ESB NETWORKS

Flexibility Multi-Year Plan 2024 - 2028

NATIONAL NETWORK, LOCAL CONNECTIONS PROGRAMME

DOC-130423-HRT

September 2023

Contents

1 GLOSSARY

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Table 1: Glossary of Terms Used in This Document

Term	Definition
AMI	Advanced Metering Infrastructure
BPD	Business Process Document
BPO	Business Process Overview
BtM	Behind-the-Meter
BTP	“Beat the Peak”
CAP	Climate Action Plan
CRU	Commission for Regulation of Utilities
CVR	Conservation Voltage Reduction
DCRP	Distribution Code Review Panel
DECC	Department of the Environment, Climate and Communications
DER	Distributed Energy Resources
DERMS	Distributed Energy Resource Management System
DD	Detailed Design
DSO	Distribution System Operator
DSU	Demand Side Unit
DUoS	Distribution Use of System
EV	Electric Vehicle
HLD	High Level Design
HV	High Voltage
KPI	Key Performance Indicator
MMS	Market Management System
MV	Medium Voltage
NN, LCP	National Network, Local Connections Programme
NSAI	National Standards Authority of Ireland
PR5	Price Review 5
RESS-1	Renewable Electricity Support Scheme 1
SCADA	Supervisory Control and Data Acquisition
SEM	Single Electricity Market
TIR	Technical Interconnection Requirements
TSO	Transmission System Operator
VRE	Variable Renewable Energy

2 EXECUTIVE SUMMARY

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The decarbonisation of Irish society relies on fundamental changes to how energy is generated and consumed. To enable these changes at the right pace and the right price, we need to make the connection between how renewable energy is generated, and how we use or store it. Every Irish home, farm, community, and business is being called on to play a part. The National Network, Local Connections programme was established within ESB Networks to work with, and for, customers to make this possible.

In the three years since the programme has been established, the urgent need to introduce and scale flexible demand in Ireland has accelerated. The original national targets for flexible demand – 20-30% by 2030 - set out in Climate Action Plan (CAP) 2021 focussed on flexible demand as a means of ensuing electricity infrastructure had the capacity to support the connection of low carbon technologies like electric transport, heating and distributed generation. However, the accelerated Climate Action Plan 2023 target for 15-20% flexible demand by mid-decade acknowledged and sought to leverage the reality that the greatest impact that flexible demand can have is to accelerate carbon abatement and the percentage of renewable energy consumed. This means that our focus is increasingly on how flexible demand can begin to reshape the demand curve, beginning to follow our indigenous supply of renewable generation, rather than a narrower focus on providing short term responses to security issues.

As mandated in the Climate Action Plan, the CRU is developing an overarching Energy Demand Strategy (EDS) to provide a coherent approach to addressing emissions associated with electricity and gas demand. As the CRU develops Ireland's national EDS, it has identified ESB Networks' central role to enable and incentivise much of the demand flexibility and response required to meet our national targets (CRU202356).

Following publication of CAP23 in December 2022, ESB Networks published its Networks for Net Zero Strategy in January 2023, with a clear commitment to Ireland's climate action policies and ambitions. Significant investment in flexibility will be key to delivering on this commitment. Flexible demand will be central to our ability to support the rapid increases in demand and distributed renewable generation across the Irish electricity system quickly, efficiently and securely. In line with the shift in emphasis in CAP23, we believe that flexible demand will be central to Ireland's ability to reduce carbon emissions, by enabling low carbon demand growth by matching new or changing energy demand with renewable energy generation. Finally, flexible demand, including, as facilitated, by storage, provides new opportunities for all customers and businesses to benefit from taking an active role in climate action.

The PR5 Regulatory Framework Incentives and Reporting (CRU/20/154) has set out that ESB Networks efforts to drive out flexibility is subject to regulatory oversight and incentivisation. This is based on the delivery of a rolling multiyear plan with a 5 year time horizon, which is subject to annual update and target setting. The development of the Multi-Year Plan 2024-2028 comes at a pivotal time in the introduction of flexible demand in Ireland. The Climate Action Plan 2023 and the establishment of the CRU's energy demand

strategy have driven a step change in the urgently of our activities, and alongside the CRU's direction of late 2022, a shift in our objectives towards the purpose of flexible demand in abating carbon.

To the extent that flexible demand can meet the objectives of enabling carbon reduction and accommodating zero carbon demand growth, we have a responsibility to create the conditions in which flexibility can grow and thrive.

As such, this updated multiyear plan, intended to reflect the objectives of the EDS, has been informed by the two developments below, alongside stakeholder consultation responses both to the EDS call for evidence and a call for input on this multiyear plan:

- 2025 horizon: scenario analysis which was consulted by the CRU as part of the EDS, in Q2-Q3 2023. Following the EDS call for evidence consultation, we have adopted next steps as set out in the milestones below that target flexible demand initially from locational medium duration flexibility (storage), XLEUs with a focus on companies willing to provide flexible demand using behind the meter gas generation matched by domestic biomethane injections, commercial and industrial electric heat installations, and flexibility ready electric transport.

- 2033 horizon: in line with feedback received through the EDS consultation, ESB Networks has commenced the development of a long term blueprint for the future markets (and underlying functionality, systems and regulatory needs) to drive flexible demand and smart energy services. The blueprint for the customer, flexibility market, retail market, behind the meter infrastructure and smart metering developments over the coming decade will be developed in collaboration with the CRU and industry over the coming months, however its initial development (which was published as part of our call for input to this multiyear plan) has informed the period of 2026 onwards in this multiyear plan.

This updated multiyear plan is also informed by our experience to date in rolling out initial local flexibility markets in Ireland since our first calls to competition in late 2021. As set out in Section 4 of this document, we have developed and disseminated extensive learnings regarding the technologies needed to support flexible demand, the impact of various market and product design parameters in stimulating the market, the impact of data quality on our ability to efficiently introduce and operate flexible demand products, and customers' responses to different messaging and incentives. The lessons learned to date have been directly accounted for in our updated multiyear plan.

Amongst the key milestones set out in this multiyear plan are:

- The launch to market of a product to incentivise location specific medium duration flexibility (for example commercial storage installations) through the provision of multiyear contracts;

- The launch to market of products targeting flexible demand from extra large energy users, and industrial or commercial customers with existing or planned electric heat facilities;

- The introduction of standard flexibility readiness technology requirements for new electric transport installations, including public and private electric vehicle chargers;
- Initial cross sectoral product development, beginning with collaborative analysis to identify the potential for electricity-gas, electricity-heat, electricity-transport and electricity-water coupling;
- The creation of routes to market for energy communities to participate in local flexibility markets;
- The introduction of flexible connections for storage and demand customers.

The proposals set out in this multiyear plan have been heavily influenced by stakeholder consultation and feedback, a summary of which is provided in this document.

The NN, LCP will continue to deliver in an agile, discovery-led approach with flexibility introduced through collaborative rollouts of new products and services, that are adapted and scaled (based on learnings). This will continue to be delivered in partnership with stakeholders and organisations, with extensive customer research, education, and recruitment initiatives to build customer participation and awareness.

3 LOOKING FORWARD

3 LOOKING FORWARD: STRATEGIC DIRECTION

The decarbonisation of Irish society relies on fundamental changes to how energy is generated and consumed. To enable these changes at the right pace and the right price, we need to make the connection between how renewable energy is generated, and how we use or store it. Every Irish home, farm, community, and business is being called on to play a part. The National Network, Local Connections programme was established within ESB Networks to work with, and for, customers to make this possible.

In the three years since the programme has been established, the urgent need to introduce and scale flexible demand in Ireland has accelerated. The original national targets for flexible demand – 20-30% by 2030 - set out in Climate Action Plan (CAP) 2021 focussed on flexible demand as a means of ensuing electricity infrastructure had the capacity to support the connection of low carbon technologies like electric transport, heating and distributed generation. However, the accelerated Climate Action Plan 2023 target for 15-20% flexible demand by mid-decade acknowledged and sought to leverage the reality that the greatest impact that flexible demand can have is to accelerate carbon abatement and the percentage of renewable energy consumed. This means that our focus is increasingly on how flexible demand can begin to reshape the demand curve, beginning to follow our indigenous supply of renewable generation, rather than a narrower focus on providing short term responses to security issues.

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ESB Networks' role as DSO is changing to meet the needs of climate action and a rapidly evolving energy system. To the extent that flexible demand can meet the objectives of enabling carbon reduction and accommodating zero carbon demand growth, we have a responsibility to create the conditions in which flexibility can grow and thrive. The two key forward looking activities to plan how we deliver this, within the EDS, are set out below. They include:

- 2025 horizon: scenario analysis which was consulted by the CRU as part of the EDS, in Q2-Q3 2023. This has been updated to account for the extensive consultation feedback received and underpins the proposals set out in this multiyear plan for enabling and incentivising high potential sources of flexibility over a 2023 – 2025 horizon;
- 2033 horizon: in 2023 ESB Networks has commenced the development of a blueprint for the future markets (and underlying functionality, systems and regulatory needs) to drive flexible demand and smart energy services to support customers' changing needs and expectations as we transition to a low carbon energy system. The blueprint for the customer, flexibility market, retail market, behind the meter infrastructure and smart metering developments over the coming decade will be developed in collaboration with the CRU and industry over the coming months, however its initial development has informed the period of 2026 onwards in this multiyear plan.

3.1 BLUEPRINT

Overview

ESB Networks has commenced the development of an industry blueprint for the developments needed to drive and enable flexible demand and smart energy services across all relevant markets over the coming decade. The blueprint accounts for key developments needed across retail market, flexibility market, technology, smart metering, power system management and consumer/behavioural domains. The blueprint will provide our industry and stakeholders with line of sight of the developments and progress to be delivered, while emphasising the role of discovery and adaptation over the course of its delivery.

The purpose of the blueprint is to set out a long term view of the products and services which will be available to customers in the retail market, flexibility markets and potentially pre-market domains over the coming decade. Phased versions of the blueprint (for 2024-2026, 2026-2028, 2028-2030 and 2030-2033) will provide a roadmap against which progress can be measured., and a baseline from which we can adapt to reflect emerging needs, priorities and what we learn through discovery.

These initial inputs include standalone functional strategies for the development of Flexibility Market Design, Retail Market Design (not included in call for input, to be developed), Smart Metering 2.0 (not included in call for input, to be developed), Power System Requirements, Behind-the-Meter Infrastructure and Customer (Domestic and Commercial) Design. Each standalone strategy provided a different perspective (i.e. from a market vs. behavioural vs. technological viewpoint) of what the energy market should look like in 2033, with all elements of the Clean Energy Package and the Climate Action Plan now delivered and embedded.

Each standalone strategy then set out the key developments needed over the coming decade to realise the 2033 described. Summaries of these standalone strategies were published as part of a call for inputs to this multiyear plan, to elicit stakeholder views. The responses received, and work to develop initial retail market design and smart 2.0

strategies, will be incorporated along with the initial set of strategies into a first version of a blueprint which will be the subject of further engagement in early 2024.

We are preparing to work closely with the CRU and industry (including current and future market participants) to ensure that this blueprint offers a practical and effective contribution to the overarching Energy Demand Strategy. The blueprint will need to set out:

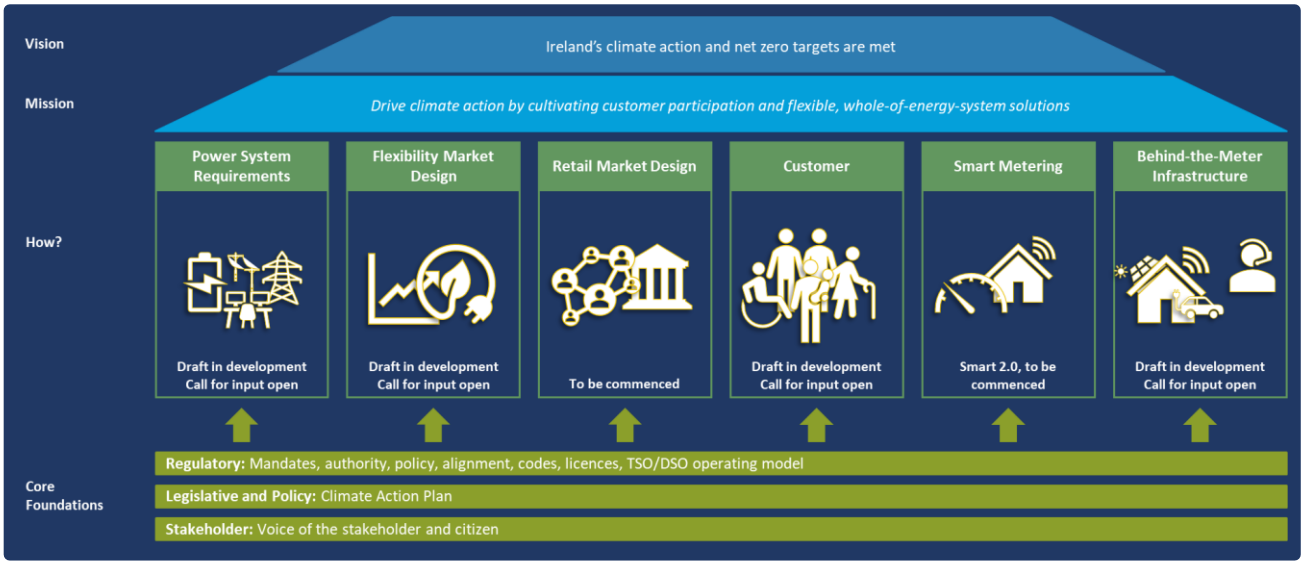
- A shared industry view of the developments needed across a range of markets and time horizons, allowing current and prospective market participants begin to invest in product development with confidence of when a route to market will be available, and allowing ESB Networks, the CRU and other stakeholders progress the design, consultation and governance needed to be ready to support future products and market developments;
- Specific measures to ensure that stakeholders derive value from these developments – for example, the introduction of biennial flexibility needs statements that provide a long-range view of the volumes, locations and forms of flexibility we will try to secure through flexibility market contracts year on year.

Aligned to the Price Review 6 (PR6) submission, and following extensive involvement of industry and key stakeholders, it is our intention that the blueprint would be agreed and adopted by industry and the CRU in H2 2024.

Scope

The objective of the blueprint is to enable climate action, and net zero targets through customer participation and flexible, whole-of-energy-system solutions.

Figure 1: Climate Action and Net Zero Plan



We have identified six key areas of development needed to build thriving markets for flexible demand and smart energy services over the coming decade. The first stage of the blueprint development process was to develop individual functional strategies for each of flexibility markets, retail markets, smart metering, behind the meter infrastructure,

customer/behavioural and power system management domains. Given the critical interdependencies between the functional strategies, and to deliver the transformative change needed, the next phase focuses on developing a framework to integrate the individual strategies into a consolidated blueprint supporting efficient long-term market evolution and policy decisions.

The individual areas where developments are needed, as identified above, include:

1. ***Power Systems Requirements*** provides a deep understanding and foresight of the impacts, characteristics, and evolving needs, of a highly distributed, low-carbon electricity system. It is the technical expertise required to develop innovative solutions to support growing customer demand and increasingly distributed generation, and storage.

   Power system analysis gives us a deep understanding of the distribution system, its location-specific characteristics and its constraints. This, in turn, will facilitate the identification of the right opportunities to deploy alternative, cost-effective flexible solutions, as a complement to long-term system development (capital reinforcement), so that Climate Action Plan targets are proactively supported in how we develop and operate the distribution system in a safe and secure manner.

   As the distribution system, customer needs and the solutions available evolve, the DSO is putting in place new and enhanced capabilities to assess and model its future needs, ensuring system security, resilience and, in parallel, delivering on Climate Action Plan targets.

2. ***Flexibility Market Design*** focuses on local and national markets for flexible demand, run by the DSO as a neutral market facilitator, offering a mix of long-term, day-ahead and intraday arrangements that afford all customers with opportunities to participate. The objective of flexibility market development is to:

   - Introduce market-based products that drive participation in flexible demand;
   - Facilitate distribution-connected customers' participation in all relevant markets.

   These solutions need to facilitate a range of different customer and market participants needs and capabilities; for example, providing the right balance of long- and short-term trading horizons, reliability and durations of response etc. They must be designed in a manner that complements existing, established electricity markets (i.e. wholesale, retail and ancillary services) and enables customers' participation in these multiple markets.

3. ***Retail Market Design*** focuses on setting the future direction for the smart meter-enabled retail market, with suppliers equipped and incentivised to harness available data to create dynamic, personalised tariffs for their customers. We will work closely with suppliers and the CRU to optimise retail market design, enabling synergies and efficiencies in operating flexibility and retail markets. At the time of writing the retail market design functional strategy was still under development.

4. ***Customer (Commercial and Domestic)*** focuses on creating the conditions for customers to participate in immersive, personalised experiences of flexible demand.

Helping to drive education and the national conversation, about how we can all take control of our energy demand and share in the benefits. Migrating products and services to third parties when appropriate.

Commercial Customers: We must create the conditions where commercial customers are offered, and ready to participate in, new products and services that enable and reward taking control of energy demand. To make this possible, in the short term we need to take a more proactive role in supporting all energy customers, beginning their journey of awareness, education and readiness to take control, fundamentally changing how they think about and use, store or generate energy. We will do this by delivering products and services in partnership with industry to provide proportionate and effective routes for different commercial segments to participate in and benefit from flexible demand.

Domestic Customers: We must create the conditions where customers are offered, and ready to participate in, new products and services that enable and reward taking control of energy demand. To make this possible, in the short term we need to take a more proactive role in supporting all energy customers, beginning their journey of awareness, education and readiness to take control, fundamentally changing how they think about and use, store or generate energy. Our approach will be underpinned by measurement, research and insights, delivering relevant and timely awareness, products and services that will support customers in proactively managing their energy use.

5. ***Smart Metering 2.0*** focuses on setting the future direction for smart meters, including use cases – such as harnessing smart meter data to support smart energy services in the flexibility and retail markets, as we as ensure customers benefit from the full suite of insights that smart metering can provide. At the time of writing the smart metering functional strategy had not commenced.

6. ***Behind-the-Meter Infrastructure*** focuses on including clear technology requirements and standards for data exchange and communication protocols, to ensure customers' homes, vehicles, solar panels and batteries are flexibility ready.

   Behind-the-meter infrastructure must proactively enable customers to participate in flexible demand, by becoming responsive to evolving price and network condition signals. Clear and achievable behind-the-meter infrastructure requirements are needed to harness the inherent flexibility of behind-the-meter distributed energy resources (DERs), including solar PV, home battery storage, smart EV chargers and energy management systems for domestic appliances.

   To optimise the ability of behind-the-meter DERs to participate in flexible demand an agreed infrastructure, including clear data exchange and communication protocols between customers / DERs, market participants and system operators, must be in place.

