



NETWORKS

Distribution System Operator notification to CER of the intended use of the electrical distribution system for the installation of fibre optic network

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1. About this Document

ESB Telecoms Ltd. entered an agreement with ESB in year 2001 to use the entire electricity network to install fibre optical networks. The charging mechanism for this agreement was reviewed and approved by CER in 2007. In practical terms, the ESB Telecoms Ltd. business focuses on backhaul fibre and has only used the 400kV, 220kV and 110kV network in this regard. ESB Telecoms Ltd. does not intend to use the distribution network to any great extent in its business. ESB now proposes to change the access rights of ESB Telecoms Ltd. such that their access is restricted to voltages of 38kV and above. Additionally, ESB envisages undertaking the installation of a nationwide fibre network by way of a joint venture company ("FibreCo"), and is currently engaged in the process of selecting a suitable partner. ESB proposes granting access FibreCo. to use the electricity network at voltages of 38kV and below for the purposes of installing a fibre optic network only.

Condition 6 of the DSO licence requires the DSO to notify CER in writing of any additional intended use of the Distribution Assets for interests other than or in addition to discharging the functions of the Distribution System Operator. While ESB Telecoms Ltd. has existing access, the DSO is mindful that ESB Telecoms Ltd. has not used the distribution system heretofore. This document therefore constitutes a formal notification under this Condition 6 and summarises the proposed use of the electrical distribution system (including the LV network) for installation of a fibre optic network.

The scope of this use, along with technical and other relevant considerations is outlined as well as the commercial implications. Potential electricity customer benefits of facilitating this additional use are also assessed both from the perspective of the Distribution Asset Owner (ESB Networks) and the Distribution System Operator (ESB Networks Ltd).

2. Use of the electricity distribution network to deploy fibre

Overview

As a knowledge-based, services-led economy, Ireland's competitiveness (and its economic recovery) increasingly depends on the availability of high-speed broadband. However, there are currently large parts of Ireland with limited (or non-existent) access to high speed broadband services.

ESB has identified an opportunity to use its electricity distribution network as suitable infrastructure for the deployment of fibre optic cable in order to deliver high speed broadband directly to homes and businesses in locations right across the country not currently served by cable or fibre. In line with Condition 4 of the Distribution Asset Owner licence, ESB has notified the DSO of its intended use of the distribution system for this purpose.

ESB envisages that the rollout of the fibre infrastructure will take place over a number of years with the potential to ultimately extend to both urban and rural areas nationwide under a project called "FTTB". Delivery of fibre in urban and semi-urban areas will complement the existing high-speed cable offering already available in large cities and the Government supported roll-out in rural areas, thus enabling Ireland to reach its ambitious targets under the National Broadband Plan, and leapfrog many competing nations in the OECD

broadband league tables. It will also support regional development and the attractiveness of the regions for locating FDI.

The electricity network is already in place, and no significant further construction work will therefore be necessary. It is intended to use this existing infrastructure to string, clip or duct the fibre optic cable. ESB, as Distribution System Asset Owner, is satisfied that these processes are readily achievable technically and has compiled a comprehensive set of technical documentation that sets out the standards and requirements of any such deployed fibre network.

FibreCo. will be granted access to use the network for the purposes of installing fibre for a fixed term. FibreCo. will pay ESB an annual fee for the duration of this access period will also give additional non-cash benefits through the provision of free and below-market fibre pair for use in relation to any current or future DSO, DAO, TSO or TAO licence purposes. ESB, as DAO, envisages that some element of the cash received from FibreCo. would be used to reduce DUOS tariffs. This is for separate discussion with CER.

Technical Overview

ESB's electrical network is operated at a number of different voltage levels. The transmission system is made up of network operated at 400kV, 220kV and 110kV. The distribution system comprises of network operated at 38kV, 20kV, 10kV and Low Voltage ("LV"). The distribution network operated at 20kV and 10kV is often referred to as the Medium Voltage ("MV") network. The LV network operates at 230V phase to neutral / 400V phase to phase and is the primary voltage level that residential and small businesses are connected to the electrical network.

