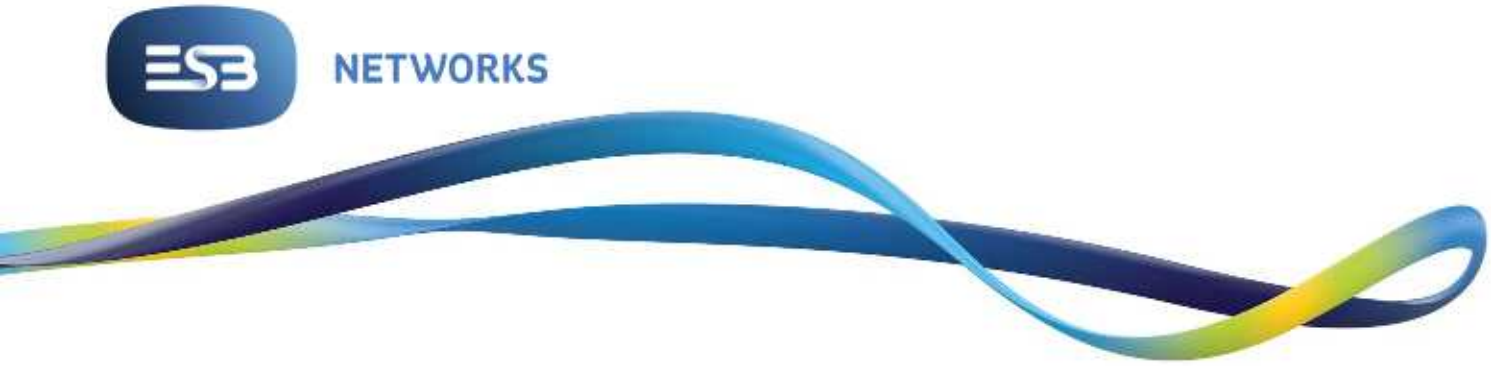

NATIONAL ELECTRICITY CRISIS SCENARIOS FOR IRELAND

ESB Networks Response to CRU Consultation (CRU/20138)

23rd December 2020

Contents

1. Introduction

ESB Networks welcomes the opportunity to respond to this important consultation, CRU/20/138: *Identification of National Electricity Crisis Scenarios for Ireland*. ESB Networks DAC makes this submission in its capacity as the licensed electricity Distribution System Operator (DSO).

ESB Networks is broadly in agreement with the electricity crisis scenarios and classifications thereof, and offer some additional insights and comments relating to same in this submission.

We note the CRU's plan to use the comments received from this public consultation to develop the risk-preparedness plan under Article 10 of Regulation (EU) 2019/941. As DSO, ESB Networks looks forward contributing to this process and to working as required with the CRU and EirGrid in the development of that risk-preparedness plan.

2. General Observations

ESB Networks makes the following general observations with regard to the draft set of national 'crisis' scenarios under which a loss of electricity supply might occur in Ireland, and to calculate the level of risk associated with each scenario.

2.1 Role of ESB Networks

ESB Networks works to meet the needs of all Irish electricity customers, providing universal affordable access to the electricity system, and delivering and managing the performance of a system of almost 155,000 km of overhead networks; over 23,000 km of underground cables; over 646 high voltage substations; significant amounts of connected generation, including over 4.5 GW of renewable generation connected to the Distribution and Transmission systems; approaching 2.3 million demand customers; and now several thousand "active customers" – including but not limited to domestic premises with microgeneration (a rapidly increasing number), demand side management, houses with battery storage, etc.

ESB Networks is committed to actively supporting all Irish homes, communities and businesses in their choices and activities at this time of fundamental change in the energy sector. Over the past 90 years Irish electricity customers have invested in a distribution system which reaches every home and business in the country, and over the past two decades, as an industry we have adapted this system to integrate high and increasing levels of renewable generation.

2.2 Electricity Crisis Scenarios: ESB Networks

Many of the scenarios examined in this document relate to the discharge of the TSO role and/or challenges to the overall availability of energy on the system as a whole. For such crisis scenarios the TSO will be the lead System Operator. ESB Networks is committed to working with the TSO and CRU where appropriate to respond to such crises to ensure appropriate and robust risk plans are in place to mitigate and respond to such events.

