

# Virtual Energy System

## Common framework

Raising awareness and fostering culture  
August 2023

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## Foreword

Digitalisation is vital to reaching the UK's climate change targets. Continuing to innovate and adapt the energy system requires a range of new tools and a reimagining of how the entire industry can come together.

That is why ESO is today presenting this ambitious call to action for an Industry-wide mission to super charge digital twins across our energy system.

This Virtual Energy System common framework will create the common language, recommend infrastructure and processes to connect and federate individual digital twins from across the energy sector.

This open framework can proactively contribute to help meet today's energy mission to decarbonise the energy system and bridge the gap to net zero.

I am delighted to launch this shared framework and together as an industry, we can turn this vision into a reality.

**Anna Carolina Tortora**  
Head of Digital Transformation & Innovation Strategy  
ESO

# Executive summary

## A blueprint to create the VirtualES

### Background

ESO have launched the Virtual Energy System (VirtualES) programme to enable the creation of an ecosystem of connected digital twins of the entire energy system of Great Britain. This will operate in synchronisation with the physical system to support the transition to net zero. It will include representations of electricity and gas assets and link up to other sectors.

Through research, expert interviews and industry-wide engagement, [14 key socio-technical factors](#) were identified which are considered necessary for the development and delivery of the VirtualES.

This report will explore the socio-technical factor of **raising awareness and fostering culture**, one of three factors that is part of the people pillar, and one of six factors initially explored to support VirtualES roadmap.

The other two socio-factors **engaging stakeholders** and **creating a governance framework** were chosen along with this key factor to be developed first. This was because they in turn will support the development of other factors, acting as a first among equals.

**Raising awareness and fostering culture** aims to ensure there is a shared vision, belief, & behaviours and enables practices to support VirtualES objectives.

### Purpose of this document

The purpose of this report is to outline the vision and its instrumental role in shaping the cultural fabric that will encompass the delivery and steady-state operations of the VirtualES.

The aim of this document is to highlight the importance of the vision & culture in fostering a sense of shared purpose, collaboration, and inclusivity within the programme team and the wider sector.

This collective sense of shared purpose allows organisations to harmonise their business strategies and operations with the VirtualES, establishing a foundation enabling effective change to embrace the VirtualES.

The shift from the current state ('as-is') to the desired state ('to-be') will require most organisations in the sector to embrace new ways of working supported by data and digitalisation strategies.

To help organisations during this transition, we have provided guiding principles for change management, along with valuable resources from the VirtualES. These resources will support the change journey, no matter where organisations begin, or the internal competencies of the organisation to manage effective change.

### Key findings

In addition to an approach, this report provides tangible actions for future stakeholders to embrace the change needed to meet the shared purpose of meeting net zero.

The key takeaways from this report are:

- Fostering the right culture is critical to the success of the programme; therefore, every organisation that participates in the programme will need to understand and acknowledge the cultural values of the programme.
- To identify program champions, organisations must clearly communicate the vision and culture. Thus, they must seek those who are intrinsically motivated to be a part of it.
- To engage with the VirtualES, all organisations will need to establish a common baseline, which encompasses technical, non-technical, and leadership competencies.
- For lasting success, organisations involved in VirtualES must embrace its values, so fostering collaboration to create shared value and accelerate the journey to net zero.

# 1

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# What is the Virtual Energy System?

