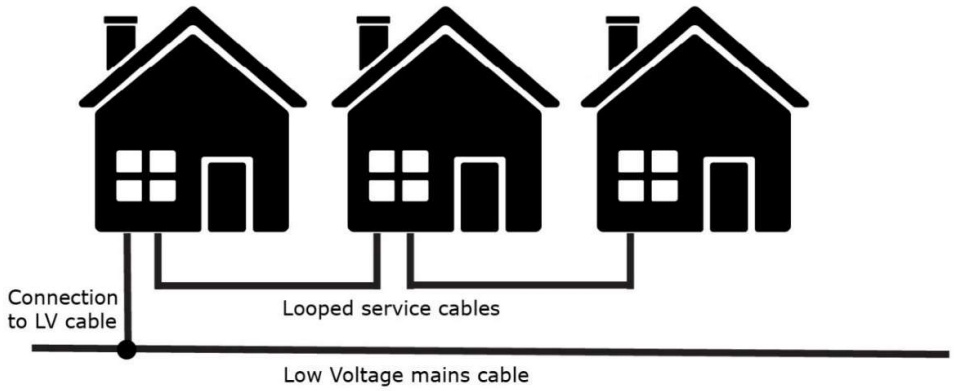


Figure ES1 Schematic diagram showing a looped electricity supply

Looped electricity supplies were a cheaper way to add homes to the local electricity distribution network. This was common, particularly for socially rented homes from about the 1950s to the 1980/90s, with semi-detached and terraced homes on new estates often with gas heating. There is a single connection from the main low voltage service cable in the street to the first property. The mains cable was then 'looped' from the first property to the next and beyond to provide their electricity connections. The looped supply may cover between two and four homes, often with a 100A supply shared between the properties.

The property may be supplied via a cable running overhead or underground. With an overhead cable, there is a connection from the pole on the street to the first house and the cable will then often run along the outside of the house to the next property. The best method to identify properties on a looped supply with an underground connection is to look at the Distribution Network Operator (DNO) cut out. If there are two cables feeding into the DNO cut out from below, then this indicates the property has a looped supply[1].

A property without a looped supply would have a single incoming cable to the DNO cut out. However, the property at the end of a looped supply would also have a single supply cable coming in. This means it would be necessary to survey both semi-detached properties or more than one in a terrace to check the properties are not on a looped supply.

1 Identifying Looped Services, Western Power Distribution, https://commercial.nationalgrid.co.uk/downloads-view-reciteme/430885 (Accessed 15 Oct 2025)

Data on the number of homes with looped electricity supplies is poor. In some areas there are good maps showing connections to the low voltage network including looped supplies. In other areas the quality of information is limited.

SP Electricity North West estimated that 20% of homes or about 500,000 homes in their region had a looped electricity supply[2]. Northern Powergrid[3] estimates there are about 22% of homes (about 900,000) in their region with looped electricity supplies but this may rise to 40% in social housing. UK Power Networks estimates that in their region, 13% of homes have a looped supply which is around one million homes.

Looped electricity supplies and low carbon technologies

The maximum electricity demand of homes will increase when adding technologies such as heat pumps and electric vehicle chargers. With a 100A service cable, there is a risk that the consumption could exceed the capacity of the supply if multiple low carbon technologies (LCTs) were installed. There can also be issues with solar PV systems primarily around local voltage rise on the system as well as high levels of export to the grid.

A looped supply can also affect retrofit of external wall insulation (EWI). This may be due to the supply being connected via an overhead cable, with the looped supply fed along the external wall. This cable was designed to be air-cooled and covering it with insulation could cause overheating and might be a fire risk.

It is therefore usually necessary to unloop the electricity supply when installing these low carbon technologies. Unlooping for these grid connections is funded by the DNO but there is no service level agreement with a timescale for the works.

Connecting low carbon technologies to the grid

Owner occupiers with a 3.68kW solar PV system or smaller can install the system under G98 regulations and notify the DNO within 28 days of commissioning. In contrast, social landlords installing more than one solar PV system in an area must submit a grid connection application in advance.

All PV systems above 3.68kW must apply for a grid connection and there is also a grid connection application process for heat pumps and electric vehicle chargers.

[2] Engineering Justification Paper, RIIO-ED2 Project Level Report, Ref No LRE EJP 8 – Service Unlooping Programme, 30 June 2021, https://www.enwl.co.uk/globalassets/about-us/regulatory-information/riio2/july-2021-submission/ejps/lre_ejp8__service_unlooping_programme.pdf (Accessed 18 Sep 2025)

[3] Personal Communication, Iain Miller, Head of Connections and Design, Northern Powergrid, (4 Nov 2025)

UK Power Networks (UKPN) has a higher rate of automatic approvals for connecting low carbon technologies than for other DNOs. Their threshold for auto approval is higher. They constantly review approval outcomes and provide insights from their data to ensure they are enabling, not blocking, low carbon technology uptake[4].

UKPN will auto approve the connection of a solar PV system up to 5kW under G99 A1.1 notify and connect via their automated Smart Connect portal. Batteries connected to the DC side of a hybrid inverter will also be auto approved. They increased the auto approval threshold for heat pumps to 10kW after finding that 87% of heat pump applications were approved with no physical works in 2023. This evidence allowed UKPN to safely raise the threshold with no risk to the network.

Octopus Energy noted there is a 'postcode lottery' around approval times for connections for low carbon technologies[5]. There are regional disparities between the average approval time and percentage of approvals in 24 hours for connections. The best performing DNOs were UKPN and National Grid Electricity Distribution.

In situations where unlooping of the electricity supply is needed, a DNO may require unlooping of the supply before low carbon technologies are installed. As an alternative, it may be possible to install solar PV and batteries before the unlooping occurs if there are restrictions so there is no electricity export to the grid. Also, it may be possible to install an EV charger or heat pump before unlooping if there is a device fitted which restricts electricity import.

Unlooping electricity supplies and the barriers

Currently DNOs present their 5-year plans to Ofgem and receive a sum of money for unlooping works. The total number of properties unlooped in the last 5 years is very low compared to the scale and cost of unlooping all properties currently connected. The works involve a design engineer to project manage the works, and subcontractors to conduct the works. Costs are high, and time periods to complete the works long. There is not enough budget, manpower or subcontractors available to move at the pace necessary to prevent bottlenecks and long delays.

Social landlords will typically aim to have an area-based approach for retrofit. Grid connection requests will therefore often involve a significant number of

[4] Personal Communication, Ashley Southgate, LCT Strategic Project Manager, UK Power Networks (5 Dec 2025)
[5] Data reveals 'Postcode Lottery' for fastest heat pump and solar installations, Octopus Energy, 1 May 2025, https://octopus.energy/press/more-news-press-releases/dno-leaderboard-postcode-lottery/ (Accessed 27 Nov 25)

properties. The design engineer dealing with these connection requests for the DNO will typically coordinate with the landlord and carry out site visits, produce a design with costings which must be approved, produce a grid connection offer, obtain permission to carry out works on the pavement or road and commission the unlooping works. There is a high workload for the engineer given the number of tasks and properties, and there is often one engineer working on this per district. This all leads to delays in the grid connection offer and before the works can be carried out.

Obtaining permission from the local authority/highways to carry out works on the pavement or road may lead to a delay of 90 days or more. It will also be necessary to access all properties associated with the looped supply to carry out the works. This may require digging a trench from the pavement to the house and needs permission of the residents. If one household refuses, this can prevent the unlooping for all the properties on that loop.

While the cost of unlooping works are funded through the DNO, there are additional costs for the landlord. Looped supplies can connect into the property at the front, side or rear. After unlooping, the electricity connection may enter a different side of the property. As a result, the landlord may need to move the consumer unit for the property to be closer to the new incoming mains connection. If there is an owner occupier on the loop, the internal electrical works required may be a disincentive to agree to have the supply unlooped.

UKPN has a different approach to addressing looped supplies than other DNOs. Where access is declined by a household on a loop, they will deliver a 3-phase unlooping solution. This is a customer-led mitigation which avoids legal disputes and maintains service continuity. A new 3-phase connection is brought into the first property and there is a 3-phase DNO cut out. This allows a 100A supply for the first home with the first phase. The cable feeding the next property has a new termination on the 3-phase cut out and is supplied by another of the 3-phases. If there are four homes on a loop, the solution would be to fit 3-phase supplies to two of the properties with a looped connection on a different phase to the next-door home. This approach reduces the number of new connections required to the LV network, with fewer homes requiring external and internal works.

Energise Barnsley 1,000 solar PV project

Energise Barnsley is a Community Benefit Society that was set up to deliver community owned renewable energy and heating projects across the Metropolitan Borough of Barnsley. The FiT for Solar in Barnsley project is piloting an innovative finance model to fund 1,000 new solar PV systems. It is recycling income from existing solar PV installations and using the strength of community energy to raise finance.

