ESO Technology Advisory Council

TAC-1

18 December 2020

Pre-read pack

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About this pre-read pack

- This pack provides the pre-read material for the first Electricity System Operation (ESO) Technology Advisory Council (**TAC-1**) meeting on 18 December 2020.

- It also serves as a briefing pack for the TAC.

- The pre-read pack is structured as per the agenda.

- We have provided high-level information relating to the agenda items in the main part of the pack.

- There are three annexes with further background information:
    - Annex 1 – Introduction to the ESO
    - Annex 2 – Introduction to RIIO-2 and the Technology Advisory Council
    - Annex 3 – Links to further information and recommended reading

TAC-1 meeting agenda

Item	Time	Duration	Description	Additional material
	15:30-15:35	5 mins	Welcome	
1	15:35-15:40	5 mins	Introduction from Fintan Slye – Director, Electricity System Operator	
2	15:40-15:45	5 mins	Introduction from Vernon Everitt – Chair	
3	15:45-16:15	30 mins	Technology Advisory Council member introductions	
4	16:15-16:35	20 mins	Terms of reference and ways of working	• Draft terms of reference document • Non-disclosure agreement and conflict of interest form • Paper template
5	16:35-16:55	20 mins	Forward look of topics	
6	16:55-17:00	5 mins	AOB	
	17:00		Close	

Item 1

Welcome from Fintan Slye – Director, Electricity System Operator

Welcome from Fintan Slye

Thank you for volunteering your time to be a member of the ESO Technology Advisory Council. Your expertise will help us ensure we achieve the digital transformation needed to deliver on our ambition of being able to operate the electricity system carbon-free by 2025.

The energy sector is undergoing massive transformation. Driven by innovation in technology, system and processes, and the UK's net-zero ambitions, we are seeing huge levels of decarbonisation and decentralisation. This creates challenges for how we operate the system – we must procure new sources of flexibility from novel technologies and upgrade our control systems to handle the increased number of market players.

Our RIIO-2 plans set out the activities we will take over the next five years to deliver our ambition. They include direct IT investment of over £400m and have the potential to deliver £2bn of new consumer benefit. Our plan is ambitious, and this has been recognised by stakeholders and our regulator, and we are well aware that it will be challenging to deliver.

Delivering our plan will mean changing the way we work. We must embrace data and digitalisation, meaning a change in our processes and our culture. As industry demand more transparency, we need to be open with the data we share.

To do this, we need to work together, and we need your expertise. Your role on the Technology Advisory Council is to guide and challenge the ESO on its digital transformation, and ensure we deliver the right outcomes for customers, stakeholders and service providers. You can shape the future of the ESO and the future energy system, so please take this opportunity to work with us.

I look forward to meeting you on 18 December.

Fintan Slye

Director, Electricity System Operator

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Item 2

Introducing the Chair, Vernon Everitt

Biography – Vernon Everitt

Name: Vernon Everitt

Current role: Managing Director, Customers, Communication and Technology, Transport for London

Vernon is responsible for TfL's customer and technology/data strategies and their delivery. These put customers at the heart of the organisation's operations.

This includes accountability for fares and payment operations, contact centres, customer information, marketing and customer insight, media relations, public affairs and travel demand management.

He focuses on how TfL can use technology and open data to deliver better journey on public transport and the road network, and enable TfL's employees to provide better customer service. He also leads on supporting and partnering with the capital's thriving tech sector.

Vernon led the successful pan-Government and transport industry marketing and communications strategy for the London 2012 Games, the largest integrated campaign of its kind ever undertaken.

Before joining TfL in 2007, Vernon spent 10 years at the Financial Services Authority (FSA) and 18 years at the Bank of England in a variety of banking, regulatory, corporate and communications roles. This included leading the FSA's national work to improve the financial capability of consumers.

Vernon is on the Boards of the London Transport Museum and Transport for Wales and is a member of an Advisory Group to Marston Group, the largest privately owned specialist UK company in the field of civil and High Court Enforcement.

Item 3

Member introductions

This section will be used to introduce the group membership

- Please come prepared to spend 2-3 minutes outlining your:
    - Area of expertise and interest
    - Experience
    - Hopes and expectations for the ESO Technology Advisory Council

- Please could you provide a brief (no more than a few sentences) summary of your current role, experience and expertise.

- Please also provide a photo suitable for the website (ideally 16x9 – ie wider than taller)

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# ESO Technology Advisory Council membership

Chair

Name	Position
Vernon Everitt	Managing Director – Customers, Communication & Technology, Transport for London

Membership

Name	Position
Randolph Brazier	Head of Innovation and Digital, Energy Networks Association
Graham Campbell	Head of DSO, Scottish Power
Andy Hadland	Chief Product Officer, Arenko
Alastair Martin	Founder and CEO, Flexitricity
David Sykes	Data Scientist, Octopus
Kate Garth	Senior Regulatory Affairs Manager, RWE Renewables
Alvaro Sanchez Miralles	CEO, STEMY Energy
Chris Kimmett	Director Power Grids, Reactive Technologies
Dennis Leach	Senior Software Engineer, Limejump
Teodora Kaneva	Programme Manager – SmarterUK, TechUK
Jo-Jo Hubbard	Founder and CEO, Electron
Simon Pearson	Digital Business Leader, Energy Systems Catapult
Peter Stanley	Director of Digital Operations, Elexon
James Houlton	Enterprise Transformation Executive, AWS
Ulrika Wising	Global VP Customer Solutions, Shell New Energies
Anastasia Vaia	VP Engineering for Scale Up of New and Digital, BP
Melissa Stark	Global Renewables Lead, Accenture
Chris Dent	Professor of Industrial Mathematics, University of Edinburgh
Claudia Centazzo	Business Development Director, Smith Institute
Judith Ward	Associate, Sustainability First

