NETWORKS

Local Network Visibility Multiyear Plan

NATIONAL NETWORK, LOCAL CONNECTIONS PROGRAMME

DOC-230921-GYO

OPENING STATEMENT

The decarbonisation of Irish society relies on fundamental changes to how energy is generated and consumed. To make this possible, securely, 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 has been established to work with, and for, customers to make this possible.

We are entering a period of rapid change and uncertainty. Over the coming years, technologies will change and Irish homes', farms' and communities' energy needs will too. We will need to be able to adapt to meet changing needs and emerging challenges. In this document we have sought to develop a proposed plan that accounts for uncertainty and delivers that adaptability.

For example:

1. **Iterative piloting and development of processes so that we can learn what works well and what needs to be done differently as we prepare for a national rollout.**
2. **Committing resources and investment to sustainable, longer term technologies that will provide information to our control room in relation to the Low Voltage Network that will deliver visibility for future years.**
3. **Extensive commitment of resources to communications and collaboration, working with partners and customers to understand their needs and how they change, so we can adapt.**

There are uncertainties and risks, and these will likely continue over the life of this programme. If we proceed too quickly, we increase the risk that customers will not be ready, or technologies will not be mature. But if we delay investment, we and our partners cannot apply what we learn, replicate successful pilots and commence a national rollout until later in the decade.

Delivering this programme will demand that we commit people and capital. ESB Networks serves and is funded by all electricity customers. All our customers will share in the benefit, but they will also share in the costs and the risk. As such, we want to give all electricity customers an opportunity to contribute. By the end of the year, we will need to make informed decisions, and we want your view:

1. Do you think we should take a more measured pace and begin to scale closer to 2030, or commit resources needed to begin build towards a national rollout commencing in 2024 / 2025?
2. There are trade offs between different developments in this plan that we could prioritise. What do you think we should prioritise, and how will this affect your business.

We need your input to determine the path forward. So please have your say!

CONTENTS

1 NATIONAL NETWORK, LOCAL CONNECTIONS – HAVE YOUR SAY!

This document is the proposed Local Network Visibility Multiyear Plan.

In this document we set out:

1. **The technological approaches we propose to take to map and monitor the low voltage system, including through the use of data analytics and retrofit monitoring.**
2. **The proposed criteria to prioritise and sequence locations across the country for inclusion in these programmes.**
3. **The annual milestones and targets over the life of the programme.**

It is critical that we implement solutions that optimally meet the wishes and needs of the customers and industry participants in Ireland. In developing these proposals, we have taken time to seek and utilise stakeholder input from round tables and focus groups, as well as to research and utilise exemplar international experiences. This has enabled us to develop the proposed approaches within this document. While we have confidence that these can meet the overall programme objectives, we are open to change and, as a result, we have prioritised this transparent and consultative approach. There were several key dimensions on which we based this document and it is important to us that we develop an understanding of your perspectives, objectives and concerns across each of those.

It may be useful to consider the below questions while reading this document. Please note when responding to this document, it is not necessary to respond to each of the below questions; responding to a specific question or a general response is welcomed and appreciated.

SELECTION CRITERIA
Do you support the proposed criteria for prioritising locations to roll out local mapping and monitoring? Are there other criteria you think we should use?

TARGET LOCATIONS
We are targeting the mapping of 50% of the country and installing 10,660 monitors. Do you think more, less or other locations should be selected? Why?

NUMBER OF CUSTOMERS PARTICIPATING
Our programme should enable 20 - 50% of customers to participate in the market by 2025. Do you think more (or fewer) customers will be ready and willing to participate?

TYPES OF CUSTOMERS PARTICIPATING
The local visibility programme is to enable domestic, small business, and community participation. Do you support this approach?

TECHNOLOGY
Do you think there are alternative technological approaches we should take to monitor and manage the local (Low Voltage) system?

PROGRAMME GO-LIVE AND DURATION
The programme commences in 2022 and will conclude in 2025. Do you think this is aligned with national policy objectives (or too fast, or too slow)?

1 NATIONAL NETWORK, LOCAL CONNECTIONS – HAVE YOUR SAY!

It is also important to us that we maximise the overall value of the programme across our stakeholders.

As such, we are Inviting perspectives on additional considerations that we could fold into our approach:

LEARNING OBJECTIVES
Are there additional customer, DSO or market learning objectives we should pursue as we secure visibility of the local network?

CUSTOMER & POLICY OBJECTIVES
Are there other upcoming policy developments or customer needs we should reflect in this roadmap?

CUSTOMER EDUCATION AND AWARENESS
Are there opportunities to drive customer education and awareness by sharing visibility of the local system as we gather it?

SUPPLY CHAIN
Are there opportunities for other parts of the supply chain to learn and develop through this local mapping and monitoring initiative?

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Glossary

3 GLOSSARY

TERM	DEFINITIONS
ADMS	Advanced Distribution Management System
AI	Artificial Intelligence
AMI	Advanced Metering Infrastructure
CRU	Commission for Regulation of Utilities
DPO	ESB Data Protection Officer
DSO	Distribution System Operator
EPRI	Electric Power Research Institute
GIS	Geographical Information Systems
IoT	Internet of Things
LTE	Long Term Evolution
LV	Low Voltage
MV	Medium Voltage
NTC	ESB Networks National Training Centre
OH	Overhead
PR5	Price Review 5
TSO	Transmission System Operator
UG	Underground

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Background

Ireland's energy system is currently undergoing transformative change. One of the key drivers for this is the National Climate Action Plan, which sets a target of 70% or more renewable electricity by the year 2030, and the continued decarbonisation of the heat and transport sectors through electrification. This is accompanied by the EU Clean Energy Package, which mandates changes to the role of the distribution system operator, including increasing use of market-based mechanisms to manage capacity on the distribution system, and measures to support the activities and market participation of active customers, energy communities and distributed renewables. To achieve the 70% target, Ireland will need to exhibit a decoupling of economic growth and energy use.

