ESB NETWORKS

2025 Innovation Consultation Response Paper

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Executive Summary

In February 2025, ESB Networks published its annual consultation report, 'Innovation to Deliver Networks for Net Zero', outlining its innovation strategy, project portfolio, and areas of focus for the coming year. Stakeholders were invited to provide feedback, and twelve detailed responses were received from various sectors, including the renewable sector, flexibility services, electrification, academia, utilities, and equipment/system manufacturers. This represented a 50% increase in engagement compared to the previous year.

Stakeholders provided strong support for our existing project portfolio, offered thoughtful proposals for collaboration, and highlighted opportunities to accelerate the transition to a Net Zero-ready electricity network.

Key themes included:

- Interest in flagship projects, notably our proposed ElectriCITY project, and a desire to collaborate on scalable solutions such as hybrid heating, AI-driven asset management, and advanced conductors.
- A need for early-stage engagement, cross-sector integration, and faster transition from trial to full deployment.
- The importance of long-duration energy storage, flexible demand, and energy communities in supporting decarbonisation.
- The potential of digitalisation and AI to unlock new value streams and improve planning, monitoring, and customer experience.
- A shared commitment to collaboration, with all respondents expressing a willingness to engage through research partnerships, technology trials, or joint policy advocacy.

In response to strategic and cross-sectoral feedback, ESB Networks is:

- Developing and publishing a revised innovation strategy in 2025, informed by an external governance and best practice review.
- Enhancing existing internal innovation governance processes in line with a renewed innovation focus.
- Exploring pathways for scaling proven technologies and embedding a challenge-led innovation culture.
- Expanding stakeholder engagement through further bilateral meetings and new collaborative mechanisms.

This consultation response outlines how ESB Networks is leveraging our stakeholder feedback as we develop our revised innovation strategy, review our governance procedures, and enhance our approach to project development. We remain committed to collaborative engagement so that together we can achieve the transformation needed to ensure a sustainable, low carbon future for Ireland.

Introduction

In its annual innovation consultation report, 'Innovation to Deliver Networks for Net Zero, ESB Networks outlined plans for a revised innovation strategy whilst giving an overview of its current project portfolio. Stakeholders were invited to provide feedback through written response to help shape and inform innovation activities into the future. The consultation received a marked increase in responses, with written submissions received from twelve respondents across the following sectors:

- **Renewable Energy Sector**
- **Flexibility - Demand Response**
- **E-Heat & E-Transport**
- **Academia**
- **Utility**
- **Equipment/Systems Manufacturers**

Positive feedback and support were received from the respondents in relation to many of our ideas, pipeline projects and active projects. Many direct proposals of products and subject areas, as well as specific offers of collaboration, were put forward for consideration.

As part of our ongoing engagement with stakeholders throughout 2024, several bilateral meetings and workshops were held with the renewable electricity sector, academia/research, e-heat, e-transport, energy agencies/authorities, equipment/systems manufacturers, utility/TSO, industry and large energy users, electricity suppliers, industry consultants and international organisations.

There has been a marked increase in engagement with this year's consultation with 50% more responses received this year, as well as a notable improvement in both the quantity and quality of feedback. The revised format and content structure of this year's document received complimentary feedback with some samples given below:

> ***"...congratulations on your achievements this year and a great document. Having worked extensively across all the GB networks ... this is one of the best summaries I've seen."***
> – an energy startup.

Additionally, there were offers to collaborate to potentially unlock benefits for the energy system:

> ***"...we are also interested in exploring ways to collaborate with counterparts in the energy sector to investigate how digital technologies and data could be leveraged for the benefit of integrated energy system."*** – a utility company

Some respondents, having assessed our existing project portfolio, highlighted potential innovation opportunities that they felt aligned with our strategy:

> ***"We are eager to propose a set of innovative projects that directly align with the key focus areas outlined in your strategy"*** – a technology provider

Further to this, as part of our consultation process, we offer individual meetings with each of the respondents to:

1. Better understand their feedback and how it may be considered for inclusion in our innovation activities.
2. Follow-up on specific offers of collaboration and/or proposed solutions to assess the merits of each proposal in the context of our evolving project portfolio and strategic objectives.