ESB has indicated that, in the deployment of the FTTB network, the electricity distribution (including LV) infrastructure will be utilised where, and to the extent it is practical to do so. It is envisaged that this utilisation will involve elements such as the overhead network, the underground ducted network and the electricity network sub-station compounds.

ESB has carried out proof-of-concept trials on both the overhead and underground distribution electrical networks and believes that installing a fibre network is technically feasible and can be achieved without impacting on the integrity of the electrical infrastructure. ESB is of the view that no public or network operator safety issues will arise from this additional infrastructure. Per Condition 4 of the Distribution Asset Owner licence, ESB as DAO has provided the DSO with the relevant technical and operational documentation relating to the deployment and operation of the fibre network on the Distribution Assets.

ESB Networks & FibreCo interfaces

FibreCo will liaise with the ESB Networks (Asset Management function) in line with the ESB Networks controlled technical interface documents (which FibreCo are bound by). FibreCo will liaise with the operations function in ESB Networks in line with the ESB Networks controlled operational interface documents (which FibreCo are bound by).

Design of FTTB Network

ESB Networks will determine the specifications and standards required of the FTTB network as it relates to the physical installation, including the operation & on-going maintenance, of the FTTB network on the existing electrical distribution system, in line with the technical interface document which it has developed.

FibreCo will determine the technology and standards required of the FTTB network as it relates to the fibre optic aspects of the network and the passive and active components that

make up that network. FibreCo will design the FTTB network in compliance with the ESB Networks agreed standards and all relevant legislation. The FTTB network designs will be audited by both FibreCo and ESB.

Build of FTTB Network

FibreCo will interface with defined personnel and systems in ESB Networks to facilitate the FTTB network build on the electrical distribution system so that it can be completed in an efficient manner with minimal impact to the electrical end-user.

ESB Networks will determine the installation standards required for building the FTTB network as they relate to physically installing it on the electrical distribution system.

FibreCo will determine the installation standards required for building the FTTB network as they relate to the optical components of the network. FibreCo will ensure the FTTB network is installed in compliance with the agreed standards. The FTTB network installation will be audited by both FibreCo and ESB Networks.

3. Primacy of the electricity network

One of the key considerations of the DSO in relation to the proposed use relates to the primacy of the operation, maintenance and development of the electricity network over that of the FTTB network. The DSO has been given the relevant assurances by the DAO in relation to the legal requirements of FibreCo. to comply with this key licence requirement.

4. Commercial considerations

ESB is mindful of the regulatory nature of the assets on which this fibre will be installed and has proposed a commercial mechanism for granting the access. This mechanism, which has both a cash and non-cash (i.e. free fibres) element to it, fully covers all incremental costs faced by ESB Networks, provides for a significant margin on those costs and also provides significant added value through avoided DSO/DAO/TSO/TAO fibre investment which will inevitably be required over time as the network develops.

5. Maintenance and Repair Agreement

It is intended that ESB Networks would carry out the maintenance and repair of the passive element of the fibre network under a separate commercial agreement. This is to ensure the safe maintenance of the FTTB network with its proximity to the electrical network and also to ensure primacy of the electricity distribution system.

FibreCo will pay ESB Networks an annual fee for this service. ESB Networks has carried out a detailed costing exercise for the provision of this service and is satisfied that the commercial fee for this service adequately covers its costs and an additional margin above this.

6. FTTB benefits

Electricity consumers

ESB Networks believes the availability of a fibre infrastructure on the MV network is of strategic long term importance and that investment in this type of infrastructure, while significant, will ultimately be economically justified and allowed as part of a future price review. Through this venture, ESB Networks sees an opportunity to future proof and leverage electricity customer benefits, by securing the future fibre needs of the electricity system at no cost to electricity consumers, while also maintaining primacy of the electricity network.

