

Energy Innovation Summit



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Volta programme

Control room evolution: AI-powered dispatch of renewables in a dynamic grid

National Energy System Operator (NESO)

- The 2023 Energy Act established an independent system planner and operator 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.



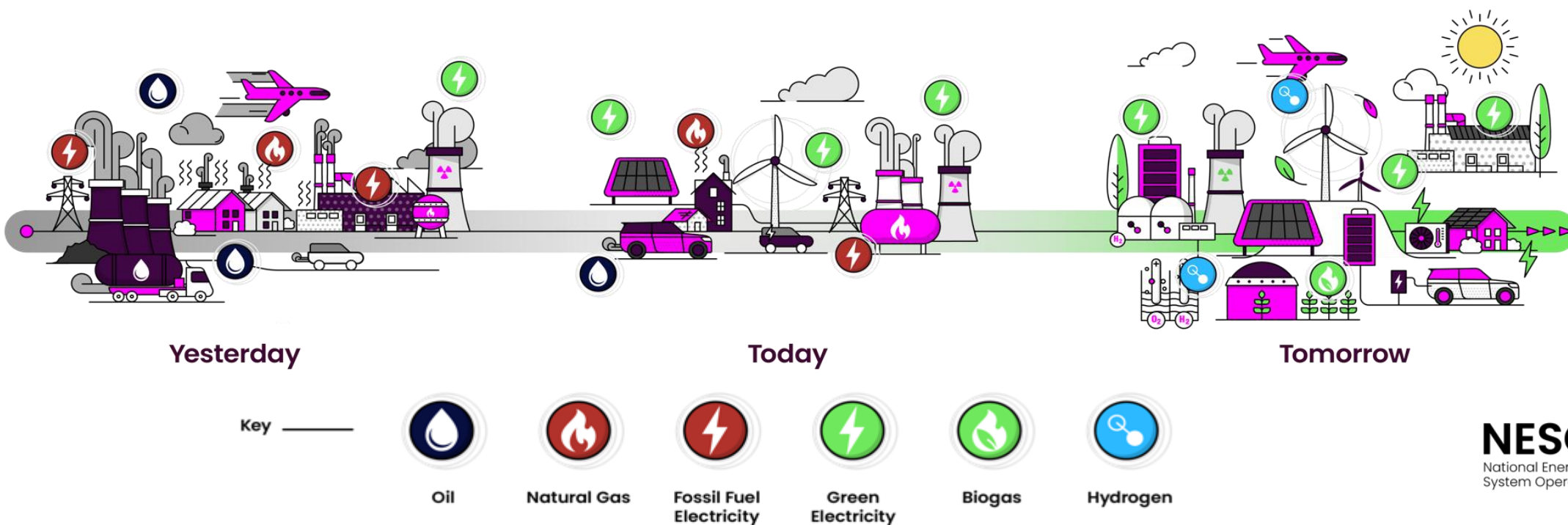
GB Electricity National Control Centre

- **Operated by NESO** – to balance electricity supply and demand in real-time
- **Central hub for decision making** – for power generation and contingency planning
- **Frequency** – maintaining at 50 Hz
- **Electricity reliability & stability** – across the network, preventing outages
- **BM (Balancing Mechanism) is our current real-time platform** – allowing generators and other providers to adjust their output
- **NESO instructs assets** – to increase or decrease generation or consumption to maintain system stability
- **OBP (Open Balancing Platform) is our new platform being delivered** – to improve performance and efficiency in the control room



The Changing Nature of Dispatch

- From thermal to renewable electricity generation
- Integrating variable & intermittent renewables
- Challenges in forecasting, inertia and system stability



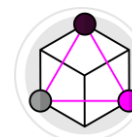
Why do we need Volta?



A new approach is needed for our Scheduling-Dispatch System to manage the increasing complexity & uncertainty of renewable generation, distributed sources & flexibility.



