Public

Energy Sector Digitalisation Plan

The digitalisation actions needed for Clean Power 2030

Summary Report

Iteration one (September 2025)

NESO
National Energy System Operator

Foreword

GB's energy system and the world's geopolitical landscape are going through a profound period of change. Decisions taken in the coming months and years will not only have significant implications on both the security and resilience of the energy system, but also how well Clean Power 2030 goals can be met.

To reach the milestone, GB needs robust digital infrastructure and seamless integration across systems, sectors and society. Without new and immediate action, the digital capabilities that underpin the clean power mission will not be achieved – keeping the benefits for consumers and the country out of reach.

To enable clean power, it is essential for the whole energy system to use advanced modelling, artificial intelligence, and understand other parts of the built environment, such as water and telecoms. These requirements demand a foundational digital energy system that supports the creation, processing, sharing, and interpretation of data with digitalised tooling and processes.

The Sector Digitalisation Plan is heavily informed from the expertise of the sector and details the digital capabilities and specific actions needed to deliver Clean Power 2030 and lay these foundations. Digitalisation underpins real-time system operability, enables the timely integration of low-carbon technologies, and creates the transparency and trust needed for consumer participation.

The steps to get to Clean Power 2030 must be guided by a long-term view, as GB needs an energy system that operates to benefit all and ensures readiness for 2050 and beyond. Success will depend on strong industry leadership, cross-sector collaboration, and sustained investment. By prioritising system integration and interoperability, as well as robust infrastructure, GB can unlock the full potential of digitalisation – delivering a cleaner, smarter, and more inclusive energy future for all.

Acknowledgments

With thanks to the Department for Energy Security and Net Zero, Ofgem, and all industry partners and stakeholders for their active engagement and valuable contributions to the development of the Sector Digitalisation Plan. This collaboration is fundamental to not only shaping the plan but also making its delivery possible. It ensures that the digital transformation needed for a cleaner, more resilient energy system can be achieved at pace and scale.

Shubhi Rajnish
Chief Information Officer, NESO

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Executive Summary

The challenge

The journey to a clean, resilient and affordable energy system by 2030 is both ambitious and urgent – and impossible without digitalisation. But as digital technologies advance at pace and a host of independent, yet interconnected initiatives unfold, the complexity and momentum of change risks undermining progress. Clear coordination and a shared vision are needed from industry.

The Sector Digitalisation Plan

The Sector Digitalisation Plan is a response to this challenge. The plan brings together diverse perspectives and expertise from across the industry to review, consolidate and map current digitalisation efforts against future system needs. It identifies a clear set of deliverable, owner-assigned actions, needed to deliver Clean Power 2030. Gaps, where intervention is needed but ownership is yet to be established are also identified.

The plan is designed not only to address immediate priorities, but also to ensure the energy system remains resilient, efficient, and fit for purpose as we move towards 2050 and beyond. For this reason, the Sector Digitalisation Plan is an iterative document. Future iterations will incorporate ongoing sector feedback so that the plan evolves in line with technology, policy and system needs.

Focus areas and outcomes

To define future needs of the clean power system, six sector outcomes were identified by the Clean Power 2030 Action Plan.

These are:

Consumer simplicity
Consumer led flexibility
Grid decarbonisation and security
Networks, access and connections
System operability
Supply chain and workforce

Digitalisation underpins each of these outcomes. As such, every action and gap in the Sector Digitalisation Plan is directly mapped to the clearest two key Clean Power 2030 outcomes. Together, they provide the practical steps required to build, deliver and coordinate the digital capabilities to make each possible.

Actions for the sector

Over the following pages are a table outlining all actions detailed in the Sector Digitalisation Plan, alongside the two key outcomes from the Clean Power 2030 Action Plan that each most directly supports, as well as a summary roadmap detailing the timeframe, and a fuller list of actions and gaps.

Energy sector digitalisation requires close collaboration. As a result, the actions outlined are shared across multiple stakeholders – including the Retail Energy Code company (RECCo), the Department for Energy Security and Net Zero (DESNZ), the Data Communications Company (DCC), NESO, and among other industry partners such as network licensees and Original Equipment Manufacturers (OEM's).