ESO Technology Advisory Council group membership
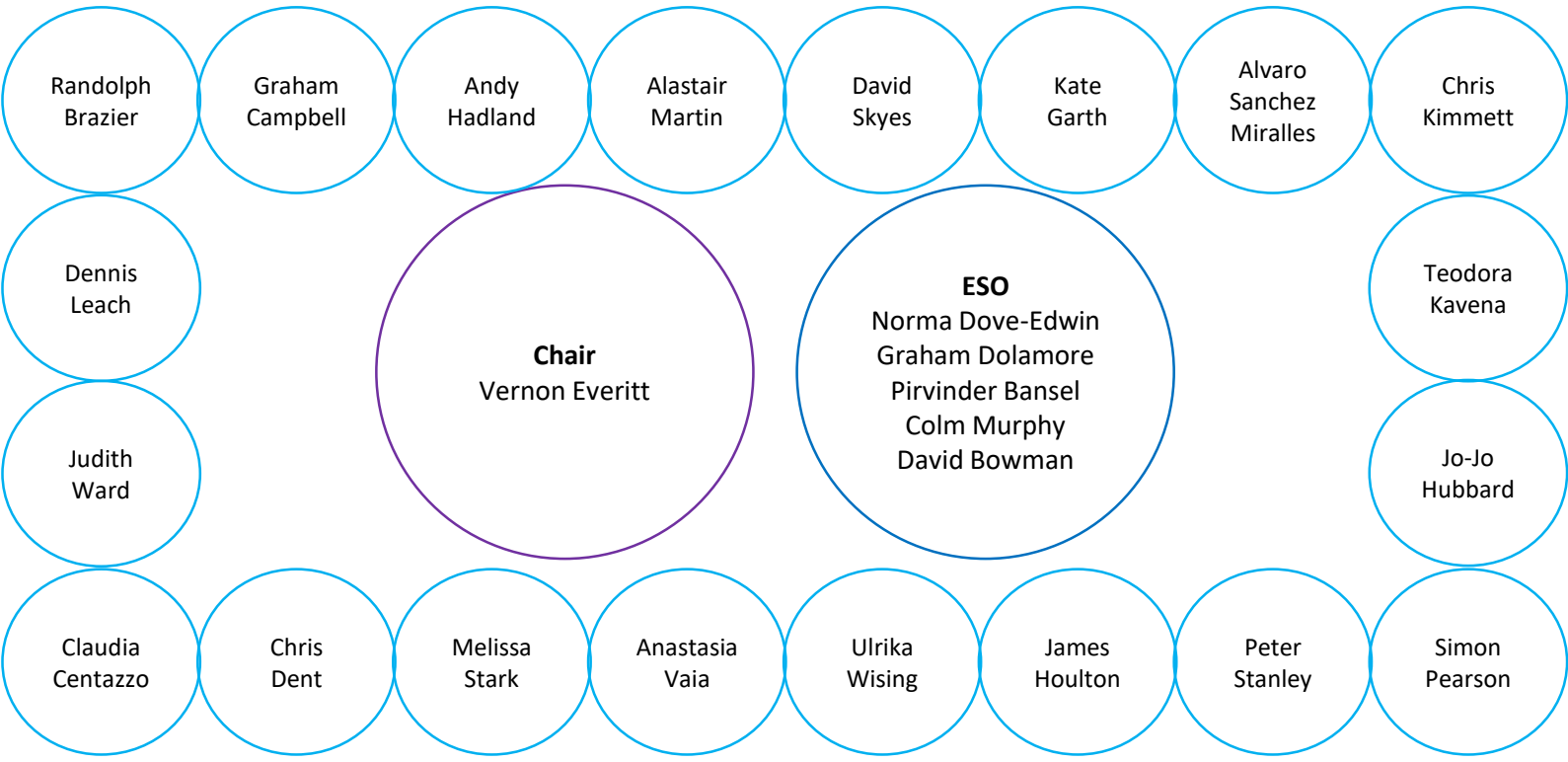
TAC members

Name: Randolph Brazier

Current role: Head of Innovation and Digital, Energy Networks Association

Name: Graham Campbell

Current role: Head of Distribution System Operation, Scottish Power Energy Networks

TAC members

Name: Andy Hadland

Current role: Chief Products Officer, Arenko

Name: Alastair Martin

Current role: Founder and Chief Strategy Officer, Flexitricity

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TAC members

Name: David Sykes

Current role: Data Scientist, Octopus Energy

Name: Kate Garth

Current role: Senior Regulatory Affairs Manager, RWE Renewables

TAC members

Name: Alvaro Sanchez Miralles

Current role: CEO, STEMY Energy

Name: Chris Kimmett

Current role: Director Power Grids, Reactive Technologies

TAC members

Name: Teodora Kavena

Current role: Programme Manager – Smarter UK, TechUK

Name: Joanna Hubbard

Current role: Co-founder and Chief Executive Officer, Electron

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TAC members

Name: Simon Pearson

Current role: Digital Business Leader, Energy Systems Catapult

Name: Peter Stanley

Current role: Director of Digital Operations, Elexon

TAC members

Name: James Houlton

Current role: Enterprise Transformation Executive, Amazon Web Services

Name: Ulrika Wising

Current role: Global VP Customer Solutions, Shell New Energies

TAC members

Name: Anastasia Vaia

Current role: VP Engineering for Scale Up of New and Digital, BP

Name: Melissa Stark

Current role: Global Renewables Lead, Accenture

TAC members

Name: Chris Dent

Current role: Professor of Industrial Mathematics, University of Edinburgh

Name: Claudia Centazzo

Current role: Business Development Director, Smith Institue

TAC members

Name: Judith Ward

Current role: Associate, Sustainability First

Name: Dennis Leach

Current role: Senior Software Engineer, Limejump

ESO representatives

Name: Norma Dove-Edwin

Current role: Head of ESO IT

Name: Graham Dolamore

Current role: Programme Director – Balancing and ENC Compliance

ESO representatives

Name: Pirvinder Bansel

Current role: IT Portfolio Manager

Name: Colm Murphy

Current role: Head of Electricity Market Change Delivery

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ESO representatives

Name: David Bowman

Current role: Balancing Product Manager

Item 4

Terms of reference and ways of working

This section will be used to agree the group's Terms of Reference and ways of working

- We have drafted the Terms of Reference (ToR) based on those for the ESO RIIO-2 Stakeholder Group (ERSG). A non-disclosure agreement (NDA) and conflict of interest (COI) form has also been drafted. We have also provided templates for papers we propose to provide to the group and the action log that will track group activity. **These are subject to agreement by the group.**

- For discussion:

- Culture and ways of working

- Terms of reference document (attached to pre-read email)

- Non-disclosure agreement and managing conflicts of interest (see next slide and material attached to pre-read email)

- Templates for papers (see later slide)

- Format for discussion of ESO papers (see later slide)

- Action log (see later slide)

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Proposal for managing conflicts of interest

Having robust and clear processes to manage conflict of interests will help group members and give confidence to stakeholders not involved in the process

- Membership list will be publicly available and all members are required to complete an NDA and declaration of business interests
    - Key point: members are chosen for their individual expertise and information that is marked as restricted should not be further distributed or used for commercial purposes
    - Information shared with the Chair and Technical Secretary
- ESO to clearly market documents where there are any restrictions on their use or distribution
    - ESO to be as transparent as possible – we will only restrict materials where necessary
    - Complete or redacted materials posted online where possible
- Chair, Technical Secretary and ESO to review materials before they are circulated to the group:
    - Review markings
    - Consider if distribution to specific group members should be restricted
    - Discuss restrictions with affected parties
- Standing agenda item at the start of each meeting to:
    - Confirm any restrictions in place
    - Ask for members to raise or declare any further conflicts of interest
    - Agree restrictions on abstentions from discussion as appropriate
- Technical Secretary to minute all restrictions and abstentions

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Template for ESO papers

We have proposed a structure for ESO papers – is this providing the information you need to have the right discussions?

