Delivering a Digitalised Energy System

Energy Digitalisation Taskforce report

Chaired by Laura Sandys CBE

An independent report sponsored by

Department for Business, Energy & Industrial Strategy

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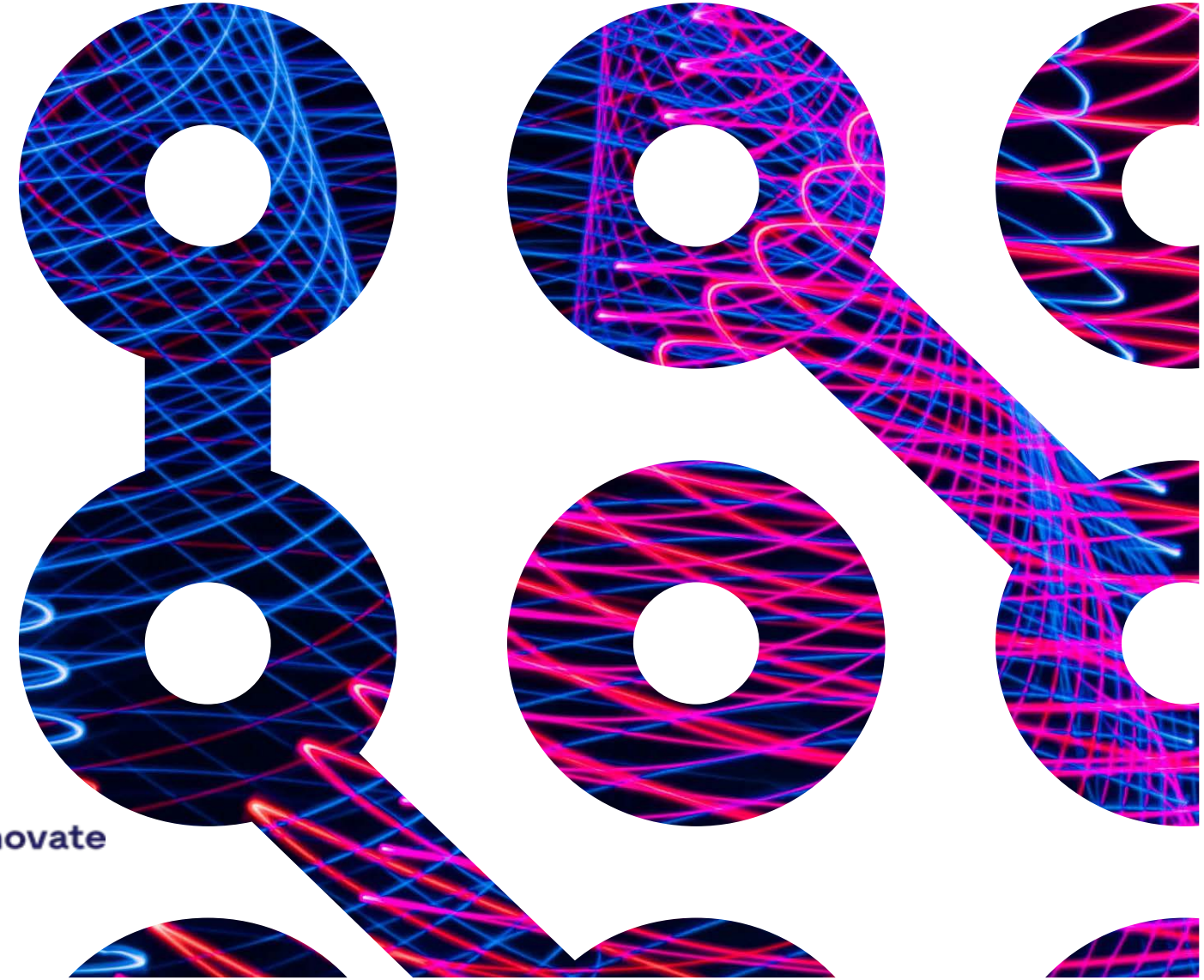
UKRI Innovate UK

CATAPULT Energy Systems



Data & Digitalisation are not just enablers, they are drivers of transformative change

Modern, Decarbonised, Digital Energy System

Very dynamic digital markets

Digitalization, AI, Algorithms

Open Data Tools & System Platforms

Data Openness

Open System Design

Operational Optimisation

Infrastructure and Asset Visibility

Data Visibility

Agile Policy & Regulation

Energy Digitalisation Taskforce

Changing Nature of Interactions will require totally new level of Visibility, Knowledge, Analytics & Algorithms

Variables across different locations with varied profiles and energy needs. Street by street through to districts and towns.

Consumers will have different & changing needs with need for consumer profiles & preferences

Data needs from local authorities, property owners, transport companies and industrial customers

New business models might require to deliver and provide services informed by data & outcomes not inputs

nationalgridESO

Price & system need signals both ways, blending vectors, self managing imbalance from supply & demand

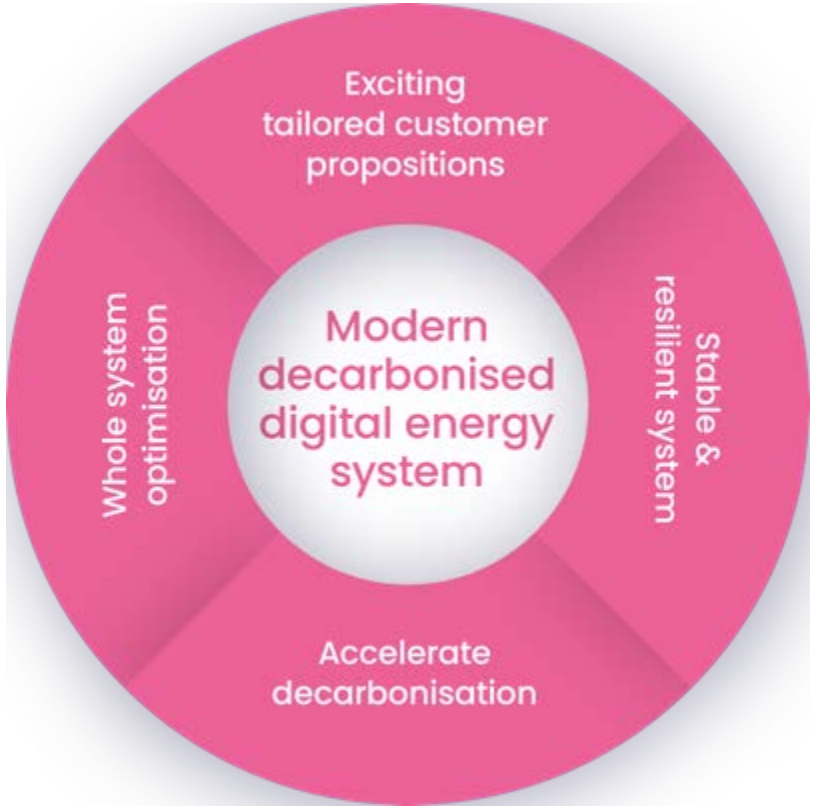
Dynamic constraint management impacted by just in time price signals across gas and electricity