# What is the Virtual Energy System?

A data sharing mechanism for the entire energy sector

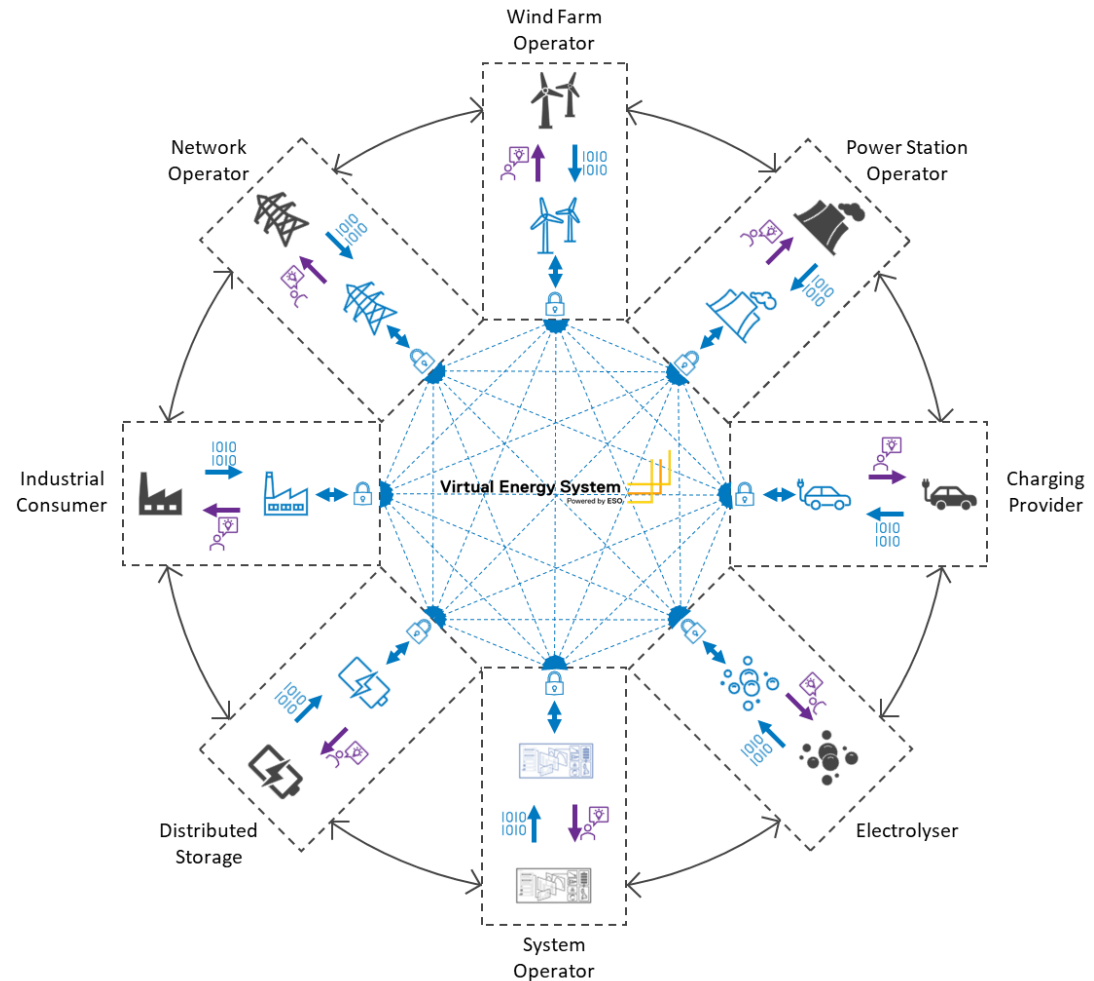
## Overview

The ambition of the Virtual Energy System (VirtualES) programme is to enable the creation of an ecosystem of connected digital twins of the entire energy system of Great Britain, that will operate in synchronisation to the physical system. It will include representations of electricity and gas assets and link up to other sectors.

This ecosystem of connected digital twins will enable the secure and resilient sharing of energy data across organisational and sector boundaries, facilitating more complex scenario modelling to deliver optimal whole-system decision making.

These whole-system decisions will result in better outcomes for society, the economy, and environment by balancing the needs of users, electricity and gas systems and other sectors.

Creating the VirtualES is a socio-technical challenge that requires a collaborative and principled approach, aligned with the National Digital Twin Programme, and other energy sector digitalisation programmes.



# How to enable a VirtualES?

A socio-technical challenge that requires a socio-technical solution

## Overview

Enabling the VirtualES requires a common social-technical framework that outlines the agreed access, operation, and security protocols.

Through research, expert interviews, and industry-wide engagement, 14 key socio-technical factors were identified which are considered necessary for the development and delivery of the VirtualES today.

These 14 identified key factors are grouped by the categories of People, Process, Data, and Technology.

Six of these factors, the first among equals, were prioritised for immediate consideration

### Priority socio factors:

- Raising awareness & fostering culture
- Engaging stakeholders
- Creating a governance framework

### Priority technical factors :

- Aligning models & taxonomies
- Increasing visibility & enabling sharing
- Creating an interoperable tech-stack



# Descriptions of the six priority key factors

## A socio-technical challenge that requires a socio-technical solution

### Raising awareness & fostering culture

Raising awareness and fostering culture has been prioritised as it is critical the industry accepts and begins to advocate for the creation of data sharing infrastructure for the energy sector. Organisations must broaden their thinking beyond traditional business models and individualistic organisational objectives to understand the opportunities available through greater data-sharing across the energy sector.

This factor outlines the baseline requirements and recommended change management principles that will support an organisation to participate in the VirtualES.

### Aligning models and taxonomies

There is broad range of terminologies for the energy sector, covering different aspects of both gas and electricity. Therefore, to achieve a successful, interoperable, standardised VirtualES, common ontologies need to be defined and specified that can enable alignment of models within the VirtualES.

This can be done through facilitating common vocabularies, outlining well-formed structures of definitions and relationships, and building on and using already existing vocabularies, ontologies, and domain knowledge.

### Engaging stakeholders

This was prioritised as participating in the VirtualES will require input, collaboration and trust from numerous stakeholders across an organisation, including those that may not come from a technical background. guidance on how to approach this would therefore be valuable.

The engaging stakeholder's guidance note provides organisations with a methodology for identifying, engaging and evaluating the success of their stakeholder engagement plan.

### Increasing data visibility & enabling sharing

Increasing data visibility starts with a distributed approach, allowing for data owners to retain control of their datasets, decide with whom to share their data, and have trust their data is secure from manipulation, or misuse.

For organisations to share their data or consume datasets from the VirtualES they will be required to meet a set of minimum characteristics. This standardised approach ensures an increase in visibility, searchability and accessibility of data for use.

### Creating a governance framework

The design of the governance model was prioritised as it will define the core players that will establish the foundations of the VirtualES. An effective governance model is a key requirement to make informed decisions regarding national critical digital infrastructure and will also act as an enabler of the culture we want to foster within the VirtualES.

The proposed model seeks to legitimise a responsible orchestrator for coordination and conflict resolution with clear government backing.

### Creating an interoperable technology stack

The goal of creating an interoperable technology stack is to enable smooth communication between organisations and systems, regardless of their underlying technologies or protocols. To enable interoperability in the sector, there needs to be a distributed network of digital spine nodes which can prepare and standardise data into a minimal operable standard. Through trusted protocols, the data can then be shared via the VirtualES by linking the digital spine nodes to enable the exchange of standardised data across the sector in a reliable, secure and governed way.