4 BACKGROUND

Such unprecedented change will require the introduction of more efficient technologies and increased customer interaction and awareness driven by the introduction of smart metering, micro generation, and increased market participation. Ireland will need to continue to move away from an energy system based on fossil fuel consumption to one driven by renewable generation, and market reform. The new energy landscape will include a large and growing number of decentralised renewable generators and storage competing for capacity on the distribution system. Capacity on the distribution system is managed and operated by ESB Networks, and with more and more distributed energy resources (including microgeneration, storage, and demand side response) connecting at the most local level, it is essential that there is an increased level of visibility on the low voltage (LV) network and its constituent parts.

Network visibility will play a critical role in allowing customers to become active participants in the electricity system, in a secure and coordinated manner. At present, ESB Networks does not have an accurate view of how loaded the LV system is or how this varies by time of day, month, and season etc. Currently, ESB Networks can only gauge to a certain degree of accuracy how loaded MV/LV substations are, for example by aggregating traditional metering data. This allows ESB Networks to estimate the loading at the substation, however, customer referencing is not always accurate and the data available is aggregated data over time. As a result, this is not a reliable or fit for purpose method for operational purposes. Coupled with the fact that the distribution system has been designed based on the high expected diversity between different customers' demand, this means that today, customers on the low voltage system cannot securely participate in flexibility services.

Increased visibility will allow ESB Networks, our customers, and emerging energy companies working to support customers, to improve decision making in operating and investing in the network. It will allow ESB Networks to introduce new solutions to help provide the capacity and reliability needed at this most local level, as new technologies continue to connect. This includes actively managing the network and how it is used, to be able to securely accommodate a greater number of low carbon technologies, at the right pace and at the right cost for customers.

To prepare for implementation of these changes, ESB Networks has been mandated to drive out programmes of work including low voltage mapping and monitoring. Using these increased levels of visibility, ESB Networks will need to manage and monitor the network more actively down to the most local level and empower domestic and small business customers to become "flexible" or "active customers". We are working toward a target of 50% mapping / modelling visibility of the network by the year 2025, in addition to retrofit monitoring on the low voltage side of the MV/LV distribution substations. At present ESB Networks have approximately 250,000 MV/LV Substations on the distribution system. ESB Networks' target is to have 10,660 monitoring devices installed on the network enabling monitoring of the LV Network by the end of 2025.

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Programme Delivery Approach

5 PROGRAMME DELIVERY APPROACH

The objectives of the National Network, Local Connections Programme in relation to visibility include a phased approach to the LV visibility technical and delivery strategy roadmap. The proposed roadmap focuses on the following three pillars:

1. **Delivery readiness and sourcing.**
2. **Securing visibility.**
3. **Sharing visibility.**

5.1 DELIVERY READINESS AND SOURCING

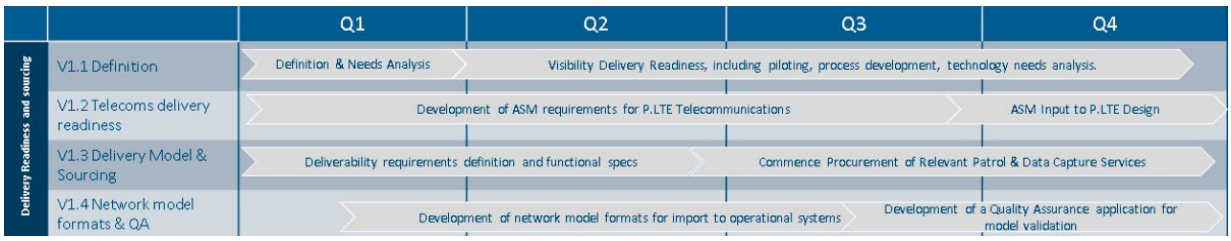
Delivery readiness and sourcing can be broken down into the following four sections:

1. **Definition.**
2. **Telecoms delivery readiness.**
3. **Delivery model and sourcing.**
4. **Network model formats and QA.**

The delivery readiness milestone for 2021 involves ESB Networks conducting comprehensive delivery readiness activities addressing technical, technological, and practical dependencies, and ensuring business readiness. This includes all solutions which best fit operating contexts.

ESB Networks also needs to define the sourcing requirements and commence sourcing of the delivery solutions to progress a high-level roadmap for operational visibility. The final part of the delivery readiness programme involves the definition of suitable network models for import to an ADMS system, and development of a quality assurance application for model validation.

The graph below gives a detail breakdown to the planned approach to reach our delivery readiness objectives for 2021.



5 PROGRAMME DELIVERY APPROACH

5.2 SECURING VISIBILITY

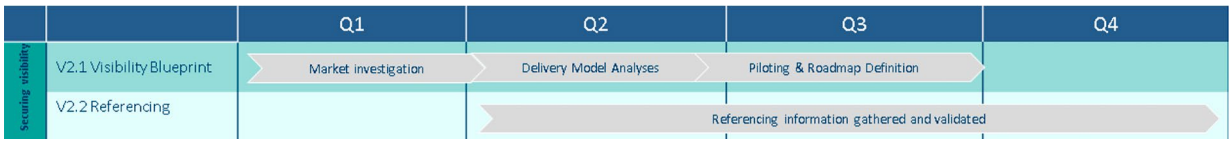
Securing visibility relates to the development of operational quality, low voltage map and model information, by securing accurate referencing of customers to MV substations, and validation of information gathered on the LV network. This incentive is split between:

1. **Future visibility blueprinting with**
2. **Preliminary referencing.**

Visibility blueprinting involves the investigation and piloting of analytics approaches and strategies to inform a future blueprint so that we can accurately and efficiently map and develop operational quality models of the low voltage electricity network.