Managing markets across the system with financial settlement requirements

Hybrid solutions will require comms between gas and electricity networks

Aims and Approach of the Taskforce

- Refocus the energy sector on the challenge and opportunities of Digitalisation as a core component of transformation, not just an enabler
- Accelerate decarbonisation of the energy system, enabling Net Zero compatible business models, markets, and industry structures
- Draw on experience from other sectors and provide a focal point to ensure digitalisation efforts are coordinated and effective
- Identify digitalisation gaps that require innovation support, Identify the governance risks that digitalisation raises and present frameworks to mitigate issues.



Guiding Principles:

- Customer Trust and Satisfaction
- Decarbonisation at scale
- Policy and Regulation fit for future system design
- Thinnest layer of central intervention possible
- Act now

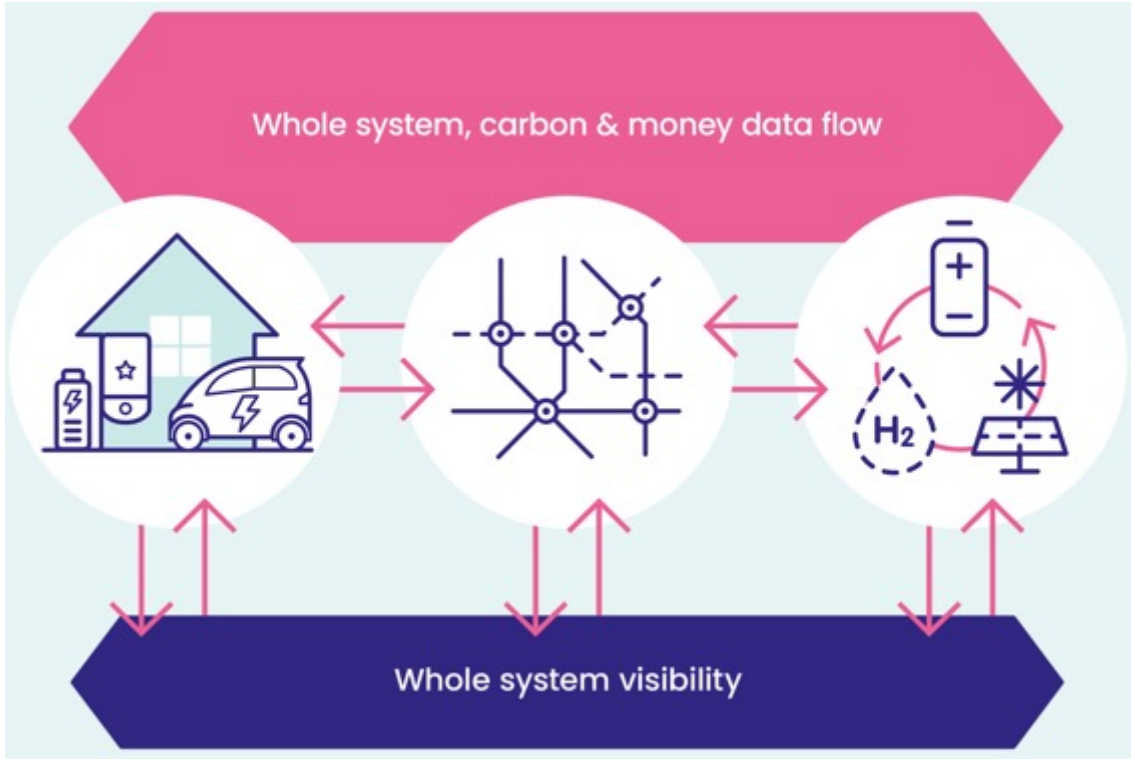
Whole system ambitions and requirements

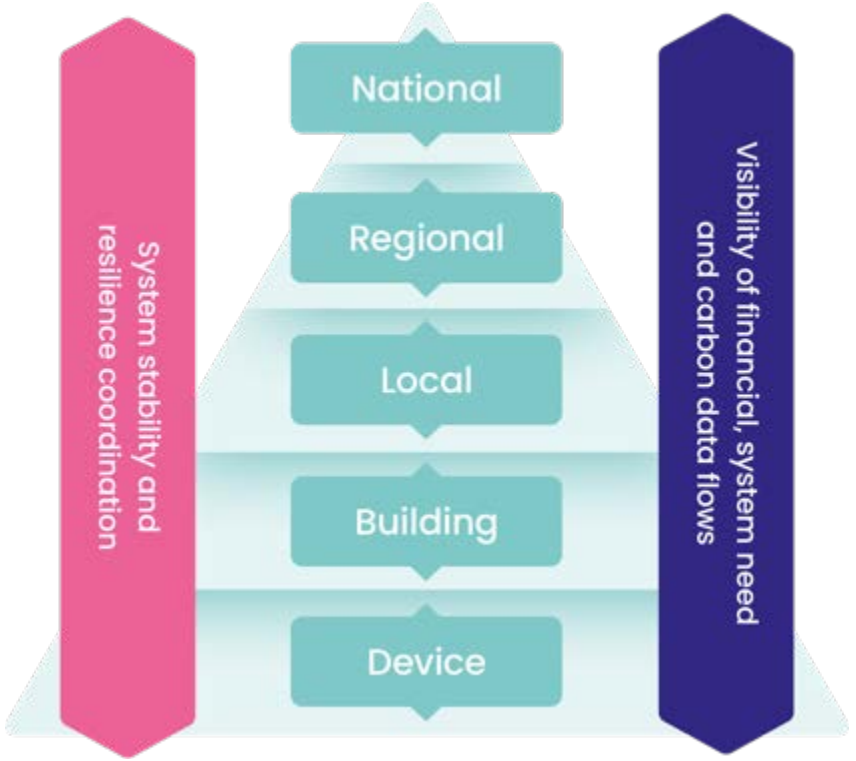
Prices to Devices

Automated communication & contracting to optimise system needs, carbon & cost. Enabling value to flow through the system.

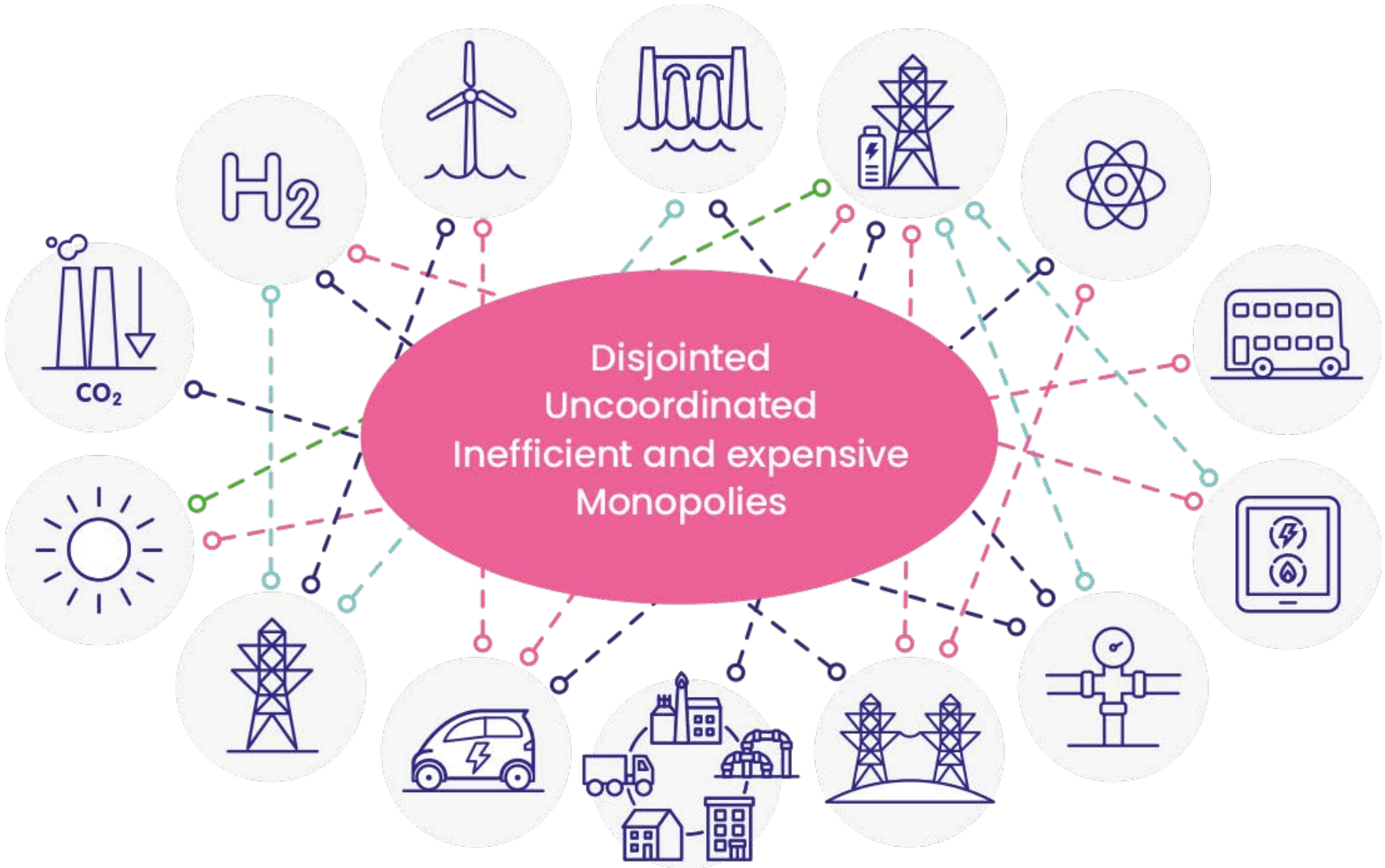
Automated & Optimised System Stability & Resilience