# Six priority key factors

## The relationship between the six priority key factors

These ‘first among equal’ socio-technical factors should be considered simultaneously together, along with the remaining eight key factors that will be explored next.

**Raising awareness and fostering culture**, creating a **governance framework**, and **engaging stakeholders** were prioritised out of the socio factors as they act as the foundation of the common framework from a social perspective and will set the tone of the programme.

Culture is defined as a combination of the artefacts (e.g., organisational vision, assumptions, beliefs and values) that characterise the programme. Fostering an appropriate culture is crucial for success, particularly considering VirtualES is a first-of-a-kind programme that will involve sector-wide collaboration and involvement.

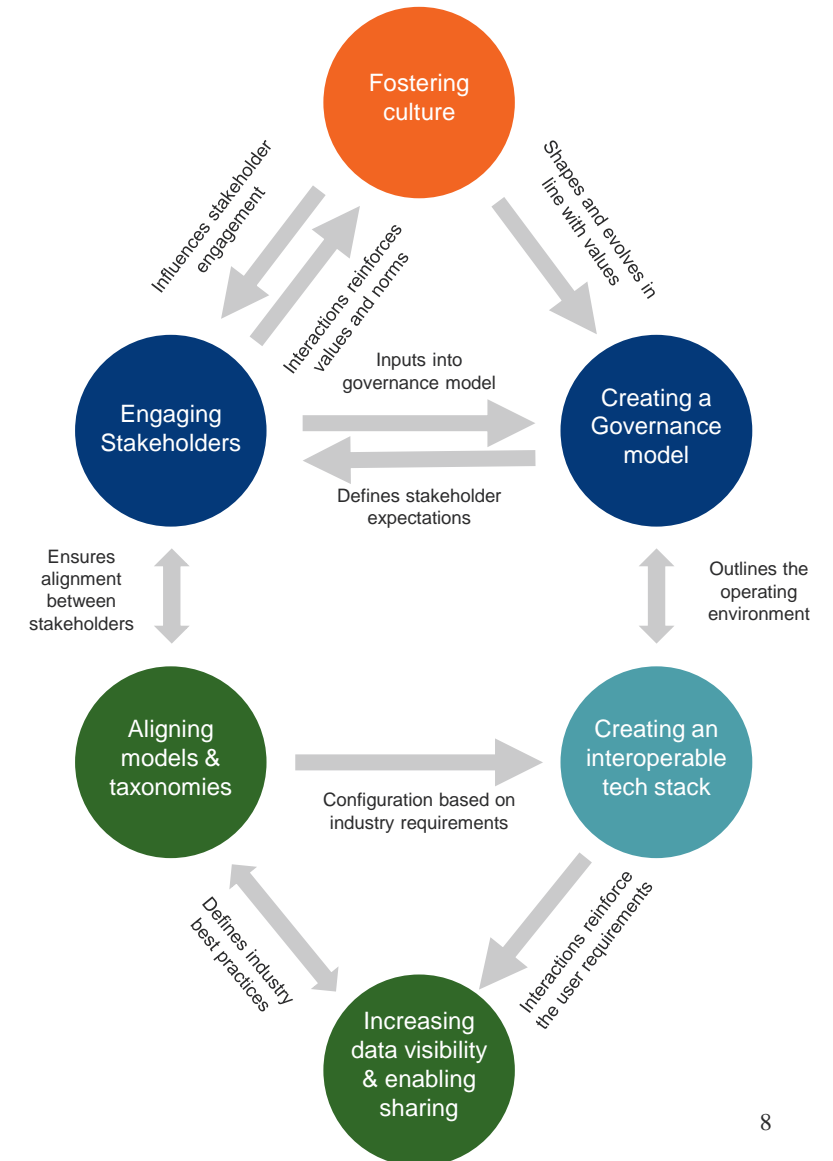
The governance model plays a significant role in reinforcing the cultural values, principles and norms that guide the behaviours and actions of individuals. When designing the governance model, it must be considered how it can reinforce and embed the cultural values, while meeting the needs of the sector.

The inherent purpose for the VirtualES is to enable sharing and visibility of data through an interoperable technology stack that ensures models and taxonomies are aligned, whilst providing trust and interoperability between actors.

Interoperability plays a critical role in enabling data sharing, ensuring standardised data formats, and an overarching governance framework. Aligning models and taxonomies ensures consistency in data interpretation.

Underpinning the other factors is engaging stakeholders. As interactions between stakeholders increase during the programme, they will influence the culture of the VirtualES. Therefore, ensuring that stakeholders who interact with the VirtualES are aware of the values of the programme and act in line with those, is important to ensure a positive culture persists over time

These six factors support the development of an energy sector data sharing infrastructure. By addressing these factors together, actors can create a harmonised data architecture that will support the VirtualES.





# Delivering the VirtualES

An overview of the development timeline of the VirtualES

## Project timelines

Throughout the development of the common framework, the approach has been industry-led, consultative, and collaborative.

This approach, coupled with explicit and proactive engagement within the energy sector and with cross-sector stakeholders, is necessary for the successful development of the common framework, delivery of the VirtualES, and ultimately in achieving sector-wide adoption.

All work has been conducted openly, with all the outputs to date published [online](#).

