

Building Network Operators (BNOs) – Overview, guide and frequently asked questions

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Contents

This guide includes an explanation of what a Building Network Operator (BNO) is, a series of example scenarios and frequently asked questions.

Glossary of terms

Listed below are terms or abbreviations that are used throughout this guide:

MOP – Meter Operator

MOCOPA – Meter Operators Code of Practise Agreement

ENA – Energy Network Association

EHV – Extra High Voltage (above 11,000V)

EDNO – License Exempt Distribution Network Operator

ICP – Independent Connections Provider

CNE – Combined Neutral Earth

IDNO – Independent Distribution Network Operator

DNO – Distribution Network Operator

LPN – London Power Networks PLC

EPN – Eastern Power Networks PLC

SPN – South Eastern Power Networks PLC

R&Ls – Rising and Lateral main

SAP – Senior Authorised Person

DG – Distributed Generation

SWA – Steel Wire Armoured cables

TBS – Temporary Builders Supply

Tri rated Tails - Trirated Cable is a high temperature, flame retardant electrical cable designed for use in panel building. Trirated Cable is often referred to more generally as Panel Wire, T.R.S (*tri-rated* singles) or BS 6231 Cable.

TT – Terre Terre, an approved method of earthing that requires RCD protection for a customer earth, operating independently of the distribution network protective multiple earth

Red head fuse – a single phase fuse carrier with a solid link (encased in red plastic) in place of a fuse

RCD – Residual Current Device

HV – High Voltage (above 1000V and below 20,000V, typically 6,600V and 11,000V)

ESQCR – the Electricity Safety, Quality and Continuity Regulations 2002

LV – Low voltage (0-1000V, typically 230V single phase and 400V three phase)

MICC / Pyro – Mineral Insulated Copper Clad cables, also known as Pyro cables

MPAN – Metering Point Administration Number

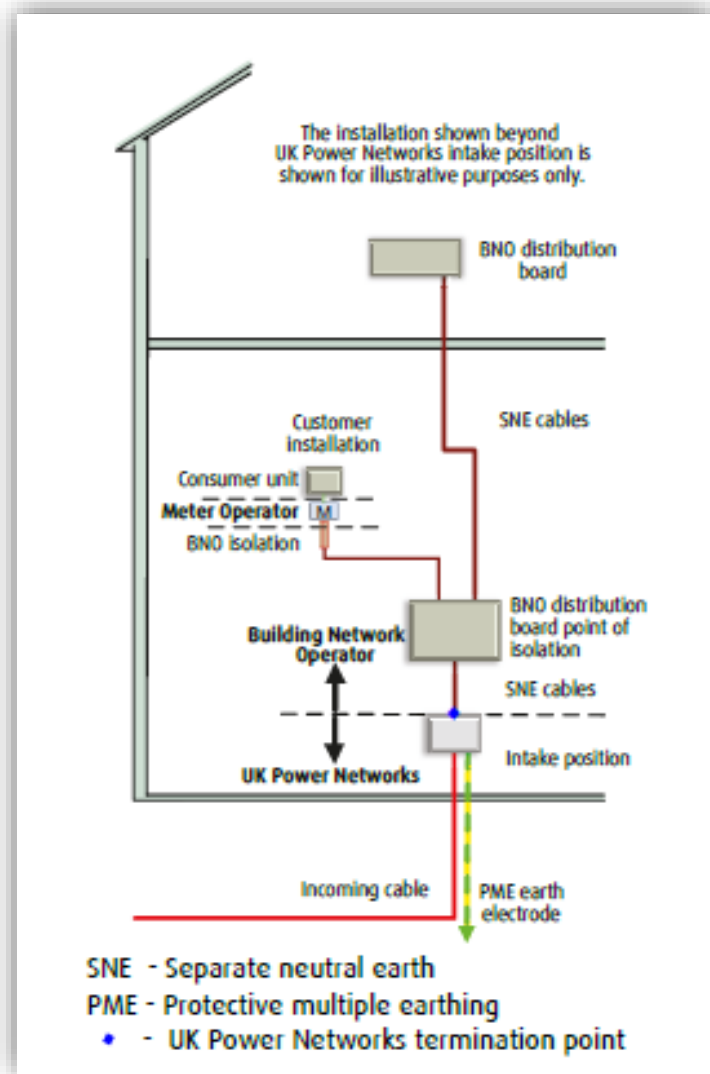
SNE – Separate Neutral Earth

DUoS – Distribution Use of System

VIR – Vulcanised Insulated / India Rubber cables



What is a Building Network Operator?



A Building Network Operator (BNO) is defined in ENA ER G87 as:

'The organisation that owns or operates the electricity distribution network within a multiple occupancy building, between the intake position and customers installations. The BNO may be the DNO, another licensed distributor or a third party exempt from an electricity distribution license (e.g. a facilities management company)'.

Therefore a BNO may be a building owner, landlord, developer or similar function in control of a building infrastructure at that given moment. A BNO may appoint a third party to act as the network operator on their behalf.

An IDNO or an EDNO, as defined in the Electricity (class exemption from the requirement for a licence) Order 2001, may undertake a BNO function.