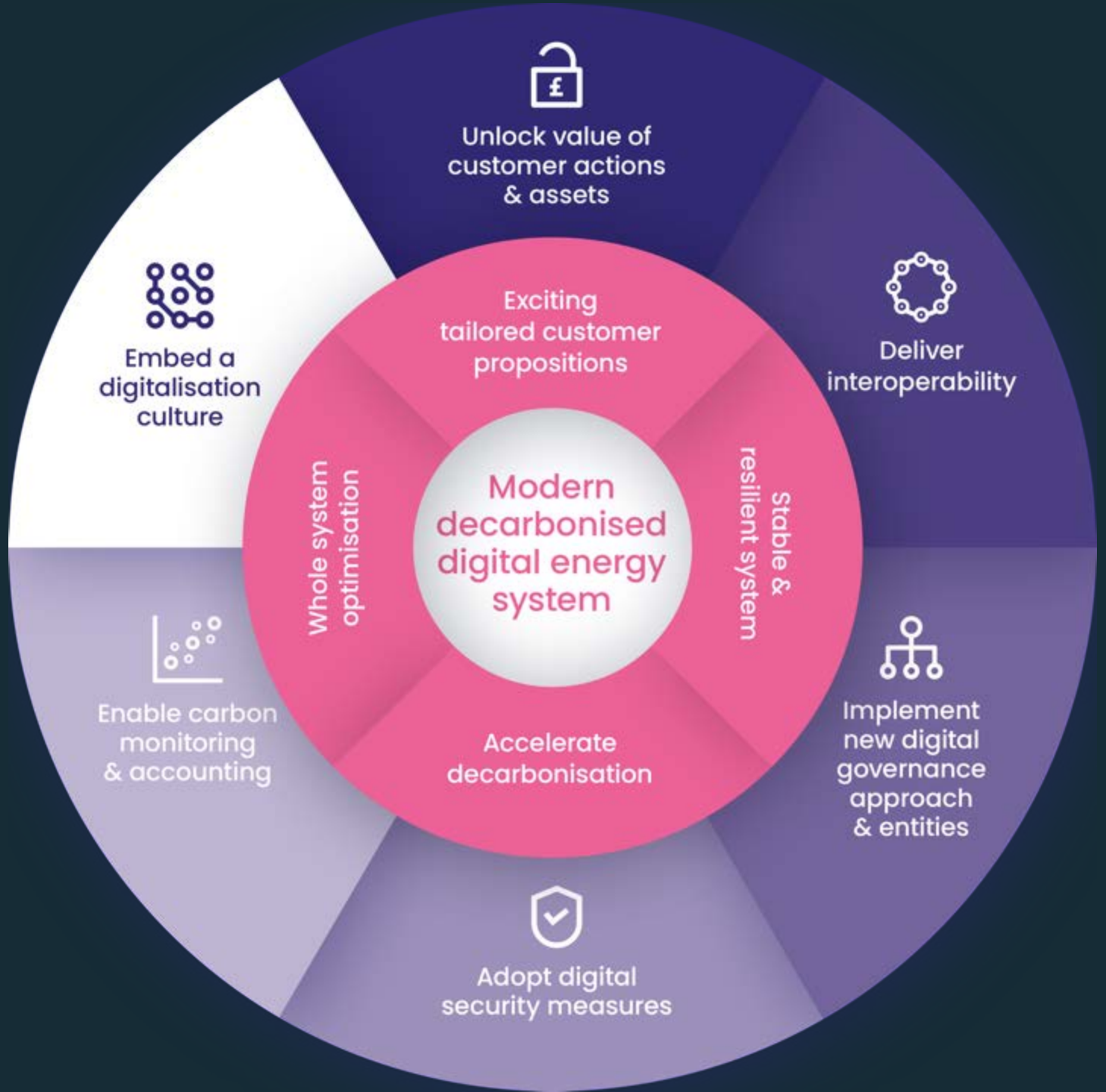
Digitalised system management operated at central, regional, local or building level



