NETWORKS

# ESTIMATED RESTORATION TIME (ERT) ACCURACY

ESB Networks Consultation

Feedback to: consultations@esbnetworks.ie

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# 1. Introduction

ESB Networks builds, operates, maintains, and develops the medium- and low-voltage electricity network in the Republic of Ireland. The ESB Networks organisation is underpinned by a shared vision to deliver sustainable and reliable networks for Ireland through focusing on performance, innovation, and our customers.

The complex network we maintain includes distribution stations, overhead lines, poles and underground cables. We deliver electricity to 2.4 million customers nationwide.

| Quantity | Description |
|---|---|
| 2.1 million | Wooden Poles |
| 150,000 km | Overhead Line |
| 22,000 km | Underground Cable |
| 242,000 | Pole Mounted MV/LV Transformers |
| 21,680 | Ground MV/LV Substations |
| 133 | 110kV/38V or 110MV substations |
| 438 | 38kV/MV Substations |
| 2.3 million | Meters |

FIGURE 1 - DISTRIBUTION SYSTEM STATISTICS

In every power system, faults are an unavoidable issue that needs to be managed. Faults can occur in the power system for multiple reasons. They can be due to the weather, with events such as high winds causing trees to fall on lines or due to lightning, flooding etc. In Ireland, in serving our dispersed rural population, the network length per capita is four times the European average, and the total length of overhead lines is six time greater than that of underground cables.

Faults can occur due to the mechanical failure of a component of the system or because of accidents such as vehicles colliding with poles. They are caused by animals (such as rodents, birds or cattle) interfering with wires and supporting structures. Power may also be cut off for safety reasons if someone has come into contact with a live conductor. Faults can even be due to criminal activity such as copper theft.

Whenever faults occur, our aim is to restore power safely as quickly as possible. Our countrywide staff of more than 3,000 people treat all customers equally, whatever the electricity supplier. A key part of

this is providing customers with an accurate Estimated Restoration Time (ERT) in the event of an outage. The ERT is our estimated time for the restoration of your power. ESB Networks are looking to improve the accuracy of our ERT process for fault outages. To further encourage this, a new incentive mechanism regarding improving the accuracy of ERTs was introduced by the Commission for the Regulation of Utilities (CRU) in the *PR5 Regulatory Framework Incentives and Reporting* (CRU20154) determination that issued in December 2020.

ESB Networks hope to use the insights gained through this consultation to aid in achieving the joint CRU and DSO objectives regarding ERT accuracy.

# 2. Current Estimated Response Time (ERT) process

The purpose of the ERT is to provide the customer with an accurate estimate as to when their power will be restored.

## 2.1 Summary of Process

The following sets out the current process regarding ERTs:

1. Estimated Restore Times (ERTs) for fault outages are created automatically in the ESB Networks Outage Management System ("the System").
2. The System makes a prediction as to where in the network the fault occurred, and it also predicts what type of fault it might be. This is based on the outage reports that are entered into the System. These reports come from customers who report a loss of supply as well as directly from signals on automated devices on the electricity network.
3. The initial ERT is then automatically calculated by the System based on pre-set configuration settings for the predicted device type involved in the fault, as well as whether it is suspected to be in an urban or rural location.
4. When ERTs are calculated by the System, it rounds the ERT up to the next 15-minute period. Therefore, if the System predicts that power will be restored at 15:01, 15:07 or 15:12, the System will calculate an ERT of 15:15.
5. While some faults can be fully or partially fixed remotely through remote network switching, most faults need to be dispatched to a crew who are required to attend the fault.
6. The crew attend the fault and assess the damage. At this point they usually obtain a better understanding of what type of fault it is and where it is located. For complex faults this involves an intricate process of fault hunting and network switching to locate the fault.

7. The crew update ESB Networks Central Dispatch as to when the fault is likely to be restored based on the latest damage assessment. This new time is entered into the System, creating a new updated ERT.
8. The latest ERTs are displayed online through the powercheck.ie website, the fault logging website and are also available through contacting the ESB Networks call centre.

The powercheck.ie website, the ESB Networks call centre and the fault logging website are the main channels that provide ERTs to customers. A typical ERT notification on powercheck.ie is shown below.