A BNO requires a distribution license unless the BNO fulfils the requirements of an EDNO, i.e. the distribution of less than 2.5MW load or generation less than 10MW; amongst other criteria.
(refer to the Electricity Order 2001).



What is a Multi-Occupied Building?

A multi-occupied building is defined in ENA ER G87 as:

‘Any single building that has been sub-divided into more than one premise, for example flats (including conversions) or factories that have been broken up into smaller industrial units. It includes communal areas (if any)’.

Building networks are governed by BS 7671; therefore UK Power Networks shall not give approval for building network designs as UK Power Networks is not an enforcing or advisory body for BS 7671. In addition there are additional regulatory requirements for multi occupied buildings e.g fire regulations, Health and Safety at work Act 1974 etc.

Where questions of the adequacy of the customers installation need to be resolved the electrical contractor should seek advice from the trade body providing their accreditation e.g. Electrical Contractors Association (ECA), National Inspection Council for Electrical Installation Contracting (NICEIC) etc.

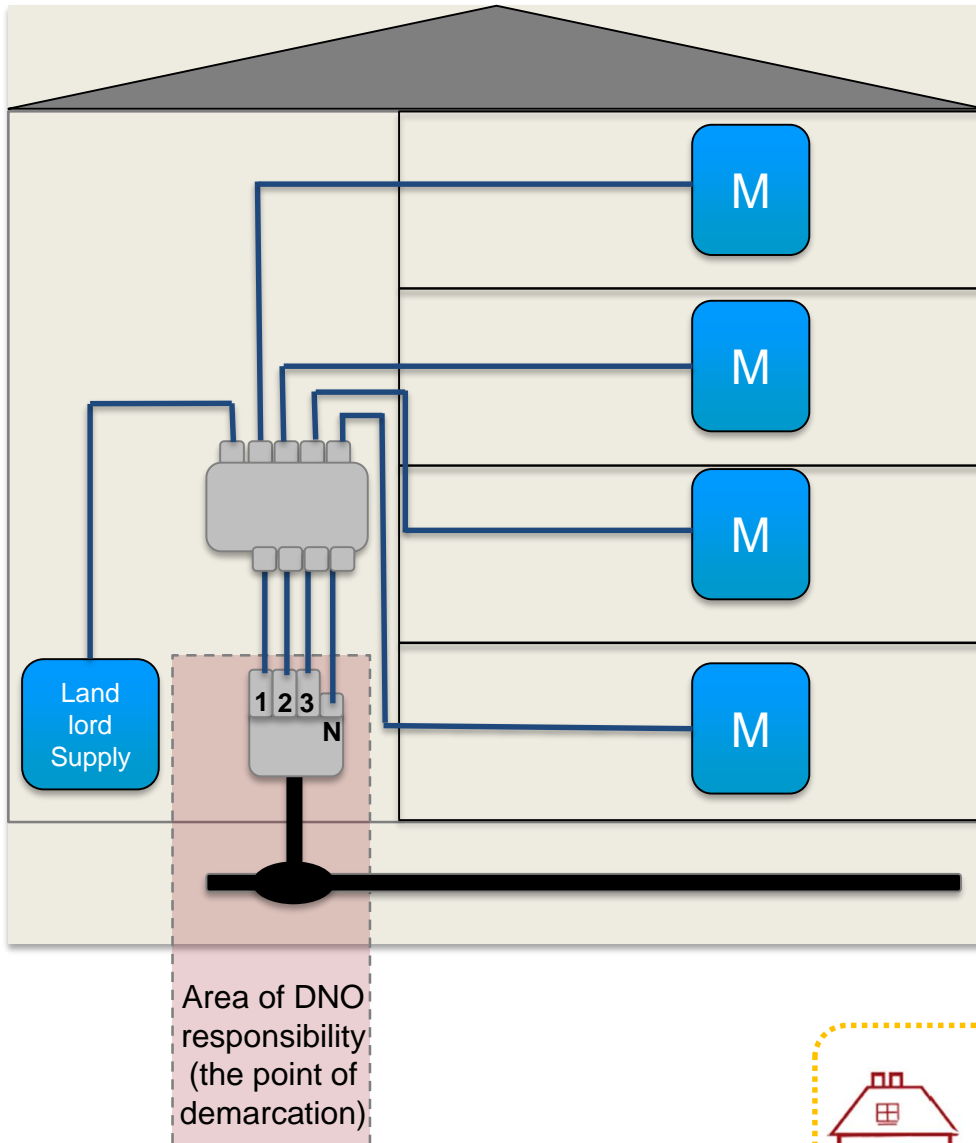
Prior to energisation the customer shall provide a request for energisation in writing together with a statement of testing/compliance with BS 7671 (and any other applicable legislation) for the building network, signed by an appropriately authorised person.

The BNO shall consider at the design stage the on-going safety of both the occupants and meter readers from hazards, as listed in ENA ER G87, in accordance with the CDM Regulations 2015.

