

STAKEHOLDER ENGAGEMENT IN THE REVISION OF ESB NETWORKS' PLANNING & SECURITY OF SUPPLY STANDARDS

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ABSTRACT

ESB Networks' Distribution System Security & Planning Standards ('Planning Standards') [1] specify and describe the fundamental approaches implemented in planning the Irish distribution network.

The overall energy sector is undergoing unprecedented change. It is acknowledged that in conjunction with other technological advancements and the increased availability of more dynamic operational systems, the applicable Planning Standards should now further evolve to account for these changes.

The revision of the Planning Standards has been identified as a key project in a companywide Innovation Strategy, which aims to facilitate the long term decarbonisation of the energy sector in Ireland. This will be achieved through the release of network capacity for connection of further renewable generation, by enabling increased electrification in the heat and transport sectors, and by transitioning to a more actively managed distribution network.

The approach proposed in the project scope involves two phases. The first, a research and analysis phase heavily informed by engagement with the main stakeholders from across the energy sector, to develop proposals and options for further consideration. The second, the integration of the recommendations from the output of the first phase into business as usual.

The key challenge for the Planning Standards review project is to develop a standard that facilitates the achievement of the aims of the Innovation Strategy and takes account of the requirements of EU wide Energy Directives and Network Codes, whilst cost effectively maintaining a safe, secure and reliable distribution system.

INTRODUCTION

ESB Networks is the licensed Distribution System Operator (DSO) for Ireland. It is responsible for planning, building, operating and maintaining the distribution network for the 2.3 million customers it serves.

The distribution networks consists of approximately 178,000km of overhead lines and underground cables,

which include the sub-transmission networks at 110kV in Dublin city and the countrywide 38kV networks, a medium voltage (MV) network operated at 10kV and 20kV (a phased network conversion plan is in place since the early 1990s to convert all rural overhead networks to 20kV operation), along with low voltage (LV) networks.

There are considerable levels of distributed generation (DG) already connected to the distribution system, where wind is the dominant renewable technology. In excess of 3,500MW of wind is currently connected across all voltage levels.

Other forms of renewable DG connected, including hydro, landfill gas, waste-to-energy and bioenergy sites, total approximately 500MW. This gives an overall renewable DG connection figure of over 4,000MW.

There has been a significant growth in interest in solar PV connections since early 2015, with almost 300MW of connection agreements now contracted. However no solar PV connections have been made to date.

As of January 2019, the system peak demand in Ireland is approximately 4,900MW. The highest historical system peak demand of 5,090MW was recorded in December 2010 [2]. There is limited interconnection between Ireland and other transmission networks or synchronous areas. The current level of non-synchronous generation penetration on the transmission system is approximately 60% with plans for this to increase to 75% by 2020.

One of the key challenges facing Ireland is the binding EU 2020 target for Renewable Energy Source – Electrical (RES-E), whereby 16% of electrical energy consumption in 2020 should come from renewable sources.

ESB NETWORKS' DISTRIBUTION SYSTEM SECURITY & PLANNING STANDARDS

ESB Networks' Planning Standards [1] were originally approved and published in the early 2000s. Minor revisions and updates were consulted upon and approved by the National Regulatory Authority (NRA) in 2003 and 2015. However no fundamental review has been carried out since their initial publication.

The primary aim of the standard is to provide guidance to interested parties on the approaches taken for development

of the distribution network, and on how new demand loads and generators are assessed for connection.

They have since become guidelines used by industry partners, demand and generation customers and consultants, who may carry out high level analysis on the feasibility of proposed connections in advance of a formal connection application.

The current standard is largely deterministic in nature, and focused on ensuring sufficient network capacity exists to meet peak demand and peak generation conditions. The security of supply standard is risk-based, such that connections at higher voltages, serving larger group demands, receive a higher level of security.

Under the current standard, DG connections are typically firm (and can reasonably expect to be able to export without interruption for the majority of network n-1 events), and the approach is essentially a 'connect and forget' one, with no active management of DG connections taking place in real-time network operation.

ESB NETWORKS' INNOVATION STRATEGY

Under the vision statement of *'Innovating towards a sustainable future for our customers and for Ireland'*, ESB Networks launched its Innovation Strategy [3] at its customer conference in September 2017. This strategy aims to facilitate the transition of the energy system in Ireland to a low carbon model, and to deliver an electricity network which serves the future needs of its customers and Ireland.

Forecasts for 2030 for the connection of further DG and Distributed Energy Resources (DER) will require the distribution network to support [3]:

- 5,800MW of wind based generation
- 2,400MW of solar PV based generation
- 1,300MW of energy storage
- 2,500MW of customer flexibility

As well as:

- up to 300,000 electric vehicles
- 330,000 homes with e-heat capability

The strategy is comprised of eight innovation roadmaps addressing different areas and work streams, which cover all aspects of the ESB Networks business:

- Connecting Renewables
- Customer Engagement
- Electrification of Heat & Transport
- Asset Optimization
- Flexibility on Our Networks
- Operational Excellence
- Network Resilience

- Working with the Transmission System Operator (TSO)

The overall strategy is underpinned by certain assumptions, including the installation of approximately 2.3 million smart meters in homes and businesses connected to the distribution system. The current smart metering programme in Ireland - *'The National Smart Metering Programme'* - is being managed and delivered by ESB Networks. Meter deployment will commence in 2019 and will continue for six years, with the installation of smart meters on a phased basis. The programme involves the installation / replacement of 250,000 meters in 2019 and 2020, and 500,000 per year, in each of the subsequent four years of the programme [4].

