

PWERU CYMRU YN ADNEWYDDOL POWERING WALES RENEWABLY

SHOW & TELL | TRANSITIONING LOCAL ENERGY SYSTEMS
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Llywodraeth Cymru
Welsh Government

ESO

CGI

nationalgrid



Electricity
Distribution

nationalgrid

Virtual Energy System
Powered by National Grid ESO





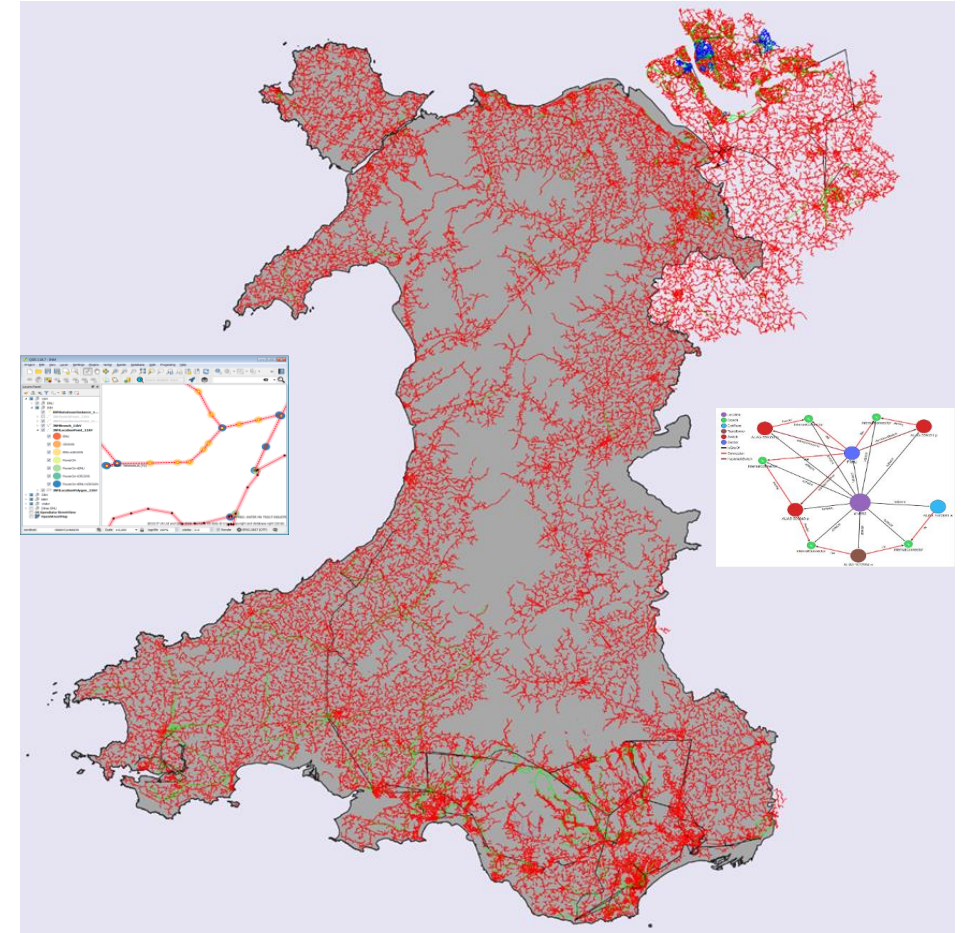
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Problem Statement

- The Welsh Government has ambitious decarbonisation plans
- Identifying suitable locations for economic and timely connection of renewable generation is challenging
 - Hard to identify and evaluate potential for use of flexibility