Blueprint Framework: Multi-layer and multi-horizon approach

The blueprint is being developed with multiple layers, and describes what products or solutions will be introduced when, in what form, and the functionality and technologies

supporting them. Each “layer” of the blueprint provides a clear description of what will be delivered, as set out below:

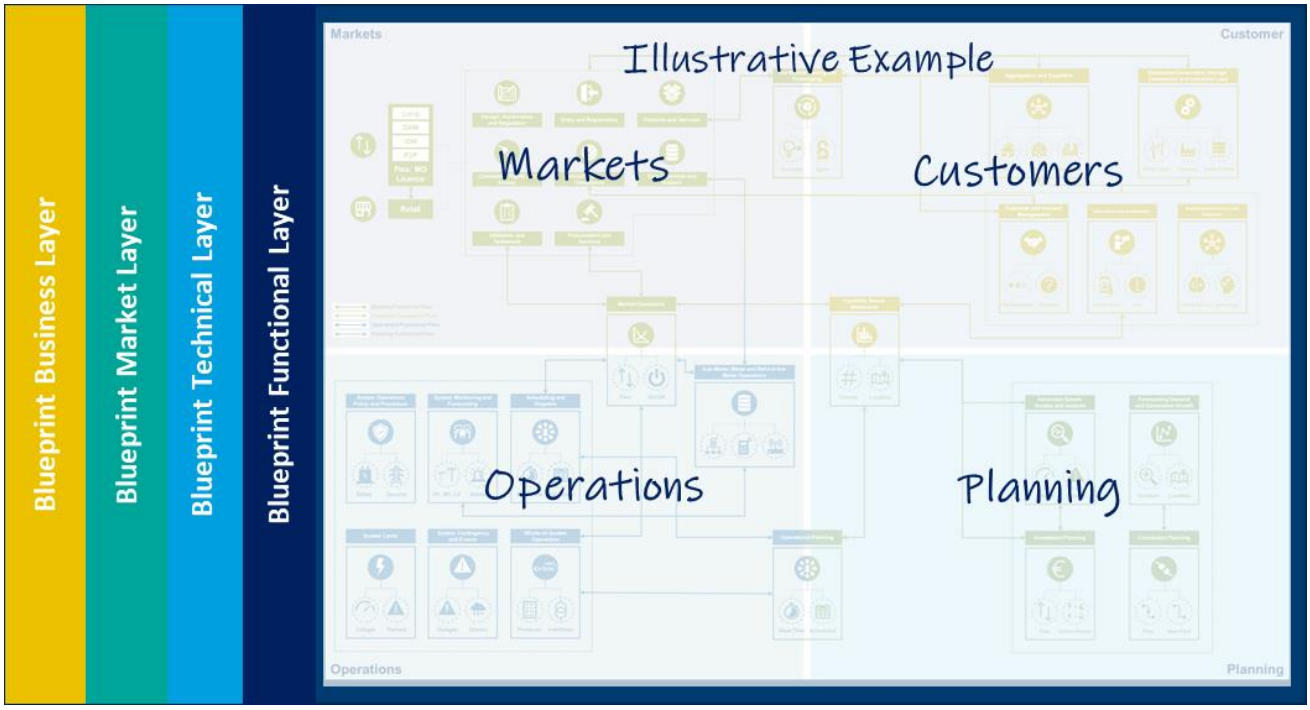
- **Market / Product Layer**: Provides a map of what products are available / supported in what market (retail, flexibility, sandbox), the relationships between different markets and products, and the transition over time of products from immature versions in a sandbox to mature versions in a flexibility or retail market. For example, the Market / Product layer would set out when a new product like energy sharing can first be supported in the Irish electricity market, and a timeline and roadmap for energy sharing products to be developed, tested (initially in a market sandbox) and over time transition into more mature or heavily regulated markets (for example the retail market);

- **Functional Layer:** Provides visibility of the functions that exist or will be put in place to support new and existing markets, including the new products introduced. The functional layer allows us identify synergies between different products and markets, where a single function can support multiple solutions (for example, data aggregation and settlement are needed for all markets) or where a given function is only needed in one market (for example, auction and contract optimization functionality will primarily be needed in the flexibility market);

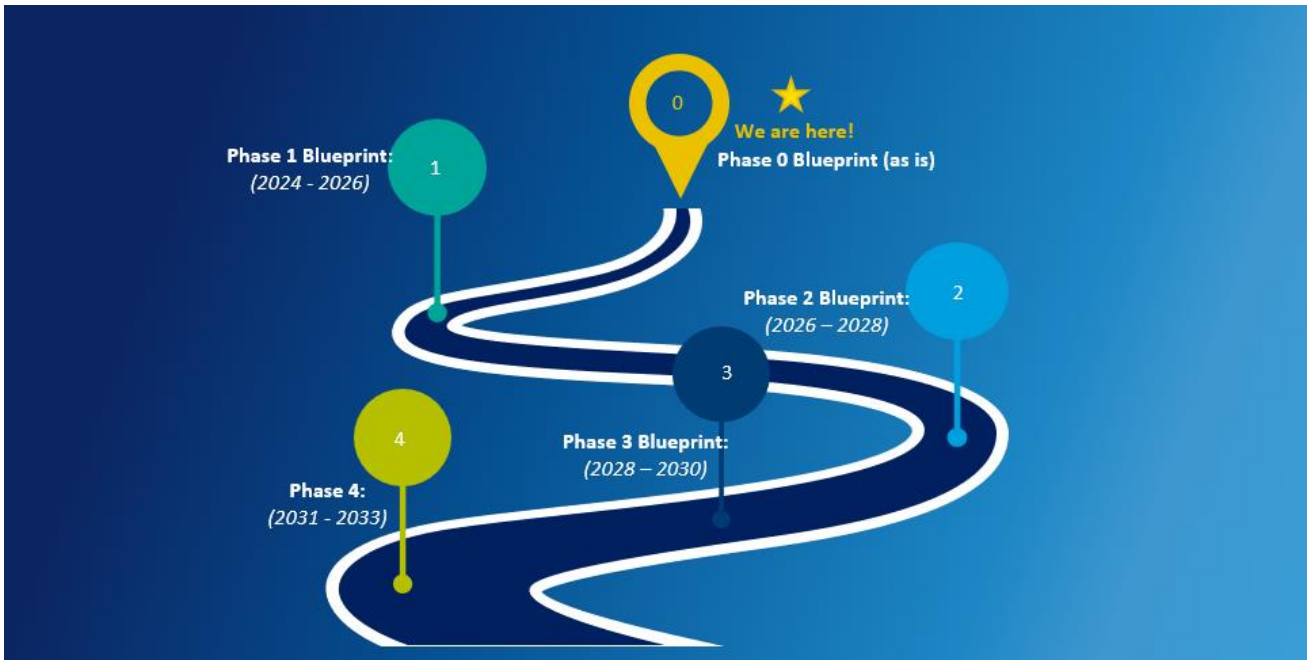
- **Technical Layer:** provides visibility of the technologies and systems architecture required to operate the functional layer. For example, the technical layer will identify where a given IT system or set of systems are supporting just one market or multiple markets;

- **Business Layer**: Sets out the skills and capabilities needed to support all other layers.

Each of the layers is structured around customer, markets, operations and planning areas, identifying for example where products originate from (e.g. customer needs, planning or operational solutions needed), and where they are developed (e.g. in the flexibility, retail or sandbox market).



This multilayer approach provides clarity of what products are available or supported in what markets, and how they interact, and the functions and technologies that will be available to support them. Phased versions of the blueprint – a version describing the markets and products in operation in 2033, and interim versions describing what is achieved by when – provide clarity on the sequence, phasing and timelines for market changes at various points in time over the coming decade.



This sequence of blueprint versions will allow stakeholders plan efficiently, and undertake product development activities with greater confidence. For example, in the Phase 1 Blueprint, energy sharing products might be supported in a market sandbox, whereas in the

Phase 4 Blueprint, energy sharing products could be supported in one or more formalised markets (e.g. flexibility and retail markets) to meet the needs of different customer segments or market participants. Establishing an endpoint blueprint, and then a series of interim versions of the blueprint over the next 10 years, provides the foundation for:

- Price review (PR6, PR7) submissions and decisions;
- Future flexibility multi-year plans;
- Basis of industry governance and prioritisation;
- Basis of capability and capacity planning

The key milestones set out later in this Flexibility Multi-Year Plan 2024-2028 – across non-wires alternatives, new products and services, and transparency and reporting – reflect the core deliverables we expect will likely feature in the Blueprint over coming 5 years. From 2024 onwards, the Blueprint will provide the basis of rolling multiyear plans.

Market / Product Layer

The Market/Product layer describes what products (e.g. energy sharing, energy lifestyle applications) are operating and are regulated within each market (e.g. market sandbox, flexibility market, retail market). The development of this layer over multiple time horizons is critical to our collective ability to agilely introduce new products and establish what best meets customers' needs, while allowing for the careful design processes needed before implementing a new solution in an established market.

An approach in which products can be introduced in an agile manner, initially in a "sandbox" market and move into more established markets over time would allow all stakeholders test new products to establish key parameters to ensure customer adoption, without disrupting critical functions in existing markets. Whilst some new products may be sufficiently mature

or defined to be implemented directly in the retail market, many emerging product concepts (for example energy sharing) are highly immature or undefined, and testing alternative approaches may prove critical to meeting customer interests.

The approach involving multiple markets of varying degrees of maturity will also be important in terms of cultivating the participation of emerging and innovative energy companies in the Irish market. By allowing for initial product introduction in a market sandbox, or a less established market like a flexibility market, it is possible to minimise barriers to entry while limiting the risks arising of this (disruption or distortion of existing markets of scale).

The sequential versions of the Market/Product layer will seek to identify when products are planned to be introduced, in what market domain (sandbox, flexibility, retail) and how do we expect them to move into more mature markets over time. It is anticipated there will be three to four markets:

- Market Sandbox (prototyping) for testing new concepts or products to learn and adapt and assess suitability for bringing to different markets. This market domain may also support simple products which have a lower level of market complexity, for example simple tariff based products;
- Flexibility Market which includes standalone flexible demand products which operate in parallel with (and potentially stacked with) other markets, including the wholesale, DS3

and capacity markets. It is anticipated that the flexibility market will support a wide range of contract types, from multiyear contracts to intra-day trading. The products it supports will closely reflect Clean Energy Package and Climate Action objectives and mandates, for example energy sharing and products designed to support carbon abatement. Products may enter directly into the flexibility market, or they may be incubated for a period of time in a “prototyping” phase in the market sandbox to learn and adapt from testing and trialling with a smaller customer base;

- Retail Market where ultimately energy retail is settled, and which needs to support the settlement of different products offered by energy suppliers. There are a range of products and settlement solutions needed to support smart energy services which may need to be supported in the retail market in future, following their development, testing and adaptation in sandbox and potentially flexibility market domains.

The product/market layer is the layer of the blueprint that determines what needs to be delivered in the functional and technology layers. For example,

- by identifying when (what phase) intraday flexibility trading is introduced in the flexibility market, we can identify when auction and contract optimisation functionality is needed, when a suitable market management system technology is needed.

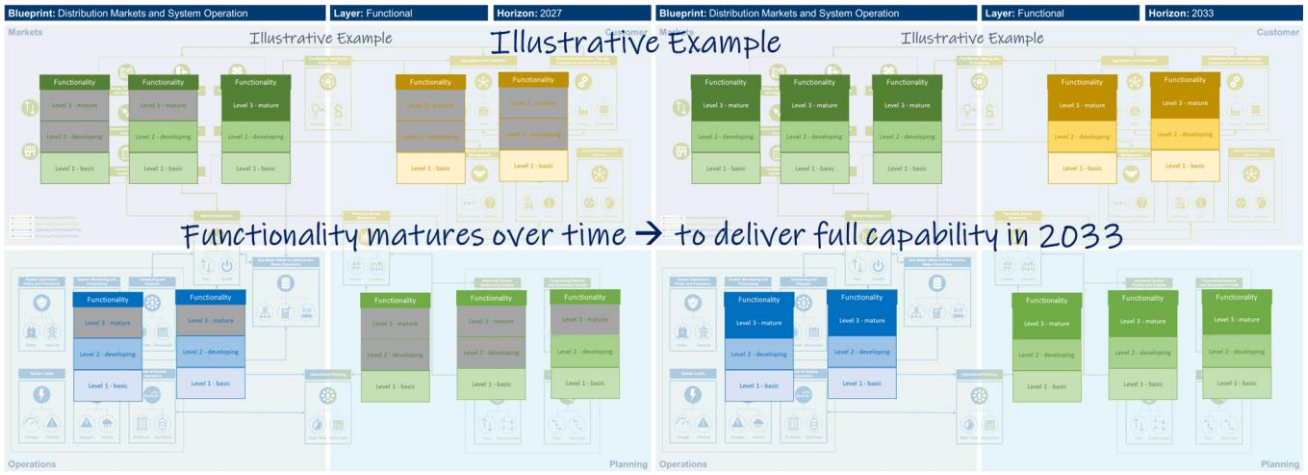
- by identifying when (what phase) a household could have contracts with different providers for import and export, or for energy and flexibility, we can identify when the associated metering, measurement, reconciliation and settlement functionality is needed, and by extension, when suitable metering and data technologies are needed.

Functional Layer

The functional layer sets out generalised functions needed to support the operation of products and solutions. New and enhanced functions will be introduced over time, with the full blueprint functionality in place by the 2033 blueprint phase. The illustration below offers an illustration of how functionality could mature between blueprint phases.

Figure 2: Sample Functions Across Markets, Customer, Operations and Planning

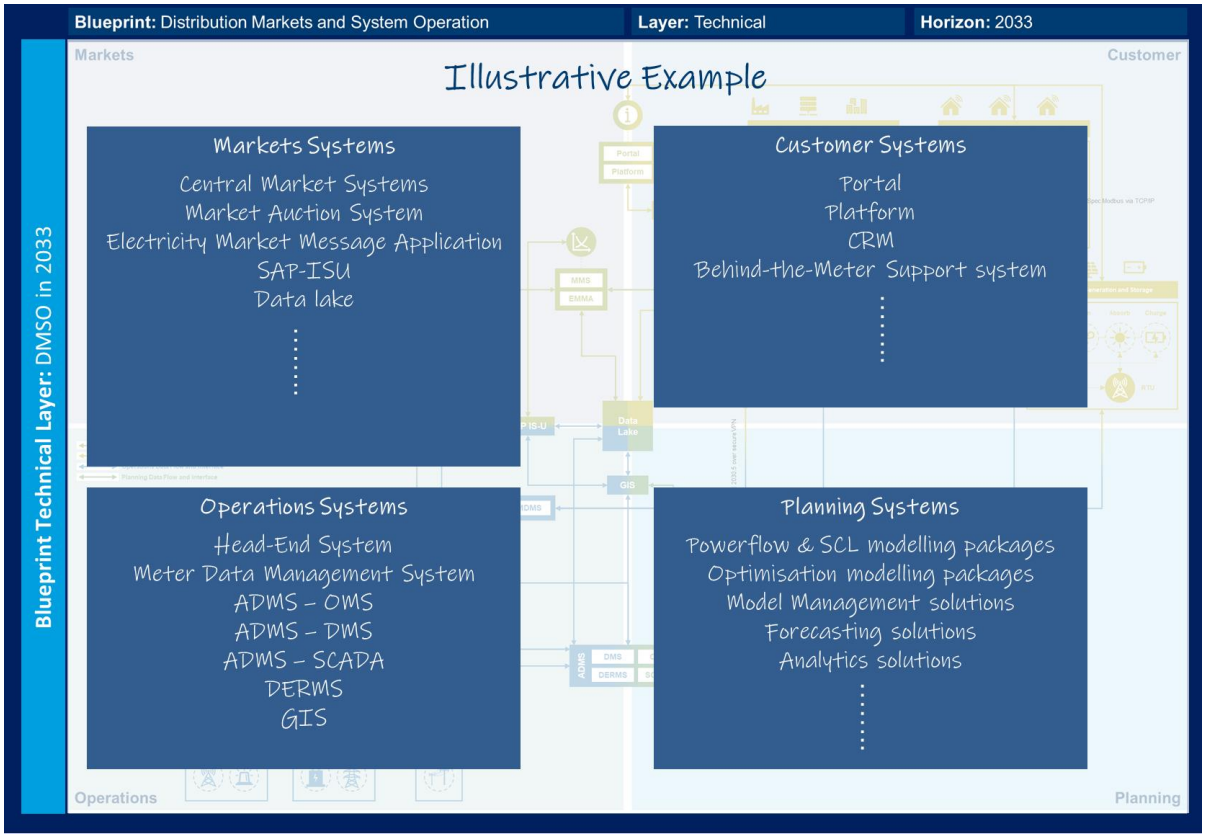
Figure 3: Sample Functional Capability Levels Across Two Time Horizons



Technical Layer

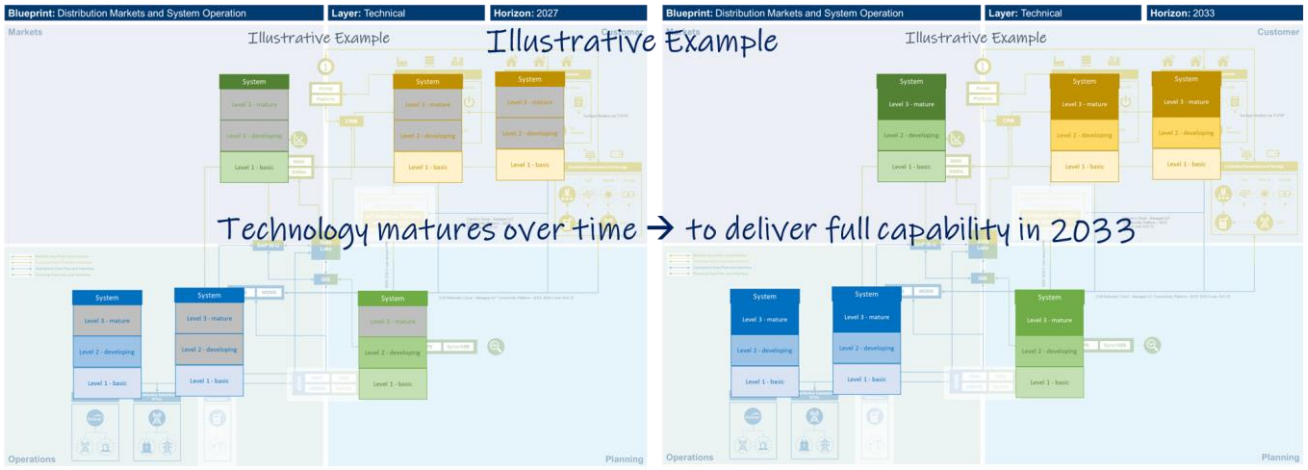
The technical layer defines the technology landscape and architecture required to operate the functional layer, with time horizons reflecting when technical capability is in place and the level of maturity across the different time horizons.

Figure 4: Sample Systems Across Markets, Customer, Operations and Planning



The technical layer sets out the technologies needed to support the functional, and market/product layers. In earlier phases the technology is more fragmented and interim. In final phases the technology layer is integrated, with systems converging, leading to less duplication of systems and functionality.

Figure 5: Sample System Capability Levels Across Two Time Horizons



Development & Industry Adoption Process

1. Functional Strategy Development – *July 2023*

The first stage in the blueprint process was the development of individual functional strategies for a 10-year horizon. Functional strategies were developed across Flexibility Market Design, Power System Requirements, Operational Control Architecture (including Behind-the-Meter Infrastructure), Customer (Domestic and Commercial), and Flexibility Operations

2. Industry Consultation Multi-Year Plan "Call for Input" – *August 2023*

During stage 2, the initial inputs to the blueprint were published as part of the Call for input on DSO PR5 incentives in August 2023. An overview of each of the market, customer, power system, behind the meter infrastructure, and 15-20% flexible system demand strategies were published, including a roadmap of activities proposed for inclusion in the multi-year plans.

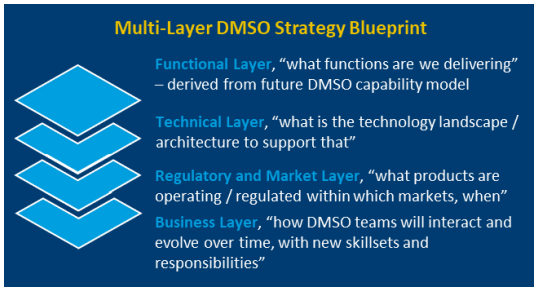
ESB Networks invited stakeholders to comment on the strategy overviews. To facilitate the collection of feedback and to provide an opportunity for discussion with stakeholders, five roundtable sessions with were held during the week of 28th August 2023. The insights gained from stakeholders at the roundtables and through email submissions have been reflected upon, and where appropriate incorporated throughout the flexibility multi-year plan and the individual functional strategies. Inputs ranged from perspectives on activities we need to introduce or accelerate, and reports, policies or research stakeholders believe should inform future strategic direction.

Section 7 of this document outlines stakeholder feedback and how we propose to respond to these inputs.

3. Blueprint Framework – *due December 2023*

Considering stakeholder feedback and industry insights collected during the call for input process, stage 3 focuses on developing the blueprint framework and integrating the individual functional strategies. The output will be a multi-layer multi-horizon blueprint framework, due December 2023. The blueprint will consider a multi-layer approach focussing on Functional, Technical, Market/Product and Business layers.

The blueprint will consider not only the activities represented in this multi-year plan, but also a phased delivery roadmap through PR6 and into PR7 for a 10-year horizon from 2023 - 2033. Within each layer a full analysis will be completed of the impacts on Markets, Customer, Operations, and Planning.



4. Blueprint Industry Workshops – *due H1 2024*

A series of workshops will be established in H1 2024 to begin consulting and involving stakeholders (industry, agencies, customer representatives) in the development of the blueprint. We expect the area of greatest focus with be the Product/Market layer, where we hope to explore stakeholder needs and expectations regarding the lifecycle of products and how they will mature and operate within both established, and new markets.

While we existing established governance groups will have an important role to play, it will also be important to ensure that a broader range of prospective market participants have an opportunity to be involved. We note that in other European and international markets, substantial product innovation has occurred, however our engagement with a number of the innovative energy companies involved has identified a range of reasons why they are not currently and do not have plans to explore the Irish market in its current state. Similarly, a range of innovative energy companies are developing in Ireland with the support of Enterprise Ireland, and are providing their services into other markets but not the Irish market to date. The blueprint process is an important opportunity to explore how best their entry into the Irish market could be enabled.

We anticipate that steering and working groups will be established as required throughout (i) the development of the DMSO Strategy blueprint and (ii) the implementation of the roadmap over the next 10 years. The terms of reference, membership, and timeline for each will be agreed in advance.

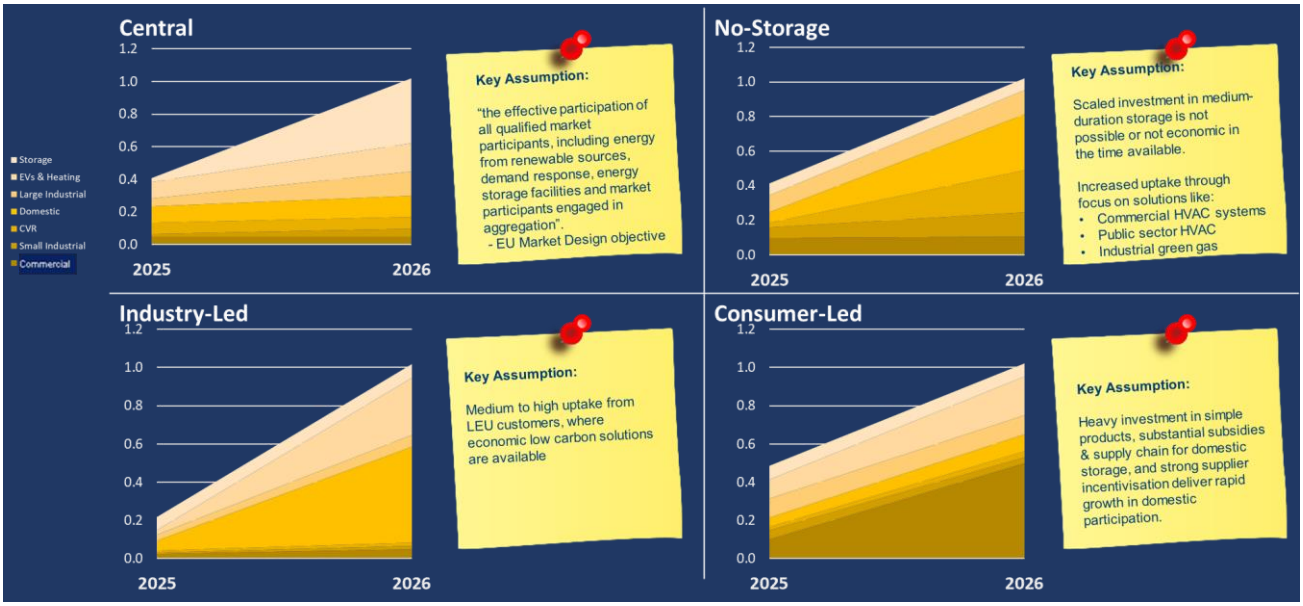
5 & 6 DMSO Strategy Blueprint Agreed and PR6 Submission – *due H2 2024*

Following extensive industry and CRU engagement to ensure that the proposed distribution markets and system operation blueprint offers a practical and effective contribution to the overarching Energy Demand Strategy, it is anticipated that the blueprint will be agreed in H2 2024. The blueprint is intended to provide a ten-year roadmap for the DMSO covering multiple price review periods – PR5, PR6 and PR7. It is intended that the blueprint will set the basis for the key proposals included as part of the DMSO PR6 submission.