Format for discussion of ESO papers

The Chair will lead structured discussions on the papers submitted for TAC consideration. Will this facilitate the right discussions?

- *Paper circulated in pre-read*

- Sponsor to introduce the paper (context, key options, key evidence, recommendation, ask of TAC) - 5-10 minutes

- Chair to ask group for points of clarification

- Chair to ask group for detailed points and feedback on:

    - Scope of paper

    - Options considered

    - Engagement activity

    - Analysis

    - Recommendations

    - Next steps

- Chair to ask group for decisions on "asks to TAC"

    - Consensus, majority/minority agreement, rejected – sectoral views captured

    - Any caveats or action points

    - Recommendations to the ESO

- **Unless otherwise stated, discussions should be under the Chatham House rule: information disclosed during a meeting may be reported by those present, but the source of that information may not be explicitly or implicitly identified**

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Action log template

Does this template capture the right information?

Action Ref	Date raised	Topic	Action / query / recommendation	Action / query / recommendation – description	Owner	Status open / closed)	Comments

Item 5

Forward looking view of topics

Topics for future meetings

This section will be used to discuss topics for discussion in subsequent meetings

- A list of potential topics is given below

  - Do you agree?

  - Is there anything else that should be included?

- An indicative schedule is given

  - Do you agree?

Strategic transformation	Digitalisation	Product development
• Culture • IT operating model	• Digitalisation strategy • Digital action plan	• Customer and user journeys • Balancing and Network Control Roadmaps (see next slides) • Data Strategy
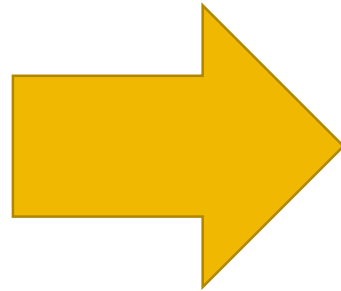
Date	Topics
18 December 2020	• Introductions • Ways of working • Terms of reference
January	• Further discussion on structure (eg strategic v technical layers) • Digitalisation strategy and digital action plan (submitted to Ofgem in December 2020)
February	• Strategic transformation • Customer and user journeys
March	• Balancing Roadmap (for publication) • Network Control Roadmap (for publication) • Data Strategy
Quarterly meetings	• Strategic transformation updates • Digital action plan updates • Product roadmap updates

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Balancing Roadmap

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Q3-4 – Balancing foundation specification work starts

Q4 – Balancing Roadmaps produced and published
- Overall Balancing Roadmap published, following TAC input
- Internal baseline technology roadmap
- Internal baseline functional capability roadmap

Q1-2 – build development environment and foundation infrastructure

Q4 – future system architecture defined
Updated Roadmap developed with TAC and published

Q1 – migration roadmap development started

Q3-4 – Test with Technology Advisory Council

TBC – develop sandbox testing environment

Ongoing – development of application components using production environment and sandbox

2020/21

2021/22

2022/23

Solution investigation work

Agile build of modular design

Agile build of modular design

0%

5%

Outcome:
- Clear 5 year visibility of our plans supported by TAC.
- Opportunities for rationalisation in end-to-end balancing process identified to inform system architecture and future operating model
- Understanding of the priority system issues to solve
- Understanding of current and future technology available for future system development

Outcome:
- Key future architecture designs made
- Sandbox environment developed
- Foundational infrastructure built and development environment established

Q4 – updated roadmap developed with TAC and published

TBC – deliver first application components

Q4 – Balancing transformation complete

2024/25

2023/24

Q4 – updated roadmap developed with TAC and published

60%

25%

Outcome:
- Transform situational awareness tool developed
- Digital twin capability established across control centre
- Real-time study tools
- Greater resilience to poor data

Outcome:
- Ability to schedule and dispatch all parties 1 MW and above
- Integrated dispatch across all platforms (including BM and PAS/ASDP)
- Increased automated dispatch capability
- Minute-by-minute balancing
- Rapid on/off balancing
- Training and simulation integrated with enhanced balancing tools
- Digital twin capability established across balancing tools

Outcome:
- Scaled agile approach to development underway
- First application components delivered and aggregated with new control centre architecture

Q4 Network control transformation complete

Map key:

% Progress/ benefit tracker

Outcomes

RIIO-2 BP commitments

New/ supplementary info

Q4 – updated roadmap developed with TAC and published

2025/26

2026/27

80%

Zero-carbon operation ability

100%

Outcome:
- Benefits: £152m*
- Enable fast response in zero-carbon system
- Enhanced cyber security systems
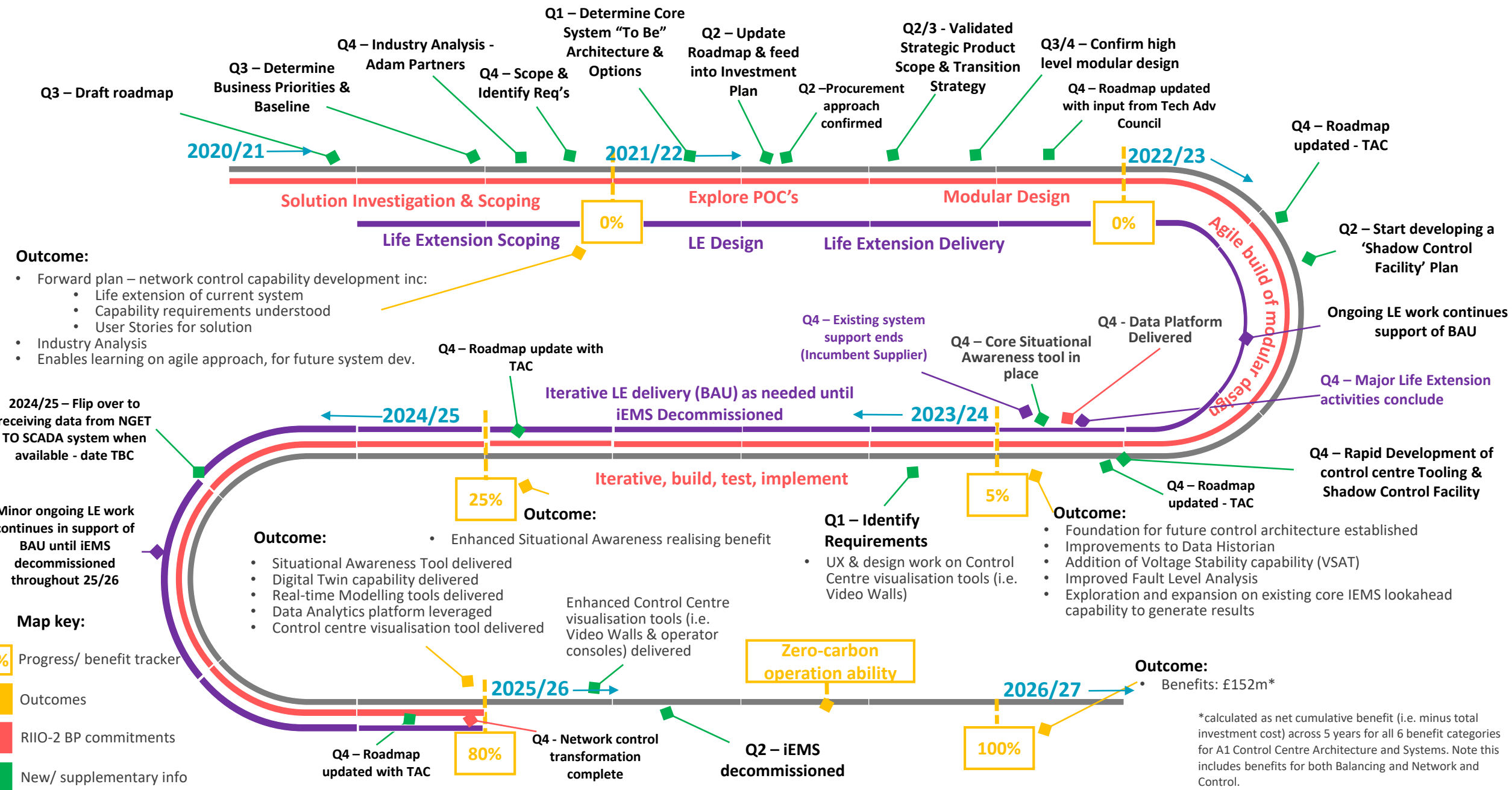
*calculated as net cumulative benefit (i.e. minus total investment cost) across 5 years for all 6 benefit categories for A1 Control Centre Architecture and Systems. Note this includes benefits for both Balancing and Network and Control.

Network Control Strategy Roadmap

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Q3 – Draft roadmap

Q3 – Determine Business Priorities & Baseline

Q4 – Industry Analysis - Adam Partners

Q4 – Scope & Identify Req's

Q1 – Determine Core System "To Be" Architecture & Options

Q2 – Update Roadmap & feed into Investment Plan

Q2 –Procurement approach confirmed

Q2/3 - Validated Strategic Product Scope & Transition Strategy

Q3/4 – Confirm high level modular design

Q4 – Roadmap updated with input from Tech Adv Council

Q4 – Roadmap updated - TAC

Q2 – Start developing a 'Shadow Control Facility' Plan

2020/21

2021/22

2022/23

Solution Investigation & Scoping

Explore POC's

Modular Design

Life Extension Scoping

LE Design

Life Extension Delivery

0%

0%

Agile build of modular design

Outcome:
- Forward plan – network control capability development inc:
    - Life extension of current system
    - Capability requirements understood
    - User Stories for solution
- Industry Analysis
- Enables learning on agile approach, for future system dev.

Q4 – Existing system support ends (Incumbent Supplier)

Q4 – Core Situational Awareness tool in place

Q4 - Data Platform Delivered

Ongoing LE work continues in support of BAU

Q4 – Major Life Extension activities conclude

Q4 – Roadmap update with TAC

Iterative LE delivery (BAU) as needed until iEMS Decommissioned

2024/25 ← Flip over to receiving data from NGET TO SCADA system when available - date TBC

2024/25

2023/24

Iterative, build, test, implement

25%

5%

Minor ongoing LE work continues in support of BAU until iEMS decommissioned throughout 25/26

Outcome:
- Enhanced Situational Awareness realising benefit

Q1 – Identify Requirements
- UX & design work on Control Centre visualisation tools (i.e. Video Walls)

Q4 – Rapid Development of control centre Tooling & Shadow Control Facility

Q4 – Roadmap updated - TAC

Outcome:
- Foundation for future control architecture established
- Improvements to Data Historian
- Addition of Voltage Stability capability (VSAT)
- Improved Fault Level Analysis
- Exploration and expansion on existing core IEMS lookahead capability to generate results

Outcome:
- Situational Awareness Tool delivered
- Digital Twin capability delivered
- Real-time Modelling tools delivered
- Data Analytics platform leveraged
- Control centre visualisation tool delivered

Enhanced Control Centre visualisation tools (i.e. Video Walls & operator consoles) delivered

Zero-carbon operation ability

Map key:

%	Progress/ benefit tracker
	Outcomes
	RIIO-2 BP commitments
	New/ supplementary info

2025/26

2026/27

80%

100%

Q4 – Roadmap updated with TAC

Q4 - Network control transformation complete

Q2 – iEMS decommissioned

Outcome:
- Benefits: £152m*

*calculated as net cumulative benefit (i.e. minus total investment cost) across 5 years for all 6 benefit categories for A1 Control Centre Architecture and Systems. Note this includes benefits for both Balancing and Network and Control.

Annexes

Annex 1

Introduction to the ESO

National Grid PLC.

National Grid is one of the world's largest investor-owned energy companies, committed to delivering electricity and gas safely, reliably and efficiently to the customers and communities it serves.

We play a vital role in connecting millions of people to the energy they use, through regulated utility businesses in the UK and US and National Grid Ventures.

We work closely with customers, partners and communities to develop solutions to the challenges we face as we make the transition to decarbonised, decentralised, smart energy systems.

National Grid is led by CEO John Pettigrew.