The new installations will be funded by a combination of:

- £1m Energy Industry Voluntary Redress Scheme grant
- Recycling feed-in tariff (FiT) income from earlier solar PV installations
- £3.3m Energise Barnsley Solar Bond III
- Income from export to the grid from the new solar PV installations.

The 1,000 solar PV systems will be installed on socially rented homes managed by Berneslai Homes. Money raised by community energy financing will be repaid using FiT income from existing installations and income based around the export of excess solar generation to the grid from the new installations.

Energise Barnsley started getting fewer successful grid connection applications following a change in policy from Northern Powergrid. There had been a change in policy from two low carbon technologies being allowed on a row of four properties with a looped supply to zero installations. This meant that Energise Barnsley was only getting positive responses from properties not on a looped supply. It was therefore necessary to send in more grid connection requests, clogging up the system further and creating more work for everyone.

More recently the policy has changed again to allow one low carbon technology to be installed on a group of homes with a looped supply prior to unlooping. It is possible to install more than one solar PV (and battery) system prior to unlooping if a G100 compliant inverter is used which can restrict the grid export to zero. Export would then be allowed after the unlooping works.

Energise Barnsley and its solar installer planned to achieve 20 installations a week. However, due to the time connection requests have taken to process (over 180 days in some instances) and the change in policies with additional restrictions (no export), the project has not been able to achieve more than 10 solar installations a week.

Together Housing and plans for decarbonisation

Together Housing is one of the largest housing associations in the North of England with nearly 39,000 properties. They have ambitious plans for retrofit improvements which includes removing gas heating from their homes by 2035. This target is potentially at risk due to the difficulty in getting grid connections and dealing with looped electricity supplies.

They have about 3,000 air source heat pumps and 1,200 ground source heat pumps. They are financially able to install about 1,500 heat pumps per year but

are struggling to get 750 installed due to DNO issues. They also have about 3,200 homes with either solar PV or solar PV and battery storage. They would like to install about 1,500 solar PV and battery systems a year and scale that up. Again, the ability to obtain grid connections is a major limitation.

Together Housing is not relying on grant funding for installing the solar PV and batteries. They have developed a commercial model for funding the installations which uses Octopus Energy as the electricity supplier. The tenants pay the same discounted unit rate for all their electricity, whether it is from the grid, solar PV or battery. This model needs solar PV export to be financially viable and so it is not possible to install systems with no export while waiting for the DNO to unloop the electricity supply.

Case studies of projects affected by looped supplies

Arrowfield Estate, Chorlton, Greater Manchester

Southway Housing Trust had a £4.2m project with over 360 properties that replaced gas boilers with air source heat pumps (ASHPs) and improved wall insulation. Major upgrades were needed for the local electricity network due to looped electricity supplies and the increased electricity demand. SP Electricity North West carried out a £2.2m upgrade in the area, providing new service cables to over 300 properties, replacing about 2km of underground electricity cable and building three new 6.6kV electricity substations and upgrading another.

Together Housing ASHP project in Halifax, West Yorkshire

Together Housing has a Social Housing Decarbonisation Fund (SHDF) wave 2 project that was improving insulation for properties. To achieve an EPC rating of band C for all the properties, the landlord was also funding installation of ASHPs. The grid connection request was submitted before Christmas 2023 and a full response was provided by mid-July 2024. Out of the 105 connection requests, only eight were approved and 97 were rejected with a quote provided for the unlooping works. The unlooping works were not completed until July 2025. It was not possible to complete all the planned unlooping works. This was due to issues around accessing properties and some people not allowing their gardens to be dug up for the works.

Social landlord in Yorkshire

The landlord is aiming to install solar PV on the roofs of several thousand homes between now and 2030. The most significant barrier to achieving this is gaining approval for the grid connections from the DNO and, if required, for the reinforcement and/or unlooping work to be carried out to the network to enable the solar PV systems to be installed. To date they have submitted applications

seeking approval for more than 3,000 homes to have solar PV installed and connected to the grid. Two examples of the delays experiences are:

- They submitted over 300 homes in one application in July 2023. Over two years later, they are still unable to install solar PV in more than two thirds of the homes
- They submitted an application with over 1,500 homes in Autumn 2024. After about a year they still have a large number of applications with no outcome as to whether they can connect to the grid, or if unlooping or reinforcement work is required, and when it will be actioned

There are fundamental structural and process/procedural issues which are preventing connection approval and/or enabling work to be delivered at pace and the scale required. This is leading to stop-start investment and uncertainty in the supply chain. It is delaying energy improvements to the landlord's homes, risking regulatory compliance and leaving tenants with unnecessarily high electricity bills in the middle of a cost-of-living crisis.

External wall insulation in Somerset with Magna Housing

During the Social Housing Decarbonisation Fund wave 2.1, Magna Housing had 16 homes where external wall insulation was delayed due to looped electricity supplies. It was not possible to carry out the roof works or install the EWI until the electricity supply had been moved. The grid connection request was made in March 2024 and the works carried out in August 2025. While the cost of the unlooping was covered by the DNO, Magna had to contribute to the cost of the transformer upgrade work. There were concerns about communications, accountability and quality of the work on site. Issues noted included cutting street light cables, leaving uncompleted works, debris and unfilled holes.

External wall insulation for a social landlord in Northamptonshire

The landlord was planning EWI in 20 homes in 2021 where the electricity supplies needed unlooping. The DNO was engaged early in the process and quoted a high cost for the works. The landlord felt the DNO should cover this but felt they had to pay to complete the retrofit works. After placing the order, it still took the DNO six to nine months to complete the upgrades. This meant that the installations were not completed until Autumn 2023.

Recommendations

- Multiple installation connection applications should be included in Ofgem guaranteed standards and landlords should ideally receive a response for a request within 30 days

  (Action – Ofgem)

- Maximum demand calculations and policies for connections to be based on more accurate real-world data rather than conservative estimates. There should be more widespread use of technical solutions including restricting import and export levels to allow better use of existing connections

  (Actions – DNOs, ENA)

- There should be a single standardised process for dealing with multiple connection applications across all the DNOs

  (Action – Ofgem, DNOs, ENA)

- Each DNO should carry out an analysis of the number of looped supplies in their region to assist in assessing the scale of the issue and solutions.

  (Action – DNOs, DESNZ)

- Landlords should get staff and contractors to photograph meters and DNO cut outs whenever they visit a property to help map homes with looped supplies and older DNO cut outs

  (Action – Landlords and contractors)

- There needs to be larger scale funding and/or procedures to address the issue of looped supplies. If issues around unlooping are not resolved, it is likely that 2050 net zero targets for homes cannot be achieved

  (Action – DNOs, DESNZ, HM Treasury)

- DNOs should adopt data-driven auto-approvals. UK Power Network's Smart Connect continually reviews approval data to refine thresholds which allowed an auto approval threshold of 10kW for heat pumps. DNOs have the ability to do this with Connect Direct, but it is unclear if this data is being used.

  (Action – DNOs, ENA)

- There is a need to reduce the number of times where unlooping is blocked by reduced access by one of the households. This may require better communication between landlord and DNO or helping fund internal electrical works for owner-occupiers

  (Action – Landlords, DNOs, DESNZ)

- Where access is declined by a customer on a loop, UK Power Networks will deliver a 3-phase unlooping solution. This provides a customer-led mitigation which avoids legal disputes and maintains service continuity

  (Action – DNOs, ENA)
- DNOs should allocate more budget to multiple grid connection applications and should employ more design technicians in each area

  (Action – DNOs, Ofgem)
- DNOs should allow a wider range of contractors for unlooping works. This includes allowing trained landlord contractors to update DNO cut outs and complete all works in the home as well as additional contractors for external works

  (Action – DNOs, Ofgem)

1. Report overview

1.1 Introduction

Significant investment in retrofitting social housing is expected in the coming years. There is a need for socially rented homes to achieve a Minimum Energy Efficiency Standard which has to date been a target of EPC band C by 2030 in England. Apart from this, there is the longer-term target of achieving net zero by 2050. In 2024, 21% of Greenhouse Gas emissions in the UK were from buildings and product uses and 66% of this (about 14% of UK emissions) were due to fuel combustion in residential buildings[6]. Greater use of low carbon technologies will be required to meet these targets. This will include using heat pumps to decarbonise heating and solar PV and battery systems to reduce electricity demand and lower energy bills. Support for retrofit in social housing in England has been provided by Government via the Social Housing Decarbonisation Fund and the Warm Homes Fund Social Housing. According to the English Housing Survey, there were 1.19 million socially rented homes in EPC bands D-G in 2023[7].