**Note: The BNO is responsible for the quality of the customer supply at the customer supply terminals in accordance with the Electricity Safety, Quality and Continuity Regulations 2002
UK Power Networks shall provide all reasonable assistance**



Scenario 1 – Conversion of single use to multiple use



When the conversion takes place the customer will often use the supply for a temporary builders supply; please note that an RCD will be required, connected to the customers earth stake for the TBS: it will provide a TT supply.

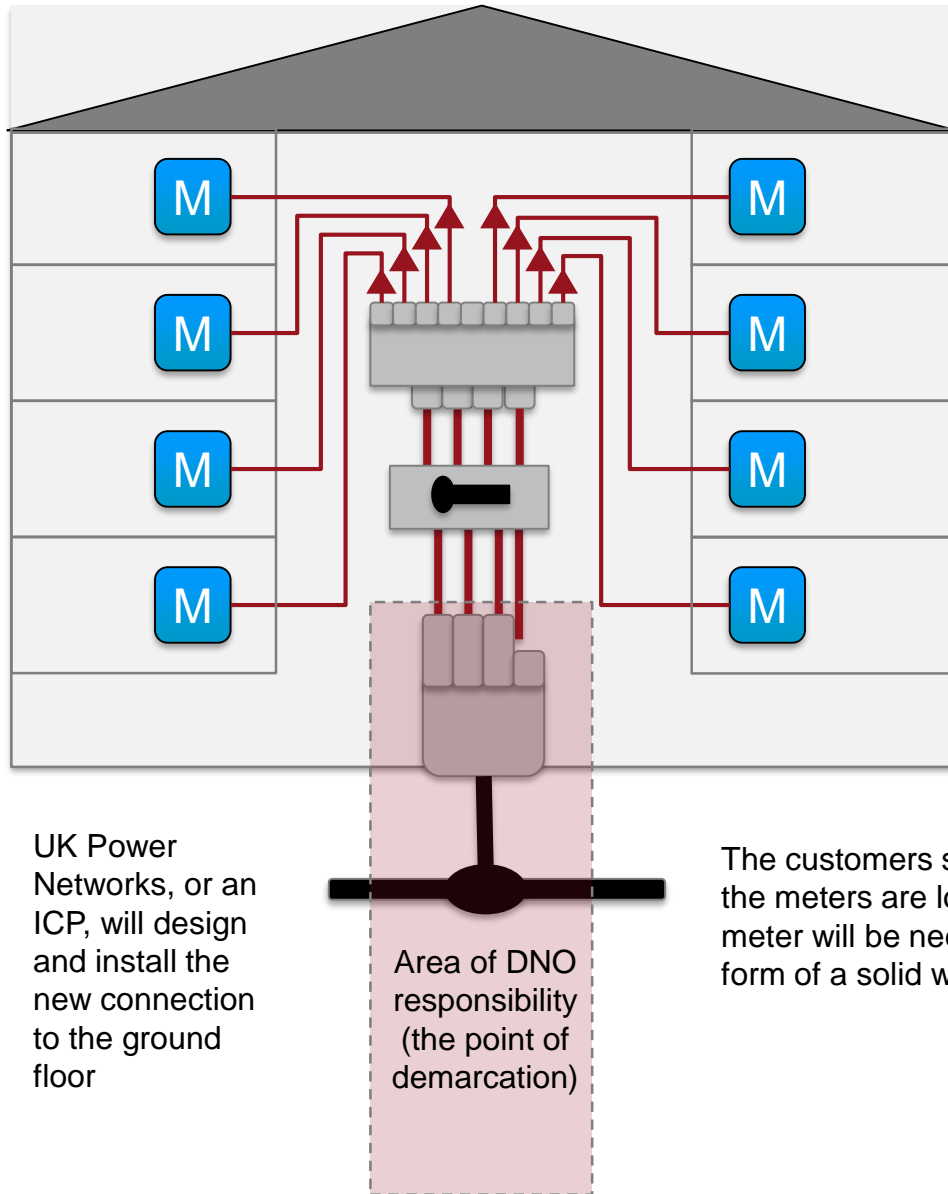
The building (house or industrial unit) is then converted into flats.

The Building Network will need to be designed and installed by the Customers accredited electrician, in accordance with BS 7671.

UK Power Networks or an accredited ICP may upgrade the service if required.



Scenario 2 – New Build



UK Power Networks, or an ICP, will design and install the new connection to the ground floor

Area of DNO responsibility (the point of demarcation)

The BNO installs the building network to BS 7671 standards

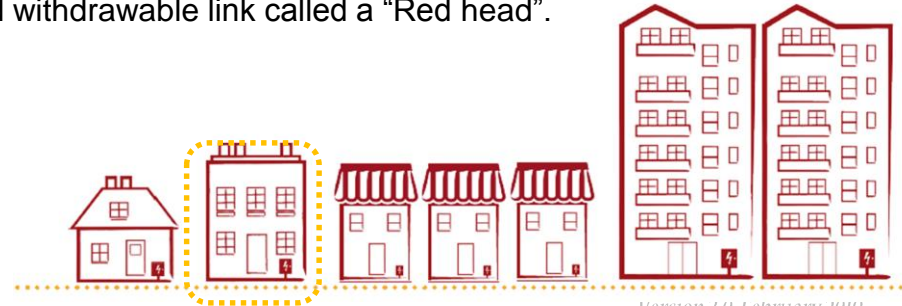
A distribution board may need to be installed by the customer. This piece of equipment divides up the main supply and provides isolation for each dwelling.