Highly accurate real-time & forward-looking models are required to **quantify & manage this uncertainty**, using advanced digital technologies & adaptive modelling approaches.



Uncertainty needs to be managed by **improving input data accuracy & by creating probabilistic trajectories** to quantify both the magnitude & direction of uncertainty.

Volta – the control room of the future

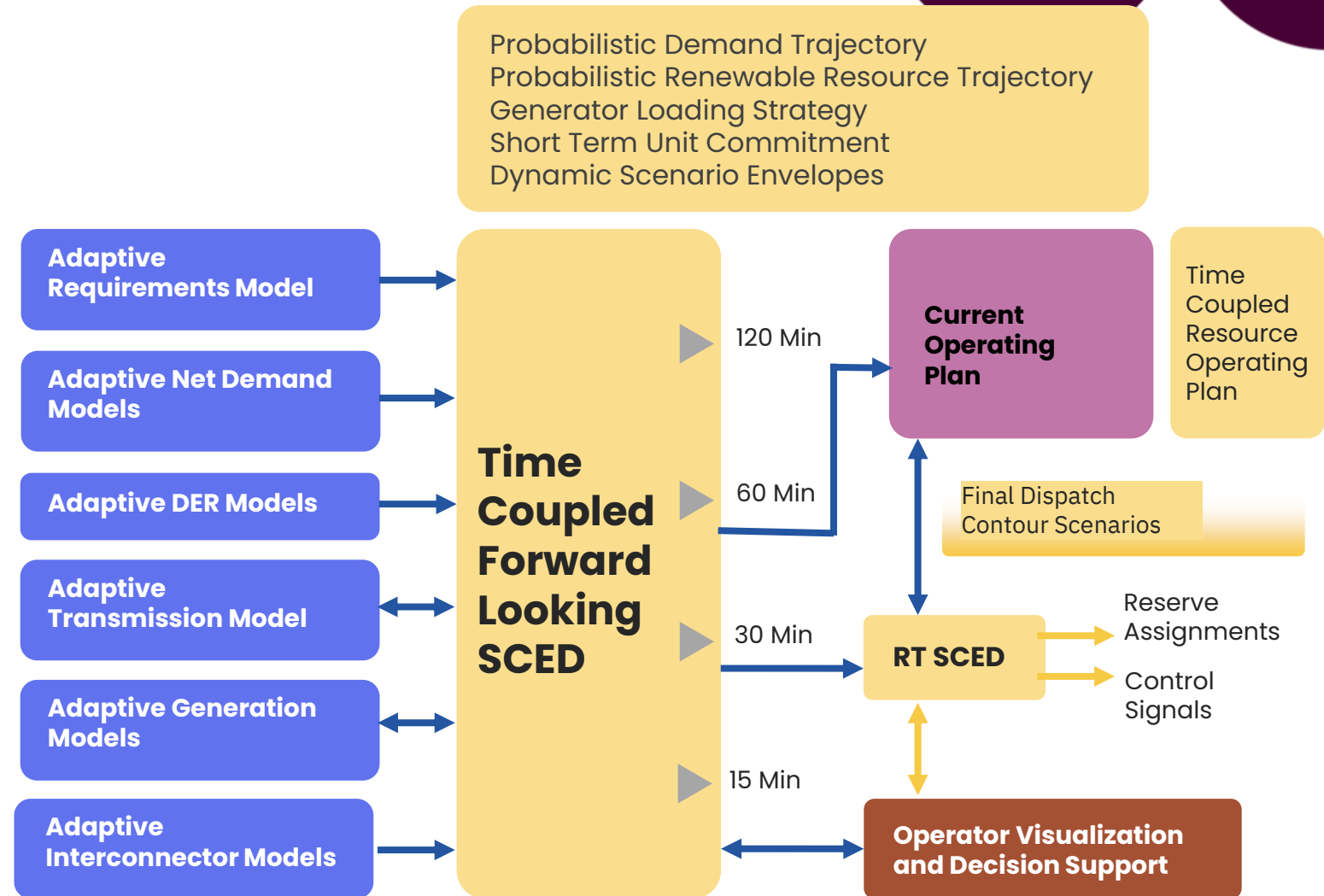
- **Digitalisation programme** – utilising machine learning & AI.
- **Optimising forecasting & dispatch decisions** – leveraging cutting edge technologies, flexible demand & storage technologies.
- **Giving operators new digital & data tools** – the ability to assess multiple scenarios, informed risk profiles & a greater ability to make strategic operational decisions.
- **Utilising adaptive input models & machine learning** – to improve performance monitoring, evaluation & feedback of the system.
- Ultimately to **reduce balancing costs** & help achieve a **net zero electricity grid**.



