

DSO/TSO Multi-Year Plan 2024 - 2028

Joint System Operator
Programme

September 2023



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 our first DSO/TSO Multi-Year Plan in 2021, EirGrid and ESB Networks have worked 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 we will be working towards between 2024 and 2028 under the following pillars: reducing dispatch down, secure future power system, facilitating new technology and whole of system solutions. The proposals outlined in this document include a detailed three-year plan for 2024-2026 and a high-level two-year plan for 2027 and 2028.

These pillars have been drawn directly from Commission for Regulation of Utilities (CRU) Decision Paper "PR5 Regulatory Framework Incentives and Reporting" (CRU/20/154), specifically the objectives set out in sections 7.9 and 8.12¹. The milestones and activities also consider stakeholder feedback that was received following the PR5 DSO/TSO Call for Input Consultation Paper published on 04 August 2023. We would like to thank all parties who contributed to the development of this document by responding to this call for input.

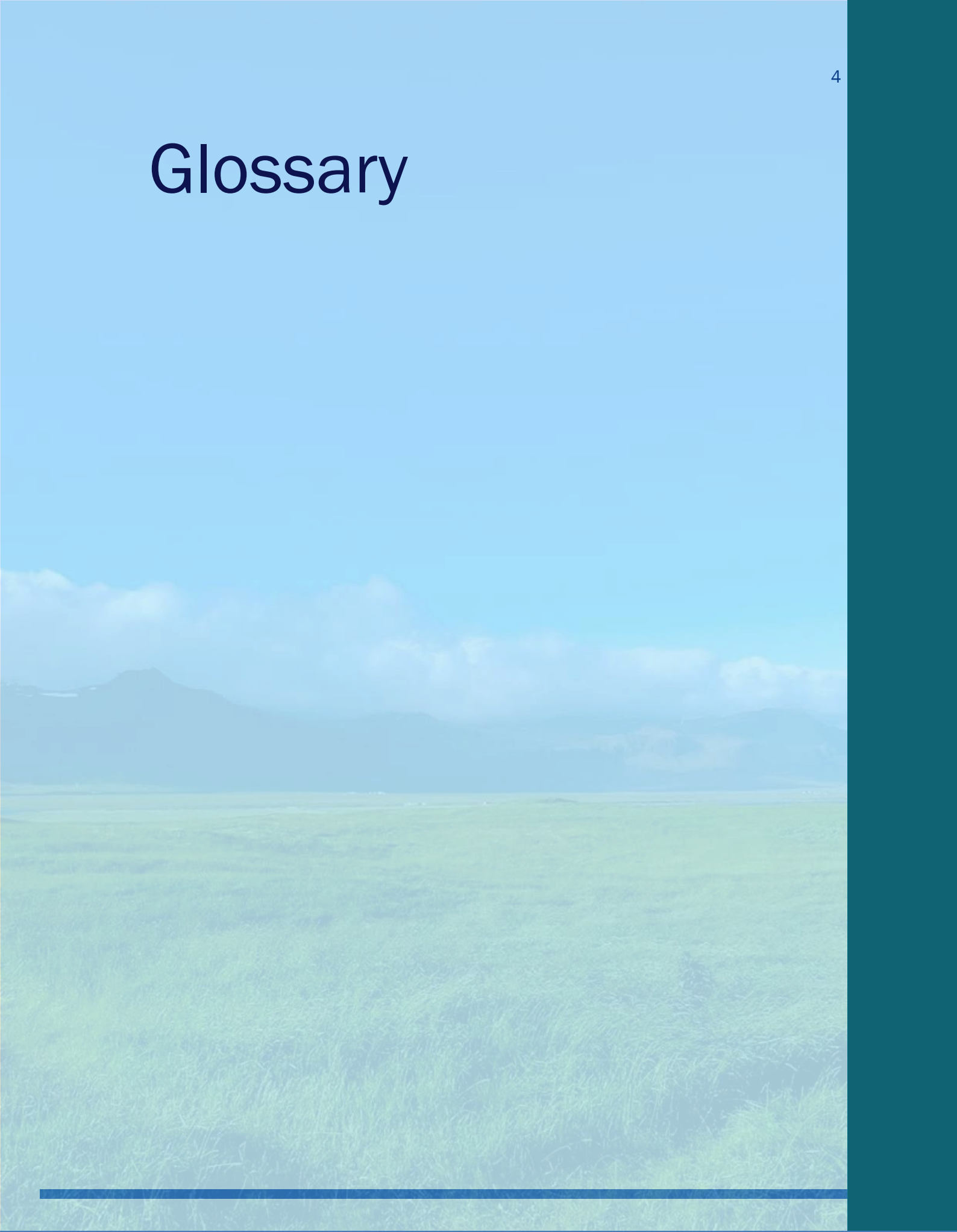
Since publication of the 2023 – 2027 DSO/TSO Multi-Year Plan, and based on stakeholder feedback received, we have introduced a number of new updates to the plan. This reflects our commitment to this programme to meet stakeholder and customer needs.

The new updates include:

- 
New tasks to reflect the 2023 Climate Action Plan and associated targets
- 
Updated section on industry participation and engagement
- 
Updates to reflect guidance from CRU Price Review 5 Balanced Scorecards Information Paper (CRU202354)

¹ 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.

Glossary



Glossary

TERM	DEFINITION
AGU	Aggregated Generator Unit
CRU	Commission for Regulation of Utilities
DECC	Department of the Environment, Climate & Communications
DER	Distributed Energy Resources
DSO	Distribution System Operator
DSU	Demand Side Unit
FNT	Facilitating New Technology
JSOP	Joint System Operator Programme
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
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
UoS	Use of Systems
WOS	Whole of system

1. Introduction

TSO-DSO Joint System Operator Programme (JSOP)

The Joint System Operator Programme (JSOP) 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 system solutions.

The CRU “PR5 Regulatory Framework, Incentives and Reporting” Decision Paper (CRU/20/154), published in December 2020, introduced a regulatory incentive on joint DSO/TSO co-ordination. Since 2021, there has been a requirement for both EirGrid and ESB Networks to submit a joint Multi-Year Plan for the DSO/TSO Joint Incentive. In this document, we have set out our planned activities for the following workstreams from 2024 – 2028:

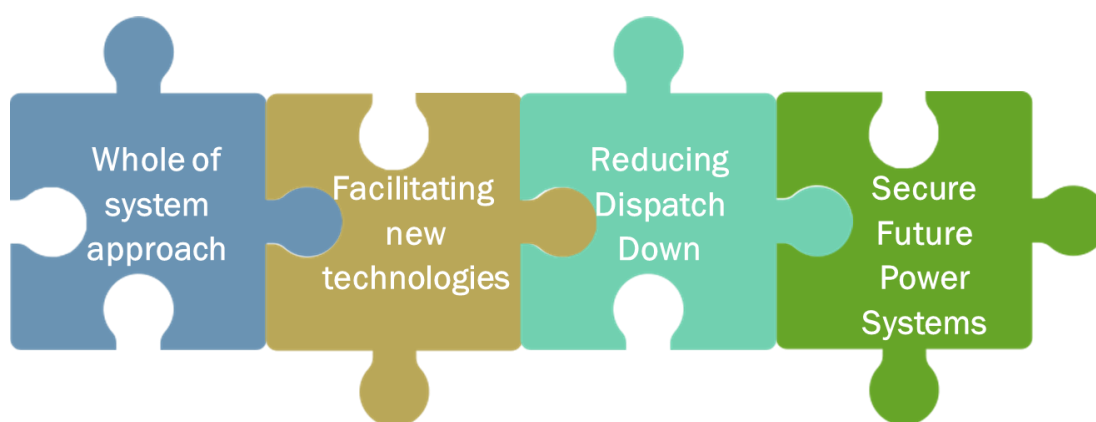


Figure 1: The four workstreams of the TSO-DSO Joint System Operator Programme

The Multi-Year Plan is submitted to CRU in September of each year to cover the next three calendar years in detail and to also cover years four and five thereafter at a high level. Based on this submission, the CRU will make a decision by year-end on the milestones, deliverable targets and weightings for the following year.

The programme objectives are detailed in figure 2 below:



Figure 2: The objectives of the 2024 – 2028 DSO/TSO Joint System Operator Programme

2024 Ambition and Approach

Since the publication of the 2022 – 2026 Multi-Year Plan, significant collaborative work has been carried out by EirGrid and ESB Networks to address the challenges and opportunities arising under the four workstream pillars. We have worked collaboratively through workshops, joint research, knowledge sharing sessions and task delivery to ensure we meet our objectives and our customers can expect a high quality, low carbon and reliable supply of electricity.

Since 2021, we have continued to update the Multi-Year Plan in consideration of policy updates, learnings from previous years and recommendations from the annual audit on the work programme.

Progress within 2023

The TSO and DSO have worked closely together in 2023 to deliver the Joint System Operator Programme. Activity has been progressed across all four workstreams, which will be outlined in detail in the end of year report for 2023 to be submitted to CRU in April 2024. Of note, significant work has been delivered by EirGrid and ESB Networks to develop a TSO-DSO operating model and its associated high-level design. The system operators have also worked together in coordination as part of the winter 2023 energy crisis as part of the “beat the peak” pilots. We also have worked together to securely plan and deliver our roles as system operators to protect against system alerts.

Both system operators 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 of both ESB Networks and EirGrid.

Furthermore, the system operators underwent an independent audit of the system operator's self-assessment of the performance on the 2022 work plan. The independent auditor found that there was either evidence or strong supporting evidence that the activities undertaken by the SOs supported the overall workstream score self-assessed by EirGrid and ESB Networks. The

auditors also provided the system operators with recommendations going forward, which we will begin addressing in this year's Multi-Year Plan.

Our Approach to Developing the 2024-2028 TSO-DSO Multi-Year Plan

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 they are necessary to achieve the overall government and regulatory policy and objectives set out for 2025, 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 that of the originally expected outcome.

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 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 adapt the multi-year plan in response to changing customer needs, changes in technology maturity, stakeholder input and pilot learnings.

As outlined previously in the DSO/TSO Multi-Year Plan 2023-2027, 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. We have also developed this plan to be outputs-driven, to ensure our decisions are centred around our customers.