An area-based approach to retrofit on a large scale is needed to achieve the improvements in energy efficiency and reductions in carbon emissions. However, landlords are finding that 'looped' electricity supplies to the properties are causing significant delays in the retrofit programmes. This is where more than one home shares a single connection to the low voltage electricity distribution network.

SP Electricity North West estimated that 20% or about 500,000 homes in their region had a looped electricity supply[8]. Northern Powergrid estimates that about 22% of properties (about 900,000 homes) in their region have looped supplies, but this rises to about 40% in social housing[9]. For the UK Power Networks region, there are estimated to be 13% of homes on looped supplies which equates to about 1 million homes[10].

[6] 2024 UK Greenhouse Gas Emissions, Provisional Figures, Department for Energy Security and Net Zero, 27 Mar 2025, https://assets.publishing.service.gov.uk/media/67e4060df356a2dc0e39b4cd/2024-provisional-greenhouse-gas-emissions-statistics-statistical-release.pdf (Accessed 18 Sep 2025)
[7] English Housing Survey 2023 to 2024, Chapter 2 Energy Efficiency Annex, Ministry of Housing, Communities and Local Government, 30 Jan 2025, https://www.gov.uk/government/statistics/annex-tables-for-english-housing-survey-2023-to-2024-headline-findings-on-housing-quality-and-energy-efficiency (Accessed 18 Sep 2025)
[8] Engineering Justification Paper, RIIO-ED2 Project Level Report, Ref No LRE EJP 8 – Service Unlooping Programme, 30 June 2021, https://www.enwl.co.uk/globalassets/about-us/regulatory-information/riio2/july-2021-submission/ejps/lre_ejp8__service_unlooping_programme.pdf (Accessed 18 Sep 2025)
[9] Personal Communication, Iain Miller, Head of Connections and Design, Northern Powergrid (4 Nov 2025)
[10] Personal Communication, Ashley Southgate, LCT Strategic Project Manager, UK Power Networks (17 Nov 2025)

2. Electricity connections

2.1 Looped electricity supplies

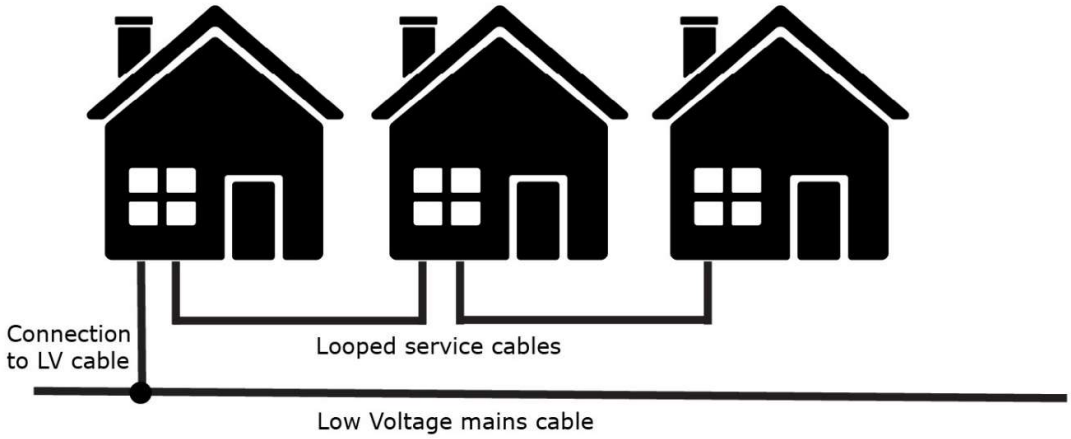


Figure 2.1 Schematic diagram showing a looped electricity supply

Looped electricity supplies were a cheaper way to add homes to the local electricity distribution network. This was common, particularly for socially rented homes from about the 1950s to the 1980/90s, with semi-detached and terraced homes on new estates. There is a single connection from the main low voltage service cable in the street to the first property. The mains cable was then 'looped' from the first property to the next and beyond to provide their electricity connections. The looped supply may cover between two and four homes. The advantage of a looped supply was that it was a cost-effective way to connect homes to the local electricity network with a reduced number of connections to the main service cable and less cabling.

The cable connecting the homes to the low voltage distribution network may have a power rating of 100A. For homes with gas central heating and limited numbers of high-power electrical appliances, it was considered acceptable to share a 100A connection across several properties.

The easiest way to identify properties with a looped supply is to look at the electricity meter and the Distribution Network Operator (DNO) cut out fuse. If you see that there are two cables feeding into the DNO cut out from below, then this indicates the property has a looped supply (figure 2.2a)[11].

11 Identifying Looped Services, Western Power Distribution, https://commercial.nationalgrid.co.uk/downloads-view-reciteme/430885 (Accessed 15 Oct 2025)

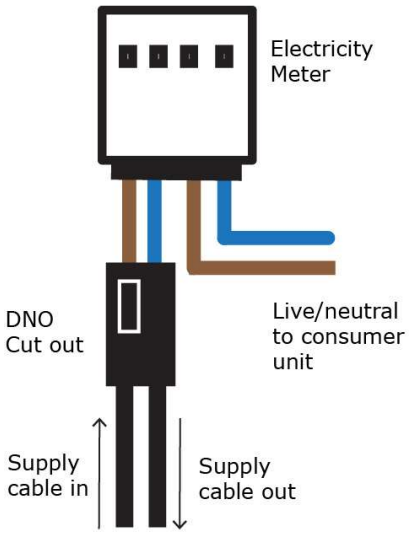


Figure 2.2a
Schematic of looped electricity service

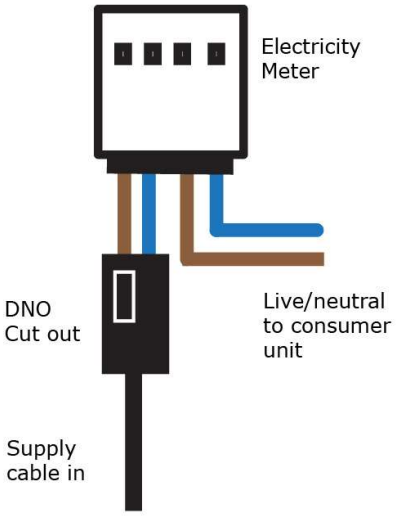


Figure 2.2b
Schematic of supply with single incoming cable

A property without a looped supply would have a single incoming cable to the DNO cut out (figure 2.2b). However, the property at the end of a looped supply would also have a single supply cable coming in. This will be the connection from the neighbouring property and there is no second cable feeding the supply to a further property. This means it would be necessary to survey both semi-detached properties or more than one in a terrace to check the properties are not on a looped supply.

Figure 2.3a
Looped supply with external meter box

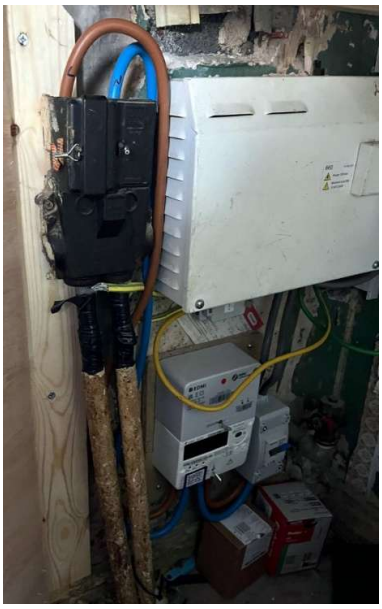


Figure 2.3b
Looped supply with internal DNO cut out and meter

Figure 2.3a shows an external meter box for a property with a looped supply. The DNO cut out (in black) is below the smart meter and there are two black cables going into the bottom of the DNO cut out. The electricity meter and DNO cut out are inside the house in figure 2.3b. The black DNO cut out is to the left of the consumer unit and has two thick cables entering from below.

Many connections to homes have underground cabling. However, some use overhead cables. It may be possible to identify properties with overhead cables that have looped supplies by following the cables visually. One of the homes may have a cable running from the pole on the street to the house and the cable may then be run along an external wall until it enters the next property.

A looped supply may be a single-phase connection shared between more than one property. However, in some cases, the connection to the first property may be a 3-phase cable and the phases were split between the three properties on the loop. This had the advantage of assisting with phase balancing. Also, each of the properties had a connection with a higher power rating than would be the case with a shared single-phase connection.

DNOs have maps showing their connections. These can show details of where the low voltage (LV) distribution network connects to properties, the cable size and whether it is underground or overhead. In some cases, it can also include the phase of the connection. The accuracy and detail of the maps can vary between regions or date of the connection. In some areas the maps can be very good but in others there may be little or no information. This can mean that the DNO may have little idea on the number or location of looped supplies in particular areas. It also means that visual checks on site are often necessary.