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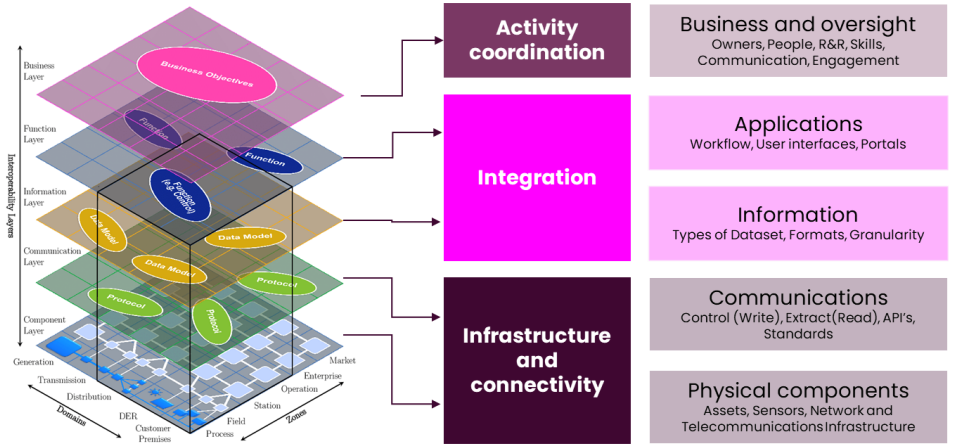
Plan structure

The plan structure

The actions, gaps and milestones that make up the Sector Digitalisation Plan are organised into three layers: infrastructure and connectivity, integration, and activity coordination. Each layer represents a distinct aspect of the energy system:



Smart Grid Architecture Model

Activity coordination	Business and oversight Owners, People, R&R, Skills, Communication, Engagement
Integration	Applications Workflow, User interfaces, Portals
	Information Types of Dataset, Formats, Granularity
Infrastructure and connectivity	Communications Control (Write), Extract (Read), API's, Standards
	Physical components Assets, Sensors, Network and Telecommunications Infrastructure

Sector Digitalisation Plan

Infrastructure and connectivity

Achieving Clean Power 2030 requires reliable devices (such as heat pumps and transformers), accurate data about those devices, and the ability for that data to be shared effectively with the right people at the right time to enable well informed decision making and effective progress to clean power. We have identified three key areas – consumer data, smart meters, and device standards – as the key enablers

Integration

Information is only valuable if it is accessible. To enable secure and efficient access to data, the GB energy sector needs integration structures that facilitate data sharing, and in turn enable the use of data for clean power. This will allow flexibility markets to be optimised and will fully equip control rooms, and ensure the resilience of critical infrastructure – key elements for a reliable energy supply that operates at the lowest cost for consumers.

Activity coordination

Digitalisation enables better visibility and management of the entire energy network, from generation to distribution and consumption. By integrating modern digital technologies and high-quality data inputs, the energy system can operate more efficiently, reducing costs and improving service offerings for consumers and businesses while enhancing energy resilience.

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Actions

Understanding the plan

The Sector Digitalisation Plan is comprised of actions and gaps.

A definition for each is provided below:

- **Action**: A clear, specific task or set of tasks designed to address a critical sector need. Each action is SMART and has an assigned action owner who is responsible for its delivery and associated funding.
- **Gap**: An area requiring intervention is identified but lacks a clear action, assigned action owner, or clear problem statement. Subsequent iterations of the plan will focus on the conversion of gaps into actions.

To determine what is critical for Clean Power 2030, the previously defined sector outcomes required for a clean power system were reviewed to identify the crucial digital enablers for each outcome.

The plan actions and gaps were then derived so that collectively, they provide the practical steps needed to build, deliver and coordinate the digital capabilities for each.

A full review of the methodology used to arrive at the final list of actions and gaps can be found in the main report.