However, there are also a set of scenarios in which the energy is not available to customers due to impact on the distribution system, either threats to critical distribution infrastructure, which are small in number, or widespread damage to a large number of distribution infrastructure assets, for example extreme weather, malicious attack, failure of critical DSO primary equipment etc. Where the distribution system is impacted, ESB Networks will be the lead System Operator in responding to such scenarios.

ESB Networks has significant expertise in dealing with incidents on the distribution network and is more than happy to comment further in the detailed responses below, and to add further insight where appropriate.

2.3 Use of LOLE and EENS as metrics for classification

ESB Networks notes that Loss of Load Expectation [LOLE] and Expected Energy Not Served [EENS] as per the ENSTO-E methodology, are used as the metrics for the determination of classification of the various scenarios examined. ESB Networks further notes that many of these scenarios are of a transmission nature or relate to challenges to energy supply. For these, it is entirely appropriate that these parameters are used in such a context and that the data to inform and quantify the classifications and application of the risk assessments, are readily available to TSOs.

However, there are scenarios, for example major storms such as Storm Darwin, for which ESB Networks have a leading role in addressing the crisis and restoring supply to customers. In such circumstances, the IT and OT systems that ESB Networks have developed necessarily focus on the production of parameters that are more germane to that context i.e. numbers of customers without supply. Energy not supplied, whilst important, is less critical to track impact and provide information to customers impacted in such circumstances.

In providing input to such scenarios in this document, therefore, ESB Networks need to make approximations in order to translate the information at its disposal, to the format used in the consultation

For the avoidance of doubt, over time, and, as work progresses on ESB Networks' ambitious Active System Management [ASM] project, such information as relates to the distribution system, will become more readily available.

3. Individual scenario details: ESB Network comments

3.1 Weather

ESB Networks have extensive expertise in managing the impact of severe weather events on the electricity system. In addition to leading the response to storm events within this jurisdiction ESB Networks have also provided assistance to utilities in other jurisdictions in the aftermath of storm events through our mutual aid relationships.

Over the last 7 years there have been two major wind storms, Storms Darwin and Ophelia, both of which were multi-day events due to the level of damage caused on the network, as well as many less severe but none the less significant storm events. In 2020 there were seven named storms over the course of the year, severe weather events impact on the electricity system, both transmission and distribution, due to the nature and extent of the distribution system the impact if often greater on it. ESB Networks have reviewed Storm Darwin in the context of this consultation and applied the EENS methodology, which resulted in a classified of Storm Darwin as critical, this is consistent with the classification in the consultation paper.

However, there are some points of note, the application of the EENS methodology is based on an assumption that the number of customers initially affected is consistent for the entire duration of the storm, this does not reflect the reality of storm restoration.

Figure 1 below graphically shows customer restoration from the time the storm subsided, to full restoration. The shape of this graph is typical for storm events and is well understood by ESB Networks. It illustrates the relatively rapid progress in the initial stages of restoration, whereby use of remote switching operations and repairs to plant at the higher voltages result in large numbers of customers being restored. As storm restoration continues a smaller number of customers are restored for the same effort by repair crews, as repair work is progressed through the voltage levels, and latterly, to repairs to plant which restore one or two homes at a time.

