



Scottish & Southern  
Electricity Networks

TRANSMISSION

# Commercial connections, innovation and whole system

Stakeholder engagement event  
26<sup>th</sup> February 2019

# Safety Moment

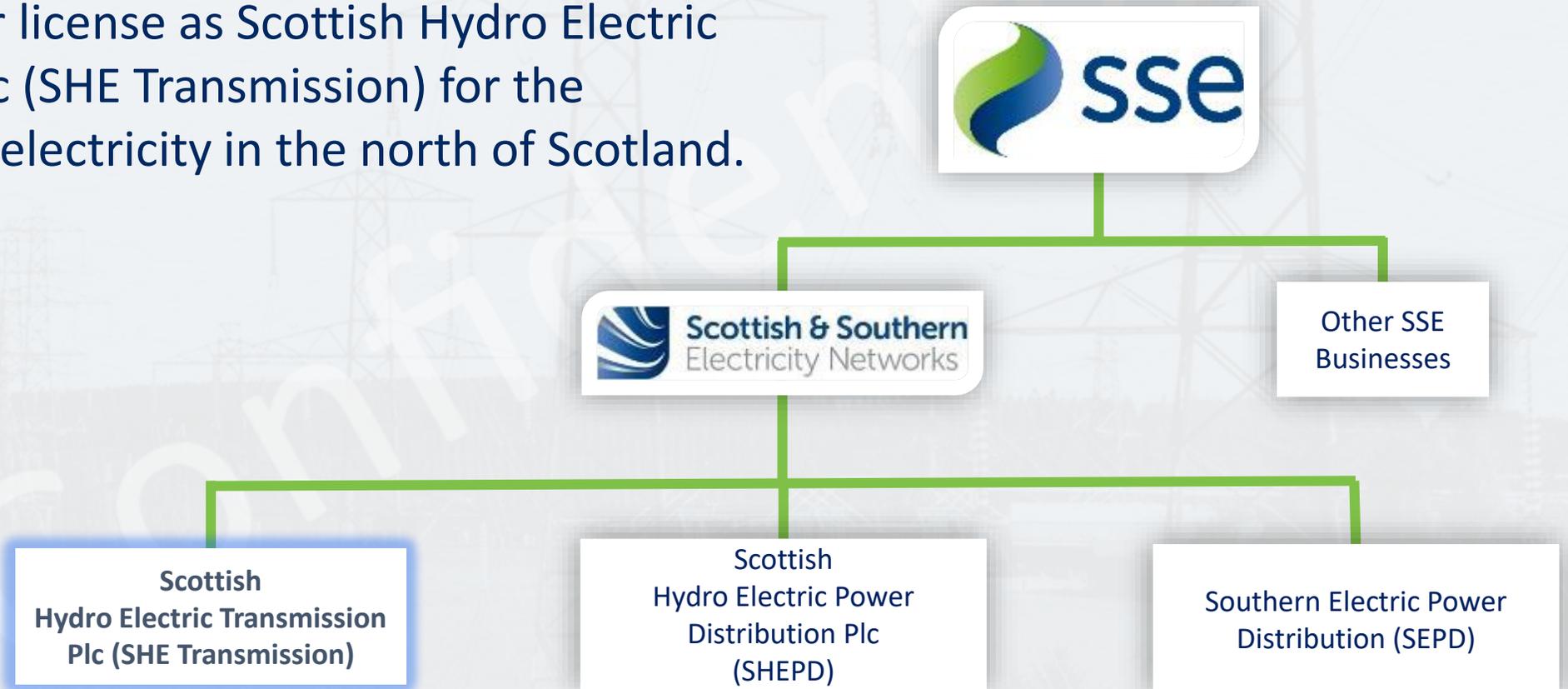
Do we really look after ourselves and others at work?

Do you recognise any of these scenarios

- Walking past a hazard because you are late for a meeting?
- Driving too close and too fast on company business?
- Ignoring a colleague who seems to be struggling because we don't have the time to stop and chat?
- Carrying our work without the correct amount of planning and communication
- 'making do' with the wrong tool or item of equipment?
- Cutting corners to get the job done?

# Who are we...

We are Scottish and Southern Electricity Networks, operating under license as Scottish Hydro Electric Transmission Plc (SHE Transmission) for the transmission of electricity in the north of Scotland.