<b>Defined the vision</b> <i>(Dec 21 – Feb 22)</i>	<b>Sketched the concept</b> <i>(Mar 22 – Apr 22)</i>	<b>Developed enablers</b> <i>(Jul 22 – Sep 22)</i>	<b>Set design principles</b> <i>(Nov 22 – Jul 23)</i>	<b>Showcase benefit</b> <i>(Expected Oct 23 – Sep 24)</i>
<p><b>Benchmark &amp; key factors</b></p> <ul style="list-style-type: none"> <li>Defined the cross-sector and global best practice for connecting assets, systems, and digital twins.</li> <li>Outlined the key socio-technical factors that need to be considered for the VirtualES to succeed.</li> </ul> <p><a href="#">Read the report</a></p> <p><a href="#">Read the report</a></p>	<p><b>Discovery phase (SIF)</b></p> <ul style="list-style-type: none"> <li>Collaboratively proved and demonstrates, with industry, how the socio-technical principles work to enable the VirtualES.</li> <li>Recommended a tangible demonstrator use case to put the framework in practice.</li> </ul> <p><a href="#">Read the report</a></p>	<p><b>Data standards, use cases &amp; advisory groups</b></p> <ul style="list-style-type: none"> <li>Identified data standards and outlined data licensing considerations applicable to the use case.</li> <li>Defined a delivery plan, governance structure, and collaborative approach, for the successful delivery of the demonstrator.</li> </ul> <p><a href="#">Read the report</a></p> <p><a href="#">Read the report</a></p>	<p><b>Common framework demonstrator (Alpha)</b></p> <ul style="list-style-type: none"> <li>Developed industry-validated governance model and technical architecture.</li> <li>Created wireframes of VirtualES based on the demonstrator use case.</li> <li>Defined a cost-benefit analysis methodology to assess potential use cases.</li> </ul>	<p><b>Development (Beta)</b></p> <ul style="list-style-type: none"> <li>Initiate the development and testing of the demonstrator.</li> <li>Further explore the security, operating model, and technical aspects.</li> <li>Continue on-going engagement with stakeholders across the sector.</li> </ul>

# Project team

## Supporting the development of the social-technical common framework

The development of the common framework has been delivered by Arup and supported by the Energy Systems Catapult and Icebreaker One. It has been sponsored by the Electricity System Operator (ESO) and National Gas Transmission (NGT) through the Network Innovation Allowance (NIA).

The purpose of the RII0-2 NIA is to provide funding to Gas Transporter and Electricity Transmission Licensees to allow them to carry out innovative projects, that focus on the energy system transition or addressing consumer vulnerability, which are outside of business-as-usual activities.

- **Electricity System Operator (ESO):** ESO is responsible to ensure a reliable, secure system operation to deliver electricity when customers need it. ESO balances the supply and demand on the system day to day, second by second, and coordinates with networks to transfer electricity from where it is generated to where it is needed.
- **National Gas (NGT):** National Gas own and operate the national gas network in addition to maintaining and managing the 7,000,000 domestic industrial and commercial combined gas assets around the UK.

- **Arup:** An employee owned, multinational organisation with more than 15,000 specialists, working across 90+ disciplines, with projects in over 140 countries and the mission to ‘shape a better world’. Arup have extensive energy and cross-sector digital twin expertise, actively contributed to the National Digital Twin programme, and are members of the Digital Twin Hub.
- **Energy Systems Catapult (ESC):** An independent, not-for-profit centre of excellence that bridges the gap between industry, government, academia, and research. Set up to accelerate the transformation of the UK’s energy system and ensure businesses and consumers capture the opportunities of clean growth. ESC are responsible for the Energy Data Task Force (EDTF) & Energy Digitalisation Task Force (EDiT).
- **Icebreaker One (IB1):** An independent, non-partisan, non-profit organisation with a mission to ‘make data work harder to deliver Net Zero’ by creating open standards for data sharing across agriculture, energy, transport, water, and the built world.

Together the five organisations assembled a delivery team to effectively collaborate and deliver the objectives of this workstream.

The logo for the Electricity System Operator (ESO), consisting of the letters 'ESO' in a bold, yellow, sans-serif font.The logo for National Gas, featuring a stylized flame icon in blue and green to the left of the words 'national gas' in a green, lowercase, sans-serif font.The logo for ARUP, consisting of the letters 'ARUP' in a bold, red, serif font.The logo for Energy Systems Catapult, featuring the word 'CATAPULT' in a bold, dark blue, sans-serif font with a stylized 'C', and 'Energy Systems' in a smaller, dark blue, sans-serif font below it.The logo for Icebreaker One, featuring a dark blue circle containing the letters 'IB1' in yellow, followed by the words 'Icebreaker One' in a dark blue, sans-serif font.

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# Raising awareness and fostering culture

# Raising awareness and fostering culture

## Approach to raising awareness and fostering culture for the VirtualES

### Overview

Raising awareness and fostering culture is a must-have aspect for a sector transformational initiative, such as the VirtualES. The interaction among the wide variety of organisations, disciplines, personalities and traditions require a common interaction point to achieve the vision, an interconnected ecosystem of digital twins.

The purpose of this priority key factor guidance note is to provide the descriptions of the cultural values that underpin the programme, a call for feedback on said values, and an approach to participate with the programme.

