

DSO/TSO Multi-Year Plan 2023 - 2027

Joint System Operator Programme

Updated May 2023 following
consultation

DOC 301122 HPO



NETWORKS

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Executive Summary

Collaboration between the transmission system operator (TSO) and distribution system operator (DSO) in Ireland is essential for a successful energy transition and long-term resilience of electricity supply. Since publication of the 2022 – 2026 DSO/TSO Multi- Year Plan¹, considerable effort has been expended by EirGrid and ESB Networks to work in partnership to meet Ireland’s targets for renewable electricity and support the path to decarbonisation.

This multi-year plan details the key tasks and milestones that the system operators are working towards between 2023 and 2027 under the following pillars: reducing dispatch down, secure future power system, facilitating new technology and whole of system solutions. These pillars have been drawn directly from Commission for Regulation of Utilities (CRU) Decision Paper “PR5 Regulatory Framework Incentives and Reporting” (CRU/20/154²), including the objectives set out in sections 7.9 and 8.12 (noting that the facilitation of new technologies was set out explicitly in section 8.12 only, whereas all other pillars were introduced in both sections 7.9 and 8.12).

As per CRU Decision Paper “PR5 Regulatory Framework Incentives and Reporting” (CRU/20/154), the proposals outlined in this document include a detailed three-year plan for 2023-2025 and a high-level two-year plan for 2026 and 2027. They have been prepared by the system operators for consideration of the CRU and the consideration of customers and stakeholders, through full public consultation.

As a result of increased collaboration between the TSO and DSO since publication of the 2022 – 2026 DSO/TSO Multi-Year Plan, and based on stakeholder feedback received, we have introduced a number of new updates to the plan. This reflects our commitment to this programme meeting stakeholder and customer needs.

The new updates include:

- 1 Introduction of a new section on industry participation and engagement;
- 2 Introduction of new pilots focusing on alleviating short-term security of supply issues; and
- 3 Introduction of an updated balanced scorecard to align with the CRU Information Paper “Price Review Five: 2022 Balanced Scorecards (CRU2022989)³”.

¹ <https://www.esbnetworks.ie/docs/default-source/publications/esb-networks-national-network-local-connections--eirgrid-multi-year-dso-tso-work-plan-covering-2022-2026.pdf> and

<https://www.eirgridgroup.com/site-files/library/EirGrid/DSO-TSO-Joint-Incentive-Multi-Year-Plan-Consultation-Paper.pdf>

² <https://www.cru.ie/wp-content/uploads/2020/12/CRU20154-PR5-Regulatory-Framework-Incentives-and-Reporting-1.pdf>

³ [CRU2022989-Balanced-Scorecard-2022-Information-Paper.pdf](https://www.cru.ie/wp-content/uploads/2022/02/CRU2022989-Balanced-Scorecard-2022-Information-Paper.pdf)

Glossary

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1. Glossary

TERM	DEFINITION
AGU	Aggregated Generator Unit
CRU	Commission for Regulation of Utilities
DCRP	Distribution Code Review Panel
DER	Distributed Energy Resources
DSO	Distribution System Operator
DSU	Demand Side Unit
FNTSS	Facilitating New Technology and System Services
GC	Grid Code
GCRP	Grid Code Review Panel
I&C DSR	Industrial and Commercial Demand Side Response
MEC	Maximum Export Capacity
MLE	Multiple Legal Entities
NCC	National Control Centre
NDCC	National Distribution Control Centre
NECP	National Energy Climate Plan
PR5	Price Review 5
QTP	Qualification Trial Process
RDD	Reducing Dispatch Down
RE	Renewable Electricity
RES	Renewable Energy Source
RESS	Renewable Energy Support Scheme
RoCoF	Rate of Change of Frequency
SFPS	Secure Future Power Systems
SNSP	System Non-Synchronous Penetration
SO	System Operator
TAO	Transmission Asset Owner
TSO	Transmission System Operator
UFLS	Under Frequency Load Shedding
WOS	Whole of system

Introduction

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2. Introduction

The Joint System Operator Programme was established by the TSO and DSO in 2021 to ensure that the system operators are working together in a collaborative and effective manner to jointly address electricity system needs and deliver whole of system solutions.

The programme objectives are:

- 1 Support societal and economic growth in a sustainable and secure manner, consistent with our license obligations, through further development of the transmission and distribution systems.
- 2 Support the delivery of Ireland's 2030 and longer term climate and energy policy objectives through collaboration between the TSO and DSO.
- 3 Address the Commission for Regulation of Utilities' (CRU) objectives for DSO/TSO coordination. These are set out below:
 - The management of dispatch down and curtailment.
 - Addressing security of supply and constraint management especially in the Dublin region.
 - A whole of system approach to the optimisation and meeting of system and customer needs.
 - Jointly developing effective processes for the deployment of new technology on the grid and in operations.

2.1 Progress within 2022

The TSO and DSO have worked closely together in 2022 to support the Joint System Operator Programme. We continue to progress the tasks committed to as part of the DSO/TSO Multi Year Plan 2022-2026 submitted to the CRU in October 2021. The TSO and DSO jointly published the responses received to this consultation in April 2022. Activity has been progressed across all four workstreams, which will be set out in detail in the end of year report for 2022 to be submitted to CRU in early 2023.

EirGrid and ESB Networks continue to work in partnership holding monthly decision-making forums in the form of a Management Liaison Board. Discussion Board meetings are also being held on a quarterly basis by project sponsors in both ESB Networks and EirGrid.

2.2 Background to Plan Development

The first DSO/TSO Multi Year Plan was submitted to the CRU at the beginning of 2021 to reflect the tasks and milestones jointly being carried out by system operators. It was recognised that to meet the ambition of the 2019 Climate Action Plan and any future increased ambition, the TSO and DSO needed to work in collaboration with market participants.

2. Introduction

Since the publication of this plan, significant collaborative work has been carried out by EirGrid and ESB Networks to address the challenges arising under the four pillars of whole of system, reducing dispatch down, facilitating new technology and delivering a secure future power system. We have worked collaboratively across these four pillars to ensure that our customers can expect a high quality, low carbon and reliable supply of electricity.

In 2021, ESB Networks launched the National Network, Local Connections Programme (NNLC), in collaboration with stakeholders from across the energy sector and broader Irish society. The programme enables and drives all customers’ active participation in local and system wide services. The DSO/TSO Multi Year Plan is central to ensuring that NNLC is delivered in a coordinated and collaborative manner, working with the TSO. Since publication of the 2022 - 2026 Multi-Year Plan, based on stakeholder feedback and continuously evolving customer and industry needs, several additional pilots have been added to this programme. This includes the introduction of the “Beat the Peak” initiatives to increase the role of demand side flexibility in supporting security of supply in 2022, 2023 and 2024. These are detailed in section 4 of this document, along with the suite of relevant pilots going live on the distribution system from October 2022.

In November 2021, EirGrid launched the inaugural Shaping Our Electricity Future (SOEF) Roadmap which was prepared in consultation with stakeholders from across society, government, industry, market participants and electricity consumers. The roadmap provided guidance on the transmission network reinforcements, engagement plans, system operation enhancements needed to achieve at least 70% of electricity from renewable resources by 2030. EirGrid is currently developing V1.1 of the roadmap which will take account of a higher RES-E target of up to 80% for 2030. Inherent in this is a secure transition to 2030 whereby we continue to maintain a safe, affordable, and reliable power system. The joint system operators’ work programme is central to ensuring that the SOEF Roadmap is delivered in a coordinated and collaborative manner, working with the DSO.

A variety of components have fed into the updates to the DSO/TSO Multi Year Plan 2023-2027. This includes the Climate Action Plan updates, SEM-22-012 System Services Future Arrangements High Level Design decision paper, engagement with task leads in both ESB Networks and EirGrid and consideration of expected new policy developments in Ireland in the period to 2027.

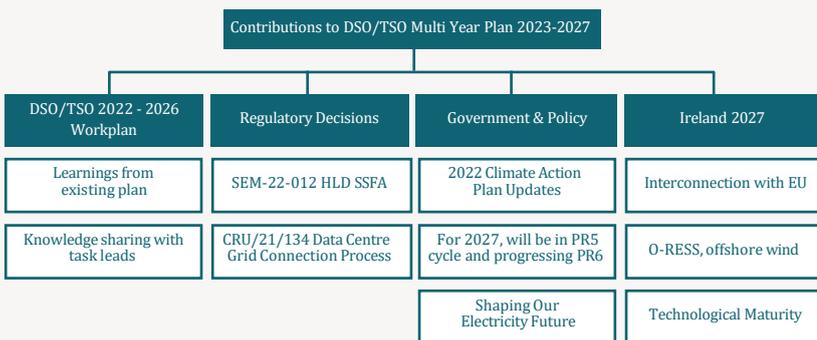


Figure 1: Contributions to the DSO/TSO 2023-2027 Multi-Year Plan

2. Introduction

As part of the development of this plan, the system operators have also taken into consideration the feedback outlined in “Price Review 5: 2021 Balanced Scorecards – Transmission and Distribution (CRU20226)” and Price Review 5: 2022 Balanced Scorecards Distribution and Transmission (CRU2022989). Following on from the review of these documents, we have continued to focus on the four workstreams as outlined in the DSO/TSO Multi Year Plan 2022-2026 as best reflecting the objectives of the PR5 determination.

The tasks and activities on the plan form the following four workstreams:

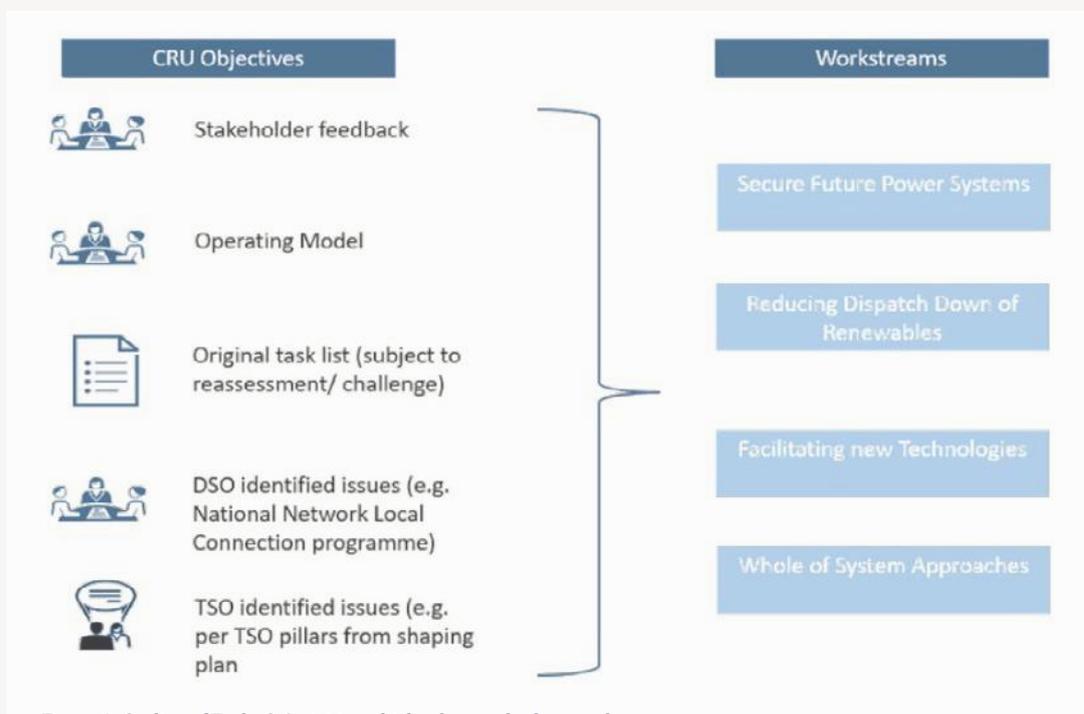


Figure 2: Outline of Tasks & Activities which relate to the four workstreams

As outlined previously in the DSO/TSO Multi Year Plan 2022-2026, although many of the tasks will deliver benefits in terms of several of these objectives, we have structured them into a primary work stream based on the primary expected benefit to customers.