The system operators collectively considered a range of inputs when developing this plan. These are outlined in figure 3.

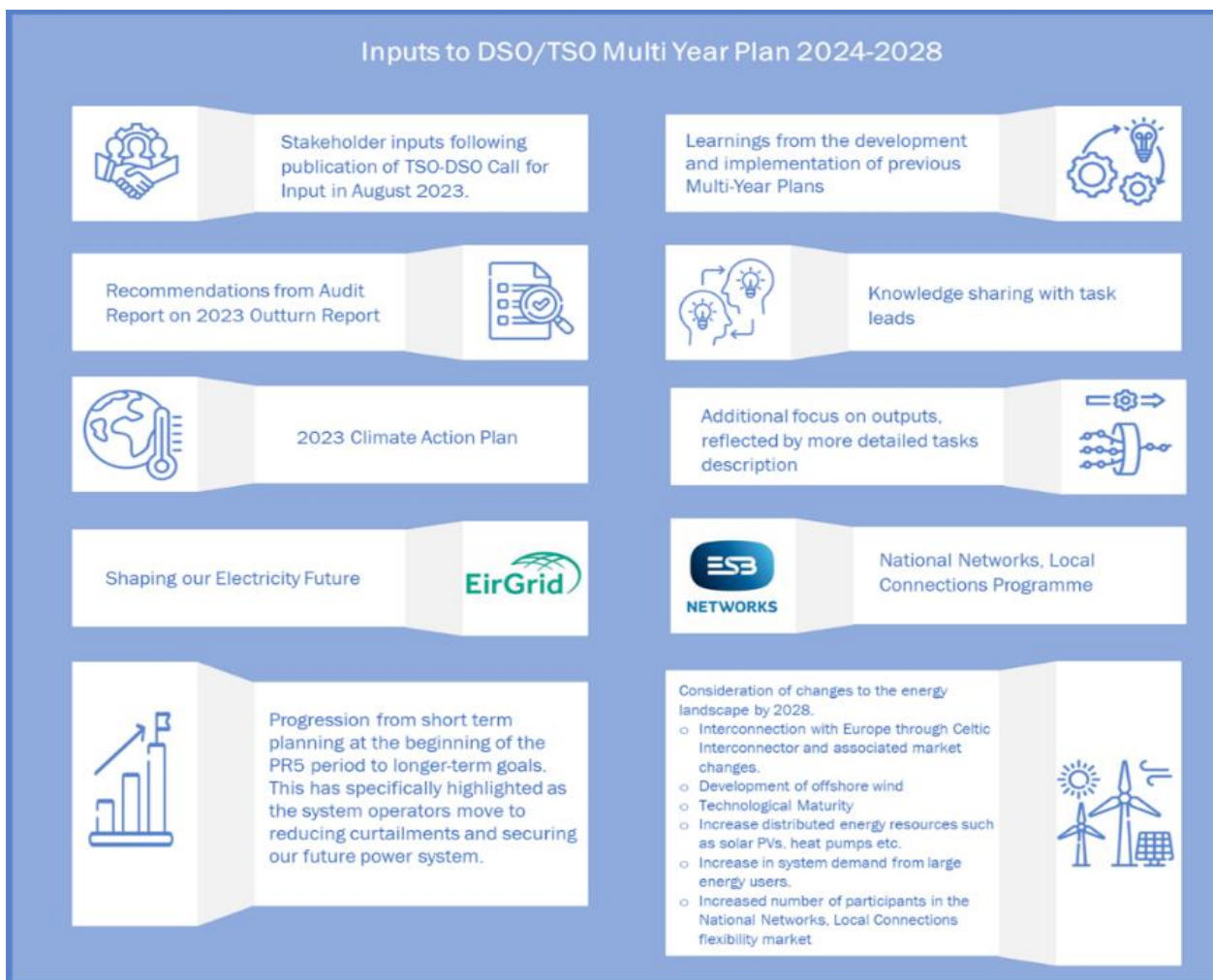


Figure 3: Inputs to the DSO/TSO Multi-Year Plan 2024 – 2028

Key inputs to the plan are:

- EirGrid’s Shaping our Electricity Future Roadmap;
- ESB Networks’ Flexibility Multiyear Plan prepared for CRU, and the accelerated rollout of flexible demand, based on engagement with the CRU as part of its work to develop the energy demand strategy, This will be delivered from the National Network, Local Connections programme (NN,LC).

In November 2021, EirGrid launched the inaugural Shaping Our Electricity Future (SOEF) Roadmap (Version 1.0) which was prepared in consultation with stakeholders from across society, government, industry, market participants and electricity consumers. Version 1.0 reflected the climate change policies of Ireland at that time. Since its formation, things have progressed and EirGrid has prepared an updated Roadmap – Shaping Our Electricity Future V1.1. The roadmap provides guidance on the transmission network reinforcements, engagement plans, system operation enhancements and electricity market changes needed to achieve 80 % of electricity from renewable resources by 2030. Inherent in this roadmap 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.

In 2021, ESB Networks launched the National Network, Local Connections (NN,LC) Programme, 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 NN,LC is delivered in a coordinated and collaborative manner, working with the TSO. Since publication of the 2023 - 2027 Multi-Year Plan, based on stakeholder feedback and continuously evolving customer and industry needs, several additional pilots have been added to this programme. The NN,LC programme has materially accelerated since the publication of Climate Action Plan 2023 and based on engagement with ESB Networks as part of the CRU's energy demand strategy development. This is outlined in the ESB Networks consultation on Scenarios for 15-20% Flexible System Demand (DOC-120423-HRS) published in June 2023 as part of the development of CRU's energy demand strategy.

How we are considering Climate Action Plan 2023

Both system operators are committed to working together collaboratively to reach our Climate Action Plan targets. Climate Action Plan 2023, published in December 2022 highlighted key areas of co-ordination between the system operators. Of note:

- ESB Networks will, under approved regulatory arrangements and in coordination with EirGrid, introduce local flexibility market arrangements designed to incentivise investment in commercial storage facilities at scale, providing local network capacity for low-carbon technologies;
- EirGrid and ESB Networks will undertake an in-depth analysis of local, regional, and system level flexibility requirements, identifying opportunities and internal changes required to facilitate demand flexibility and provide flexibility to support the system operation and local network congestion management.

These have been taken into consideration during the development of this document, specifically in relation to a new task on "co-ordination of demand side flexibility targets" as outlined in the facilitating new technology workstream.

Dependencies

A number of dependencies as outlined in the 2023 – 2027 DSO/TSO Multi-Year Plan are still relevant to the ongoing work that will continue be maintained until 2028. 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 2024 – 2028 DSO/TSO Multi-Year plan will include:

- Climate Action Plan 2023 and future Climate Action Plans;
- Network Code on Demand Response;
- CRU Energy Demand Strategy and associated decision(s),
- CRU decision(s) on hybrid connections;
- System Services Future Arrangements – Phase III: Detailed Design and Implementation – Phased Implementation Roadmap for the System Services High Level Design – Decision Paper.

Other dependencies that were outlined in the 2023 – 2027 DSO/TSO Multi-Year Plan that are still relevant, include, but are not limited to:

- SEM-22-12 High Level Design System Services Future Arrangements;
- CRU/21/124 CRU Decision on Data Centre Grid Connections Process;
- SEM-21-027 Proposed Decision on Treatment of New Renewable Units in the SEM;
- SEM-21-016 Consultation on compliance of the SEM market arrangements with EU Electricity Balancing Guideline (EU Regulation 2017/2195);
- Regulatory decisions regarding the funding of local and system services 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;
- 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 have included DSO/TSO co-ordination 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”.

Industry Participation and Engagement

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.

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 key stakeholders to ensure that we address barriers to entry and shape incentives to maximise participation with our programme. Considering the learnings from 2023, we will continue to engage with industry to develop our Multi-Year Plan and ensure our plan has been developed with inputs from our key stakeholders.

Calls for input went out to the public and industry from the 04 August to 05 September 2023. Feedback and responses received from the consultation have been incorporated into this Multi-Year plan. In this regard, the system operators propose the following engagement checkpoints for the DSO/TSO Multi Year Plan 2024-2028:

1. The progress of the DSO/TSO Multi-Year Plan 2024 – 2028 will be shared at a SOEF advisory council meeting and an NN,LC advisory council meeting during the year,
2. The system operators will conduct stakeholder engagement sessions when necessary;

3. The TSO and DSO will jointly engage in a call for input for the 2025 – 2029 Multi-Year Plan with industry to ensure that the updated Multi-Year Plan reflects industry feedback.

Call for Input Response



2. Call for input response

In August 2023, ESB Networks and EirGrid published a joint Call for Input on the DSO/TSO Multi-Year Plan 2024 – 2028. The purpose of the Call for Input was to give stakeholders an opportunity to provide input and feedback on the planned activities for 2024, 2025 and 2026 (to be set out in detail) and the planned activities at a high level for 2027 and 2028.

Following the closure of the Call for Input on 05 September 2023, ESB Networks and EirGrid are jointly responding to the inputs received, acknowledging, and reflecting on, the full range of respondents' feedback. The below response outlines the system operators' proposed next steps to address the immediate, actionable feedback that was within the scope of the DSO/TSO Multi-Year plan. Some comments received were not relevant to the content of this Multi-Year Plan. As a result, these out-of-scope comments have not been addressed in our response. Specifically, these comments were either related to the work of one single system operator or TAO-TSO specific.

We would like to take this opportunity to thank and acknowledge the written input and constructive feedback received from the following three respondents: (i) Bord Gáis Energy, (ii) EDF Renewables and (iii) a response from an individual person. We welcome the positive feedback and engagement contained in the responses and note the specific points to be addressed.

Key themes emerged from the feedback received in the consultation, which include;

- The Multi-Year Plan should outline key actions to be undertaken by the SOs to achieve the Climate Action Plan 2023 targets and the 2030 renewable energy targets;
- The Multi-Year Plan should outline an effective management plan that will reduce constraints and curtailment; and
- All workstreams and their associated activities in the multi-year plan could be enhanced through increased stakeholder engagement.