3.2 15%-20% FLEXIBILITY BY 2025 – SCENARIOS & NEXT STEPS

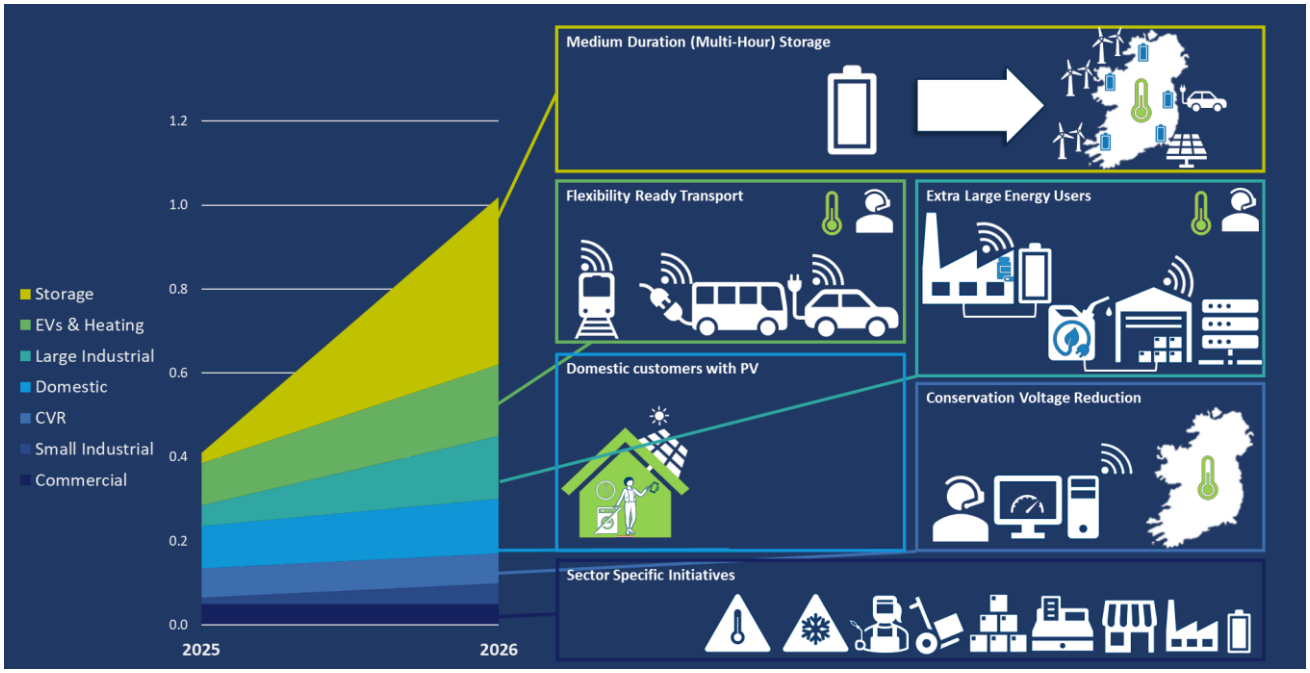
In response to the targets set out in Climate Action Plan 2023 – and ESB Networks' corresponding commitment to delivering on these targets in the *Networks for Net Zero* Strategy – ESB Networks developed the 15-20% Flexible System Demand Scenarios for consultation by the CRU as part of the Energy Demand Strategy call for evidence. These scenarios were developed to help identify viable pathways to deliver on 2025 demand side flexibility and carbon abatement targets.

Figure 6: Key Assumptions



The purpose of the scenarios was to allow us to build a baseline plan for enabling and incentivising high potential sources of flexibility to come to market. Based on the best available evidence at the time, the central scenario described the most likely pathway to achieving this target. However, each of the scenarios reflect a different way in which the step change needed to deliver on 2025 demand side flexibility and carbon abatement targets could be achieved. Each of the counterfactual scenarios has been used to sensitivity test our proposed next steps and identify the low-regret investments that will allow us to adapt and pivot to accommodate other scenarios (if customer readiness or market dynamics shift).

Figure 7: Scenarios for Achieving Flexible Demand



The four scenarios that describe how 15-20% flexible demand could be achieved are all underpinned by different sources of flexibility. These sources have been identified as the most likely viable sources of large-scale flexible demand in Ireland in a 2-3-year timeframe (from the time of writing). They include commercial-scale storage, flexibility-ready transport, large industrial customers investing in demand flexibility, flexibility from domestic, agricultural and community customers with solar PV, and some level of participation from commercial customers in specific sectors or facilities. Based on the central scenario and the subsequent consultation input received, we have developed a baseline plan to deliver key initiatives to stimulate and incentivise flexibility from medium duration storage, transport, extra-large energy users, commercial and industrial heat, and targeted domestic customers.

This central scenario identified the most likely means of achieving 15-20% flexible demand by 2025, based on the evidence available, and has been updated based on the consultation feedback received. The alternative scenarios developed are based on additional evidence collated to identify the conditions under which alternative scenarios may emerge. By using this scenario analysis, we have been able to test our baseline plan and identify whether individual or groups of investment proposals are robust and deliver value under a number of scenarios. We have also used it to identify no-regret actions which make the plan more robust to changes in our operating environment over time (for example, increased / reduced consumer engagement, increases / decreases in costs in individual sub-sectors that influence their ability to invest in flexible technology etc). The scenarios include a “no storage” scenario, an industry-led scenario, and a consumer-led scenario.

We need customers and market participants to choose to participate in flexibility services, and thus moving from scenario analysis to action plan has depended on intensive co-creation and engagement with stakeholders and customer representatives. The CRU published the scenarios for public consultation as part of its Energy Demand Strategy call for evidence and elicited diverse and independent perspectives on the assumptions made,

the key initiatives proposed and most importantly, the gaps in the scenarios which should be addressed.

The summary table on the following pages provides an overview of the key feedback receive through this consultation process, and the next steps – included in this multiyear plan – to act on this feedback.

Table 2: Overview of Key Feedback Received

	Clarifications sought	15-20% Actions (2023-2025 horizon)	Product Parameters (2023-2024 horizon)	Blueprint (2024-2033 horizon)
Feedback	Stakeholders drew attention to the relatively short time horizon of the 15-20% scenarios and the need to also consider the developments and pathways needed for diverse customer demands over a longer horizon. Stakeholders wanted to engage on whether targets should be stated in terms of power, energy or carbon abatement. There was a strong stakeholder sentiment that the most meaningful and appropriate target is ultimately the carbon abated by flexible demand A number of stakeholders sought clarifications as to why short to medium duration storage could result in short term carbon increases if operating freely in the market, outside of any flexible demand contract. Stakeholders sought clarification as to the definitions of medium and long duration storage.	In the main, stakeholders affirmed or did not disagree with the high potential sources of flexible demand identified for short to medium term scaled developments. The one area where there was a strong consensus amongst respondents regarding gaps in the scenarios related to commercial and industrial heat. Stakeholders from across government, enterprise agencies and industry confirmed their view that there is a high potential for flexible demand from these resources. This was further confirmed through direct engagement over the consultation period. A number of stakeholders drew our attention to the limitations of certain potential sources of XLEU flexible demand. They identified that behind the meter storage and process shifting are poorly aligned with many data centre operators; business models or reliability requirements. A small minority of stakeholders identified that HVO had not been	A range of stakeholders identified the need for and value of flexible connections alongside flexible demand products, to provide capacity for flexible, low carbon resources (for example heating, storage). Stakeholders provided specific market design proposals designed to incentivise longer duration technologies Stakeholders provided views on effective contractual / commercial mechanisms that could be employed to provide a route to market for sources of medium duration flexibility including storage. Stakeholders identified that for corporate power purchase agreements to play a meaningful role in flexible demand, the contractual parameters must involve (temporal, geographical) matching between demand and renewable generation.	Stakeholders called for a greater focus on the potential for cross vectoral solutions. Market participants drew attention to the need for the market to have a clear line of sight of future volumes, locations and other aspects of flexibility which will be required. Retail market participants in particular called for a greater focus on coherent approaches and governance for flexible demand including through retail market developments.

	Clarifications sought	15-20% Actions (2023-2025 horizon)	Product Parameters (2023-2024 horizon)	Blueprint (2024-2033 horizon)
		overlooked as a material source of flexible demand in the scenarios	Stakeholders emphasised the need for technology neutral flexible demand products. Stakeholders emphasised the important of product design enabling stacking of services between different markets, and for TSO/DSO coordination	
Next Steps	We plan to clarify publicly in Q4 that: • We agree that carbon abatement (which is most directly related to energy metrics rather than power metrics) is the fundamental target and in future we will endeavour to communicate targets with a greater emphasis on energy and carbon abatement potential. • Whilst the 15-20% scenarios have a 2-3 year horizon, in line with CAP 2023 targets, the products we are developing are designed with careful consideration of longer term market dynamics and customer needs, and furthermore the Blueprint under development addresses market, customer and technological	Over the period 2023 – 2025, next steps as per the milestones in this plan have been proposed to progress the following, based on the support of the areas of focus identified in the consultation with an additional focus on the flexible demand potential of industrial and commercial heat: • Provide a route to market for medium duration flexibility (including storage) through multiyear contracts for location specific flexibility, with product launch from end 2023 / beginning 2024 • Launch a carbon abatement flexible demand product for extra-large energy users, launching to market in H1 2024 • Launch a simple flexible demand incentive product for commercial / industrial heat, launching to market in H1 2024	At the time of writing we cannot comment in detail on the in-development proposals for a product and market design to incentivise investment in medium duration storage facilities to provide flexible demand. However we can confirm that the proposals submitted are informing the ongoing product design and in many instances are consistent with the design proposals we consider most likely to prove efficient and effective in stimulating investment. Also, as identified in the milestones set out in section 5.1 of this document, we are actioning the proposals regarding the need for flexible connections to accompany many of the products proposed (as per the proposed product launches in this	As set out in the milestones section of this document, in response to the feedback received we are increasing the focus on cross vectoral solutions, commenting with analysis to feed into future product development. This will focus initially on electricity-gas, electricity-water, electricity-heat and electricity-transport synergies. As set out in Section 5.1 of this document, we are proposing to provide line of sight to the market on an ongoing basis into the future of the locations, volumes and types of flexibility needed through the publication of a “Flexibility Needs Statement”. In response to calls for greater coherence between flexibility market and retail market developments and activities to

	Clarifications sought	15-20% Actions (2023-2025 horizon)	Product Parameters (2023-2024 horizon)	Blueprint (2024-2033 horizon)
	considerations over a materially longer horizon • In addition to publishing a summary of the market analysis identifying the impacts of storage in the wholesale market, a high level explanation of the driver of this was provided in bilateral stakeholder engagement • Whilst we are not aware of any broadly accepted definitions of medium and long duration storage, for the purposes of this exercise we are referring to installations of 4-12 hour duration as “medium duration” and 12+ hours as “long duration”.	• Progress proposals for standard flexibility readiness technical requirements to apply to new electric transport installations, with proposals submitted to the CRU at end 2023 and their adoption supported from H1 2024 onwards Based on the feedback from XLEUs and their representatives, the initial focus of product development for XLEUs is now being narrowed to focus primarily on the potential for a sector coupling solution whereby XLEUs provide flexible demand through the use of behind the meter gas generation whose consumption is matched by domestic biomethane injections.	document and identified in the 15-20% column of this table.	stimulate flexible demand, there is a core focus in the Blueprint described in sections 3.1 and 5.4 of this document on the relationship between and product transitions between flexibility market and retail market development.

4 LOOKING BACK: LEARNING & SUCCESSES TO DATE

4 LOOKING BACK: LEARNING & SUCCESSES TO DATE

4.1 SUCCESSES OF PROGRAMME DELIVERY TO DATE

Since the programme's inception, significant progress has been made in testing, and proving, new capabilities – as well as enhancing existing capability – to transform the role of the DSO (as per the Clean Energy Package and Price Review 5 regulatory incentives). Following the high-level design phase of the programme in 2021 (leading to the submission of our initial delivery plans and agile approach to the CRU at end 2021 with additional information in early 2022) our focus in 2022 was the introduction of the first local flexibility markets, and accelerating flexibility to provide new security of supply solutions.

The National Network, Local Connections Programme has, to date, adopted a discovery led approach to develop and trial new solutions. Lessons learnt – through the operation of live initiatives – have informed the design of subsequent propositions and measures.

Some of the new and enhanced capabilities delivered to date include:

- The establishment of the **first local flexibility markets** which introduced flexible non wires solutions, that are now undergoing testing to manage demand and support network operations in response to local network contingencies (such as network faults or outages) in three locations around the country;
- The development of new, non-discriminatory **flexibility market rules** defining the criteria and eligibility parameters for the first flexibility products (along with a basis for validation and settlement);
- The development and implementation of **detailed processes** – and an underpinning solution architecture – to procure and operate flexibility services at scale (in specific geographic areas with multiple network constraints);
- The introduction of **dynamic instruction sets** to facilitate greater distribution-connected participation in the wholesale market and DS3 System Services. To deliver this, we introduced the use of dynamic forecasting of local generation (on a week-ahead/day-ahead basis) which we now use to release demand reduction capacity to participate in TSO and SEM markets from distribution-connected demand sites in congested locations. Until now these sites would be prohibited from participating in TSO and SEM markets for much of the year;
- The development of an operating system to facilitate the dynamic instruction set that combines **location-specific weather forecast** data with power system studies; this system provides daily statuses to multiple demand side flexibility providers in the market, confirming whether demand reduction capacity can be released (and, thus, enabling greater participation in the wholesale market and DS3 System Services);
- The introduction of **flexibility products for both commercial and domestic customers** to address the generation gaps forecasted over the coming winters; the

purpose of these initiatives has been to support security of supply in Ireland, **empower and engage customers** through the period of the energy security and cost of living challenges, and facilitate the EU Commission's proposals for emergency market intervention to reduce bills for Europeans by (i) reducing electricity consumption by at least 5% during selected peak price hours, and (ii) identifying the 10% of hours with the highest expected price and, subsequently, reducing demand during these peak price hours;

- The introduction of **enhanced customer services and supports**, including the (i) development of an education and awareness strategy, and (ii) implementation of multiple campaigns across TV, radio and social media to support a behavioural flexibility product. These augmented customer activities have facilitated enhanced engagement amongst domestic customers on their electricity usage, empowering them to make informed decisions on their consumption and respond to requests to adjust demand (in line with prevailing electricity system conditions);

- The delivery of **enhanced low voltage network** visibility (monitoring, modelling and mapping capabilities), providing greater operational visibility and accuracy through improved LV network data quality (and, thus, creating the potential for domestic and small business customers connected to the LV system to participate in flexibility into the future);

- The development of an **interim operational technology plan**, which formed part of the broader programme information technology and operational technology (IT/OT) delivery roadmap and implementation plan. The interim OT plan will enhance existing functionality and add new modules as required to enable a technical solution to actively manage distribution system flexibility services, before the enduring technical solution is in place;

- Progressing the joint development of a **future DSO-TSO operating model**, agreeing future ways of working with the TSO – including new and enhanced protocols around (i) monitoring and forecasting, (ii) market operations, (iii) operational planning, and (iv) activation, dispatch and re-dispatch – that facilitate whole-of-system optimisation.

Through the development and delivery of the capability as captured above, substantial lessons have been learnt by the programme, which have been applied in future planning, design and delivery. As the programme continues to evolve and grow, capturing these lessons learnt effectively is crucial in determining what has worked well and identifying areas for further improvement. Capturing lessons learnt also ensures that the programme continues to apply a focus on optimising performance and ultimately maximising the return on investment across the duration of the programme. This will continue to be a critical component of programme delivery into the future. Lessons learnt on the programme to date are outlined in the section below.

4.2 TECHNOLOGY – LESSONS LEARNT

4.2.1 Enabling Technology

Several technology solutions have been developed or procured to support the initial rollout of each new flexible demand product over the last 12 months. These solutions included bespoke solutions built in house, communication platforms, manually supported offline solutions, and third-party flexibility procurement solutions identifying flexibility zones and network needs.

Pilot 1 involved our introduction of local markets for congestion management at locations across the distribution system. Implementing this required the capability to forecast network requirements and match them to a suitable flexibility product such as Secure, Dynamic and Restore (ENA-standard products). The dispatch and delivery of these services required validation and settlement calculations. It was identified that email communication between DSO and Flexibility Service Providers was an effective means of communicating dispatch instructions, equally for the commercial Beat the Peak products. However, as we seek to deliver a diverse range of flexible solutions across sectors a more robust, secure dispatch capability is required, to that end several dispatch mechanisms have been considered and included in our interim operations technology strategy to support 15-20% flexible system demand.

Flexibility Service Provider participation was limited to a small number of assets in Pilot 1 & BTP Commercial Active, however the manual extraction of meter data from metering systems and import into bespoke tools for validation and settlement was cumbersome and resource intensive. It has been confirmed that the existing data architecture is not suitable to scale for large volumes of participants which is the intention for next few years to reach our flexibility targets for 2025. Thus, a technical proposition shall be developed around a sustainable data architecture that will support automated system integrations to enable a validation and settlement process that isn’t dependent on manual intervention.

While the pilot rollouts of new products to date have allowed us to test market rules, the market rules will evolve and continue to evolve under business as usual. Thus, until a time that we determine the maturity in market structure and engagement rules, we need to continue to learn and evolve the associated technologies accordingly, in terms of our digital and technical enablers as part of the interim technology strategy.

When rolling out the initial products to date, limitations in terms of our existing distribution management suite of technologies, and the network data available to us, have made it challenging to accurately forecast dynamic needs for flexible services based on visibility of current network operations. As such, events had had to be planned further in advance of operations than we would like in the longer term or triggered primarily from other external factors such as TSO issued system alerts as opposed to detected distribution network conditions. To that end as part of our interim technology strategy, we have identified that an accurate power-flow model with state estimation and forecasting and using real time network conditions and configurations is required to support wide scale deployment of flexibility services.

Pilot 2 involved our introduction of “dynamic instruction sets” – week ahead and day ahead forecasts which allow demand side units providing services to EirGrid from congested locations on the distribution system participate more freely than was previously the case. Through this pilot, we encountered further challenges around network forecasting and visibility using existing technologies. As a result, the technological solution put in place required a combination of forecasting and the use of pre-completed offline studies. Identification of ongoing network events such as Unplanned outages and abnormal network configuration continues to drive manual resource intensive processes to drive decision making and furthermore necessitates a more conservative approach to ensure system security. This will be mitigated in the future by using a tool which uses real time data and modelling of power flow and state estimation with integration to capacity allocation tools for decision making. Pilot 2 was also able to leverage other data sources, including weather forecast data for generation forecasting. AS this worked well, we are now considering the range of new solutions across the services we provided and as such need to be included in our data architecture.

Across each of the pilots a common theme was that detailed manual studies - which were required to support business processes relating to the operation of flexible demand - consumed significant resources. For instance, offline data assessments are being done to identify yearly and seasonal baseline capacity values for participants joining different flexibility schemes. Moving forward it has been identified that we should seek to digitise those processes which can benefit from advanced data science and analytics approaches, driving insights and optimising delivery.

Through the flexible demand products rollout out to date, a significant volume of data was gathered. For reporting and transparency, it will be necessary to develop as part of our interim technology strategy a DSO platform including reporting and dashboards. It should be noted though that a key learning was that data design and structure is key to enabling this capability and that integration needs to be considered at the earliest design stages.

To support the flexible demand products rollout out to date, bespoke solutions such as a ‘Flexibility Services Tracker’ (FST) have been developed in-house to manage Flexibility Service Provider services processes including Flexible Service Provider registration, dispatch of utilisation requests and validation and settlement processes. This FST solution would require significant development to facilitate the scale required over the coming years. In addition, the FST would still face challenges in that it would not be possible to integrate the solution with some of the core systems which will be key in for Flexibility Markets going forward for example ADMS. Thus, it has been learnt that a new solution needs to be implemented in the form of a Market Management System (MMS) that is more scalable and will support integration with ADMS and existing meter data platforms.

For Beat the Peak (BTP) Domestic, the selected technology supported speed to market and an agile approach. A more robust, integrated, and scalable solution is required to deliver personalised, contextualised messaging to participants at scale. The behavioural change and content testing approach defined for BTP Domestic was complex and thorough. A technology solution to support execution of this approach, and interrogation of the data would have been beneficial, and will be required to support the scale of the BTP-D

campaign (this includes the communications technology, the customer database and the websites utilised for sign up). Testing of customer messaging has been extremely valuable in refining the campaign and sustaining high engagement. A robust technology solution (e.g., CRM) would be beneficial in maximising the impact of this and tracking an end-to-end customer journey and campaign.

In Pilot 3b we are extending congestion management services in the Mullingar area with a specific focus on the participation of domestic customers. To provide greater visibility to customers and market participants of the opportunities to participate in this pilot when compared with Pilot 1 it was decided to enhance the user experience with the procurement of an external software solution from Piclo. This solution provides an online map of where flexibility services will be required in the competitions for the Pilot 3b Service Windows. This solution went live in November 2022 and over recent months it has been seen to be a very manually intensive process and the population of the coordinates onto the platform require weeks of preparation and analysis. Future solutions for visibility purposes will require better data import processes and integrations like with a GIS tool to allow for greater ease when verifying the data.