At the start of 2021, as much as 4.5% of ESB Networks' customer base was not referenced to a connection point on the network and 12.3% of the customer base was referenced to an unknown LV feeder on a secondary substation. A customer who is not referenced is not "visible," and a customer who is not visible will not be able to participate until they are. In 2021, 20% of all customers will be assessed for connection point reference and LV feeder reference. By the end of 2025, those without a reference of this sample will have correct referencing assigned based on collaborative use of AMI validation data. Those without a reference of this sample will have correct referencing assigned based on collaborative use of AMI validation data.

The graph below gives a breakdown of the planned approach to achieve the "securing visibility" incentive for 2021.



5 PROGRAMME DELIVERY APPROACH

5.3 SHARING VISIBILITY

In 2021, ESB Networks is developing a roadmap for the delivery of both beta and production data exchange platforms and dashboards. These platforms and dashboards will enable customers and industry to engage with system operation, challenges and solutions, as active customers and communities, and participants.

The blueprinting of this will be delivered by the end of 2021. At the time of writing, proposals have been developed based on desktop technical research, and customer and industry surveying. Technical alternatives are being considered, to make better use of the tools, technologies, and data available to ESB Networks and to share these with the wider community.

This milestone involves preliminary steps to prepare, to define and implement future TSO / DSO data exchange, to support secure, whole of system approaches in line with the future TSO / DSO operating model that is currently in development. As the ESB Networks' technology eco-system develops, further communication, data exchange and integration with the TSO is required.

6

What This Plan Is Delivering

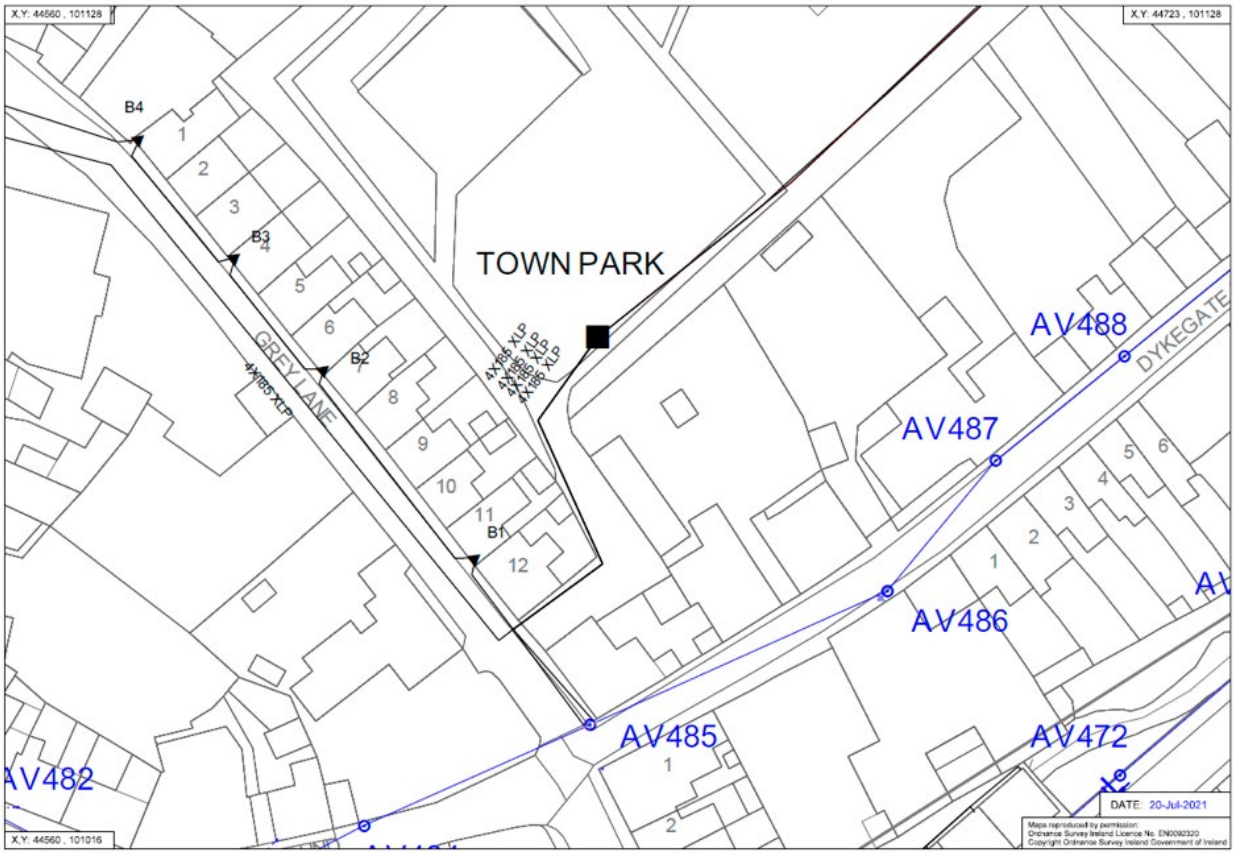
6 WHAT THIS PLAN IS DELIVERING

6.1 BACKGROUND

Accurate network models include accurate referencing of customers to substations and circuits, and the topology and electrical parameters of the low voltage circuits themselves.