Both ESB Networks and EirGrid acknowledge the feedback received and have worked to ensure that the multi-year plan reflects relevant feedback. Where relevant we have ensured the 2024 – 2028 Multi-Year Plan captures the suggested changes and constructive feedback received from stakeholders.

Table 1: Feedback received and system operator responses to TSO-DSO Call for Input

FEEDBACK RECEIVED	SYSTEM OPERATORS' RESPONSE
<p>We ask that the updated Plan 2024 - 28 make clear reference to the actions and improvements being made to meet the updated targets under the Climate Action Plan 2023 (CAP 23) and the Shaping Our Electricity Future roadmap v1.1 (SOEF1.1). Further we ask that the Plan 24 - 28 incorporates the improvement points by the CRU in its "Price Review Five: 2023 Balanced Scorecards Distribution and Transmission"</p>	<p>The system operators agree that the 2024 – 2028 Multi-Year Plan should clearly define how the actions in the plan will facilitate the system operators' ability to meet the updated targets under CAP23 and CRU PR5 2023 Balanced Scorecard. These changes have been captured under the introduction and whole of systems workstream in the 2024 – 2028 Multi-Year Plan. As per the CAP 23 target, the system operators are committed to meeting up to 80% RES-E target to contribute to the current target of 75% reduction in emissions in the power sector by 2030.</p>
<p>We believe that the key area of focus should be on delivering Net Zero by 2030.</p>	<p>The system operators will engage further on the most effective way to provide greater transparency on how we are working together to meet our Climate Action Plan 2023 targets and targets of delivering net-zero by 2050.</p>
<p>Economic growth should not be a target in itself rather supporting well-being through reliable and equitable access to energy for essential needs and facilitating sustainable and circular economic activity.</p>	<p>The system operators agree that the programme should be underpinned by the target of ensuring reliable and equitable access to energy for all while facilitating sustainable and circular economic activities. Our programme objectives have been updated to reflect this change.</p>
<p>We ask that the Plan includes tasks to demonstrate the identification and alleviation of system constraints</p>	<p>Each system operator has a responsibility to manage constraints on its system. In its SOEF and Operational Policy Roadmap, the TSO has outlined a set of measures to alleviate transmission network constraints and curtailment. As part of the NN, LC Programme, the DSO is preparing to launch products designed to address current and future distribution network constraints, as part of the government's immediate term objective of 15-20% flexible demand by 2025.</p>
<p>Constraint and curtailment continue to be an issue for renewable generators. We recommend that an effective management plan for constraint and curtailment of renewable generation, which are otherwise likely to increase in impact</p>	<p>It is recognised that there can be interactions between distribution and transmission constraints. It is an objective of this DSO/TSO workplan to ensure that this interaction is managed effectively.</p>
<p>Grid constraints should be addressed</p>	<p>The SOs are currently investigating several</p>

<p>through sharing of maximum export capacity (MEC) at community level, and community level batteries and energy storage projects as collaborations between ESB Networks and energy communities.</p>	<p>questions and areas regarding batteries. The SOs will provide further clarity once positions on this technology are fully understood. It should also be understood that battery technology is a complement to the other technologies that we need to meet the CAP 23 targets and as such its implementation needs careful considerations.</p> <p>ESB Networks welcomes the suggestions regarding how community energy could be incorporated into its activities with respect to flexible demand and storage. ESB Networks will include this feedback in the inputs under consideration as it develops a blueprint for driving flexibility and new services over the coming decade. For more detail see section 8 of the ESB Networks 2024-2028 Flexibility Multi-Year Plan,</p>
<p>[We] ask that the Plan 24 - 28 include that a clear plan on collaboration and interaction between the TSO and DSO is incorporated to deliver efficient markets across the energy, system services, and capacity markets.</p>	<p>Both system operators acknowledge the importance of delivering efficient markets across the energy, system services and capacity markets. As part of the whole system approach to the DSO/TSO operating model, an implementation plan is to be developed in 2024 to address some of these concerns.</p>
<p>We ask that the two system operators (TSO, DSO) demonstrate that cooperation in the Plan 24 - 28 occurs to ensure that the risk of a two-tier market for system services and flexibility will be avoided by all parties.</p>	<p>The system operators are working together to develop a DSO/TSO operating model to ensure the operational compatibility of system services and local services. This will be considered as part of the implementation plan due to be developed by ESB Networks and EirGrid as part of the whole of system workstream.</p>
<p>We believe that this workstream (SFPS) could be improved by a considered and consistent engagement with stakeholders, participants, and investors on the projected changes to the power system that the SOs identify through their cooperative approach.</p>	<p>The system operators remain committed to regular engagement with participants and the value of engagement with stakeholders, participants and investors. Where possible, the system operators plan to leverage existing forums – for example, the National Network, Location Connections Advisory Council and the Shaping Our Electricity Future Advisory Council.</p> <p>In light of this feedback, the system operators are currently planning our stakeholder engagement for 2024 and this workstream will be considered.</p>

<p>The parts of the plan about "protection settings for largest customer" - it is not clear why the focus should be on protection of large customers rather than small customers and households.</p>	<p>This task refers to equipment protection settings that are applied by large industrial customers to protect their processes and equipment during faults on the power system. The sensitivity of these settings is causing technical issues for the operation of the power system which we are working together with these customers to resolve. Although the protection settings for smaller customers today is not an issue, it is likely to become an issue in the future.</p> <p>The behaviour of equipment installed by smaller customers and households is being considered under a separate task – SFPS5 - Assessment of DER (Distributed Energy Resources) on Future System Performance to ensure secure energy transition</p> <p>We have updated the wording in the Multi-Year Plan to ensure that more information and detail around this action and workstream is available.</p>
<p>We welcome the joint work proposed, to minimise the dispatch down of renewable generation to ensure its efficient use and aim to achieve renewable energy targets in an economic manner.</p>	<p>The system operators appreciate the feedback. We have highlighted our joint work to reduce dispatch down as part of the reducing dispatch down workstream.</p>
<p>We welcome any areas where efficiencies can be made to increase project delivery timelines and volumes.</p>	<p>The system operators appreciate the feedback and will continue to focus on enhancing co-ordination between the DSO and TSO to deliver efficiencies in the programme.</p>
<p>We welcome the Facilitating New Technologies and Systems Services proposal, where the joint system operators are looking to pilot new technologies and processes, and to facilitate the integration of new technologies, in particular hybrid connections and supporting arrangements to optimise the use of existing infrastructure.</p>	<p>The system operators appreciate the feedback. We will continue to work towards facilitating new technologies, particularly hybrid connections as part of this Multi-Year Plan.</p>
<p>...addressing loopholes whereby demand side fossil fuel generation which does not meet EirGrid environmental and emissions criteria</p>	<p>Firstly it is important to clarify that all participants in ESB Networks' demand response programmes must adhere to the</p>

<p>for demand response participation is getting around those rules by instead participating in ESB's beat the peak programme where the same standards do not apply</p>	<p>emissions limits set by the Environmental Protection Agency. Furthermore, ESB Networks can confirm that continuously adapting the environmental and emissions criteria with respect to participation in ESB Networks' flexible demand programmes is a current focus, and will be reflected in all future product launches.</p>
<p>We ask also that the PR5 DSO/TSO Joint Incentive Multi-Year Plan 2024-2028 ('Plan 24-28') when drafted provides a clear and detailed focus on outputs to demonstrate the delivery of these priorities which focus on priorities as expected by the CRU5.</p>	<p>Both System Operators have strongly considered the outputs of the tasks of each workstream when developing this document, as noted in section 1 of this document "Ambition and Approach". Outputs of these tasks we're discussed by both system operators during workshops to develop this document. The final section of this document relating refers to both the outcomes and new capabilities of each task, which provide more detail to the reader on what the system operators are focusing on as part of this Multi-Year Plan between 2024-2028.</p>
<p>Direct procurement from consumers by the System Operators should not be permitted or enabled given the competition concerns this would raise. We believe that the design work for a competitive market framework must be led by the CRU much akin to how the market design of system services at the wholesale level is occurring (SSFA).</p>	<p>The Joint System Operator Programme (JSOP) has been established to reflect how EirGrid, in its role as Transmission System Operator (TSO), and ESB Networks, in its role as Distribution System Operator (DSO), are jointly addressing electricity system and customer needs through whole-of-system solutions, in a collaborative and effective manner. JSOP is underpinned by a multi-year delivery plan, including dedicated tasks to enable the participation of distribution-connected resources in System Services Future Arrangements, underpinned by technical modalities (including registration, qualification, and dispatch arrangements).</p> <p>In addition, there are dedicated tasks to develop a holistic market framework to (i) agree future operating model, (ii) market/operations framework development, co-ordination of constraints & review alignment of aggregation structures for transmission & distribution services (iii) data exchange & systems configuration and (iv) Future Arrangements – Distribution connected customers.</p> <p>Finally, as noted in ESB Networks' Flexibility</p>

	<p>Multiyear Plan, a key element in the blueprint ESB Networks is in the early stages of developing with industry and the CRU a plan for transitioning products which are not currently being offered by the market from DSO-led to industry-led. The governance arrangements for this will be established in due course, led by CRU, to ensure that all current and future prospective market participants can play a central role.</p>
<p>We consider that the delivery targets and associated Balanced Scorecard (BSC) thresholds need to be higher and more ambitious for the SOs to push them to deliver the changes needed. We propose changes to the criteria proposed for the BSC. We believe that the “financially neutral” point should be increased to 60% of the plan completed (from the proposed 40%), and that the 100% upside is set at >95% of plan completed (allowing for some tasks whose completion may not be within the control of the SOs).</p>	<p>PR5 and annual balanced scorecard is published by the CRU will outline the scoring process for the TSO-DSO Multi-Year Plan. This will be considered further as required.</p>
<p>Clearly Defined work programme: We would welcome a programme which includes clearly defined milestones and actions to ensure that the 2030 RES-E targets can be achieved.</p>	<p>Task WOS7 on grid code and distribution code evolution to support RES-E targets by 2030 addresses these targets and reflects the long-term approach required to meet the 2030 target. Each year, the SOs meet and define appropriate milestones to coordinate their work as highlighted as part of this task. A mid-year checkpoint will occur in 2024 to review whether any distribution code or grid code updates are required throughout the year.</p>
<p>Demand response incentives by both EirGrid and by ESB networks should facilitate genuine load-shed demand response, and energy storage, and not use of fossil fuels on-site.</p>	<p>We welcome this feedback and are considering how it could be applied in ongoing and future market and product design.</p>

Whole of System Approach

3. Whole of System Approach

One of the key objectives of the TSO-DSO Joint System Operator Programme is to develop of a whole of system approach to system operation between the TSO and DSO. The whole of system 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.