# What is RIIO-T2?

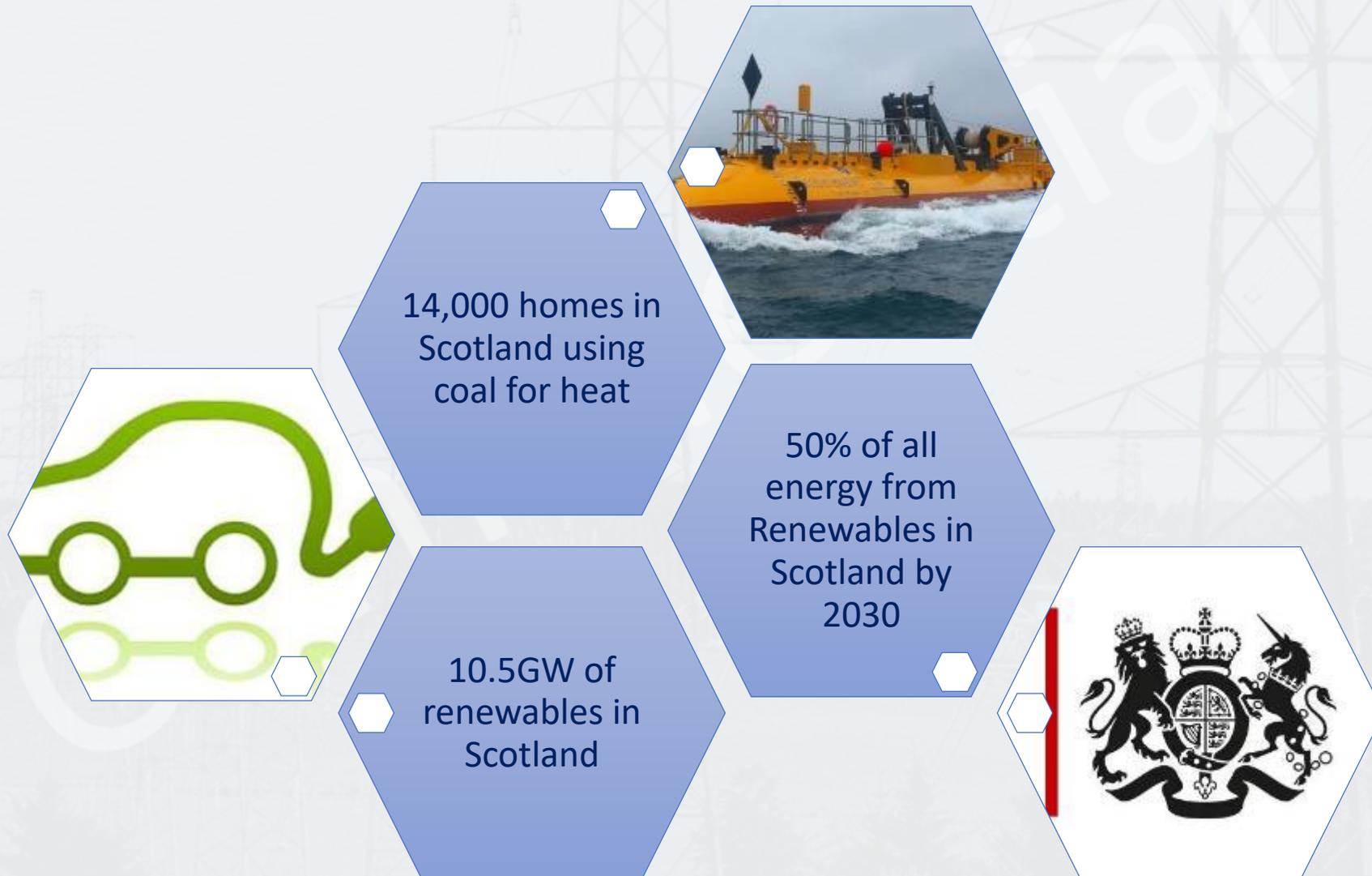
Network  
Regulation  
The RIIO model

## RIIO

(**R**evenue = **I**ncentive + **I**nnovation + **O**utputs)

is Ofgem's performance-based framework to set the price controls for Network Operators in the UK.

# Changing Energy Landscape



# SHE Transmission's Strategic Themes

## Safe and Secure Network Operation



Use data efficiently to understand, predict and get the best network performance

## Sector-leading Efficiency



Integrated approach to whole life development and operation, using risk-based engineering to deliver value

## Stakeholder-led Strategy



Taking a whole system approach to network operation and development to meet current and future customers' needs

## Leadership in Sustainability



Trusted partner of customers and communities, realising long term benefit for society, economy and environment

# RIIO-T2 DELIVERY PROGRAMME

Below is a timeline of how the project will run.