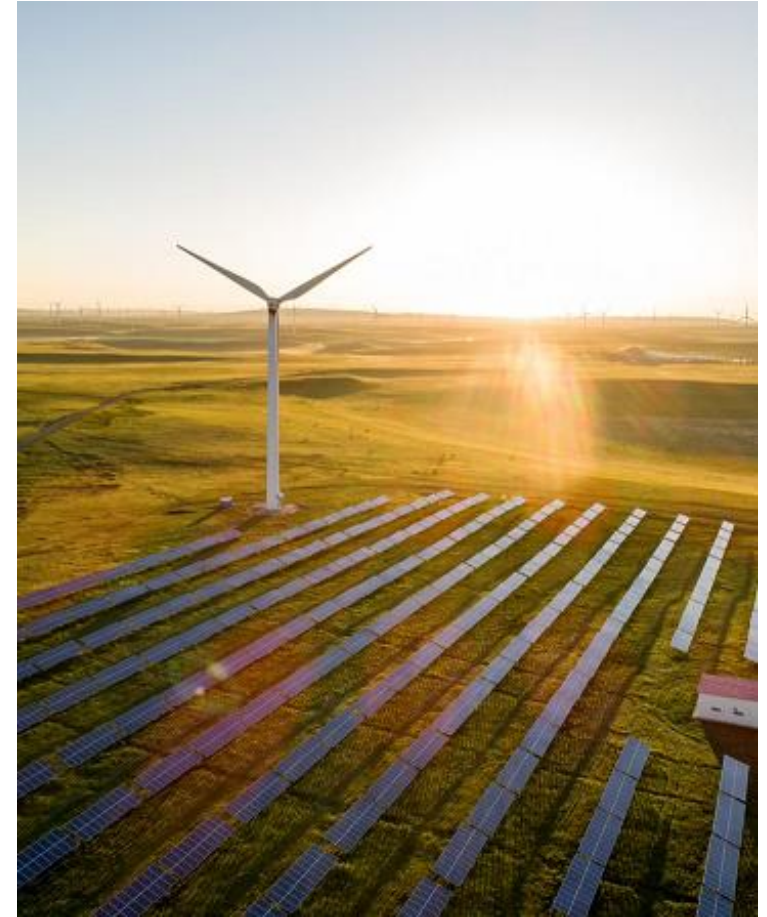
Powering Wales Renewably addresses these challenges to:

- Help deliver the Welsh Government's decarbonisation plans
- Increase renewable electricity hosting capacity, and
- Deliver in the best interests of Wales's citizens and their communities.