2.3 Multi-Year Plan Ambition and Approach

Many of the tasks and activities proposed within this ambitious programme are inherently world leading. The approaches proposed, in terms of the level of coordination between the TSO and DSO in addressing the needs of our customers, consumers, and society will break new ground internationally. We are adopting these approaches as we believe these are necessary to achieve the overall government and regulatory policy and objectives set out for 2030 and beyond. However, we do so knowing that in many instances there will be limited precedent or blueprints for us to follow. As such, there will be a degree of underlying risk which we must manage throughout the life of the programme, and there will likely be cases where the outcome of a task is different from what we expected at the outset.

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The approaches being developed include co-ordination of services arrangements on a constrained system, coordinated management of pioneering levels of variable non-synchronous renewable generation and whole of system approaches to ensuring we provide capacity and security to support the uptake of low carbon technologies in homes and businesses.

The proposed approach within the plan is an iterative one, allowing us to learn what works and what needs to be adapted. We will endeavour to pilot activities with our customers, and communities early and often in the programme. We will adapt the multi-year plan in response to changing customer needs, changes in technology maturity, stakeholder input and pilot learnings.

Customer participation and engagement will be a critical component to ensure that pilots and activities deliver enduring outcomes. We will engage actively with our customer, industry, and community stakeholders to ensure that we address barriers to entry and shape incentives to maximise participation within the limits of our funding.

2.4 Industry Participation and Engagement

Since the Joint System Operator Programme commenced in 2021, industry participation and engagement has been a key focus of the programme. The system operators understand the need to actively engage with our customers, industry, and community stakeholders to ensure that we address barriers to entry and shape incentives to maximise participation with our programme.

This MYP underwent a public and industry consultation from 10 February to 10 March 2023, and has been updated accordingly.

In this regard, the system operators propose the following engagement checkpoints for the DSO/TSO Multi Year Plan 2023-2027:

- 1** The TSO and DSO will jointly engage in a public consultation on the multi-year plan with industry on the updated proposals.
- 2** The system operators will conduct a standalone targeted joint stakeholder engagement exercise (workshop, roundtable or information session, as appropriate); with a focus on progress in the development, and shaping, of the future DSO-TSO operating model. This will also discuss how the DSO/TSO co-ordination of constraints will be managed via the future DSO/TSO operating model.
- 3** The progress of the DSO/TSO Multi Year Plan 2023-2027 will be shared at a SOEF advisory council meeting; and a National Networks Local Connections advisory council meeting during the year.
- 4** Balanced Scorecard: To facilitate increased transparency and visibility around the balanced scorecard, the system operators propose to publish a summary of the results of the most recent audit.

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2.5 Dependencies

A number of dependencies as outlined in the 2022 – 2026 DSO/TSO Multi-Year Plan are still relevant to the work that will continue until 2027. We continue to work towards building enduring approaches, but acknowledge the reliance on other external parties. Where applicable we have called these out on the detailed plan, and some key high-level dependencies are listed below.

A number of key new dependencies for this 2023 – 2027 DSO/TSO Multi-Year plan include:

- 1 SEM-22-12 High Level Design System Services Future Arrangements.
- 2 CRU/21/124 CRU Decision on Data Centre Grid Connections Process.
- 3 ACER Consultation on the Framework Guideline on Demand Response.
- 4 SEM-22-009 - Decision Paper on Dispatch, Redispatch and Compensation Pursuant to Regulation (EU) 2019/943.

Other dependencies that were outlined in the 2022 – 2026 DSO/TSO Multi-Year plan that are still relevant, include, but are not limited to:

- 1 SEM-21-027 Proposed Decision on Treatment of New Renewable Units in the SEM.
- 2 SEM-21-016 Consultation on compliance of the SEM market arrangements with EU Electricity Balancing Guideline (EU Regulation 2017/2195).
- 3 Regulatory decisions regarding the funding of local and system services (including as required to progress piloting activities). For example, if either the TSO or DSO seeks to pilot a service which is not currently funded within the existing Use of Systems (UoS) or market revenue streams, a funding model of the appropriate scale would be required to progress the pilot.
- 4 Industry/customer readiness – for example, it will not be possible to progress a Qualification Trial Process (QTP) pilot or other pilot if potential participants do not bid proposals into the process.

Each work stream and initiative within that work stream has its own risks, assumptions, and dependencies. The intention of this document is to highlight the initiatives and indicative timings.

These initiatives focus on the points where DSO/TSO coordination is vital. Each system operator has its own unique initiatives under the different licence obligations, which will be progressed in parallel with this programme and in many instances interact with it.

For example, the piloting activities on the distribution system referenced in this programme are primarily initiatives within a DSO programme (the National Network, Local Connections Programme). However we include activities related to these pilots in this programme to ensure that these pilots include a dedicated focus on how best to implement DSO/TSO coordination with respect to the set of activities addressed in the proposed “DSO-TSO operating model”.

Whole of System Approach

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3. Whole of System Approach

As part of the Joint System Operators' work plan, one of the key objectives is the development of a whole of system approach to system operation between the TSO and DSO.

This Joint System Operator workstream focuses on optimising the system as a whole rather than focusing on the transmission and distribution systems in isolation. Improved co-ordination between the DSO and TSO is important to deliver more efficient markets and a more resilient system.

One of the key updates in 2022 was the publication of the SEM-C Decision on System Services Future Arrangements High Level Design (SEM-22-012) in April 2022. This provides a framework for the competitive procurement of system services required for stable, secure and economic operation of the transmission system across the island of Ireland. This will feed into the development of the vision and principles of the operating model for the whole of system approach to system operation between the TSO and DSO.

Visibility and monitoring

Improved monitoring and visibility, through enhanced control centre capabilities in EirGrid's National Control Centre (NCC) and ESB Networks' National Distribution Control Centre (NDCC) will be necessary to manage the network securely in a cost-effective manner. It will be important to ensure that new and enhanced control centre capabilities are specified to account for both operators' needs and to avoid developing duplicate systems and additional costs for customers.

Forecasting

Cooperation on forecasting of demand and generation will enable better decision-support for the system operators. Over time this will contribute to greater supply reliability. This will continuously enable more cost-efficient decisions in system operation scheduling and dispatch.

System Services and Local Services

The continued evolution of system services (as per the SEM-C Decision on System Services Future Arrangements High Level Design (SEM-22-012) in April 2022) and the planned introduction of local services by ESB Networks on the distribution system should provide a greater range of services to support customers' needs on the distribution system and wider transmission system, and to support Ireland's decarbonisation policy objectives.

The expanded range of services will improve our capability to manage security, congestion and renewables penetration at a local level, alleviate transmission constraints, provide the capability of increased participation of distribution connected customers in the wider markets and provide a more efficient flexible market.

The development of transmission system services and local services on the distribution system in a manner which is operationally compatible will help service providers to participate and deliver services across all markets.

3. Whole of System Approach

Joint System Operator – Operating Model

A key initiative within the Whole of System workstream is the development of a future DSO-TSO operating model. Substantial changes are occurring in system operation. These include active network management at distribution level and other measures to enable pioneering levels of renewable generation and low carbon technologies. Supporting these will require changes to operating practices, interfaces and data exchange.

During 2022, the DSO and TSO have been working towards developing a future operating model direction, that sets out the vision and principles and an operating “straw man” for data exchange, operational interfaces, and protocols into the future.

Further development and implementation of this future DSO-TSO operating model will address the following functional areas, over the life of the multi-year plan:

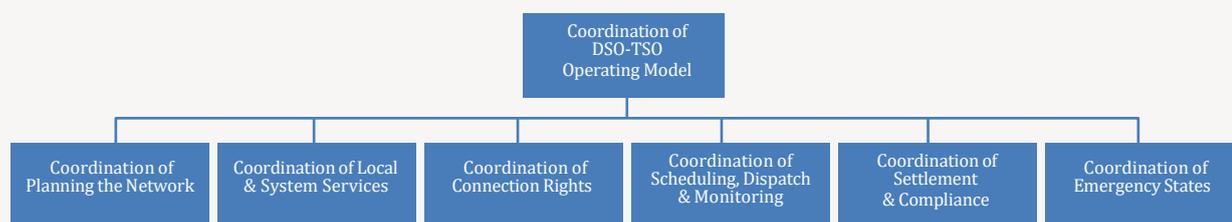


Figure 3: DSO-TSO operating model

Within the DSO/TSO Multi Year Plan 2023-2027 both DSO and TSO have included tasks and pilots that will provide opportunities to develop our capabilities across each functional area of the operating model. These activities will allow us to iteratively develop and operationally test elements of the operating model, acting as building blocks to progress and inform the enduring operating model.

The processes and protocols for cooperation at operational interfaces and data exchange developed throughout the multi-year plan, will form the basis for an enhanced operating model to support the goals of the Climate Action Plan in a manner consistent with the Clean Energy Package legal framework.