SHE Transmission Business Plan Development **July 2017 - Q4 2019**



The timeline is correct as of August 2018 and is subject to change. For further information please visit [www.ssen-transmission.co.uk](http://www.ssen-transmission.co.uk)



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# Customer Connections

Lauren Logan, Commercial Policy Manager

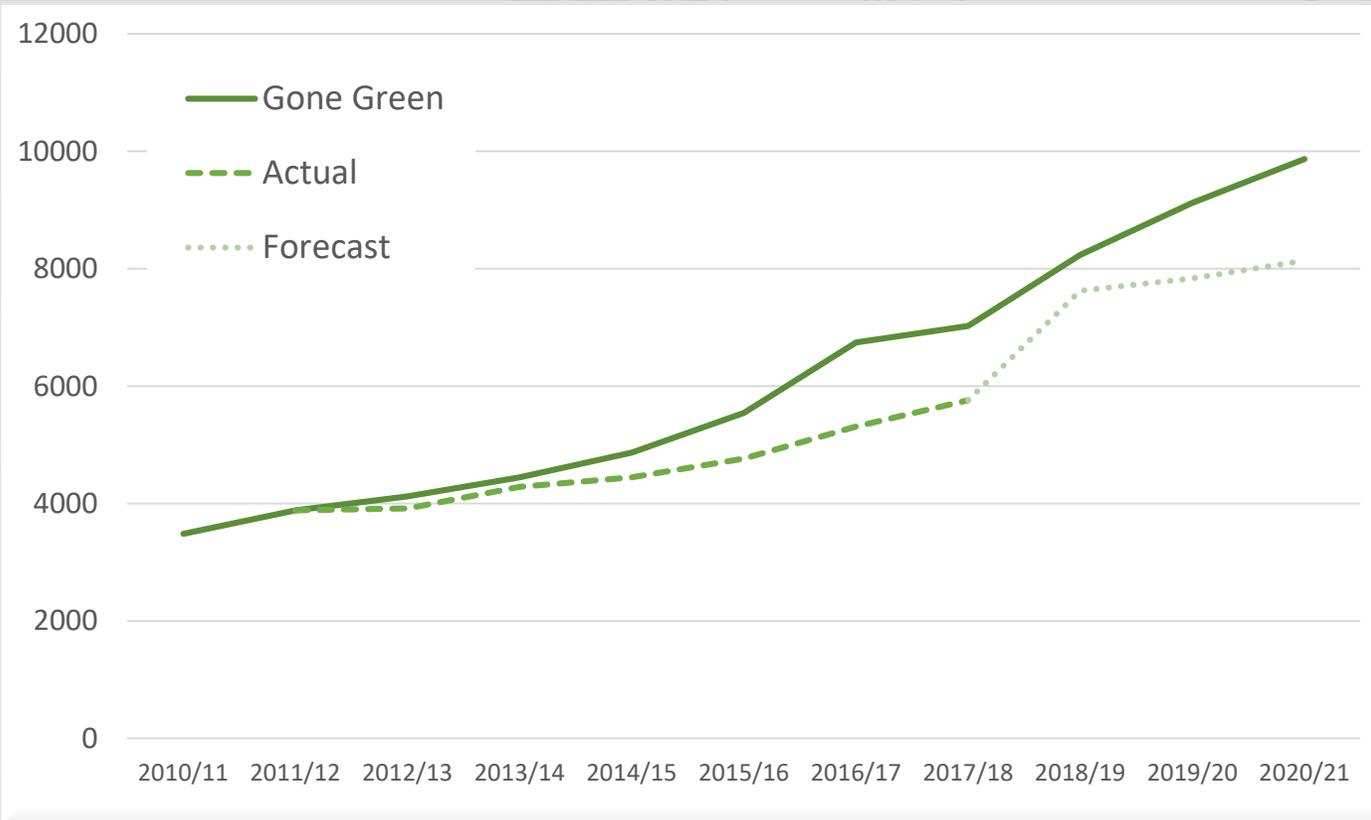
# Objective for today

Feedback from stakeholders to understand what matters to our existing and future customers during each stage of the customer journey.

- Success during RIIO-T1
- Our Ambition for RIIO-T2
- What does this mean for you?
- Your Feedback

# Since 2010:

- More than double the MW of generation connected
  - Now supports more than 6GW of renewables
- Track record for “on time” delivery
- Reported customer satisfaction >95%