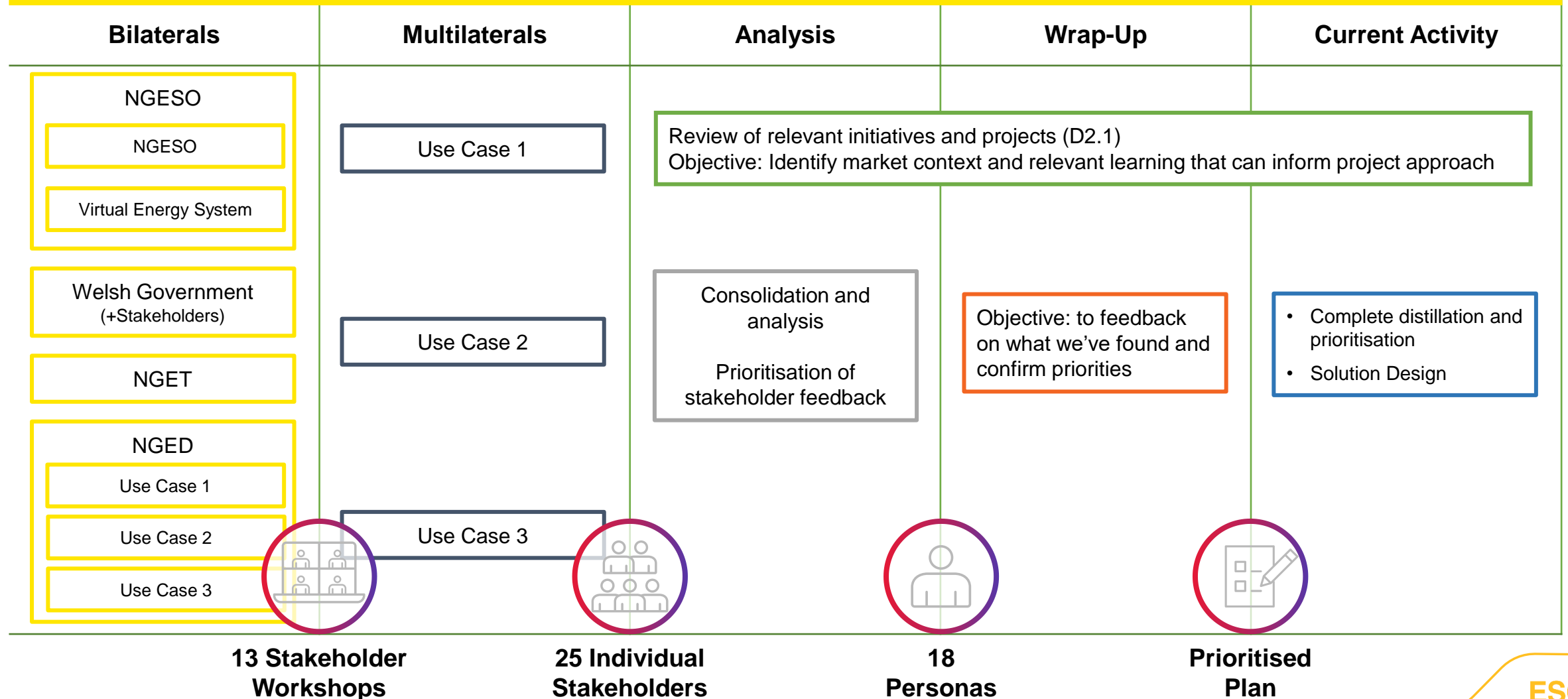
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- Targeted at the Net-zero challenge and accelerating climate action.
- Collaboration between
 - Welsh Government,
 - Customers, and
 - Transmission and Distribution network operators
- Deliver a digital twin of T&D networks across Wales
 - Build on investments in Virtual Energy System and Intelligent Distribution Network Model
- Use-case Driven
 - Connections
 - Flexibility
- Whole 'Electricity' System context
- Provide the first use case for the Virtual Energy System at scale







Discovery Approach

Objective: Understand the different stakeholder priorities and needs



Powering Wales Renewably Stakeholder Needs

Department Role	Welsh Government / System Stakeholders	ESO	Transmission Network Operator	Distribution Network Operator
				
Personas	<ul style="list-style-type: none"> ▶ Policy Strategist ▶ Local Energy Planner ▶ Community Groups (Local Ownership) ▶ Developer / Investor 	<ul style="list-style-type: none"> ▶ Customer Connections Manager ▶ Operational Planner ▶ Early Competition Manager ▶ Network Modeler ▶ DER Visibility Manager ▶ Whole Electricity System Manager 	<ul style="list-style-type: none"> ▶ SIF & Commercial Lead ▶ Intelligent Substations – Product Manager ▶ Intelligent Substations/Network – Principal Architect ▶ Strategic Network Design – Transformation Lead 	<ul style="list-style-type: none"> ▶ Operations Manager ▶ DSO Manager ▶ Connections Manager ▶ Network Planning and Regulatory Reporting
Needs	<ul style="list-style-type: none"> ▶ Securing investment ▶ Informing policy action ▶ Delivery of Local Area Energy Plans ▶ Better visibility of issues ▶ Community engagement ▶ Identification of potential sites ▶ Time and cost to connection 	<ul style="list-style-type: none"> ▶ Improve connection applications ▶ Improve “Whole System” coordination ▶ Better visibility of embedded generation at the distribution level ▶ Improve resource utilisation 	<ul style="list-style-type: none"> ▶ Improve strategic network design 	<ul style="list-style-type: none"> ▶ Improve use of flexibility ▶ Improve outage planning ▶ Identify dynamic network options ▶ Prioritising reinforcements ▶ Visibility of customer plans and needs