Joint System Operator – Operating Model

A key initiative within the whole of system workstream is the development of a future TSO-DSO operating model. Substantial changes are occurring in system operation, such as active network management at distribution level and other measures to enable pioneering levels of renewable generation and low carbon technologies on the network. Supporting these will require a model to outline the operating practices, interfaces, market operations and data exchange needed for our customers.

In 2023, both system operators conducted a series of workshops to develop the vision, principles and high-level design of the TSO-DSO Operating Model. The system operators developed the model taking into consideration system optimisation / scheduling, dispatch and activation, and settlement solutions that may be viable for our customers.



Figure 4: Areas of co-ordination of the TSO-DSO Operating Model

For 2024, the system operators will be focusing on developing an implementation plan for the operating model to ensure we deliver these solutions for our customers. We 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 system operators will be engaging with industry and CRU with the outcome of the proposed TSO-DSO Operating Model in due course.

Alignment of System Services and Local Services

Both system operators are working together to develop a TSO-DSO operating model to ensure the operational compatibility of system services and local services. The continued evolution of system services by EirGrid and the introduction of local services by ESB Networks should provide a greater range of services to support customer needs. The evolution of system services is being progressed by EirGrid in alignment with the SEM-23-043 Phased Implementation Roadmap for the System Services High Level Design Consultation Paper published in June 2023. ESB Networks is also introducing local flexibility services on the distribution system to support Ireland's decarbonisation policy objectives, as outlined in ESB Networks' "Scenarios for 15-20% Flexible System Demand" Consultation Paper published in August 2023 as part of CRUs energy demand strategy.

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.

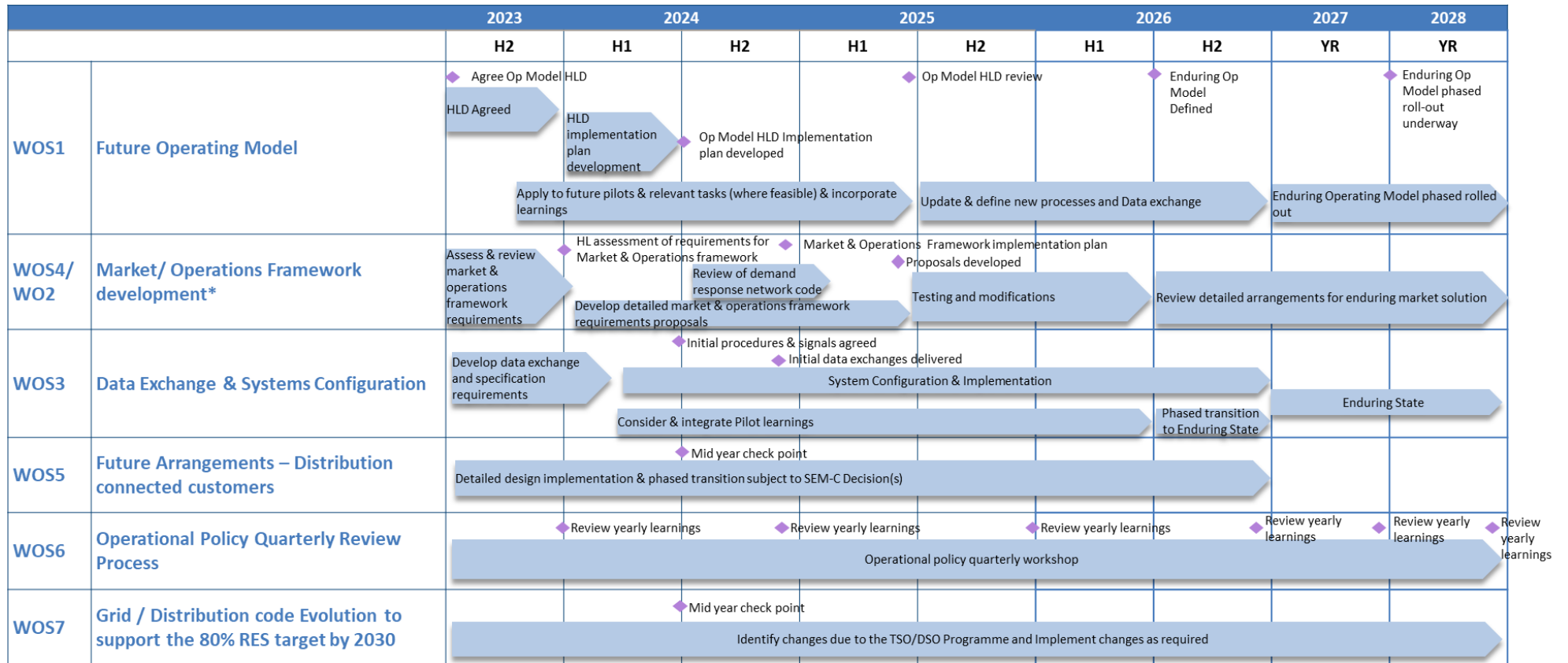
Visibility, monitoring and forecasting

One of the key focus areas to ensure the success of the whole of system approach is increased co-ordination in visibility, monitoring and forecasting.

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.

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

Whole of Systems Plan on a Page (POAP)



* Including co-ordination of constraints & review alignment of aggregation structures for transmission & distribution services

◆ Milestone
★ Go-Live

Figure 5: Whole of Systems POAP

Key milestones/dates:

2024:

- H1 – WOS1: Agree Op Model HLD.
- H1 – WOS3: Agreement on the initial procedures and signals or data exchange by the end of H1.
- H2 – WOS2/4: The Market & Operations Framework implementation plan complete by end of H2;
- H1 – WOS5: Mid-year checkpoint held on Future Arrangements for System Services, dependent on publication of decision paper;
- H1 – WOS7: Mid-year checkpoint held to determine if any Distribution Code or Grid Code to support the 80 % RES target by 2030.
- H2 – WOS3: Initial data exchanges in line with the requirements of the future operating model delivered by the end of H2.
- H2 – WOS6: Review yearly learnings and any outputs from quarterly operational policy updates.

2025:

- H1 – WOS1: Review of the operating model HLD by the end of H1;
- H1 – WOS2/4: Proposals developed for Markets & Operations Framework by the end of H1
- H2 – WOS6: Review yearly learnings and any outputs from quarterly operational policy updates.

2026

- H1 – WOS1: Enduring operating model is defined.

2027 & 2028:

- 2027 – WOS1: Enduring operating model is rolled out in phased approach.

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

Facilitating New Technology and System Services

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 electrification. Climate Action Plan 2023, published in December 2022 also introduced new targets such as 15-20% demand side flexibility by 2025 and 20-30% demand side flexibility by 2030.

Meeting these objectives will see transformative changes in the electricity system operation and related markets and additional co-ordination between the system operators. The widespread adoption of low carbon technologies in the period to 2028 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 such as batteries, 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:

- Coordinated QTP activities;
- Progressively improving processes for DSUs' participation in all markets;
- Co-ordination on the technologies required to achieve 15-20% demand side flexibility by 2025 and 20-30% demand side flexibility by 2030 respectively;
- 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).

As required in Climate Action Plan 2023, the system operators will work together to enable hybrid connections and supporting arrangements to optimise the use of existing infrastructure. The system operators submitted three documents to CRU as part of the previous Multi-Year Plan and are awaiting direction from CRU before further developing the milestones for 2024.

Facilitating New Technology Plan on a Page (POAP)

		2023	2024		2025		2026		2027	2028
		H2	H1	H2	H1	H2	H1	H2	YR	YR
FNT1	QTP Process	Launch of New QTP	◆ New QTP processes established and new QTP launched. QTP Annual Process	◆ DSO/TSO collaboration on QTP trials QTP Annual Process	◆ DSO/TSO collaboration on QTP trials QTP Annual Process	◆ DSO/TSO collaboration on QTP trials QTP Annual Process	◆ DSO/TSO collaboration QTP Annual Process	◆ DSO/TSO collaboration QTP Annual Process	◆ DSO/TSO collaboration QTP Annual Process	◆ DSO/TSO collaboration QTP Annual Process
FNT2*	Pilot 1 – I&C DSR Local Market	Review & Refine the collaboration process Pilot-1 operational	◆ Review and Refine collaboration process ◆ Decision on extension of Pilot 1	◆ Pilot 1 learnings from TSO-DSO interactions						
FNT3*	Pilot 2 – Dynamic instruction sets	Pilot-2 operational	◆ Review & Refine the collaboration process ◆ Pilot 2 learnings from DSO/TSO interactions	◆ Pilot 2 learnings from TSO-DSO interactions						
FNT4*	Pilot 3b – Pilot of Scale	Review & Refine the collaboration process ◆ DSO/TSO process agreed ★ Winter 2 go-live Pilot-3b operational	◆ Pilot 3b processes agreed ★ Pilot 3b Go live ◆ Mid year checkpoint	◆ DSO/TSO process agreed ★ Winter 3 go-live	◆ Pilot 3b learnings from TSO-DSO interactions Pilot-3b possible extension					
FNT6*	Pilot 5 - Collaboration on development of FASS	Process development / Implementation phase / review and refine collaboration process								
FNT10	Pilot 3a & 6 – Beat the Peak Commercial & Domestic	◆ DSO/TSO process agreed ★ Winter 2 go-live Development cycle Pilot operational	◆ DSO/TSO process agreed ★ Winter 3 go-live	Re-evaluation						
FNT7 FNT8 FNT9	Hybrid Connections	Post CRU Decision – Hybrid Co-Located Connections Implementation Scoping	◆ Commence implementation of hybrid connections programme Develop future policy and phased implementation							

*Explore potential of DSO flexibility pilots to provide system services within one of the tasks marked above

Figure 6: Facilitating New Technology POAP

◆ Milestone
★ Go-Live

Key milestones/dates:

2024

- H1 – FNT4: Collaboration processes of pilot 3B to be agreed by the end of H1
- H1 – FNT6: Mid-year checkpoint on the process development/ implementation phase/ review and refine collaboration process of FASS (Pilot 5)
- H1 – FNT 7/8/9: Commence implementation of hybrid connections programme².
- H2 – FNT1: DSO/TSO collaboration on QTP trial(s) following annual QTP process;
- H2 – FNT2: Decision on extension of Pilot 1;
- H2 – FNT3: Review and refine the collaboration process of Pilot 2 operations
- H2 – FNT10: Beat the Peak Commercial & Domestic winter 3 DSO/TSO processes agreed.