There are a number of manufacturers of distribution boards. Distribution boards may be referred to as:

- Ryefield Unit
- Bemco Unit or
- Any Multi-way Termination

UK Power Networks strongly recommends that a stand alone isolator is installed (by the customer). This will generally be sized to meet the load and will allow the supply to be energised before the internal wiring is completed. However, if the space is not available the distribution board can act as a point of isolation.

The customer's supplier installs meters via the chosen meter operator. If the meters are located in each flat, then a point of isolation adjacent to the meter will be needed to allow the meter to be fitted. This will often take the form of a solid withdrawable link called a "Red head".



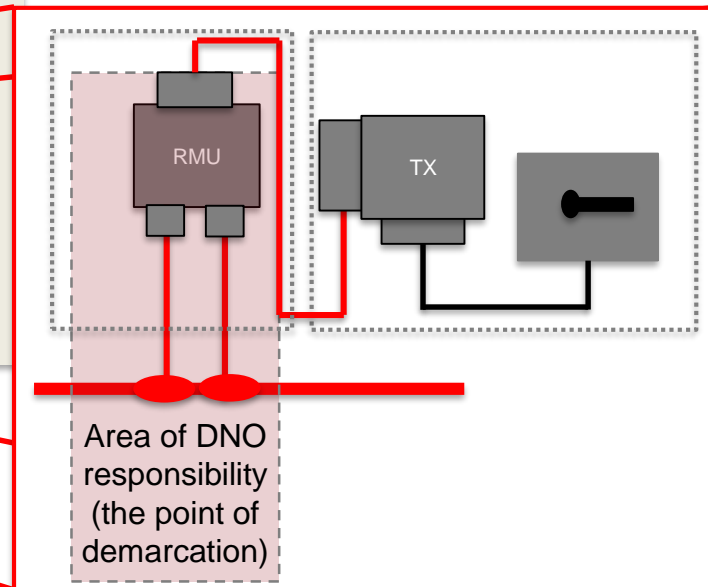
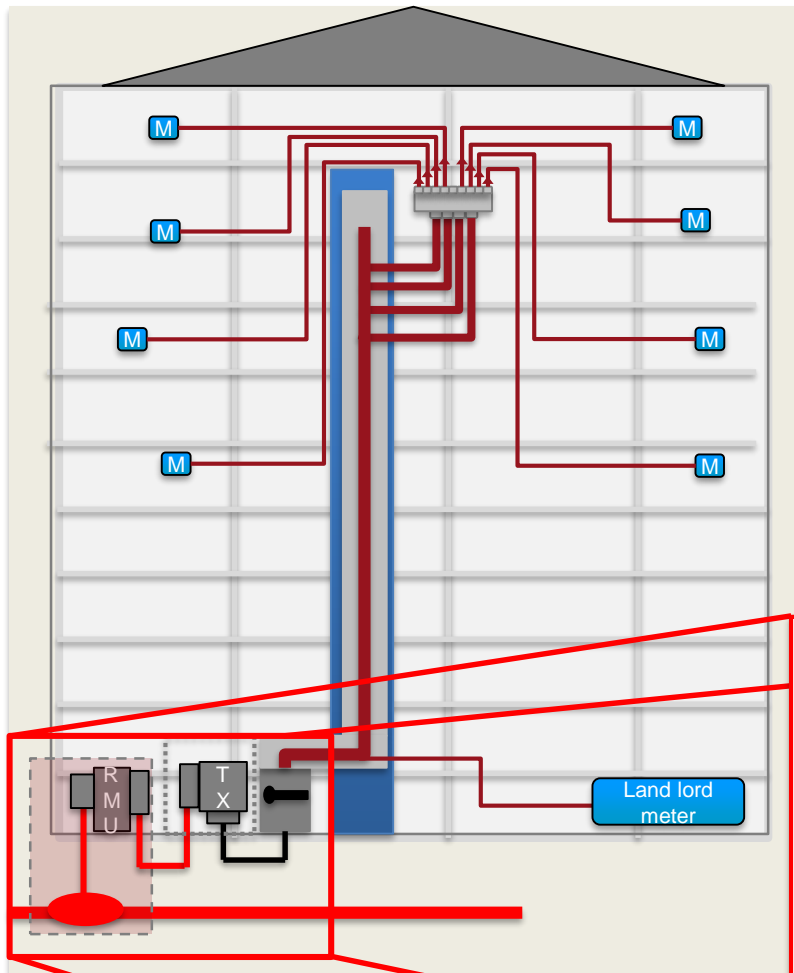
Scenario 3 – 11kV supply to high rise (New or conversion)

The BNO installs the building LV network to BS 7671 standards.