Purpose
Bring energy to life

Vision
We will exceed the expectations of our customers, shareholders, and communities today and make possible energy systems of tomorrow

Values
Every day we do the right thing and find a better way

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National Grid business units

US Regulated Business

UK Regulated Business

NGV Non-regulated Business
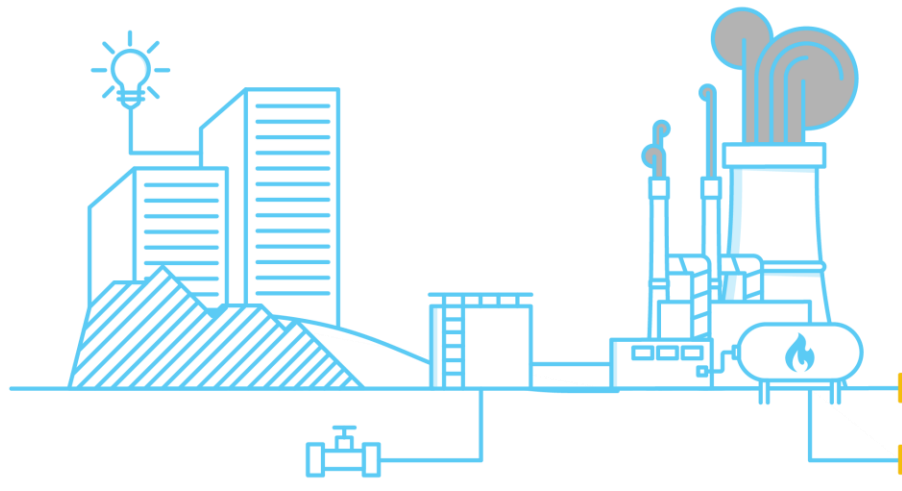
Electricity Distribution

Gas Distribution

FERC Regulated Wholesale Businesses

ET – Electricity Transmission

Electricity System Operator

National Grid Partners

GT – Gas Transmission

Gas System Operator
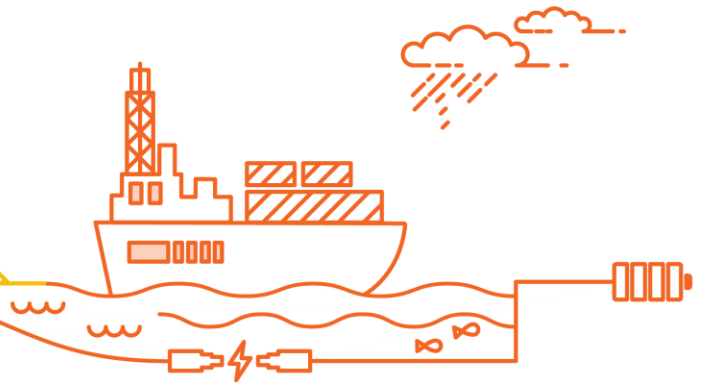
NGV – National Grid Ventures

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The ESO Executive Team

Fintan Slye

Director of UK System Operator

Craig Dyke

Acting Head of Strategy & Regulation

Rob Rome

Acting Head of National Control, ESO

Kayte O'Neill

Head of Markets

Julian Leslie

Head of Networks

Zoe Morrissey

ESO Legal Business Partner

Gregg Smith

Finance Director

Huma Ali

Senior HR Business Partner, ESO

Janet Morrow

Head of Corporate Affairs

Norma Dove-Edwin

IT Business Partner

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Legally separate

On 1 April 2019, the Electricity System Operator (ESO) became a legally separate business within the National Grid Group.

This provides transparency in our decision-making and gives confidence that everything we do will promote competition and is ultimately for the benefit of consumers.

Legal separation was to:

- Build trust and drive value for consumers
- Address perceived or real conflicts of interest

- Greater independence & transparency
- Facilitate competitive markets and enable whole energy system thinking

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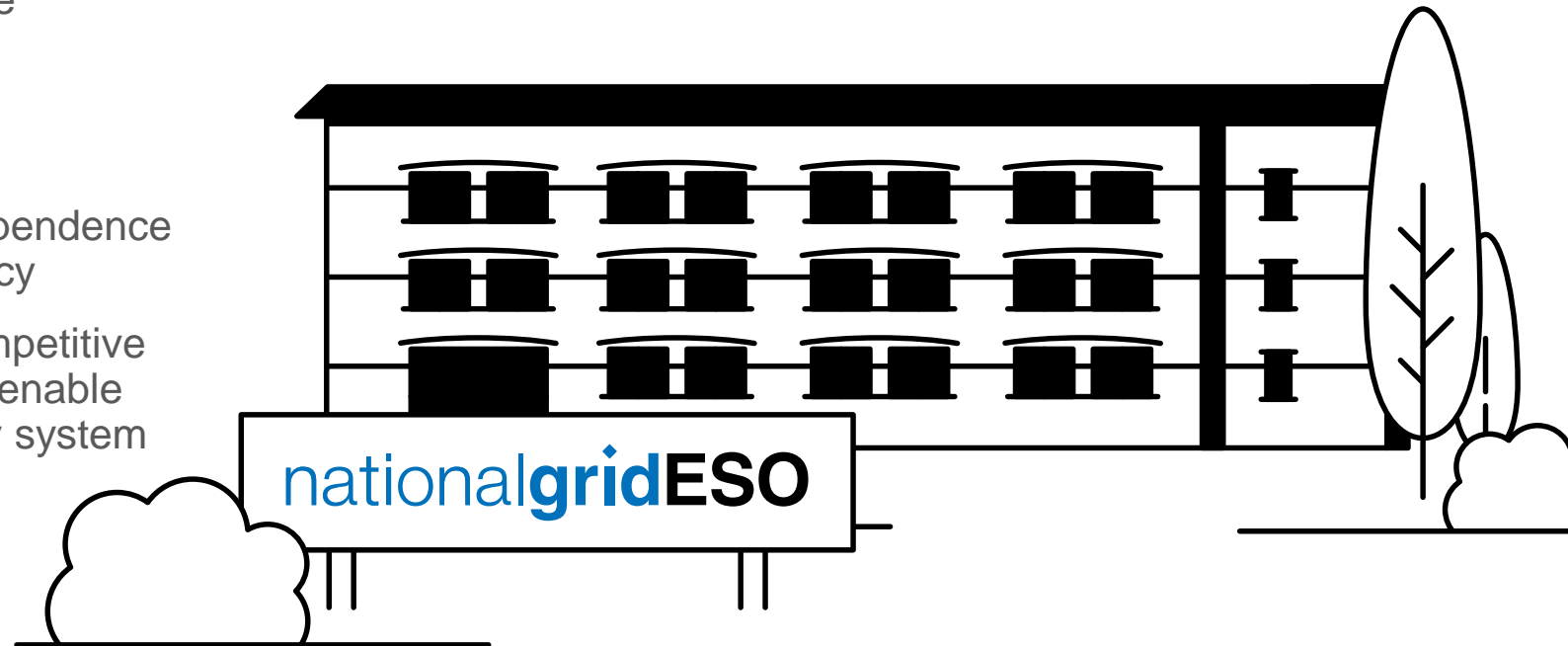
How does the energy system work?

Wind on shore and off shore

Solar

· On shore wind
· Solar farms
· CHP connection
· Peaking Power

Demand Side Management / Aggregators

PV Integration

NUCLEAR POWERED

COAL POWERED

GAS POWERED

Demand from industry

Power Generation

BIOMASS POWERED

HYDRO POWERED

Hydro energy storage

Transmission

Distribution Network Operators

Battery storage

Consumer demand
Commercial Industrial Domestic

Interconnectors to European Countries

Electricity System Operator

EV Charging

Day to day operations

As the electricity system operator for GB, we move electricity safely, reliably and efficiently through the system.