Action	Description	Outcomes
Action 1: Consumer consent design and implementation	RECCo to detail requirements and design for the consumer consent service and how it interfaces with other shared digital infrastructure by 2026	
Action 2: Continued operability	DESNZ to continue to work with DCC and wider industry to ensure that necessary smart metering capability will be in place as the industry transitions through mobile telecommunications technologies	
Action 3: Improved smart meter data access	Elexon, DESNZ, and RECCo to align smart meter access between the Smart Data Repository, Smart Meter Energy Data Repository and consumer consent solution by mid-2027	
Action 4: Network asset security	Networks to start developing organisational plans for the potential impact of quantum computing to existing cryptography and protect any relevant systems in line with NCSC guidance by 2028	
Action 5 Asset hardware security	DESNZ to work with industry to start developing plans for the potential impact of quantum computing to existing cryptography and protect any relevant systems in line with NCSC guidance by 2028	
Action 6: Smart device interoperability	Industry and DESNZ to agree device interoperability standards by January 2027 through existing workstreams	
Action 7: Register for asset information	Networks to implement an asset register that integrates with the Flexibility Market Asset Registration (FMAR) implementation by October 2027	
Action 8: Standardisation of market interfaces	The market facilitator to determine if early progress can be made on the creation of standards to accelerate development and deliver value for flexibility markets within 2026	
Action 9: Control room technology requirements	NESO to determine technology requirements to optimise large number of low carbon assets by mid 2028	
Action 10: Control room communications	NESO to work with Distribution System Operators (DSOs) on communication and coordination standards and data types by mid 2028	
Action 11: Requirements and DSI functionality	The Interim DSI Coordinator will, from its launch in 2026, capture and then prioritise user requirements in collaboration with its stakeholder advisory group with a priority given to supporting clean power outcomes	
Action 12: DSI operational requirements	NESO will determine a proposed service model for the DSI by the end of the MVP period (late 2026)	
Action 13: Data ontology	NESO to align its Data Sharing Infrastructure from 2027 to the emergent common ontology to ensure compliance, enabling harmonised, interoperable data to support Clean Power 2030	
Action 14: Alignment of trust framework(s)	DESNZ, Ofgem, NESO, RECCo to work together through 2025/6 to establish a view on how the various aspects to trust frameworks can be aligned.	
Action 15: Digital coordination role	NESO will undertake further work in early 2026 to help scope what a digital coordination role should achieve	
Action 16: Sector digitalisation plans	NESO to assume stewardship of the plan and establish a clear governance framework to guide future annual iterations	