### Aims of raising awareness and fostering culture

In the context of the VirtualES, the aim of raising awareness and fostering culture is to:

- **Align stakeholders on the programme vision and cultural values:** This provides contextual descriptions of the culture that underpins the programme and outlines mechanisms around how participants should engage with the VirtualES in order to foster the appropriate programme culture.
- **Foster awareness by providing a benchmark:** Setting a baseline of the technical requirements, skills, leadership characteristics and workforce capabilities required for participation enables a successful programme implementation.
- **Provide change management principles:** Outlining an approach to organisational change that can be applied to foster awareness and desire to advocate to be part of the VirtualES.

# 2.1

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# Defining the culture

# Defining the culture

## Approach to defining the culture of the VirtualES

### Why is culture important?

Organisational culture has been studied extensively and is generally defined as a combination of the artefacts (e.g. organisational vision and mission statements), shared beliefs & values and assumptions that characterise an organisation.

Fostering an appropriate culture within an organisation is crucial as it establishes a common understanding amongst actors and dictates how they should interact to achieve a unifying vision. Fostering the right culture is a bi-directional process, meaning it can be fostered top-down (e.g. explicit values and governance structures) and bottom-up (e.g. by behaviours stakeholders exhibit when they interact with each other).

Fostering an appropriate culture is key because it will be an enabler of the following outcome. These will enable success for organisations participating in the VirtualES:

- Create a sense of belonging that unites actors behind a single vision
- Increase collaboration and improve openness & trust which will in turn increase innovation
- Support adaptability and resilience by promoting flexibility and a willingness to change

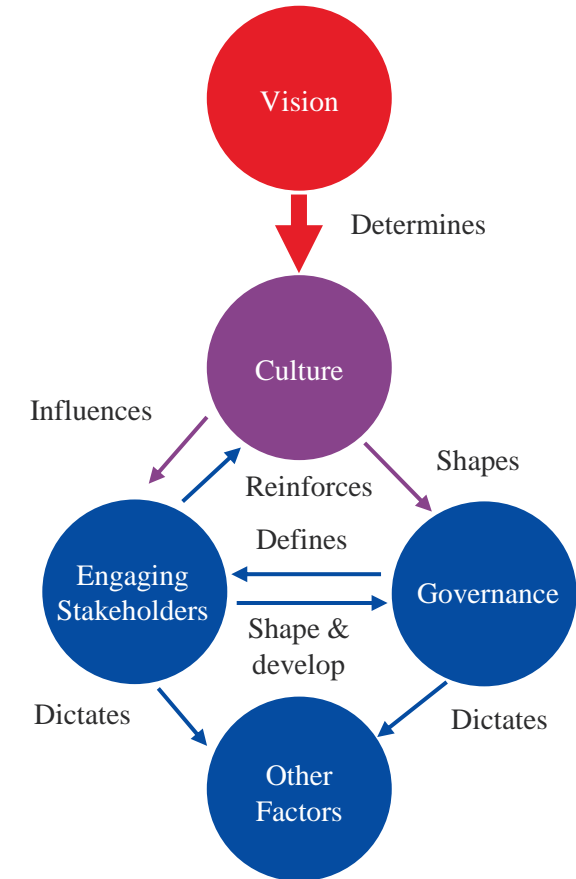
### Approach to defining the culture

The vision provides the starting point and acts as the ‘North Star’ for the VirtualES, outlining how decisions are made and determining the direction of travel.

Defining the culture of the VirtualES began by establishing an engaging vision with a clear purpose. Building an engaging vision involves both articulating a challenging target and defining the explicit values of the VirtualES.

Based on the vision, cultural values that will enable the achievement of the vision are determined and validated through stakeholder engagement. These cultural values shaped the governance model and influenced the stakeholder engagement approaches.

The adjacent diagram illustrates how the priority socio-factors interact and are dependent on the vision and culture of the VirtualES.



Interaction between priority socio factors

# Vision of the Virtual Energy System

The ‘North Star’ that outlines how decisions are made and determine the direction of travel for the VirtualES

## Vision of the VirtualES

The vision of the VirtualES is to transform the energy sector by forging a vital connection between: demand and supply, enabling modelling, scenario planning and real-time decision-making, to facilitate the transition to net zero. This will be achieved by pioneering the world’s first ecosystem of interconnected digital twins representing the entire energy system.

Through these digital twins, secure and resilient data sharing will be enabled, empowering stakeholders across the network and accelerating the decarbonisation of the energy system.

This energy system will need to be operationalised through modelling a wide range of scenarios which will require visibility of system behaviour and capability. This decentralised energy system will support more complex energy flows with a digitalised exchange of data in real-time offering benefits for all stakeholders in the energy system.

Achieving this vision will require collaboration across the entire energy system at an unprecedented scale. The development of a common social-technical framework to facilitate interoperability and a trust framework that is underpinned by the cultural values of the programme is a key requirement to enable this collaboration.

