

NATIONAL NETWORK LOCAL CONNECTIONS

POWER SYSTEM REQUIREMENTS STRATEGY

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NETWORKS

Call for Input | Power System Requirements | July 2024

OVERARCHING · VISION · NORTH STAR

Our Vision

Ireland's climate action and net zero targets are met

Our Mission

Our mission is to drive climate action by building the DSO's capability to cultivate customer participation and flexible, whole-of-energy-system solutions

Our Enabler

'Flexible system demand' is demand with the ability to respond to changing states of generation, demand, storage, and network conditions through a combination of system operator mechanisms, such as implicit and explicit flexibility, coupled with individual/collective customer behaviour.

How will we enable our purpose, vision and mission?

Power System Requirements

An understanding and foresight of the impacts, characteristics and evolving needs, of a highly distributed, low-carbon electricity system. The technical expertise to develop innovative solutions - including identifying opportunities for customers to provide flexible services - to support growing customer demand and increasingly distributed generation including storage

Flexibility Market Design

Local and national markets for flexible demand, run by the DSO as a neutral market facilitator, offering a mix of long-term, day-ahead and intraday arrangements that afford all customers with opportunities to participate

Retail Market Design

Setting the future direction for the smart meter-enabled retail market, with suppliers equipped and incentivised to harness available data to create dynamic, personalised tariffs for their customers. We will work closely with suppliers and the CRU to optimise retail market design, enabling synergies and efficiencies in operating flexibility and retail markets

Customer

We want to encourage all energy consumers to become active energy citizens by promoting thoughtful electricity usage. By understanding demand side flexibility, personal energy patterns, and the origins and impacts of energy use, customers can take control to positively influence the grid, environment, and their finances

Smart Metering

Setting the future direction for smart meters, including use cases - such as harnessing smart meter data to (i) identify faults, and (ii) baseline, measure and validate flexibility services delivered by customers - the implementation of the next generation meter, and the development of an enduring solution for microgeneration

Behind-the-Meter Infrastructure

Behind-the-meter infrastructure, including clear technology requirements and standards for data exchange and communication protocols, to ensure customers' homes, vehicles, solar panels and batteries are flexibility ready



Core Foundations

Regulatory: Mandates, authority, policy, alignment, codes, licences

Legislative and Policy: Climate Action Plan

Stakeholder: Voice of the stakeholder and citizen

POWER · SYSTEM · REQUIREMENTS · OVERVIEW

OBJECTIVE

The Electricity Market Directive (EU) 2019/944 (as amended on 11/04/2024) defines the role of the DSO in relation to the introduction of flexibility services, including:

- The development of flexible products and services necessary for the **efficient, reliable and secure operation of the distribution system**. [EU2019/944, Article 31].

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

Enabling **New Demand Connection** (e.g., LEUs) as a mechanism to enhance system flexibility and provide pathways for low to zero carbon emission connections that also contribute significant flexibility in the distribution system.

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

STRATEGIC PROPOSALS

1 FORECAST GENERATION AND LOAD
Forecast localised distributed generation, low-carbon technologies and demand to support system operation and planning

2 ENHANCE SUITE OF STUDIES
Analyse the needs/impacts of generation and demand, assessing thermal, voltage, system strength, harmonics and other parameters

3 HIGHLIGHT SYSTEM REQUIREMENTS
Identify and publish the requirements (annual look ahead) – and the potential – for flexibility services in the short, medium, and long term

4 ENHANCE CONNECTION PLANNING
Introduce – and embed – flexible connections, to accelerate electrification and the connection of renewable generation

5 FLEXIBILITY INVESTMENT PLANNING
Develop an enhanced investment planning methodology to identify optimum solutions to identified network constraints, taking account of different attributes of various solutions and where and when flexible services are available

6 ENHANCE OPERATIONAL PLANNING
Enable the DSO's optimisation of demand and supply, at a local level, by undertaking near real-time and real-time operational planning

STRATEGIC PARAMETERS



ARENAS

Where will we be active?