For Pilot 3b, network security considerations greatly limited the amount of functionality and content we could include on the Piclo visibility dashboards. For Flexibility Service Providers to gain further insights into the local flexibility market competitions they were directed to the e-tenders platform to ensure compliance with the procurement rules and data protection. For future competitions, to add value at the point of communication with the Flexibility Service Providers, it will be necessary to provide as much information as possible in the interest of increasing transparency for potential Flexibility Service Providers. To support this objective, and equally to support validation, settlement and forecasting it will be important to document the required use cases which involve the processing of personal data and its use in supporting DSO objectives.

Finally, the process used to identify flexible services for pilot 3b involved power flow work based on peak load conditions. In preparing the output of this work for publication as part of the procurement processes shortfalls in this approach were identified – including how to introduce clarity to customers and FSP's in terms of where a service is of benefit to the system and which customers can provide that service. As we deal with lower voltages (20kV, 10kV and below) this becomes more complex. Ultimately this will be resolved by a robust more real time market coupled with an updated operating system.

4.2.2 Behind-the-Meter Infrastructure

Behind-the-Meter Infrastructure Standard Development
It is critical that appropriate standards for controllability and interoperability are in place for residential distributed energy resources before the scale of these customers on the system expands further. Otherwise, there are risks to consumer access to flexible demand services, as well as consequential impacts on the security and stability of the power system. It is important that ESB Networks provide direction on standards and protocols for this market as this has the potential to increase rapidly over the medium to long term.

Behind-the-Meter Infrastructure Proof of Concept – Supply Chain learnings. During 2022 ESB Networks commenced bench test piloting the integration of behind the meter technologies. In 2022, during pilot initiation there was a supply chain issue in sourcing smart inverter devices. This was driven by the demand for silicon-based electronics and the global labour shortages in the aftermath of the Covid-19 pandemic. For 2023 and beyond the supply chain situation looks to be improving across the power electronics sector. Nevertheless, the supply chain, technology availability and cost are critical factors in adoption for both customers and electrical installers.

Behind-the-Meter Infrastructure Proof of Concept – Compatibility learnings. The communication gateway device demonstrated a robust and consistent bi-directional signal exchange for monitoring and control of a smart inverter. Defining the correct SunSpec Modbus settings from the cloud application via communication gateway to the smart inverter was initially trial and error during the early stages of development. Significant challenges were encountered reading and writing external instructions to the smart inverter initially, this was due to manufacturer security settings and in-built propriety default software blocking 3rd party access. The team worked with the smart inverter manufacturer to overcome these issues. The proof of concept found optimum settings that worked consistently over time, but it would be advisable to do testing per smart inverter manufacturer for a production rollout, to verify compatibility.

Systems Interoperability Standard Development – UK DNOs via the Energy Networks Association (ENA) in the UK are initiating a project to develop a standard for systems interoperability to dispatch DER. The data communication for dispatch by all system and network operators will be handled at scale via common Web APIs. This approach looks to develop a new standard for operations dispatch and associated communications, instead of utilising existing standards as demonstrated by other utilities internationally.

4.2.3 Network Model Data Quality

An important part of delivering the objectives of NN, LC is the augmentation of the existing operational technology capabilities to include advanced functionality such as power flow to support our ability to forecast demand and optimise management of the network. While enabling this functionality, there were several lessons learnt in terms of the quality of network model data and data configurations during 2022 in preparation for Pilot 2 and Pilot 3b.

Importance of Accurate Geospatial Data & Network Topology
Geospatial data provides the physical location and attributes of network assets such as switchgear, conductors, transformers and substations within the system. This data enables the network model to accurately represent the characteristics of the distribution network. The model analysis identified several key data attributes which will need to be validated on site. A pilot to identify the best method to capture this data was initiated for the Pilot 3b area (Mullingar) and will inform the approach for the national rollout.

Network Modelling Methodology

The operational technologies ESB Networks current uses only require a network model that provides accurate logical connectivity model and there was no need to provide extensive network equipment data. For advanced distribution management system (ADMS) functions such as load flow and state estimation, the network model needs to be expanded to include engineering attributes like resistance, reactance, and configuration for power system objects along with the physical characteristics of equipment such as correct phasing data transformer sizing, conductor rating, and length.

Accurately modelling the behaviour of network equipment such as transformers, substations, consumer loads and DERs is critical for achieving accurate a network model.

During the Pilot 2 assessment it became apparent that phasing information in our network model is not always accurate, which had a negative impact on power flow analysis. The distribution network is unbalanced (single phase spurs at 10 and 20kV supply customers and their single-phase load, typically domestic), in case of missing or incorrect spur/lateral phasing information, the power flow and state estimation output would produce errors (false load imbalance across phases) thus preventing system managers, operators and engineers to use it for real time and study/forecasting purposes. Given the importance of having accurate phasing information to ensure the correct operation of the system we determined that line patrol is necessary to assess the level of accuracy and correct any inaccuracies. Corrections will be made in the source databases, such as GIS and GMD, to ensure that the phasing information is accurate and up to date.

Network analysis results have also shown that the existing “simplified” network model which has a single load object at a MV/LV transformer site cause high discrepancy in the results of power flow solution as compared with real time data. A new load modelling approach is proposed where the network model design and the loading data is granular enough to accommodate the different load and microgeneration categories at a single MV/LV transformer site.

Distributed Energy Resources Generation Profiling & Forecast

Generation profiles represent the behaviour of distributed energy resources and other generators connected to the distribution network over time, weather, and different operation conditions. Accurate modelling of generation profiles and forecast is essential to analyse the impact of distributed energy resources on network performance in real time.

To achieve more accurate generation profile and forecast for weather dependant generators, more granular windspeed forecast and solar irradiance data will be required. Currently, we are using only limited data points to gather windspeed forecast and solar irradiance information, but we are obtaining windspeed forecast data for all wind farm site locations specifically to improve the accuracy and precision of the data.

Consumer Load Profiling

Consumer load profiles represent the behaviour of consumers connected to the distribution network over time, weather, and different operation conditions. Accurate modelling of load profiles is critical to analyse network behaviour under different demand scenarios – such as

peak load, off-peak load, and seasonal variations – and use this information to efficiently deploy flexible services.

To improve the accuracy of load profiles, it is necessary to create more granular temperature bands. This enables a more detailed representation of the impact of temperature on consumer behaviour. However, creating more granular temperature bands requires more accurate temperature data to be available for the modelled region. Currently, we are using only four data points to gather temperature information, but we are planning to obtain temperature data from all 34 different locations nationwide to improve the accuracy and precision of the data. This will provide a more comprehensive and detailed understanding of temperature patterns and allow for the creation of more granular temperature bands to improve load profile accuracy.

In addition to that new load profiles are also to be created for the large customers having specific load patterns. We are planning to extract aggregated data to create new load profiles for all types of consumers such as industrial, commercial, urban, etc. This effort will result in a substantial increase in the number of load profile types available, providing more precise and accurate data for analysing load patterns.

To achieve further improvements in network analysis, we plan to perform state estimation analysis on medium voltage feeder heads[1] and the devices on these feeders such as re-closers, sectionalisers etc, in addition to power flow studies. This approach will provide more accurate results, as state estimation uses real-time measurements to analyse the network. To facilitate these improved methods of monitoring the MV network state will be required, and more telemetered devices will be required at MV level to provide 3 phase Voltage and Current measurements at suitable points on the MV Network. We have commenced studies into the feasibility of retrofitting Ground Mounted RMUs and Over Head Switchgear with telemetry solutions. Improved monitoring capabilities will improve the quality of the state estimated solution which will allow optimal dispatch of flexibility services and network management.

Conservation voltage reduction (CVR) learnings

Conservation voltage reduction (CVR) was rolled out as part of the Beat the Peak initiatives in 2022 towards EU Regulation 2022/1854. The rollout delivered insights as to whether CVR can be applied without causing harm to power quality, as well as how large the energy savings and/or load reductions due to CVR are.

From the ‘Always On’ (voltage reduction applied directly at each station) approach taken this Winter, we have learnt:

- A limited number of transformers are available for CVR using the ‘Always On’ approach due to the necessity of strictly adhering to operational standards relating to normal network configuration, and the baseline voltage levels across the network;

[1] Feeder head is the first section of the feeder out from the HV station

- Aggregated voltage events from smart meters are an effective method of monitoring for CVR related impacts. We carried out initial work on this but there is further benefit in exploring the usefulness of this data;
- The analysis to date indicates that CVR is having a noticeable impact on energy savings and load decrease. The average CVR factor across all stations where it is operational today are estimated (currently) as 0.88% which means that per 1% decrease in sending voltage, the direct load decrease after reducing the sending voltage is 0.88%. With an average reduction in sending voltage of 2.1% across the 20 transformers this results an average daily energy saving of 1.34 MWh per transformer;
- The functionality of CVR can be further improved by setting up a system-based (technological) approach so that the sending voltage of transformers can be remotely controlled. This will also enable increasing the number of viable transformers and developing appropriate policy and procedures which could in theory unlock potential for even greater impact as you could take multiple approaches to include 'Always On', 'Peak reduction' and response to System Alerts.

Further rollout of CVR will focus on the system-based approach and we have commenced gathering requirements to implement this solution.

4.3 MARKET DESIGN – LESSONS LEARNT

4.3.1 Stakeholder perspectives on market rules

During the market rule development of Pilot 1 we conducted a series of workshops with stakeholders to test initial flexibility products and customer propositions. These were very valuable to gain an understanding of our customers.

The stakeholders identified some barriers to entry which were fed into the market rules for Pilot 1. An example of this is the ability of participating customer sites or "Flexible Service Assets" (FSAs) to meet the entire delivery period. Prior to this engagement, we had been hopeful that FSAs could deliver for the full length of the delivery period (2-5 hours depending on the zone). The Request for Tender (RFT) included a market rule that allowed FSAs deliver for a nominated length of time within the delivery period window and the only technical requirement was 30 minutes minimum.

As these sessions were valuable, the same group of stakeholders have been involved in successive rounds of workshops and interviews as part of ongoing flexibility product design activities. For example, they were involved to test the desirability of proposed commercial concepts to maximise FSP participation in Pilot 3b.

4.3.2 Ability to "pause" assets' participation

One of the Pilot 1 contracts was with a Flexible Service Provider who had two assets (customer sites) in a unit to meet the 100kW minimum requirement. Asset 1 was on a long-term outage for much of the duration of the service window (6 months), but Asset 2 was

available. Per the market rules and the contract, the entire unit (both Asset 1 and Asset 2) was deemed unavailable, and this meant that the Asset 2 was not utilised. We have taken this on board as a lesson learnt and will be factoring a way to 'pause' or temporarily remove assets for legitimate reasons. We also lowered the minimum unit threshold to 10kW.

4.3.3 Review of how we tender

We learnt in Pilot 1 that the asset recruitment time for Flexible Service Providers was 6-9 months. We took this on board as a lesson learnt and, it was decided that the pre-qualification stage of the procurement process for Pilot 3b would be split out into two steps: a Qualification System Questionnaire (QSQ) followed by a Pre-Qualification Questionnaire (PQQ). This approach was adopted to make the tendering process as easy and efficient as possible for prospective Flexibility Service Providers (FSPs) and to give them ample time to gather their proposed Flexible Service Assets/Units for this pilot – in turn, ensuring the pilot is open to as many participants as possible.

The PQQ is due to issue to pre-qualified applicants in Q4 2023. Applicants will be asked to complete the PQQ template, providing a list of the MPRNs of their proposed Flexible Service Assets for pilot 3b. Proposed assets must have a quarter-hourly meter or smart meter at the time of the RFT to be eligible. ESB Networks will verify whether each asset is electrically connected to one of the specified MV feeders that form Lot 1 or Lot 2 of the pilot. Applicants can submit as many MPRNs as they wish and re-submit the PQQ template with new MPRNs on a weekly basis. PQQs can be submitted by applicants any time until close of business Friday each week during that period and ESB Networks will endeavour to respond by close of business Tuesday the following week, advising which MPRNs are electrically connected to participating feeders. This approach was also developed to facilitate the ongoing rollout of smart meters in Mullingar and the surrounding area.

Allowing FSPs to submit proposed MPRNs on a rolling basis between May and RFT stage will enable them to gather new assets on an ongoing basis while smart meters are rolled out during that period. Our commitment to a quick turnaround in checking each proposed MPRN and reverting to FSPs on each asset's eligibility on a weekly basis creates additional workload and resource constraints for ESB Networks, but this agile approach has been adopted to accommodate both the FSPs and the national smart meter programme. This manual approach emphasizes the need for new technological solutions, as identified in Section 4.2.

4.3.4 Clearly defined market terms

A further lesson identified with delivery periods was the definitions of 'Delivery Period' and 'Nominated Delivery Period' in the tender documentation. If the delivery period is 3 hours but FSP's only contract for 1 hour of nominated delivery period then they should only receive availability payment for 1 hour, not 3. Clarity was required in the documentation on the meaning and implementation of each definition.

4.3.5 Supporting flexible service providers

In Pilot 1, one applicant qualified through the PQQ, but ultimately did not submit a tender. Further engagement after the tender period indicated that the applicant withdrew due to technical complexity of asset assessment and lack of expertise in the applicant company. Further support for customers and potential FSPs is required to enable participation. This is being addressed through a review of the procurement process.

4.3.6 Price discovery

We initially considered that price discovery would be best approach for industry, but now know that to stimulate the market at the requisite pace, we need a combination of price discovery and fixed price services. Pilot 1 and Pilot 3b are pay as bid markets to facilitate price discovery. Beat the Peak Commercial initiatives are a fixed price service.

4.4 POWER SYSTEMS – LESSONS LEARNT

4.4.1 System modelling

Over the course of 2021 and 2022 substantial power system modelling work has been required to progress the programme. This is delivered using established power system engineering techniques, using power flow software, and in more innovative ways – using a core load database and comparing with network models using data analytics tools. Some of the lessons learnt from this work are the following:

- For assessment of the impact of changes in load on system congestion – for example thermal loading of plant - a data analytics approach can provide an answer with a good level of accuracy more quickly than full scale modelling. The analytics approach is also easier to automate which means that as load data changes the insights derived can also be updated is a fast and seamless way. As a primary use of flexible services will be to address thermal overloads, this indicates that data analytics will continue to be a vital tool;

- Input to strategic goals can be more quickly provided via an analytics approach and the level of accuracy is adequate for same. The analytics information was key in allowing the development of insights in terms of use of battery storage for example which will be important as storage is expected to provide flexible services to ESB Networks achieve the CAP 23 targets;

- Certain network issues – such as voltage and short circuit levels – still require more detailed traditional studies to ascertain the impact of load and new devices on the system.

As a result, we are progressing further analytics development work to ensure that key information and statistics are kept up to date, while also maintaining and developing more traditional study competencies.

4.4.2 IT/OT domain

The work that the NN, LCP has been involved in augmenting core operational technology (OT) capabilities over the last 12 months to incorporate advanced functionality (e.g., power flows) has highlighted the importance of the core data, (e.g., MV network data) to optimise network operations. This learning has directly led to:

- The establishment of a dedicated team working on improvements to our network data model. This team has identified key MV data attributes critical to accurate forecasting of network conditions;
- An operational visibility and mapping approach which is considering the best method to validate and capture the required MV data attributes. This involves patrolling for MV data updates and including use of drones. We are currently piloting patrolling methods to capture the required information, the initial focus being on improving MV phasing information and how to obtain same in the fastest and most cost-effective fashion;
- An ongoing assessment of the core assumptions made in the past in terms of thermal and overload ratings of our plant with a view to moving away from rule sets which were required to facilitate system operation in the past to more detailed data which can be facilitated by improved OT capabilities. This in turn may unlock capacity for at least part of the year and/or based on specific scenarios.

4.4.3 Pilot implementation

As part of the rollout of the flexible demand products to date, it has become clear that our local operational and customer services supervisors across the country understand the value in flexible services as a network solution. This led directly ESB Networks' personnel seeking the rollout of "summer services" – flexible demand available over the period when most maintenance and upgrade works are undertaken on the network. The use of these services:

- Will undoubtedly identify some issues which will improve ESB Networks enduring market solutions;
- Will aid in the ultimate transition of flexible demand services into business-as-usual system operations.

As ESB Networks have worked through Pilot 1, 2 and during our preparation for Pilot 3b, the importance of a real time modelling system to optimise the use of flexible services has become more apparent. Having a real-time modelling system is critical to ensuring that services are only utilised (incurring utilisation costs) where there is an actual requirement – which takes account of actual (rather than peak) load, and actual forecast generation (rather than full MEC or zero output). Work in this area has also informed:

- How will NN, LC Programme team be structured to support the Flexibility Operations function;

- How we will the Flexible Operations teams interact with other internal stakeholders;
- How will Pilot 3b Mullingar processes be developed.

The importance of a real time modelling system has also become apparent in several other areas worked on in the last year:

- How can the required flexible services be identified. Over the course of preparation for **Pilot 3b Mullingar**, progress has been made in identifying future network requirements using static load data and static load flow results. This has the potential to over-estimate the service requirement. To plan and optimise the use of services it is important to utilise services as they are needed. A real time system will determine where these services are available; how much service is available at a given location; match the service with the specific problem.
- For **Pilot 4 Flexible Connections for renewable generation**, a real time modelling system can make decisions based on actual weather and expected output of renewable resources; estimated load based on historical measured load data and expected weather conditions; what mix of generation types are in the area – specifically a mix of solar and wind and how we 'add' these. In addition to minimising the turn down of renewable resources, we will be better placed to use this resource to keep load connected in scenarios which might otherwise lead to load shedding.

4.5 CUSTOMER – LESSONS LEARNT

4.5.1 Customer Research Overview

Over the past year we invested in a multilayer approach to customer research to ask, observe and decipher domestic and commercial customers behaviour around energy use. We considered customers *awareness and understanding* on flexible demand, their *behaviours* associated with changing how and when they use electricity and the *role of rewards, incentives and payments* play in encouraging customers to adopt flexible products and services. The synthesis of this research outlines that customer both domestic and commercial require five key things from the NN, LC to engage in flexible demand:

- **Lead the public conversation on flexible demand:** There is a requirement for a trusted entity to lead a national conversation about demand-side flexibility, educating on energy consumption and the positive impact that customers' flexible use could have, both in terms of sustainability and financial management.
- **Education:** there is a need for better understanding energy as a key part of future everyday life, driven by education, social and digital campaigns, with supporting tools to encourage continuous growth. Learning needs to be interactive and engaging at all levels and digital solutions will make the on the go learning experience more real time and positive.

- **Extol the benefits:** The financial, environmental, and social benefits of action need to be made clear and attractive. Customers' engagement on energy needs to be supported by digital channels, incentives, and applications as well as social purpose and connection.
- **Make action easy:** The infrastructure and the right tools must be in place to ensure that we can support customers to make the best choices and enable them to act. Leaning on behavioural nudges and setting energy-saving defaults will make action easier for customers.
- **Facilitate:** Buying and selling flexible demand must be enabled by technology, with more power in the hands of the consumer to generate, store, buy and sell renewable energy and be incentivised to earn through the positive actions they take. Energy must become more than a bill. The right partners and supports need to be put in place to ensure no one is left behind.

4.5.2 Pilot delivery level

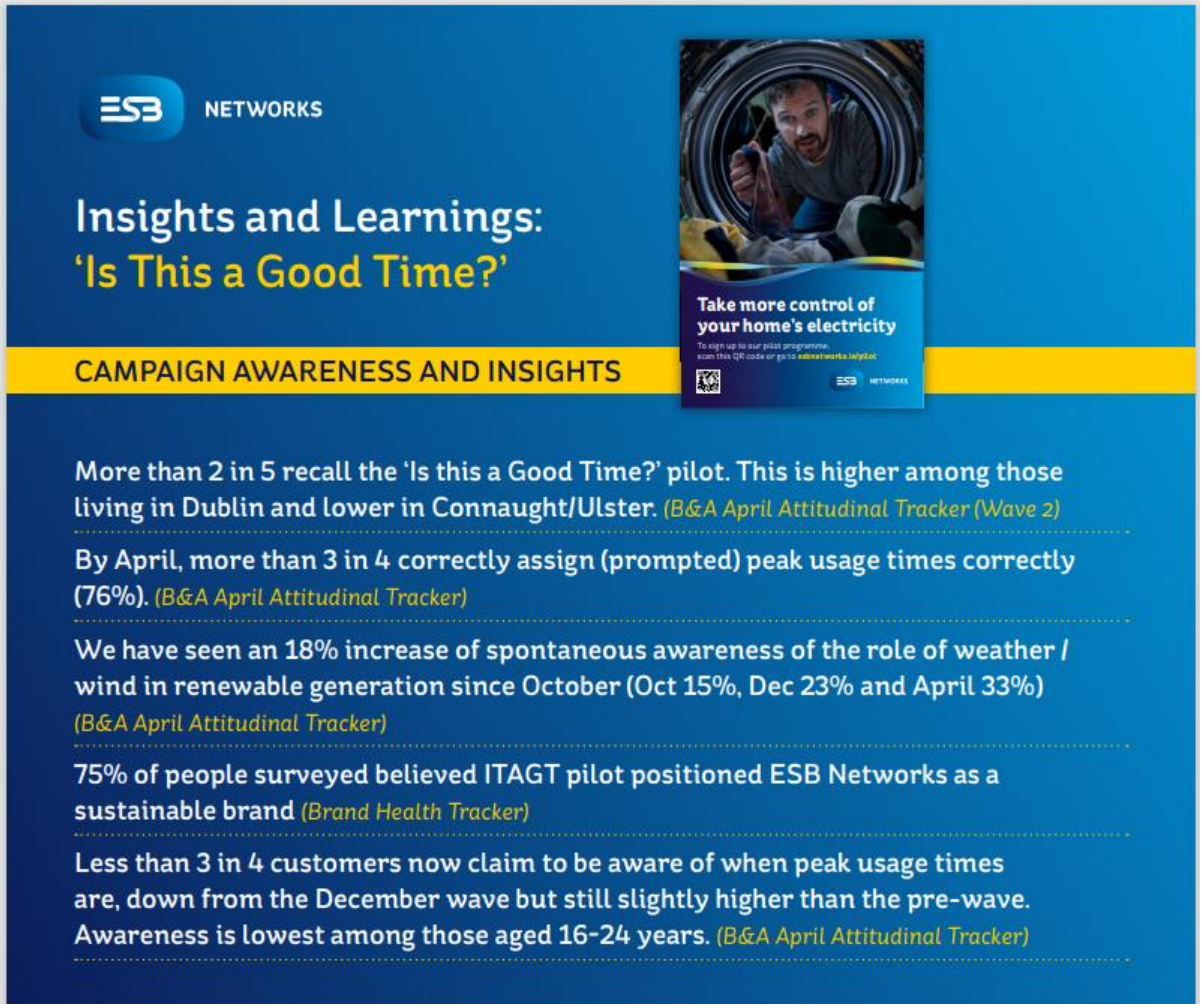
We learnt key things across all pilots namely, customer insight at the beginning allowed for more seamless recruitment and adoption. It supports in streamlining operations and engagement of future propositions.