1. Emerging Innovation Opportunities

Q. What emerging trends, technologies, or innovation areas do you see as opportunities for collaboration with ESB Networks to support Ireland's Net Zero goals?

Stakeholders highlighted several key innovation topics including long-duration energy storage (LDES), energy flexibility, low-carbon network hardware (e.g., Aluminium Composite core overhead line conductors (ACCC), High Temperature Superconductor (HTS) cables), demand-side technologies, and the potential of energy communities.

We welcome the alignment from stakeholders on key innovation opportunities that support Ireland's decarbonisation. ESB Networks recognises the critical role those emerging technologies – such as LDES, dynamic line rating (DLR), and energy flexibility platforms – play in accelerating the transition to a Net Zero-ready electricity network.

Several projects in our 2025 innovation portfolio reflect these priorities, including:

- Flexible Demand Connections – Timed Connections, which explores short-term demand flexibility mechanisms.
- Dynamic Line Rating, which enables better utilisation of existing assets.
- ElectriCITY, which proposes to focus on scalable low-carbon energy community models.

We are actively exploring collaborative pathways with technology developers, researchers, and network users to progress projects that unlock new capacity, reduce costs, and strengthen resilience. We continue to assess emerging trends and technologies for future inclusion in our portfolio, informed by evolving policy, network needs and stakeholder priorities.

2. Flagship Projects for Collaboration

Q. Are there flagship projects or large-scale initiatives you would like to collaborate on with ESB Networks to drive innovation and deliver transformative outcomes?

Stakeholders expressed interest in participating in the ElectriCITY project, scaling existing trials (e.g., LDES), and co-developing centres of excellence for grid innovation.

We thank all respondents for their interest in partnering on large-scale and flagship innovation initiatives. We are particularly pleased to see strong interest around the proposed ElectriCITY project, which aims to create a blueprint for whole-of-system electrification in urban areas. In setting out their interest in being involved in the ElectriCITY project, many stakeholders highlighted the alignment of their expertise or services with the proposed project objectives, including demand aggregation, equitable access to flexibility, and local energy sharing. This underscores that the proposed project objectives align well with what industry and the market at large consider important innovation focus areas for ESB Networks to advance.

Beyond ElectriCITY, we acknowledge the need for scalable platforms to trial technologies such as hybrid heat pumps, mobile battery energy storage systems as an alternative to diesel generation, and advanced conductors. We look forward to developing pilots and demonstration projects that validate these solutions in a real-world network context.

3. Building a Resilient and Adaptive Network

Q. How can we implement innovative solutions together to build a more resilient and adaptive electricity network, addressing challenges such as climate change and electrification?

Stakeholders stressed the importance of early-stage engagement, cross-sector integration, and fast-tracking deployment of proven technologies.

ESB Networks shares the ambition of our stakeholders to accelerate the deployment of innovative solutions that enhance network resilience and adaptability. This includes both technical solutions, such as advanced monitoring (e.g., GridVision, AI-assisted inspections), and strategic enablers, such as cross-sector energy integration with renewable gases and electrification of industrial heat.

We acknowledge the importance of early-stage engagement, working to advance and align innovation trials with planning and policy frameworks, that can move from proof-of-concept stage to scalable deployments. We continue to refine our governance processes to enable faster delivery of validated technologies through our “Fast Follower” approach and external reviews. We are also engaging with stakeholders and policy makers to ensure the appropriate policies are in place to support and enable the deployment of validated, innovative technologies.

We support collaboration through structured pilots and projects, particularly where multiple utilities and academic partners share insights and resources.