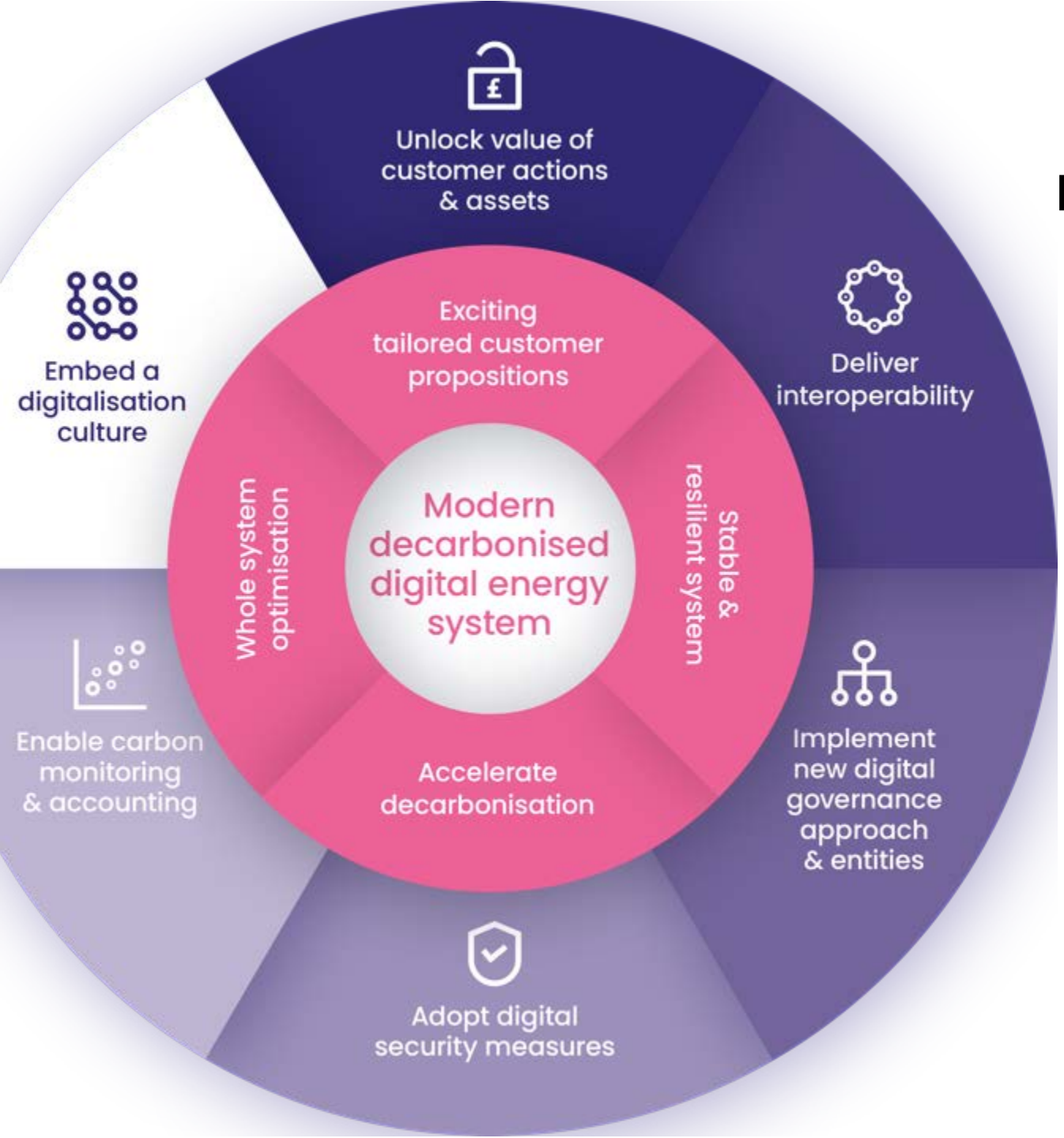


Getting the plumbing right





Taskforce Recommendations



Highlights

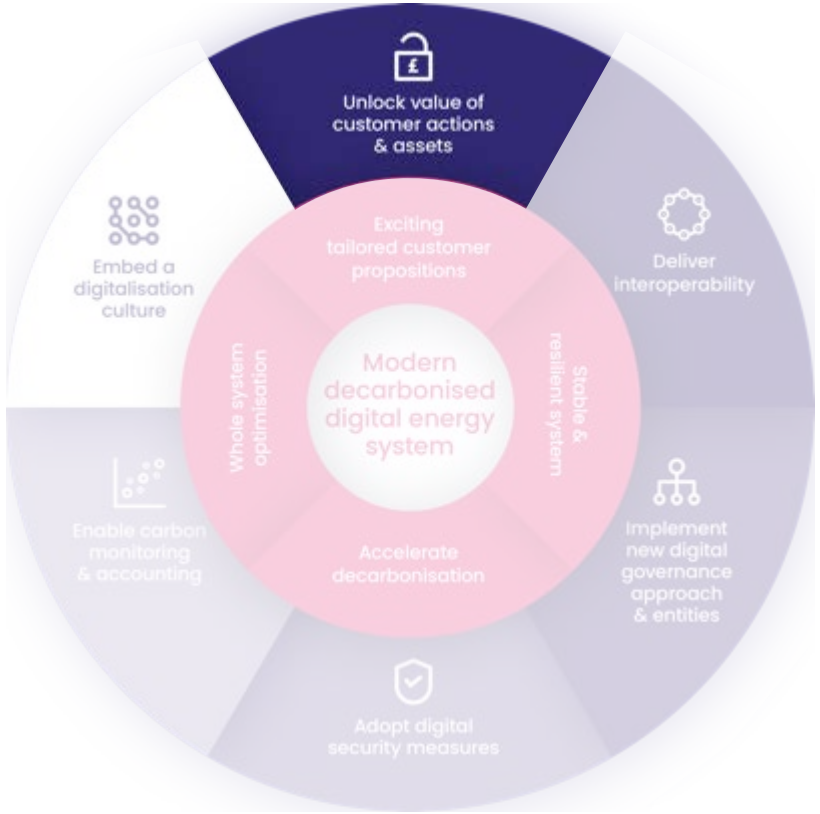
- **Unlock the Value of Consumers Actions and Assets**
  - **Customer Consent Dashboard**
    - Customer control and acceptance is crucial to build trust and deliver appropriate consumer protection
  - **Mandate Smart Energy Assets**
    - Unlocking flexibility by ensuring customer energy assets are connected and smart
- **Deliver Interoperability**
  - **The Digital Spine**
    - Distributed systems monitoring to enable whole system interoperability and operation
- **Implement new Digital Governance and Entities**
  - **Digital Delivery Body**
    - Delivering public interest assets at speed and independent from vested interests
- **Enable Carbon Monitoring and Accounting**
  - **Dynamic Carbon Monitoring and Reporting**
    - Carbon visibility is critical to future policies and informing consumer actions

Unlock value of customer actions & assets