- **Pilot 1:** The availability and performance of different types of customers within this pilot varied as did performance on consecutive delivery days. We also took learnings in relation to the settlement process in order to make it more streamlined for service providers that are participating in the pilot.
- **Pilot 2:** The introduction of day ahead availability based on weather forecasting was well received by DSUs constrained over the summer period. DSUs commented that if this pilot delivered 5-10 extra days over the summer, they would find the process worthwhile.
- **Pilot 3b:** Early engagement on the location of Pilot 3b took place, however industry advised they still need a longer lead time to allow for recruitment of assets.
- **Pilot 4:** This pilot saw the first engagements between NNLC and renewable generation developers. The process identified potential projects (who were issued their offers in ECP2.1) that could be connected early with a flexible connection. Assessments are currently underway of projects which received offers in ECP2.2 and projects which are due to receive offers in ECP2.3.
- **Beat The Peak – Domestic 'Is this a good time?' Pilot:** To support Ireland's efforts in security of supply, NNLCP stood up this domestic demand side flexibility in a matter of weeks. We delivered at pace and were agile with design and execution to facilitate responding to customer demand side response behaviours. We built into the design of this programme a research and measurement approach to enhance the effectiveness of the pilot.

Initial lessoned learned which informed the pilot was that there was a gap in Irish society for a trusted brand to give customers relevant and actionable suggestions on how to take control of their electricity usage. There was a large component of society who were confused as to what 'peak time' meant in terms of energy cost and carbon cost but once they were aware they changed their behaviour around how and when they used electricity, customers who are incentivised post action offer more behavioural changes, customers want to know more on when it is a 'good time' to use electricity and not just when it is peak times. This pilot has been rooted in research and measurement which has really allowed the programme to be agile and customer responsive in how and what we communicate.

A snapshot of lessons learned post pilot below:

Figure 8: Lessons Learned from Beat the Peak Initiatives



PARTICIPANT INSIGHTS

+18.5K participants
- 52% female, 46.4% male
- 55% were child free, 29% young families, 14% older families
- 37.1% work hybrid, 29% work from home, 20% work outside the home

Overall, the registration process performed well, 78% completing the form (Google Analytics) and 94% rating the process 4 or 5 *(Participant Survey)*

The pilot drove positive impact in customers 'feeling in control'. Signed up participants felt more in control and were more like to conserve energy than the general public. *(Registration & Exit surveys vs Attitudinal Tracker)*

There was a 20% uplift in participants feelings of 'being in control' of electricity consumption while wider population showed no change.

Signs show participants are more conscious of their usage, 89% consciously reducing their electricity usage between 5-7pm, women in particular showing higher affinity.

Insights and Learnings:
'Is This a Good Time?'

PILOT PARTICIPANT COMMS LEARNINGS

Clear, simple and actionable tone of communications were well received by participants with 89% agreeing tips were practical and easy to action. *(Participants B&A Survey)*

Very high engagement with comms all through pilot supporting the fact that communications were well received and useful for participants (60% average vs 21.5% industry average).

Top performing email topics were appliance specific – Fridge (open rate 61%), Air Fryer (open rate 61%) and Hairdryer (open rate 60%).

91% of participants are happy with email communications. *(Participants B&A Survey)*

Those receiving a more enhanced version of pilot feel more conscious of little actions to take than those with more basic experience (93% vs 80% agreement, Participant survey).

BEHAVIOURAL INSIGHTS AND DRIVING CHANGE

The pilot worked hard at driving awareness, intent and nudged behaviour change; however longer time is needed to impact on more organic behaviour shifts.

Those not taking part in 'energy events' are more likely to ignore Peak Hours - 10% agreement for those invited to 'energy events' vs 17% agreement for those not invited to events *(B&A Participation Survey)*

INCENTIVE LEARNINGS

Monetary incentive is a more impactful motivator for participation

Post payment encouraged higher event participation compared to paying beforehand (80% survey completion vs 77%)

Monetary saw 13% uplift in response rate compared to those that received a charity incentive (78% vs 69%), and higher Pilot participation overall.

47% of invited participants opted in to take part in 'energy events' with 24.1K positive actions were claimed as a result of 'energy events' *(Self-reporting surveys).*

The lessons learned will inform the future direction of customer demand side flexibility propositions.

Through Beat the Peak Commercial: the lessons learned from customers was that:

- The tender application process was onerous. Industry has voiced that it found it challenging to navigate e-Tenders and would like to see a simpler qualification process aligned to the value of services being provided.
- The absence of penalties is welcomed by participants and is key to reducing barriers to entry. However, this likely contributed to customers under performing in certain instances.
- The certainty with regard to the delivery window and when customers could be called was a big positive and welcomed by participants.
- A more frequent settlement process and a simpler method of calculating remuneration would be welcomed.
- Participants advised they would participate in future BTPCA schemes, however in the interest of recruiting more customers, would strongly encourage stacking with other markets and longer-term contracts.

Each of these learnings is being incorporated where possible into updated product design, processes and procedures for the 2023/24 Beat the Peak offerings.

4.5.3 Value of stakeholders in supporting customers

When the NN, LC programme was stood up we acknowledged that to deliver an inclusive network to support the people of Ireland it would require an *all of* the energy industry approach. We published a consultation framework to underpin this ambition (here). Throughout the delivery of pilots and propositions we ensured stakeholder representation on the programme via our Advisory Council and by identifying and engaging with key stakeholders to support the design of propositions.

Over the past 12 months we have attended & presented at 17 conferences, held 18 webinars, delivered 5 roundtables, participated in 71 bi-lateral stakeholder meetings.

We continue to realise and appreciate the contribution stakeholders make to inform pilots, propositions. For example:

- As a direct result of suppliers support of ‘Is This a Good Time?’ Pilot, 22% of registrations from our joint programme and supplier communication drives;
- After one supplier issued out an email to encourage their customers to sign up there was a spike in registrations 408% compared to the weeks previous to it;
- As a direct result of key stakeholders across professional services, commercial semi state, & schools participating in beat the peak pledge (here) we saw megawatt savings from one participant of approx. 2,777MW hours across the winter period and another significant participant saved 30MW hours per day at peak time.

5 2024-2028 MILESTONES

5 2024-2028 MILESTONES

5.1 NON-WIRE ALTERNATIVES MILESTONES

For the purposes of this multiyear plan, “non wire alternatives” refer to actions or milestones which accelerate the introduction of any non-wire alternatives (including for example any of the products or services included in the next section) onto the Irish distribution system. So NWA actions include for example the introduction of standard technological requirements, or industry partnerships to accelerate new communications and control models. We do not include the products or services themselves (which may in fact be “non wires alternatives) in this section, as they are addressed separately in the next section).

5.2 NEW PRODUCTS & SERVICES MILESTONES

New Products and Services refer to new products or services for to support or enable flexible demand or generation, for example

- New market based products introduced by the DSO to incentivise flexible demand;
- New connections products introduced by the DSO to enable flexible connections for demand, storage or generation;
- New services introduced by the DSO to complement market based products, for example products and services providing educational or awareness benefits, supporting the uptake of more market based solutions.

5.3 TRANSPARENCY AND REPORTING MILESTONES

The below milestones have been identified as mechanisms to increase the transparency of market development and market activities. It is a growing and critical element of our role as a neutral market facilitator. Transparency and reporting milestones are designed to provide customers, market participants or prospective market participants with:

- Assurance that markets are developed and operated in a fair and non-discriminatory manner;
- Line of sight of future opportunities to participate in markets;
- Line of sight of future opportunities to influence market design and development.

5.4 2024-2026 KEY MILESTONES

The proposed key milestones are identified in the table below and a high-level overview of each is provided in the following section.

Table 3: NN, LCP Non-Wire Alternatives Milestones 2024-2026

Date	Milestone (Non-Wire Alternatives)	Description
2024	**Behind-the-Meter Infrastructure: Flexibility-Ready Standards Development**	ESB Networks proposes to introduce standard 'flexibility ready' requirements for smart inverter-based distributed energy resources and electric vehicle chargers/charge points. This milestone relates to designing the technical specifications – including communications protocols and standards – needed to deliver this flexibility-ready behind-the-meter infrastructure. This will include: • Updates to the technical architecture and standards governing interconnection of behind-the-meter distributed energy resource systems with the Irish distribution system Publishing updated technical architecture and standards governing the interconnection of behind-the-meter distributed energy resource systems • End-to-end behind-the-meter architecture fully tested from ESB Networks to the customer (via an aggregator or directly connected) • Complete integrated testing for both application and transport layer protocols for the end-to-end behind-the-meter architecture from ESB Networks to the customer (via an aggregator or directly connected) • Technical adoption plan for mandatory flexible readiness standards for Behind-the-Meter DER submitted to the CRU.
2024	**All eligible pipeline HV or MV reinforcement schemes to be tested for a flexible solution, with rolling tenders established**	One of the objectives of flexible demand is to provide an alternative or complementary solution to network reinforcement. In 2024 we will establish an initial set of standard eligibility criteria against which all pipeline HV and MV reinforcement schemes will be tested, to establish whether a flexible solution offers a viable and economic solution. In addition to this, to support timely establishment of local flexibility solutions for these projects, rolling procurement processes will be established to support the pre-qualification of flexibility service providers, and increasingly frequent calls to competition.

Date	Milestone (Non-Wire Alternatives)	Description
2025	**Behind-the-Meter Infrastructure: Testing of automated flexibility services through the market**	ESB Networks proposes to introduce standard 'flexibility ready' requirements for smart inverter-based distributed energy resources and electric vehicle chargers/charge points. This milestone relates to collaboration with market participants and smart home providers – pending market readiness – to test automated flexibility services through the market (commencing in 2025). This will involve end-to-end testing of flexibility services architecture, allowing the definition of set-up, commissioning, operation and ongoing compliance monitoring functions. The end state is a fully live and operational system-wide ADMS Integration of the behind-the meter-architecture as a functional operational technology distributed energy resources dispatch capability and full integration with the operational technology control room systems.
2026	**Achieve sufficient market liquidity to fully address a localised network constraint**	One of the objectives of flexible demand is to provide an alternative or complementary solution to network reinforcement. This milestone refers to our endeavouring to build enough market liquidity by 2026 that in some locations we can solve real-time network constraints (noting that to date customer participation is substantially lower than the level needed to achieve this)
2026	**Behind-the-Meter Infrastructure: Automated Flexibility Services Partnerships**	ESB Networks proposes to introduce standard 'flexibility ready' requirements for smart inverter-based distributed energy resources and electric vehicle chargers/charge points. This milestone builds on the 2025 milestone by (to the extent necessary based on market developments over the intervening period) establishing partnerships with commercial market participants to maximise customer engagement with and embedding of automated flexibility services
2026	**Flexibility Market Platform**	To operate flexibility markets, we rely on the use of market platforms to interact with participating customers and energy companies. As set out earlier in this document, a range of in-house developed and off the shelf products are being used to achieve this to date, but more mature technology will be necessary as the scale and nature of flexible demand grows. This milestone is for the introduction of a new market platform to support market participants who are participating in flexibility services

Table 4: NN, LCP New Products & Services Milestones 2024-2026

Date	Milestone (New Products & Services)	Description
2024	**Introduce new kinds of Flexible Connection**	One of the objectives of flexibility is to provide an alternative or complementary solution to network reinforcement. This includes opportunities for flexible demand, storage or flexible generation to secure a quicker or more cost-effective connection by voluntarily providing some level of flexibility. This milestone relates to the issuing of the first flexible demand and storage flexible connections building on the issuing of the first flexible generation connection offer in 2023.
2024	**Locational Medium-Duration flexibility Product Launch**	Storage or other forms of more investment intensive flexible demand offer a high value form of location-specific flexible demand, so ESB Networks is working with the CRU to provide a viable route to market route to market. This milestone is for the launch to market of a product which provides the necessary market conditions for the development of assets to deliver these services, pending CRU approval of proposals developed and consulted in late 2023. Note: This activity is being delivered in a highly collaborative and agile process in partnership with the CRU. Given the nature of this product, there is a high degree of dependency on CRU decisions and governance processes. As such, prior to finalising or assessing performance vs. this milestone, it will be necessary to engage with the relevant CRU personnel to ensure that the proposed timeline is consistent with their expectations and proposed resource allocation etc.
2024	**XLEU Carbon Abatement Product Launch**	There is the potential for significant carbon abatement if extra-large energy users (XLEUs) participate in flexible demand products to shift existing demand and deliver low or no carbon demand growth. The milestone is for the design and launch to market of a carbon abatement product(s) co-created with XLEUs to achieve this. At the time of writing it is expected this will initially target XLEUs matching flexibility they provide locally with domestic green gas injections. Note: This activity is being delivered in a highly collaborative and agile process in partnership with the CRU. Given the nature of this product, there is a high degree of dependency on CRU decisions and governance processes. As such, prior to finalising or assessing performance vs. this milestone, it will be necessary to engage with the relevant CRU personnel to ensure that the proposed timeline is consistent with their expectations and proposed resource allocation etc.

Date	Milestone (New Products & Services)	Description
2024	**Commence Sector Coupling Product Development**	The role, and importance, of sector coupling to deliver climate action is increasingly clear, as transport and heating demands move to electricity, electricity demands of water management grow, and the potential for coupling electricity and gas flexibility grows with growing opportunities for biogas and hydrogen. This milestone is for ESB Networks to begin the work needed to ensure systematic identification of future cross sector opportunities and product development accordingly. Initially, to ensure that ESB Networks and operators of other sectors can engage in an informed and effective manner, we will synthesise Ireland's future heat, transport, gas and water needs, forecasts and development plans to build visibility of the potential cross-sector synergies from sector coupling. This will include: • Desktop analysis of the available projections of future gas, heating, transport and water demands and development plans, overlaying these on ESB Networks' scenario analysis for future electricity system demands; • Preliminary collaboration with public and private transport operator(s) regarding short-, medium- and long-term sector coupling (electricity and transport) • Preliminary collaboration Uisce Eireann regarding short-, medium- and long-term sector coupling (electricity and water) • Preliminary collaboration with the SEAI regarding short-, medium- and long-term sector coupling (electricity and heat) • Preliminary collaboration with Gas Networks Ireland regarding short-, medium- and long-term sector coupling (electricity and gas) building on our initial collaboration regarding the potential for sector coupling as part of the XLEU caron abatement product identified above • Engagement with other public sector bodies and the relevant government departments to secure steering and guidance on opportunities to align sector coupling initiatives with public policy measures (for example where the enterprise agencies are supporting the uptake of a given heating or transport solutions amongst their clients, the opportunity to couple this with a cross sector flexible demand offering)

Date	Milestone (New Products & Services)	Description
2024	**Commercial & Industrial heat Product Launch**	The role, and importance, of sector coupling to deliver climate action is increasingly clear, particularly regarding heating demands. Through this consultation process and the CRU's EDS call for input, it has become clear that the short to medium term potential for flexible demand from commercial and industrial heat must be targeted. As such, this milestone relates to the design of a flexible demand product for commercial customers who have or are considering investment in industrial heat electric heat solutions on site. It will include: • Definition of a flexible demand product, the objective of which would be to incentivise flexible demand from heat installations, delivering carbon abatement and more cost effective and/or quicker connections for industrial heating demand. • Ancillary design measures and proofs of concept, for example the provision of flexible connections or MIC increases where a site is investing in a heating solution which offers voluntary flexibility. • Collaboration with agencies including the SEAI, IDA Ireland and Enterprise Ireland and the relevant government departments to maximise alignment with public supports, as well as business' engagement with the design process and uptake of the product.
2024	**New Domestic & Commercial Product Launch(es)**	ESB Networks' rollout of flexible demand products and work to create the conditions where new flexible demand products are rolled out and grown in the competitive market, as delivered through the NN,LC programme, has adopted an adaptive discovery led approach. This means that each year, the products and services we roll out are informed by • What we have learned through consultation, engagement, technological or market developments, market testing and product rollouts • CRU, government, customer and stakeholder priorities and developments, as these change in response to a rapidly changing environment As such, this milestone relates to our launch of additional products (in addition to or replacing any of the product launches identified on a standalone basis in this table) in an adaptive manner, to maximise the impact and benefits of our work rolling out flexible demand on a continuous basis.

Date	Milestone (New Products & Services)	Description
		Examples of the kinds of product which may be launched in 2024 are provided below, pending identified / accelerated customer needs, gaps not addressed by other products, and the relative impact of these products compared to other calls on resources: • New or adapted Beat the Peak Commercial products could be launched, where there is evidence that product adaptations will drive greater adoption of benefits; • New or adapted Is this a good time domestic products could be launched, to increase the level of personalisation provided, to increase the emphasis of these products on energy and carbon abatement (from an initial focus on “peak” or infrequent / irregular behaviours) or to apply other behavioural or market learnings gathered; • To deliver network maintenance and upgrades, it is often necessary to take outages of the network, affecting customers in the area. It may prove valuable to introduce a new flexible demand product for customers in the area to offer flexible demand as an alternative or complement to these outages, so we can safely and efficiently deliver their local network upgrades. • We believe that energy communities could help us drive greater awareness and adoption across Ireland. As such, one area of service development would be to work with communities to deliver an effective community dashboard to support communities in participating in flexible demand. • We believe that working through schools is an effective manner of reaching many thousands of households nationwide, and in particular of reaching those harder to reach and disadvantaged customers. As such, a service to provide educational supports to schools may be launched. • As identified under “Lessons Learned”, we believe there is a need to drive greater awareness and education of flexible demand and the opportunities it could create amongst our customers. As such, we could deliver a customer centric awareness and engagement campaign and associated services to ensure that no one is left behind on this energy transition and lay the foundations for future market led customer recruitment activities.

Date	Milestone (New Products & Services)	Description
2025	**Complete the phased competitions for the full CAP 2025 target volume of large-scale multi-year multi-hour-duration flexibility**	Storage or other forms of more investment intensive flexible demand offer a high value form of location-specific flexible demand, so ESB Networks is working with the CRU to provide a viable route to market route to market. This milestone is for the conclusion of a period of phased competitions (commencing 2024) offering total aggregate contract volumes in line with the 2025 CAP target targets for flexible demand and associated carbon abatement. Note: This activity is being delivered in a highly collaborative and agile process in partnership with the CRU. Given the nature of this product, there is a high degree of dependency on CRU decisions and governance processes. As such, prior to finalising or assessing performance vs. this milestone, it will be necessary to engage with the relevant CRU personnel to ensure that the proposed timeline is consistent with their expectations and proposed resource allocation etc.
2025	**Route to market for community-based flexibility participation**	We believe that energy communities could help us drive greater awareness and adoption across Ireland. However, through piloting activities in 2021 – 2023 it has become apparent that various conditions for participating in flexible demand products create barriers to entry for energy communities. The milestone is for ESB Networks to work to establish a route to market for energy communities that are currently unable to pass the qualification process to participate in local flexibility market arrangements. ESB Networks will implement tools (e.g. DSO toolkit (community toolkit) as published in June 2023) to assist customers to participate in flexibility markets.
2025	**New Domestic & Commercial Product Launch(es) (2025)**	ESB Networks' rollout of flexible demand products and work to create the conditions where new flexible demand products are rolled out and grown in the competitive market, as delivered through the NN,LC programme, has adopted an adaptive discovery led approach. This means that each year, the products and services we roll out are informed by • What we have learned through consultation, engagement, technological or market developments, market testing and product rollouts • CRU, government, customer and stakeholder priorities and developments, as these change in response to a rapidly changing environment As such, this milestone relates to our launch of additional products (in addition to or replacing any of the product launches identified on a standalone basis in this table) in an

Date	Milestone (New Products & Services)	Description
		adaptive manner, to maximise the impact and benefits of our work rolling out flexible demand on a continuous basis. Examples of the kinds of product which may be launched in 2024 are provided below, pending identified / accelerated customer needs, gaps not addressed by other products, and the relative impact of these products compared to other calls on resources: • New or adapted Beat the Peak Commercial products could be launched, where there is evidence that product adaptations will drive greater adoption of benefits; • New or adapted Is this a good time domestic products could be launched, to shift the focus materially towards the recruitment of higher propensity customers, for example those with rooftop solar installations; • Based on the cross sectoral developments in 2024 or ongoing commercial customer demand research, additional simple tariff based products to incentivise high potential commercial or industrial demands could be introduced
2026	**New Domestic & Commercial Product Launch(es), (2026)**	ESB Networks' rollout of flexible demand products and work to create the conditions where new flexible demand products are rolled out and grown in the competitive market, as delivered through the NN, LC programme, has adopted an adaptive discovery led approach. This means that each year, the products and services we roll out are informed by • What we have learned through consultation, engagement, technological or market developments, market testing and product rollouts • CRU, government, customer and stakeholder priorities and developments, as these change in response to a rapidly changing environment As such, this milestone relates to our launch of additional products (in addition to or replacing any of the product launches identified on a standalone basis in this table) in an adaptive manner, to maximise the impact and benefits of our work rolling out flexible demand on a continuous basis. Examples of the kinds of product which may be launched in 2024 are provided below, pending identified / accelerated customer needs, gaps not addressed by other products, and the relative impact of these products compared to other calls on resources:

Date	Milestone (New Products & Services)	Description
		• Based on the cross sectoral developments in 2024 and 2025, or ongoing commercial customer demand research, additional simple tariff based products to incentivise high potential commercial or industrial demands could be introduced • Building on the issuing of the first demand flexible contracts (in 2024), product enhancements to enable the business as usual adoption of flexible demand connections and flexible storage connections (from 2026 onwards) could be progressed
TBC*	**Energising initial storage operators in flexibility market** **** Pending regulatory process and market readiness***	Storage or other forms of more investment intensive flexible demand offer a high value form of location-specific flexible demand, so ESB Networks is working with the CRU to provide a viable route to market route to market. This milestone relates to the energisation of initial storage sites (from 2026 onwards) that have secured contracts in the first calls for competition in 2023/2024.