3. Whole of System Approach

3.1 Whole of System Approach Plan on a Page

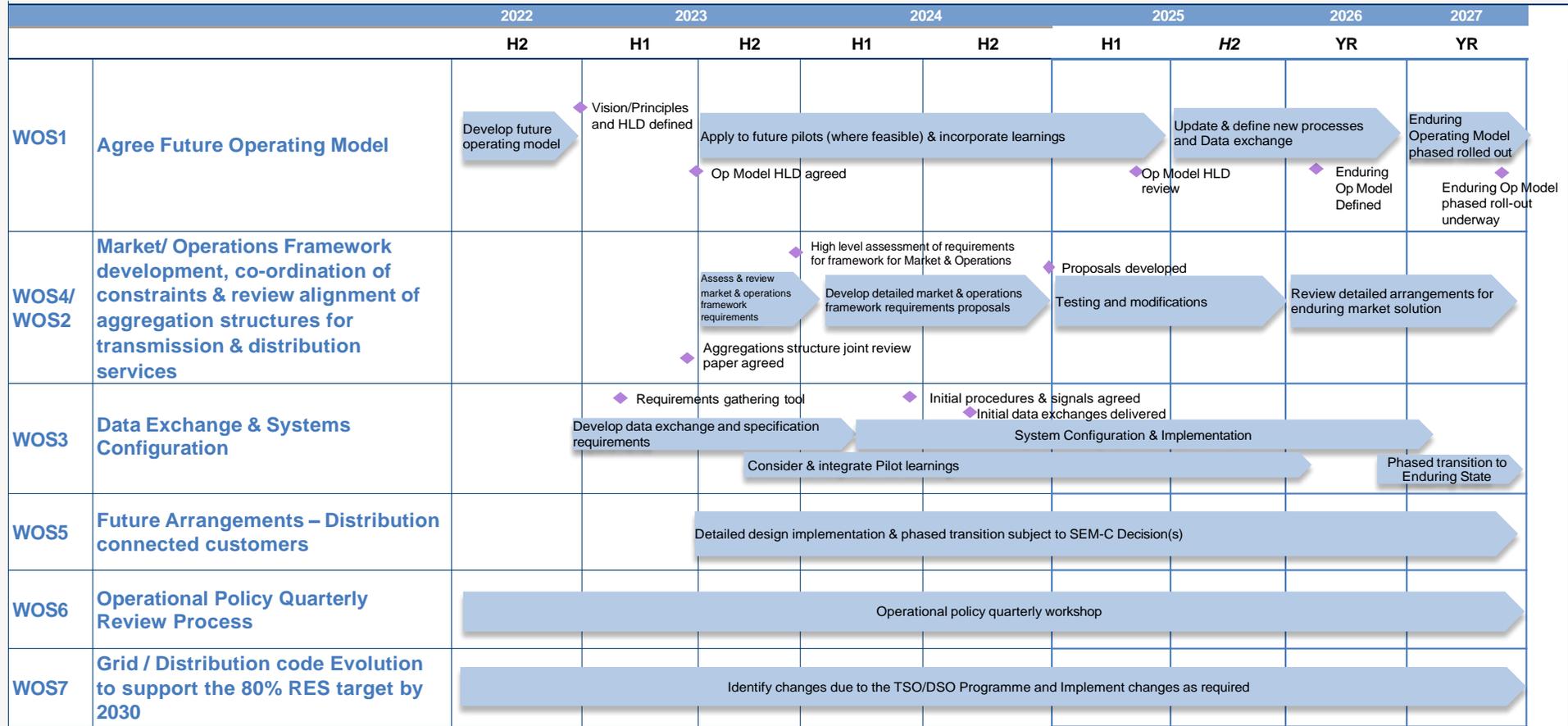


Figure 3: Whole of System Approach Plan on a Page

◆ = Milestone
★ = Go-Live

3. Whole of System Approach

Key milestones/dates:

2023:

- H1 – WOS1: Vision & Principles and operating model high level design (HLD) defined
- H1 – WOS1: Operating model HLD agreed
- H1 – WOS3: Data exchange requirements gathering tool developed
- H2 – WOS2: Aggregation structure joint paper setting out a review of the alignment of aggregation structures for transmission and distribution services and next steps agreed
- H2 – WOS4: High level assessment of requirements for framework for Market & Operations

2024:

- H1 – WOS3: Initial data exchange requirements and procedures agreed
- H2 – WOS3: Initial data exchanges delivered
- H2 – WOS4: Proposals for detailed market and operations framework developed

2025:

- H1 – WOS1: Operating model HLD review

2026 & 2027:

- 2026 – WOS1: Enduring operating model defined
- 2027 – WOS1: Enduring operating model phased roll-out underway

Identification of further potential tasks / milestones applicable in the longer term will be kept under review as this joint plan evolves. During 2022 progress was made on WOS1 – operating model via a series of detailed joint workshops and collaboration, however this work now continues into 2023. WOS2 “Review alignment of aggregation structures for transmission and distribution services” has been merged with WOS4 “Market Operations Framework” on the plan on the page due to their similarity and dependency on WOS1 “Agree Future Operating Model”.

Note: Previous task WOS8 (Review impacts of compliance testing process of (non-firm) distribution resources) from 2022 – 2026 plan is being integrated in this broader WOS1 task and will be delivered as a sub-task.

3. Whole of System Approach

Whole of System Approach Task Description and Outcomes:

Task ID	Task Name	Task Description	Outcomes / New Capabilities	Dependencies
WOS1	Agree Future Operating Model	<p>Task to develop the agreed operating model including the following:</p> <p>Monitoring & forecasting protocols Market operations protocols Operational planning protocols Dispatch & Re-dispatch protocols Compliance management protocols Outage Planning protocols</p> <p>Note: Previous task WOS8 (Review impacts of compliance testing process of (non-firm) distribution resources) from 2022 – 2026 plan is being integrated in this broader WOS1 task and will delivered as a sub-task.</p>	<p>Outcomes:</p> <ul style="list-style-type: none"> • Future operating model (To-be Model) agreed • Key interface requirements developed and piloted • Data exchange requirements developed and piloted <p>Capabilities delivered</p> <p>2023</p> <ul style="list-style-type: none"> • Agreed High-Level Design • Interim capabilities piloted (see enabling technology for details) <p>2024</p> <ul style="list-style-type: none"> • Interim capabilities piloted (see enabling technology for details) <p>2025</p> <ul style="list-style-type: none"> • TSO and DSO will be able to operate the respective systems with pioneering levels of variable renewable generation and low carbon technology <p>2026 - 2027</p> <ul style="list-style-type: none"> • Customers will have clear and consistent routes to market enabling effective participation in both local and system wide markets, based on previous years' development and testing. 	<p>SEM 22-012 Decision System Services Future Arrangements</p> <p>SEM-21-027 Proposed Decision on Treatment of New Renewable Units in the SEM</p> <p>SEM-22-009 Decision on Dispatch, Re-dispatch</p> <p>SEM-21-016 RA</p> <p>Consultation on Compliance with Guideline on Electricity Balancing</p> <p>CRU/21/060 Data Connections Policy</p> <p>CRU target setting for DSO Flexibility Multiyear Plan</p> <p>CRU approval of relevant changes to enable the future operating model</p>
WOS4	Market Framework Development	<p>This task is a sub-task of the DSO-TSO operating model. To develop the detailed framework for DSO-TSO markets & services coordination: registration processes and data exchange; provisions for value stacking; detailed rules, oversight and services prioritisation rules; settlement rules for dual service providers.</p> <p>This task will also take into consideration DSO/TSO co-ordination of constraints. The DSO and TSO will work together to continue to ensure that dispatch down is coordinated in a manner that is equitably applied and does not overly constrain renewable sources of generation. RDD5 "DSO-TSO co-ordination on constraints" has been merged with this task for 2023 as this topic will be a key part of the market framework development.</p>	<p>Outcomes:</p> <p>Customers/Service providers will have clear framework for which services can be offered to both TSO and DSO to facilitate participation in multiple markets. The development of coordinated solutions to enhance constraint management and highlight any inefficiencies.</p> <p>Capabilities delivered</p> <p>2023, 2024</p> <p>Where appropriate, participating customers/services providers will be able to offer services to TSO and DSO on a pilot basis for additional services.</p> <p>2025</p> <p>Customers will be able to offer services to TSO and DSO on a clear basis with agreed service prioritisation and service conflict rules agreed.</p> <p>Settlement arrangements under these rules developed.</p> <p>2026 - 2027</p> <p>Market arrangements reviewed in line with enduring solution additional services. Improved coordination of the application of transmission and distribution constraints to minimise the impact on renewable generation.</p>	<p>Appropriate Regulatory decisions.</p> <p>CRU target setting for DSO Flexibility Multiyear Plan</p> <p>Agreement of future operating model (WOS1)</p>

3. Whole of System Approach

Whole Of System Approach Task Description And Outcomes:

Task ID	Task Name	Task Description	Outcomes / New Capabilities	Dependencies
WOS2	Review alignment of aggregation structures for transmission and distribution services.	Task to consider the enhancement and alignment of transmission / SEM DSU/ AGU structures with any new aggregation structures to be used for broadening aggregation participation in both transmission and distribution services.	<p>Outcomes: This task addresses potential barriers for customers to provide services to both TSO and DSO and allows service providers to aggregate assets in different combinations to support transmission or distribution needs.</p> <p>Capabilities delivered 2023</p> <ul style="list-style-type: none"> Collectively bring preliminary proposals based on pilot learning to the regulator for consideration and decision <p>2024</p> <ul style="list-style-type: none"> Pending regulatory approval, service providers with aggregated assets will have clear rules in relation to participating in multiple services markets which can be adapted and developed further. 	<p>Appropriate regulatory approval (CRU or SEM-C) to make any proposed changes to rules covering aggregators.</p> <p>CRU target setting for DSO Flexibility Multiyear Plan</p> <p>Agreement of future operating model (WOS1)</p>
WOS3	Data exchange and systems configuration	<p>This task is a sub-task of the DSO/TSO operating model. New control technologies will facilitate active management of distributed resources, and greater data exchange between TSO and DSO.</p> <p>This task is to capture the necessary requirements in the development and design of operational technology systems for distributed energy resources management.</p> <p>From 2026, there will be a phased transition to the enduring state.</p>	<p>Outcomes: The outcome of the task is the integration of operational technology interfaces and establishment of the data exchange requirements in the TSO and DSO control room technology and operational systems.</p> <p>Capabilities delivered 2025</p> <ul style="list-style-type: none"> TSO and DSO will have improved ability to securely and efficiently manage the electricity system, as a result of enhanced information sharing (as per the operating model) and will have an improved capability to exchange relevant data via automated systems to agreed protocols. 	<p>Appropriate funding for control room technologies and information exchange capabilities.</p> <p>CRU target setting for DSO Flexibility Multiyear Plan</p>
WOS5	Future Arrangements – Distribution connected customers	This task enables the participation of distribution connected resources in updated TSO system services market arrangements by implementing the provisions from tasks WOS1, WOS3 and WOS2 necessary to the EirGrid Future Arrangements for System Services initiative.	<p>Outcomes: Phased implementation of procedures and governance for distribution customers' participation in transmission system services.</p> <p>Capabilities delivered: Distribution customers will be able to participate in TSO system services to agreed registration, access, and operational procedures.</p>	<p>SEM-22-012 System Services Future Arrangements High Level Design Decision Paper</p> <p>Appropriate and timely regulatory decisions during the detailed design and implementation process.</p>