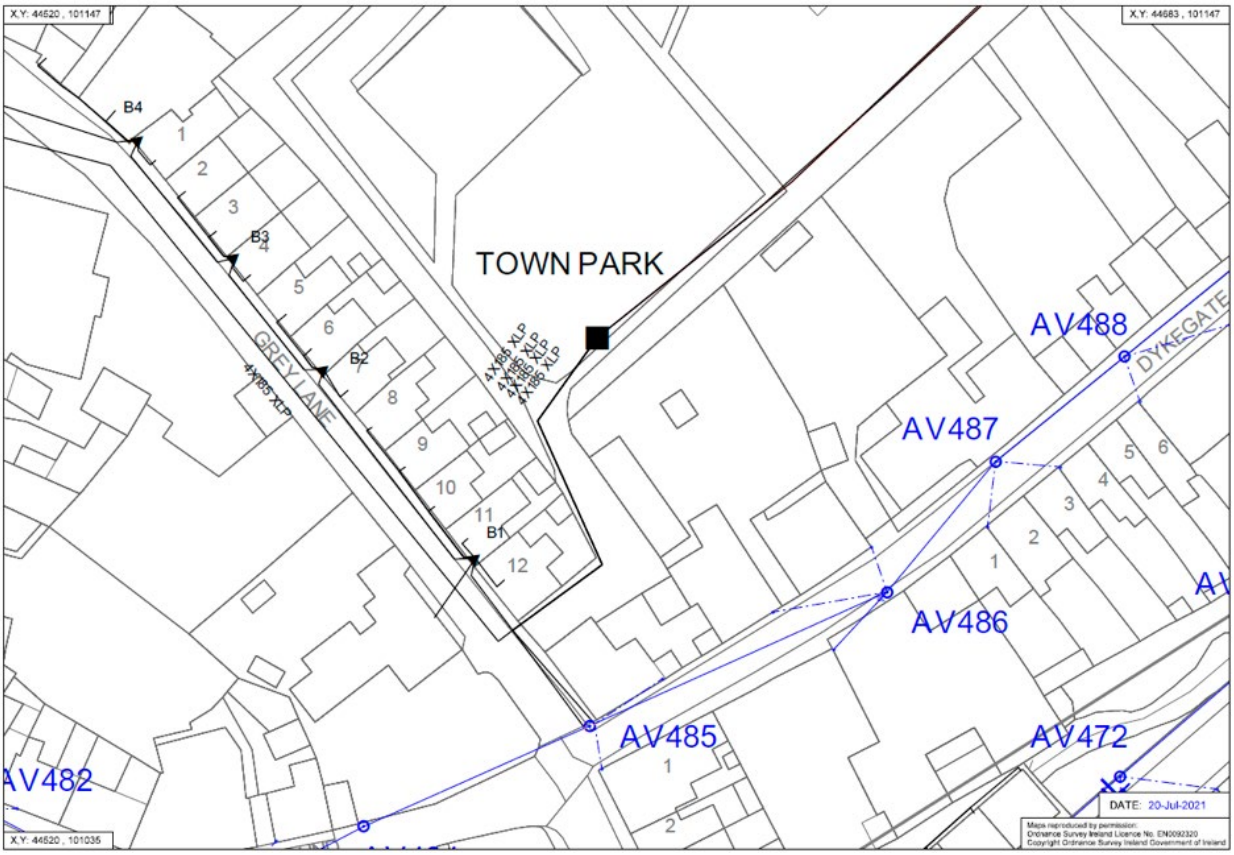
In cases where there are already records of the low voltage network, the information includes the LV network from the secondary substation down to the minipillar or pole outside a customer's premises. However, it does not include the overhead (OH) or underground (UG) lines that connects the customer's premises to the LV network. The existing maps are not always complete and there are gaps in the network which may leave some customers disconnected from the LV electrical model.

FIGURE 1 **LV MAP WITHOUT SERVICE CONNECTIONS**



6 WHAT THIS PLAN IS DELIVERING

FIGURE 2 **LV MAP WITH SOME SERVICE CONNECTIONS**



6.2 MAPPING CAPABILITIES

ESB Networks is seeking to develop accurate maps or models of the low voltage system using an approach that combines data analytics with field spot checks. This is an innovative approach which has not been piloted previously in Ireland but is delivering promising results in other jurisdictions.

To carry out this approach to mapping our LV distribution system, the key requirements are AMI (smart metering) data and the deployment of field resources (boots on the ground) to validate the data analytics model. ESB Networks is partnering with the Electric Power Research Institute (EPRI) to develop the data analytics model required, based on its experience working with US utilities, some of whom have successfully implemented similar approaches. Upon completion of initial testing of the data analytics model, on the ground validation will be undertaken and pending its success, the results from the EPRI model will be fed into ESB Networks' GIS system.

ESB Networks is developing a documented and approved procedure for field staff to validate results. This procedure references ESB Networks' safety rules, policies, and protocols. Training will also be provided by ESB Networks to contractor field staff carrying out any validation exercises. This will be delivered under the control of ESB Networks' National Training Centre (NTC).

6 WHAT THIS PLAN IS DELIVERING

It is anticipated that 10% of results obtained during the development phase of this data analytics-based modelling approach will need to be validated to indicate the level of accuracy across the network. However, it will only be possible to confirm the accuracy of this assumption once initial model results are available. Due to challenges in relation to accessing smart metering data as a result of its falling within GDPR legislation, this has not been possible to date. However, there is ongoing consultation with ESB Data Protection Officer (DPO) to secure access to this data.