2025

- H2 – FNT1: DSO/TSO collaboration on QTP trial(s) following annual QTP process
- H2- FNT2: Review of Pilot 1 learnings from DSO/TSO interactions;
- H1 – FNT3: Review of Pilot 2 learnings from DSO/TSO interactions;
- H2 – FNT4: Review of Pilot 3b learnings from DSO/TSO Interactions.

2026

- FNT1: DSO/TSO collaboration on QTP trial(s) following annual QTP process .

2027 & 2028

- FNT1: DSO/TSO collaboration on QTP trial(s) following annual QTP processes .

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: Milestone on hybrids connections is dependent on CRU decision.

² Dependent on CRU decision(s)

Reducing Dispatch Down of Renewable Generation

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 surplus 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. This and other changes to the electricity system including additional generation from the distribution system requires collaborative effort between the TSO and DSO to effectively manage the future power system. Through coordinated effort, the TSO and DSO continue to work to enable generators to connect to the system earlier, in a more cost-effective manner. This enables more generators to be connected to the system ensuring more availability on the system.

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 Minimum number of Units Online (MUON) 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.

The actions listed in the Reducing Dispatch-Down of Renewable Generation workstream are dependent on the finalisation of the Future Operating Model as to how the actions will roll-out in the future. The DSO/TSO Future Operating model aims to enable better management of the system and enhanced coordination between the system operators. Enhanced management and coordination will enable reduced constraints on the system.

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:

- Developing Distributed Energy Resources (DER) visibility, controllability, forecasting and modelling to deliver more efficient real-time operation and planning of the system leading to improved management of constraints and curtailment;
- 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.
- In collaboration with the system operators, the DSO Pilot 4 (Renewables Flexible Access) aims to introduce flexible access arrangements for distribution connected renewable generators.

Currently the system operators have limited visibility of what DER are doing on the network. In 2023 the system operators began to identify the high-level requirements, gaps and capabilities needed to enhance forecasting, real-time visibility, and controllability. These identified requirements will enable the system operators to develop the capabilities to accurately develop

and deliver on DER visibility, controllability, forecasting and modelling. The system operators anticipate that the future system will have increased variability of generation sources. This may require additional controllability to ensure limited disruption to the system.

The DSO and TSO are working collaboratively to reduce dispatch down. However, both are aware that the actions set out in this workstream will have greater longer-term benefits than short term/immediate advantage.

Reducing Dispatch Down of Renewable Generation Plan on a Page

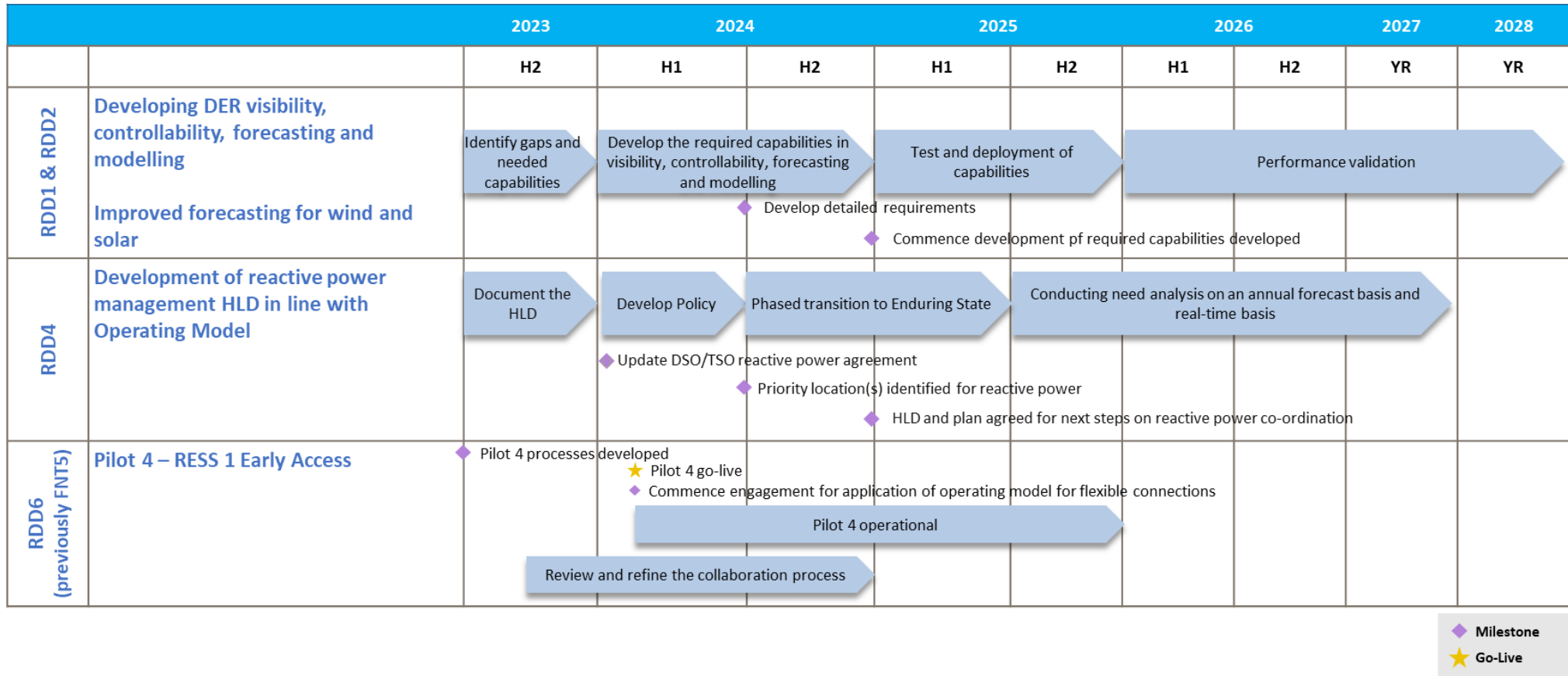


Figure 7: Reducing Dispatch Down of Renewable Generation Plan on a Page

Key milestones/dates:

2024

- H1 – RDD4: Update DSO/TSO Reactive Power Agreement;
- H1 – RDD4: Priority location(s) for reactive power co-ordination identified;
- H1 – RDD6: Commence engagement around the application of the operating model for flexible connections;
- H2 – RDD1 & RDD2: Detailed requirements for required capabilities developed in visibility, controllability, forecasting and modelling;
- H2 – RDD1 & RDD2: Commencement of the required capabilities for DER visibility, controllability, forecasting and modelling;
- H2 – RDD4: HLD and plan agreed for next steps on reactive power co-ordination.

2025

- H1 – RDD1 & RDD2: Testing and deployment of DER visibility, controllability, forecasting and modelling capabilities;
- H2 – RDD6: Operationalise DSO/TSO co-ordination on constraints in line with operating model HLD.

2026

- RDD1 & RDD2 - Operationalise the process for DER visibility, controllability, forecasting and modelling and improved forecasting of wind and solar in line with DSO/TSO operating model HLD;
- RDD4: Transition reactive power management to an enduring state and incorporate into BAU.