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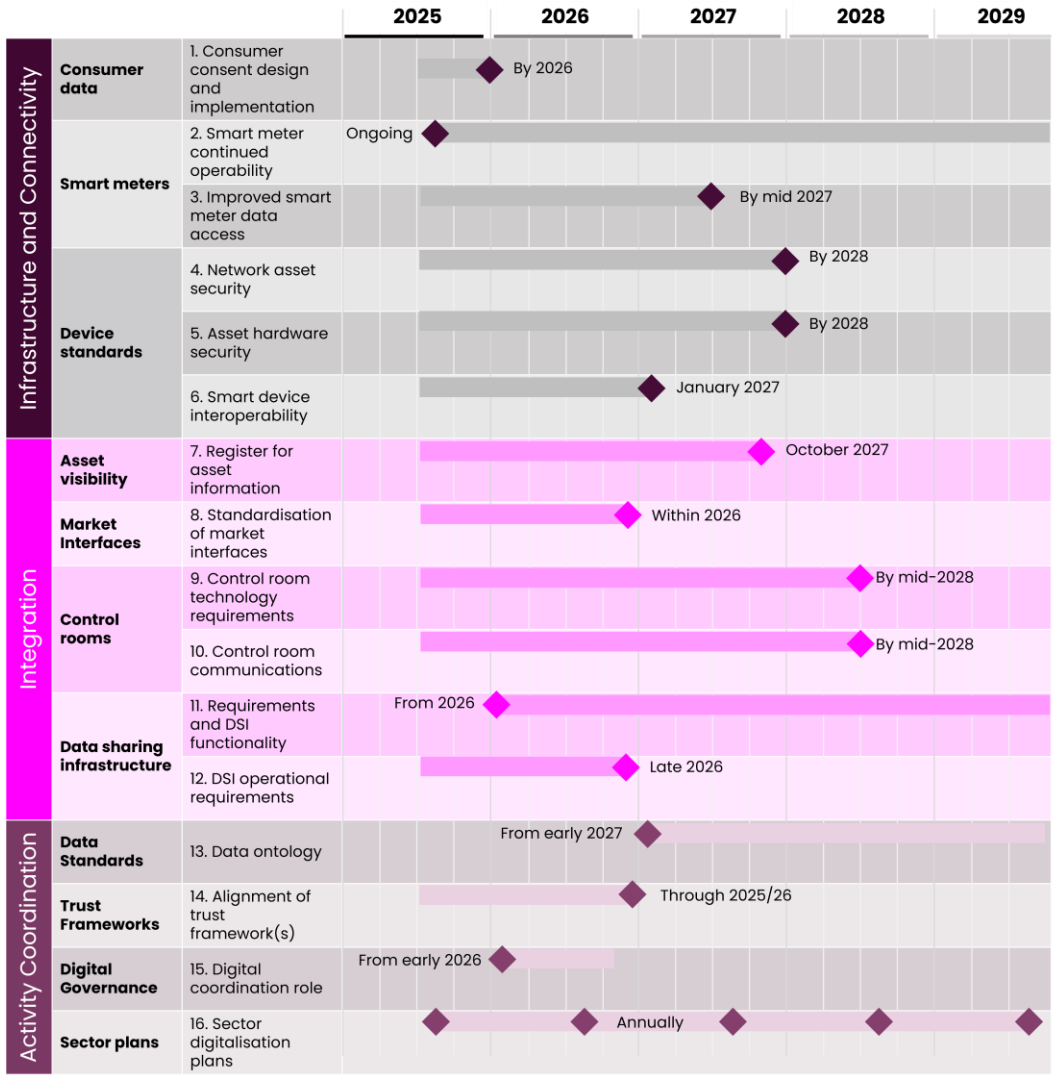
Roadmap



			Clean Power 2030 outcome map						
Area	What is needed?	Action	Consumer simplicity	Consumer led flexibility	Grid decarbon-isation and security	Network access and connections	System operability	Supply chain and workforce	Clean Flexibility Roadmap action map
Infrastructure and connectivity	Consumer consent design and implementation	Action 1	✓	✓					44a
	Smart meter continued operability	Action 2	✓				✓		10a,10b,10c
	Improved smart meter data access	Action 3		✓			✓		
	Network asset security	Action 4				✓	✓		
	Asset hardware security	Action 5		✓			✓		
	Smart device interoperability	Action 6	✓	✓					
	Device firmware updates	Gap		✓			✓		
	Resilient telecoms	Gap	✓	✓			✓		
	Cross sector telecoms strategy	Gap				✓	✓		
	Resilience requirements for critical digital energy assets	Gap				✓	✓		
	Transmission and 'supply side' data requirements	Gap			✓	✓			
	Industrial and Commercial Data Requirements	Gap			✓		✓		
	Smart fallback operation modes	Gap		✓			✓		
	Smart Functionality for Smart Appliances and HEMS	Gap	✓	✓					
Integration	Register for asset information	Action 7		✓		✓			39a,39b
	Standardisation of market interfaces	Action 8	✓	✓					39c,40a,41c
	Control room technology requirements	Action 9		✓			✓		
	Control room communications	Action 10		✓			✓		
	Requirements and DSI functionality	Action 11			✓	✓			43a,43b,43c
	DSI operational requirements	Action 12			✓	✓			
	Planning Data Standard	Gap			✓	✓			
	Secondary Suppliers and Split Metering Requirements	Gap	✓	✓					
	Back Office and Improving Online Cust. Care	Gap	✓	✓					
	Network buildout process and tooling	Gap				✓		✓	
Activity coordination	Data ontology	Action 13			✓		✓		41b
	Alignment of trust framework(s)	Action 14	✓		✓				42a
	Digital coordination role	Action 15			✓			✓	46a
	Sector digitalisation plans	Action 16			✓			✓	
	Policy changes	Gap	✓					✓	
	Consumer Journey	Gap	✓					✓	
	Workforce Mobilisation	Gap				✓		✓	
	Risk register of digital infrastructure	Gap			✓		✓		
	Financing, cost-benefit and the value of data	Gap	✓		✓			✓	

Conclusion (page 1 of 2)

The Sector Digitalisation Plan reflects a shared commitment to acting decisively. It recognises that system transformation must be inclusive, transparent, and equitable – designed and delivered in collaboration with society and with a clear focus on consumer benefit.