Field trials are also required as part of the procurement of equipment and devices for the purposes of validation, including:

1. **Phase and feeder identification units.**
2. **Cable location units.**

6.3 AVAILABILITY OF SMART METERING DATA

As part of the increased visibility, customers without a reference point on the LV network will have correct referencing assigned, based on collaborative use of the AMI validation data. To use this data analytic approach to LV mapping, there is a high dependency on smart metering AMI data.

Smart metering data will be used to produce a model using voltage, current, active power, and reactive power. This will allow for LV mapping, and customer referencing to the LV outlet in the substation and the customer phasing (the phase that the customer is on in a three-phase system).

However, at present, smart metering data is not available due to GDPR (General Data Protection Regulation) constraints. Without access to smart metering data, voltage monitors will be required on each LV circuit in an MV/LV Substation to allow complete visibility of the LV Distribution system.

ESB Networks is in consultation with ESB DPO to resolve this issue.

6 WHAT THIS PLAN IS DELIVERING

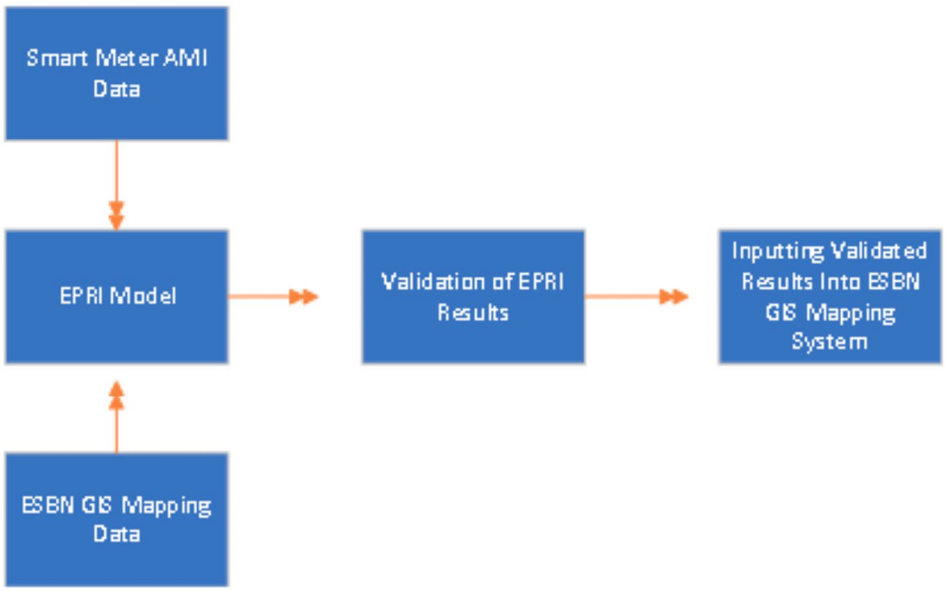
6.4 EPRI MODEL APPROACH

From market research including several utilities worldwide, and in anticipation of the availability of smart metering data, a data analytics-based approach is being developed to map the Irish LV distribution system. ESB Networks expects that this will offer a cost effective, resource efficient approach, and thus is progressing a pilot prior to committing resources to any other mapping approach. The data analytics-based approach depends on the availability of smart metering data. As a result, the programme will initially focus on the areas where the Smart Metering Programme has predominantly been rolled out including the greater Dublin and Cork regions.

ESB Networks have commissioned EPRI to develop a model using a data analytical approach including both smart metering and GIS data. Once the data is imported into the model, it will generate mapping results, customer referencing and customer phasing. ESB Networks will complete an appropriate level of validation of the generated mapping results on the ground. It is anticipated that this validation will be 10% of the generated mapping results during 2022 and 2023.

This validation will be carried out by ESB Networks field staff deployed on the ground over a 2-year period and the results will be imported into the GIS system with continued consultation with EPRI. Procedure and safety protocols will be developed, and training will be required by all ESB Networks field staff in consultation with the ESB Networks National Training Centre (NTC).

EPRI Model Process:



6 WHAT THIS PLAN IS DELIVERING

6.5 AI IMAGE RECOGNITION APPROACH

One of the largest gaps in the ESB LV model is the connection between minipillar/pole to the customer premises. To address this and as another potential alternative to the EPRI model, a proof-of-concept project is under development to use AI image recognition software to scan through google street view images.

If implemented, the AI tool could find the conductor connecting the minipillar/pole to the customer premises, and in turn, provide GPS start and end coordinates so that the conductor could be recorded in the ESB Networks GIS mapping system.

6.6 ALTERNATIVE APPROACHES

Alongside the model approaches under consideration as detailed above, there are alternative approaches under consideration. However such alternative approaches may also be highly dependent on smart metering data availability. As such any alternative will focus on the geographical areas where smart metering installation has been rolled out. We will continue to research alternative approaches to ensure that what we deliver is an effective approach and make best use of the resources available to us over the life of the programme

6.7 VISIBILITY CAPABILITIES

6.7.1 LV MONITOR CHARACTERISTICS

For ESB Networks to have an active, real-time view of the LV network, the installation of LV monitors on ground mounted and pole mounted MV/LV substations is required. LV monitoring will allow ESB Networks to offer flexibility services to its customer base.

The technical design of these monitoring devices is still under consideration and is subject to change at the time of writing.

Each device will measure voltage and current in up to 6 LV circuits in the MV/LV substation. The device will use these measurements to calculate frequency, active and reactive power, power factor, power flow direction, and power quality in terms of voltage sags/swells, and harmonics. Initially each measurement and calculation will be communicated back to ESB Networks' IT systems via 3G/4G connection, however communication will be via an ESB Networks private LTE network once it becomes available.

Each device will have an on-board memory which will be capable of storing a period of measurements if the data signal is lost. These stored measurements will again be communicated back to ESB Networks once the data connection has been restored.