3. Whole of System Approach

Task ID	Task Name	Task Description	Outcomes / New Capabilities	Dependencies
WOS6	Operational Policy Quarterly Review Process	<p>On-going policy review process for future changes to operating policies. Addresses issues that will impact on existing policies e.g.</p> <ol style="list-style-type: none"> 1. System Non-Synchronous Penetration (SNSP) 2. Minimum Number of Conventional Units On (MUON) 3. Rate of Change of Frequency (RoCoF) 4. Voltage Control 5. Priority Dispatch, Dispatch Balancing 6. Curtailments 7. Demand Side Management (DSUs and AGUs) 8. Congestion Management 9. Multiple Legal Entities (MLE)s 10. Over install policy Forum to explore technical impacts of any changes in policy. 	<p>Outcomes: SOs will have a forum to explore the technical impact of proposed changes to operational policy and consider the respective impacts on customers and system operations.</p>	
WOS7	Grid Code & Distribution Code evolution to support RES-E Targets by 2030	<p>Review the Grid Code and Distribution Code in the context of the current and future needs of the power system and initiate a programme of change to deliver the necessary modifications.</p>	<p>Outcomes: Each year arising from the DSO/TSO programme, required changes to Grid and Distribution Code will be necessary to codify changes arising from all workstreams.</p> <p>This task will ensure the requisite changes are brought to the appropriate panels for consideration and implementation.</p>	<p>CRU approval of Grid and Distribution Code changes brought forward by the Grid and Distribution Code Review Panels.</p>

Facilitating New Technology and System Services

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4. Facilitating New Technology and System Services

The government's Climate Action Plan sets out a target of up to 80% renewable electricity by 2030 and the decarbonisation of the heat and transport sectors through the electrification of heat and transport.

The objectives and measures set out in the Climate Action Plan were placed on a statutory footing with the adoption of Ireland's National Energy and Climate Plan (NECP) in 2020. Meeting these objectives will see transformative changes in the electricity system operation and related markets.

The widespread adoption of low carbon technologies in the period to 2030 offers the potential for customers to become more engaged with the electricity system and highlights the importance of new technologies in meeting these targets. These technologies could play a role in providing the demand side flexibility needed to manage the distribution and transmission systems in a secure, reliable, and cost-effective manner into the future.

Additionally, coordination between different technologies, for example battery, wind, and solar generation in hybrid arrangements, has the potential to deliver greater value from existing network infrastructure.

To realise this potential, processes and systems to support the co-ordination of transmission and distribution operations and markets are needed. The DSO/TSO joint system operator programme will develop and build these processes and systems, including by actively progressing and testing cooperative solutions through the pilot programmes being led by the DSO or the TSO over the life of this programme. This includes:

- 1 Coordinated / joint QTP activities.
- 2 Progressively improving processes for DSUs' participation in all markets.
- 3 The DSO seeking to support transmission objectives as well as distribution objectives throughout the life of its flexibility piloting programme (which runs in parallel with this programme).

Both system operators are looking to pilot new technologies and processes, and to facilitate the integration of new technologies (e.g. hydrogen-based technology and grid forming technology). The system operators will work together to enable hybrid connections and supporting arrangements to optimise the use of existing infrastructure.

Since publication of the 2022 – 2026 DSO/TSO Multi Year Plan, two new tasks have been included in this workstream, in response to the security of supply challenges in winter 2022, 2023 and 2024. These tasks, the development of coordination processes to support ESB Networks' Beat the Peak initiatives, went live in 2022 and will help facilitate demand reduction across the network during peak demand periods.

All milestones and associated tasks that have been updated as part of this multi-year plan are outlined in figure 4 of this document.

4. Facilitating New Technology and System Services

4.1 Facilitating New Technology and System Services Plan on a Page

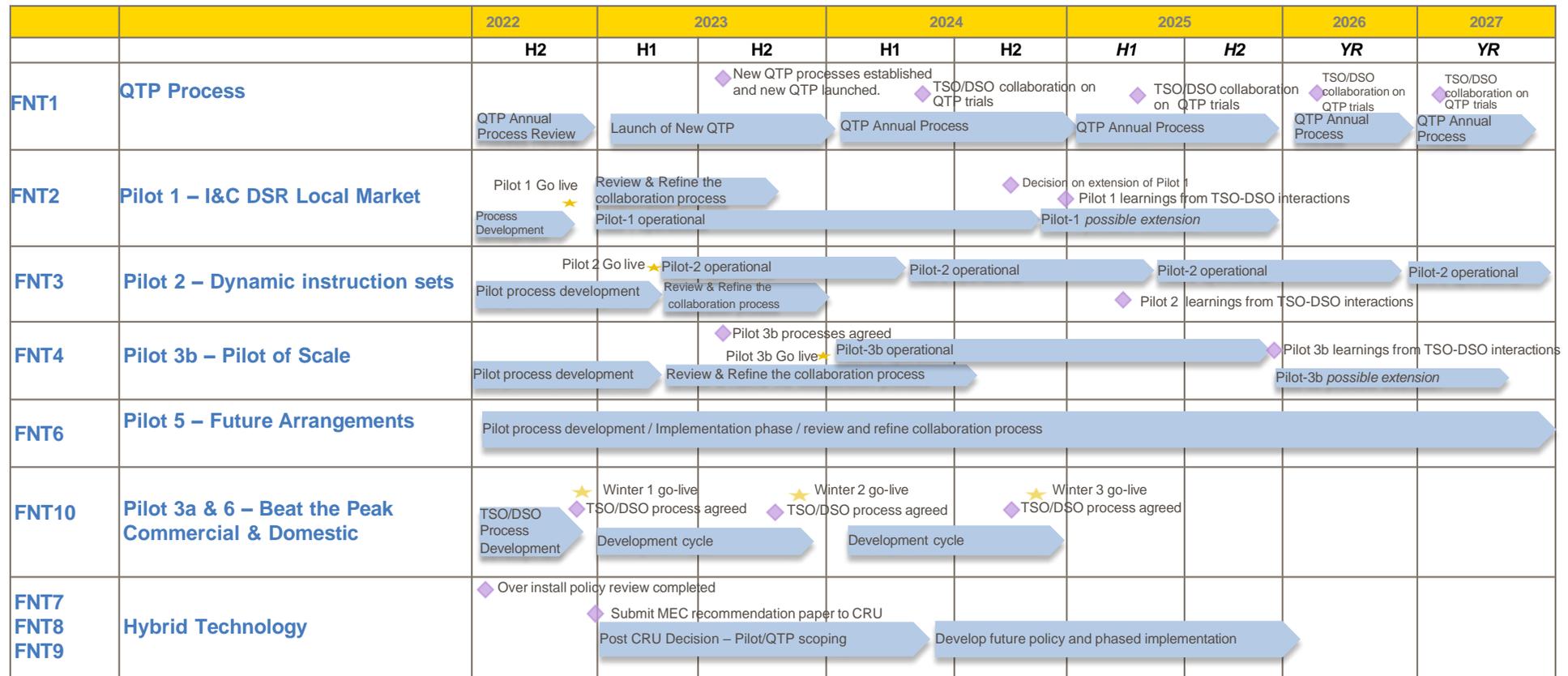


Figure 4: Facilitating New Technology and System Services Plan on a Page

◆ = Milestone
★ = Go-Live

4. Facilitating New Technology and System Services

Key milestones/dates:

2023

- H1 – FNT3: Go live of DSO Pilot 2 in line with operating model HLD
- H2 – FNT1: New QTP processes established and new QTP launched
- H2 – FNT4: Pilot 3b DSO/TSO coordination processes developed in line with operating model HLD
- H2 – FNT10: Beat The Peak Commercial & Domestic winter 2 DSO/TSO processes agreed
- H2 – FNT10: Beat The Peak Commercial & Domestic winter 2 Go-live

2024

- H1 – FNT1: DSO/TSO collaboration on QTP trials
- H2 – FNT2: Decision on extension of Pilot 1 (or merging into Pilot Pipeline 3)
- H2 – FNT10: Beat The Peak Commercial & Domestic winter 3 DSO/TSO processes agreed
- H2 – FNT10: Beat The Peak Commercial & Domestic winter 3 Go-live
- H2 – FNT2: Pilot 1 learnings from DSO/TSO interactions

2025

- H1 – FNT1: DSO/TSO collaboration on QTP trials
- H1 – FNT3: Pilot 2 Learnings from DSO/TSO interactions
- H2 – FNT4: Pilot 3b learnings from DSO/TSO Interactions

2026 & 2027

- FNT1: DSO/TSO collaboration on QTP trials

Identification of further potential tasks/milestones applicable in the longer term will be kept under review as this joint plan evolves. Continuation of learnings from pilots to feed into enduring solution.

Note: FNT5 “DSO RESS 1 Early Access Pilot” has now been included as part of the reducing dispatch down workstream as RDD6.