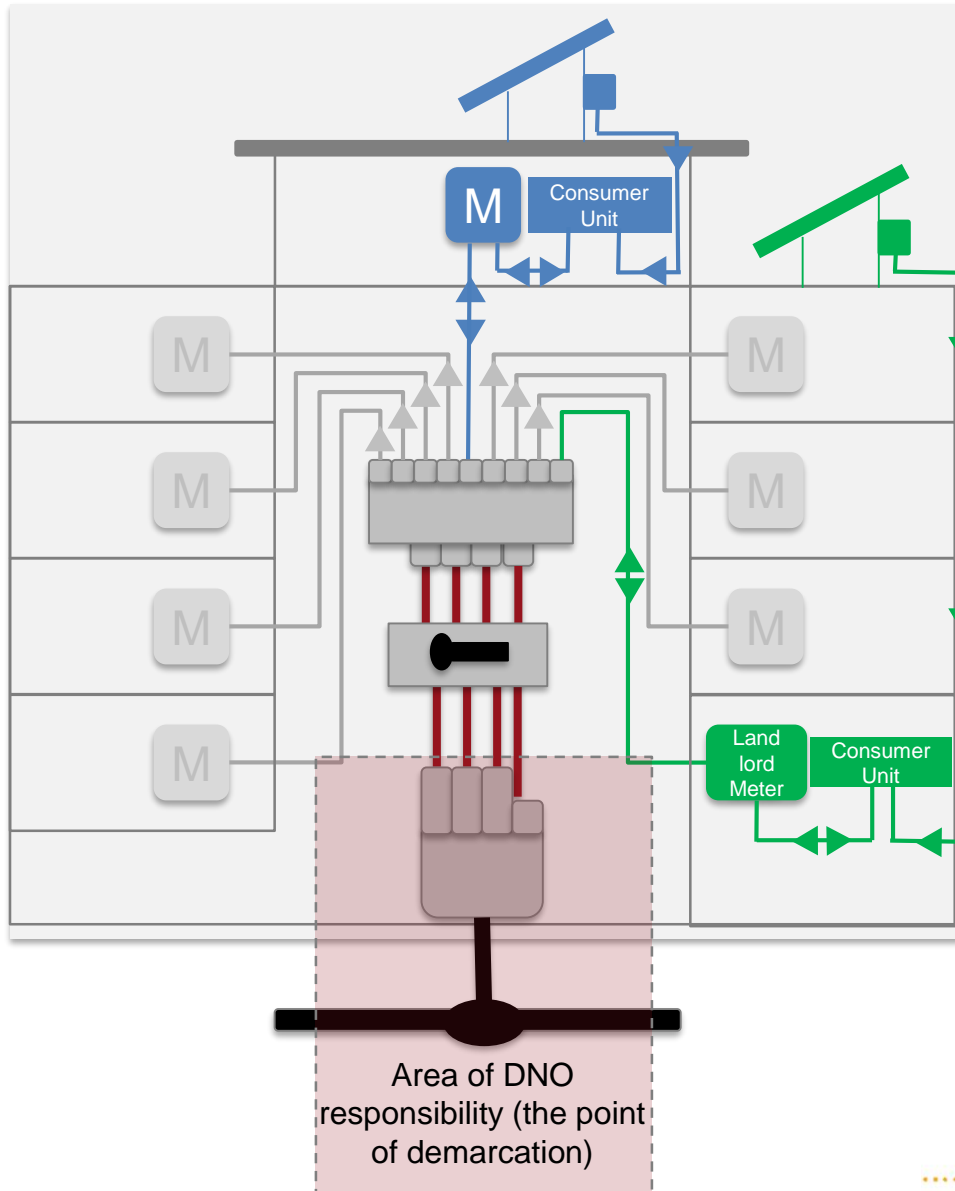
This is essentially the same as an LV Network configuration with the difference being at the intake position. UK Power Networks or an ICP will install a metered ring main unit and the customer will install the 11kV cable to the private transformer and all low voltage plant and cable beyond this.

A second customer owned switch room will need to house the private transformer. The customer will not have access to the UK Power Networks substation.

An accredited independent distribution network operator will be required to construct, and / or manage (e.g SAP Services), customer owned 11kV installations.



Scenario 4 – New Build with Distributed Generation



Individual/BNO

BNO

If any **individual** or **landlord/BNO** looks to connect DG below 16A/3.6kW per phase the ENA ER G98 process will be followed. The DG can be connected with UK Power Network notified of the connection within 28 days of installation.

If any **individual** or **landlord/BNO** looks to connect DG above 16A/3.6kW per phase up to a maximum of 50kW the simple ENA ER G99 process will be followed. An application to UK Power Networks will be made by the **BNO** and the affect on the network assessed. A quotation will be provided as required. The G99 relays will be assessed and permission given for energisation.

If any **individual** or **landlord/BNO** looks to connect DG above 50kW the full G99 process will be followed. An application to UK Power Networks will be made by the **BNO** and the affect on the network assessed. A quotation will be provided for any alteration as required. The G99 relays will be assessed via a witness test before permission given for energisation.



Frequently asked questions...

Q1. Background to change – introduction of BNO process – when and why?