When housing developers request a grid connection for new homes being constructed, the DNO assesses the electrical works required. Households are not likely to all be using high power electrical appliances at the same time which lowers the average consumption for the properties, a concept known as diversity. DNOs carry out what is known as an ‘After Diversity Maximum Demand’ ADMD calculation. This provides the maximum likely demand across multiple properties considering the maximum likely loads in each property and the diversity factor. DNOs normally choose the most cost-effective option for the requirements of the developer. This will include the power rating of the cables, and any new substations required.

Factors considered in the ADMD calculation include the type of space and water heating. There is a lower maximum likely demand in homes with gas heating than for homes with storage heaters, immersion heaters and electric showers for example. This meant that more economic connections like looped supplies were more common on estates of new homes with gas central heating.

2.2 Looped electricity supplies and low carbon technologies

Decarbonising heating and transport means that technologies like heat pumps, electric vehicle chargers, solar PV and batteries are becoming more common. ADMD calculations must consider the electrical demand from these new technologies[12]. These technologies are likely to be included in new homes and connections to the local electricity distribution network will be designed to accommodate them.

There is also a need to retrofit these technologies to existing homes. Homes with looped electricity supplies may need them unlooped or delooped to provide the homes with an electrical connection with sufficient capacity to meet potential demand. Normally the unlooping is funded by the DNO and the household/landlord does not need to pay for these works.

For example, with a looped supply with a 120A service cable, the supply was considered sufficient for each household to use up to 60A[13], with cookers, washing machines and other kitchen appliances the highest consuming devices. Addition of a 7.5kW electric vehicle charger could use 32A by itself. A further low carbon technology like a heat pump might have a rated electricity consumption of 15-25A. Multiple low carbon technologies combined with other high power electrical devices such as cookers could mean that the consumption could approach that of the capacity of the service cable.

The nominal voltage for domestic supplies in the UK is 230V but the acceptable voltage range is between 216.2V and 253.0V. Solar PV systems can raise the voltage on the local network. Increasing numbers of installations and the size of systems are leading to greater voltage rises. Several large PV systems on a looped supply might cause the supply voltage to exceed 253.0V which would be an issue. The other possible issue would be where large numbers of PV systems were all exporting to the grid at the same time which could lead to heating of supply cables. Installation of battery storage with the solar PV can reduce this risk.

A looped supply can also affect retrofit of external wall insulation (EWI). The electrical supply for the property may need moving and unlooping prior to installation of the EWI. For example, where a looped supply is connected via an overhead cable, the cable to the next property could be fed along the external

[12] ADMD Calculator – LCT ready housing developments, SP Energy Networks, https://www.spenergynetworks.co.uk/pages/admd_calculator.aspx (Accessed 16 Oct 2025)
[13] Engineering Justification Paper, RIIO-ED2 Project Level Report, Ref No LRE EJP 8 – Service Unlooping Programme, 30 June 2021, https://www.enwl.co.uk/globalassets/about-us/regulatory-information/riio2/july-2021-submission/ejps/lre_ejp8__service_unlooping_programme.pdf (Accessed 16 Oct 2025)

wall. This cable was designed to be air-cooled and covering it with insulation could cause overheating and might be a fire risk.

2.3 Homes with looped electricity supplies and reducing their number

SP Electricity North West published an Engineering Justification Paper in June 2021, discussing the issue of unlooping electricity services. The paper noted that an estimated that 20% of homes in their region had a looped electricity supply[14]. This equated to around half a million households.

The paper was focused on unlooping due to demand for electric vehicle charge points. It assumed that no detached homes had looped supplies and that small terraced houses would not have off-street parking are were unlikely to install EV chargers. Therefore, the dwellings requiring unlooping based on national averages, were 42% medium/large, terraced houses and 58% semi-detached houses.

Solutions considered included partial de-looping (at a cost of about £943 per property) and full unlooping, costing £2,639 per property. The paper recommended a mix of partial de-looping and full unlooping, with 8,570 partial deloops and 23,448 full unloops for the financial years 2024-2028 in the RIIO-ED2 price control period. This number of partial and full unlooping equates to about 6% of the total number of looped electricity supplies in the region. Higher levels of unlooping are likely to be required to account for installation of solar PV and heat pumps as well as EV chargers.

Metis is working with Oxfordshire County Council to install solar PV and battery systems for residents with no upfront cost. The residents then pay for the system with a monthly 'Home comfort charge'. By August 2025, Metis had installed over 200 systems with the long-term aim to be installing thousands in the county. From their experience, there are about 20% of private homes with looped electricity supplies in Oxfordshire[15] [16].

Northern Powergrid estimates that about 22% of properties (about 900,000 homes) in their region have looped supplies, but this rises to about 40% in social

[14] Engineering Justification Paper, RIIO-ED2 Project Level Report, Ref No LRE EJP 8 – Service Unlooping Programme, 30 June 2021, https://www.enwl.co.uk/globalassets/about-us/regulatory-information/riio2/july-2021-submission/ejps/lre_ejp8__service_unlooping_programme.pdf (Accessed 16 Oct 2025)
[15] Metis by SMS hits 200 solar PV and battery installations in partnership with Oxfordshire County Council, SMS, 20 Aug 2025, https://www.smsenergy.com/insights/metis-by-sms-hits-200-solar-pv-and-battery-installations-in-partnership-with-oxfordshire-county-council/ (Accessed 21 Oct 2025)
[16] Personal Communication, Tom Woolley, Smart Product and Strategy Director, Metis, (15 Oct 2025)

housing[17]. The estimated number in the UK Power Networks region is 13% of properties or about one million homes[18].

The National Infrastructure Commission report published in February 2025 on the electricity distribution network noted that demand for electricity would increase by about 50% by 2035 and double by 2050[19]. The report recommended reform and simplification of the price control mechanism for DNOs. This would take a rebalanced approach that considered long term objectives with wider societal and economic benefits as well as ensuring improvements are delivered efficiently. This would include a proactive approach which accelerated improvements to the distribution network such as unlooping. Such an approach which unlooped properties in advance would allow households to consider installing a heat pump after a boiler breaks down rather than waiting an extended period for unlooping before an installation could take place. The report also recommended that Government sets a date for elimination of looped electricity supplies. This would then allow Ofgem to develop an approach for DNOs to deliver this objective over the required period of price controls.

In a response to the report[20], the UK Government agreed that unlooping should be accelerated but did not agree that a date should be set for elimination of looped supplies. While targeted proactive unlooping could assist with installation of low carbon technologies in a timely fashion, other solutions like load limiting devices may be suitable alternatives in the short term.

The Chartered Institute of Housing (CIH) responded to Ofgem's end-to-end review of the connections process in January 2025[21]. One landlord noted that their DNO was not set up to deal with the issue (of looped supplies for landlords) and so give it to their small works team. They note that retrofit programmes in social housing are highly coordinated and sequential. If there is a delay in one of the parts of the programme there will be knock-on effects which might risk the retrofit programme.

[17] Personal Communication, Iain Miller, Head of Connections and Design, Northern Powergrid (4 Nov 2025)
[18] Personal Communication, Ashley Southgate, LCT Strategic Project Manager, UK Power Networks (17 Nov 2025)
[19] Electricity distribution networks: creating capacity for the future, National Infrastructure Commission, February 2025, https://webarchive.nationalarchives.gov.uk/ukgwa/20250327100350/https:/nic.org.uk/studies-reports/electricity-distribution-networks-report/ (Accessed 21 Oct 2025)
[20] Government Response to the National Infrastructure Commission's Study 'Electricity distribution networks: Creating capacity for the Future'. DESNZ, July 2025, https://assets.publishing.service.gov.uk/media/68679354d520affe4e581cc7/nic-study-electricity-distribution-networks-government-response.pdf (Accessed 21 Oct 2025)
[21] CIH response to Ofgem's end-to-end review of the connections process, 7 Jan 2025, https://www.cih.org/news/cih-response-to-ofgem-s-end-to-end-review-of-the-connections-process/ (Accessed 21 Oct 2025)

An example noted in the response showed how processes can cause additional complications. When moving a meter box from the external wall of the home and altering the service prior to EWI, coordination is required between the energy supplier and the DNO. However, the energy supplier will only communicate directly with the resident who is their customer and rents the property. This complicates coordination and leads to delays and extra costs.

2.4 Connecting low carbon technologies to the grid

When installing low carbon technologies such as an electric vehicle charge point or heat pump, an EV & HP connection application needs to be completed in advance. This can be submitted online via ENA Connect Direct[22].