We don't generate or sell electricity and we are not responsible for the infrastructure, for example the pylons and cables, needed to move electricity around.

[Find out more about the ESO's role here](#)

We balance the system in real time ensuring that supply and demand is always met.

We operate 24/7, 365 days a year.

We help ensure the rules which govern the industry's roles and responsibilities are fit for purpose.

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Our 2030 mission is to enable the transformation to a sustainable energy system and ensure the delivery of reliable, affordable energy for all consumers

Success in 2025 looks like:

An electricity system that can operate carbon free by 2025

A whole system strategy that support net zero by 2050

Competition everywhere

The ESO is a trusted partner

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Our focus areas:

The engineering transformation:

ensuring reliable, secure system operation to deliver energy when consumers need it

The market transformation:

unlocking consumer value through competition

The sustainability transformation:

enabling and supporting the drive towards a sustainable whole energy future

The smart transformation:

driving innovation and increased participation across the energy landscape

The capability transformation:

developing the right people and systems to deliver the future

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Annex 2

Introduction to RIIO-2 and the Technology Advisory Council

Our RIIO-2 business plan - overview

Part 1: Context

- Introduction and context
- Assumptions underpinning our plan
- A plan informed by our stakeholders
- Facilitating the transition to a net-zero energy system

Part 2: Our proposals

- Reliable and secure system operation, to deliver energy when consumers need it
- Transforming participation in smart and sustainable markets
- Unlocking consumer value through competition
- Driving towards a sustainable, whole energy future
- Open data

Part 3: Setting the ESO up for success

- Financing our plan
- Technology underpinning our ambition
- Innovation at all levels of the business
- People culture and capability

£250 million annual cost of the ESO.

£3 annual saving on each consumer bill in RIIO-2

£2 billion net consumer benefits in RIIO-2

£400 million IT investment

Theme 1: Ensure reliable, secure system operation to deliver electricity when consumers need it

- **Transforming our control centre architecture and systems**, to be able to operate a zero carbon electricity system by 2025

- **Upgrading our control centre training and simulation capabilities**, to be able to operate the system under range of scenarios, in partnership with the wider energy industry

- **Evolving our restoration procedures** to ensure the reliance and reliability of the future and ensuring they meet the expectations of consumers in a highly-electrified world.

Theme 1

	2021/22	2022/23	2023/24	2024/25	2025/26
Total Opex	33	37	41	42	44
Capex	24	37	46	41	32

Legend: Total Opex, Capex, FTE

Investment £208 million – Net benefit £218 million
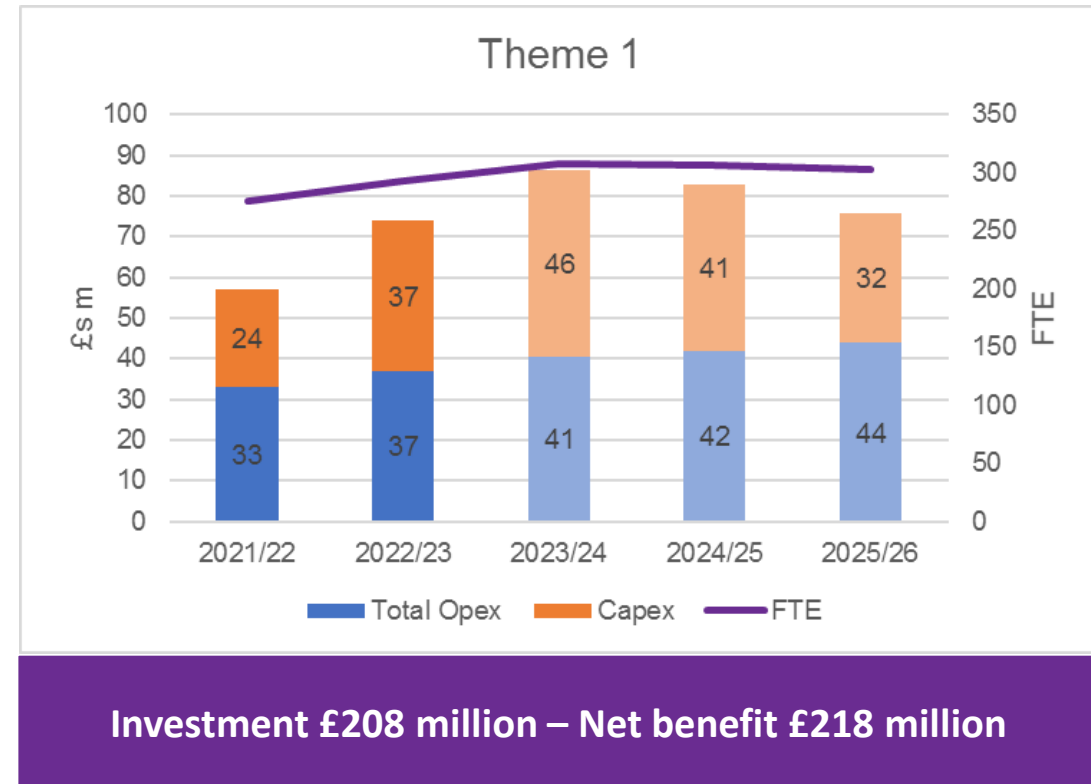
Theme 2: Transforming participation in smart and sustainable markets

- **Build the future balancing service and wholesale markets** – to attract the volume of flexibility we will need in the future, to achieve the UK's commitment to net zero emissions by 2050

- **Transform access to the Capacity Market** – to deliver security of supply with a plant mix that supports the UK's 2050 carbon target at an appropriate cost to consumers.

- **Develop codes and charging arrangements that are fit for the future** – that will facilitate the rapid change needed to deliver the low carbon energy system of the future. Code governance will be seen as an enabler of change, not a barrier

Theme 2

	2021/22	2022/23	2023/24	2024/25	2025/26
Capex	20	14	14	14	13
Total Opex	31	28	30	30	30