Government and the Regulator need to create policy, regulation, and digital infrastructure which enables industry to deliver the trust and assurance to unlock the value of customer actions and assets.

Actions:

- Develop a simple customer consent dashboard
- Mandate smart enabled energy assets
- Streamline asset registration
- Review customer protection regime
- Utilise smart meter data for public good
- Recognise data based, virtual solutions



Customer acquires energy asset → Energy asset is auto-registered → Customer gives data access consent → Energy asset provides system services → Data can be used to verify response → Customers are rewarded

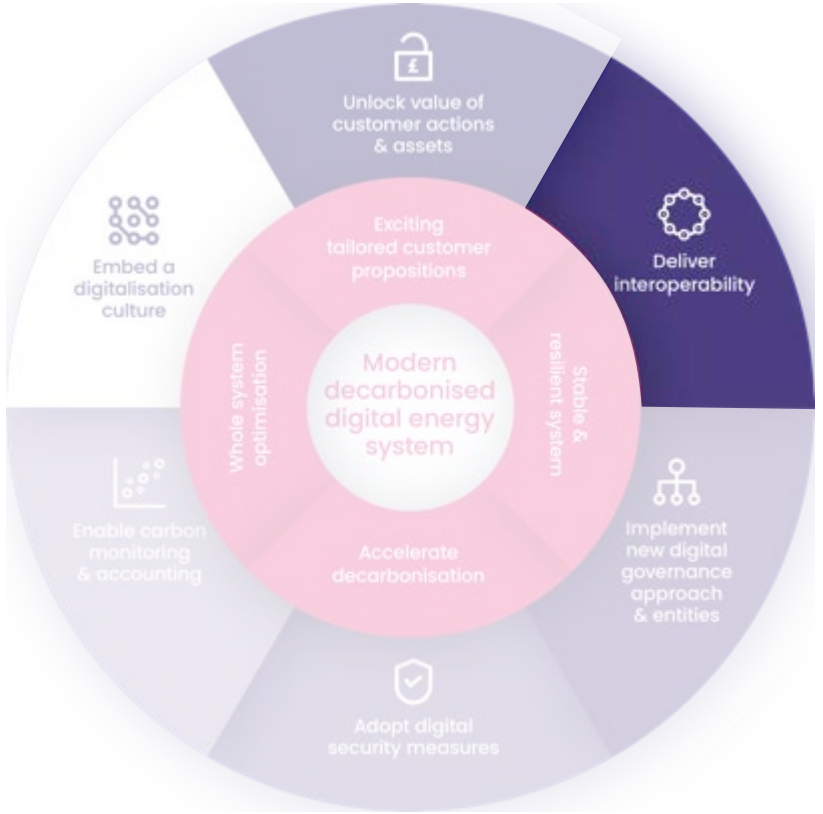
Customer's are protected from negative outcomes, particularly as new products and services are developed

Deliver Interoperability

The sector needs to deliver interoperability through the development and deployment of key Public Interest Digital Assets including a Digital Spine solution.