Devices will be powered off the ESB LV Network and will have a capacitor backup so that it can perform a last gasp communication in the event of power failure. The devices will be sufficiently rated to protect against all weather conditions and will be designed in such a way as to not compromise the safety of ESB staff or any ESB Networks equipment.

6 WHAT THIS PLAN IS DELIVERING

6.7.2 LV MONITOR EXAMPLES

All devices shown in this section were purchased and used by ESB during Project Winterpeak, which formed part of the Dingle pilot project. These all serve as examples only and do not reflect which device ESB will choose to use at the end of the procurement process.

Further information relating to the Dingle project can be found below:

https://www.esbnetworks.ie/who-we-are/innovation/esb-networks'-dingle-project

https://www.esbnetworks.ie/newsroom/blog-post/2021/06/28/esb-networks-dingle-project-more-information

FIGURE 3 **POLE MOUNTED MONITORING DEVICE DEVELOPED BY MAC DEVICES**

FIGURE 4 **INSIDE POLE MOUNTED MONITORING DEVICE DEVELOPED BY MAC DEVICES**

FIGURE 5 **GROUND MOUNTED MONITORING DEVICE DEVELOPED BY DEPSYS**

6 WHAT THIS PLAN IS DELIVERING

6.7.3 PROCEDURES AND TRAINING

The procedures and training for the installation of the LV monitoring devices will need to be developed once the procurement process is complete. Upon completion of procurement, ESB will run field trials of the selected device in the ESB Networks National Training Centre (NTC). Installation procedures will be developed for field staff to install LV Monitors, referencing ESB Networks' safety rules, policies, and protocols. Training will be provided by ESB Networks to field staff carrying out installation under the control of the NTC.

6.7.4 MARKET SCAN/RESEARCH

Market research was conducted by ESB Networks through engagement with LV monitoring device manufacturers including MAC Devices, VTechnology, Depsys, Eneida and EA/Powerpoint Engineering. Each of these manufacturers have extensive experience with large customers both nationally and internationally. This is not an exhaustive list of manufacturers of these types of devices, and all manufacturers that bid into the tender process will be considered equally.

Each vendor session helped inform ESB Networks about the availability of LV monitors on the market and to what technical specifications/ level they can be developed. The sessions also informed ESB that the technical specifications required for the devices are possible to develop.

Marketing material and technical documentation were shared by manufacturers with ESB Networks however documentation is not shared here as it is commercially sensitive.

ESB's past experiences developing LV monitoring devices for the Dingle project have informed the design process for the National Network, Local Connections Programme.

6 WHAT THIS PLAN IS DELIVERING

6.8 REQUIRED IT & ARCHITECTURE

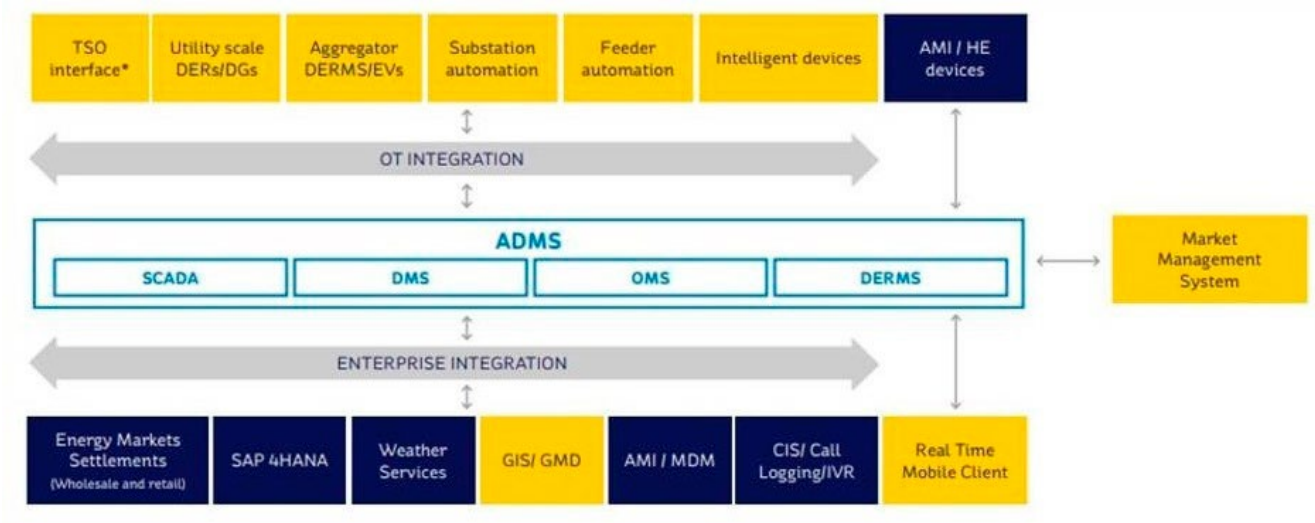
6.8.1 ADMS MAPPING

As part of the overall National Network, Local Connections Programme, ESB Networks is working towards implementing a fully integrated Advanced Distribution Management System (ADMS). Visibility of the LV network will be integrated into the ADMS which will give ESB Networks more operational control of the LV system. It is envisaged that this will take place in Q1 of 2025. In the interim, the LV mapping data will be stored in the current ESB Networks' GIS system.