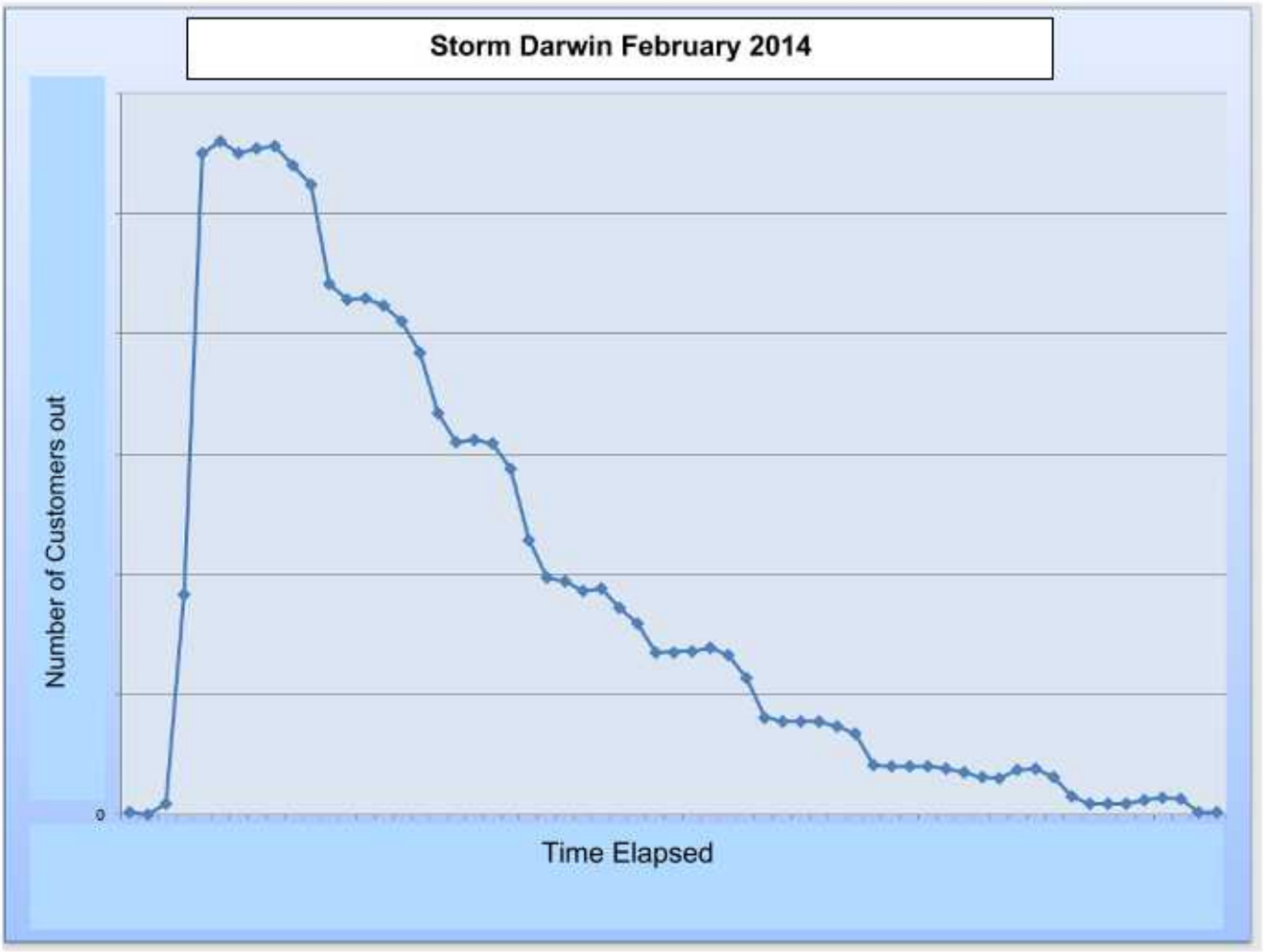

Figure 1: Typical Storm Event Customer Restoration Profile

The point is that were the methodology applied more rigorously i.e. to effectively use the area under the curve, the outcome would be a lower classification.

ESB Networks acknowledges the general context in which this consultation is set but note that the classifications derived in this manner may not fully represent the scale and gravity of such an event. They would not for example capture such things as the involvement in National Emergency Co-ordination Group or the sourcing of repair crews from other jurisdictions through mutual aid agreements with other utilities etc.

Cold Spell

ESB Networks have no comment with respect to impact of cold spell on energy balancing or adequacy of generation. In the event emergency load shedding is required by the TSO, ESB Networks in its role as DSO will work with the TSO to identify and implement this requirement on the distribution system.

Heavy precipitation and flooding, winter incident, heatwave / dry spell, solar storm

ESB Networks are broadly in agreement with the identification of and assessment of these weather events. In recent years snow and rain storms in particular had localised / regional impact, for example storm Emma (2018), had multiday impact on the distribution networks in regional areas. Please also refer to points raised above in section 3.1.

3.2 Malicious

Cyber-attack on business-critical ICT infrastructure

With the increasing sophistication of cyber attackers driving greater frequency and severity of incidents across various sectors, including the energy sector, cyber risk has evolved from being an IT risk to a business-wide risk and within ESB Networks it is classified and managed as such.

We recognise that a major cybersecurity incident to our grid connected systems would result in extremely grave consequences for our business, for electricity customers and for the wider economy. The protection of these systems, from all forms of cyber risk and blended (combined physical/cyber) attacks, is recognised as essential to maintaining ongoing operations.