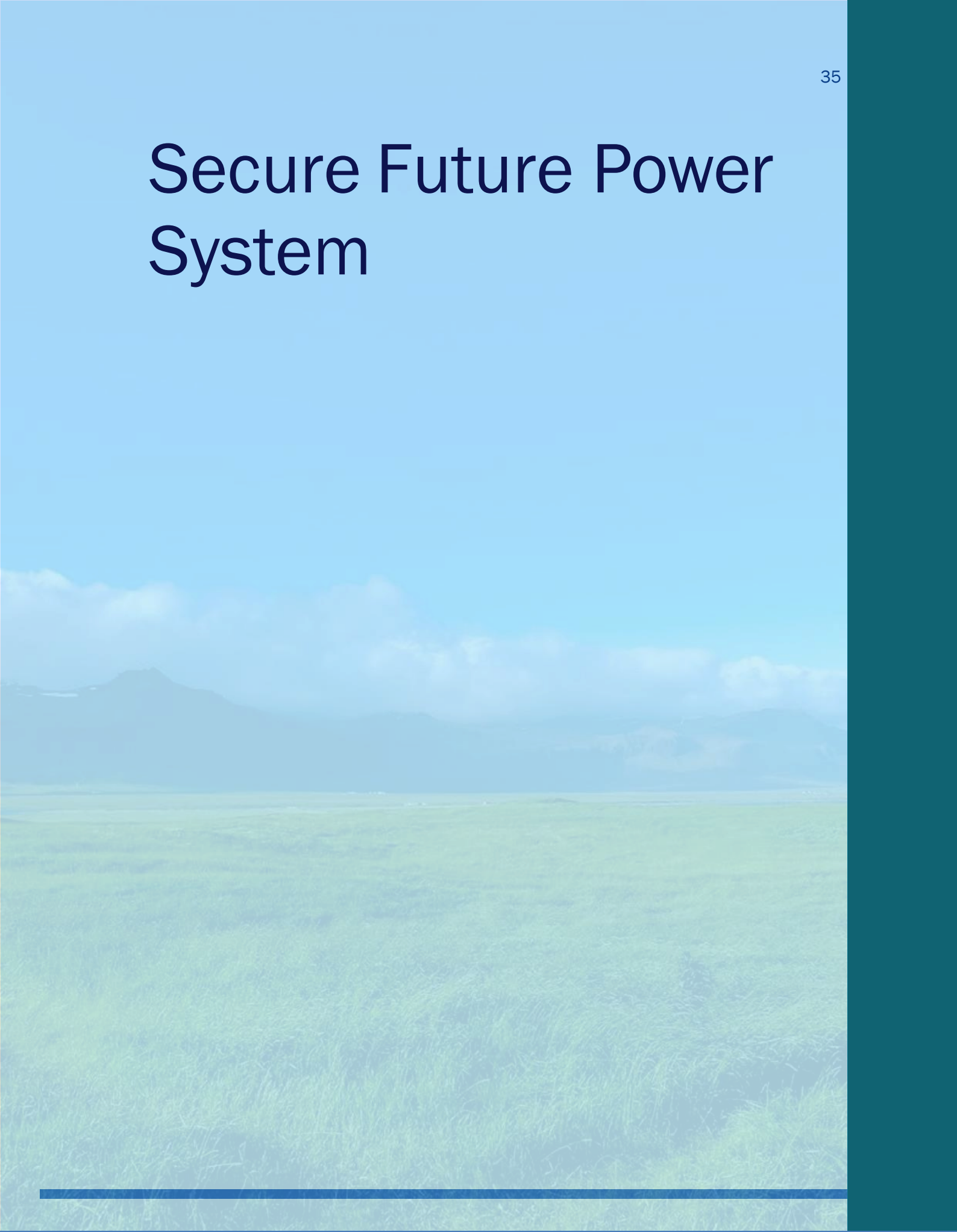
2027 & 2028

- RDD1 & RDD2 - Operationalise the process for DER visibility, controllability, 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 collaborate on initiatives that will contribute to reducing 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.

Secure Future Power System



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 and beyond. In 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 the 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 2023, we believe this approach best demonstrates the TSO and DSO collaborating with each other. TSO and DSO will document the collaborative steps taken to improve the outcome for market participants for both long-term and short-term security of supply concerns.

The initial focus of the Secure Future Power System workstream has been to identify longer-term operational requirements to ensure that both system operators are prepared to address these requirements. This will ensure security of supply is maintained. The system operators anticipate that as renewable penetration continues to increase, the characteristics of the transmission-distribution interface and the demand supplied by the power system will change.

To ensure that we have the capability to securely manage the transition to increased renewable penetration, we need to fully understand the characteristic of how these technologies will interact with system operations. This includes the consideration of the technologies' 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.

To enable Ireland's 2030 energy and climate goals while 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:

- Inform changes to our operational processes and potentially standards and settings that are applied;
- Allow us to work to enable market-based solutions, where we believe there to be 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. Large electricity users or large customers can have a significant impact on system operations. For example, sensitive equipment protection settings that are applied by large industrial customers to protect their processes and equipment during faults on the power system can cause technical issues for the operation of the power system. We are working together with these customers to resolve these issues.

Work in 2023

In 2023, the system operators actively engaged with large customers to finalise a review of their protection settings and coordinate the implementation of updated protection settings. The system operators in 2024 will conduct an assessment of performance standards for large electricity customers. The protocol for data centre flexible demand implementation was reviewed on an ongoing basis in 2023, with necessary updates implemented where required. The system operators will continue to collaboratively review and update the protocol as required.

Ensuring secure future power systems

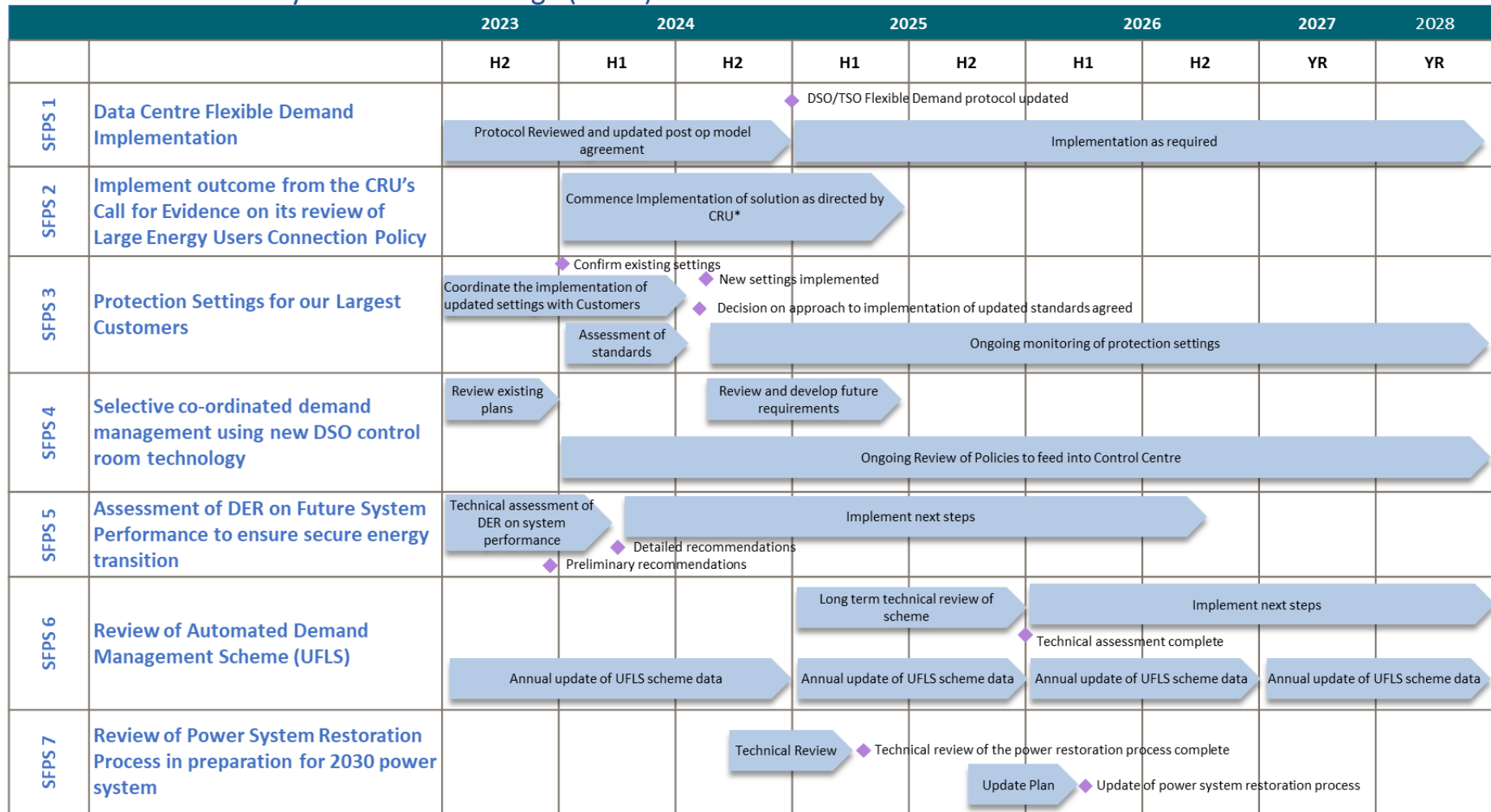
In the future, with high penetrations of embedded renewables and new technologies, it will be important to adapt our processes and systems for responding in the event of a security of supply issue arising.

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. The actions undertaken in 2023 and going forward in 2024 (and onwards) aim to avoid undesirable behaviour on the system while further enhancing and ensuring overall system security 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.

In 2023 the system operators continued to work closely with the CRU and the Irish Government to facilitate the implementation of increased renewable energy generation and penetration into the system and distribution of the high levels of renewable energy. The development of a technical assessment for distributed energy resources on the system began in H1 of 2023 with the aim of concluding the assessment by end of H1 2024. The technical assessment will provide a better understanding of the impact of distributed energy resources on the system, possible gaps and challenges, and the tools and technologies that may be required to ensure a secure power system.

The system operators with the CRU have identified key tasks as outlined below to increase overall system security and avoid undesirable system behaviour that may cause disruptions to the supply, while maintaining ongoing day to day operations.

Secure Future Power Systems Plan on a Page (POAP)



*Duration dependent on outcome of CRU policy

- ◆ Milestone
- ★ Go-Live

Figure 8: Secure Future Power System POAP

Key milestones/dates:

2024

- H1 – SFPS 5: Detailed recommendations developed on future system performance to ensure secure energy transition;
- H2 – SFPS1: DSO/TSO Flexible Demand protocol updated as required for subsequent implementations of data centre flexible demand.
- H2 – SFPS3: Approach on the implementation of updated protection settings standards for our largest customers decided.
- H2 – SFPS3: New protection settings for largest customers implemented.

2025

- H1 – SFPS7: Technical review of the power system restoration process considering changing system characteristics and tool capability.
- H2 – SFPS6: Technical assessment of automatic demand management scheme (UFLS) arrangements and recommendations on next steps.