4. Digitalisation, AI, and Open Data

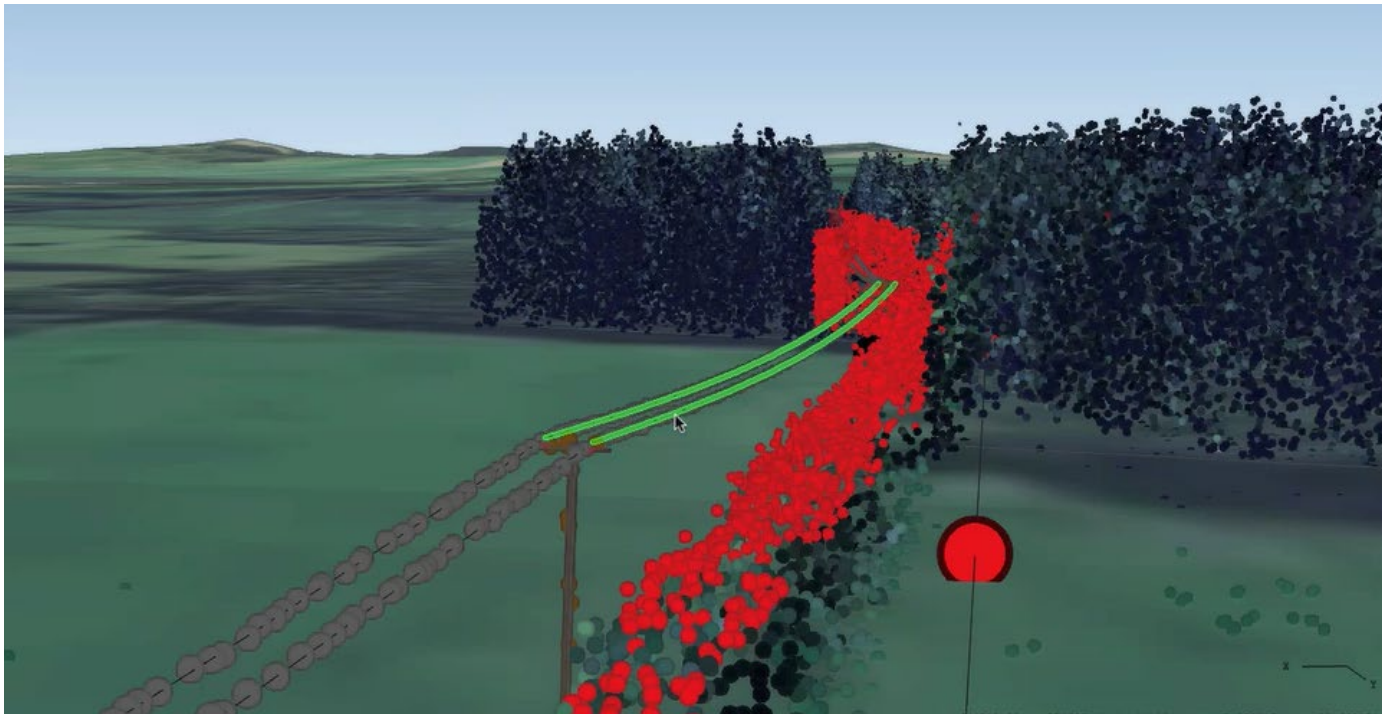
Q. In what ways can digitalisation, AI, and open data be utilised to drive efficiency and innovation across the energy ecosystem?

Feedback focused on enabling access to smart meter data (live and historical), using artificial intelligence (AI) to improve fault prediction and planning, and leveraging open datasets to encourage third-party innovation.

We appreciate the strong support for digitalisation and AI as key enablers of network innovation. ESB Networks continues to invest in data-driven infrastructure planning through projects such as:

- Plexigrid, our LV digital twin pilot
- GridVision AI, for asset condition assessment
- Advanced Infrastructure Self-Serve pilot, for MV capacity screening

We acknowledge the importance of access to smart meter data for research and solution development. In our role as Data System Provider (DSP) and Data Access Provider under the Smart Meter Data Access Code, we are responsible for creating, operating, maintaining, and administering the Smart Meter Data System and to collect, validate, transfer, and store smart meter data, ensuring efficient and secure access for eligible parties. We are responsible for making available all relevant procedures for providing access to smart meter data, and as determined by the CRU we will also be required to publish, online in a readable format, non-personal data reports on a periodic basis.



5. Collaboration with ESB Networks

Q. Are you open to collaborating with ESB Networks and in what context would you like to collaborate? If not, are there obstacles preventing you from collaborating with us?