4. Facilitating New Technology and System Services

4.2 Technology Tasks and Outcomes

Task ID	Task Name	Task Description	Outcomes / New Capabilities	Dependencies
FNT1	QTP Process (System Operators Coordination)	<p>QTP – annual call for potential projects; possible examples include hybrids, hydrogen, grid-forming</p> <p>Over the next year and beyond both parties will agree on what should be trialed for the benefit of milestones in 2030.</p>	<p>Outcomes: QTP learnings and outcomes. Annual call for potential projects, possible examples such as hybrids, hydrogen, grid-forming.</p> <p>Capabilities delivered</p> <ul style="list-style-type: none"> Customers will be able to trial new technologies on the system or enable the use of existing technology in new applications. SOs will be able to assess the impacts of integrating these technologies on their respective systems. 	<p>Conducting annual QTP trials is dependent on identification of relevant trial focus areas by the TSO and participation of service providers in the trials.</p> <p>SEM-22-012 System Services Future Arrangements High Level Design Decision Paper sets out new arrangements for the QTP for which there will be a transition period.</p>
FNT2	DSO Pilot 1 - I & C DSR Local Market (System Operators Coordination)	<p>This task delivers an ability to manage the required DSO/TSO interaction relating to the DSO flexibility pilot. The pilot provides for the DSO to use flexible services providers to manage local congestion and this task will ensure that any relevant impacts on the TSO are considered, the nature of which will vary dependent on the specific location and provider makeup.</p> <p>Pilot 1 will continue to be operational from 2022 – 2024, with a possible one year extension. Learnings from DSO/TSO interaction from this pilot will be used for other pilots, specifically pilot 3b.</p>	<p>Outcomes: Learnings from the trial to address enduring solution for information exchange and service prioritisation for TSO/DSO.</p> <p>Capabilities delivered 2023 TSO and DSO will work together to assess the impacts and begin to gather learnings of distribution customers providing services.</p>	<p>Dependent on participation of flexible service providers in pilot.</p> <p>SEM-22-009 Decision Paper on Dispatch, Redispatch and Compensation Pursuant to Regulation (EU) 2019/943</p>
FNT3	DSO Pilot 2 – Dynamic Instruction Sets (System Operators Coordination)	<p>This task delivers an ability to manage the required DSO/TSO interaction relating to the DSO 2023 Dynamic Instruction Sets pilot. This pilot delivers an ability for the DSO to facilitate participation of DSUs in providing balancing and system services in congested areas where their operation would breach planning standards. Augmented DSO operational systems with an improved modelling granularity will facilitate a day ahead allocation process compared to the current process of offline annual studies.</p>	<p>Outcomes: The outcome of this task will be the development and implementation of a set of joint business processes that manage the DSO/TSO interaction and form a pilot implementation for aspects of operating model. This will support the maximisation of DSO IDS participation in TSO system service arrangements.</p> <p>Capabilities delivered 2023 DSU customers will be able to participate more freely in transmission markets using a more granular and efficient capacity allocation process which will improve their network access in congested areas</p> <p>The DSO will be able to provide day ahead allocation and associated processes which will have other applications in DSO/TSO coordination.</p>	<p>Dependant on participation of DSUs in pilot.</p> <p>SEM-22-009 Decision Paper on Dispatch, Redispatch and Compensation Pursuant to Regulation (EU) 2019/943</p>

4. Facilitating New Technology and System Services

Task ID	Task Name	Task Description	Outcomes / New Capabilities	Dependencies
FNT4	DSO Pilot 3b – Pilot of Scale (System Operators Coordination)	<p>This task delivers an ability to manage the required DSO/TSO interaction relating to the DSO 2023 Flexibility Pilot of Scale. This pilot builds on previous 2022 DSO flexibility pilot and delivers capability for additional products, more complex use cases and broader flexible service provider participation.</p> <p>The pilot will consider the requirements for facilitating distribution connected customers at residential level participating in TSO services/products or aggregated participation in wholesale markets such as balancing.</p>	<p>Outcomes: The outcome of this task will be the development and implementation of a set of joint business process by building on the experience from the DSO 2022 Flexibility pilot that will manage the DSO/TSO interactions and form a revised pilot implementation of aspects of Operating model.</p> <p>Deliver capability to utilise residential demand in the delivery of services to TSO.</p> <p>Capabilities delivered 2023</p> <ul style="list-style-type: none"> • Distribution connected customers will be able to offer reactive power services to both TSO and DSO as appropriate to their network location and topology. <p>Capabilities delivered 2024</p> <ul style="list-style-type: none"> • Residential customers will be able to participate (via aggregation) in services to the TSO and DSO. 	<p>Dependent on participation of flexible service providers in pilot.</p> <p>Learnings from Pilot 1</p>
FNT6	DSO Pilot 5 Future Arrangements (DSO/TSO Operating Model updates) (System Operators Coordination)	<p>This pilot tests the updated processes for relevant technical modalities (including registration, qualification, and dispatch arrangements) of distribution connected customers in TSO system services market.</p>	<p>Outcomes: The outcome of the pilot would be to test the processes for service participation from distribution connected customers in new auction- based services on an interim basis and inform the implementation of enduring DSO operational systems.</p> <p>Capabilities delivered The DSO will be able to provide the following in coordination with the TSO and customers:</p> <ul style="list-style-type: none"> •Improved registration processes for customers •Qualification processes •Allocation processes •Dispatch arrangements 	<p>Progression of the Future Arrangements detailed design and implementation process and associated SEMC decisions.</p> <p>Dependent on participation of flexible service providers in pilot.</p> <p>Dependent on the Future DSO-TSO operating model HLD</p>
FNT10	Pilot 6 - Beat the Peak Domestic (System Operators Coordination)	<p>Domestic behavioral demand response campaign, promoting and rewarding customers who reduce demand during peak demand events, testing a mixture of personal, community and broader pro-social incentives. This campaign will be supported by digital elements including the provision of targeted insights into customers' electricity demand.</p>	<p>Outcomes: Domestic customers actively lower their demand during peak hours.</p> <p>Capabilities delivered Demand is lowered on the network during peak hours, reducing the security of supply challenges during winter 2023, 2024 and 2025.</p>	<p>CRU Consultation on Electricity Network Tariffs 2022 -2023</p>

4. Facilitating New Technology and System Services

Task ID	Task Name	Task Description	Outcomes / New Capabilities	Dependencies
FNT10	Pilot 3a - Beat the Peak Commercial (System Operators Coordination)	Commercial demand response campaign, targeting large and multi-site commercial customers to reduce demand during peak events, in return for financial incentives in the form of direct payments. A “active” campaign and a “pledged” campaign will be available, where the “active” campaign operates on the basis of baselining, measurement, financial rewards and eligibility criteria designed to maximise value for money. The “pledged” campaign will be open to all commercial bodies and emphasises reputational incentives, to build awareness and build collective action to beat the peak. A “daily” campaign is in development for introduction in early 2023.	Outcomes: Commercial customers actively lower their demand during peak hours. Capabilities delivered 2023: Demand is lowered on the network during peak hours, reducing the security of supply challenges during winter 2023, 2024 and 2025.	CRU Consultation on Electricity Network Tariffs 2022 -2023
FNT7	Hybrid Technology (MLE)	Given the potential for different technology types behind a single connection point to be owned by separate legal entities, the SOs are exploring a model whereby multiple legal entities might be permitted to connect behind a single connection point. The plan builds on the work from the FlexTech Hybrid Working Group ¹ .	Outcomes: Develop a contractual framework to accommodate MLEs behind a single connection point. Capabilities delivered Generators owned by different legal entities will be able to operate behind a single connection point.	CRU review and decision on the recommendations paper submitted to CRU in June 2022. Next steps will be determined post CRU engagement.
FNT8	Hybrid Technology (Over Install)	An over-installation policy of 120% has been in place in Ireland for the past number of years. In Northern Ireland, an over-installation policy of 120% was introduced in May 2016. However, the current generation mix on the system is evolving and as such, there is now a need to examine the current over-install policy to establish if the current policy can be increased to allow for maximisation of existing connections points. The rationale for seeking to increase or remove the current installed capacity limit of MEC is to maximise the use of existing connections and transmission/distribution infrastructure by increasing the capacity factor for conventional or renewable plant. This provides benefits to developers as there is a reduction in connection charges and lead times on connection offers/build out of infrastructure. There is also improved revenue streams associated with increased capacity factors.	Outcomes: Completion of review of the existing Over-Install Policy. Capabilities delivered: Generation customers will be able to increase their capacity factor by connecting more generation behind their connection point.	Over install policy recommendations paper was submitted to CRU in October 2022. CRU review and decision. Next steps will be determined post CRU engagement.
FNT9	Hybrid Technology (Dynamic Sharing of MEC)	Determine policy for sharing of Maximum Export Capacity (MEC) behind a single connection point that enables hybrid connections to share MEC.	Outcomes: The ultimate outcome is to optimise use of network infrastructure through enabling the sharing of MEC behind a single connection point. Capabilities delivered 2023: Subject to sharing of MEC policy determined by CRU.	A paper setting out the outcome of the technical assessment was submitted to CRU in January 2023. CRU review and decision Next steps will be determined post CRU engagement.

¹ This is dependent on a CRU decision post-submission of a recommendations paper to CRU by EirGrid and ESB Networks

Reducing Dispatch Down of Renewable Generation

5

DSO/TSO Multi-Year Plan
2023 - 2027

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5. Reducing Dispatch Down of Renewable Generation

Renewable generation may be dispatched down at times to manage local transmission or distribution system constraints and/or curtailed at times to manage system wide limits. Over the coming years, there will be a growing risk of localised or system-wide over supply of renewable generation, which will lead to a growing need to dispatch down. Minimising this dispatch down of renewable generation will be increasingly important to ensuring the efficient use of renewable generation and achieving renewable energy targets in an economic manner.

Ensuring the appropriate transmission and distribution infrastructure build-out to minimise constraints is a key planning activity for both the TSO and DSO. Evolving operational policies in areas such as System Non-Synchronous Penetration (SNSP) and Rate of Change of Frequency (RoCoF) are a focus for the TSO. These and other initiatives are ongoing activities for the TSO and DSO in seeking to reduce the dispatch down of renewable generation.

In terms of this joint DSO/TSO plan there are initiatives across workstreams that will contribute to reducing dispatch down of renewables. For example, in the Whole of System Approach workstream, the TSO and DSO will examine processes, interfaces and data exchange to enhance the communication between both control centres and thus reduce the overall need to dispatch down. Another example is in the work to enable hybrids and trial other generation sources as part of the Facilitating New Technology and System Services workstream, which should also facilitate reducing dispatch down of renewables.

Within this workstream we have focused on a number of additional tasks that build on these other activities in seeking to reduce the dispatch down of renewables by:

- 1 Developing Distributed Energy Resources (DER) visibility, forecasting and modelling to deliver more efficient real-time operation and planning of the system leading to improved management of constraints and curtailment.
- 2 Improving wind and solar generation forecasts - more accurate forecasting and coordination of constraint information will allow for lower error margins and thus more efficient scheduling and dispatch decisions.
- 3 Reactive power co-ordination – a more efficient dispatch and better mitigation of voltage based constraints can be achieved through improved co-ordination of reactive power management by DSO and TSO.
- 4 Assessing current DSO/TSO co-ordination on constraints.
- 5 Coordination between the system operators regarding DSO Pilot 4 (Renewables Flexible Access), which introduces flexible access arrangements for distribution connected renewable generators.

Since development of the 2022 DSO/TSO Multi-Year Plan, both System Operators have reviewed the previous list of milestones relating to reducing dispatch down in the Multi-Year Plan. Following on from this review, the task on DSO/TSO co-ordination of constraints (previously RDD 5) has been incorporated as part of WOS4 on Market/ Operations Framework development, as it is heavily influenced by the DSO-TSO operating model and Operations Framework the systems operators are jointly developing.