Table 5: NN, LCP Transparency & Reporting Milestones 2024-2026

Date	Milestone (Transparency and Reporting)	Description
2024	**Development & Industry Adoption of Markets Blueprint**	ESB Networks recognises the need to reflect the breadth of power system, retail market, flexibility market, technology and consumer/behavioural developments needed over the coming decade, in an efficient and integrated/strategic manner that supports progress but emphasises the role of discovery and adaptation over the course of its delivery. Aligned to the Price Review 6 submission – and based on extensive involvement of industry and key stakeholders, this milestone relates to the publication of a future markets blueprint, setting out the phased introduction of new products and services in market sandbox, flexibility market and retail markets over the coming decade.

Date	Milestone (Transparency and Reporting)	Description
2024	**Development & Industry Adoption of DSO-Market Participants Transition Model**	ESB Networks recognises the need to work hand in glove with suppliers, aggregators, energy services companies and any company seeking to innovate and offer new smart energy or flexible demand services. The ambition is to support and stimulate the market by helping to address some of the market barriers and failures that exist today. This could include offering education, awareness and products and services to support the understanding and uptake of flexible demand and then work with transitioning this activity, where relevant to other stakeholders. It could also include measures, for example price structures and other incentives to help reduce the risk associated with product innovation and development under conditions where the returns available for flexible demand in the market are uncertain today. It is proposed that a transition model will be developed in collaboration with current or prospective market participants by: • Identifying barriers to entry or other market failures that currently exist (for example, weak or uncertain price signals from the wholesale market, high customer acquisition costs, product development costs, etc) • Identifying actions that could be taken by the DSO and CRU to help mitigate these failures in the short to medium term. These could include inter alia incentives and price structures, education and awareness activities, shared research, etc • In the interim, ESB Networks would collaborate with market participants on occasion when it is necessary to introduce products which customers can participate in either directly or via a market participant, to ensure that customers' access is maximised. • Setting thresholds (for example in terms of customer volumes or percentage market penetrations) for the market-led flexible demand which, once met, could trigger the phasing out of directly provided DSO services (to the extent that this aligns with regulatory and energy policy at the relevant point in time).

Date	Milestone (Transparency and Reporting)	Description
2024	**Launch DSO Platform**	The milestone relates to the launch of a DSO Platform, which will act as an accessible gateway to information, services and supports offered by the DSO and energy companies providing flexible demand services to customers Irish businesses, and other businesses with Irish operations. The purpose of the platform is to enable all electricity customers to become active energy citizens through the provision of accessible and intuitive tools and resources. Initial information and publications will include: • Provision of data and information on the operation of the electricity system e.g. on local demand and renewable generation flows. • Publication of draft flexibility contracts, along with sample flexibility specifications and market rules.
2024	**Review and update of standard products for flexibility (based on 2021 – 2022 experience and stakeholder consultation)**	As set out in Section 4 of this document, through iterative product design and competitions since 2021, we are continuously learning about how customers and market participants respond to different product designs. While we continuously adapt our products based on this learning, in 2024 for market transparency and dissemination purposes, we will prepare a comprehensive report which provides a review of the products launched to date, and how they have been updated or built upon in each successive product launch.
2025	**Review and update of standard market and regulatory reporting**	Transparency and reporting milestones are designed to provide customers, market participants or prospective market participants with: • assurance that markets are developed and operated in a fair and non-discriminatory manner • line of sight of future opportunities to participate in markets • line of sight of future opportunities to influence market design and development Having commenced the introduction of standard industry reporting in 2023, we will review and update of standard market and regulatory reporting on the procurement and dispatch of DSO flexibility, and of TSO flexibility bids validated (based on 2023 – 2024 experience and stakeholder consultation).

Date	Milestone (Transparency and Reporting)	Description
2025	**Monitor & Grow Vulnerable Customer Participation**	ESB Networks identifies that there are vulnerable customers (economic, medical, digital) whose participation in flexible demand products may involve additional challenges, so we are exploring what measures can be put in place to support the most vulnerable in our society. This milestone will track and identify whether vulnerable customer segments are being supported, as required, to engage in flexible demand services in a meaningful way (with iterations and partnerships introduced to address gaps as needed)
2025	**Publish First Biennial Flexibility Needs Statements**	ESB Networks recognises the need to provide the market with line of sight of where we will be looking to secure flexibility services. The milestone relates to the publication of multi-year flexibility needs statements (market information), indicating the type, volume, duration and frequency of flexibility needed.
2025	**Review and update of standard market and regulatory reporting on the procurement and dispatch of DSO flexibility, and of TSO flexibility bids validated (based on 2023 – 2024 experience and stakeholder consultation)**	In 2023 we are launching an initial suite of standard market and regulatory reporting, an important development to ensure industry confidence. In 2025 a substantive review and update of the reporting in place will be completed, identifying what reporting and information is most used (and by extension demonstrably valuable) and where there is potential to adapt the reporting framework to deliver greater value. This could include for example the publication of reports on the average prices and volumes of flexible demand secured per location.
2026	**Embed a measurement framework to capture insight, health and success of embedding flexible demand products and services into Irish society**	ESB Networks recognised the requirement to build awareness, education and understanding for flexible demand so as customers will be in a position to adopt flexible demand products and services (regardless of who is offering these services). This milestone relates to tracking and understanding the changing attitudes and behaviours across customer awareness and adoption of flexible demand products and services, monitoring and tracking the effectiveness of initiatives and propositions and how are customers progressing through the journey towards proactive management and the overall contribution of customer engagement initiatives to 2033 flexibility targets.

5.5 2027-2028 HIGH-LEVEL MILESTONES

Table 6: NN, LCP Milestones 2027-2028 (pending PR6 determination)

Date	Milestone	Description	PR5 Objective[2]
2027-2028	DSO Flexibility Auction Platform for day-ahead, intraday and peer-to-peer trading	By 2027/2028, ESB Networks anticipates a level of flexible demand in line with the Climate Action Plan. With that level of flexible demand available, ESB Networks will introduce an auction platform where market participants can trade flexibility using a variety of mechanisms. This will range from long term contracts to short term contracts, day ahead and intraday trading, as well as peer to peer trading.	**Non-Wires Alternatives**
	Intensive activities to increase the uptake of automated flexible demand services	Develop new industry partnerships to accelerate and automate new communications and control models including the development of standard technological requirements.	
2027-2028	Targeted customer awareness & education services	By this point in time, with targets for general consumer awareness and understanding of flexible demand and the products available met, our focus will shift to identifying customer segments at a more granular level and providing educational and awareness supports to those who a greater need for and/or lower levels of awareness and by extension, access to flexible demand products.	**New Products & Services**
	Proposals for enduring flexibility market arrangements to the CRU	By 2027/2028, through continuous development and testing in the market sandbox and flexibility market, we expect that sufficiently mature proposals for formal regulatory adoption can be provided, offering a baseline for more formal industry governance thereafter of development and adaptation of flexibility market products and services.	
2027-2028	**Refresh roadmap of energy lifestyle applications**	Through market participant / ESB Networks partnerships, a range of energy lifestyle applications will have been developed and rolled out to all electricity customers. In this milestone we propose that the roadmap for further developments of this manner be refreshed, based on market and customer experience to this point.	**Transparency and Reporting**

[2] PR5 Regulatory Framework Initiatives and Reporting - CRU/20/154 - PR5 Regulatory Framework, Incentives and Reporting published on 18/12/2020

5.6 SUPERSEDED MILESTONES

Table 7: NN, LCP Previously Committed Milestones 2024-2025

Date	Milestone	Status	Rationale for Supersession if applicable
2024	Future Arrangements Initial Go-Live	On hold	Pending an agreed TSO/SEMC timeline for Future Arrangement, a timeline for engagement to develop solutions ensuring the participation of distribution-connected customers can be put in place.
2024	Agile Customer/Community Pilot Go-Live	Merged	This milestone has been merged into the “Launch DSO Platform” milestone
2024	Nationwide Rollout – Flexibility Procurement	Ongoing	This milestone is being achieved through the delivery of the full suite of product launches and supporting measures set out in the table above. Reflective of the significant progress that has been achieved to date through piloting, the development of a 15-20% roadmap, this is no longer a high level standalone milestone but rather the result of delivering the more granular milestones for product launches established in this multiyear plan, along with the delivery of a suite of supporting services through the DSO platform.
2024	New products rollout	Ongoing	
2025	Nationwide rollout of flexibility services	Ongoing	
2025	Introduction of nationwide standard services / support for communities	Ongoing	
2025	Introduction of nationwide standard services for active energy customers	Ongoing	
2025	Rollout of modalities enabling distribution customers participate in transmission and SEM markets	Ongoing	This task is being addressed in the short term through the rollout of a solution for dynamic instruction sets, achieved in 2023, and in the longer term through the Whole-of-System workstream of the DSO/TSO Multiyear Plan, with the implementation of the TSO/DSO future operating model, including interim implementations as required to facilitate individual TSO, DSO or wholesale market solutions which precede the full implementation of future TSO or DSO technologies.

6 PROPOSED SCORECARD

6 PROPOSED SCORECARD

The CRU has introduced an annual balanced scorecard based on ESB Networks' development and execution of this plan to enable customers actively participate in a flexible distribution system. This approach is based on the high-level milestones that were agreed by ESB Networks to reflect the following parameters:

- Introduction of non-wires alternative;
- Establishment of standard products and services to the benefit of all system users; and
- Establishment of robust reporting and transparency arrangements,.

The incentive is also in line with the requirements of Article 32 of the Electricity Market Directive 2019, 2019/944 (Incentives for the use of flexibility in distribution networks).

In September each year, aligning with its consultation with stakeholders, a detailed flexibility multi-year plan covering the three following years (and the two years after at high level) must be submitted to the CRU by ESB Networks. Based on the submission, the CRU will decide, by year-end, on the milestones, deliverable targets and weightings for the following year.

In assessing the outcome of performance, the CRU will consider the following criteria:

- Quality of the plan and defined actions (20% of scoring);
- Quality of implementation of the plan (40% of scoring); and
- Effectiveness of the plan and demonstrable impact (remaining 40% of scoring).

6.1 PROPOSED MILESTONES TO BE INCENTIVISED

The following table sets out how the proposed 2024 flexibility milestones align to the most up-to-date balanced scorecard. Key Flexibility Milestones for 2024 are aligned against the CRU's Flexibility Balanced Scorecard Objectives.

Upside and downside weightings associated with each aspect of the scorecard have been proposed based on the estimated aggregate customer impact of the milestones set out under each element of the scorecard.

Table 8: Scorecard

Element (Objective)	2024 Milestone Alignment	Upside (€m)	Downside (€m)
Flexible non-wires alternatives	Behind-the-Meter Infrastructure: Flexibility-Ready Standards Development	1	0.33
	All eligible pipeline HV or MV reinforcement schemes to be tested for a flexible solution, with rolling tenders established		
	Tasks substituted or added in an adaptive manner pending customer, stakeholder and regulatory priorities identified during 2024		
Establish standard products and services to the benefit of all system users	Introduce New Kinds of Flexible Connection	1	0.33
	Locational Medium-Duration flexibility Product Launch		
	XLEU Carbon Abatement Product Launch		
	Commence Sector Coupling Product Development		
	Commercial & Industrial heat Product Launch		
	New Domestic & Commercial Product Launch(es)		
	Tasks substituted or added in an adaptive manner pending customer, stakeholder and regulatory priorities identified during 2024		
Establish robust reporting and transparency arrangements	Development & Industry Adoption of Markets Blueprint	1	0.33
	Development & Industry Adoption of DSO-Market Participants Transition Model		
	Launch DSO Platform		
	Review and update of standard products for flexibility (based on 2021 – 2022 experience and stakeholder consultation)		
	Tasks substituted or added in an adaptive manner pending customer, stakeholder and regulatory priorities identified during 2024		
Total		**3**	**1**

6.2 ASSESSMENT

ESB Networks' proposed assessment against the criteria is discussed below: This has been developed to reflect the PR5 Regulatory Framework and Reporting (CRU/20/154).

6.2.1 Quality of the Plan and Defined Actions

ESB Networks proposes that the quality of the plan and defined actions are measured by:

- Independent quality assurance, delivered by an independent third party;
- Demonstrable adherence to the defined programme delivery method/approach;
- Demonstrable and robust risk, assumption, issue and dependency management.

6.2.2 Quality of Implementation of the Plan

ESB Networks proposes that measurement of the quality of the implementation plan should be based on delivering the milestones set out in the scorecard (or alternative / equivalent activities where higher customer or regulatory priorities emerge within the year of delivery).

6.2.3 Effectiveness of the Plan and Demonstrable Impact

The effectiveness of the Flexibility Multiyear Plan, and demonstrable impact, will be assessed based on the customer and stakeholder impact of what is delivered, measured through a range of quantitative and qualitative approaches giving a holistic view of both the short and long term impacts achieved.

6.2.4 Considerations for 2024 multi-year plans

As network companies are in their third year of delivery under the PR5 regulatory framework, the CRU highlights the following points which network companies must incorporate when preparing their 2024 multi-year plan submissions:

- The proposals and deliverables to be included in the scorecards should be more outputs-focused as opposed to inputs-focused. The CRU acknowledges that some elements of the balanced scorecards contain some outputs-focused metrics already, but would like to see network companies develop this further and propose deliverables that go beyond BAU with a clear focus on outputs for customers and market participants. Proposals should also be clearly mapped to the objectives of each of the balanced scorecard incentives as originally set out in CRU20154;
- The proposals should be ambitious and stretching, building further on those previously included in the 2021, 2022 and 2023 balanced scorecards. The CRU expects to see progression from short-term planning and process activities to how companies are actually delivering the roll-out or deployment of technologies and solutions on the ground to address the PR5 objectives and wider Climate Action Plan 2030 targets;
- The multi-year plans should be standalone submissions that contain all the details needed for the CRU to set the balanced scorecards – each element of the scorecard should be detailed in terms of the actions (and expected impacts) the network company proposes to deliver as opposed to referring to external published plans;
- The quality of the multi-year plans submitted to the CRU forms part of the overall balanced scorecard assessment. As such, the CRU expects multi-year plans to be detailed and of high-quality to minimise the need for further queries on the submission when setting the balanced scorecards. Submissions that are incomplete, lack clarity or do not define clear actions to meet specific deliverables/ milestones impact on stakeholders' ability to effectively engage in the consultation process and the CRU's ability to set the balanced scorecards;

- Proposed balanced scorecard actions should not overlap with other incentives as the CRU will only reward relevant actions once. Where actions in a given balanced scorecard cover the same or similar topics to actions contained in another balanced scorecard, the network company should make it clear how actions differ both in terms of delivery and outcomes in order to be included in their respective balanced scorecards. Failure to do so will result in the CRU removing any duplications from scorecards;
- The post-consultation multi-year plan submissions should contain information on how the network company considered stakeholder views and how the multi-year plans were amended following stakeholder feedback.

7 STAKEHOLDER CONSULTATION AND FEEDBACK

7 STAKEHOLDER CONSULTATION & FEEDBACK

As part of the Call for Input on DSO PR5 incentives Multi-Year Plans 2025-2028 published in August 2023, ESB Networks invited stakeholders to comment on the inputs being developed in relation to the strategies for introducing flexibility and addressing different market and consumer perspectives. In particular:

- Scenarios for 15%-20% flexible demand;
- Market Design strategy;
- Domestic and Commercial Customer strategy;
- Behind the Meter Infrastructure strategy;
- Power System Requirements strategy;

To facilitate the collection of feedback and to provide an opportunity for discussion with stakeholders, five roundtable sessions with stakeholders were held during the week of 28th August 2023 on the above topics. The insights gained from stakeholders at the roundtables and via email submissions are highly valued. Feedback has been reflected upon, and where appropriate incorporated throughout the Multi Year Plan and associated milestones. Inputs ranged from perspectives on activities we need to introduce or accelerate, and reports, policies or research stakeholders believe should inform our plans.

In this section we outline stakeholder inputs or feedback received and an indication of how we have accounted for any inputs received up to 15th September 2023 in this version of the Flexibility Multi Year Plan. Feedback received between 15th September and the extended closure of the Call for Input on 29th September will be accounted for in a subsequent version of the Flexibility Multi-year Plan on the week of 20th October 2023. The feedback is laid out in 5 sub-sections, each corresponding to one of the topics listed above and associated roundtable that was held.

7.1 15%-20% FLEXIBILITY SCENARIOS FEEDBACK

Table 9: Flexibility Scenario Feedback

Theme	Feedback Received (Scenarios)	How this input is being accounted for
Approach	A representative body operating in the storage industry, enquired how carbon emission could be increased based on modelling conducted by the NN, LCP.	Firstly, we can confirm that a summary of the modelling undertaken and results obtained will be published alongside the CRU's publication of proposed next steps in progressing the initiatives under the Energy Demand Strategy for which ESB Networks is responsible. However, in the meantime, we can confirm that subsequent to the receipt of this submission, ESB Networks met with the relevant body and provided a high-level explanation of the factors at play. In short, specialist modellers found that if 2-4 hour storage had the facility to participate in the energy market today, it would likely seek to discharge when price is high, most notably when there is import on the interconnector. To be available to discharge at these times, storage would seek to charge in the preceding hours. In the earlier years of the time horizon studied (2023 – 2025), when oversupply of renewable energy is low or not yet occurring, often this charging behaviour results in storage consumer gas fired generation (driving additional emissions). And as emissions associated with interconnectors are attributed to the location where generation occurs, offsetting the use of the interconnector does not offset any emissions in the Irish electricity sector.
Approach	A private organisation advised that ESB Networks engage with LEUs at its earliest convivence, as impacted organisations have a propensity to be risk averse.	Firstly, ESB Networks confirmed that engagement with XLEUs has commenced, cognisant of this consideration. Secondly, in response to this feedback, the plan for rollout of XLEU products is being updated to account for different XLEU / industries' typical investment culture and risk tolerance. This objective of this exercise is to identify how the sequencing of work with different XLEUs to leverage less risk average XLEUs' initial adoption of products to establish the necessary track record to support the subsequent adoption of XLEUs in other sectors.

Theme	Feedback Received (Scenarios)	How this input is being accounted for
Approach	A representative body enquired whether thermal storage was taken into consideration of the 'flexible demand' definition.	ESB Networks confirms that thermal storage (when it relates to electricity) is within the definition of flexible demand. Furthermore, the updated multiyear plan (and anticipated "next steps" to initiatives within the Energy Demand Strategy) has introduced a significantly greater focus on the role of industrial and commercial heat (and its capacity for demand shifting or thermal storage). This includes the sector coupling and commercial / industrial heat product launch identified in section 5.1 of this document.
Approach	An Irish semi state organisation suggested that ESB Networks consider the potential role for cross-sector energy system integration in achieving greater demand flexibility, with the gas network continuing to provide customers with onsite generation with a reliable source of fuel.	In response to this and other stakeholders' similar feedback, the focus on cross sectoral opportunities for demand flexibility has been materially increased in this multiyear plan. This includes the sector coupling and commercial / industrial heat product launch identified in section 5.1 of this document. Furthermore, engagement with Gas Networks Ireland and other operators from other sectors has commenced since this feedback was received.
Approach	A respondent in the electric vehicle industry affirmed their support for ESB Networks' ambition for a minimum of 960MW of flexible demand (15% of total) by the end of 2025.	We welcome this comment and will continue to engage with our stakeholders as a means of providing an update regarding the progress of this target.
Scenarios	A respondent in the electric vehicle industry recommended giving priority to the "consumer-led" scenario while also considering prudent policies from other options. Additionally, they caution against concentrating transformative power solely in the hands of industry players, as it may hinder public engagement and long-term flexibility goals.	In acknowledgement of this comment, while ESB Networks' role is to create the conditions in which the competitive industry introduce the products and services which drive consumer participation at scale, we appreciate that in the short term it may be necessary for ESB Networks and other agencies to drive these conditions by delivering agency led or DSO led initiatives. Where we do this, it will be informed and influenced by broad and inclusive industry engagement to ensure that our activities are addressing current market failures, and that there is a plan in place to address these market failures and transition to more industry-led solutions over time, through activities included in the Blueprint.

