

Energy Innovation Summit



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Powering Wales Renewably Manager

Pweru Cymru yn adnewyddol **Powering Wales Renewably**

A digital twin approach to energy
planning and coordination

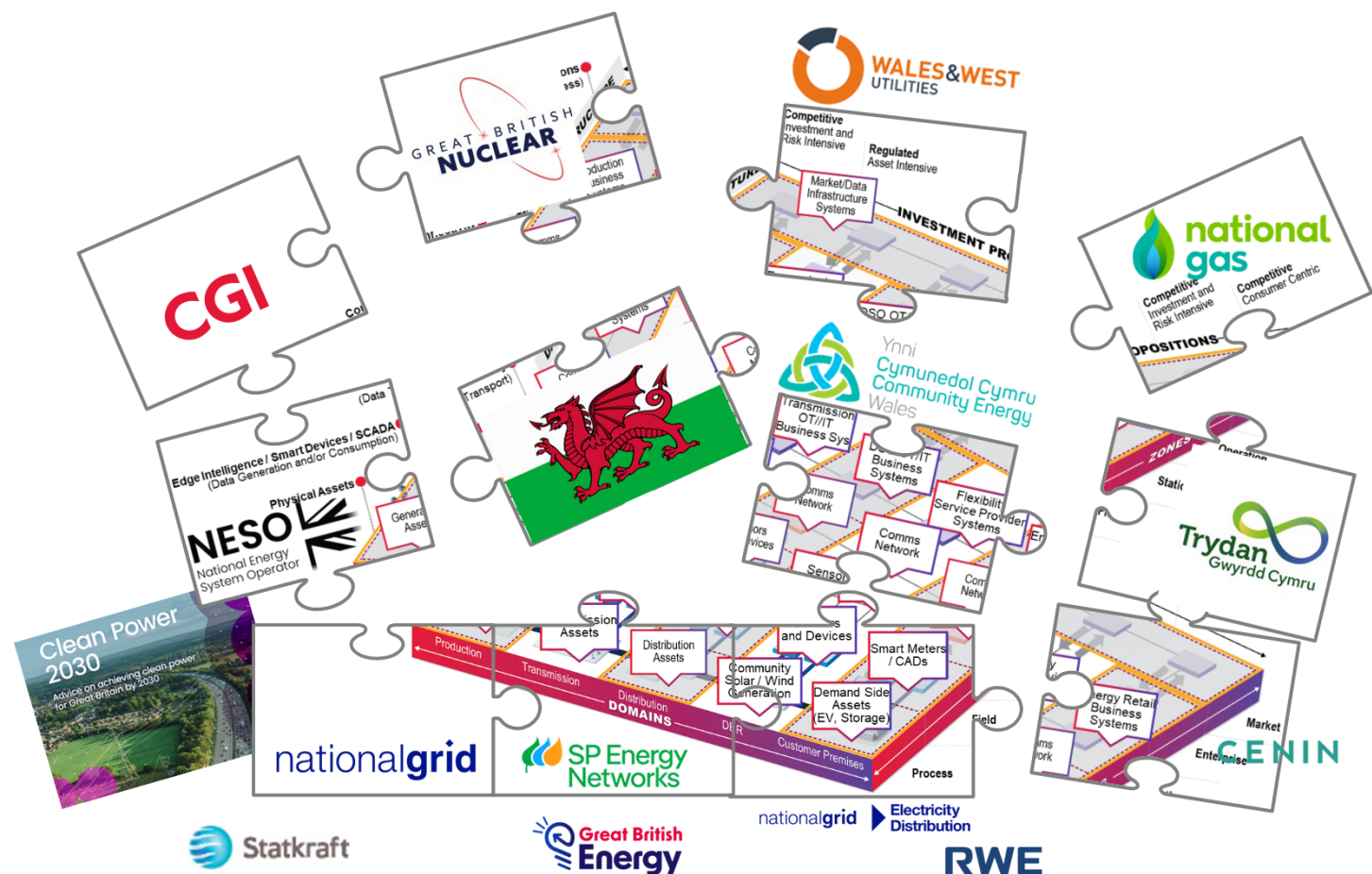
National Energy System Operator (NESO)

- The 2023 Energy Act established an independent system operator and planner for GB
- To help accelerate the energy transition
- NESO is built on previous experience as the Electricity System Operator (ESO)
- ESO balanced electricity supply and demand 24/7, and networks and markets roles



Powering Wales Renewably in Context

The Strategic Innovation Fund (SIF) aims to help transform gas and electricity networks for a low-carbon future. SIF funding is for transformative, strategic projects that explore new ideas.