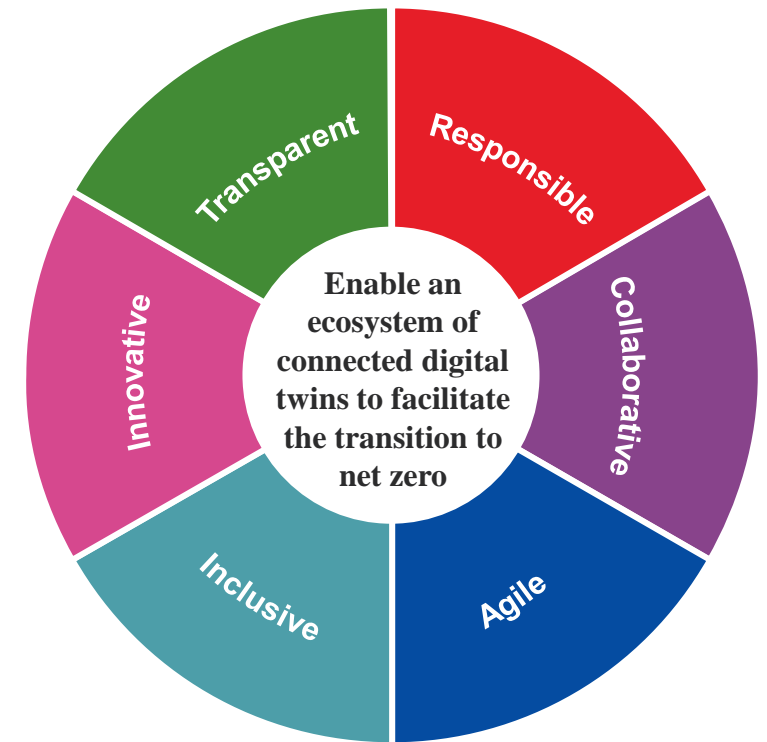
## Leveraging the vision to define the culture

The vision is a key element of fostering an appropriate culture for the VirtualES and will lay the foundation for successful system collaboration.

One of the key assumptions that will define the culture is that while each individual organisation involved in the VirtualES will have its own culture, when interacting with the programme, individuals will engage in a way that is conducive to fostering the target culture within the VirtualES.

It is also assumed that participants in the VirtualES will share belief in its vision and will be willing to participate in a meaningful way to simultaneously achieve their own organisational objectives and those of the wider vision of the VirtualES.

The vision of the VirtualES acts as the ‘North Star’. Cultural values that align with the achievement of this vision were identified, and are summarised on the adjacent diagram.



Vision and cultural values of the VirtualES

# Values that underpin VirtualES

The 'North Star' of the programme, dictating how decisions are made and determining the direction of travel for the programme as a whole

## Values of the VirtualES

The values that support achieving the vision of the VirtualES were determined as:

- **Transparency:** participants in the VirtualES are willing to share information, data, and knowledge openly with other members. Decisions are unbiased and ethical with a clear rationale.
- **Responsibility:** participants in the VirtualES take ownership and responsibility for their actions and decisions, taking a whole-system approach and creating collective value.
- **Collaboration:** participants in the VirtualES work together to achieve the shared goals and vision of the VirtualES including: leveraging technology, data, and knowledge-sharing.
- **Agility:** the VirtualES should respond and adapt quickly to changes and challenges to take advantage of opportunities as they arise.
- **Inclusivity:** participants are respected and treated fairly with equal opportunities for participation creating a sense of belonging and fostering open communication.
- **Innovation:** the VirtualES fosters creativity, supports the generation of new ideas, and adopts a mindset of continuous improvement.

Strong alignment between the vision and culture of an organisation will increase commitment of those participating in the VirtualES and create a sense of shared purpose.

These values enabled the development of the design principles of the governance model to support the VirtualES.

Decisions, actions and interactions pertaining to the VirtualES should continue to be guided by these values.

## Reinforcing cultural values

Establishing the values of the VirtualES is an important part of defining the culture. Making these values explicit is a critical success factor in uniting complex and diverse team members behind a unified vision.

To ensure success in fostering the right culture for the participating VirtualES, it is vital that the explicit values outlined are reinforced.

Leaders within organisations participating in the VirtualES must set an example when it comes to displaying these values by demonstrating behaviours and decision making that are value consistent.



# 2.2

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## Participating in the Virtual Energy System

# Participating in the Virtual Energy System

## Establishing project teams, assessing readiness and creating a change management plan

### Overview

Participating in VirtualES offers exciting opportunities for organisations to improve customer propositions and to improve team efficiency by enabling user driven innovation. For the VirtualES to be a success, it is critical to have strong sector buy-in. These next steps provide organisations who are eager to participate (with some guidance) to start becoming VirtualES-ready.

- **Understand and articulate the vision:** (as summarised in [Section 2.1](#)) engage with industry events such as the show and tells.
- **Create motivated and culturally-aligned project team(s):** articulate the vision to relevant stakeholders and begin to identify those who are intrinsically motivated to participate.
- **Establish a baseline:** understand your organisations' readiness to participate in the VirtualES by reviewing the technical and social baseline requirements for participation outlined in this section.
- **Create a change management plan:** leverage the change management principles outlined in this document to create a plan for change to move from your current baseline to being VirtualES-ready.

### Engaging project teams

In addition to aligning with the explicit values of the VirtualES, individuals should also be intrinsically motivated to participate. Three key components that predict intrinsic motivation and which should be considered when creating project teams internally:

- **Autonomy** is the feeling of having control over one's own actions and is especially reinforced when individuals align their behaviours with their values.
- **Competence** is the sense that individuals can succeed and grow when taking part in the activity.
- **Relatedness** concerns a sense of belonging and connection. This will be cultivated through the culture of the VirtualES and the activities run by the programme.

When building project teams internally, these components should be considered to ensure the best results for your organisation and the programme as a whole.