2026

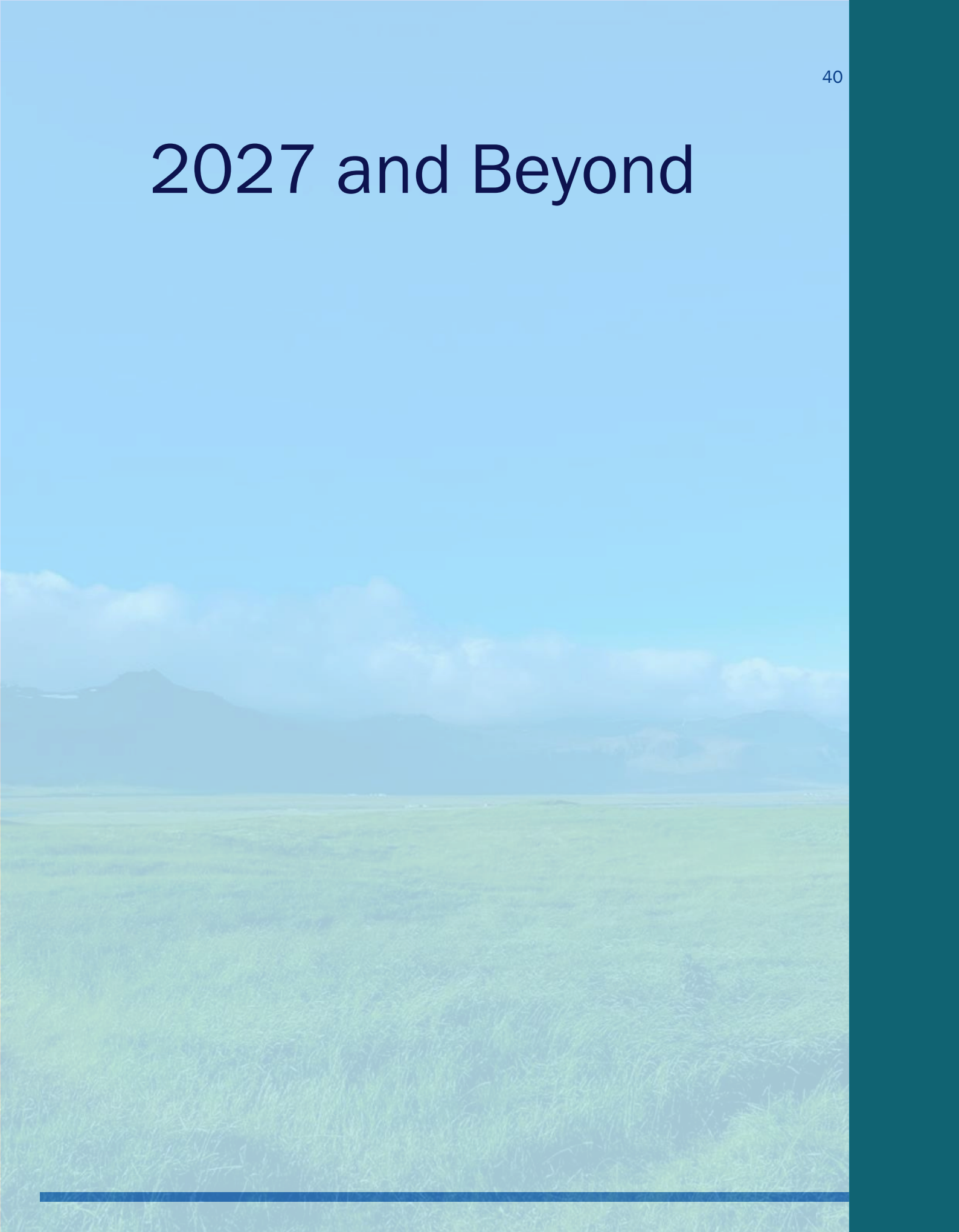
- SFPS7: Update of the power system restoration process.

2027 – 2028

- SFPS 1 – implement data centre flexible demand and transition into BAU;
- SFPS 6 – Implement next steps on the assessment of DER on Future System Performance to ensure secure energy transition.

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

2027 and Beyond



7. 2027 and Beyond

The electricity industry and society are going through rapid changes due to the energy transition and the pace and scale of newly adopted technology. Where high level milestones for 2027 / 2028 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 the new EU energy legislation;
- 3 Compliance with clean energy emissions regulations that will affect generators and demand side participants (2024/2025);
- 4 Connection of the new Celtic Interconnector to France (2026);
- 5 Availability of a new tie-line with Northern Ireland (2026);
- 6 Operational constraints including SNSP limits;
- 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 customer 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 three years which will further inform the key activities for 2027/2028.

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 in 2024/2025 as part of the Multi-Year Plan;
- 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.

Learnings from pilots going-live in 2023 such as customer participation in markets through continued evolution of services and the application of new technology.

Balanced Scorecard Proposal

8. Balanced Scorecard Proposal

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 2024 – 2028.

The Commission for the Regulation of Utilities (CRU) has mandated system operators submit a detailed multi-year plan to the CRU, covering the three following years (and the two years after at high level) that is aligned with feedback received through the consultation with stakeholders.

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 2023 to 2025 (as well as 2026 and 2027 at a high level) while this year's updated multi-year plan covers 2024 to 2026 (as well as 2027 and 2028 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,

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

- (20%) quality of the plan and defined actions;
- (40%) quality of implementation of the plan;
- (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.

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. 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 methods / approach;
3. Demonstrable and robust risk, assumption, issue, and dependency management.

Quality of Implementation of the Plan

We propose that measurement of the quality of the implementation plan should be quantitatively through a mechanistic rule. This would determine the upside / downside amounts by comparing the percentage of tasks included in the plan that have been completed with thresholds for completion. i.e., if 80 % or more of the tasks have been completed, the DSO and TSO would benefit from the maximum amount. If 40% of the plan has been completed, no upside nor downside would be given. If 0% of the tasks have been completed, the maximum downside would be given. If between 40-80% or 0-40% of tasks have been completed, the upside would be computed based on linear interpolation.

Balanced Scorecard Proposal

	Milestones - 2024	Indicative timing
Whole of System Approach	Operating Model high level design implementation plan developed	H1
	Initial procedure and signals for data exchange and systems configuration agreed	H1
	Market & Operations Framework Implementation Plan developed	H2
	Initial data exchanges delivered	H2
Facilitating New Technology and System Services	Pilot 3b process agreed	H1
	DSO/TSO collaboration on QTP trials	H2
	Review and refine the collaboration process for pilot 2	H2
	Commence implementation of CRUs decision on hybrid technology ²	H2
	Beat The Peak Commercial & Domestic winter 3 DSO/TSO processes agreed	H2
Reducing Dispatch Down	Develop detailed requirements for DER visibility, forecasting, controllability and modelling.	H1
	DSO/TSO reactive power agreement updated	H1
	Required capabilities for DER visibility, forecasting and modelling developed	H2
	HLD and plan agreed for next steps on reactive power coordination	H2
Secure Future Power Systems	DSO/TSO Flexible Demand protocol updated	H2
	New Protection Settings for our Largest Customers implemented	H2
	Detailed recommendations of distributed energy resources on future system performance to ensure a secure energy transition	H2

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 is to be 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.

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:

Table 2: Capabilities delivered as part of TSO-DSO Joint System Operator Programme

Task Name	Capabilities delivered - 2024
Whole of System Approach	
Agree Future Operating Model	Agreed High-Level Design of the DSO/TSO operating model. Interim capabilities piloted.
Market / Operations Framework development, coordination of constraints and review alignment of aggregation structures for transmission and distribution services.	High level market and operations framework requirements assessed. Detailed market and operations framework requirements proposals delivered. Participating customers / service providers will be able to offer services to TSO and DSO on a pilot basis for additional services.
Data Exchange & Systems Configuration	Data exchange procedures and signals delivered. Pilot learnings integrated into procedures.
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.
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 Commercial	Demand is lowered on the network during peak hours, reducing

	the security of supply challenges during winter 2024.
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. Delivering improved flexibility for customers in the long-term.
High-level design and plan agreed for next steps on reactive power co-ordination	Reactive power HLD and plan developed and agreed in line with the high-level future operating model. Interim capabilities delivered.
Secure Power Systems	
Update Protection settings for our largest customers, as appropriate	Improved coordination of protection settings and understanding of behaviour during system disturbances
Assessment of DER on Future System Performance to ensure secure energy transition	Improved understanding of the impact of DER on the system and what tools and technologies are required to ensure a secure power system. Deliver minimal disruption to customers and market participants.

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

9. Detailed Descriptions

Whole of System

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> <ul style="list-style-type: none"> Monitoring & forecasting protocols Market operations protocols Operational planning protocols Dispatch & Re-dispatch protocols Compliance management protocols Outage & Planning protocols <p>This will follow on from the TSO-DSO Operating Model High level design work carried out in 2022 and 2023.</p>	<p>Outcomes:</p> <ul style="list-style-type: none"> Future operating model (To-be Model) agreed Implementation Plan agreed and developed Key interface requirements developed and piloted Data exchange requirements developed and piloted. <p>Capabilities delivered 2024:</p> <ul style="list-style-type: none"> Implementation plan agreed and developed <p>Capabilities delivered 2025-2028:</p> <ul style="list-style-type: none"> Interim capabilities piloted (see enabling technology for details) TSO and DSO will be able to operate their respective systems with pioneering levels of variable renewable generation, DERs and low carbon technology Customers will have clear and consistent routes to market enabling effective participation in both local and system wide 	<ul style="list-style-type: none"> SEM 22-012 Decision System Services Future Arrangement SEM-21-027 Proposed Decision on Treatment of New Renewable Units in the SEM SEM-22-009 Decision on Dispatch, Re-dispatch SEM-21-016 RA Consultation on Compliance with Guideline on Electricity Balancing CRU/21/060 Data Connections Policy CRU target setting for DSO Flexibility Multiyear Plan CRU approval of relevant changes to enable the future operating model Network code on demand response

			markets, based on previous years' development and testing.	
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:</p> <ul style="list-style-type: none"> 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>Capabilities delivered 2024:</p> <ul style="list-style-type: none"> Collectively bring preliminary proposals based on pilot learning to the regulator for consideration and decision 	<ul style="list-style-type: none"> Appropriate regulatory approval (CRU or SEM-C) to make any proposed changes to rules covering aggregators. CRU target setting for DSO Flexibility Multiyear Plan TSO-DSO Operating Model Implementation Plan

			<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. 	
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. 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:</p> <ul style="list-style-type: none"> 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>Capabilities delivered 2025-2028:</p> <p>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>	<ul style="list-style-type: none"> Appropriate funding for control room technologies and information exchange capabilities CRU target setting for DSO Flexibility Multiyear Plan
WOS4	Market Framework Development	<p>This task is a sub-task of the DSO- TSO operating model. The aim of the task is to:</p> <ul style="list-style-type: none"> Develop the detailed framework 	<p>Outcomes:</p> <ul style="list-style-type: none"> Customers/Service providers will have clear framework for which services can be offered to both TSO and DSO to facilitate 	<ul style="list-style-type: none"> Appropriate Regulatory decisions. CRU target setting for DSO Flexibility Multiyear Plan Implementation Plan of TSO-