A1. The Electricity Act 1989 allows for companies that meet certain criteria to be exempt from having a distribution licence, whilst the Electricity (Class Exemptions from the Requirement for a License) Order (2001) provided limits on who can qualify to be a licensed exempt distribution network operator.

The publication of the Electricity and Gas Internal Markets Regulations (2011) provided direct to market supply metering for embedded tenants of a building.

In response to this legislative framework the Energy Networks Association produced the Engineering Recommendation G87 (LV Supplies to Multi-Occupied Buildings) national standard to provide guidance for multi-occupied buildings, which defined a Building Network Operator as:

The organisation that owns or operates the electricity distribution network within a multiple occupancy building, between the intake position and customers installations.

The BNO may be the DNO, another licensed distributor or a third party exempt from an electricity distribution licence (e.g. a facilities management company).

Therefore the building network operator could be the building owner or a body appointed by the building owner to run the electricity services within a building. This clarified the national position and has since become a category B condition of the Distribution Licence for each Licensed Distribution Network Operator (all DNOs and IDNOs).



Frequently asked questions...

Q2. What do the legislative changes mean?

A2. The current national position provides a common framework for the responsibilities and liabilities of each party involved in a multi-occupied building;

- › allowing direct access to metering for customers,
- › providing clarity on how the Electricity Safety, Quality and Continuity Regulations 2002 (ESQCR) apply to all network operators between distribution and supply points; and
- › provides a basis for common working across the UK

Primarily, the framework describes two states of building network operator: 1) a licensed network operator and 2) a licence exempt network operator. A building network operator is either one or the other, the framework provides no exceptions.

The license exempt building network operator may recover the costs of providing and operating their building network; please refer to Question 7.

Likewise the owning party must maintain the building in accordance with the ESQCRs, though the design regulations governing each party differ; a licensed party is bound by the national network operator's approvals for cable selection, network design etc. whilst the unlicensed party within a building is only constrained by the IET wiring regulations BS 7671 (currently 17th edition A3) and so can provide a cost effective solution more appropriate to the building.

Q3. What is the high level process for a Building Network Operator and who is responsible from what point of the equipment?

A3. There are three parties involved in any BNO arrangement with each owner being responsible for their network equipment:

1. DNO (in this case UK Power Networks) - For a new building the DNO responsibility ends at the customer side of the intake be it a cut out supply, the feeder way on an LV board or the cable end box of an HV or EHV supply
2. BNO - Owns everything beyond the DNO point of demarcation EXCEPT any meters embedded within the BNO network or attached to DNO equipment, these act as islands of ownership within each network. The BNO has the additional responsibility of the building and the infrastructure of the building.
3. Electricity Supplier – Owns the meters embedded within the BNO Network

Frequently asked questions...

Q4. Who installs what, and where?

A4. Depending upon the voltage of the building supply, the DNO requires the provision of either a switch room or a substation within which all DNO supply equipment is installed by the DNO (See EDS 08-2110 for LV examples). The switch room is provided by the building owner.

Suppliers and their meter operator representatives will require metering positions at agreed locations within the building. Metering equipment will be installed by the suppliers appointed meter operators. The suppliers appointed meter operator will verify the sanctity and security of the building network before energising supplies within the building.

Customer cables may be terminated onto DNO equipment by either the supplier appointed meter operator or by the DNO themselves, depending on the voltage of the supply.

All customer cables are installed by the building network owner (either the building owner themselves or a suitable electrical contractor), noting that meter operators require a point of isolation immediately adjoining the metering positions and that all wiring must be in accordance with BS 7671.

Q5. Why can't tri rated tails be accepted?

A5. UK Power Networks do not accept these tails as they cannot be terminated successfully to our equipment. However, tri rated tails may be acceptable to your supplier within your building network, and you should consult them to check.

Q6. Does the MOP need to see a BS 7671 test certificate before connecting an isolator adjacent to our main supply?

A6. The majority of MOPs would like to have access to the BS 7671 test Certificate upon request and / or it should be available for reference with the installation.

Q7. How do I recover my costs for providing the building network, and how is this calculated?

A7. OFGEM has issued guidance for licence exempt building network operators and associated charge for use of their building network. Please refer to the OFGEM document "Guidance on third party access charges for licence exempt gas and electricity distribution networks" reference 151/11, published 10th November 2011, a pdf of which is available at: <https://www.ofgem.gov.uk/ofgem-publications/50612/tpa-network-charging.pdf>

Frequently asked questions...

Q8. How does a customer know if they are supplied from a BNO network?

A8. The customer may not know. In the event of a fault they should contact their DNO using the common '105' call number. The DNO will act accordingly and where ownership is unclear UK Power Networks will attend site to investigate. In the event that UK Power Networks is not the BNO then this is likely to be the building landlord, owner or a maintenance company acting on their behalf.

Q9. Who are BNOs, is there somewhere we can see a list of them?

A9. A BNO can be a building owner, operator or an organisation appointed by the building owner or operator to act on their behalf. There is not one reference point or 'list' of BNO's.

Q10. How can the identity of the BNO, of a particular installation, be determined and what is there to prevent a third party subsequently changing / adding to the BNO installation?