5. Reducing Dispatch Down of Renewable Generation

5.1 Reducing Dispatch Down Of Renewable Generation Plan on a Page

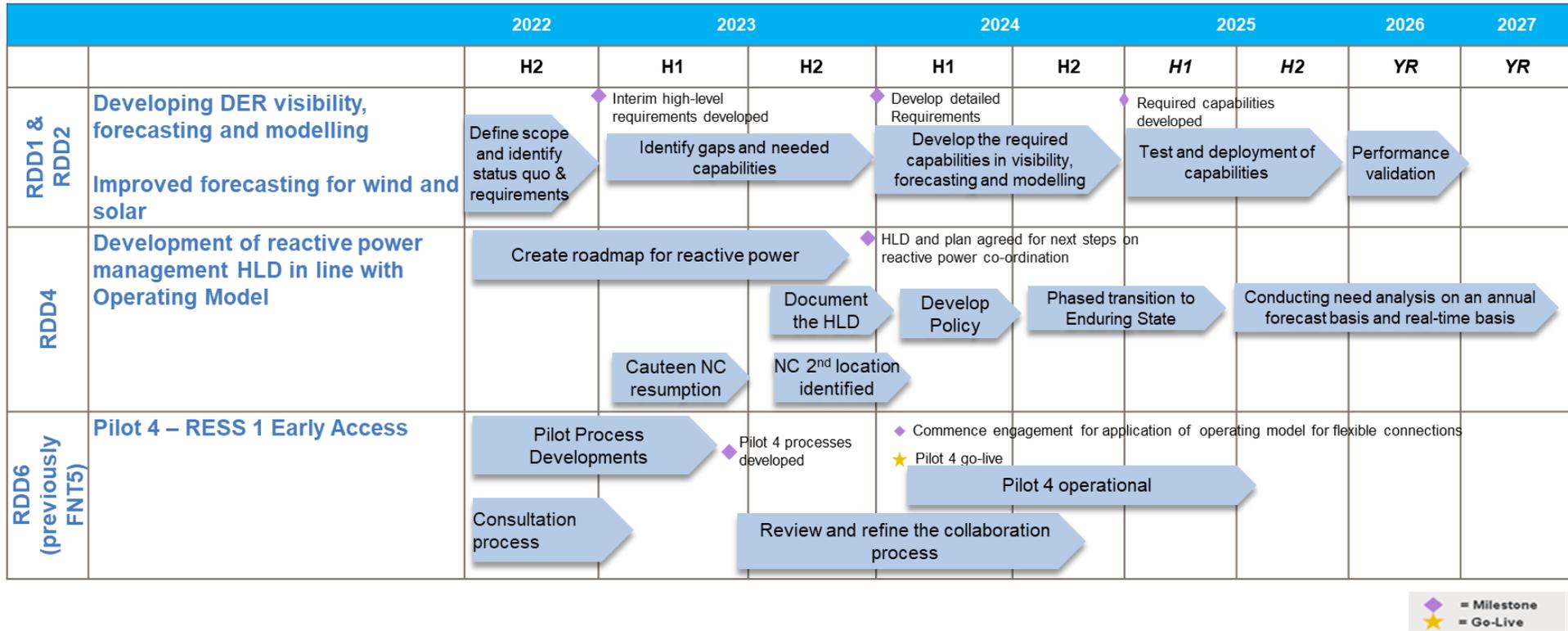


Figure 5: Reducing Dispatch Down Of Renewable Generation Plan on a Page

5. Reducing Dispatch Down of Renewable Generation

Key milestones/dates:

2023

- H1 – RDD6: Pilot 4 processes developed in line with DSO-TSO operating model high level design.
- H2 – RDD1 & RDD2: Develop detailed requirements for DER visibility, forecasting and modelling.
- H2 – RDD4: High-level design and plan agreed for next steps on reactive power co-ordination.

2024

- H1 – RDD6: Commence engagement for application of operating model for flexible connections.
- H2 – RDD1 & RDD2: Required capabilities developed for DER visibility, forecasting and modelling.

2025

- H2 – RDD6: Operationalise DSO-TSO Co-ordination on constraints in line with operating model HLD.

2026 & 2027

- RDD1 & RDD2 - Operationalise the process for DER visibility, forecasting and modelling and improved forecasting of wind and solar in line with DSO-TSO operating model HLD.

Note: RDD3 “ QTP Process has been merged with FNT 1 “QTP Process” due to the similarities in both tasks. FNT1 “QTP Process” annual call for projects will still reflect the commitment from both system operators to reduce dispatch down.

RDD5 “DSO-TSO co-ordination on constraints” has been merged with WOS4 “Market Framework Development” for 2023 as this topic will be a key part of the market framework development.

5. Reducing Dispatch Down of Renewable Generation

5.2 Reducing Dispatch Down Of Renewable Generation Tasks And Outcomes

Task ID	Task Name	Task Description	Outcomes / New Capabilities	Dependencies
RDD1	Developing DER visibility, forecasting, and modelling	<p>The growth of DER on the system will impact both distribution and transmission system operation and planning. DER will also have the capability to provide services to the TSO and DSO. This task builds on the DSO-TSO operating model (WOS1) and feeds into the associated data exchange (WOS3) by identifying :</p> <ol style="list-style-type: none"> 1. The visibility of DER (real-time production/consumption, service availability and planning data) required by the TSO and DSO to allow for secure system operation and planning. This will include an assessment of what data is required at the bulk supply point (DSO- TSO interface) level. 2. The forecasting of DER consumption/ production levels and services capability to feed into planning and scheduling processes. 3. The modelling of DER in operational, market, planning and analysis tools to reflect their impact on the transmission and distribution systems and their market and services capability. This task delivers an ability for modelling DERs in a consistent manner ensuring that both SOs are assessing the same information re DER availability. This will be required for both the RESS pilot and the pilot of scale. 4. This task includes flexible demand such as EVs, heat pumps and embedded generation. 5. This task will incorporate learnings from other jurisdictions on DER visibility forecasting and modelling where applicable 	<p>Outcomes: Solutions for the delivery of DER visibility, forecasts, and models as an input to WOS3.</p> <p>Capabilities delivered 2025 DER accounted for in the TSO's and DSO's systems to allow for secure and efficient system planning, real-time operation, and market operation.</p>	<p>WOS1 and WOS3</p> <p>Regulated funding as appropriate to implement systems changes.</p> <p>Regulatory approvals as required to implement operating model.</p>
RDD2	Improved Forecasting of wind and solar	<p>This task delivers a capability to share knowledge and exchange information so that the forecasting of renewables is aligned for the respective needs of the TSO and DSO.</p> <p>Improved forecast accuracy and constraint awareness will deliver a more efficient dispatch.</p>	<p>Outcomes: Improved forecasts.</p> <p>Capabilities delivered 2025 More efficient operations – reduction of dispatch down of renewables due to forecast errors.</p>	
RDD4	Development of reactive power management HLD in line with operating model	<p>A more efficient dispatch can be achieved through improved utilisation of the reactive power capabilities on the distribution network and co-ordination of reactive power exchanges at the DSO/ TSO interface. This can assist in reducing the necessity to run conventional generation on the transmission system for voltage support thereby creating more 'headroom' for renewable generation.</p> <p>The TSO and DSO have respectively, and jointly, investigated solutions to utilise the reactive power capability of distributed generation. The outcomes of these investigations will inform the implementation of future technologies intended to achieve the same outcome in an integrated manner.</p>	<p>Outcomes: 1. Create roadmap for reactive power; next steps and application of learnings 2. Revise operational policy on reactive power</p> <p>Capabilities delivered 2026 Utilisation of the reactive power capabilities of generation on the distribution network to support the efficient operation of both distribution and transmission systems.</p>	<p>CRU target setting for DSO Flexibility Multiyear Plan</p>

5. Reducing Dispatch Down of Renewable Generation

Task ID	Task Name	Task Description	Outcomes / New Capabilities	Dependencies
RDD6	DSO Pilot 4 (System Operators Coordination)	This task delivers an ability to manage the required DSO/TSO interaction relating to the DSO flexible access pilots and rollout. This initiative delivers the capability to offer flexible, actively managed connections for renewable generators on the distribution system.	<p>Outcomes: The outcome of this task will be the development and implementation of a set of joint business processes by building on the experience from the DSO 2022 Flexibility pilot that will manage the DSO/TSO interactions.</p> <p>Capabilities delivered 2024 DSO will be able to offer actively managed connections in locations where renewable generators are seeking flexible access, considering TSO impacts.</p> <ul style="list-style-type: none"> •The SOs will be able to operationally test processes for distribution generators with an actively managed connection. 	CRU decisions regarding the introduction of flexible access, as required.

Secure Future Power System

6

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6. Secure Future Power System

This workstream's objective is to address the long-term challenges and leverage the opportunities created by high renewables penetrations; high volumes of distributed energy resources (DER) and; widespread demand side flexibility.

This plan addresses the medium to longer term issues associated with secure future power system operations for the five year period of PR5. For the 2023 – 2027 Multi-Year Plan, EirGrid and ESB Networks updated the title of this section to “Secure Future Power System” to reflect the focus of both system operators on long-term security of the power system and distinguish it from the CRU's Security of Electricity Supply Programme. This Multi-Year Plan also reflects that both EirGrid and ESB Networks will continue to work together to manage more acute and shorter terms security of supply needs, as highlighted in FNT10.

As required in the balanced scorecard for 2022, we believe this approach best demonstrates the TSO and DSO collaborating with each other. The TSO and DSO will document the collaborative steps taken to improve the outcome for market participants for long-term and shorter term security of supply concerns.

The focus initially will be to identify the longer-term operational requirements and to prepare to address these in order to maintain security of supply in the context of changing characteristics of the transmission-distribution interface and the demand supplied by the power system.

To ensure that we have the capability to securely manage this transition, we need to fully understand the characteristic of how these technologies will interact with system operation, including consideration of their protection, their dynamic response, and how they are embedded across the system. We also need to ensure that our mechanisms to manage and recover from security of supply events are adapted to these new demand characteristics and capabilities.

In the short to medium term, the system adequacy position in Ireland will be challenging.

The system operators are working with CRU and Department of the Environment, Climate and Communications (DECC) on a wider security of supply programme across a range of areas to manage this nearer term challenge, whereas this Secure Future Power System work programme is focused on long term coordination for a secure system.

Ensuring a secure transition:

We will conduct a series of reviews of the technical characteristics and performance under system fault conditions of large electricity users and distributed energy resources. The outcome of this analysis will:

- 1 Inform changes to our operational processes and potentially standards and settings that are applied.
- 2 Allow us work to enable market-based solutions, where we believe that there is the potential for distributed resources to contribute to meeting system needs.

We will also work with large electricity users on the implementation of arrangements to manage their connections when impacted by local congestion issues and/or more widespread supply capacity issues.

Managing security of supply events:

In the future, with high penetrations of embedded renewables and new technologies, it will be important to adapt our processes and systems for responding in the event of a security of supply issue arising. It is important that our tools and processes allow for management of the event so that the minimum disruption occurs, and that the integrity of the overall power system is maintained. Reviews of the range of market and non-market-based actions available, the parameters of automatic response and the conditions under which different solutions are activated will be undertaken within this workstream to ensure that the changing characteristics of demand on the system are accounted for.