All respondents expressed a strong interest in collaborating, with several offering specific engagement routes (industry forums, trials, data partnerships).

We are greatly encouraged by the high level of interest in collaborating across industry, academia, and civil society. Collaboration is an essential component to ensure we advance and deliver on our Networks for Net Zero strategy. As part of our renewed innovation governance framework, ESB Networks will:

- Expand structured engagement via pilot projects and bilateral working groups.
- Offer feedback on proposed research applications and provide letters of support where strategic alignment exists.
- Facilitate early-stage alignment on technology readiness for third-party trials.
- Continue engagement and participation through industry forums and roundtables, and community partnerships.

We also continue to engage internationally through peer technical working groups and forums by sharing knowledge and contributing to the development of international best practice across Europe. Additionally, we continue to participate in global innovation programmes like Free Electrons, where we actively seek out new innovation solutions and emerging technologies from energy startups.

6. Strategic Insights and Broader Feedback

Q. Are you open to collaborating with ESB Networks and in what context would you like to collaborate? If not, are there obstacles preventing you from collaborating with us?

Several stakeholders offered strategic feedback on innovation governance, delivery processes, and opportunities for continuous improvement. We welcome the constructive and future-focused feedback shared by respondents, highlighting how we can enhance the overall innovation ecosystem. Key themes that emerged included:

- Accelerating innovation and scaling of solutions
- Review of the DSO planning standards, in the context LDES and flexible connections
- Enhancing system flexibility and its importance in achieving climate action targets
- Embedding a "challenge-led" innovation culture
- Using AI and digital tools to enhance internal innovation processes
- Strengthening cross-sectoral integration and policy engagement

We welcome the constructive and future-focused feedback shared by respondents, highlighting how we can enhance the overall innovation ecosystem. In response, we have taken the following steps:

- Governance and Strategy Review: In 2024, we commissioned an external review of international innovation governance best practices, including benchmarking against UK DNOs. The output of this review is informing the development of a revised innovation strategy, which we plan to publish in 2025, and will enhance our innovation lifecycle from ideation and project prioritisation, to governance structures, through to transitioning successful projects into the business.
- Faster Transition from Pilot to Scale: We recognise the importance of moving proven technologies from trial to widespread implementation more rapidly. To support this, we are strengthening our BAU transition processes and exploring differentiated approaches for technologies with higher TRLs or international validation.
- Challenge-Oriented Innovation Culture: We are evolving our internal innovation practices to include root cause identification for documented challenges, supported by cross-functional engagement. These efforts are designed to ensure that innovation investments directly address priority network needs.
- Digital Innovation Enablement: We continue to explore the use of digital tools and AI to support internal idea management, solution evaluation, and proactive sourcing of innovations from adjacent sectors.
- Policy and System-Level Engagement: We continue to engage with the CRU, DECC, and EirGrid on issues such as flexible connection policy, DSO-TSO interfaces, and smart meter data access.

We thank all respondents for these valuable insights, which will directly support our continuous improvement efforts and align with our goal of delivering an adaptive, resilient, and Net Zero-ready electricity network.

7. Conclusion

The electricity network has a critical role to play in enabling Ireland's journey to Net Zero and the impact of ESB Networks' innovation activities have the potential to extend far beyond our own organisation.

By evolving our innovation strategy, focusing on key challenges, and delivering flagship projects, we aim to support Ireland's energy transition while fostering collaboration across the ecosystem. We are committed to accelerating the connection of renewable generation, supporting the electrification of heat and transport, and enhancing network resilience. Implementing innovative ideas and technologies will deliver benefits for our customers. Our consultation document provides a summary of the innovation activities ongoing or in development across ESB Networks.

We are committed to continuing this conversation. We invite all stakeholders to help shape our innovation activities by sharing insights, proposing new ideas, and exploring further opportunities for collaboration. Your feedback will directly inform our revised innovation strategy and the future direction of our project portfolio. We appreciate the time and input of those who have contributed already, and welcome further engagement.

For further information on innovation at ESB Networks, please visit our new website.

For any additional information, please contact ESB Networks' Innovation Team via email: innovationfeedback@esbnetworks.ie

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