Compliance with the EU NIS Directive is a priority focus for ESB Networks, and we engage in on-going proactive engagement with the relevant competent authorities, our trusted cybersecurity partners, and our vendors in this regard. We recognise that this threat is constantly evolving, and we must keep adapting in order to continue to provide the protection our systems need, and to ensure that, where any cyber incidents do occur, ESB Networks is properly positioned to respond and recover.

ESB Networks agree with the NRA evaluation on the classification of the impact and likelihood of such an attack.

Cyber-attack on systems not physically connected to the power grid; Physical attack against critical assets; Physical attack against TSO control centres, Threatening/ blackmailing/hostage-taking of key employees; Insider attack

The scenarios described relate to transmission system operation, ESB Networks does not therefore have a position on these scenarios.

There are a number of key distribution system assets for example, the National Distribution Control Centre (NDCC), an attack or loss of critical distribution system assets or critical employees would similarly impact the supply of electricity to customers. A broader view should be taken on the scenarios listed in this section to take account of the impact to the supply of electricity of loss of key

distribution assets, alternatively a number of additional scenarios referencing the critical distribution infrastructure is warranted.

3.3 Primary equipment failure

Local technical failure with regional importance

The loss of a major Bulk Supply Point (BSP) on the distribution system in an urban area, was examined as part of this consultation response. Per the EENS methodology, such a loss for 1 hour would be classified as either minor or insignificant. For a 24 hour outage, the events would be categorised as either Critical or Major. Classification as Major would be in line with that depicted in section 3.3 of the consultation for *Local technical failure with regional importance*.

While accepting the general context of the consultation risk assessment ratings, ESB Networks are of the view that in terms of impact on customers homes and businesses and the resultant news and media coverage it is likely that such events could be described as at least major or arguably, critical.

Simultaneous failure of power system primary elements

The scenario described relates to transmission system operation, ESB Networks does not have a position on this. In the event that the TSO requires load to be shed during an emergency, the DSO will work with the TSO and CRU to identify and implement load shedding required.

3.3 Technical failure

Loss of ICT tools or telecommunication infrastructure required for power system operation in or near real-time

ICT tools currently play a crucial role in the management and control of the grid and this will only increase as Smart Grid technologies revolutionise electricity production and consumption into the future.

ESB Networks view our ICT tools through the lens of the people, processes, and underlying technologies. We have always placed a strong focus on managing and maintaining our ICT estate and are very conscious of the need to build in the appropriate levels of resilience into our ICT systems.

This concentration on resilience, through attention to such areas as capacity and performance planning, system monitoring, redundancy and disaster recovery planning mitigate the likelihood of a loss of our ICT tools. Accordingly, ESB Networks agree with the CRU's classification of the likelihood of such a risk materialising.

Complexity of power system control mechanism

The scenario described relates to the transmission system control and operation, ESB Networks does not have a position on this.

However, ESB Networks are currently in the process of transforming the control and operation of the distribution system to cater for customer and distribution system requirements to deliver on climate action targets, the complexity of distribution system control systems will therefore increase as the systems are developed, managing system risk is and will remain a core element of the development work, inclusion of distribution system control may be considered in future risk scenario analysis.

3.4 Natural disaster

ESB Networks agrees with the risk and assessment as described in the consultation.

3.5 Fuel shortage

The scenario described relates to the transmission system and market operation, ESB Networks does not have a position on this.

3.6 Human factors

Pandemic; Strike, riots, industrial action in power supply chain

ESB Networks agrees with the risk and assessment as described in the consultation.

3.7 Market related

The scenario described relates to the transmission system and energy market operation, therefore ESB Networks does not have a position on this.

4. Conclusion

ESB Networks welcomes the opportunity to comment on this document. ESB Networks broadly agrees with the scenarios identified and the assessment of the risks. ESB Networks have identified some additional scenarios for consideration. The methodology used to assess the risk in some circumstances may underestimate the impact on customers as outlined in the response above, in particular where scenarios would greatly impact on the distribution system.

We note the CRU's plan to use the comments received from this public consultation to develop the risk-preparedness plan under Article 10 of Regulation (EU) 2019/941. As DSO, ESB Networks looks forward to continuing to contribute to this process and to working as required with the CRU and EirGrid in the development of that risk-preparedness plan.