6. Secure Future Power System

Recovering the power system:

Our existing plans for the recovery of the power system post a major disturbance will be reviewed considering the changing characteristics of the system, with a view to leveraging future capabilities from distributed energy resources.

6.1 Secure Future Power System Plan on a Page

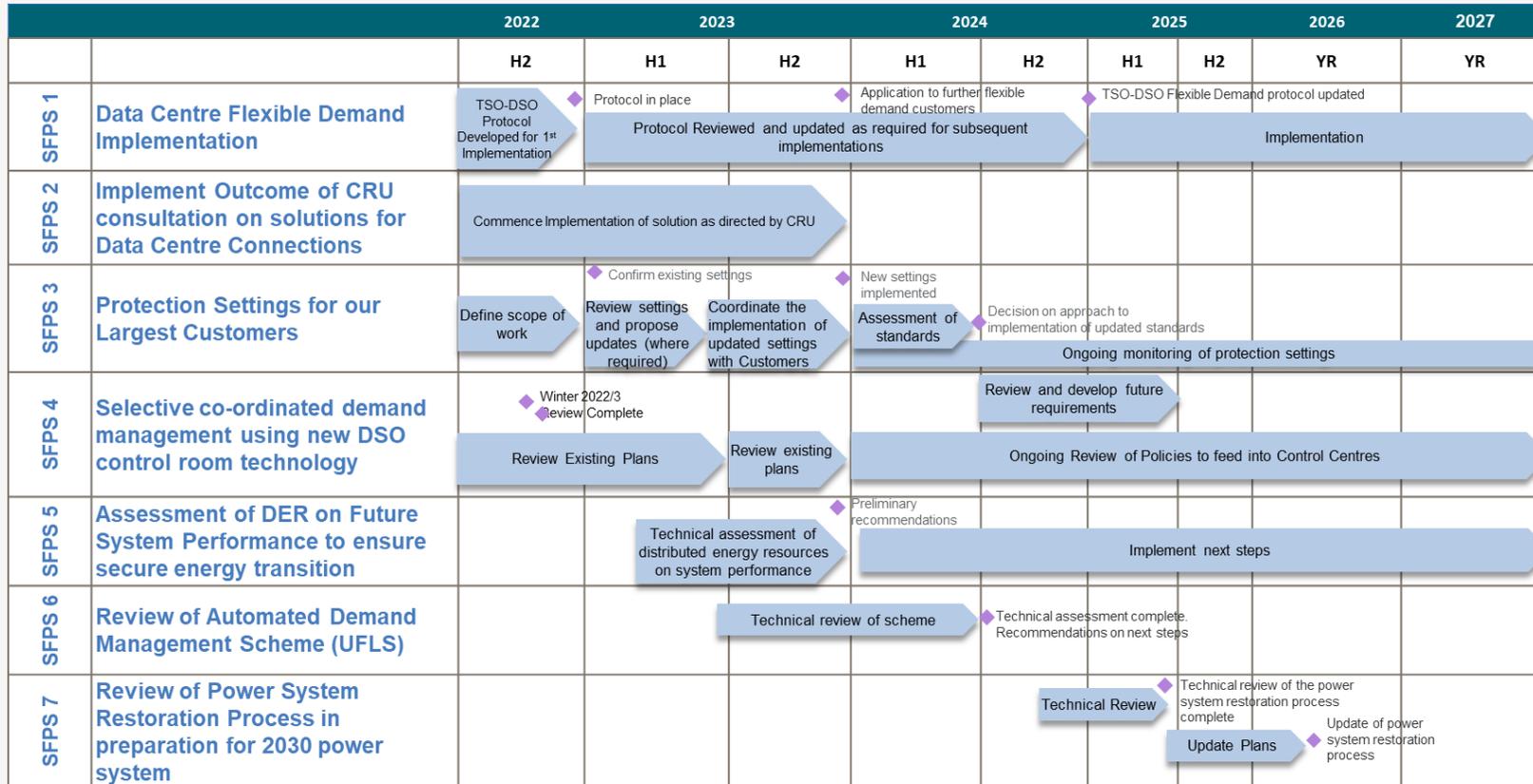


Figure 6: Secure Future Power System Plan on a Page



6. Secure Future Power System

Key milestones/dates:

2023

- H1 – SFPS3: Update protection settings of our largest customers, as appropriate.
- H2 – SFPS5: Technical assessment of distributed energy resources on system performance during faults and recommendations on next steps.

2024

- H1 – SFPS3: Decision on approach to implementation of updated standards with respect to protection settings for our largest customers.
- H1 – SFPS6: Technical assessment of automatic demand management arrangements and recommendations on next steps.
- H2 – SFPS1: DSO/TSO Flexible Demand protocol updated as required for subsequent implementations.

2025

- H1 – SFPS7: Technical review of the power system restoration process considering changing system characteristics and tool capability.

2026 - 2027

- 2026 – SFPS7: Update of power system restoration process.

Identification of further potential tasks / milestones applicable in the longer term will be kept under review as this joint plan evolves.

6. Secure Future Power System

6.2 Secure Future Power System Tasks and Outcomes

Task ID	Task Name	Task Description	Outcomes / New Capabilities	Dependencies
SFPS1	Data Centre Flexible Demand Implementation	A number of planned data centres are required (under the terms of their connection agreement) to facilitate reductions in their demand at times of system stress. A generic DSO/TSO operating protocol has been developed to implement flexible demand at data centre sites but further work is required to develop the DSO/TSO arrangements for its implementation.	Outcomes: The output of this task is a DSO/TSO protocol on the implementation of flexible demand at data centre sites. Capabilities delivered 2023 The TSO and DSO capability to coordinate and implement flexible demand to manage system security.	The timelines for this task are dependent on the connection and demand ramp-up of the first distribution connected data centre at which flexible demand arrangements apply.
SFPS2	Implement Outcome of CRU consultation on solutions for Data Centre Connections	The CRU has consulted (CRU21060) on mitigation options to address the system security impact of data centre demand. An implementation period will now follow.	Outcomes: Implementation of a solution to manage data centre connections. Capabilities delivered 2023 Subject to the solution option determined by CRU.	The CRU has consulted (CRU/21/060) on mitigation options to address the system security impact of data centre demand. The outcome of this decision may affect the plans.
SFPS3	Protection Settings for Our Largest Customers	Formalise arrangements for coordination of the protection settings of our largest customers to ensure that system security is maintained. This will involve engagement with our customers.	Outcomes: Engagement with our largest customers and updated procedures for the coordination of their protection settings. Updated standards. Ongoing monitoring of protection settings to ensure system security is maintained. Capabilities delivered 2023 Improved coordination of protection settings and understanding of behaviour during system disturbances. 2024 Decision on approach to implementation of updated standards. 2025 Procedures implemented to ensure system security is maintained.	This task will require engagement with our largest customers on their protection settings.
SFPS4	Selective co-ordinated demand management using new control room technology	This task delivers a capability to apply a more selective approach to rota and emergency system event preparation, prevention and response, taking into account the impacts of different customer sensitivities to load shedding, the impact of embedded small scale generation on load shedding maps. Augmented DSO control room technology such as Advanced Distribution Management System (ADMS) and Distributed Energy Resource Management System (DERMS) would support this task.	Outcomes: Create a document describing a consistent systematic business process to co-ordinated demand management This will feed into the data transfer/interfaces between the DSO's ADMS and the TSO's scheduling system. Capabilities delivered 2024 Updated processes and tools to allow the TSO and DSO effectively manage demand.	CRU target setting for the DSO Flexibility Multi- year Plan

6. Secure Future Power System

Task ID	Task Name	Task Description	Outcomes / New Capabilities	Dependencies
SFPS5	Assessment of DER on Future System Performance to ensure secure energy transition	Develop greater understanding of the performance of Distributed Energy Resources (DER) during system events (voltage and/or frequency deviations) to ensure that system security and safety is maintained as the power system diversifies and decentralises.	<p>Outcomes: The output of this task is the technical assessment of the behaviour of DER during transient system events and recommendations for any follow-on work to address performance issues.</p> <p>Capabilities delivered 2024 Improved understanding of DER behaviour during system faults.</p>	
SOS6	Review of Automated Demand Management Scheme	The Automated Demand Management arrangements currently in place were established decades ago to secure the overall integrity of the power system against multiple, co-incident, generation losses. Changes to the nature of demand (the impact of DER) will drive changes to the net quantity of demand disconnected by a system event so the scheme will need to be reviewed to ensure that it delivers sufficient response and meets System Defence requirements.	<p>Outcomes: The output of this task is a technical review of the demand management scheme to inform subsequent updates to the scheme.</p> <p>Capabilities delivered 2024 Recommendations on changes to the Automated Demand Management Scheme.</p>	
SOS7	Review of Power System Restoration Process in preparation for 2030 power system	The characteristics of the power system in 2030 will result in changes to how we restore the system in the unlikely event of a black-out. New black-start sources and technologies will be used, and the restoration process will need to account for the impact of DER on the distribution network.	<p>Outcomes: The output of this task is a technical review of the power system restoration process to inform subsequent updates to the power system restoration process.</p> <p>Capabilities delivered 2026 Recommendations on changes to the power system restoration process.</p>	

2026 and Beyond

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DSO/TSO Multi-Year Plan
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7. 2026 and Beyond

The electricity industry and society are going through rapid change due to the energy transition and the pace and scale of new technology adoption. Where high level milestones for 2026/2027 are known, they have been outlined within each workstream.

Three years from now it is more difficult to plan with certainty the key milestones that can be underpinned by guaranteed resources and finance.

There are many different factors that will affect our planning. Among them:

- 1 Targets established in successive updates to the Climate Action Plan
- 2 Targets and requirements introduced in new EU energy legislation
- 3 Compliance with clean energy emissions regulations that will affect generators and demand side participants (2024/2025)
- 4 Re-integration with EU through the new Celtic Interconnector (2026)
- 5 Availability of a new tie-line with Northern Ireland (2025)
- 6 SNSP Levels
- 7 Smart meter roll-out
- 8 Low voltage visibility
- 9 Implementation of the RESS auctions
- 10 Pace of electrification of heat and transport
- 11 The impact of new tariffs on customers behaviour
- 12 The technology maturity level and commercialisation of different technology types
- 13 The implementation of any new directives by the regulator
- 14 National Energy Security Framework proposals

As we monitor these events/progress, the plan will be updated to reflect any changes in the years ahead.

New capabilities and opportunities will emerge over the course of the next 3 years which will further inform the key activities for 2026/2027.