Owner-occupiers who have a solar PV system installed with an inverter rated at 3.68kW (16A) or less can install the system under G98 regulations without prior contact with the DNO. They are then required to notify the DNO of the installation within 28 days of commissioning.

A social landlord installing more than one solar PV systems within a small geographic area, with each having a 3.68kW inverter or smaller must follow G98 regulations for multiple premises. Unlike for a single installation, a project with multiple solar PV systems must submit a grid connection application for the installations in advance. It is recommended that installers/developers discuss the feasibility of the connections with the DNO at an early stage. Grid reinforcement works might be needed and there might be issues such as properties having looped electricity supplies. After initial positive discussions, a grid connection application should be made. Again, this can be completed via ENA Connect Direct. A response will be provided by the DNO following assessments of the impact of the installations on the local network. The grid connection offer will describe the conditions of the connection offer and whether there are any grid reinforcement charges required. Should the terms be agreeable, the connection offer should be accepted, and the installation can go ahead.

There are other types of relevant grid connection applications. G99 is used for installations where the inverter is rated above 3.68kW (16A) and again it is necessary to apply for approval in advance of the installation.

Where excessive import or generation from a device can affect the local electricity network, G100 regulations can be applicable[23]. In this case customer export or import limitation schemes (CLS) can be used to limit the export and/or import. There are hybrid inverters on the market which are G100 compliant.

[22] ENA Connect Direct, https://connect-direct.energynetworks.org/ (Accessed 16 Oct 2025)
[23] G100 Issue 2 Import-Export Limitation Recommendation, Alternergy, https://www.alternergy.co.uk/blog/post/g100-issue-2-import-export-limitation-compliance (Accessed 16 Oct 2025)

These can use a current transformer or mains meter with a hard-wired communications link to the inverter. Export limitation on the device can reduce generation output within a second[24].

In situations where unlooping of the electricity supply is needed, a DNO may require unlooping of the supply before low carbon technologies are installed. As an alternative, it may be possible to install the low carbon technology (e.g. solar PV and battery) under G100 regulations but allow no export until the electricity supply has been unlooped.

There are potential challenges for the local network with large numbers of low carbon technologies being connected. For example, if all the households on a street have an electric vehicle and are incentivised by a tariff to charge at the same time this can cause problems. While new smart tariffs can shift overall demand from the 4pm-7pm peak, if all cars began charging at say midnight, there would also be an issue. There may be a need to encourage different charge times for neighbouring properties. There will likely to be a need for technological solutions to demand management on a local as well as a national scale.

Octopus has noted there is a 'postcode lottery' around connecting low carbon technologies to the grid[25]. Connections are approved fastest in the South East, South West and South Wales. Part of the reason why UKPN is leading in the speed of connection approvals is due to having many more connection requests automatically approved via their Smart Connect portal for installers.

UKPN constantly reviews approval outcomes and provides insights from their data to ensure that they are enabling, not blocking the uptake of low carbon technologies. They increased the auto approval threshold for heat pumps to 10kW after finding that 87% of heat pump applications were approved with no physical works in 2023. This evidence allowed them to safely raise the threshold with no risk to the network[26]. They have a higher maximum threshold with up to 10kW for automatic approval for solar PV. They also ignore the impact of a DC coupled battery which is also auto approved.

[24] G100 Compliance Certificate, GivEnergy Hybrid, https://midsummerwholesale.co.uk/pdfs/giv-g100-declaration.pdf (Accessed 16 Oct 2025)
[25] Data reveals 'Postcode Lottery' for fastest heat pump and solar installations, Octopus Energy, 1 May 2025, https://octopus.energy/press/more-news-press-releases/dno-leaderboard-postcode-lottery (Accessed 28 Nov 25)
[26] Personal Communication, Ashley Southgate, LCT Strategic Project Manager, UK Power Networks (5 Dec 2025)

2.5 Unlooping electricity supplies and the barriers

Currently, DNOs present their 5-year plans to Ofgem and receive a sum of money for unlooping works. The total number of properties unlooped in the last 5-years is very low compared to the scale and cost of unlooping all properties currently connected. Multiple connection access requests are not covered by guaranteed standards by Ofgem, and therefore are not prioritised by the DNO, as there is no fear of a fine.

The works involve a design engineer to project manage the works, and subcontractors to conduct the works. Costs are high, and time periods to complete the works long. There is not enough budget, manpower or subcontractors available to move at the pace necessary to prevent bottlenecks and long delays.

Once a connection request has been made, staff at the DNO will consult any maps showing connections of the properties to the local distribution network. The engineer is likely to have to carry out site visits. Visual assessments of overhead cables from the pole to the house would be possible. Where underground cabling has been used, it may be necessary to arrange to visit homes and examine the DNO cutout. The electricity meter may be in an external cabinet, but it might be inside the home and so the visit may need coordinating with the residents.

The DNO design engineer typically coordinates with the landlord, has to carry out site visits, produce a design, get this approved if necessary by senior managers, and produce a grid connection offer. If this offer is agreed by the landlord, they must obtain permission from the local authority/highways for any works digging up the pavement or road. Organising permissions for works on the road or pavement can lead to delays of 90 days or more [27].

If there are a significant number of installations planned in an area, this means there is a high volume of work for the design engineer associated with assessing the grid connection and organising the unlooping of the supplies where required. The DNOs have a small number of engineers allocated to this work, often with one covering a large district which may have many installations planned. Despite the engineer's best efforts, dealing with the volume of the work can lead to large delays.

It will also be necessary to access all the properties associated with the looped supply when unlooping the supply. This may require digging a trench from the

[27] Connecting your low carbon technology – a helpful customer guide, SP Energy Networks, https://www.spenergynetworks.co.uk/userfiles/file/Connecting_your_low_carbon_technology.pdf (Accessed 23 Oct 2025)

pavement to the house and requires permission of the residents. There are benefits to the residents of having an electricity supply with a greater power rating. This can include the ability to install low carbon technologies and increased value of the property.

However, not all residents are willing to have their garden or path dug up. This is particularly difficult if there are mixed tenures in the properties with looped supplies. It can be difficult to persuade owner-occupiers and private renters to cooperate with the works. If one household refuses, this can prevent the unlooping for all the properties on that loop.

There also restrictions on the amount of pavement which can be blocked off to allow for works. This is to avoid blocking off pavement access for the elderly or disabled for more than a short distance. As a result, only small numbers of properties can be unlooped at a time.

While the cost unlooping works are funded through the DNO, there are additional costs for the landlord. Looped supplies can connect into the property at the front, side or rear. After unlooping, the electricity connection may enter a different side of the property. As a result, the landlord may need to move the consumer unit for the property to be closer to the new incoming mains connection. This cost of these electrical works can be of the order of £1,000. Where there is an owner-occupier in one of the properties with looped supplies there may be a reluctance to agree to unlooping due to the owner-occupier having to fund the internal electrical works themselves. Grant funding may be needed cover internal electrical works for some owner occupiers to avoid the risk of them blocking unlooping of the other properties.

UKPN takes a different approach to unlooping to other DNOs. They struggled with proactive unlooping and focused on more effective unlooping when required by households. When a grid connection request is made using the Smart Connect portal, a photo of the DNO cut out needs to be included. The application also includes details of whether the property has a looped electricity supply.

Where unlooping is required, UKPN initially attempts full unlooping of each property. This may not always be possible due to one of the households being unwilling to have their garden dug up or internal electrics moved. Where access is declined by a household on the loop, UKPN will deliver a 3-phase unlooping solution as a customer led mitigation to avoid legal disputes and maintain service continuity[28].

[28] Personal Communication, Ashley Southgate, LCT Strategic Project Manager, UK Power Networks (5 Dec 2025)

A 3-phase supply is typically brought into the first property on the loop and a 3-phase DNO cut out installed. This first property is supplied by a single phase with a capacity up to 100A. The cable to the next property is re-terminated in the 3-phase cut out and will also supply a single phase to the next property up to 100A. Where there are four properties on a looped supply, it would be necessary to have two of the homes having new 3-phase connections to the local network.

UKPN also waits until the capacity of their transformers on the LV network reaches 95% capacity before replacement. Other DNOs are more cautious, replacing them after reaching 80% capacity. This makes better use of existing capacity and reduces unnecessary expenditure.

3. Energise Barnsley 1,000 solar PV project

3.1 Energise Barnsley FiT for Solar project

Energise Barnsley is a Community Benefit Society that was set up to deliver community owned renewable energy and heating projects across the Metropolitan Borough of Barnsley. One of the partners in Energise Barnsley is Berneslai Homes, an arms-length management organisation (ALMO) responsible for managing over 18,000 homes on behalf of the Council.