Actions:

- Deliver data sharing fabric
- Adopt network data standard
- Deliver energy asset register
- Deliver energy data catalogue
- Evolve flexible asset standards
- Deliver a digital spine for the system



Limited interventions to aid interoperability and create commercial opportunities

Customer Centred

Open Source and Open Data

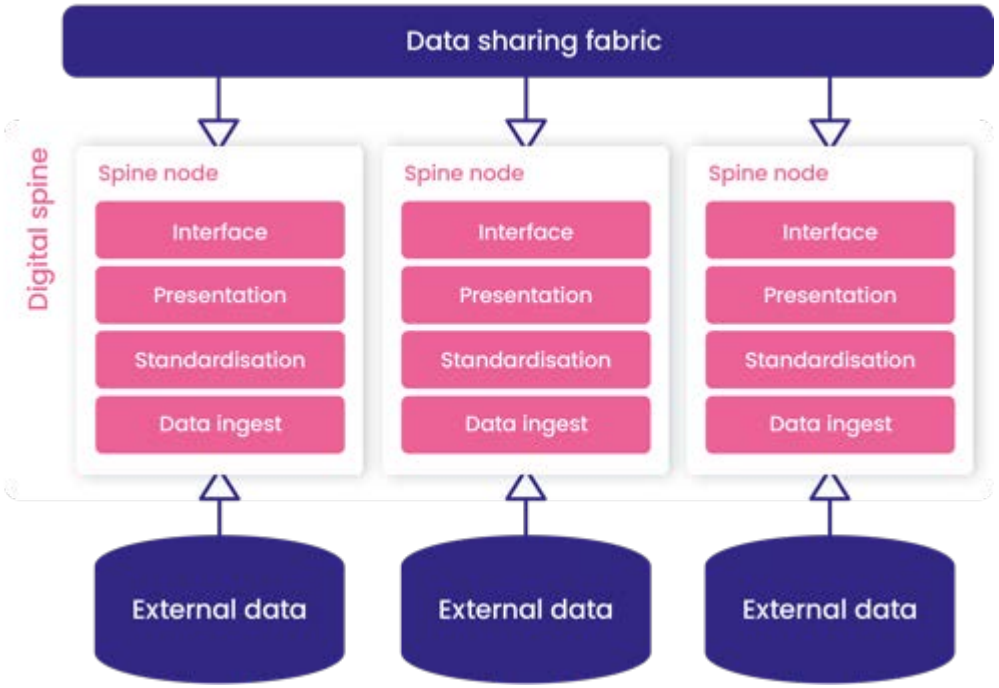
Deliver Interoperability
The Digital Spine

Develop a common digital spine for the energy system that enables mission critical information to flow seamlessly to support the operation of a distributed and decarbonised energy system

Features:

- Distributed System Monitoring
- Open Source
- Integration with other digital assets
- Create options for the future system
- Create commercial opportunities
- Enable core digital functions

Inspired by cloud scale technology providers, distributed energy systems leaders and government technology innovators such as GDS and HMRC

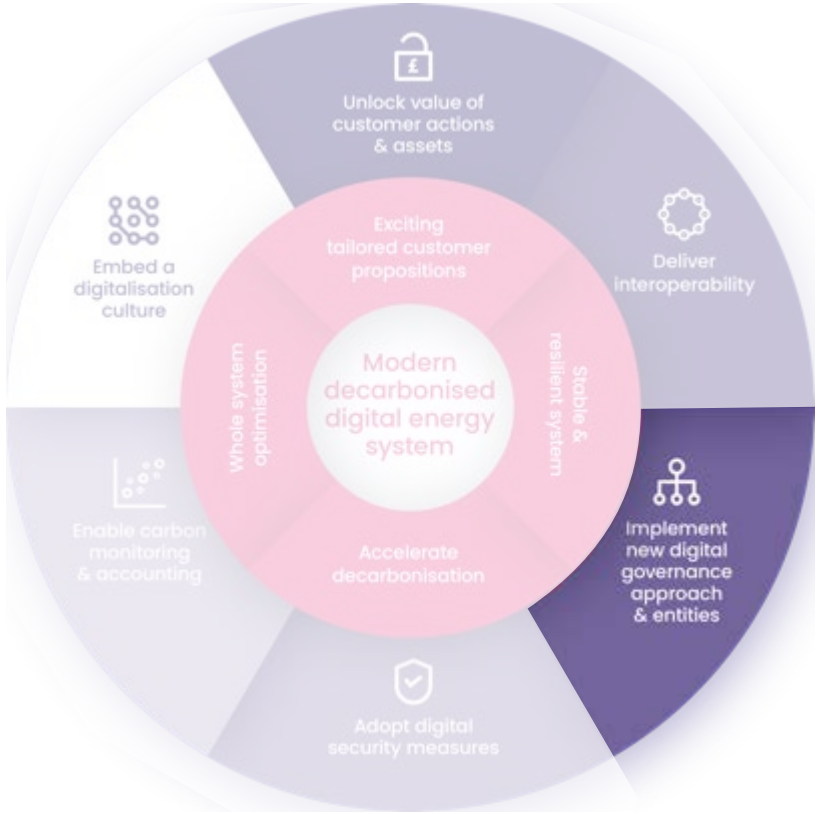


Implement new digital governance approach & entities

Digital Governance needs to be embedded as business as usual with a new Energy Digitalisation Delivery Body to develop the Public Interest Digital Assets and support sector-wide Digitalisation.