# Connections Process focus during RIIO-T1

## Process for Direct Connections

### Transmission Connection Process



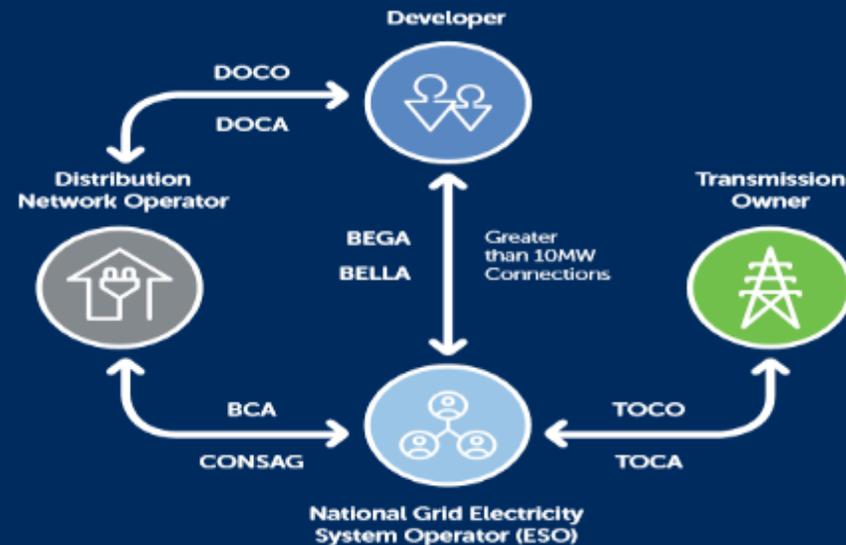
**BCA** Bilateral Connection Agreement  
**CONSAG** Construction Agreement

**TOCO** Transmission Owner Construction Offer  
**TOCA** Transmission Owner Construction Agreement



## Process for Embedded Connections

### Relationship for Embedded Connections



**DOCO** Distribution Owner Connection Offer  
**DOCA** Distribution Owner Connection Agreement  
**BCA** Bilateral Connection Agreement  
**CONSAG** Construction Agreement  
**BEGA** Bilateral Embedded Generation Agreement  
**BELLA** Bilateral Embedded License Exemptible Generation Agreement  
**TOCO** Transmission Owner Construction Offer  
**TOCA** Transmission Owner Construction Agreement