A10. There are a number of methods that are used to confirm the DNO/BNO Boundary

- › EDS 08-1103 requires the labelling of all UK Power Networks owned equipment with an indication of the boundary of ownership.
- › All multi-occupied buildings designed since 1st June 2013 will be a building network owned and operated by the building owner.
- › Guidance is available on request for properties designed and built before 1st June 2013.
- › Since 1st June 2013 UK Power Networks ownership ends at the outgoing terminals of the supply termination (be that cut out, LV board, HV supply, EHV supply or boundary metering unit at any voltage).
- › Third parties may only operate on a BNO network with the express permission of or appointment by the building network operator.
- › Other network operators may not trespass upon another network operator's distribution network.

Q11. What do UKPN want from a BNO?

A11. To adhere to the requirements of EDS 08-1103 – Multi-Occupied Building Supplies, available at: <http://library.ukpowernetworks.co.uk/library/asset/40b220aa-88ba-462d-8a7d-20a9ba9f8b21/EDS+08-1103+Multi-Occupied+Building+Supplies.pdf>



Frequently asked questions...

Q12. Should there be an isolator between the UK Power Networks cut out and the commencement of the BNO installation?

A12. UK Power Networks strongly recommends the use of an isolator between the UK Power Networks intake and the first asset on the BNO network. There is no requirement to install any device as the intake may be used to provide isolation on request for the entire building network but, as this incurs a fee from the Distribution Network Operator for each visit, UK Power Networks considers an isolator to be more cost effective and recommends that an isolator approved under BS 7671, be installed.

Q13. What are the MOCOPA requirements?

A13. The MOCOPA requirements are the Meter Operation Code of Practice Agreement (MOCOPA®). An agreement between Electricity Distribution Businesses and Electricity Meter Operators in Great Britain which defines safety, technical and business interface requirements regarding the provision of meter operation services. Further information can be found here: <https://www.mocopa.org.uk/>

Q14. What type of isolation point do we need adjacent to the meter?

A14. Typically, these can be Red head fuses or double pole isolators; guidance can be sought from your supplier.

Q15. How is the isolation point sealed?

A15. The MOCOPA approved sealing method will be applied by the supplier appointed MOP, at energisation.

Q16. Can a BNO pull the main fuse to isolate the building network for maintenance etc?

A16. No, the DNO will still be required to pull the main fuse as required.

Q17. Will UK Power Networks periodically inspect BNO installations to ensure no unmetered supplies are in place?

A17. No, If UK Power Networks do not own the building network, then liability for the network remains with the BNO. UK Power Networks may though undertake an investigation pursuant to it's statutory obligations should it have suspicion of an unauthorised supply of electricity being taken for a premise which has no registered MPAN.



Frequently asked questions...

Q18. How do I protect my installation from theft of electricity?

A18. Checks would be made at energisation but as the DNO we would not subsequently audit the building network and nor would your appointed supplier. The building owner has responsibility to remain vigilant for the property they are managing and ensure that all supplies are associated with a registered MPAN and taken through meters installed by the supplier's appointed MOP. In the event that any suspicion is raised the building owner should seek appropriate advice from an approved electrician and/or speak to the relevant electricity supplier.

Q19. How are meters checked on a BNO Network?

A19. Meters within the BNO network will be checked and readings taken as with any other installed meter

Q20. Do UK Power Networks see uniformity across all DNOs for the Building Network Operators?

A20. Broadly yes. All UK DNOs are required to adhere to ENA ER G87 as part of their license condition; therefore, the requirements for earthing and cable selection are consistent. Each DNO does vary on the issue of ownership, broadly speaking most UK DNOs do not own BNO networks since the introduction of ENA ER G87. One DNO actively operates as a BNO under their IDNO service operation.

Q21. When will/how will UK Power Networks update the rest of the industry and affected parties about Building Network Operators?

A21. Actions so far include;

- › UK Power Networks engaging in wider community discussions since the first publication of EDS 08-1103 in August 2012.
- › Articles published in both the NICEIC and ECA journals and presentations to ECA and IET working groups across the three license areas.
- › Communication on the process and EDS 08-1103 is ongoing.

Q22. Who is responsible for signing off the installation ready for energisation?

A22. The Supplier appointed MOP performs the final energisation at the end user point of metering and confirms the security of the BNO network. UK Power Networks performs the energisation of the intake position only and does not necessarily energise the wider building network, for example; if a point of isolation is installed (be that a switch fuse, isolator or even a distribution board), the intake position can be energised far in advance of the building completion. If supplies are direct from the intake with no isolation internally then energisation of the intake will have to wait until all supplies are secured and will likely be performed by either a MOP or in conjunction with a MOP.

Frequently asked questions...

Q23. Licensed and unlicensed BNOs. Which standards should the installation follow?

A23. All network operators are governed by the ESQCR. Licensed building network operators are governed by national DNO requirements and BS 7671 whilst unlicensed building network operators will be governed by BS 7671 only, within a building environment.

Q24. Who ultimately set out the guidance and if there is a query between different providers, who oversees this?

A24. This was established at a national level due to legislation. The regulator, OFGEM, oversee and monitor all network operator issues.