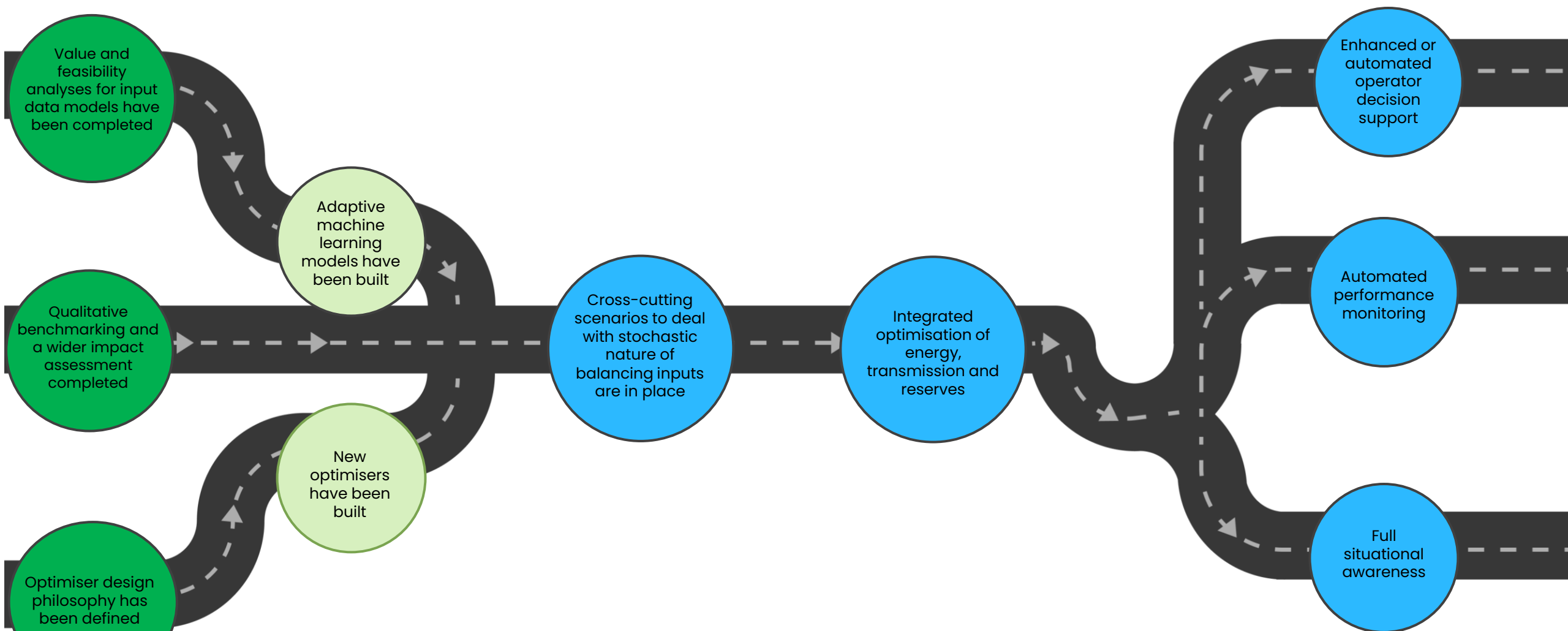
Public Our Starting Points

NESO vision created by Google Tapestry as the North star

- Automated insights through adaptive ML input data models
- Probabilistic trajectories of various system states, taking into account external conditions
- Time coupled security-constrained economic dispatch optimisation engines creating SOP, instructions and Reserve
- Enhanced or automated operator decision support
- Automated performance monitoring