Actions:

- Establish governance principles for Public Interest Digital Assets
- Establish Algorithm Governance
- Promote Digital Energy Competition
- Establish a Delivery Body for Public Interest Digital Assets
- Regulate Interdependencies
- Develop a Dynamic Risk Dashboard



Delivery Body:

- Initiation, Incubation and Transition
- Working with industry stakeholders
- Utilising open approaches
- Time Limited and Mission Driven

Improving Digital Security, Carbon Visibility and Digital Leadership

Adopt digital security measures

Digital security principles and interventions need to be embedded throughout the sector to collectively enable safe digitalisation at scale.

Actions

- → Implement modern password policies and merit order of patching
- → Map cascade effects of system security zones
- → Increase frequency of regular penetration testing
- → Adopt zero trust and least privilege
- → Work towards a Just Culture
- → Run drills and threat assessment exercises
- → Leverage cross-sector collaboration

Enable carbon monitoring & accounting

Carbon emissions from energy production, storage and delivery need to be measured at source with data reported and shared in a standard format.

Actions

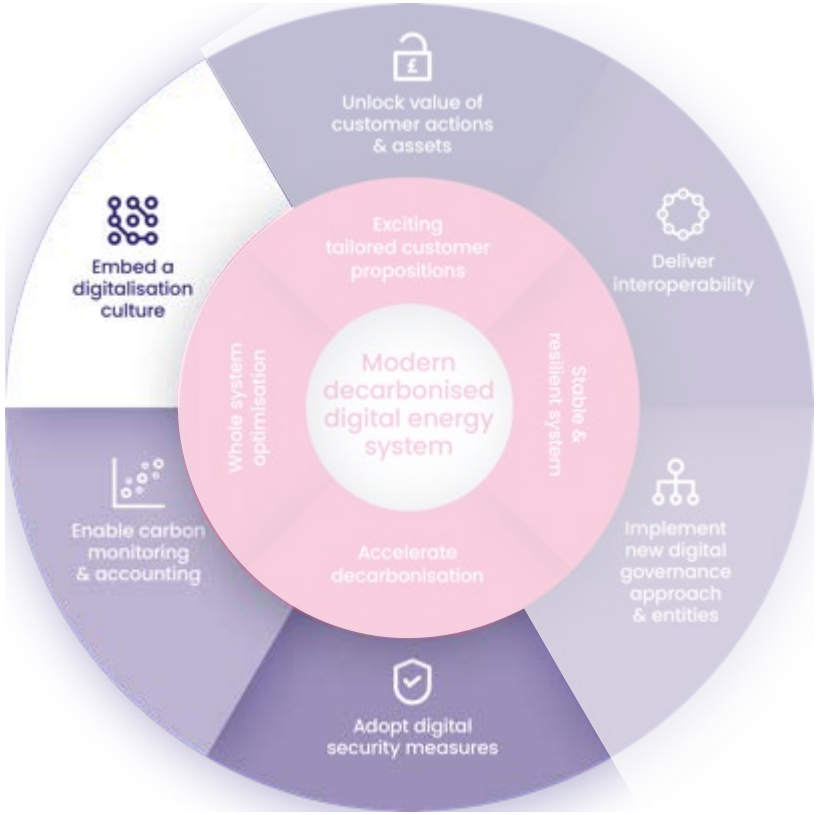
- → Mandate dynamic carbon reporting
- → Mandate dynamic carbon monitoring
- → Require separate emissions and offsetting reporting
- → Adopt carbon data open standard