What is Different About the Project ?

- SIF Project focused on overcoming specific blockers to the Welsh energy transition
- The Welsh Government is a project partner
- Whole-System digital twin enabled approach
- Multi-energy vector network status
- Key Welsh project stakeholders included
- All energy network operators in Wales included
- Based on formative stakeholder collaboration



Discovery



Alpha



Beta



BaU

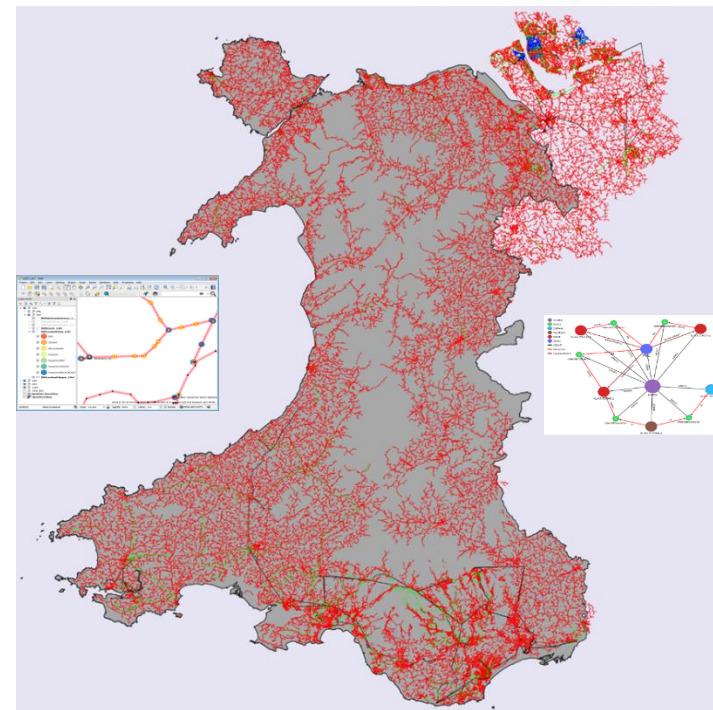
Llywodraeth Cymru
Welsh Government

CGI

CENIN



nationalgrid

Virtual Energy System
Powered by NESO

nationalgrid

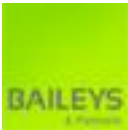


Partners and Stakeholder Momentum

Alpha Partners



Wider Stakeholders



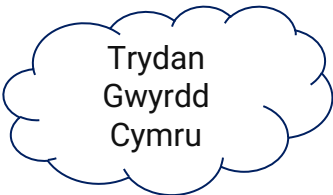
Supply Chain Stakeholders



Partners for Beta



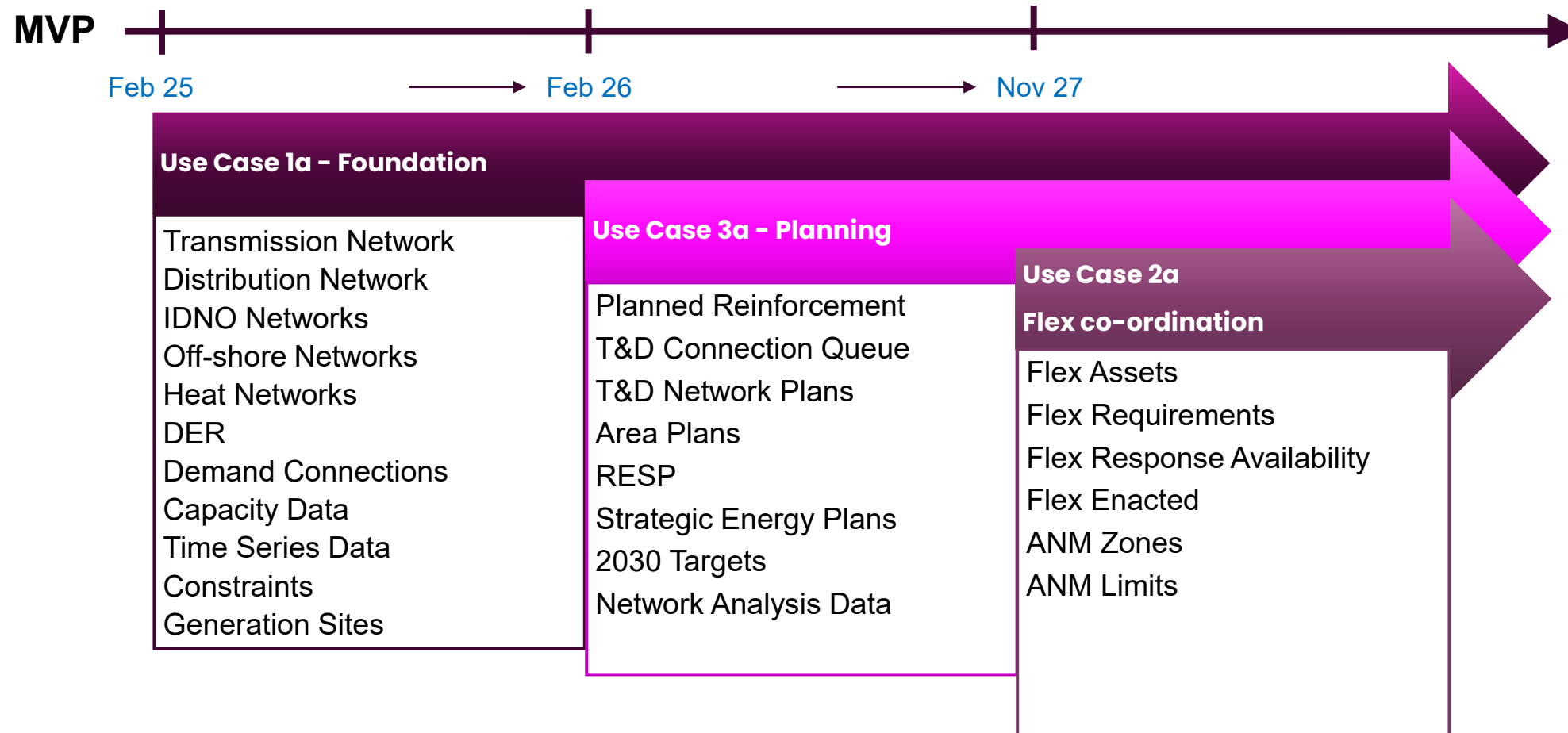
Emerging Beta Stakeholders



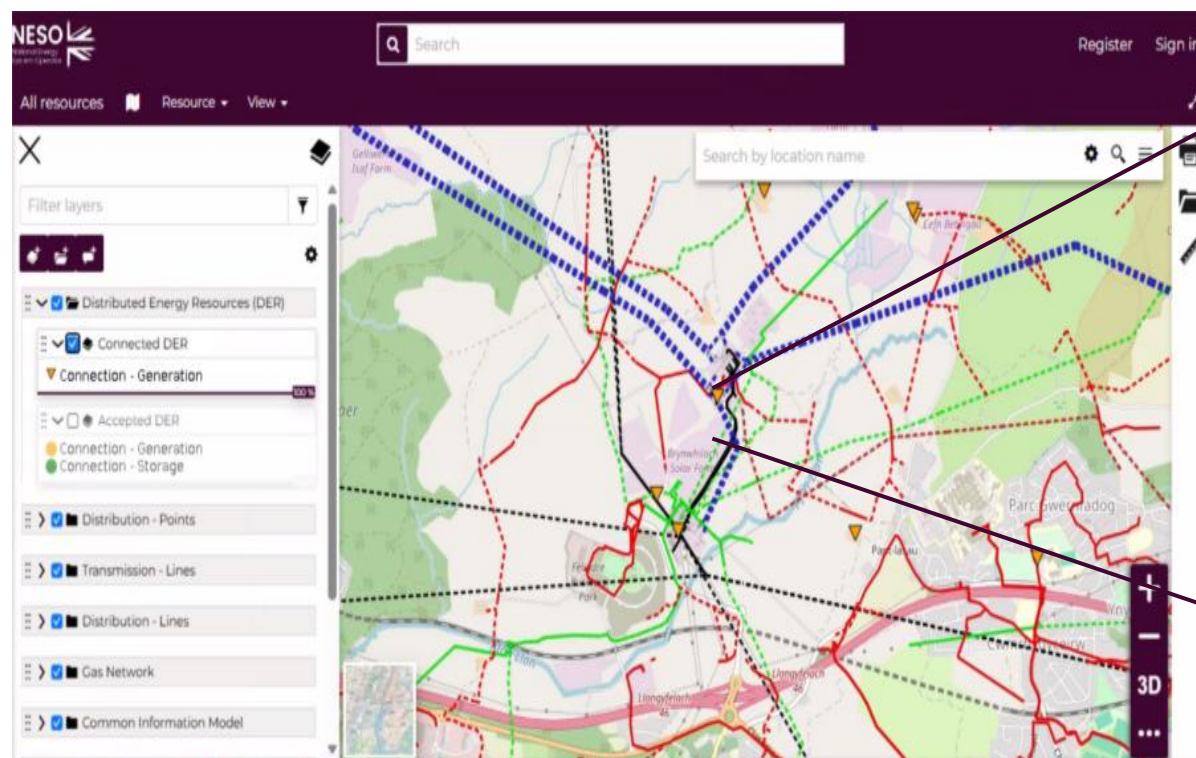
Solution Deliverables

Use Case 1 Foundation	The first Welsh whole energy system intelligent network status model, correlated to multiple industry and external datasets will deliver: • Better matching of connection to network site • Enhanced location choice for connections • System capacity release enabled by whole system visibility