# Connections Process focus during RIIO-T1

Early Engagement



Pre-Application Meetings

Flexible Solutions



Bhlaraidh Wind Farm Connection

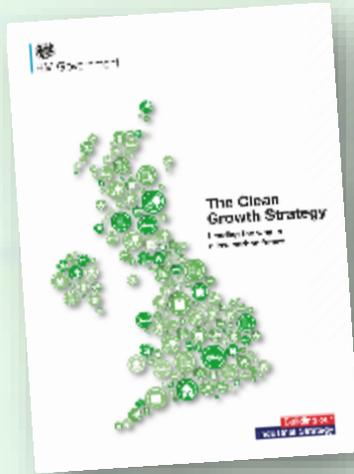
Commercial Innovation



Orkney Alternative Approach

# LOOKING AHEAD TO RIIO-T2

NATIONAL POLICY

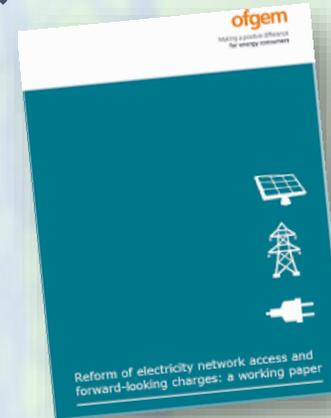


NEW CONNECTIONS

AFFORDABLE  
BESPOKE  
OPTIMISE  
COLLABORATIVE

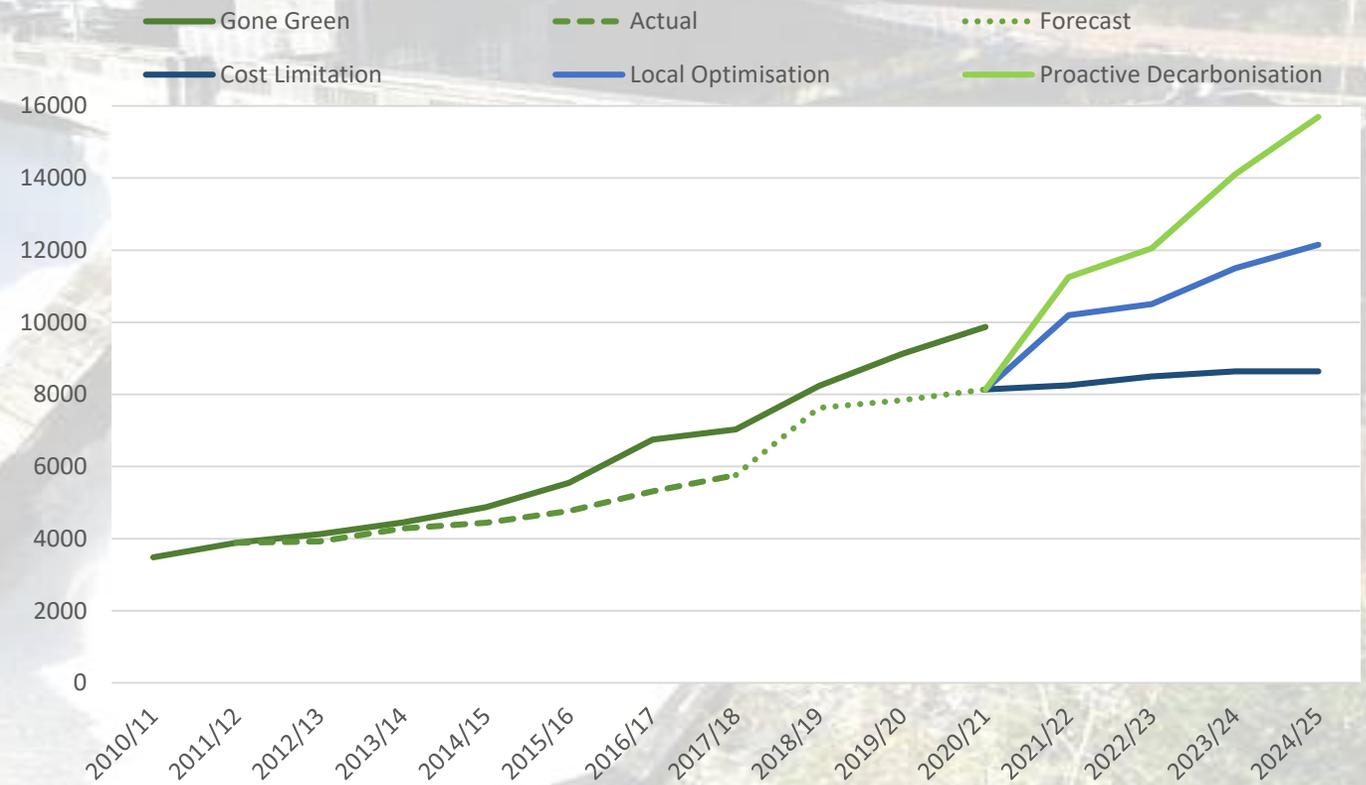
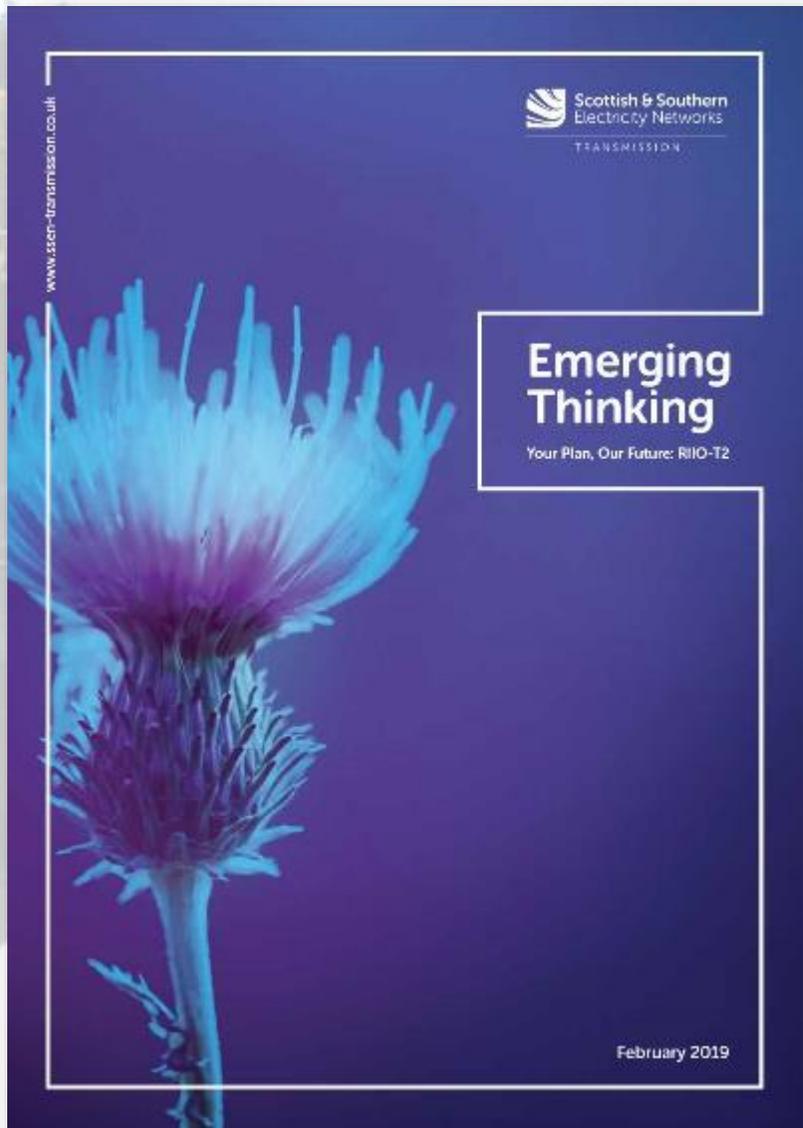
EVERYONE