Total Opex ■ Capex ■ FTE
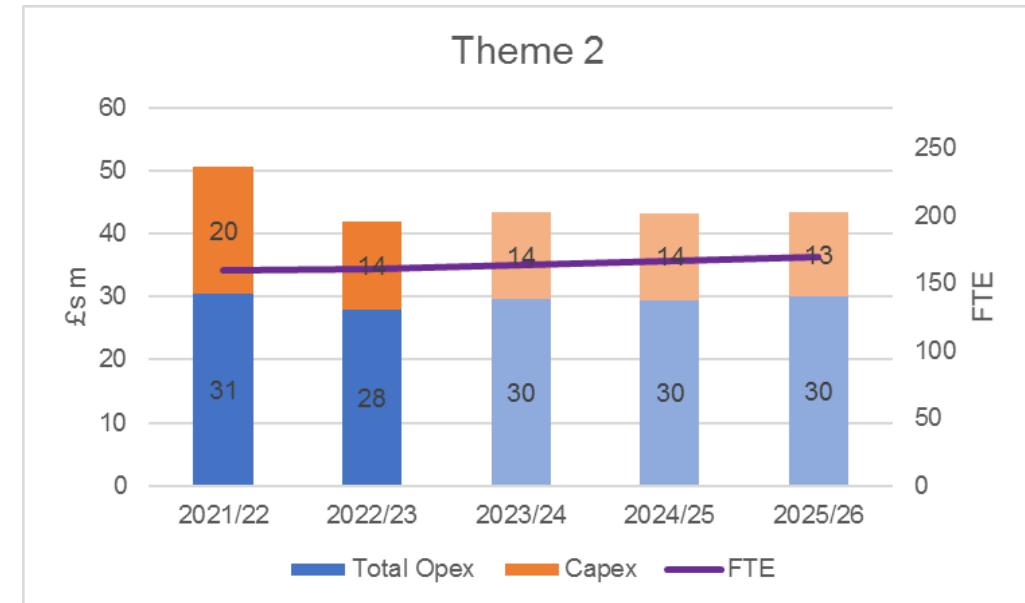
Investment £64 million – Net benefit £414 million

Theme 3: Unlocking consumer value through competition

- **Deliver new competitive processes** - so asset and non-asset based solutions can compete to meet future system needs.

- **Extend and enhance the Network Options Assessment (NOA) approach** - bringing the significant cost savings the NOA has already achieved for consumers to other areas, such as end of life asset replacement decisions

- **Undertake, with industry, a review of the System Quality and Security of Supply standard (SQSS)** - so system standards are appropriate for the decarbonised energy system of the future

- **Support Ofgem to develop its thinking on competitively appointed transmission owners** - bringing the benefits of competition to a wider range of consumers.

Theme 3

Investment £19 million – Net benefit £663 million
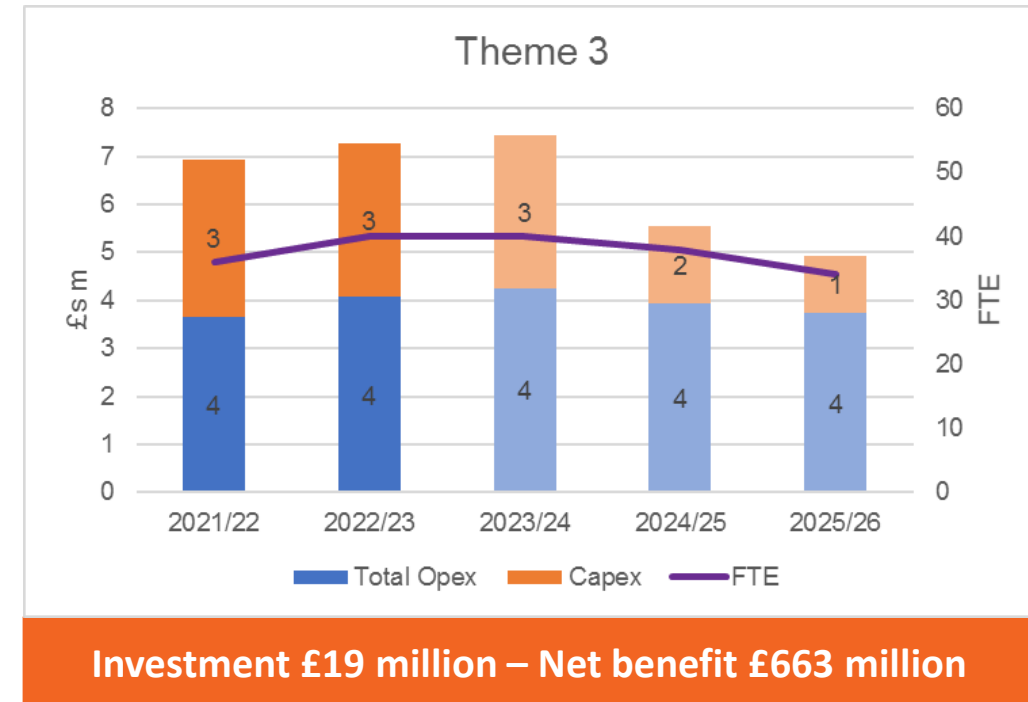
Theme 4: Driving towards a sustainable, whole-energy future

- **Leading the debate** on decarbonisation of the GB energy industry, harnessing our significant expertise to identify ways to achieve the 2050 net zero target, and policy decisions that must be made

- Working more closely with Distribution Network Operators (DNOs) and Transmission Owners (TOs) to **streamline the connection process**, so that parties can take a more efficient, whole electricity system view

- Defining innovative ways to a**chieve zero-carbon, whole electricity system operability**, working with DNOs

- **Developing a whole electricity system approach** to accessing networks, therefore tackling an area of significant consumer cost.

Investment £100 million – Net benefit £673 million
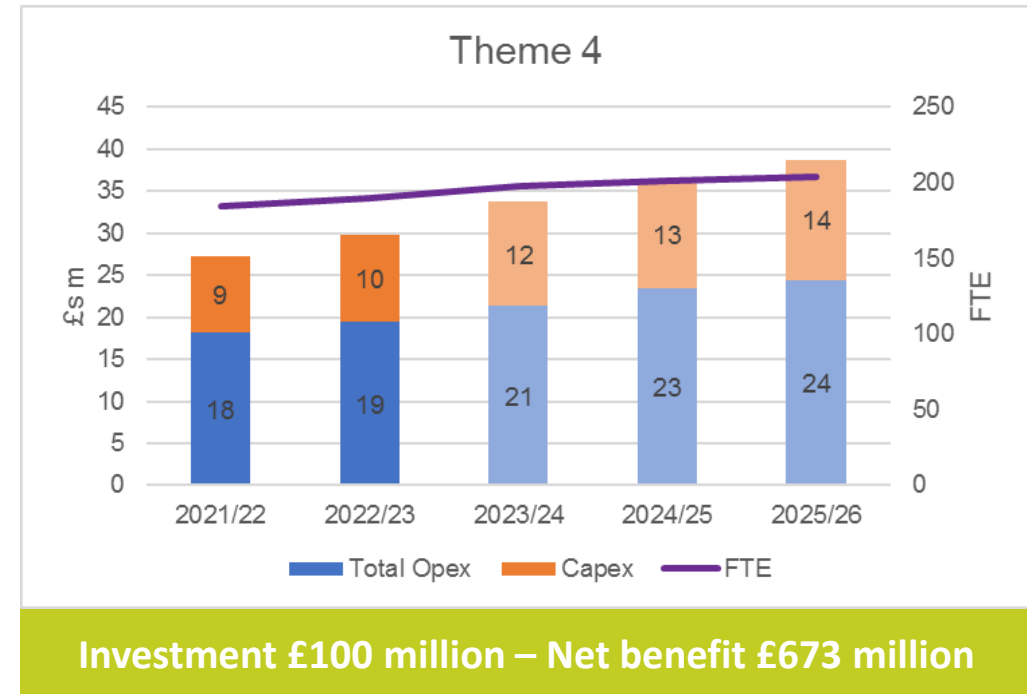
Digitalisation and open data