The FiT for Solar in Barnsley project is piloting an innovative finance model to fund 1,000 new solar PV systems. It is recycling income from existing solar PV installations and using the strength of community energy to raise finance.

The new installations will be funded by a combination of:

- £1m Energy Industry Voluntary Redress Scheme grant[29]
- Recycling feed-in tariff income from earlier solar PV installations
- £3.3m Energise Barnsley Solar Bond III[30]
- Income from export to the grid from new solar PV installations.

Barnsley Metropolitan Borough Council funded 310 solar PV installations in 2012/2013. Income from the feed-in tariff (FiT) has now repaid the cost of these original installations. The Council offered to provide the remaining FiT income from these properties up until 2038 to contribute to installing the new systems.

A grant application was made to the Energy Industry Voluntary Redress scheme's Innovation fund for £1m towards the installation of the systems. Further upfront funding of £3.3m was raised by Energise Barnsley through their Solar Bond III.

The 1,000 solar PV systems will be installed on socially rented homes managed by Berneslai Homes. In 2015, Energise Barnsley used community energy funding to install 321 solar PV systems, primarily on south facing Berneslai Homes properties. This new project will include east-west facing roofs. Money raised by community energy financing will be paid back in the long term by FiT income from the existing installations and income based around the export of excess solar generation to the grid from the new installations.

The solar PV installations planned were all under 3.68kW (16A) and able to follow G98 regulations. In practice most installations were about 3kW. Before

[29] FiT for Solar – Barnsley, Energy Industry Voluntary Redress Scheme, https://energyredress.org.uk/fit-solar-barnsley (Accessed 17 Oct 2025)
[30] 1000 Solar Homes, Energise Barnsley, https://energisebarnsley.co.uk/1000-solar-homes/ (Accessed 17 Oct 2025)

the procurement process, Energise Barnsley and Berneslai Homes pre-selected homes where good data was available on the condition of the roof.

The homes selected were in areas of low income which had not been included in the previous residential solar PV programmes due to the size of the roof or the roof orientation.

Participation in the scheme was optional for residents. The only requirement was that the property had a smart meter.

3.2 FiT for Solar grid connection applications and looped supplies

It was expected that there would be issues with the grid connection applications for some properties. As a result, there would be a drop out of properties from those who consented to have an installation. To estimate the number of households that were needed to be recruited to achieve 1,000 installations, a batch of initial grid connection applications was submitted in July 2023. About 65% of the connection requests from Northern Powergrid were positive which did not raise any alarms. On previous solar PV projects in 2013 and 2016, there was a grid connection acceptance rate of about 66%. Some properties did not receive a positive grid connection response because they were the third or fourth house on a shared loop.

The grid connection applications were resubmitted for the same set of homes immediately prior to the installations on the new project. This time there was a much lower positive response rate. Northern Powergrid had changed their policy towards multiple low carbon technology (LCT) requests. This changed from two LCTs being permitted on a row of four homes with looped electricity supplies to zero. This meant that Energise Barnsley was now only receiving positive connection responses on homes that did not have a looped electricity supply. It was therefore necessary to send in more grid connection requests, clogging up the system further.

More recently, the policy has changed again, and one low carbon technology can now be installed on a group of homes with a looped electricity supply. Therefore, a single solar PV system (with PV export) could be installed on a group of homes before their electricity supplies were unlooped.

Alternatively, grid connection agreements have been permitted for more than one solar PV system to be installed on a group of homes with looped supplies if the inverters used were G100 compliant and produced no PV export. Unlooping could be carried out at a later date and PV export would be allowed once that has occurred. While this allows a reduction in installation delays there are financial impacts. Firstly, the landlord is having to use a more expensive G100 standard inverter, increasing installation costs. There is also a delay in being

able to receive the smart export guarantee (SEG) income which affects the finances of the project in terms of income.

The issue of unlooping electricity supplies is under resourced with insufficient budgets. Few staff have been allocated to the issue. Initially there was one engineer for South Yorkshire and two more were being recruited. The engineer must carry out site visits, arrange access to view internal connection boards, liaise with highways, deal with internal processing at Northern Powergrid to programme/cost the works and keep this all within the budget allowed by Ofgem.

The Head of Connections and Design needs to approve unlooping projects with a budget of over £0.5m and projects over this level are rarely signed off. This has limited Energise Barnsley to making connection requests with 45 or fewer properties.

By early September 2025, Energise Barnsley had 1,211 homes scheduled for unlooping and 96 properties had been unlooped.

Energise Barnsley and its solar installer planned to achieve 20 installations a week. However, due to the time connection requests have taken to process (over 180 days in some instances) and the change in policies with additional restrictions (no export), the project has not been able to achieve more than 10 solar installations a week.

4. Together Housing and plans for decarbonisation

Together Housing is one of the largest housing associations in the North of England. They have nearly 39,000 properties from Hull across to Southport and from North Yorkshire down to Derbyshire.

The landlord has ambitious plans for retrofit improvements which includes removing gas heating from their properties. The original plan was to switch to electric heating by 2030, but due to delays caused by the DNOs, this target has been postponed until 2035. This new target may also be difficult to achieve due to the difficulty of getting grid connections with the DNOs.

At the time of writing, they have about 3,000 air source heat pumps and 1,200 ground source heat pumps. They are financially able to install about 1,500 heat pumps per year but are struggling to get 750 installed due to DNO issues[31].

Together Housing has about 3,200 homes with either solar PV or solar PV and battery storage. They would like to install about 1,500 solar PV and battery systems a year and scale that up. Again, the ability to obtain grid connections is a major limitation.

Together Housing is not relying on grant funding for installing the solar PV and batteries. They have developed a commercial model for funding the installations which uses Octopus Energy as the electricity supplier. The tenants pay the same unit rate for all their electricity, whether it is from the grid, solar PV or battery. This unit rate currently has about a 20-25% discount to the electricity price cap.

DNOs can allow installation of solar PV (and battery) systems on homes with looped electricity supplies if the systems are restricted to produce no PV export. It could be possible to install systems with no export until unlooping is carried out a year or more later by the DNO. However, this would not work for the Together Housing funded installations as solar PV export and grid services are required for the installations to be economic.

Together Housing has found that DNOs often have a poor understanding of the number of homes with looped supplies and their locations. The quality of information from maps can be very variable.

To better understand the situation themselves, whenever a staff member or contractor visits the home, they are asked to photograph the meter and the DNO cut out. This will help them build a map of which properties have looped supplies, and which have dated DNO cut out fuses.

[31] Personal Communication, Gemma Voaden, Senior Manager Net Zero, Together Housing Group, (22 Oct 2025)

While assessing properties for installations and carrying out works, the DNOs or their contractors may have to visit the properties. Together Housing provides the DNOs with the contact details for the household, having signed a data sharing agreement. If Northern Powergrid fails to access the property after three attempts, they would normally request assistance from Together Housing to help gain access. In October 2025, Northern Powergrid started sending termination letters where they cancel the works after not gaining access after several attempts. This means that landlords will have to reapply for the grid connection and start the process all over again, leading to further delays.

The DNOs can enforce access but do not use this unless there is an immediate danger. In a few cases where a boiler has failed, Together Housing has used the opportunity to replace this with a heat pump. Where the DNO must visit because of this, rather than the DNO enforcing access to the property, Together Housing has found that the DNO will tell them to remove the heat pump. Such an inflexible approach can lead to high extra costs for landlords.

They have found that Northern Powergrid are much more risk averse in calculations over maximum demand for a grid connection. For example, where maximum demand calculations for the property suggested the DNO cut out should be above 60A, monitoring of about 30 households using current clamps indicated that the maximum demand never spiked above 45A.

There can be poor communication of policies within the DNOs. Together Housing requested to have an installation take place with a load limiter which could be removed after the homes were unlooped. At first Northern Powergrid refused to allow the installation with a load limiter. However, when the issue was later raised with a senior manager, they told Together Housing that this was acceptable and in fact would help the situation.

5. Case studies of projects affected by looped supplies

5.1 Arrowfield Estate, Chorlton, Greater Manchester

Southway Housing Trust had a large retrofit project on the Arrowfield Estate in Chorlton, Greater Manchester which commenced in late 2022. The £4.2m project was part funded (£1.9m grant) by the European Regional Development Fund (ERDF) as part of the Low Carbon Living programme. The project which retrofitted over 360 homes, replaced old inefficient gas boilers with highly efficient air source heat pumps and improved wall insulation for properties[32]. Carbon emissions in the properties were expected to decrease by about 50%.