		<p>for DSO-TSO markets & services coordination:</p> <ul style="list-style-type: none"> • Registration processes and data exchange; • Provisions for value stacking; detailed rules, • Oversight and services prioritisation rules; • Settlement rules for dual service providers. <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</p>	<p>participation in multiple markets.</p> <ul style="list-style-type: none"> • The development of coordinated solutions to enhance constraint management and highlight any inefficiencies <p>Capabilities delivered 2024:</p> <ul style="list-style-type: none"> • Design of how local and energy market will co-ordinate for customers. <p>Capabilities delivered 2025-2028:</p> <ul style="list-style-type: none"> • Where appropriate, participating customers/services providers will be able to offer services to TSO and DSO on a pilot basis for additional services 2025 • Customers will be able to offer services to TSO and DSO on a clear basis with agreed service prioritisation and service conflict rules agreed • Settlement arrangements under these rules developed 2026 - 2027 • Market arrangements developed and reviewed in line with enduring solution additional services. Improved coordination of the application of 	<p>DSO Future Operating Model</p>
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			transmission and distribution constraints to minimise the impact on renewable generation	
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:</p> <ul style="list-style-type: none"> Phased implementation of procedures and governance for distribution customers’ participation in transmission system services <p>Capabilities delivered:</p> <ul style="list-style-type: none"> Distribution customers will be able to participate in TSO system services to agreed registration, access, and operational procedures 	<ul style="list-style-type: none"> Outcome of System Services Future Arrangements – Phase III: Detailed Design and Implementation – Phased Implementation Roadmap for the System Services High Level Design – Decision Paper Appropriate and timely regulatory decisions during the detailed design and implementation process

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:</p> <ul style="list-style-type: none"> • 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. 	
WOS7	Grid Code & Distribution Code evolution to support RES-E Targets by 2030	Review the Grid Code and Distribution Code in the context of the current and future needs of the power system and	<p>Outcomes:</p> <ul style="list-style-type: none"> • Each year arising from the DSO/TSO programme, required changes to Grid and Distribution Code will be necessary to codify changes 	CRU approval of Grid and Distribution Code changes brought forward by the Grid and Distribution Code Review Panels.

		initiate a programme of change to deliver the necessary modifications.	arising from all workstreams • This task will ensure the requisite changes are brought to the appropriate panels for consideration and implementation	
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Facilitating New Technology

Task ID	Task Name	Task Description	Outcomes / New Capabilities	Dependencies
FNT1	QTP Process (system operators Coordination)	QTP – annual call for potential projects; possible examples include hybrids, hydrogen, grid-forming Over the next year and beyond both parties will agree on what should be trialled for the benefit of milestones in 2030.	<p>Outcomes:</p> <ul style="list-style-type: none"> QTP learnings and outcomes. Annual call for potential projects, possible examples such as hybrids, hydrogen, grid-forming. <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 <p>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. 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.
FNT2	DSO Pilot 1 - I & C DSR Local Market (system operators Coordination)	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. Pilot 1 will continue to be operational from 2022 – 2024, with a possible one year extension.	<p>Outcomes:</p> <ul style="list-style-type: none"> Learnings from the trial to address enduring solution for information exchange and service prioritisation for TSO/DSO. <p>Capabilities delivered: TSO and DSO will work together to assess the impacts and begin to gather learnings of distribution customers providing services.</p>	Dependent on participation of flexible service providers in pilot. SEM-22-009 Decision Paper on Dispatch, Redispatch and Compensation Pursuant to Regulation (EU) 2019/943

		Learnings from DSO/TSO interaction from this pilot will be used for other pilots, specifically pilot 3b.		
FNT3	DSO Pilot 2 – Dynamic Instruction Sets (system operators Coordination)	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>Outcomes:</p> <ul style="list-style-type: none"> 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>Capabilities delivered:</p> <ul style="list-style-type: none"> 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>The DSO will be able to provide day ahead allocation and associated processes which will have other applications in DSO/TSO coordination.</p>	Dependant on participation of DSUs in pilot. SEM-22-009 Decision Paper on Dispatch, Redispatch and Compensation Pursuant to Regulation (EU) 2019/943

<p>FNT4</p>	<p>DSO Pilot 3b – Pilot of Scale (System Operators Coordination)</p>	<p>This task delivers the ability to manage the required TSO-DSO interaction relating to the DSO 2023 Flexibility Pilot of Scale.</p> <p>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:</p> <ul style="list-style-type: none"> 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. Deliver capability to utilise residential demand in the delivery of services to TSO <p>Capabilities delivered:</p> <ul style="list-style-type: none"> 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>
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FNT6	DSO Pilot 5 Future TSO/DSO Operating Model (System Operators Coordination)	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>Outcomes:</p> <p>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:</p> <p>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>TSO-DSO Operating Model Implementation Plan</p>
FNT10	Pilot 6 - Beat the Peak Domestic (System Operators Coordination)	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>Outcomes:</p> <p>Domestic customers actively lower their demand during peak hours.</p> <p>Capabilities delivered:</p> <ul style="list-style-type: none"> • 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 2023 -2024

<p>FNT10</p>	<p>Pilot 3a - Beat the Peak Commercial (System Operators Coordination)</p>	<p>Commercial demand response campaign, targeting large and multisite 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 collective action to beat the peak. A “daily” campaign is in development for introduction in early 2023</p>	<p>Outcomes:</p> <ul style="list-style-type: none"> Commercial customers actively lower their demand during peak hours. <p>Capabilities delivered:</p> <ul style="list-style-type: none"> Demand is lowered on the network during peak hours, reducing the security of supply challenges during winter 2024 and 2025. 	<p>CRU Consultation on Electricity Network Tariffs 2023 -2024</p>
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FNT7	Hybrid Technology (MLE)	<p>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.</p> <p>The plan builds on the work from the FlexTech Hybrid Working Group¹.</p>	<p>Outcomes:</p> <ul style="list-style-type: none"> • 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. 	<p>CRU review and decision on the recommendations paper submitted to CRU in June 2022. Next steps will be determined post CRU engagement.</p>
FNT8	Hybrid Technology (Over Install)	<p>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 overinstall 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/</p>	<p>Outcomes:</p> <ul style="list-style-type: none"> • Completion of review of the existing Over-Install Policy. <p>Capabilities delivered:</p> <ul style="list-style-type: none"> • Generation customers will be able to increase their capacity factor by connecting more generation behind their connection point 	<p>Over install policy recommendations paper was submitted to CRU in October 2022. CRU review and decision. Next steps will be determined post CRU engagement.</p> <p>CRU published a consultation on the over-install policy in 2023. Both system operators are awaiting the CRUs decision on this task to develop next-steps.</p>

		<p>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.</p>		
FNT9	Hybrid Technology (Dynamic Sharing of MEC)	<p>Determine policy for sharing of Maximum Export Capacity (MEC) behind a single connection point that enables hybrid connections to share MEC</p>	<p>Outcomes:</p> <ul style="list-style-type: none"> The ultimate outcome is to optimise use of network infrastructure through enabling the sharing of MEC behind a single connection point. <p>Capabilities delivered:</p> <ul style="list-style-type: none"> Subject to sharing of MEC policy determined by CRU. 	<p>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.</p>

Reducing Dispatch Down

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. 	<p>Outcomes:</p> <ul style="list-style-type: none"> • Solutions for the delivery of DER visibility, forecasts, and models as an input to WOS3. <p>Capabilities delivered 2025:</p> <ul style="list-style-type: none"> • 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>WOS1 and WOS3 Regulated funding as appropriate to implement systems changes. Regulatory approvals as required to implement operating model.</p>

		5. This task will incorporate learnings from other jurisdictions on DER visibility forecasting and modelling where applicable		
RDD2	Improved Forecasting of wind and solar	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. Improved forecast accuracy and constraint awareness will deliver a more efficient dispatch.	<p>Outcomes:</p> <ul style="list-style-type: none"> Improved forecasts. <p>Capabilities delivered:</p> <ul style="list-style-type: none"> More efficient operations – reduction of dispatch down of renewables due to forecast errors. 	
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:</p> <ul style="list-style-type: none"> Create roadmap for reactive power; next steps and application of learnings Revise operational policy on reactive power <p>Capabilities delivered:</p> <p>Utilisation of the reactive power capabilities of generation on the distribution network to support the efficient operation of both distribution and transmission systems.</p>	CRU target setting for DSO Flexibility Multiyear Plan

Secure Future Power System

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.	<p>Outcomes:</p> <ul style="list-style-type: none"> The output of this task is a DSO/TSO protocol on the implementation of flexible demand at data centre sites. <p>Capabilities delivered: The TSO and DSO capability to coordinate and implement flexible demand to manage system security.</p>	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 from CRU's Call for Evidence on its review of Large Energy Users Connection Policy	The CRU has consulted (CRU21060) on mitigation options to address the system security impact of data centre demand. An implementation period will now follow.	<p>Outcomes:</p> <ul style="list-style-type: none"> Implementation of a solution to manage data centre connections. <p>Capabilities delivered: Subject to the solution option determined by CRU.</p>	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.	<p>Outcomes:</p> <ul style="list-style-type: none"> 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. <p>Capabilities delivered:</p> <ul style="list-style-type: none"> 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	<p>Outcomes:</p> <ul style="list-style-type: none"> 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. <p>Capabilities delivered:</p> <ul style="list-style-type: none"> Updated processes and tools to allow 	CRU target setting for the DSO Flexibility Multi- year Plan

		maps. Augmented DSO control room technology such as Advanced Distribution Management System (ADMS) and Distributed Energy Resource Management System (DERMS) would support this task.	the TSO and DSO effectively manage demand.	
SFPS 5	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:</p> <ul style="list-style-type: none"> 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>Capabilities delivered:</p> <ul style="list-style-type: none"> Improved understanding of DER behaviour during system faults. 	
SFPS 6	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	<p>Outcomes:</p> <ul style="list-style-type: none"> The output of this task is a technical review of the demand management scheme to inform subsequent updates to the scheme. <p>Capabilities delivered:</p> <ul style="list-style-type: none"> Recommendations on changes to the Automated Demand Management Scheme. 	

		need to be reviewed to ensure that it delivers sufficient response and meets System Defence requirements.		
SFPS 7	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:</p> <ul style="list-style-type: none"> 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>Capabilities delivered:</p> <ul style="list-style-type: none"> Recommendations on changes to the power system restoration process. 	