Additionally, a further assumption underpinning the strategy is the availability and roll out of more advanced control systems and increased network visibility. To facilitate this, a SCADA system upgrade is to be delivered as a project under the Innovation Strategy that will enable the transition to a more active distribution system.

Given the ambitious DG and DER targets and envisaged timelines stated in the strategy, it is acknowledged that the revision of the Planning Standards, in conjunction with the transition towards a more active distribution system, is required to enable these future connections. Thus, the review of the current Planning Standards is a constituent project in the 'Connecting Renewables' roadmap.

The outcome of projects in other roadmaps will also inform the revised Planning Standards and feed into the Planning Standards review, such as the assessment of dynamic line rating, temperature adjustment of load readings and equipment ratings, and trials of energy storage installations at individual sites and on the distribution network.

STAKEHOLDER ENGAGEMENT

ESB Networks recognises the importance of stakeholder engagement and understanding stakeholder needs.

It is also acknowledged that collaboration with external parties is key to ensuring effective innovation and that innovation will have wider benefits to Irish society through improved efficiency, reduction in environmental impacts and customer empowerment. This forms part of the vision and value pillars which are the foundation of the Innovation Strategy and centered on the needs of customers and other stakeholders.

Key drivers for the stakeholder engagement include:

- To ensure the process of developing the revised Planning Standards is transparent.

- To establish early buy-in from stakeholders.
- To give all stakeholders a chance to contribute to the outcome of the review.
- To ensure industry consensus can be reached, as much as possible, ensuring that the revised Planning Standards balance the needs of key stakeholders including ESB Networks, the NRA and customers.
- To make the implementation of the revised Planning Standards easier, as the rationale will be documented and clearly communicated.

ESB Networks believes that stakeholder engagement and management are central to the success of the Planning Standards review. To enable an efficient and effective approach, a robust Stakeholder Engagement Plan has been developed [5].

The development of this plan involved:

- Identifying relevant stakeholders and the various stakeholder groups.
- Identifying the most appropriate method of engagement for each stakeholder group, depending on their requirements and levels of interaction with the network, such as, existing forums, bilateral meetings, interactive workshops, conference presentations and open/online or closed/directed surveys.
- Identifying themes to discuss with stakeholders.
- Ensuring all stakeholder inputs are recorded, assessed and responded to.
- Consideration was given to previous stakeholder engagement carried out elsewhere throughout the industry and lessons learned were applied to the Stakeholder Engagement Plan [6].

An overall companywide Stakeholder Engagement Strategy [7] has also been developed and approved as part of the Innovation Strategy, covering wider aspects of customer engagement on the changing energy landscape, and a separate Stakeholder Engagement Plan for the Planning Standards review has been developed to align with the overall company strategy.

The following four stakeholder groups were identified:

1. Electricity industry parties
2. Network users
3. Government interests
4. Others as appropriate, such as, academia, energy agencies or associations, community groups, etc.

The stakeholder groups identified were drawn from experience of groups with whom ESB Networks currently interacts. As a reference point, stakeholder groups identified in similar reviews and working groups in the UK were considered to ensure a similar stakeholder audience

has been captured [8].

Other stakeholders who have not specifically been identified by ESB Networks are welcome to participate in stakeholder engagement. In an effort to capture as wide a stakeholder audience as possible, different methods of engagement will be used, with a final public consultation towards the end of the project in Autumn 2019.

The Stakeholder Engagement Plan was split up into three phases:

1. Initial engagement workshops to inform the terms of reference of the project.
2. Ongoing engagement throughout the project keeping stakeholders informed with regular progress updates and regular opportunities to provide feedback.
3. Final engagement summarising conclusions, ensuring that all stakeholder issues are recorded, assessed and responded to and ensuring that stakeholders are aware of the final public consultation in Autumn 2019 on the revised Planning Standards, ahead of approval by the NRA.

The first phase of the Stakeholder Engagement Plan is now complete, and the second phase is active.

Having initially identified the relevant stakeholders and stakeholder groups, invitations were issued to individuals and organisations in the energy sector in Ireland, such as the industry associations for:

- Large and small-scale wind
- Solar PV
- Bioenergy
- Battery and non-battery energy storage
- Demand response providers

A number of separate Stakeholder Engagement workshops were held with these groups and topics raised and discussed in an open forum at the workshops were subsequently considered to be either in-scope or out-of-scope for the Planning Standards review project.