Major upgrades were needed for the local electricity network due to looped electricity supplies and the increased electricity demand. SP Electricity North West carried out a £2.2m upgrade in the area, providing new service cables to over 300 properties, replacing about 2km of underground electricity cable and building three new 6.6kV electricity substations and upgrading another[33]. £2m towards the electricity upgrade came from SP Electricity North West's Green Recovery Fund. This was part of funding from Ofgem which was brought forward for shovel ready projects to support a green recovery after COVID-19.

5.2 Together Housing ASHP project in Halifax, West Yorkshire

Grid connection applications were submitted before Christmas 2023 for 105 heat pump installations. This was for a social housing decarbonisation fund (SHDF) wave 2 project. The insulation works were fully grant funded and involved extracting old cavity wall insulation (CWI) and replacing with thermal bead CWI. Underfloor and loft insulation was also carried out. Most, but not all the properties were achieving EPC band C with the insulation measures. The air source heat pump (ASHP) installations were fully funded by Together Housing and ensured that all the properties achieved EPC band C and met the requirements for the SHDF funding.

Together Housing submitted the grid connection requests for installing the 105 ASHPs before Christmas 2023. The DNO acknowledged receipt of the requests in mid-January 2024. A full response was provided in mid-July 2024 about seven months after the application. Out of the 105 connection requests, only eight were approved and 97 rejected with a quote for the unlooping works. Together Housing responded to this request by the end of July 2024.

[32] Project focus: Arrowfield, P & H Engineering, Issue 28, https://www.pandhengineering.co.uk/features/project-focus-arrowfield (Accessed 20 Oct 2025)
[33] Major Multimillion-pound project in Manchester underway, Electricity North West, https://news.enwl.co.uk/news/major-multimillion-pound-project-in-manchester-underway (Accessed 20 Oct 2025)

The unlooping works were scheduled to start in February 2025 and end in April 2025 but did not finish until July 2025. It was not possible to complete all the planned unlooping works. This was due to issues around accessing properties and some people not allowing their gardens to be dug up for the works.

This led to major delays in the retrofit programme and a rush to complete the installations before the deadline to complete the project by 31 March 2026.

5.3 Social landlord in Yorkshire

A social landlord in Yorkshire has been focusing on improving the fabric of homes to reduce energy demand. In recent years, they have also been scaling up their solar PV installation programme. In order to connect the solar PV systems to the electricity grid, permission from the DNO is required. In this case, most of the properties where grid connection applications have been made are in the Northern Powergrid (NPG) region.

They are looking to install solar PV on the roofs of several thousand homes between now and 2030. The most significant barrier to achieving this is gaining approval for the grid connections from NPG and, if required, for the reinforcement and/or unlooping work to be carried out to the network to enable the solar PV systems to be installed. To date they have submitted applications seeking approval for more than 3,000 homes to have solar PV installed and connected to the grid.

Two examples of issues and delays being experienced are as follows:

- They submitted over 300 homes to NPG in one application in July 2023. Over two years later, they are still unable to install solar PV in more than two thirds of the homes
- They submitted an application with over 1,500 homes to NPG in Autumn 2024. After about a year they still have a large number of applications with no outcome as to whether they can connect to the grid, or if unlooping or reinforcement work is required, and when it will be actioned

These examples typify a process that is currently taking far too long. It is resulting in stop-start investment in energy improvements to the landlord's homes, risking regulatory compliance. It is also delaying energy bill savings for customers in the middle of a cost-of-living crisis and providing uncertainty for the supply chain.

The landlord's experience with NPG is that individuals are striving hard to support their installation programmes, but there are fundamental structural and process/procedural issues which prevent connection approval and/or enabling work to be delivered at pace and at the scale required.

5.4 External wall insulation in Somerset with Magna Housing

During the Social Housing Decarbonisation Fund (SHDF) Wave 2.1, Magna Housing had 16 homes where installation of external wall insulation (EWI) was delayed due to looped electricity supplies[34]. It was not possible to carry out the roof works or install the EWI until the electricity supply had been moved.

The DNO was informed of the issue and a request to unloop the electricity supplies was made in March 2024. There were significant delays in carrying out the works and formal complaints were raised with the DNO and the issue logged with the Department of Energy Security and Net Zero (DESNZ). The works were finally carried out in August 2025, 17 months after the initial request. While the cost of the unlooping was covered by the DNO, Magna had to contribute to the cost of the transformer upgrade work.

There were concerns about communications, accountability and quality of the work on site. Issues noted include cutting street light cables, leaving uncompleted works, debris and unfilled holes.

5.5 External wall insulation for a social landlord in Northamptonshire

A landlord in Northamptonshire had just over 20 homes where external wall insulation (EWI) was planned. However, these properties had looped electricity supplies which needed unlooping before the EWI could be installed.

The initial plan was to carry out the works in about 2021 and the DNO was engaged early in the process. The DNO quoted a high cost for the works (multiple thousands per home and likely to be ca £5-£6k). The Energy Manager was unhappy with these high costs, feeling the DNO should cover this. The project was delayed while considering the cost implications. In the end, the landlord felt they had to pay the costs to be able to complete the retrofit work. After placing the order, it still took around six to nine months for the DNO to complete the upgrades. The landlord chased the DNO regularly as the delay was holding up the retrofit works. This meant that the installations were not completed until Autumn 2023[35].

[34] Personal Communication, Jason Hawkes, Energy Manager, Magna Housing, (16 Sept 2025)
[35] Personal Communication, Former Energy Manager, Social landlord in Northamptonshire, (19 Sept 2025)

6. Impact of looped supplies on retrofit and a Just Transition to Net Zero

Looped electricity supplies are an issue limiting retrofit of many homes across the country. This affects technologies which can assist in electrifying heating and transport as well as improving energy efficiency. Delays in unlooping electricity supplies are putting targets for improving the energy efficiency of rented homes and net zero at risk.

Households living in detached homes are unlikely to have a looped electricity supply. Owner occupiers who can afford to buy a solar PV system can install one with a 3.68kW inverter and subsequently notify the DNO. If they want to install a larger PV system, heat pump or EV charger, there is a need to complete a grid connection application, but applications for individual homes are dealt with more rapidly.

In contrast, socially rented homes are more likely to have a looped electricity supply. Landlords wanting to retrofit properties are facing significant delays in retrofit programmes due to DNOs not processing applications and carrying out unlooping works in a timely manner. This is reducing the number of solar PV/battery systems and heat pumps that landlords can install a year. It may also risk their ability to meet the targets for EPC band C by 2030 and decarbonising homes by 2050.

This may also leave millions of socially renting households in cold and energy inefficient properties for many years longer than necessary. If these households are left behind, there will be no just transition to net zero and support for the transition is likely to be lost.

7. Recommendations

- When requesting grid connections for solar PV and other low carbon technologies it is necessary for landlords to use a multiple connection requests to the DNO. These are not covered by Ofgem guaranteed standards which means that DNOs are not responding to the requests in a timely manner. This can lead to bottlenecks for large installation schemes, with long delays in responses.
    - **Recommendation** – Multiple installation connection applications should be included in Ofgem guaranteed standards and landlords should ideally receive a response from a request within 30 days

      (Action – Ofgem)
- Some DNOs can be very conservative in estimates of the maximum demand for properties. Policies can be over restrictive such as at one point allowing no low carbon technologies to be installed on properties with looped supplies
    - **Recommendation** – Maximum demand calculations and policies for connections to be based on more accurate real-world data rather than conservative estimates. There should be more widespread use of technical solutions, restricting import and export levels to allow better use of existing connections

      (Action – DNOs, ENA)
- Larger landlords often have homes in areas covered by more than one DNO. There can be complications when dealing with different processes in different areas
    - **Recommendation** – There should be a single standardised process for dealing with multiple connection applications across all the DNOs

      (Action – Ofgem, DNOs, ENA)

- There is limited knowledge of the numbers and locations of looped electricity supplies.
    - **Recommendation** – Each DNO should carry out a full analysis and assessment of looped supplies in their region to assist in assessing the scale of the issue and developing solutions.

      (Action – DNOs, DESNZ)
    - Landlords should get staff and contractors to photograph meters and DNO cut outs whenever they visit a property to help map homes with looped supplies and older DNO cut outs. This data could potentially be shared with the DNO to update their records.