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Stakeholder Priorities

Use Case	Priority	Benefit
UC#1 Foundation	Better inform key decisions	Reduce the time to connection
	Common understanding	Improved stakeholder understanding
	Identify areas with network capacity	Identify areas with potential for DER connections
	Enable connections where required	
UC#2 Flexibility Markets & Constraint Coordination	Whole system coordination flexibility	Improved constraint management
	Improve DER (and CER) participation in provision of flexibility, revenues, & liquidity	Improved planning, operational decision taking & conflict avoidance
	Maximise network DER hosting	Capacity coordination enhancement
		Increased renewable hosting
UC#3 Whole Electricity System Connections and Capacity	Optimise development options	ID benefits of constraint release
	Model T/D connection queue management changes.	Improved connection times
	Improve delivery of regional and local area energy plans	Accelerate delivery of decarbonisation and local plans
	Improved outage planning	Reduced outages &/or outage duration

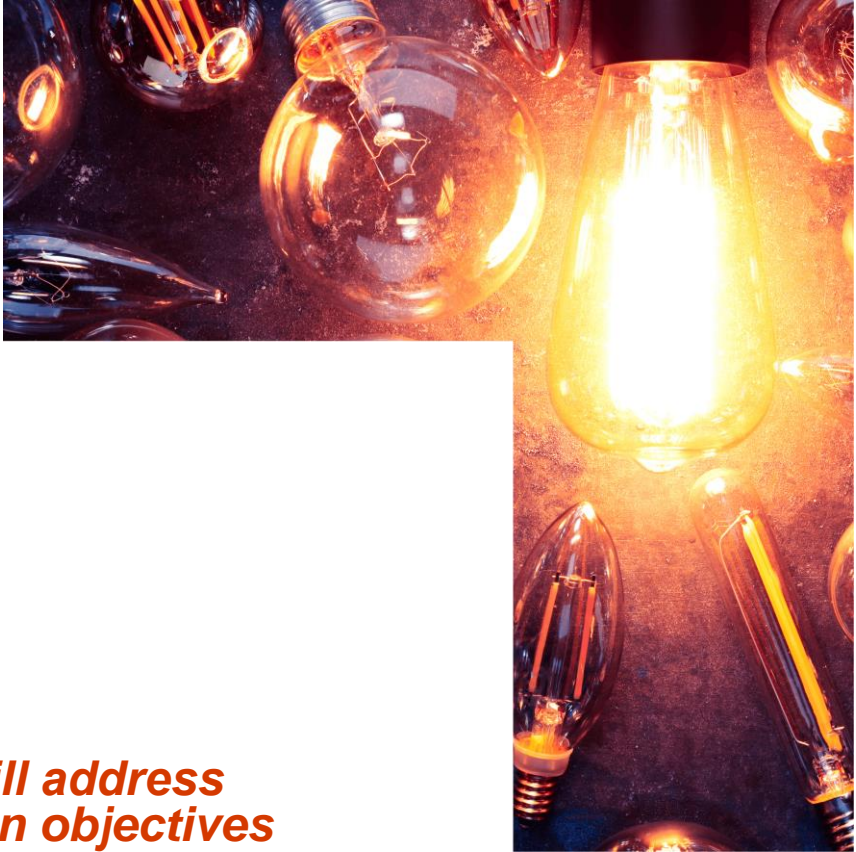


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Evolving Learning

Discovery Scope	Learning Points
Increase Renewable Hosting	➡ Increase decarbonised demand
Access to the right people	➡ Adapt approach to people's needs
Different System Actor perspectives	➡ Symptoms vs root cause
"Whole System"	➡ Governance is part of the "System"

Consensus that a 'Digital Twin' of the electricity system will address root cause issues and accelerate delivery of decarbonisation objectives