INDUSTRY CHANGE



# EMERGING THINKING

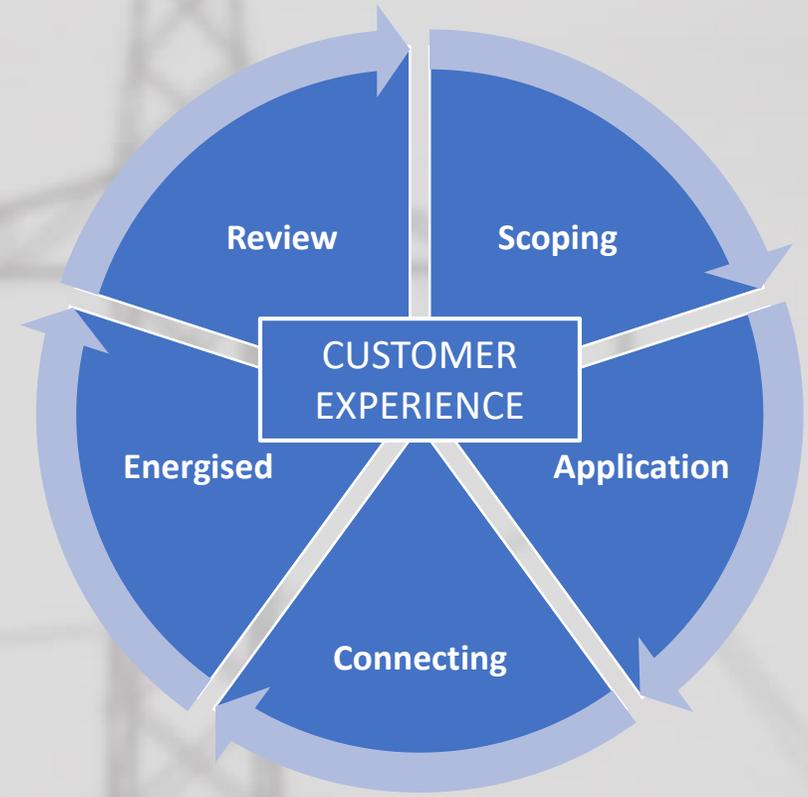
*The north of Scotland is essential to enabling a sustainable GB energy system*