- **We will adopt Energy Data Task Force recommendations** including "presumed open"
  - Provide access to our data in machine-readable format through a data portal
  - Data sets will be prioritised based on stakeholder need and consumer value

- **We will digitalise our service offering** through investments that will transform the user experience of dealing with the ESO
  - Data portal, Single markets platform, Connections hub, Outage management, Digitalised Grid Code

- **We will digitalise our internal processes**, enhancing decision making, operational and market efficiency
  - Data platform transforming our operations and ability to implement change
  - Enhanced modelling and analysis across our activities

The Technology Advisory Council (TAC) will play a crucial role in helping us achieve our ambitions

- Stakeholders recognise that our business plan is **ambitious**, and want to help us deliver it

- In our RIIO-2 Business Plan, we committed to **continuing collaboration** with stakeholders to ensure the success of future system and technology developments

- **We propose to create a cross-sector Technology Advisory Council* for ESO transformation**

- At an overall level, the TAC will:

  1. Help set the strategic direction of the ESO transformation journey in systems (including process and technology) development
  2. Provide stakeholder input into the ESO transformation, ensuring the changes we make reflect wider market needs.
  3. Bring transparency around our decision making and help the ESO communicate change externally in the appropriate manner. This will help stakeholders plan their own IT system changes, including those that will interface with the ESO.
  4. Ensure accountability from the ESO for delivering on its promises and proactively communicating changes.
  5. Allow us to consult and engage on the experience of interacting with the ESO and invite input into key design, development and testing phases of our solutions development. It will also provide transparency of the decision-making logic behind our systems.

* In our RIIO-2 Business Plan and associated stakeholder engagement, the group was called the Design Authority

ESO Stakeholder Engagement Groups

RIIO-2 Stakeholder Group (ERSG)

Purpose: Challenge, review and provide expert input into the ESO's RIIO-2 proposals and business plan. Monitor, challenge and input into the ESO's engagement programme with stakeholders.

Membership: Representative cross section of ESO's stakeholders

Chair: Charlotte Morgan

Technology Advisory Council (TAC)

Purpose: Challenge and help set the strategic direction of the ESO transformation journey in systems (including process and technology) development. Enhancing transparency and accountability to our delivery and decision making.

Membership: Cross section of stakeholders including Market Participants, IT Companies etc.

Chair: Vernon Everitt

Networks Stakeholder Group (ENSG)

Purpose: Help ensure that the ESO develops fair and transparent early competition and offshore coordination proposals that incorporate and balance feedback from all affected stakeholders.

Membership: Representative cross section of stakeholders of the offshore coordination and early competition projects

Chair: Fiona Woolf

Engineering Advisory Council (EAC)

Purpose: Provide peer review and challenge to engineering analysis and solutions and provide insight into international best practice and new innovations

Membership: Leading academics and international TSOs

Chair: TBD

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Proposed Technology Advisory Council structure

Strategic level

The strategic TAC will take the ambition from the ESO (and wider industry) and help set the requirements for solution development

Role	Benefits
Works with ESO to translate ambition and business direction into a technological and digital transformation strategy For system development, provide input into: ○ Product strategy ○ Product roadmap Verify user-journeys (created by ESO)	Ensures transformation strategy meets a wide range of market participant needs Provides expertise of those who have been through digital transformation Future proofs the strategy through cross-sector input

Technical levels

The technical level sits below the strategic level, overseeing design, testing and implementation.

Area	Role	Benefits
Requirements and design	Input into: • Understanding market participant requirements • Ensuring tools meet market participant requirements Attachment and hand-over points.	Guides prioritisation of response to user requirements Allows trade-offs to be considered in an open, transparent forum
Development and testing	Oversee development of product and associated market processes (eg data transfers) Advises on proof-of-concept, simulation, testing and trialling in-beta.	Provides independent technical guidance Provides stakeholder scrutiny and transparency
Implementation	Oversee implementation Incorporate best practice from external organisations that have been through the digital transformation Input into lessons learned Assess value for money / input into formal performance evaluation.	Independent scrutiny of implementation and progress transparency Provide expertise on how to implement significant change into the business Ensures learnings are captured and feed into future product development

Annex 3

Links to further information and recommended reading

Links to further information

Document Title	Link
National Grid website	https://www.nationalgrid.com/
ESO website	https://www.nationalgrideso.com/
FES in 5	https://online.flippingbook.com/view/621114/ **(Recommended reading)**
ESO Forward Plan	https://www.nationalgrideso.com/document/173131/download
RIIO-2 Business Plan	Website: https://www.nationalgrideso.com/our-strategy/riio/riio-2-final-business-plan Executive Summary: https://www.nationalgrideso.com/document/158041/download **(Recommended reading)** Business Plan: https://www.nationalgrideso.com/document/158051/download CBA report: https://www.nationalgrideso.com/document/158061/download Stakeholder report: https://www.nationalgrideso.com/document/158066/download Technology annex: https://www.nationalgrideso.com/document/158071/download
ESO RIIO-2 Stakeholder Group Report on ESO RIIO-2 Business Plan	https://www.nationalgrideso.com/document/159491/download
Ofgem Challenge Group report on RIIO-2 Business Plans	https://www.ofgem.gov.uk/system/files/docs/2020/01/riio-2_challenge_group_independent_report_for_ofgem_on_riio-2_business_plans.pdf
ESO Digitalisation Strategy	https://www.nationalgrideso.com/document/157931/download **(Recommended reading)**
Final Determinations	Website: https://www.ofgem.gov.uk/publications-and-updates/riio-2-final-determinations-transmission-and-gas-distribution-network-companies-and-electricity-system-operator ESO Final Determinations: https://www.ofgem.gov.uk/system/files/docs/2020/12/final_determinations_-_eso_annex_.pdf
ESO RIIO-2 Delivery Schedule Balancing Roadmap Network Control Roadmap	ESO RIIO-2 Delivery Schedule – see MS Teams site Balancing and Network Roadmap – see above slides

We will store this information in a Microsoft Teams site that everyone can access

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