6.8.2 ADMS MONITORING

Once installed on the network, data from the LV monitors will be pointed to a gateway in the Microsoft Azure internet of things (IoT) hub environment. From here, ESB Networks will be able to import monitoring data from the Microsoft Azure IoT hub into the new ADMS once it becomes available. Real time information will then be fed to operations/control room staff to assist with network performance. Real time and historical data will also become available to ESB Networks staff for further analysis when required. Creation of platforms and dashboards and associated analytics will be developed in the Microsoft Azure IoT hub environment. This is currently being explored as part of the programme of work.

FIGURE 6 **REQUIRED IT & ARCHITECTURE**



7

Visibility Milestone Plan 2021- 2025

7 VISIBILITY MILESTONE PLAN 2021- 2025

The objective of the National Network, Local Connections Programme Visibility Multiyear Plan is to outline the proposed roadmap for increasing visibility of the network between now and the end of the year 2025. In 2020, it was agreed that visibility will be tracked and incentivised year on year by the CRU, working toward a target of 50% visibility of the network by the year 2025. As well as introducing increased levels of visibility, the ESB Networks will need to manage and monitor the network. Such monitoring will be achieved by deploying measurement devices on the low voltage side of the MV/LV distribution substations.

Each year of the visibility multiyear plan will build upon learnings from the previous year. Delivery phases will follow typical project delivery lifecycle phases of High-Level Design (HLD), Detailed Design (DD), Build, Test and Deploy. The target for monitoring is to have 10,660 monitors installed by the end of 2025. This will follow a waterfall methodology however there will be significant overlap between each year. 2022 and 2023 will see the completion of detailed procurement, data analytics with the engagement of EPRI, and data integration. 2024 will follow a similar path however procurement of both digital and private long-term evoluation (PLTE) monitors will be completed in 2023.

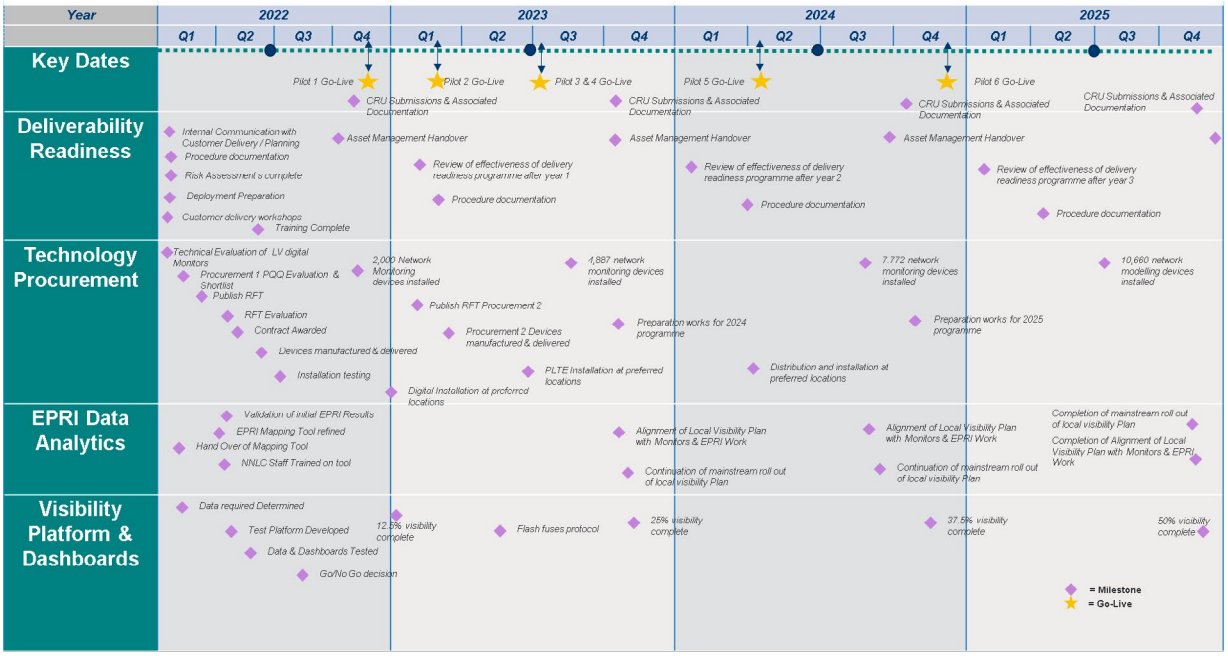
As part of PR5, the CRU is introducing an annual balanced scorecard based on ESB Networks' development and execution of a plan to secure increased visibility (50% of the low voltage network), improved customer referencing (assessment of 20% of all customers for connection point reference and LV feeder reference, and correction of the assigned referencing for those that are not based on collaborative use of AMI validation data), and monitoring (10,660 monitoring devices on the LV network) prior to the end of 2025. The scorecard focuses on the following three pillars, delivery readiness and sourcing, securing visibility, and sharing visibility. ESB Networks' performance will be scored on quality of plan & actions (20%), implementation (40%) and effectiveness (40%).

The scorecard is designed to reflect the need for better information on, and visibility of the LV Network, allowing the DSO to manage the networks more efficiently and deliver better outcomes and efficiencies for customers and market participants. This will require ESB Networks to gather and validate the reference information required to support the visibility of the LV network and deliver system interfaces required to enable visibility of the LV network. By the end of 2021 ESB Networks are required to deliver an LV visibility technical & delivery strategy roadmap. ESB Networks are also required to complete certain delivery readiness activities addressing technical, technological and practical dependencies and develop a plan for the delivery of a beta data exchange platform.