As the country moves toward Clean Power 2030, and ultimately Net Zero, the digital foundations laid now will determine the system's future ability to adapt, innovate, and thrive. These foundations are more than just technology — they are about ensuring everything we do is purposeful and aligned to what matters for people, businesses, and the planet.

Each action within this plan is explicitly linked to the clean power outcome it supports. By mapping every step to specific consumer and system benefits, we reinforce clear accountability and maintain a direct line of sight to real-world impact.

The need for digitalisation is no longer in question. With continued progress, the benefits include:

- **Consumer trust and simplicity will grow:** Digital integration will deliver a smoother consumer experience with simple accounts and apps, consistent tariff visibility, and aligned data consent processes. This will strengthen consumer engagement and confidence in participating in flexibility markets.
- **Consumer-led flexibility will become accessible at scale:** With the digital coordination of millions of devices such as EVs, heat pumps, and smart appliances, GB can mobilise the 10-12 GW of consumer led flexibility needed to balance the gird effectively through consumer participation.
- **System inefficiencies and lower bills:** Managing flexibility digitally will help reduce peak demand and avoid the need for inefficient over-sizing of the supply side, ultimately supporting lower bills for consumers.
- **Real-time system operability and resilience will be strengthened:** Advanced digital data analytics, automated resilience testing and robust cyber-secure architectures will reduce the risk of outages and enhance the system's ability to manage the variability and distributed nature of renewables.
- **Improved data visibility and sharing**: Comprehensive, interoperable asset registers and standardised market interfaces will give operators clear insight into the location, capability, and usage of assets, enhancing optimisation and planning ability.
- **Standardisation will enhance interoperability:** Aligned device standards and coordinated data sharing frameworks will enable seamless integration and mobility of assets across platforms and markets, reducing costs and improving market efficiency.
- **Control room communication and coordination will be strengthened:** The evolution towards a distributed, flexibility-driven system will be supported by advanced data sharing and communication standards between Transmission and Distribution System Operators, helping to maintain system stability.

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Conclusion (page 2 of 2)

Sixteen priority actions must now move forward, with a further seventeen gap areas identified where more certainty is required, or delivery mechanisms are yet to be established. These actions and gaps are mapped across the three plan layers — communication and infrastructure, integration, and activity coordination — together with six outcomes from the Clean Power 2030 Action Plan.

From this mapping, several clear conclusions emerge:

- **Integration and Coordination are critical:** Modernising the energy system depends on seamless data sharing, well-defined digital roles, and alignment across the sector. Coordinated plans and clear accountability will be vital to deliver change at pace.
- **Gaps exist in every focus area:** Each category, from cyber security to consumer engagement and workforce development, faces significant challenges. Closing these gaps through targeted action is essential for a flexible, resilient system.
- **A consumer-first approach to digital infrastructure is needed:** Smooth operation of the smart metering system, strong interoperability standards, clear data sharing obligations, and an easy, secure experience must be at the core of the sector's response, ensuring everyone can benefit
- **Data and cyber security must not be compromised:** Managing an expanding range of digital assets risks introducing new vulnerabilities , requiring enhanced protocols and strong industry collaboration to keep the system resilient.
- **Standardisation and shared data models are key:** A lack of common data and operational standards continues to slow progress. Tackling this will unlock interoperability and strengthen efficiency across the sector

This plan gives purpose and direction to the journey ahead. By closing gaps, driving coordination, and putting people at the heart of the energy transition, the sector can lay the foundations for a digital, net zero future.

NESO
National Energy System Operator

Public

Warwick Technology Park
Gallows Hill
Warwick
CV34 6DA

Virtuales@neso.energy

www.neso.energy

NESO
National Energy System Operator