The benefits to electricity consumers from this approach will accrue in two areas:

1. Over time a reduction in DUOS, to be discussed with CER
2. Avoided investment in the network, facilitated by the availability of fibre
 - a. In the event that CER believes fibre investment will ultimately be needed, this investment requirement will be avoided by FibreCo providing free fibre as part of the commercial terms of the Network Access Agreement
 - b. In the event that CER believes fibre investment will not ultimately be needed, having fibre available will allow ESB Networks to develop the system in a more cost effective way than would otherwise be the case as the availability of fibre will enable enhancements in network design and equipment deployment

At this point in time it is difficult to quantify the value of 2b above; however, specific network applications facilitated by the availability of fibre are outlined below.

In terms of customer impact, ESB has carried out trials on the installation of fibre on its network and developed interface document which FibreCo will be bound by, based on these.

Distribution system operations

Having a dedicated pair of fibres will enhance the performance and reliability of SCADA operations through increased bandwidth and reduced latency, additional security and improved reliability as fibre telecoms networks are not impacted by the interference of electricity compared to their copper telecoms network equivalent. This would be leading edge technology. Ultimately, using fibre to manage SCADA would deliver better performance of the distribution electrical network and would facilitate improved modelling of this network for use in the Distribution Control Centres, delivering improved network performance.

The rollout of this fibre network on the distribution electrical network will facilitate SCADA for additional network equipment, such as MV substations, MV reclosers, voltage regulators and capacitors. It would also be a key component of improving the network control for embedded generation on the distribution network and facilitate improved performance in this area.

Advanced protection

The new fibre network on the distribution electrical network would facilitate a new generation of protection applications, increase public safety and optimise continuity. It would:

- allow more effective communication of the MV/LV faults back to the HV station, delivering improved network protection performance
- facilitate the monitoring of network imbalance on the Distribution system, highlighting the problem networks for resolution
- improve the performance of the Earth fault protection schemes on the Distribution Electrical system
- facilitate further deployment of Distributed ASC protection schemes deeper into the MV network

Additionally, this new fibre network would facilitate remote access to relay devices for interrogation, setting and commissioning purposes and deliver upon the efficiencies and cost saving measures that can be gained from this.

The new fibre network can also be used for collecting meter data from aggregator or concentrator locations on the MV network. It can be used as an enabler for wireless communications to Smart meters at these aggregator locations - WiMax etc.

Asset Management

The availability of the new fibre pairs will facilitate improved connectivity and interaction with the electrical equipment on the MV and LV network and will facilitate optimised network investment as a result of these improvements. This would typically be in the areas of Asset Condition Monitoring where the Asset Management function can develop more effective systems and models to identify problem assets for remedy or replacement. The increased connectivity and interaction with the MV and LV assets would also facilitate ESB Networks to move towards more condition based maintenance for certain asset classes.

Smart Networks

The ongoing development of Smart networks will be greatly enhanced by the availability of this new fibre network, again through improved connectivity and interaction with the electrical equipment on the network. It will be required in certain locations to facilitate the development of the following Smart network initiatives:

- The optimisation of losses on the Distribution Electrical network
- Reactive Power Management similar to what is done on the Transmission Electrical network
- Improvements in network control programmes such as
 - Advanced Voltage control
 - Voltage Set Point control
 - Power Factor control
- An enabler for any future Demand Side Management programme

7. Conclusion

The proposed opportunity identified by ESB as DAO to use the electricity distribution to roll out a fibre network has the potential to leverage significant additional value for electricity customers both through a reduction in DUOS over time and through reduced network investment facilitated by the provision by FibreCo. of free and below market value fibre for control and operations use. Using existing assets for the benefit of Irish citizens is a government objective and ESB is seeking to support this objective through using the assets in this manner.

The commercial model proposed provides for potential significant upside should the project be successful and protects the electricity customer from commercial risk.

The DSO has been given the relevant technical assurances by the DAO and has been provided with all information sought and is submitting this document to CER as a formal notification of the proposed additional use of the distribution assets.