# PROPOSED AMBITION

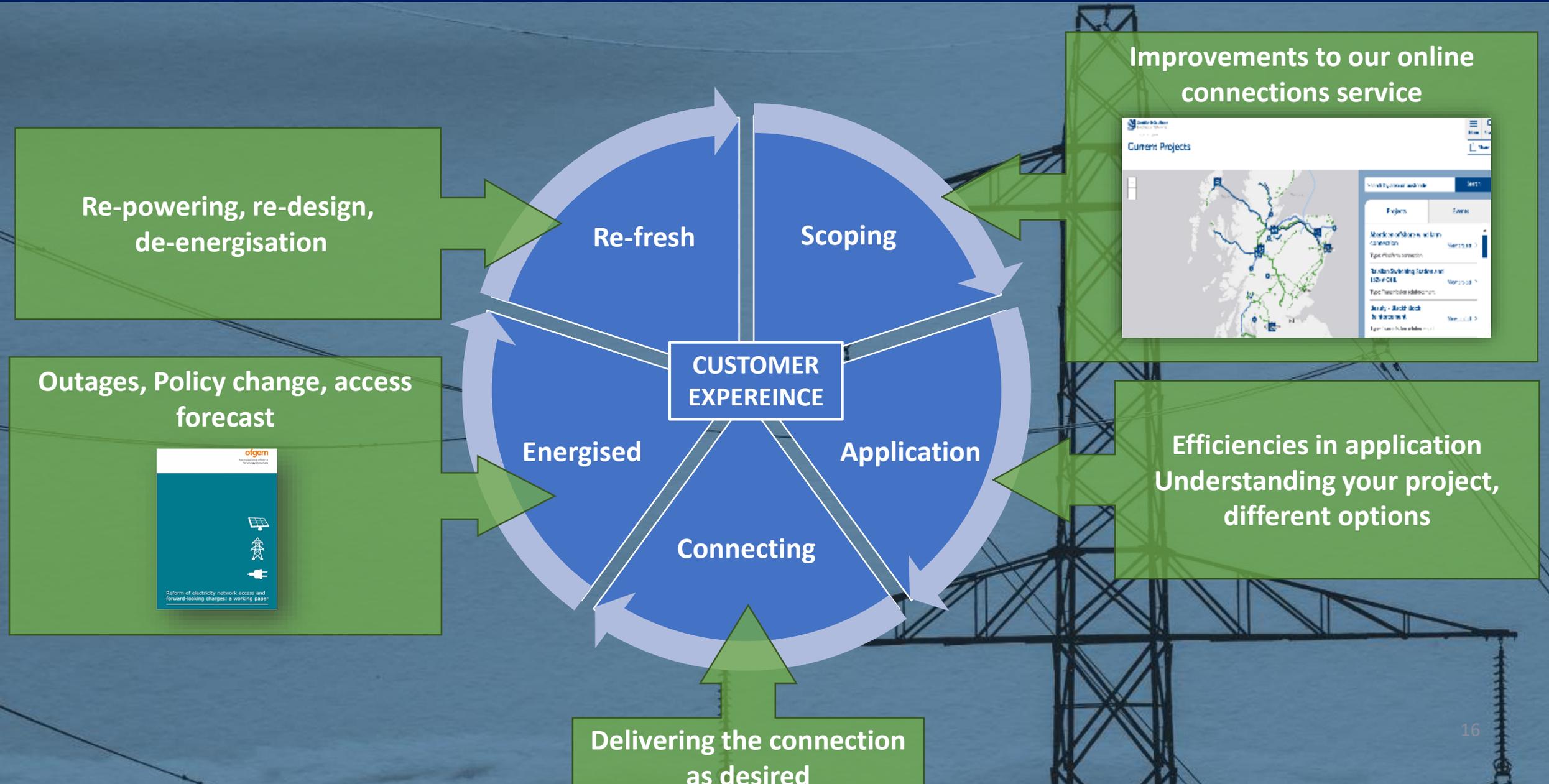
Provide tailored solutions and services for all our connection customers, that are also optimal for the wider GB energy consumer

- 1. Tailored customer services and products for our existing and future customers:** from project scoping to re-powering we aim to provide the services and products that matter to our customers today and in the future throughout the lifecycle and duration of their connection with us
- 2. Optimal connection solutions:** we will work with our customers to ensure that the **tailored** connection solution is optimal for their unique project economics and timescales, whilst ensuring that it is also the optimal solution for the wider network and GB consumer
- 3. Accessible connections process:** your connection experience should be simple, transparent, efficient and fit for the future



Our ambition applies to each step of the customer experience from pre-application to post-energisation

# Evolving Connections Process



# Connections Ambition

1. Tailored Connection service
2. Optimal Connection solution
3. Accessible Process

Measure connections success based on stakeholder feedback



## STAKEHOLDER-LED STRATEGY

Taking a Whole System approach to network operation and development to meet current and future customers' needs



## SAFE AND SECURE NETWORK OPERATION

Use data efficiently to understand, predict and get the best network performance

1. Tailored Connections service
2. Optimal Connections solution
3. Accessible Process

## CONNECTIONS OPPORTUNITIES

1. Tailored Connection service
2. Optimal Connection solution
3. Accessible Process

Measure connections success based on stakeholder feedback



## LEADERSHIP IN SUSTAINABILITY

Trusted partner of customers and communities, realising long term benefit for society, economy and environment



## SECTOR LEADING EFFICIENCY

Integrated approach to whole life development and operation, using risk-based engineering to deliver value

1. Tailored Connection service
2. Optimal Connection solution
3. Accessible Process

Measure connections success based on stakeholder feedback

# Ambition to keep improving the customer journey

Thank you for your valuable feedback but it doesn't stop here ....