      (Action – Landlords, contractors and DNOs)

- Currently Ofgem allocates a small pot of funding which DNOs can use to address the issue of looped supplies, primarily in response to requests.
    - **Recommendation** – There needs to be larger scale funding and/or procedures to address the issue of looped supplies. If issues around unlooping are not resolved, it is likely that 2050 net zero targets for homes cannot be achieved

      (Action – Ofgem, DESNZ and HM Treasury)
- There is a 'postcode lottery' around how quickly connection applications for low carbon technologies are approved and supplies are unlooped
    - **Recommendation** - Other DNOs should consider speeding up connection requests by taking the approach used by UKPN and allow auto approval of connections up to 5kW, heat pumps up to 10kWh and ignore DC coupled batteries
    - DNOs should adopt data-driven auto-approvals. UKPN's Smart Connect continually reviews approval to refine thresholds and this has allowed them to increase the threshold to 10kW for auto approval for heat pumps. DNO's also have the ability to do this with ENA Connect Direct but it is unclear whether this data is being used

      (Action DNOs, ENA, Ofgem)
- If one household on a looped supply refuses the works to unloop the supply then the other households are unable to benefit from unlooping
    - **Recommendation** – There should be greater coordination between landlords and DNOs to ensure access to properties for unlooping
    - Where an owner-occupier is unwilling to allow unlooping due to the cost of electrical works in their home, the potential of grant funding to cover these internal electrical works should be investigated
    - There should be greater publicity around the benefits of unlooping and improving electrical connections
    - Where access to allow unlooping has been declined by a household, UKPN has been successfully delivering a 3-phase unlooping solution as a customer-led mitigation to avoid legal disputes and maintain service continuity

      (Action – Landlords, DNOs and DESNZ)
- There are often long delays before DNOs unloop electricity supplies. This is partly limited capacity of DNO design technicians and contractors.
    - **Recommendation** – DNOs to allocate more budget to multiple grid connection applications and to employ more design technicians in each area
    - DNOs to allow a wider range of contractors for unlooping works. This includes allowing trained landlord contractors to update DNO cut outs and complete all works in the home for unlooping as well as use of additional contractors for external works

      (Action – Ofgem, DNOs, ENA, DESNZ)

8. Appendix 1 – Together Housing DNO briefing paper

Working with Distribution Network Operators

A briefing from Together Housing Group

Background

Together Housing Group

Together Housing Group is one of the largest social housing providers in the North of England, with nearly 39,000 properties over 4000 square miles, largely centered in Lancashire and Yorkshire. Having undertaken roof (solar) energy works for a number of years, we are now amongst the first social housing providers to commit to removing fossil fuels from all our properties by 2035 as part of a wider group decarbonisation strategy. With 31,000 properties currently using gas central heating, this is an ambitious challenge and, as we are one of the first, we are identifying a number of challenges throughout the project.

Social Housing Sector

The social housing sector is a central component to social and economic life in the UK. As well as providing over 4 million homes across England and Wales, we play vital roles in supporting employment, construction and the community. As such we are well placed to lead the national agenda around decarbonisation of properties at scale, making markets in the production and distribution or solar PV, air source and ground source heat pumps (ASHP/GSHP) and retrofit insulation models.

Together Housing Group work with a number of local and national partnerships. We are a founding member of the West and South Yorkshire Housing Partnerships and members of the North Yorkshire and Greater Manchester Housing partnerships. We partner with the National Housing Federation, Homes for the North and Northern Housing Consortium to work with the government around national housing issues. We take a lead in decarbonisation work in a several of these partnerships.

Distribution Network Operators (DNO)

In England and Wales the energy infrastructure is provided through a number of companies regulated by Ofgem. These include the generation companies, transmission networks (The National Grid) and Distribution Network Operators (DNO) who take the electricity from the grid to a property. The so-called "Energy Suppliers" then essentially hire the different networks and charge customers for the electricity they use.

Our Concerns

DNOs have different ways of distributing power into homes. Sometimes, one supply line is shared between multiple properties (looping). To protect the wider network, networks are fused before they enter the home. Traditionally, these have always been 60 amps. Looping and fuses below 100 amps are fine for most domestic usues, but when ASHPs or electric vehicle (EV) chargers are coupled with other devices, the load may well exceed the fuse capacity.

Before Together Housing (or anyone else) can install an ASHP or EV Charger they need to seek permission from the DNO if it's likely to push electricity demand above that of the fuse or supply.

The DNO has to carry out a variety of tasks including a real-world survey to determine whether the existing supply is adequate, whether it is looped or has a 60 amp fuse. If this is the case, they then need to book in work and complete it before we can install a heat-pump or EV charger. Additionally, the meter tail (the point where the DNO wires connect to the house supply meter) in a property is not always suitable, though this is the responsibility of the energy supplier, not the DNO.

For a domestic customer this piece of work is relatively straightforward, though often slow. When, like Together Housing, you are working at scale, however, the speed and process can be prohibitive. Despite our attempts to work with DNOs to address this, we have not found a solution.

The role of the DNO in this process becomes a mission critical risk area in planning the social housing investment. Early indications suggest that based on the experience of Together Housing, DNOs are not sufficiently prepared or organised to meet the demands arising from the planned investment programmes of social housing providers.

Together Housing is leading in getting this work underway and are already experiencing this issue at scale. Other housing associations we are working with have indicated that they are now coming across similar issues in their areas. There are 1,600 housing associations in the UK with over 4 million homes. Many, if not most, of these will be completing retrofit work in the coming years and wanting to install ASHPs to many of these properties. **If DNOs are unable to deal with Together Housing completing 30k properties in the ten years, they will be unable to deal with the scale of works that are to come and this will present both DNOs and social housing providers with a barrier to meeting nationally set net zero targets.** This problem is in addition to private homeowners and landlords wishing to install ASHPs and EV chargers.

Public Affairs Briefing Paper
Distribution Network Operators

Responses from local DNOs

Together Housing work with two DNOs. Electricity North West (ENWL) largely in Lancashire and Northern Powergrid (NPG) largely in Yorkshire.

The respective CEOs of both DNOs have issued strategies about how they are committed to facilitating the process of decarbonising the electricity grid, but in practice the understanding of what this means in the localised engineering teams is very unpredictable and inconsistent with many claiming not to have the skills and capacity to respond.

Both DNOs have set up teams specifically to deal with decarbonisation issues but in both cases the resources seem insufficient, and the teams are lacking continuity to make practical impact.

In the ENWL area Together Housing and its contractors (who have similar training to DNO operatives) have undertaken their property surveys to identify looped properties, the size of the incoming fuse, and overall peak load, passing this over to try and speed up the process. It is having little effect.

Practicalities

Together Housing has a comprehensive plan in place for a job of this scale and has submitted a list of properties to the DNO.

DNO Surveys

Ideally, we would hope that the DNOs could carry out the survey 12 months ahead of us so that we can make preparations for smooth programme delivery. This would also enable us to tackle additional problems (such as where new meter tails are required, as energy suppliers have not shown much interest in replacing them). Unfortunately, this timescale has not been met.

Further Work

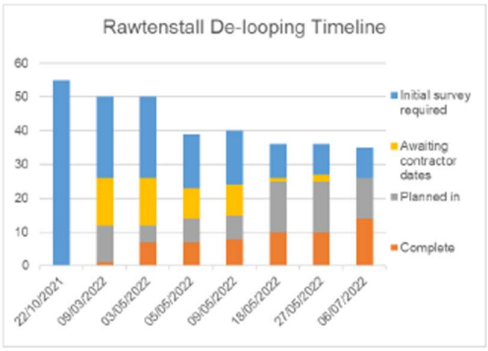
Where the survey indicates an issue, subcontractors are used by the DNO to carry out the work, though the timescales for this are prohibitive. Again, some if not all of this work could be completed by our contractors in theory, however this has not been a solution the DNOs have been able to accommodate.

An example

As part of our Green Homes Grant LAD 2 Project we observed the following timescales over 55 properties:

- **October 2021 – First survey booked in**
- **March 2022 – First property de-looped**
- **May 2022 – Seven properties had been de-looped**
- **July 2022 – A further seven (14 total) had been de-looped**

While this example dates back a number of years, we have seen little change. A recent project in Leeds has seen just a small number of homes needing de-looping, but **a quotation for doing so being 18 months to 2 years.**



Such delays will critically disrupt our investment programme, slow the pace of decarbonisation and may affect the outcomes of national funding programmes.

The risk and uncertainty in investments meeting these barriers is denting confidence in the sector to proceed and may lead to some landlords connecting devices to the grid before notifying, potentially disrupting the network.

What needs to happen

The situation is time critical. We need:

- **An urgent national and regional conversation** between Ofgem, DNOs and social landlords in how they can support our decarbonation strategies and we can in turn ease the burden on their responsibilities.

Ofgem has a new statutory objective of:

Being responsible for working with government, industry and consumer groups to deliver a net-zero economy, at the lowest cost to consumers.

This gives scope for:

- **A national approach** to network transformation that is guided by Ofgem.
- Social landlords and DNOs reaching an agreement where they can **carry out connection work ahead of notification**, saving delays in the process
- Social landlords working with DNOs to **enable suitably trained social housing contractors to carry out fuse upgrade replacements** on an agreed basis.

Further contacts

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