Volta Street View Roadmap

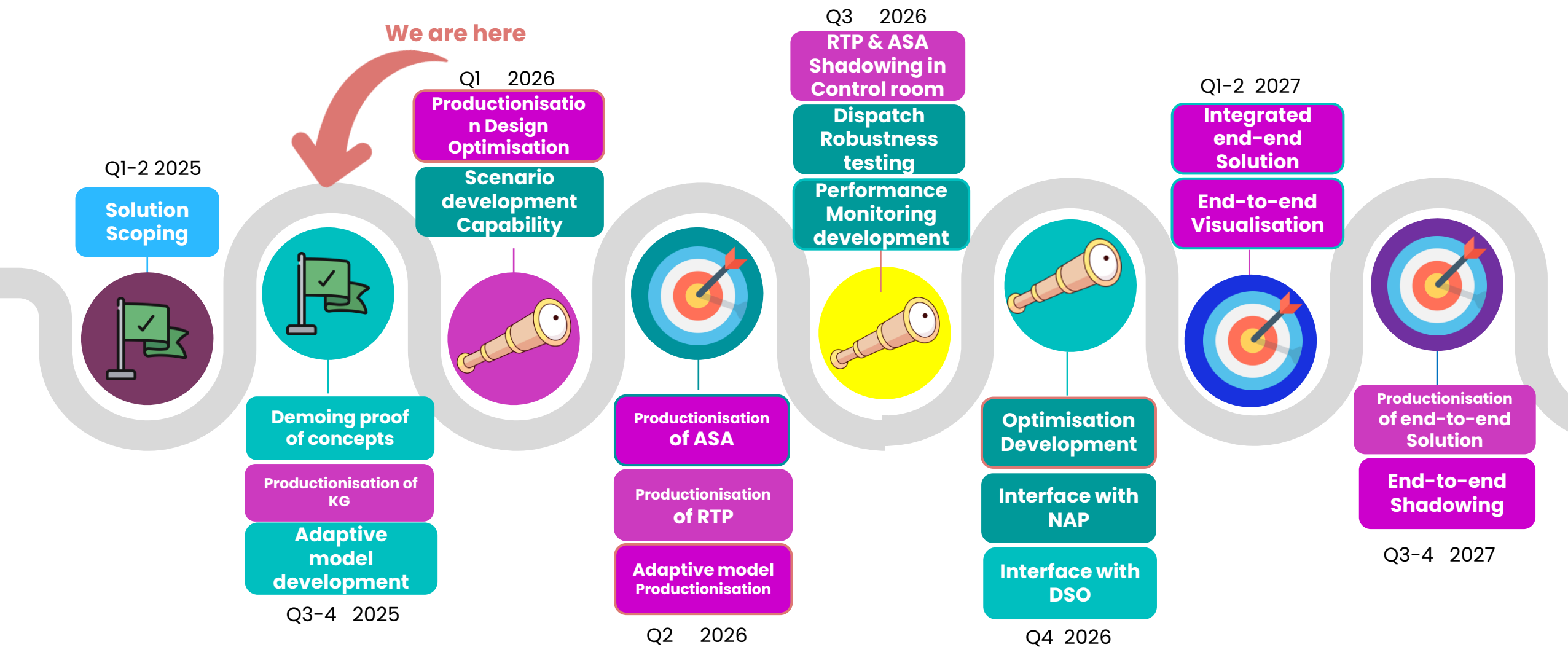


Volta projects

- A programme of innovation projects
- Partnering with industry – GB & international
- Collaborating with other system operators



Volta Roadmap – Updated Q3; 2025



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