### Engaging individuals

Although not a requirement for participation in the VirtualES, it would be a benefit to the programme and to the individual if they were intrinsically motivated to be part of the programme. These individuals could be people who have a keen interest in achieving net zero or in the digitalisation of the energy system.

There will also be lots of opportunities for individuals to gain and apply new digital knowledge and abilities that are becoming ubiquitous across all sectors. Anyone who is interested in building competence in this area is also likely to be highly motivated to be part of core project teams. There will be exciting opportunities to learn from experts in the industry through the activities that will be organised by participating in VirtualES.

Participation in the VirtualES will also provide exciting opportunities for those that are interested in innovation and creative problem-solving. Those that enjoy creating new solutions and customer propositions will gain substantial personal value from engaging with and participating in the VirtualES.

# Establishing a baseline

## Understanding your organisations' readiness to participate in the VirtualES

### Establishing a Baseline

The VirtualES will be a far-reaching programme with multiple actors and stakeholders involved with varying levels of digital maturity. Establishing a baseline allows an organisation to understand where they are today and, if needed, design the journey to being VirtualES-ready.

High-level technical and social requirements have been identified that will support being part of the VirtualES.

The technical requirements focus on what an organisation needs from an IT architecture and the skills required for digital team members to participate in the VirtualES. The requirements are based on research, stakeholder engagement and a review of existing technology.

The behavioural requirements are enablers from a leadership and broader workforce perspective (e.g. those from legal functions). They have been identified using a combination of research from the National Digital Twin Programme, sector engagement and a review of other academic & grey literature.

Once a baseline is established, the change management principles detailed in this section can be used to create and implement a plan for change.

### Technical requirements for participation

Organisations need to have a sufficient level of digital maturity to connect to the ecosystem of connected digital twins enabled by the VirtualES and share and consume standard datasets by other key participants across the sector.

An organisations' readiness to use the VirtualES to achieve its business objectives will need to span across its operations, people, governance, technology and people capabilities:

- **Operation** – Organisations will need to develop policies, procedures and triage processes to understand the data they are sharing and access requirements, the licensing process, and more.
- **Governance** – Organisations will need to define how they interact and can be compliant with the VirtualES trust framework which brokers the sharing of that data between participants. They will also need to ensure / audit the usage of data in line with agreed licencing conditions.
- **Technology** – Organisations will need to ensure their own data and technology strategies align with the sector best practice to encourage a culture of data sharing and treating data like products that can be shared and consumed to derive insight from.

This should be aligned with key publications, standards and best practices, for example, Ofgem's digitalisation strategy and data best practices, and the recommendations from the Energy Digitalisation Taskforce. Organisations should also ensure their technology code of practices and technology environments are set up to drive the value out of the connectivity with the VirtualES.

- **People** – Organisation will need to deploy a variety of skillsets to extract value from a digital and data sharing infrastructure such as the VirtualES. As a minimum, these skills include:
  - **Data fundamentals** – the understanding of data in context, including: its quality, purpose, value and other characteristics.
  - **Data modelling & standardisation** – the ability to consume data and convert it so that it can be consumed into proprietary systems for downstream analytics and modelling. This also applies in reverse, converting data into the required VirtualES data standard to enable its sharing and interoperability.
  - **Data management & governance** – the ability to suitably define and apply data management controls, permissions and governance.

# Establishing a baseline

## Understanding your organisations' readiness to participate in the VirtualES

### Technical requirements for participation (continued)

- **Application of secure & approved protocols / APIs** - key IT skills including the application of secure and approved protocols and APIs for data sharing.
- **Lifecycle Assurance & Quality Management** – the management and assurance across the data to enable a culture of quality improvement, ensuring data trust, transparency and alignment.
- **Legal & ethics** - the understanding and application of business integrity, ethics, data privacy, data compliance and legal obligations & considerations needed to enable the exchange of data.
- **Security** – the ability to set correct access control permissions to the data and understand and apply additional cyber security and privacy requirements enhancing technologies (e.g. encryption, anonymisation etc.)
- **Modelling & analytics** – the generation of meaningful insights from data using analytics, modelling, data science and visualisation techniques for improved data interpretation and decision-making.

### Social requirements - workforce capabilities

In addition to displaying behaviours aligned with the values of the VirtualES, the broader workforce should display competence in the following capabilities:

- **Business analysis & strategic thinking:** Identifies, evaluates and analyses complex business requirements and can formulate long-term plans in a dynamic business environment.
- **Communication:** Articulates thoughts clearly & openly and uses active listening to navigate diverse perspectives and build positive relationships.
- **Willingness to learn:** Demonstrates openness to new ideas and actively seeks out opportunities for learning and development.
- **Creativity & problem-solving:** Analyses problems to break them down into manageable components and develops practical and innovative solutions. Exhibits adaptability, flexibility and willingness to learn from failures.

### Social requirements - leadership characteristics

Leaders will play a crucial role in the success of the VirtualES, particularly with regard to securing funding. However, the EDiT report found that many leaders in the energy sector are not experienced in digital transformation and have flagged this as a potential risk for the success of the VirtualES. It is not expected that leaders become data experts, however they should show competence in the following capabilities:

- **Transformational leadership:** Inspires and motivates others to embrace change and work collectively towards a common, challenging goal.
- **Humility:** Understands their own strengths and development areas, demonstrates a willingness to learn from others and appreciates & acknowledges the contributions of others.
- **Empowerment:** Demonstrates trust in the abilities of others, inspires them to take ownership of their work and use their unique skills to achieve a shared vision.
- **Influence:** Understands the value of digitalisation and can articulate a clear strategic business case to secure funding and bring the entire workforce on the digitalisation journey.