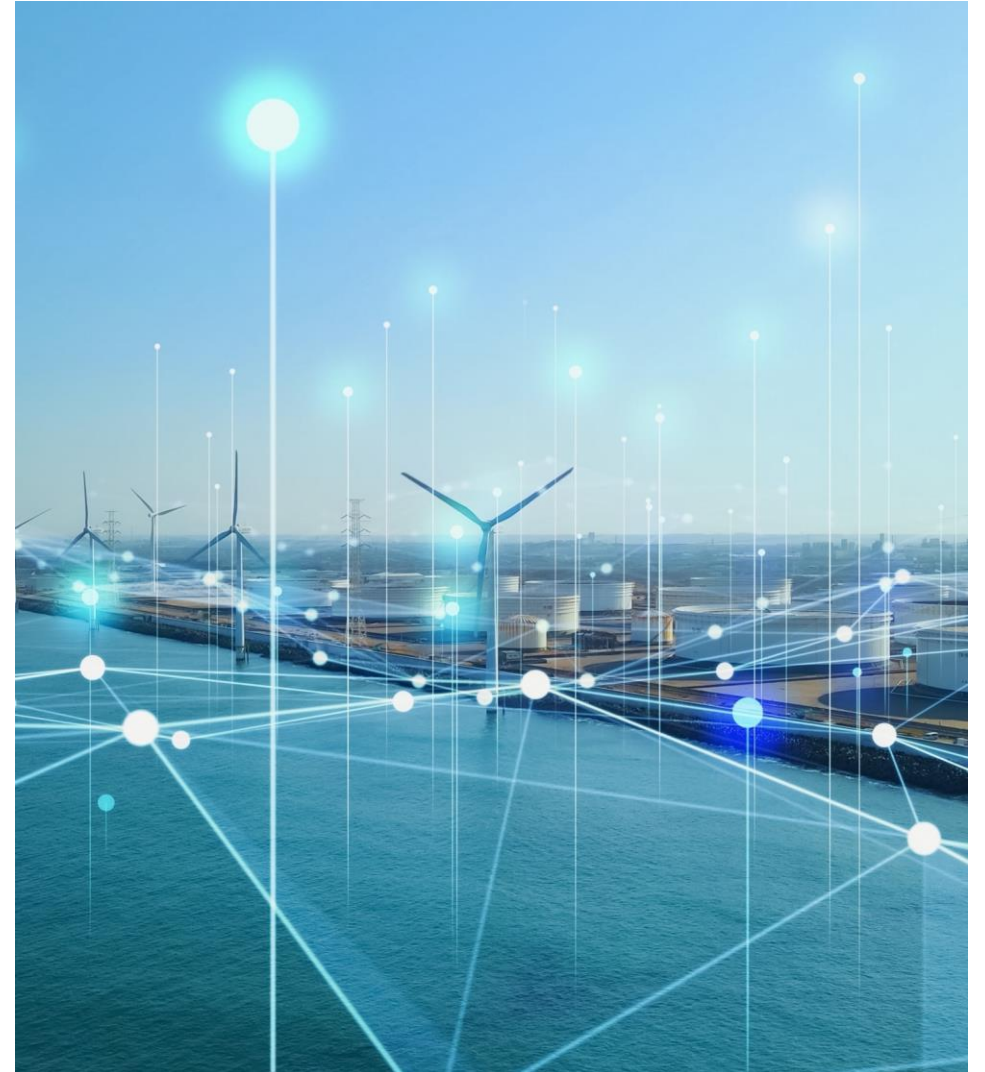


Looking Ahead to Alpha

Alpha Phase (experimental development): The Alpha Phase will focus on preparing and testing the different solutions to the challenges identified during the Discovery Phase, ahead of any future large-scale demonstration of the Project. It will also test the riskiest assumptions.

- Aligned to VirtualES and inform wider electricity network digitisation initiatives
- Use existing available data sources
- Focus on user interaction and value from Powering Wales Renewably Twin, not data acquisition
- Agile delivery, with stakeholder feedback shaping each iteration
- Dedicated collaboration stream, to support other projects and initiatives
- Prove concept in Alpha through demonstrators
- Need for standardisation identified
- Leverage investment in Open Data
- User prioritised use cases
- Focus stakeholder collaboration through POC model
- Collaborate with existing initiatives and build linkages
- Utilise demonstrators to determine path to BAU

Questions



Stay in touch:

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