Key considerations for activities in this period include:

- 1 The development of network codes on demand side response, aggregation, and flexibility, specifically the ACER consultation on the Framework Guideline on Demand Response.
- 2 Development of cooperation proposals for the next price review period as part of the Multi-Year plan in 2024/2025.
- 3 Refining the capabilities piloted in 2023->2025 and transitioning these into business as usual solutions for customers.
- 4 Further development of flexible network management capabilities
- 5 Adapting to technological change and the opportunities and challenges presented
- 6 Learnings from pilots going-live in 2022 such as customer participation in markets through continued evolution of services and the application of new technology.

Have Your Say

8

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8. Have Your Say

These proposals have been informed by energy policy, regulation and customer and stakeholder input, and set out our proposed approach for the next five years. These plans will also be reviewed and updated on an annual basis.

Stakeholders' input is incredibly important to ESB Networks and EirGrid and we sought customer and industry views on the tasks and activities set out, in this document. This MYP underwent a public and industry consultation from 10 February to 10 March 2023, and has been updated accordingly following the feedback.

For reference the consultation questions were as follows:

- Q1 What are stakeholders' views on the proposed joint activities within the proposed work programme for whole of system approach?
- Q2 What are stakeholders' views on the proposed joint activities within the proposed work programme for facilitating new technology and system services?
- Q3 What are stakeholders' views on the proposed joint activities within the proposed work programme for reducing dispatch down of renewable generation?
- Q4 What are stakeholders' views on the proposed joint activities within the proposed work programme for improving secure future power system?
- Q5 Are there other activities that stakeholders believe that the DSO and TSO should be jointly working together on during the term of the multi-year plan, in particular considering the 2026/2027 timeframe?
- Q6 What are the stakeholder's views on the proposed balanced scorecard for calendar year 2023?

Balanced Scorecard Proposal

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DSO/TSO Multi-Year Plan
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9. Balance Scorecard Proposal

As part of the regulatory framework outlined in the CRU's PR5 Regulatory Framework, Incentives and Reporting Decision (CRU/20/154), the CRU has introduced an annual balanced scorecard on Joint DSO/TSO coordination. The system operators have also considered CRU Price Review Five: 2021 Balanced Scorecards (CRU202226) in developing the proposed balanced scorecard for 2023 – 2027.

The Commission for the Regulation of Utilities has mandated that the system operators shall submit to the CRU in September each year, aligning with their consultation with stakeholders, a detailed multi-year plan covering the three following years (and the two years after at high level). In 2022 the submission of the 2023-2027 plan and its publication for consultation has been deferred by a number of weeks, into December 2022, to allow for the CRU's process of providing feedback on the previous year's multiyear plan.

In the multi-year plans, the system operators will set out their planned activities to address the objectives set out in CRU/20/154. Based on the submission, the CRU will decide, by year-end, on the milestones, deliverable targets, and weightings for the year. The previous multi-year plan covered 2022 to 2024 (as well as 2025 and 2026 at a high level) while this year's updated multi-year plan covers 2023 to 2025 (as well as 2026 and 2027 at a high level). Applying the timeline set out in CRU/20/154 but allowing for the lagged process this year to allow for CRU feedback, it is the system operators' expectation that targets will be set in Q1 2023.

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

- 1 (20%) quality of the plan and defined actions.
- 2 (40%) quality of implementation of the plan.
- 3 (40%) effectiveness of the plan and demonstrable impacts.

The assessment will be informed by an independent audit to be procured by DSO/TSO as part of the overall process.

9. Balance Scorecard Proposal

9.1 Quality Of The Plan And Defined Actions

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

- 1 Independent quality assurance audit of the Joint System Operator Programme.
A report shall be shared with the CRU that will document the assessment and any associated actions.
- 2 Demonstrable adherence to the defined programme delivery method/approach.
- 3 Demonstrable and robust risk, assumption, issue, and dependency management.

9.2 Quality Of Implementation Of The Plan

We propose that measurement of the quality of the implementation plan should be based on delivering the 2023 milestones set out in the following table. The criteria for measurement should be based on a continuum of achievement as highlighted in the figure below:

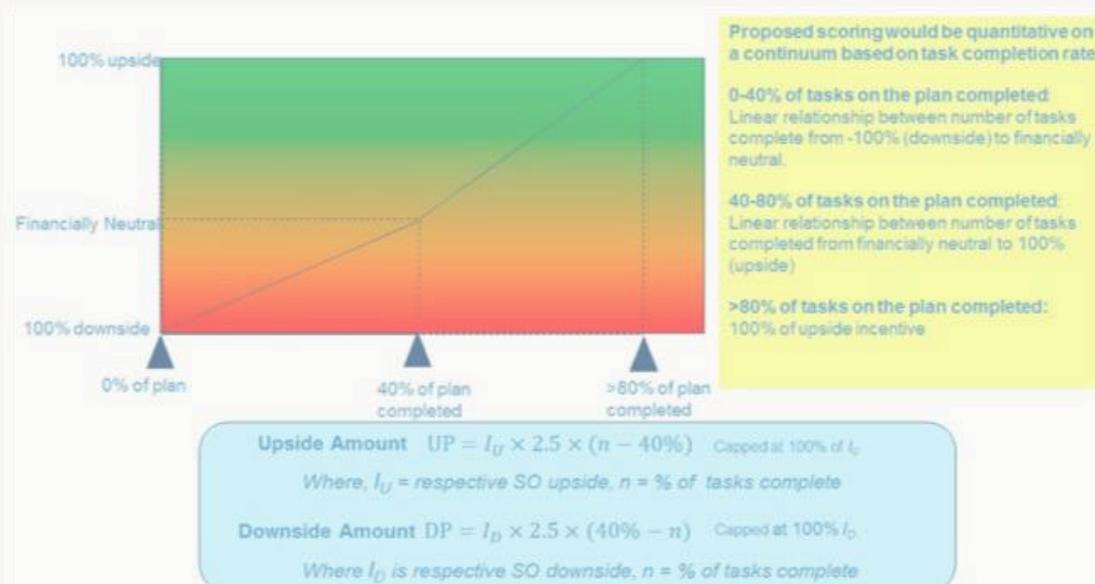


Figure 7: Scoring proposal for implementation

9. Balance Scorecard Proposal

Workstream	Milestones - 2023	Indicative timing
Whole of System Approach	Vision & Principles and operating model HLD defined	H1
	Operating model high level design (HLD) agreed	H1
	Data exchange requirements gathering tool developed. (For implementing operating model HLD)	H1
	Aggregation structure joint paper setting out a review of the alignment of aggregation structures for transmission and distribution services and next steps agreed	H2
	High level assessment of requirements for framework for Market & Operations (Implementing the operating model HLD)	H2
Facilitating New Technology and System Services	Go live of DSO Pilot 2 in line with operating model HLD direction	H1
	New QTP processes established and new QTP launched	H2
	Pilot 3b DSO/TSO coordination processes developed in line with operating model HLD direction	H2
	Beat The Peak Commercial & Domestic winter 2 DSO/TSO processes agreed	H2
	Placeholder – follow-up milestone(s) on hybrids (dependent on CRU feedback)	H2
Reducing dispatch down	Develop detailed requirements for DER visibility, forecasting and modelling.	H2
	High-level design and plan agreed for next steps on reactive power co-ordination.	H2
Secure Future Power Systems	Update protection settings of our largest customers, as appropriate.	H2
	Technical assessment of distributed energy resources on system performance during faults and recommendations on next steps.	H2

Table A: Scoring Proposal (DSO/TSO Plan Implementation Metrics)

The milestones have indicative targets so that the incentive supports progressive delivery and performance across the year. Subject to appropriate governance, the delivery of individual actions may vary to reflect efficient delivery of the overall incentive priorities. Therefore it is intended that the dates are indicative and for information only, and that the incentive outturn assessment will be based on achieving the overall annual deliverables, rather than meeting half-yearly milestones.

Furthermore, it is important for customers and stakeholders that the system operators maintain a degree of adaptability, introducing new tasks (potentially at the expense of existing ones) subject to transparent and objective change control and prioritisation processes. This ensures that new information regarding customer, industry and regulatory needs is accounted for effectively. It also ensures that where an external dependency impacts the timeline of a task, resources can be deployed effectively on other tasks delivering customer or industry value.

9. Balance Scorecard Proposal

9.3 Effectiveness Of Implementation Of The Plan

As the programme is focused co-ordination between the system operators who are separately incentivised for agreed performance metrics in relation to system operation and performance, we propose that the effectiveness of plan implementation is best measured by the incremental capabilities delivered on a continuum from 0 – 40%. These capabilities are laid out within each workstream and summarised for 2023 in Table B. These outcomes will be subject to an independent quality assurance audit of the Joint System Operator Programme. A report shall be shared with the CRU that will document the assessment and any associated actions:

Task Name	Capabilities delivered - 2023
Whole of System Approach	
Agree Future Operating Model	Agreed High-Level Design of the DSO-TSO operating model. Interim capabilities piloted.
Review alignment of aggregation structures for transmission and distribution services.	Collectively develop preliminary proposal based on pilot learning.
Market Framework Development	Participating Customers/services providers will be able to offer services to TSO and DSO on a pilot basis for additional services.
Future Arrangements – Distribution connected customers	Relevant SO Input to the detailed design process relevant for distribution customers.
Grid Code & Distribution Code evolution to support RES-E Targets by 2030	Each year arising from the DSO/TSO programme, required changes will be brought to the appropriate panels for consideration and implementation. This will provide clarity for all transmission and distribution system users.
Facilitating New Technology and System Services	
QTP Process	Technology providers will be able to trial new technologies on the system or enable the use of existing technology in new applications. Both SOs will be able to assess the impacts of integrating these technologies on their respective systems. ¹
DSO Pilot 1 I&C DSR Local / DSO Market	Customers may be able to stack the revenue that they are earning from both transmission and distribution system operators for industrial / commercial scale demand side flexibility.
Pilot 3b – Pilot of scale	Distribution connected customers in the pilot will be able to offer services to both TSO and DSO as appropriate.
Beat the Peak Domestic	Demand is lowered on the network during peak hours, reducing the security of supply challenges during winter 2023.
Beat the Peak Commercial	Demand is lowered on the network during peak hours, reducing the security of supply challenges during winter 2023.
Reducing Dispatch Down of Renewable Generation	
Developing DER visibility, forecasting, and modelling	Determine the aspects of system planning, real-time operation, and market operation that need to be enhanced as a result of increased DER in the network.
Secure Power Systems	
Data Centre Flexible Demand Implementation	The TSO and DSO capability to coordinate and implement Flexible Demand to manage system security
Protection settings for our largest customers	Improved coordination of protection settings and understanding of behaviour during system disturbances

Table B Capabilities Delivered in 2023

¹ This added capability will be dependent on the type of technology providers who enter the QTP in a given year.