Use Case 2 Flexibility Coordination	The first whole-system, near-real-time representation of flexibility requirements, DER (Distributed Energy Resources) site availability and dispatch. • Coordination of all network operator Welsh flex requirements • Accessing all DER response availability • Enhancing DER response site selection • Quantifying interaction between ANM (Active Network Management), procured flex, curtailment, off-setting, and storage potential
Use Case 3 Integrated Planning	The first top-down and bottom-up comparison of Local Area Energy Plan's, energy network development plans, and locational connection queues, for alignment and delivery tracking. • Locational comparison of top-down and bottom-up plans • Informed basis for whole-system investment option decision-making that is adaptive to change • Net Zero progress tracking against on the ground deployments

PWR – Data Centric Delivery Plan



PWR Progress – Release 1



Open Data Portal

nationalgrid



nationalgrid Electricity Distribution



PWR Looking Ahead

Use Case 3a – Planning

	Release 3 & 4 Aug 26	Release 5 Feb 27	Release 6 May 27
Planned Reinforcement T&D Connection Queue T&D Network Plans Area Plans RESP Strategic Energy Plans 2030 Targets Network Analysis Data	Plan Co-ordination	Planning Analysis	Renewables Enablement
	• Combined T&D conn q future • Network dev plan base • Planned reinforcement • Area energy plans • RESP • SEP data • T&D net dev plan WNS • T&D network plans • Area Plans	• Identify & Loc Hydro conn • DER connection Queue • 2030 Grid Mission Tracking • Network Analysis model	• Load Constraint • Gen Constraints • Renewal Net Potential • Community Eng Potential

- Data
- Data Sharing Agreements
- Stakeholder Engagement
- Industry Developments
- RESP/SEP Progression
- Scope of other projects

Innovation at NESO aims to accelerate the path towards a sustainable GB energy system for everyone.

We do this by generating and testing new ideas, technologies or approaches to solve critical challenges and by sharing innovation insights. We champion transformational, scalable innovation that contributes to clean power.

Learn more about how NESO facilitates innovation, our projects and the funding routes available: innovation@neso.energy

neso.energy/about/innovation