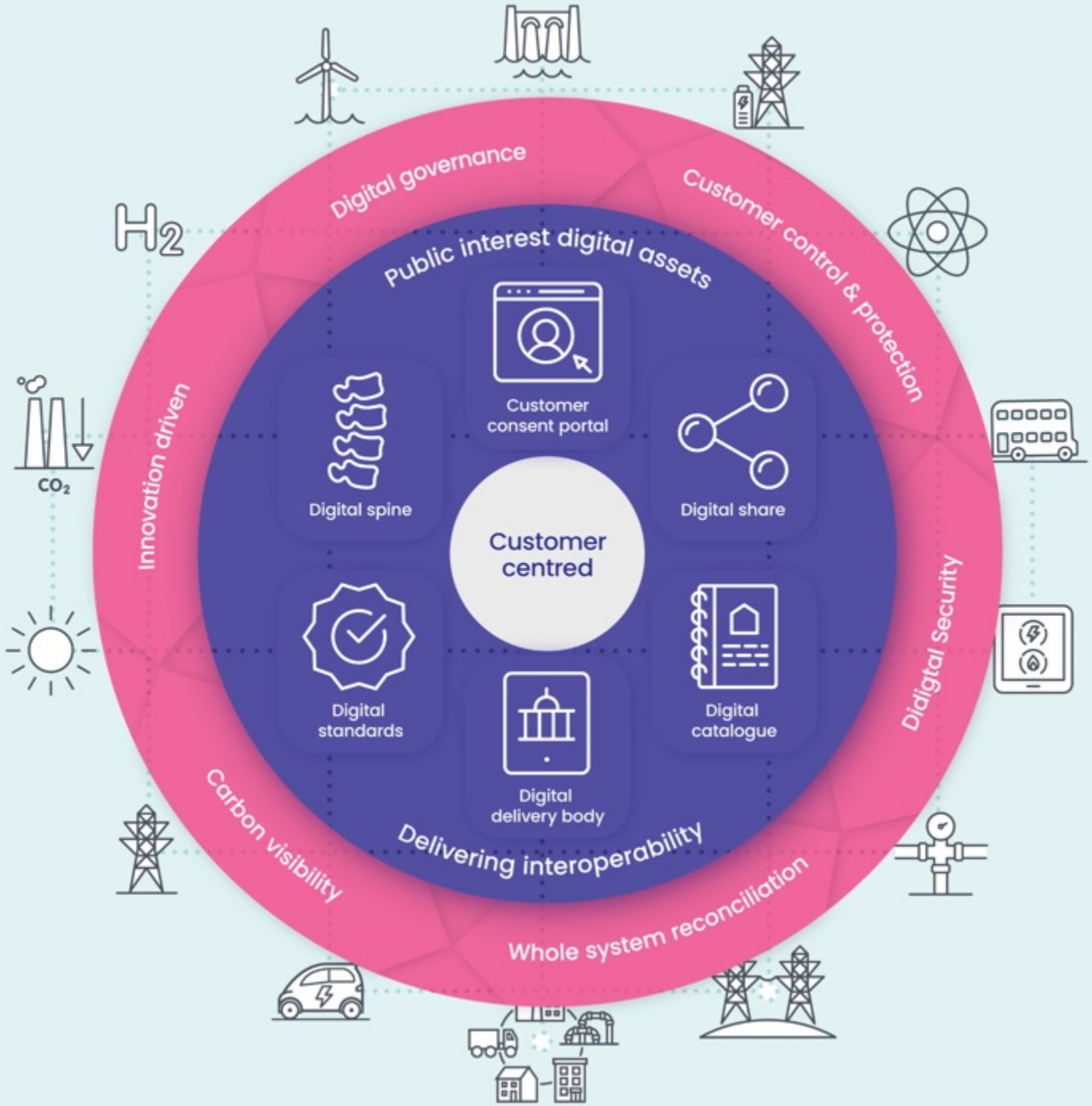
Embed a digitalisation culture

A digitalisation culture needs to be embedded throughout the energy sector by promoting digital leadership, valuing digital assets, and focusing on whole system user experience.

Actions

- → Promote Digital Leadership
- → Value and Investment in Digitalisation
- → Focus on whole system user experience





- **Unlock Customer Data through clear consent and control portal**
- **Deliver interoperability through Public Interest Assets**
- **Implemented through the Digital Delivery Body**
- **Address new Digital Governance**
- **Establish appropriate customers control and protections**
- **Employ digital Security measures**
- **Enable whole system reconciliation**
- **Deliver whole system Carbon visibility**
- **Open up opportunities for innovation**

Thank you

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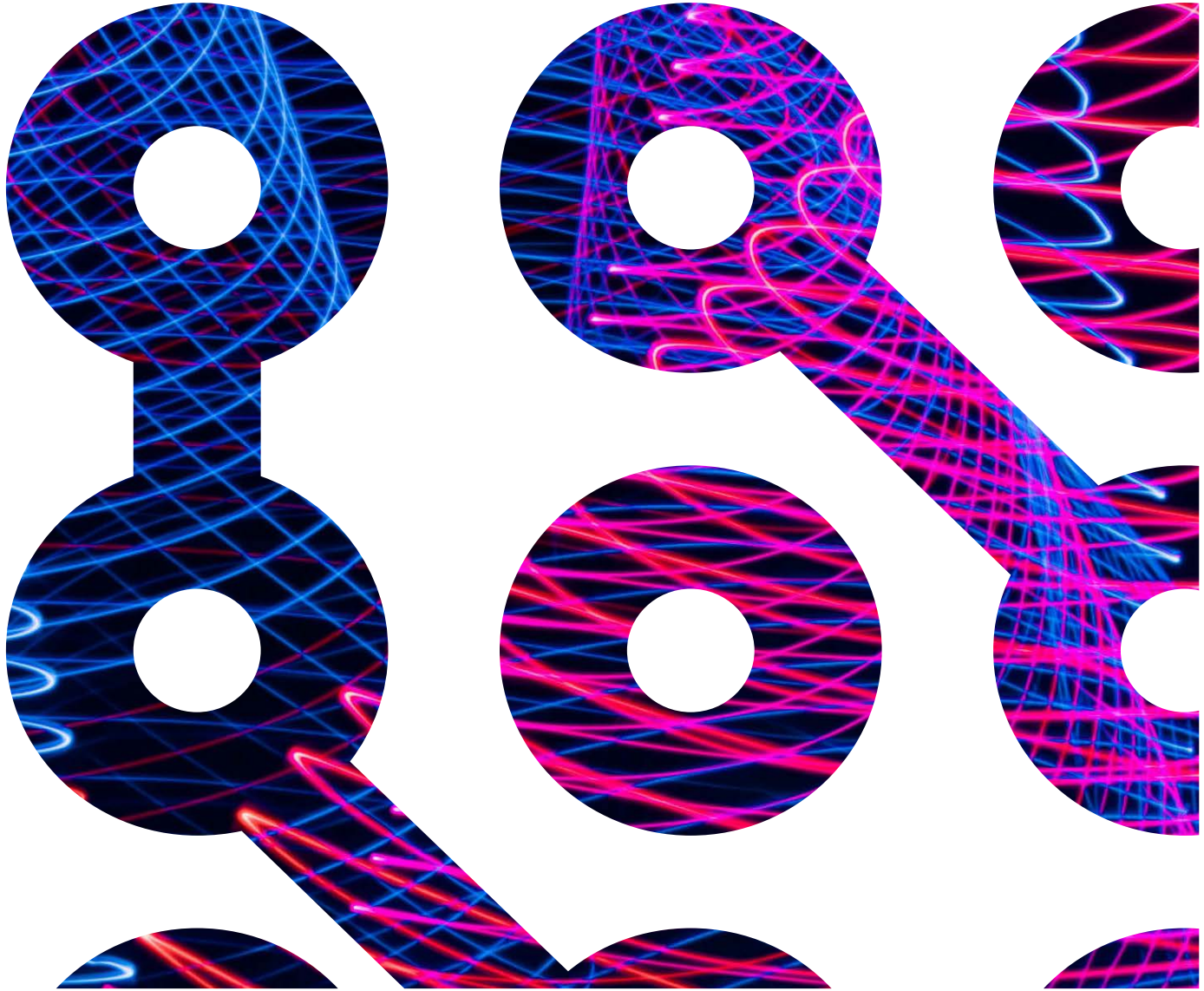

For more information contact us at:

digitalisation@es.catapult.org.uk