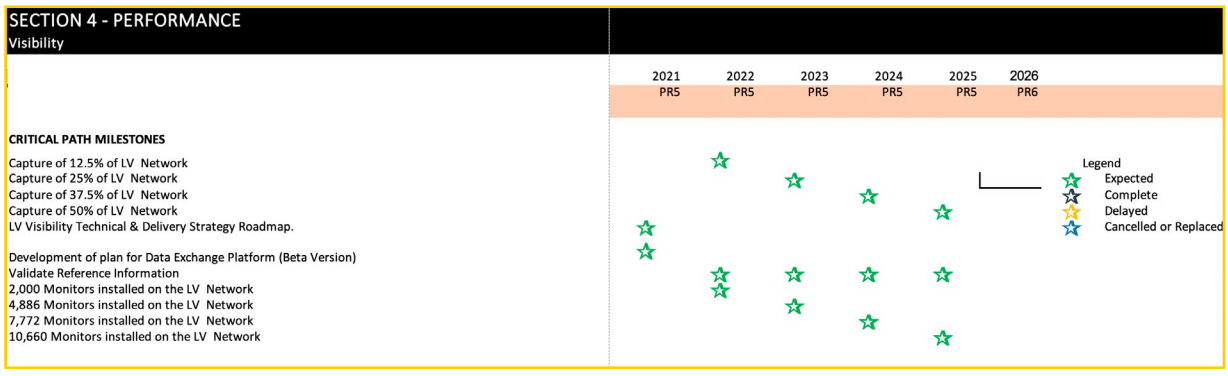
7 VISIBILITY MILESTONE PLAN 2021- 2025

Please see the below visibility multiyear plan from 2022 onward. This multiyear plan provides the basis of the proposed annual milestones to be used as targets in the PR5 Visibility Incentive.

FIGURE 7 **HIGH LEVEL PLAN ON A PAGE**



During 2023, 2024 and 2025, ESB Networks must also gather and validate reference information required to support the visibility of the network. The target for 2022 is to capture 12.5% off the LV network, this is to be expanded to 25% by the end of 2023, 37.5% by the end of 2024, and 50% by the end of 2025. During 2023, 2024 and 2025, ESB Networks must also gather and validate reference information required to support the visibility of the network. ESB Networks will also aim to install 10,660 LV monitoring devices on the network between 2022 and 2025, broken into tranches of 2,000 in 2022 and 2,887 per year for the remaining three years.



7 VISIBILITY MILESTONE PLAN 2021 - 2025

The table below reflects the milestones from 2021 onwards.

YEAR	MILESTONES
2021	LV visibility: technical & delivery strategy roadmap. Readiness activities addressing dependencies. Sourcing of technical solutions. Development of a plan for the delivery of a beta data exchange platform. Commencement of gathering & validating reference information.
2022	Capture of 12.5% of LV Network by the end of 2022. Gather and validate customer reference information required to support the visibility of the LV Networks for 5% of all customers. ESB Networks is working towards reaching a level of 2,000 monitors by 2025.
2023	Capture of 25% of LV Network by the end of 2023. Gather and validate customer reference information required to support the visibility of the LV Networks for 5% of all customers. ESB Networks is working towards reaching a level of an additional 2,887 monitors by 2025.
2024	Capture of 37.5% of LV Network by the end of 2024. Gather and validate reference information required to support the visibility of the LV Networks. ESB Networks is working towards reaching a level of an additional 2,887 monitors by 2025.
2025	Capture of 50% of LV Network by the end of 2025. Gather and validate customer reference information required to support the visibility of the LV Networks for 5% of all customers, delivering a total of 20% of all customers completed. ESB Networks is working towards reaching a level of an additional 2,886 monitors, delivering a total of 10,660 monitors, by 2025. Deliver system interfaces required to enable visibility of its LV network.

8

Dependencies

8 DEPENDENCIES

As with all transformation programmes, there are dependencies and constraints that require close and careful management to ensure the plan is delivered effectively. The key dependencies in relation to the Local Network Visibility Multiyear Plan have been captured below.

FOR	DESCRIPTION	YEAR	WHEN
Asset Management	Operational Visibility Mapping have been recommended to become the asset owner of LV Monitors during the deployment programme with hand over plan to be put in place after. This will be conducted on a phased approach from 2022-2025.	**2022-2025**	**Annually Q4**
GIS Data	GIS data to be extracted for EPRI – Connectivity information to be pulled for further support to the first two data sets.	**2022-2025**	**Annually Q1-Q4**
Smart Metering Data	EPRI - Data analytics (Smart Metering Dependent) - Extraction of MRPN information (data protection protocol to be observed).	**2022-2025**	**Annually Q1-Q4**
Smart Metering Data	Smart metering data required for flash fusing approach.	**2022-2025**	**Annually Q1/Q2**
Smart Metering Data	There is a dependency that ESB Networks DPO will approve the use of AMI geospatial and voltage data which can be anonymised for use to develop the LV mapping model in order to achieve the 12.5 % annual target of LV mapping from 2022 until 2025 inclusive.	**2022-2023**	**Annually Q1-Q4**
Customer Delivery	Customer delivery – Roll out installation team (boots on the ground) for monitoring and validation of secondary model results and bridge gaps on data analytical model	**2022-2025**	**Annually Q1-Q4**
Network Telecoms	Availability of the LTE network required for procurement 2 and the rollout of LTE monitors on the LV network.	**2022/2023**	**Annually Q1-Q4**
EPRI	EPRI required to build the data analytics model used in relation to increasing mapping of the LV network.	**2022-2023**	**Annually Q1-Q4**

9

Next Steps

9 NEXT STEPS

1 **Procurement**
a). Monitor technical specification.
b). Tender process.

2 **Procedures**
a). Validation of mapping
b). Installation of LV monitors, including commissioning and risk assessments.

3 **Continue to develop the EPRI modeling tool.**

4 **Continue exploration of alternative mapping methods.**