# Change management approach

## Guiding principles to implement successful change when engaging with VirtualES

### ADKAR model overview

The Prosci ADKAR® model is a goal-oriented change management model that is used to guide organisational change. The ADKAR model represents the five tangible and concrete outcomes that individuals need to achieve for lasting change:

- **Awareness**
- **Desire**
- **Knowledge**
- **Ability**
- **Reinforcement**

This model has been adapted to provide organisations with a set of guiding principles to manage the change required to become participants of the VirtualES and help realise the following benefits::

- Providing a structured approach to implementing and executing change.
- Identifying barriers to change.
- Embedding change across an organisation by focusing on individuals.
- Enabling measurement of success

### Raise awareness

It is important to realise that by implementing change, you require employees to step outside of their comfort zone.

#### What can you do to build awareness?

- Identify a key sponsor within the business, ideally at the executive level, to deliver key messages and demonstrate support for the VirtualES.
- Communicate the opportunity and use cases to employees across the business.
- Signpost information and content available about the VirtualES to employees and encourage them to actively engage with the initiative.
- Host events including town halls, information sessions, and workshops to share information to help employees access information .

#### VirtualES resources available

- Recordings of previous show and tell events.
- Invitations to upcoming webinars, workshops and events.
- Thought leadership articles and resources.

### Create desire

There is a difference between understanding that there is a need for change and wanting change to happen. To implement change successfully, the desire to change must be built amongst employees. The Easy, Attractive, Social, Timely (EAST) framework outlined in the *engaging stakeholders* priority key factor is a useful set of principles to build this desire.

#### What can you do to build desire to change?

- Strong employee involvement in creating the needed solution. This can be done, for example, through workshops, breakfast events and lunch & learns.
- Clearly communicate the benefits and use cases of the VirtualES through the key sponsor.
- Provide a forum to collect reasons for resistance for change and proactively manage resistance.
- Develop incentive programmes aligned with the change required where appropriate.

#### VirtualES resources available

- Example use cases
- Share success stories from the VirtualES with all participants.

# Change management approach

## Guiding principles to implement successful change when engaging with VirtualES

### Build knowledge

It is critical that individuals will have the right level of knowledge to participate in the VirtualES.

Successful implementation will require support from multiple functions who will require a different level of knowledge. Ensuring information is appropriate for the target audience is critical to maintain engagement.

#### What can you do to build knowledge of VirtualES?

- Understand the gap between current knowledge levels and desired knowledge levels across the relevant functions in order to leverage the baseline measurement as a starting point.
- Advocate for resources through the key sponsor and provide time for employees to gain the additional knowledge required to participate in the VirtualES.
- Implement formal training programmes.
- Establish multi-disciplinary VirtualES working groups to encourage collaboration.

#### VirtualES resources available

- Training resources on implementing the VirtualES.
- Training resources on how to use the VirtualES.

### Increase ability

Once individuals have acquired the relevant knowledge, provide opportunities to apply theoretical knowledge to create effective change in practice and build skills & capability.

#### What can you do to build ability?

- Provide opportunities for hands-on practice and experience with the VirtualES.
- Encourage employees to build competence through already existing development initiatives (e.g. appraisal / development planning activities).
- Identify coaching and mentoring opportunities between internal SMEs and less experienced individuals.

#### VirtualES resources available

- Programme-wide Communities of Practice to share knowledge, lessons learned, and successes.
- Programme-wide mentoring opportunities.
- Simple ways for users to understand its core functionality.

Building capabilities and skills was identified as one of the 14 key factors and additional guidance on this topic will be provided.

### Provide reinforcement

Once employees are actively working on the change required to implement the VirtualES, it is critical that the right behaviours are celebrated and reinforced.

It is also important to capture feedback and continuously improve.

#### What can you do to reinforce the change?

- Align VirtualES-related activities with other tactical and strategic initiatives across the business.
- Define project milestones and vocally celebrate their achievements at the executive level.
- Encourage managers to provide positive feedback when individuals or teams demonstrate the right behaviours and attain the relevant skills.

#### VirtualES resources available

- Mechanism to collect feedback from the industry through the Governance framework.
- Regular updates on programme-wide achievement of vision and goals.

# 3

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# Call to action

# Your input into the values of the programme

**Raising awareness of the cultural values and fostering a programme wide culture to enable effective change**

## Overview

Your feedback is crucial in ensuring that the VirtualES aligns with your needs.

Please share your thoughts on the program's overarching vision, mission and cultural values to ensure the programme sets the right tone from the beginning.

The programme is a collaborative endeavour as reflected in the culture.

Together, let's achieve the shared vision that reflects the collective aspirations and drives the benefits of the VirtualES towards facilitating the energy sector achieve a net zero future.

## Initiate change

The programme is making continued progress and to keep pace and take advantage of the opportunities provided by digitalisation it's time to start initiating your change management process to ensure your organisation is ready to engage with VirtualES.

**Please share your feedback:**  
[VirtualES@nationalgrideso.com](mailto:VirtualES@nationalgrideso.com)

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