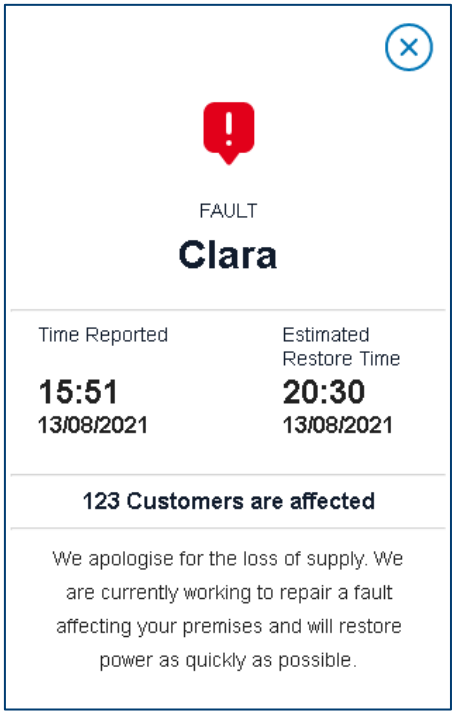


FIGURE 2 - POWERCHECK.IE POP-UP BOX

# 3. Improving the accuracy of ERTs

ESB Networks are seeking to improve the accuracy of future ERTs for fault outages by collecting and analysing historic fault outage data and using the insights gained through this analysis to predict future ERTs. The overall goal is to use a data-centric approach to:

- establish the current baselines of the restoration times for fault outages, grouped across a number of fault characteristics (e.g. number of customers impacted)
- then use this historic data to adjust the configuration in the System and try to improve the accuracy of our ERTs

For this incentive, ESB Networks are analysing Estimated Restore Time (ERT) accuracy in two distinct categories namely:

- Fault Outages
- Storm Outages

In 2022, we plan to explore where technical developments within the System, as well as process change, can drive improvements.

- The technical work will involve the completion of the evaluation between two key competing approaches – deriving ERTs by device type versus ERTs by number of customers. Combining the best of these two selected approaches with further fine tuning based on more granular location information for the fault will also be analysed.

If, on analysis of the data, we find that the average distribution of the historic fault restoration time for faults related to particular characteristics (e.g. number of customers) differs significantly from the parameter that sets default ERT time that the System gives for that type of fault, ESB Networks will adjust the parameter, where the System has a mechanism to do so.

- The process change focuses on defining and implementing our processes for out of hours ERTs and for the ERT process for extreme weather events.

Extreme weather events, in particular, represent a separate set of challenges in getting timely and accurate ERT data to customers. As a storm blows through the country, it presents safety obstacles to immediate restoration, for example the risk of sending crews out in Red or Orange level winds, when trees or lines may still be coming down. Analysis of past storms show that the forecasted weather in advance of the storm may differ from the weather experienced and therefore the actual damage to the network is not easily predicted. It is only when the storm has past that the true scope of the damage is revealed. See Table 1 below for a comparison of damage from two 2020 storms with similar weather warnings beforehand and very different outcomes.

| Name | Date | Peak Number of Customers without supply | Forecast |
|---|---|---|---|
| Storm Jorge | 29/02/2020 | 7400 | Red wind warning Clare & Galway, Orange wind warning for country. |
| Storm Ellen | 19/08/2020-22/08/2020 | 180,000 | Red wind warning Cork, Orange wind western coastal counties. |

TABLE 1: COMPARISON OF STORM JORGE VERSUS STORM ELLEN

Recognising this, ESB Networks propose to review the ERT process for major storms separately as part of this incentive, to establish the optimal ERT process to best serve the customer during major storms.

From 2023 onwards, the focus will be on delivering against the ERT targets that will be in place and further fine tuning the selected configuration settings within the System based on the latest data.

# 4. Questions to our Stakeholders and Customers

1. Do you have any feedback or input on the existing ESB Networks Estimated Restoration Time (ERT) process?

2. Do you have any have any feedback or input on the proposed approach ESB Networks have outlined for improving the accuracy of ERTs?

3. Were you previously aware of where to find the fault ERT?

We look forward to hearing your feedback which can be submitted to consultations@esbnetworks.ie

# 5. Conclusion

We are now publishing this document for consultation, and we would welcome your feedback on the existing Estimated Restoration Time process and responses to the questions outlined in Section 4.

The closing date for receipt of feedback is **5:00pm, 28th October 2021**. We look forward to hearing your views which will help further shape our plans for 2022 and beyond.