- Forecasting **generation and load growth** – (including profiles)
- **Modelling short-** (real-time and near real-time) **and long-term** system requirements
- Identifying **network constraints** resulting from customer needs and the evolving electricity system
- Identifying how alternative, cost-effective **flexible solutions** can be deployed
- Facilitating **flexible connections** for demand and generation customers
- **TSO/DSO coordination** to facilitate the optimal integration of DER and maintain the balance between supply and demand.



VEHICLES

How will we get there?

- **Innovation and streamlining** in power system analysis
- **Industrialise process** for the execution of system studies
- Development of a methodology for **capex deferral investment** taking account of new services and solutions
- **Near real-time and real-time operational planning desks**



DIFFERENTIATORS

How will we stimulate the marketplace?

- **Transparency** including the publication of updated market information related to short- and long-term flexibility services needs
- **Stakeholder engagement** to ensure alignment of new developed products and services with real customer needs and capabilities



ECONOMIC LOGIC

How will this provide consumer value?

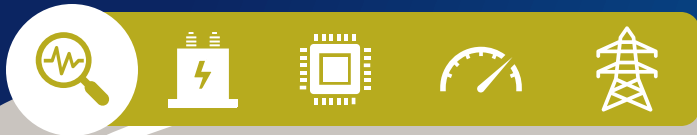
- Identifying and deploying the **most economically advantageous solution**, be it network reinforcement or flexibility services
- **Fostering competition** between network and non-network solutions

POWER · SYSTEM · REQUIREMENTS · VISION

Forecast Generation and Demand: Forecast localised distributed generation, low-carbon technologies and demand to support system operation and planning



Advanced System Studies and Analysis: Identify new flexibility services opportunities, based on analysis of the capabilities, needs and impacts of generation and demand, assessing thermal, voltage, system strength, harmonics and other parameters



Flexibility Needs Statements: Identify and publish the scale, type and locations of flexible services to address short-, medium- and long-term system needs



Connection Planning: Utilise enhanced tools and analysis to introduce and embed flexible connections, to accelerate the connection of renewable generation and low-carbon demand