In-scope topics include:

1. Exploration of different types of connections conditions from the current standard firm connection, for both demand and generation connections:
 - Timed connections – a connection which may be only available during certain times of the day, or during expected peak load times.
 - Non-firm access connections – to date all connections have been made available on a firm basis so that the generator can

- reasonably expect to be able to export without interruption for the majority of network n-1 events.
- Variable or flexible access connections and curtailment options.
2. Exploration of the use of flexibility services such as the contracting of an energy storage solution or demand side response to defer or delay a network reinforcement.
 3. Appropriate levels of security of supply for Central Business Districts.
 4. Appropriate consideration of High Impact Low Probability events in the Planning Standards.
 5. Appropriate consideration of large point loads such as data centres in group demand calculations.
 6. Appropriate consideration of contribution from DG and DER to security of supply levels.
 7. Exploration of the implementation options for an Active Network Management system.

Feedback from the Stakeholder Engagement workshops informed both the Terms of Reference [5] drawn up for the project, and the overall Project Plan [5].

A key part of the project plan is the engagement of technical consultancy support, both to augment the resource of the project team and to ensure a wider review of industry international best practice from other similar jurisdictions is included. Additionally, the use of consultancy support is expected to provide an independent industry perspective, and to challenge the assumptions, options and proposals made during the project.

The specification for the consultancy support requirement was also informed by the stakeholder engagement workshops. The enquiry process was completed during December 2018, with a consultant appointed in early 2019.

The primary means for ongoing general stakeholder updates will be through the Distribution Code Review Panel (DCRP), as a standing body which meets quarterly, constituted to review the Distribution Code, and assess and propose amendments for approval by the NRA. While the DCRP is chaired by ESB Networks, it comprises membership from the TSO, the NRA and various industry representatives from the renewables sector, synchronous generators groups, independent suppliers, national standards bodies, and major customers. Minutes of DCRP meetings are published quarterly [9] on the ESB Networks website.

IMPACT OF EU NETWORK CODES ON PLANNING ACTIVITIES

ESB Networks is committed to playing a leading role in enabling Ireland's transition to a low carbon energy future

powered by clean electricity. National and EU policies continue to drive this transition, with the Clean Energy for All Europeans Package of directives and regulations in 2016 providing revised targets for Ireland [10]. The revised Planning Standards need to evolve to ensure the revised targets can be met.

The three EU Network Codes in the 'Connection' family [11], the requirements of which may influence or effect planning activities (and therefore are accounted for in the Planning Standards review), comprise the;

- Demand Connection Code (DCC),
- Requirements for Generators Code (RfG)
- HVDC Connection Code (HVDC)

An impact assessment was carried out on each code to ascertain what aspects of distribution planning activity would need to change or evolve to meet the mandatory requirements as set out in the codes. The impact of the HVDC Connection Code was deemed to be minimal on the Irish distribution system.

Under the DCC, a significant condition affecting distribution planning activity, is now imposed by the clause on reactive power requirements (Article 15). Where applicable, this clause imposes requirements including that:

- A reactive power range no wider than 48% of the Maximum Import Capacity (MIC) during reactive power import shall be specified.
- Reactive power may not be exported across the connection point under active power flow conditions of 25% of MIC

These requirements were reviewed and a number of technical studies carried out to assess the practical impact on planning activities, where the DCC is deemed applicable. The analysis was based on historic data, over a period of one year.

A number of existing connection points with differing types of underlying distribution network were assessed (e.g. predominately underground cable, predominantly overhead, rural, high density urban, standard urban) to ascertain typical Q/P ratios. Similar networks were also assessed under minimum load conditions to ascertain reactive power flow direction across the connection point.

Furthermore, the requirements imposed by the codes which affect distribution planning activities will now be included as part of the Planning Standards review. These requirements may be applied during assessment of a new network connection or when amending an existing connection, and to which the DCC applies.

Stakeholder engagement for both the DCC and RfG codes took the form of a public consultation (held jointly between ESB Networks and the TSO) on parameter selection and other requirements.

A public consultation was held for the RfG in December 2017 for a period of seven weeks, and a similar public consultation was held for the DCC in August 2018 for a period of five weeks.

The outcomes of both consultations were compiled and forwarded to the NRA for their consideration and ultimate approval, which will then be transposed into the Distribution Code in various modification proposals to the DCRP.

PUBLICATION OF INFORMATION

As part of the Stakeholder Engagement process, it was considered important to publish the Stakeholder Engagement Plan, Project Terms of Reference and Project Timeline. This will keep stakeholders informed of proposals and give stakeholders the opportunity to contribute feedback on proposals and to ensure transparency in the process of developing the revised Planning Standards. These documents were published in January 2019 [5].

CONCLUSION

It is anticipated that by engaging with stakeholders throughout the Planning Standards review that a revised copy of the Planning Standards will be achieved that can facilitate the aims of the Innovation Strategy and balance the needs of key stakeholders including ESB Networks, the NRA and customers.

It is also hoped that the value of stakeholder engagement will be recognised by all and that the experience will be used to continue to build stronger, more active and engaged working relationships with stakeholders that will help shape future plans.

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