Q25. What is the timescale to design, sign off, approve and install works associated with a BNO installation?

A25. This remains in line with the existing guaranteed standards of performance appropriate to the voltage level, maximum power requirement and number of exit points requested by the customer.

Q26. Who are the points of contact for the UK Power Networks related work associated with a BNO Installation. What standard forms are used and are there specific procedures to follow?

A26. This remains unchanged from the existing UK Power Networks project gateway and small services connection processes.

Q27. What happens in an emergency? / What happens if there is a loss of supply?

A27. See question Q8. A network operator may not trespass upon a network owned by another network operator. In addition, UK Power Networks are not a qualified and authorised BS 7671 body, therefore UK Power Networks will respond to faults upon the UK Power Networks distribution network but cannot and will not respond to faults on a building network owned by a third party. UK Power Networks will always act in a manner to ensure the safety of customers and its staff. If UK Power Networks find an unsafe situation they will act accordingly to eliminate the danger.

Q28. If UK Power Networks attend and it's found to be a fault on the BNO network, do BNO's have a timescale to restore supplies?

A28. No, there is no national agreement for supply restoration by BNOs.

Frequently asked questions...

Q29. What are the variations in delivery with the BNO process between a new installation and an internal network alteration / connect additional load?

A29. This will vary on a case by case basis. For example; work within a building network that requires no additional load, and does not require a UK Power Networks site visit to provide intake position isolation, will occur without any UK Power Networks oversight or intervention. If new MPANs are required these may be requested from UK Power Networks, or other IDNO, without an associated new connection project or requirement for additional load. Work requiring additional load will be assessed by Project Gateway and Connections and a design produced in accordance with EDS 08-1103.

Q30. Where do I find the information about the requirements for the meter positions on a BNO network?

A30. BS 7671 IET Wiring regulations 18th Edition (BS 7671-2008 incorporating amendment no.3-2015)

Q31. Can I have more than one supply to the building?

A31. Yes, refer to EDS 08-2100 for restrictions

Q32. What changes are there to ASC (agreed supply capacity)?

A32. The maximum power requirement is agreed with the customer in the connections agreement and is not associated with a specific MPAN for supplies above 100A single phase. This is not changed for building networks.

Q33. Are there any changes in the MPAN generation process for BNO created supply points?

A33. No, MPANs may be requested from UK Power Networks for BNO supplies, where the BNO is unlicensed.

Q34. If the BNO is licensed, are they responsible for the MPAN?

A34. Yes



Equipment found in a BNO Installation

Fuse

Installed at the intake position by UK Power Networks or by the BNO in a distribution board, fuses are governed by BS 88 and BS 7671.



Bus-bar riser

Solid copper bars installed in trunking running up the riser. Often used on tall blocks where cables cannot easily be installed due to weight. Owned and maintained by the BNO. These need to be sealed/locked by the BNO to prevent illegal abstraction



Isolator

Sized to meet the load. Allows supplies to be energised before internal wiring is completed. If space is limited the fuses from the distribution board can act as a point of isolation.



'red head' links

When meters are located in each flat a point of isolation is required so the meter can be fitted. These can take the form of a solid withdraw-able link called a 'Red head' or other devices, refer to BS 7671 for guidance



Steel Wired Armoured (SWA)

Installed from the distribution board to each property to provide a separate neutral earth supply to a flat.



Switch fuse

When meters are remote (more than 2m from fuse board) a switch fuse is required to provide a secondary protection and this is installed by the customer.



Distribution board

Installed by the customer for properties with more than four supplied. This splits the main supply and provides a withdraw-able fuse for each dwelling, these are sized according to the load requirement (typical 100A for a domestic flat)



Low Smoke and Zero Halogen (LSOH)

Cables installed for more than 10m within buildings should be suitably insulated by low smoke and zero halogen material to prevent toxic gases in fire. Refer to BS 7671 17th Edition Amendment 3 for guidance on this and other electricity related fire requirements.



References

Installers, Developers, Independent Connection Providers (ICPs) and Independent Distribution Network Operators (IDNOs) may obtain a copy of ER G87 from the Energy Networks Association.

Energy Networks Association Engineering Recommendations (ENA ER) G98, G99 and G87 are available from the Energy Networks Association at: <http://www.ena-eng.org/ENA-Docs/>

Building Network Operators charges for use of system payments is addressed in the Electricity and Gas (Internal Markets) Regulations 2011, specifically in Schedule 2ZA S.5(1) which can be found at:

<http://www.legislation.gov.uk/ukxi/2011/2704/schedule/2/made>

Guidance for the Electricity Order 2001 can be found at:

<https://www.gov.uk/electricity-licence-exemptions>

The design rules are set out in the below documents that can be found on the UK Power networks G81 Webpages:

<http://library.ukpowernetworks.co.uk/library/en/g81/>

- › [EDS 08-1103](#) - Multi-occupied buildings
- › [EDS 08-2101](#) - Services up to 100Amps
- › [EDS 08-2100](#) - Services over 100Amps
- › [EDS 08-2110](#) - Services over 100Amps (Drawings)

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any questions or comments on the content of this
guide