Theme	Feedback Received (Scenarios)	How this input is being accounted for
Scenarios	A respondent stressed the importance of transparent markets, dynamic tariffs, and support for flexible assets like electric vehicle charging, for a successful consumer-focused transition to a low-carbon, flexible system.	Firstly we want to agree with this feedback and provide assurance that we are committed to fostering transparent, fair, and competitive markets through robust frameworks and analysis methods, as well as the highest degree possible of dissemination and engagement to ensure that there is the greatest possible awareness of the opportunities arising. Secondly, the key action taken to reflect this comment is the inclusion of a milestone in 2024 for the collaborative development of a Blueprint for Markets for Flexible Demand. The purpose of this blueprint is to develop a shared plan across our industry for the changes in Customer supports, Flexibility Markets, Retail Markets, Behind the Meter Infrastructure, Smart Metering and Power System Management to deliver high levels of consumer participation in flexible demand and smart energy services over the coming decade. The development of this blueprint will provide: • Transparency of what products (including market based, tariff based etc) will become available in what timeframe and what markets (market sandbox, flexibility market, retail market) • Transparency of the technical solutions and maturity of integration of flexible assets at each phase of development over the coming years
Scenarios	Flexible system demand scenarios, even if they slightly miss targets, could lead to positive results. Increased consumer engagement, backed by incentives for low-carbon tech and flexible demand, may enhance energy efficiency, improve energy security, reduce consumption, and promote electric alternatives, benefiting air quality and reducing emissions.	We welcome the respondent's feedback and concur in their assessment regarding the multiple benefits the flexible system demand scenarios will have on the Irish electricity market.

Theme	Feedback Received (Scenarios)	How this input is being accounted for
	An Irish semi state organisation believes that achieving demand flexibility in the next 2-3 years can be facilitated by on-site electricity generation using gas. This approach enables energy systems integration, enhancing overall system flexibility without impacting general tariff payers. Requiring on-site generators to have export capacity can prevent grid strain and reduce blackout risks.	We appreciate the input from the respondent regarding achievable demand flexibility in the next 2-3 years. Their suggestion of employing on-site electricity generation using gas is consistent with our current industrial proposal. As part of this initiative, we are actively working on developing and launching a range of initially customised carbon reduction products. These products will serve as incentives for large energy users to make operational and investment decisions aimed at reducing emissions specific to their locations, thus contributing to local DSO balancing efforts. Furthermore, our approach also encourages investments in gas receipts and green certificates, promoting cleaner and more sustainable energy sources in line with our commitment to environmental sustainability

7.2 MARKET DESIGN FEEDBACK

Table 10: Market Design Feedback

Theme	Feedback Received (Market Design)	How this input is being accounted for
Creating the conditions for a competitive market	Further information sought in relation to the development of an architecture for a Flexibility Market which will include P2P (Peer to Peer) trading.	Peer to peer trading (referred to inter alia as “energy sharing”) is an example of the products for which a pathway will be created in the development of the Blueprint. In this context, we can confirm the following at this point in time: • There are a range of diverse definitions of and mechanisms for introducing peer to peer or energy sharing services. At the time of writing, the evidence available to us suggests that within the Irish energy industry, there are a range of diverse views on this matter. Furthermore, there is no evidence to suggest that there is any single “correct” or “defined” definition. • From ESB Networks’ perspective, there is an important role for peer to peer in encouraging localised balancing for example within renewable energy communities or citizen energy communities. We consider this highly consistent with the purpose and mechanisms of flexible demand. • Notwithstanding this, there is limited evidence as to what aspects of peer to peer (including “for what purpose” and “by what mechanism”) may or may not appeal to customers. As such, it is our firm believe that a period of developing and considering (and potentially testing) different peer to peer concepts in a markets sandbox, in close collaboration with the CRU and electricity market participants is needed,

Theme	Feedback Received (Market Design)	How this input is being accounted for
		before locking in on and implementing an enduring solution whose delivery may prove costly and disruptive of existing processes or market developments. • The timeline for introducing peer to peer solutions will be substantially influenced by EU legal requirements in this regard. As such, in initial Blueprint proposals, it is likely that ESB Networks will share options regarding how peer to peer solutions could be 1. developed and tested in an initial interim rollout, in a markets sandbox, to a timeline that meets legal requirements. 2. Subject to regulatory decisions and customer / market sentiment as to "what works", successful elements of this could be transitioned initially into flexible demand products (which are regulated but as yet immature, thus there is lower potential for disruption and lower entry barriers) and / or into retail market design (which is highly regulated and mature, and as such will require a careful design and implementation process) In this manner, • Sandbox market implementations could accelerate our industry's knowledge of what peer to peer mechanisms appeal to customers and achieve climate action and/or efficiency benefits • Flexibility market implementations could accelerate our ability for customers to realise the benefits at scale, in advance of longer term retail market implementations Retail market implementations, when ultimately put in place, are proven to have a customer benefit and can be delivered in a cost effective manner without undue disruption
Creating the conditions for a competitive market	Clarification sought in relation to the future integration of retail market design (RMD) and flexibility markets. Further information in relation to the timelines of SMART 2.0 was requested. A respondent suggested that smart tariffs could be the standard, there could be a 24hr smart metering plan and suppliers could present customer usage data. The supplier in	ESB Networks has commenced the development of a blueprint that accounts for the breadth of power system, retail market, flexibility market, smart metering, behind the meter infrastructure and consumer/behavioural developments needed over the coming decade, in an efficient and integrated/strategic manner that supports progress but emphasises the role of discovery and adaptation over the course of its delivery. The Initial inputs to this blueprint have been published as part of calls for input, and this will be the subject of further engagement later in 2023 (and in early 2024). At the time of the call for input, whilst flexibility market preliminary analysis was available for sharing, retail market and Smart 2.0 future planning was at a less mature stage and thus

Theme	Feedback Received (Market Design)	How this input is being accounted for
	question is keen to participate at a future bi-lateral session with ESB Networks.	unavailable for sharing. Work is progressing in this regard, and it is anticipated that in early 2024 through the blueprint process, greater insight can be shared as part of a process in industry involvement in the blueprint. However at this point in time, we can confirm that the Blueprint is the proposed mechanism for developing a coherent long term plan for the development of the retail market and smart metering capabilities needed to support product innovation and flexible demand over the coming years In the "Blueprint" section of this document we provide more information, and in the milestone for the development of this blueprint in 2024 we provide further visibility of the likely timeline and process to work closely with retail market participants, as well as prospective market participants with an interest in innovative flexible demand offerings, to develop an agreed blueprint.
	We favour a learn-by-doing approach. Instead of trying to design the perfect market arrangement from the beginning, start small and learn what works and what doesn't. With input from the various stakeholders, we can build an appropriate market.	
Creating the conditions for a competitive market	A respondent voiced their support for ESB Networks commitment to inclusivity of access for domestic customers. This market works best if the consumer offerings are attractive on multiple levels, if customer savings or benefits are sufficient to support an appropriate payback time for flexible assets (such as electric vehicle chargers), and if the service is easy for consumers to use and understand.	When developing flexibility products, ESB Networks objective is to ensure that the flexibility products are attractive to the end customer, and also the flexible service provider/energy management specialist company. As such, our multiyear plan includes the following: • Development & Industry Adoption of DSO-Market Participant transition Model – the objective of this task is to identify why electricity power suppliers today are not providing the incentives and services noted, and develop a pathway for ESBN to help address these gaps today with the direct provision of services, while creating the conditions which make it viable for suppliers to do so in future • The development and launch of a range of new products and services which are designed to provide a stronger commercial signal for market participants to develop customer facing flexible demand offerings. We note that a central part of our flexibility product development process since early 2022 is to work closely with current or prospective market participants to identify how best our design can facilitate their design of corresponding customer facing services.
	If consumer power utilities are not driving more profitable power demand usage changes among its customers, then it's because the profit from cutting demand, depending on power input costs, is not a driving issue to nudge behaviour change more than just greenwashing. Higher power demand, even with higher input power costs, must be offering more profit than the return of changing that pattern of power use. Fuel input costs, driven by gas prices mostly, is where utilities will invest in at a utility scale to seek profit until such time as carbon emissions from non-renewable power generation is charged for, at a rate that pushes more to seek ways of cutting that	

Theme	Feedback Received (Market Design)	How this input is being accounted for
	high carbon power use by cutting demand change among its customer base - at scale and at the highest adoption rate as fast as possible.	
	An energy market operator appreciates the presented roadmap and finds it generally comprehensive. However, we propose a more ambitious approach, emphasising that markets can act as catalysts by attracting flexibility service providers and bolstering demand side flexibility investment through clear and transparent price signals.	
Creating the conditions for a competitive market	Connecting power usage to the biggest potential power demand pattern of consumers outside the home will be transport i.e. electric vehicle recharging and offering V2G options to sell power back. EirGrid and retail power suppliers must offer a wider variety of wholesale tariffs that incentivise power flexibility consumer behaviour.	We agree that flexible charging has the potential to become a very substantial source of both demand and flexible demand, As such, in the “Next Steps” to the scenarios consulted upon as part of the CRU’s EDS consultation, and in tis multiyear plan, we have confirmed a number of steps to progress standard flexibility readiness requirements for future electric vehicle connections. Without these technical provisions in place, the potential for flexible demand from vehicle charging could be significantly delayed or compromised. Secondly, we agree that vehicle owners will need the right combination of awareness, information and incentives to choose to charge flexibly. As such, our multiyear plan includes the following: • Development & Industry Adoption of DSO-Market Participant transition Model – the objective of this task is to identify why electricity power suppliers today are not providing the incentives and services noted, and develop a pathway for ESBN to help address these gaps today with the direct provision of services, while creating the conditions which make it viable for suppliers to do so in future • New Domestic & Commercial Product Launches – each year there is a facility for new products to be launched, addressing gaps in the market arising. So for example, if in 2024 the products already committed (targeting XLEUs, medium duration location specific flexibility, and commercial/industrial heat) along with the products already existing do not offer a route to market which matches the level of maturity of electric vehicle smart charging in 2024, ESB Networks’ has a facility to design and introduce a targeted product accordingly

Theme	Feedback Received (Market Design)	How this input is being accounted for
Market Design	A respondent enquired about ESB Networks' position on demand control modifications and notification. Based on their current understanding, the existing models send instructions to known users to reduce power. An alternative opt-in model involves creating an API to provide real-time system status to third-party developers. This API would enable client systems to make informed decisions based on location, MPRN, estimated load, and potential price incentives. Customers can strategically plan power usage with predictive information. Examples include car chargers adjusting consumption, hot water cylinders heating opportunistically, rooftop solar systems optimizing battery use, and smart plugs indicating optimal device usage. Future V2G implementations would benefit from this API.	This suggestion is in line with design proposals currently under consideration as part of the Blueprint process and also the 'Call to input on Market Design Strategy'. We would welcome further engagement on this model and its incorporation into the Blueprint for market development and the associated systems layer, through the process set out in Section 3.1
Market Design	The necessary market will be complex, and we encourage you to look to Great Britain which has been developing a vast flexibility market. It has not all been successes and there are many lessons to take from the evolution of DSO flexibility markets, the Demand Flexibility Service and other reserve products.	We acknowledge, and welcome, the respondent's offer to provide further information and lessons learned – from its member participants – with respect to demand response trials/schemes internationally. Since its establishment, the National Network, Local Connections Programme has adopted an agile, discovery-led approach, grounded in a comprehensive synthesis of international best practice in introducing local flexibility market arrangements on distribution systems. ESB Networks is a member of Eurelectric and the EU DSO Entity and collaborates extensively with international peers and world-leading research and innovation bodies, including Irish universities, and the Electric Power Research Institute. We regularly participate in knowledge sharing with peer international utilities, e.g. the Australian Energy Market Operator (AEMO), Consolidated Edison in New York, SA Power Networks in Australia, Transpower in New Zealand, Fluvius in Flanders, Elia in the Netherlands, and various UK DNOs as well as National Grid ESO. ESB Networks has adopted and tested approaches used in several different jurisdictions. Under the Open Networks Project – managed through the Electricity Networks Association (of which ESB Networks is a member) – UK distribution network operators have developed standardised flexible product definitions (sustain, secure, dynamic and restore) specifically for use in distribution system management. Following

Theme	Feedback Received (Market Design)	How this input is being accounted for
		consultation in Q4 2021, we looked to introduce these products for use through a series of pilots. ESB Networks has garnered significant learnings around development of flexibility products through operation of the flexibility pilots and the Beat the Peak schemes. Whilst we remain closely involved with international utilities, we have an increasing awareness that there will be a need for original indigenous innovation in Ireland to introduce products that are likely be more successful in securing the flexible demand needed to achieve the carbon abatement objectives of the 15-20% target.
Market Design	A market operator suggested advancing day-ahead trading through the Flexibility Auction Platform to 2025 from 2027+ with a simplified setup initially. The analysis of the Celtic Interconnector implications should precede its go-live, involving its participation in the flexibility market. A respondent voiced their support for postponing peer-to-peer trading and carbon abatement products to later stages, emphasizing the importance of starting with simple flexibility market arrangements to build trust and understanding, with ongoing refinement via stakeholder engagement." The market operator believes that the industry is ripe for the introduction of a market platform and associated services even before early 2025, particularly if long-term auctions are the initial format.	A range of differing views were received with respect to timing of the flexibility auction platform and advanced market and product arrangements. We will investigate the underlying intent and assess the different ways they could be addressed. However we note that there are a range of other considerations which will influence when an auction platform can be introduced. This include but are not limited to: • Availability of suitable technology – extensive work was undertaken in 2022 to investigate the market for flexibility market platforms, revealing this market to be highly immature; • Risk of making a decision too early and having something in place that does not meet our needs, and our customer's needs. At the time of writing, the evidence available to us is that the requirements with respect to an auction platform are not yet well defined, and that many market participants are not yet ready to meaningfully participate in a definition process. We (collectively, across the electricity industry) need to learn and experiment before making substantial investments in a solution. • Risk of premature investment in a solution to deliver services which are not sufficiently well understood, and whose value to customers (and customers' desire for them) is as yet not well understood or evidenced As such, we will develop an approach which balances accelerating the rollout of flexibility and smart energy services, with the learning and discovery led approach that we remain committed to and continue to believe is the right way to go. Refer to section 3.1 (Blueprint) for more information on how we intend to approach this and when industry can get involved. Note that we agree that the analysis of the Celtic Interconnector should ideally precede day ahead trading, enabling us to design for European market integration to the greatest extent possible.

Theme	Feedback Received (Market Design)	How this input is being accounted for
Market Design	A respondent recommended the simultaneous introduction, or close sequencing, of both long-term and short-term contract types to fully utilise available flexibility.	We agree with the respondent and are implementing different contract types within the confines of available technology and customer readiness and appetite. This is reflected in the multiyear plan now proposed. For example, one of our 2024 milestones is to introduce locational medium duration flexibility, where as shorter-term contract examples are provided under 'New Domestic & Commercial Product launches.
Market Design	A respondent noted that there could be lessons learned from establishing the Single Electricity Market, regarding troubleshooting and operating at pace could be considered in the development of the 2024 Flexibility Multi Year Plan.	We agree on the importance of leveraging the lessons learnt. In response to this constructive input, we plan to seek out people with relevant experience from the establishment of SEM to learn from their experience and practices (e.g., The Modifications Committee and Capacity Modifications Working Groups meet every two months to progress Modification Proposals)
Market Design	Different parts of the power system will have the same needs at the same time. There is an argument that resources should not participate in multiple services. We disagree with this argument as it will encourage all resources to focus into one market, leaving other markets underserved. This causes prices in the underserved market to rise, at which point resources will shift back to it. Instead of these markets competing with one another to attract capacity, we should allow resources to operate in both services. This simplifies operations for flexibility providers, they don't have to make the choice; it incentivises the right resources that can provide multiple services at the one time. In time, through competition of these resources, the service costs should fall.	We agree with the respondent and are making every effort to design our products in a manner that enables and encourages stacking, while protecting against unintended consequences.
Flexibility Product Design	Measuring demand reduction can be a difficult task, as we must estimate what the load would have been if the assets were not called upon to provide flexibility to the market. Baselines are a balance of complexity and accessibility. Historic baselines can seem straightforward but may create a perverse incentive for users to	We note all the suggestions on the flexibility product design, and they will be fed into the market / product design process for all relevant product launches identified in the multiyear plan milestones set out in Section 5. There are many differing views in the different jurisdictions and amongst different market participants on how to best baseline in a fair transparent manner that does not provide perverse incentives. As the technologies available to us progress, through the delivery of the in-development blueprint as well as the establishment of technologies to support

Theme	Feedback Received (Market Design)	How this input is being accounted for
	increase their use across all days to boost their baselines. This also requires more calculations to estimate each users' individual baseline value. We favour a profile baseline, that shows what a typical asset would have done on that day. This removes the perverse incentive and is simple to apply	the product launches set out in Section 5, so too will our ability to for example, baseline more dynamically. We agree with the suggestion on service windows and are factoring this into our market rules. Section 4.3 describes lessons learnt regarding Market Design. We learnt, from engaging with our stakeholders, that they would be mostly unable to meet the full length of a delivery period and we therefore introduced a market rule that allowed assets delivery for a nominated length of time with 30 mins as a minimum. We agree with the feedback on contracts and are implementing different contract types within the confines of available technology and customer interest. For example, one of our 2024 milestones is to introduce locational medium duration flexibility, whereas shorter-term contract examples are provided under 'New Domestic & Commercial Product launches. We agree that different price mechanisms are needed to incentivise different customer types and we factor this into our different schemes. We note that this is consistent with how many different markets in diverse sectors operator, and that it promotes diversity and innovation in a competitive market. To date we have demonstrated this in Pilot 1 and Pilot 3b are pay as bid which means the Flexible Service provider bids in a price determined themselves, whereas our BTP commercial schemes are set prices. In the milestones set out in the multiyear plan in Section 5, whereas we expect that the medium duration locational flexibility and XLEU carbon abatement product will likely also be pay as bid services (reflecting the diversity of solutions that might be bid, and the potential nature of costs involved for the bidders) whereas it is likely that other offerings, for example a product targeting commercial heating systems, would likely be a simpler locational tariff based offering, reflecting the prospective participants' need for simplicity and the relative homogeneity of assets and costs involved for the prospective providers. Finally, we note the guidance provided regarding respondents' views on adequacy of different payments available in the market today, and will feed these views into future pricing and benchmarking exercises.
	ESB Networks should consider how farming could benefit from PV power and demand flexibility, if the PV FIT return is good enough and the on-site electricity use is low enough. Then envision the scenario where the PV FIT return is no longer adequate and you attempt to modify it, lowering farming income (even with substantial gov/EU grants).	
	Long-term contracts provide visibility on commitment and revenues for flexibility service providers, encouraging investment in flexibility assets. While short-term contracts allow flexibility service providers to adjust commitments based on real-time factors like weather, production schedules, and consumption schedules. However, a combination of long-term and short-term flexibility contracts in Day-Ahead and/or Intraday markets is crucial to maximize participation from service providers.	
	A respondent stated that consumers prefer a simple FIT (feed in tariff) return that does not depend on the current demand and retail power prices, which are higher than the FIT KW payments. Demand flexibility plans should avoid fixed returns and adapt to seasonal power demand changes and consumer usage patterns to increase adoption	

Theme	Feedback Received (Market Design)	How this input is being accounted for
	Narrower service windows allow resources to provide more accurate capacity for specific times. For example, the available capacity of electric vehicle charging flexibility varies throughout the day as drivers plug in and charge. This means that at 4pm on a weekday not many electric vehicles are plugged in and charging, however come 7pm, many people have returned home and plugged in their cars. The number of people charging could increase five-fold over that three-hour period. If a market operated in four-hour blocks, then the respondent could only offer its minimum amount into that services window. A narrower service window, for example one hour or thirty minutes, allows the respondent to more clearly show the market and system operator what it can provide at what time.	
TSO/DSO/SEMO coordination	Clarification sought in relation to TSO/DSO co-ordination i.e. Op Model and the approach regarding the introduction of future products	We can confirm that at the time of writing ESB Networks and the TSO are preparing to engage with industry on initial proposals for a future model for TSO, DSO and SEM interactions. This model is designed to maximise the potential for flexibility to deliver benefits across multiple markets and system needs, in a secure and efficient manner. Please refer to the DSO/TSO Multiyear Plan 2024-2028 for more detail. Additional information regarding industry engagement will be shared jointly by the DSO and TSO. In the meantime, we can confirm that before launching any new product, the TSO and DSO consult intensively with experts across the two organisations to coordinate the operation of the product and ensure that product design accounts for the potential interactions between different markets and the potential for stacking.
	The relationship mechanism for the future flexibility products, the wholesale market and SEM committee should be considered in ESB Networks' plan to deliver 15-20% demand side flexibility by 2025.	
	A respondent confirmed their alignment and support with ESB Networks' views about the benefits of a TSO/DSO coordination scheme thus exposing the flexibility to all possible buyers and using it in a coordinated and efficient way.	

Theme	Feedback Received (Market Design)	How this input is being accounted for
Flexibility Contracts	It was advised that that language used in flexibility contracts can be understood by the broader population.	ESB Networks understands and appreciates the importance of ensuring that procurement documents and contracts are written in a manner which can be understood by the broader population. In response to this input, we are preparing simplified descriptions about how the procurement process works (e.g., a FAQ document) and make this available on the website. There will also be public engagement and customer specific comms that will explain incentives.