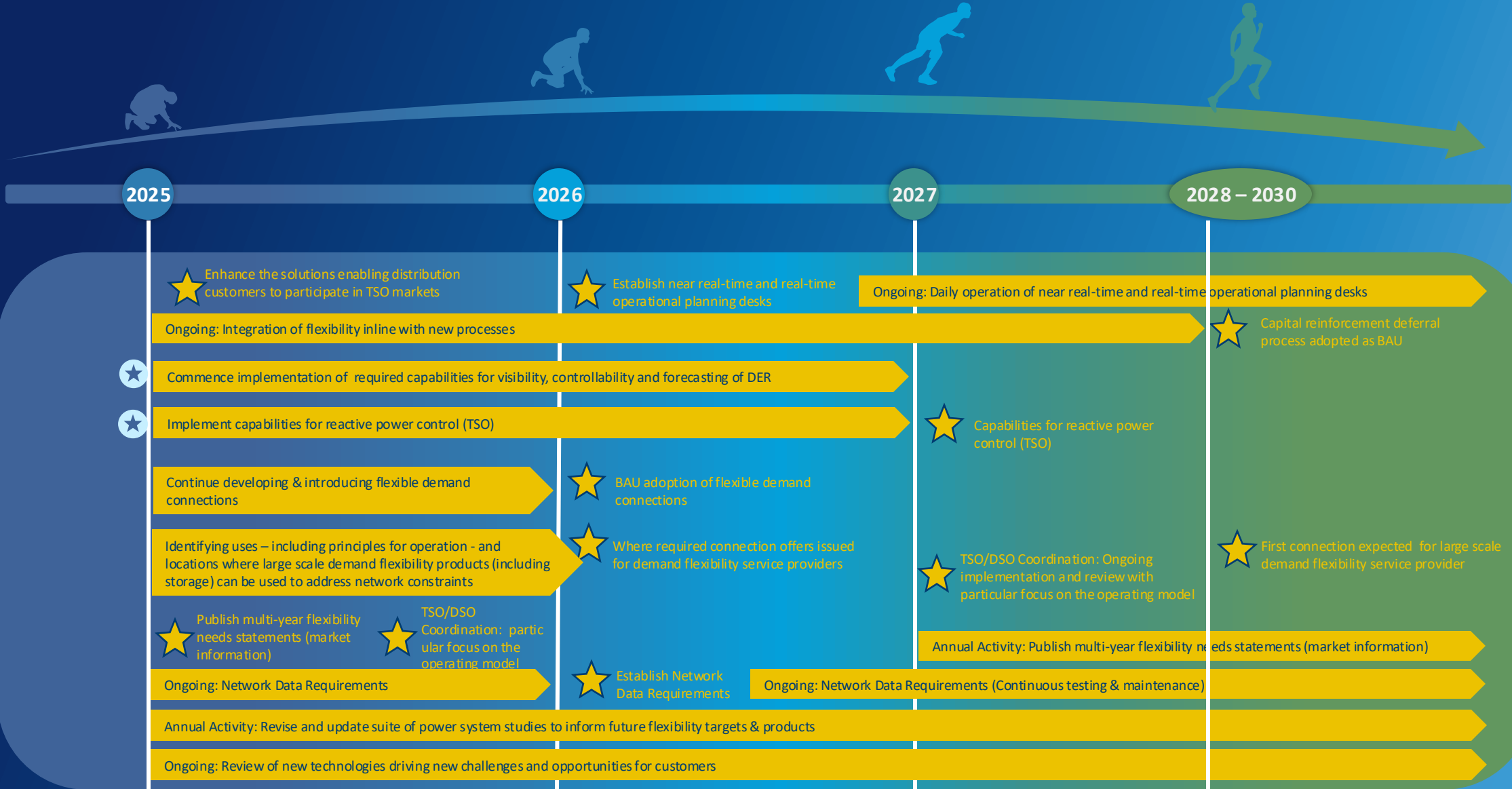
Investment Planning: Develop an enhanced investment planning methodology to identify optimum solutions to identified network constraints, taking account of different attributes of various solutions and where and when flexible services are available



Operational Planning: Enable DSO optimisation and local balancing of flexible demand, storage and distributed generation, applying near real-time and real-time operational planning,, while considering TSO requirements and constraints



STAGING · PLAN TO 2030



Legend:

Suite of initiatives



Milestone



New addition since CFI 2023

Work in progress in 2024 and expected to be completed in 2025

- **Integrate flexibility into long-term planning processes**
 - This task is currently in progress and is expected to be delivered during the year of 2024. The primary deliverable in 2024 will be the alignment of existing processes, with new processes. The full integration of flexibility will be an ongoing deliverable. For example, task “Capital reinforcement deferral process adopted as BAU” is set for 2028.
- **BAU adoption of flexible generation connection offers**
 - Flexible generation connection processes were developed under Pilot 4 and the processes developed are currently implemented for current and future ECP assessment processes. The development of an updated Guidance document will further progress this initiative
- **First flexible generation connection live**
 - First flexible connection go-live is the major milestone of Pilot 4. The first connection is expected to happen in Aug 2024.

New Tasks added since 2023 Call for Input

- TSO/DSO Coordination – work with EirGrid
 - Reducing Dispatch Down 1&2 – Visibility, forecasting and modelling
 - This task aims to create detailed requirements and capabilities for DER management, including visibility, forecasting, controllability, and modelling.
 - The feasibility of adopting DER controllability of micro, mini and small-scale generation, improving visibility of DERs at a more granular level is the core function of the task.
 - Reducing Dispatch Down 4 – Reactive Power Control
 - The task aims to enhance dispatch efficiency by better utilizing reactive power on the distribution network and coordinating exchanges at the DSO/TSO interface. This has a number of benefits including potentially reducing reliance on conventional generation thereby creating more capacity for renewable generation.