7.3 CUSTOMER FEEDBACK

Table 11: Customer Feedback

Theme	Feedback Received (Customer)	How this input is being accounted for
Creating the conditions for a competitive market	In relation to future customer communication, awareness and education, there is a need to understand how the transition of responsibility from the DSO to a supplier led model will unfold.	There are two key actions in our multiyear plan to account for this feedback. Firstly, ESB Networks has commenced the development of a **blueprint** that accounts for the breadth of power system, retail market, flexibility market, smart metering, behind the meter infrastructure and consumer/behavioural developments needed over the coming decade, in an efficient and integrated/strategic manner that supports progress but emphasises the role of discovery and adaptation over the course of its delivery. The Initial inputs to this blueprint have been published as part of calls for input, and this will be the subject of further engagement later in 2023 (and in early 2024). At the time of the call for input, whilst flexibility market and customer preliminary proposals were available for sharing, retail market and Smart 2.0 future planning was at a less mature stage and thus unavailable for sharing. Work is progressing in this regard, and it is anticipated that in early 2024 through the blueprint process, greater insight can be shared as part of a process in industry involvement in the blueprint. However, at this point in time, we can confirm that the Blueprint is the proposed mechanism for developing a coherent long-term plan for the development of the retail market and smart metering capabilities needed to support product innovation and flexible demand over the coming years. One of the key elements of this Blueprint will be a “Market/Regulatory layer”, which provides a framework for the introduction of new products and services to be delivered by competitive market participants. This framework provides for initial product development and testing in a market sandbox, to support innovation and more agility in bringing new solutions to market. Where these products or aspects of them deliver demonstrable value for customers or industry, they can transition into more mature markets, including flexibility and retail markets, pending the nature of the products, the
	Clarification sought regarding the steps the DSO will need to undertake to ensure the supplier led approach is robust and fit for purpose.	
	An aggregator outlined their opposition to a supplier-led approach to domestic flexibility, citing it as a hindrance to new business models. Traditional energy suppliers are slow to adopt flexibility, whereas smaller companies benefit customers and the grid. A supplier-led model limits customer choice and creates barriers to entry for new players and innovation, favouring established companies over newcomers.	
	An energy company noted that stakeholders are keen to understand the future roles and responsibilities of suppliers and aggregators.	
	A respondent operating within the energy industry, suggested that the plan should reflect steps which ESB Networks will undertake in order to build trust with customers.	

Theme	Feedback Received (Customer)	How this input is being accounted for
		competitive parties seeking to deliver these products, etc. It will be critical that suppliers, aggregators, and all prospective market participants have an active role in shaping this layer of the Blueprint.
	There are no metrics for what the strategy should achieve on the consumer side of demand flexibility. Much of what is noted is a wish list of what we would all like to see being completed but no metrics. No metrics means no way of assessing success from now or in 2026 and what needs to be done by 2030.	In the "**Blueprint**" section of this document we provide more information, and in the milestone for the development of this blueprint in 2024 we provide further visibility of the likely timeline and process to work closely with retail market participants, as well as prospective market participants with an interest in innovative flexible demand offerings, to develop an agreed blueprint. Reflective of the feedback received, issues like KPIs and how best to build consumer trust will be raised through this process.
		The second action is a commitment to **Development & Industry Adoption of DSO-Market Participants Transition Model.** ESB Networks recognises the need to work hand in glove with suppliers, aggregators, energy services companies and any company seeking to innovate and offer new smart energy or flexible demand services. The ambition is to support and stimulate the market by helping to address some of the market barriers and failures that exist today. This could include offering education, awareness and products and services to support the understanding and uptake of flexible demand and then work with transitioning this activity, where relevant to other stakeholders. It could also include measures for example price structures and other incentives to help reduce the risk associated with product innovation and development under conditions where the returns available for flexible demand in the market are uncertain today.
		It is proposed that a transition model will be developed in collaboration with current or prospective market participants by: • Identifying barriers to entry or other market failures that currently exist (for example, weak or uncertain price signals from the wholesale market, high customer acquisition costs, product development costs, etc) • Identifying actions that could be taken by the DSO and CRU to help mitigate these failures in the short to medium term. These could include inter alia incentives and price structures, education and awareness activities, shared research, etc • In the interim, ESB Networks would collaborate with market participants on occasion when it is necessary to introduce products which customers can participate in either directly or via a market participant, to ensure that customers' access is maximised.
		Thresholds or indicators could be set for the phasing out of products or services which customers access directly (as opposed to a market participant) – to the extent that this

Theme	Feedback Received (Customer)	How this input is being accounted for
		meets consumer and regulatory needs – as competitive provision of the services in question grows.
Creating the conditions for a competitive market	Due to the dependency on suppliers to increase customer engagement, in order to achieve the 15-20% flexible system demand by 2025 targets, a supplier advised that suppliers participate at future NN, LCP advisory councils.	Suppliers will play a crucial role in the delivery of 15-20% Flexible System Demand by 2025. We are in the process of engaging to secure supplier representation on the Advisory Council.
Communication	A supplier encouraged the NN, LCP to increase its cadence of communicating with suppliers regarding progress updates.	The NN, LCP will engage with suppliers with a view to having suppliers represented on the Advisory Council. Milestone Q1 2024.
Applying research & learnings	A community energy group have collated anthropological research findings based on initiatives they have conducted to date and are willing to collaborate with ESB Networks regarding customer engagement and interactions with technologies i.e. ChatAI.	ESB Networks appreciate the invitation to collaborate and value the insights that the community group have amassed, as it will add value in supporting the attainment of the 15-20% flexible system demand target.
Applying research & learnings	An energy community group inquired about strategies to promote customer enrolment in the ESB Network Customer Portal to foster proactive engagement in energy management. They observed that specific demographic groups tend to exhibit reluctance in subscribing to energy tariffs, possibly due to misinformation and hearsay. However, by joining the portal, individuals could monitor their electricity consumption and make informed decisions about tariff plans, leveraging real-time data on usage patterns, peak consumption, and energy-saving practices to enhance their environmental impact awareness and manage electricity costs effectively."	ESB Networks are investing in an awareness campaign to promote and encourage electricity customers (regardless of their electricity supplier) to use the customer portal in Q4 2023 and will communicate more explicitly that signing up to the customer portal does not mean you are signing up to change your tariff.
Applying research & learnings	A respondent stated that the consumer demand strategy depends on better power user personas to offer more flexible power tariffs and demand flexibility. ESB Networks communication approach should alter from that which was	We recognise that our communication approach needs to evolve based on lessons learned from the ongoing smart meter rollout, in particular as regards the uptake of smart tariffs.

Theme	Feedback Received (Customer)	How this input is being accounted for
	adopted in the roll out of Smart Meters, as the uptake of smart tariffs has failed to meet expectations.	To achieve this, we are investing significant time and resources into understanding our customers better. This includes strengthening our capabilities in customer research and behaviour analysis, as well as collaboration with the SEAI Behavioural Analysis unit and specialist behavioural scientists whose services have been vetted by the SEAI for us. While our communication approach is not simply replicating what was done in the National Smart Meter Program (NSMP), we are actively incorporating valuable insights and lessons learned from that experience into our updated communications strategy. Our primary goal remains to encourage greater participation in flexible demand products and services, and we are dedicated to adapting our approach to ensure it aligns with the evolving needs and preferences of our customers. We appreciate your ongoing support and collaboration as we work together to achieve our ambitious target of 15-20% flexible demand by 2025.
Applying research & learnings	An energy community group suggested intensive education and engagement with customers will be key if the vision of the domestic customer presented is to be realised. Talk to people who already have low carbon technologies, inverters, batteries, and electric vehicle chargers. Find out what worked for them, what didn't work and suggestions for improvements. The real-life stories of customers from energy communities (such as Aran Island) could be used to encourage other customers	Customer research is very important to creating relevant products, services, and communications to support the uptake of flexible demand products and services and build awareness, we are investing in customer research and will engaging with customers who have adopted low carbon technologies. ESB Networks are investing in an awareness campaign to promote and encourage electricity customers (regardless of their electricity supplier) to use the customer portal. Education and awareness is something ESB Networks intend to invest in to promote proactive participation in demand flexibility.
Smart Metering Data Access	Offering open sources data to third party app providers and dashboard designers, will provide increased levels of choice to customers.	We acknowledge the significant value that open-source data can bring to the table in fostering innovation and engaging stakeholders in the co-creation of customer-centric products and services, including applications and dashboards. It is crucial to recognise that altering customer behaviours concerning energy consumption will play an instrumental role in attaining our ambitious target of achieving 15-20% flexibility. Applications and dashboards will serve as pivotal tools in illustrating to customers the profound impact their behaviours have on energy consumption. We embrace the opportunity to collaborate with developers in this domain, actively exploring new avenues for customer offerings. This is an area of interest that we plan to consider further, with proposals developed as part of the **Blueprint** process described in Section 3.1. Furthermore, we will actively seek opportunities for collaboration and coordination with other relevant agencies if they are pursuing similar objectives.

Theme	Feedback Received (Customer)	How this input is being accounted for
Smart Metering Data Access	Stakeholders are keen to understand the barriers and interim workarounds to the smart meter data access code and potential re. MCR1208 in the interim	We understand the concerns raised by stakeholders regarding access to smart meter data and the potential impacts in the interim. ESB Networks is actively in discussions with the CRU (Commission for Regulation of Utilities) to address these issues pertaining to the Smart Metering Data Access Code. We want to emphasise our commitment to working collaboratively with our stakeholders on this matter and ensuring alignment with their concerns and needs.
Education & Awareness	A respondent encouraged ESB Networks to provide consistent and reliable usage information and a dedicated customer application to access it.	ESB Networks has launched a Customer Portal where electricity customers (regardless of their supplier) today can access to their reliable and consistent smart metering usage data. We would welcome further contributions through the **Blueprint** process described in Section 3.1 as to future smart metering or related services which ESB Networks could provide or facilitate the provision of by market participants.
Education & Awareness	Raising awareness of customer behaviour and its impact on the network by liaising with schools.	We have included this proposal amongst the candidate initiatives for 2024 as set out in the New Domestic & Commercial Products and Services milestone.
Education & Awareness	A community energy group noted that some customers may hesitate to register for the portal, as they may assume that they are committing to a specific rate plan	ESB Networks will account for this input in the detailed design of our communications and onboarding experience for products and services.

7.4 BEHIND-THE-METER INFRASTRUCTURE FEEDBACK

Table 12: BTM Infrastructure Feedback

Theme	Feedback Received (Behind the Meter Infrastructure)	How this input is being accounted for
Applying research & learnings	A community energy group encouraged ESB Networks to collaborate with them, as lessons learned regarding the implementation and adoption of technologies could support the delivery of the Behind the Meter Infrastructure plan.	As ESB Networks continues to develop products and services we will continue to engage, consult and partner with customers, communities and industry. ESB Networks has specifically identified a Behind the Meter infrastructure initiative. ESB Networks appreciates the invitation to collaborate and will engage where possible.
Technologies	Technologies such as inverters are still evolving and vary from country to country. The goal is to establish effective standards and protocols for both Ireland and Europe based on the lessons learned from similar Irish based projects.	ESB Networks agree and have consulted widely on interoperability research projects internationally on the architecture design but having an Irish based research project like REACT where the performance of different protocols and DER systems in an Irish context is very interesting, and following a review, the learnings could feed into future proposals.
Technologies	Clarifications were sought on IOT, Cloud Gateway and security capabilities that will be required.	ESB Networks are currently engaging with targeted key stakeholders such as the SEAI Smart Grids and NSAI TC20 on the detailed component architecture for the integration of BtM DER and smart electric vehicle charging. This architecture includes specific requirements on the in-home IoT communication gateway and also includes the required end to end cybersecurity standards (currently in testing). ESB Networks will be incorporating this feedback on the architecture design when submitting the final BtM proposals to the CRU at the end of this year.
Technologies	A respondent enquired about ESB Networks view on the advantages/disadvantages of wired vs wireless technologies.	ESB Networks recognises the role both wired and wireless technologies will play in delivering behind the meter infrastructure. Global experience for BtM DER shows that if connectivity is via the customer's Wi-Fi, connections are lost over time. Cause-analysis shows several reasons; including latched-up Wi-Fi networking components that require rebooting, changed security settings and range/noise issues. Therefore, a wired Ethernet connection is preferred.

Theme	Feedback Received (Behind the Meter Infrastructure)	How this input is being accounted for
Communication	Wireless Communication with OpenADR: The respondent notes that wireless communication, particularly using OpenADR (Open Automated Demand Response), is likely to be the method of choice for demand side response in the UK. They also highlighted the proposed Irish model for ESAs requires SunSpec Modbus communication, potentially limiting the availability of ESAs in the Irish market.	The proposed architecture proposes SunSpec Modbus protocol from the IoT Gateway to the Smart Inverter DER for micro/mini generation and also for smart electric vehicle charging - a wired ethernet wired connection provides better communication continuity and stronger security profile, which has been demonstrated by our laboratory testing and also by other utilities internationally. ESB Networks agree for smart control of electric vehicle charging there are more than one option available as outlined in the response and this feedback will be incorporated into the architecture. ESB Networks also supports alternative architecture for legacy installations, it is imperative we strive to incorporate this DER resource – ESB Networks welcome detailed proposals on how to incorporate legacy systems.
Communication	Direct Communication to Cloud Server: The respondent suggests allowing existing devices to communicate directly with the Cloud Server. This approach aims to reduce the need for additional hardware and infrastructure.	ESB Networks supports and is considering alternative architecture for legacy installations, it is imperative we strive to incorporate this DER resource – ESB Networks welcome detailed proposals on how to incorporate legacy systems.
Communication	Different Communication Needs for Generation vs. Loads: The respondent highlights that while hardwired communication may be necessary for generation equipment, a wireless solution should suffice for individual loads. This distinction recognizes that different devices may have varying communication requirements.	ESB Networks agree for smart control of electric vehicle charging there are more than one communication option available as outlined in the response and this feedback will be incorporated. Just to note, when it comes to demand services there is significantly greater potential to do harm to the network and has a greater capacity impact on the distribution system than generation. Typically, BtM generation installations are 1-4 kW whereas an electric vehicle is approximately 7kW. Even if generation is coincident and charging may be more diverse, the size of individual demand means that their potential for harm - even after diversity - is greater. From a technology perspective there may be greater flexibility in the communication standards available. But in terms of ESB Networks requirement for reliability – the communications is potentially of greater importance for demand services over generation.
Standards	UK Standards for ESAs: The UK has introduced standards, PAS 1878 and PAS 1879, for Energy Smart Appliances (ESAs). These standards are not currently mandatory but provide insights into the direction of the UK market in terms of ESAs.	ESB Networks will be aligning to European/CENELEC standards, and some options need to be explored here - including OpenADR. Please note that the UK DNOs did not agree to implement or agree to adhere to PAS 1878/1879, as they are focusing on API dispatch to solely the aggregators.

Theme	Feedback Received (Behind the Meter Infrastructure)	How this input is being accounted for
Standards	A respondent stated that in order to alleviate the potential of supply chain issues for relevant hardware i.e., electric vehicle chargers, it was noted that a common regulatory standard with the UK is worth considering.	ESB Networks believe this is a great suggestion and we are currently looking into developing in conjunction with the SEAI a common regulatory communications standard for all electric vehicle chargers.
Vehicle to Grid (V2G)	A supplier enquired on whether ESB Networks would be interested in collaborating with them in conducting a V2G/V2H study/initial project.	ESB Networks will seek to establish a partnership platform with private industry to support early adopters through education / technology deployment, at volume, so that such work can be used as a template for future growth and development.
Approach	A respondent emphasise the importance of considering demand side response, especially concerning Energy Smart Appliances (ESAs).	A member of the NN, LCP team met with the EVHACS team on 11/09/23' and clarified the ESB Networks' approach is focused on Behind the Meter (BtM) small scale generation and control of domestic electric vehicle charging. On the demand response point, ESB Networks will be aligning to European/CENELEC standards, and some options need to be explored here - including OpenADR.
Workforce Training	Preparing for standardised training programs for electricians and skilled workers may present another set of challenges. Notably, Ronan Meere appears to be actively addressing the challenges associated with technical architecture and interoperability.	We absolutely agree with this point. ESB Networks will seek to work closely with RECI (Register of Electrical Contractors in Ireland) to identify the required training and course material that will be required for the rollout of the BtM DER infrastructure.
Technical Infrastructure	A community energy group has identified a significant challenge in Ireland's pursuit of achieving 15-20% flexibility in the energy system by 2025.The primary obstacle is the lengthy process of developing the necessary technical architecture. This process demands at least 18 months of full-time technician involvement. Ensuring interoperability for data exchange is essential for the success of these initiatives, but it also introduces additional complexity.	The point raised is valid, and it's imperative that we collaboratively consider both technology/architecture BtM approach and the science of human behaviour. Without ensuring that customers are well-informed and actively engaged throughout the development process, any attempts to introduce new technology in homes will likely face significant obstacles to adoption.
Engagement	Ensure there are links with colleges where environmental engineering/ electrical courses/ social science etc. are being rolled out so that students are aware of what is happening and how they can use practical projects and assignments to add to information on flexibility readiness in Ireland and ultimately help us meet our CAP 2023 goals.	UCD and SETU are developing a test platform which combines grid models, hardware in the loop and interconnected communication systems built to the ESB Networks architectural, communication and data transfer exchange for BtM DER. On a broader note, the plan outlined in the Customer call for input pack, includes milestones in relation to liaising with schools as a means of building awareness with school students.

Theme	Feedback Received (Behind the Meter Infrastructure)	How this input is being accounted for
Study	As part of the Data CELLAR project, householders on Inis Mór will be able to trial a Decision Support System (DSS) tool. Among its functionalities will be 1) Optimal RES sizing and 2) DSO Resources Optimal location. Is the latter something that ESBN would be interested in collaborating on?	ESB Networks appreciate that data analytics for resource and load optimisation will have a key role in modelling customer behaviour for behind the meter DER usage. The BMI team will carefully study the CELLAR project and review the potential for a possible collaboration in this space.
Supply Chain	Ensure there are links with colleges where environmental engineering/ electrical courses/ social science etc. are being rolled out so that students are aware of what is happening and how they can use practical projects and assignments to add to information on flexibility readiness in Ireland and ultimately help us meet our CAP 2023 goals. Link in with agencies in peripheral regions (e.g., as per the LEAP project) to ensure that installers get to those areas and that there is follow up. One of the big questions that customers in peripheral regions have about engaging in the use of new technologies is “if this breaks down, who is going to come to fix it”.	ESB Networks are currently working on a joint research and development project with the SEAI to design and build new DER BtM communication technologies. UCD and SETU are developing a test platform which combines grid models, hardware in the loop and interconnected communication systems built to the ESBN architectural, communication and data transfer exchange for BtM DER. PhD and research students will work on the platform being developed and bring forward the transferable skills to this industry in the future. This directly links to providing the intellectual property and skills to reach our CAP targets. ESB Networks will also work to ensure that peripheral regions will have the necessary technology support to assist with the roll out of BtM technology.
Supply Chain	It would help to have additional support e.g., in the form of uplifted grants from the SEAI for clients in peripheral regions/the islands to install behind the meter storage.	ESB Networks will engage with SEAI actively to promote technical and financial support customers in peripheral regions and the islands to install behind the meter storage.
Standards - metering	Power market requirements should account for the existing capabilities of metering equipment. Many distributed energy resources were not designed with the metering requirements of the Secondary Operating Reserve in mind. We welcome the creation of the “flexibility readiness standards”. These standards should acknowledge what electric vehicle charging assets can achieve and align this with power market requirements.	Noted and thanks for the feedback - ESB Networks will ensure that flexibility readiness standards will ensure electric vehicle charging assets will be incorporated with that future market system requirements. Please note that ESB Networks regularly engage with UK based entities as a means of ensuring alignment of standards across both jurisdictions.

7.5 POWER SYSTEM REQUIREMENTS FEEDBACK

Table 13: PSR Feedback

Theme	Feedback Received (Power System Requirements)	How this input is being accounted for
Energy Storage	Additional information needed in relation to the approach which will be adopted to introduce flexible storage connections (i.e. Floating MIC).	Flexible storage connections will likely be the subject of consultation in 2023 Q4, as part of the storage product development process with CRU
Energy Storage	Based on recent policy development, and evidence emerging from the nascent hydrogen energy sector, an Irish semi state organisation would suggest the impact of green hydrogen production be considered in assessing future power system requirements. Such consideration may include the following aspects: • Hydrogen as a potential driver for demand growth on the distribution power system (supply of electricity to electrolysis for green hydrogen production) • Hydrogen as a potential source of supply to the distribution power system (fuel cell electricity production from supply of green hydrogen) • Green hydrogen production (via electrolysis) as a potential means to limit constraint and curtailment of wind generation feeding the distribution power system. Action 1 of the National Hydrogen Strategy is noted in this context: Develop and publish data sets showing the likely locations, volumes, and load profile of surplus renewables on our electricity grid out to 2030. The outcome of this action may inform likely locations for future placement of hydrogen related demand and supply. While green hydrogen is not anticipated to emerge at scale in Ireland before 2030, and acknowledging the timeframe of the ESB Networks Power System Requirements Strategy is to 2030, the stakeholder propose it is nonetheless important to commence assessment of the above future requirements at an early stage of power system reinforcement planning.	The role, and importance, of sector coupling to deliver climate action is increasingly clear, as transport and heating demands move to electricity, electricity demands of water management grow, and the potential for coupling electricity and gas flexibility grows with growing opportunities for biogas and hydrogen. In response to this and other inputs relating to exploring cross vectoral solutions, we have proposed to commence work on cross vectoral product development. This will initially involve ESB Networks beginning the work needed to ensure systematic identification of future cross vector opportunities and product development accordingly. Initially, to ensure that ESB Networks and operators of other vectors can engage in an informed and effective manner, we will synthesise Ireland's future heat, transport, gas and water needs, forecasts and development plans to build visibility of the potential cross-vector synergies from sector coupling. As regards hydrogen, this will include: • Preliminary collaboration with Gas Networks Ireland regarding short-, medium- and long-term sector coupling (electricity and gas) building on our initial collaboration regarding the potential for sector coupling as part of the XLEU caron abatement product identified above Engagement with other public sector bodies and the relevant government departments to secure steering and guidance on opportunities to align sector coupling initiatives with public policy measures, in particular as regards hydrogen.

Theme	Feedback Received (Power System Requirements)	How this input is being accounted for
Engagement	Finally, an Irish semi state organisation wish to acknowledge the ongoing work by ESB Networks and the wider ESB group in helping Ireland to become a leader in green energy production and transportation. They also welcome the opportunity for ongoing collaboration between our respective organisations in this regard.	ESB Networks appreciates this comment and wants to acknowledge and thank our stakeholders for their consistent and growing participation in consultations, roundtables, council meetings, bilateral meetings, and other forums for engagement. The time and openness being invested by all parties is key to delivering progress.