- As part of RIIO-T2 we won't only deliver solutions and services for our existing and future connection customers on feedback from the customers of today
- To ensure our services and solutions remain optimal we will keep our plans to deliver optimal services up to date based on customer feedback and industry change

We will **commit to measuring the success** of our ambition for RIIO-T2 throughout the duration of our next price control through customer feedback

How will this success be measured? We want to know which parts of the customer journey matter to you so we can ensure we keep delivering



# What do you think of our ambition for RIIO-T2

## **Project Scoping**

- *What information and engagement (with us and other parties) would help you reach the application stage?*

## **Application**

- *What service could we provide to make the application process more efficient for you?*
- *What services could we provide to ensure the connection solution works for you?*

## **Connecting**

- *What could we do to make sure your connection solution is delivered as desired?*

## **Energised**

- *Once your energised we want to ensure our service continues, what services can we provide to ensure your project remains connected economically?*

## **Re-fresh**

- *Thinking of re-powering or re-designing? What can we do to ensure your project remains efficient and economic?*

## **Feedback**

- *We want to keep delivering for our customers throughout RIIO-T2, what parts of the connections customer journey would you like us to be measured on?*



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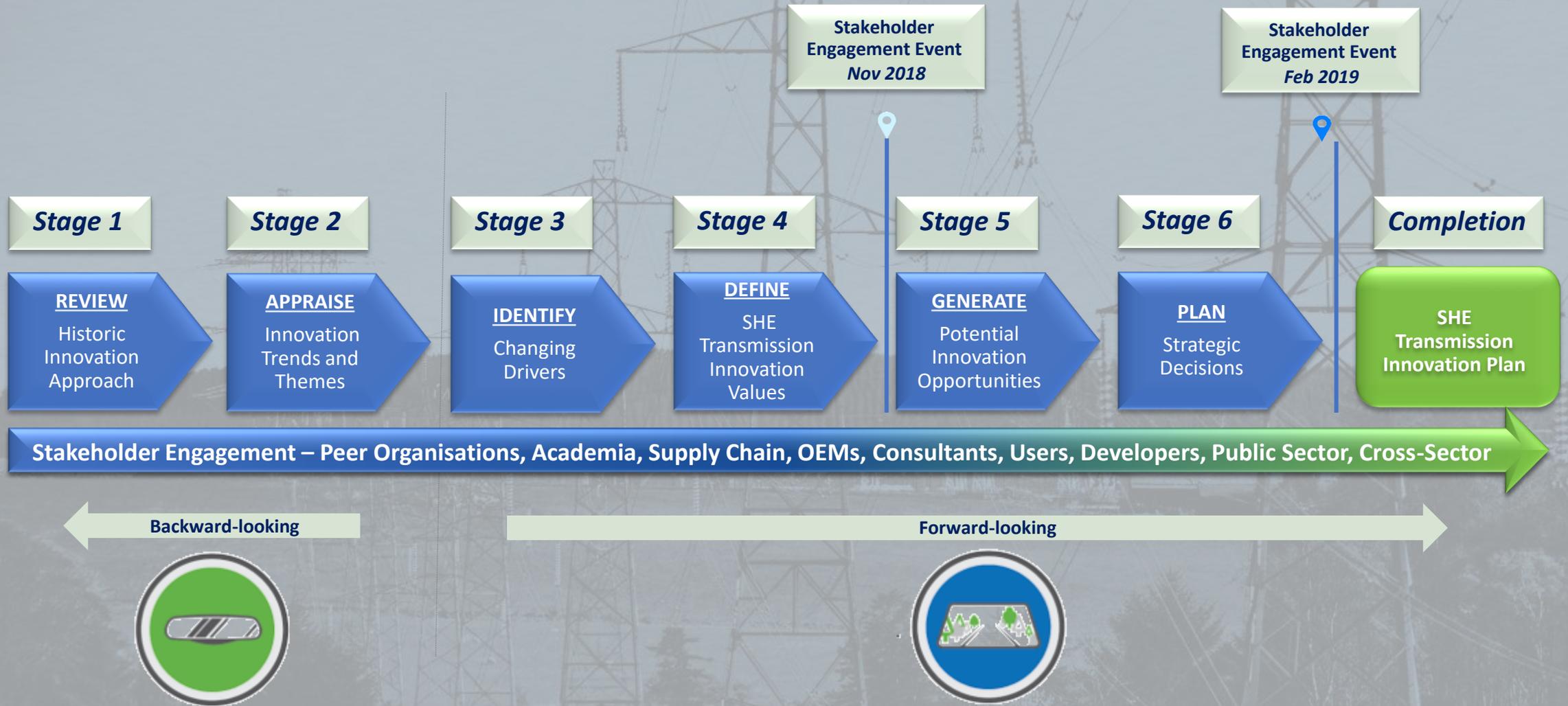
# Innovation

Andrew Urquhart, Commercial and Innovation Manager

# Overview

- Innovation strategy development
- Objective and definition
- ‘You said . . . .’ ‘we did . . . .’
- Innovation framework
- Focus areas

# Innovation Strategy Development



# SHE Transmission Innovation Objective and Definition

## Objective

*we aim to **support** the transition towards a clean energy economy, whilst maintaining high levels of reliability in electricity supply and ensuring energy remains affordable for all.*

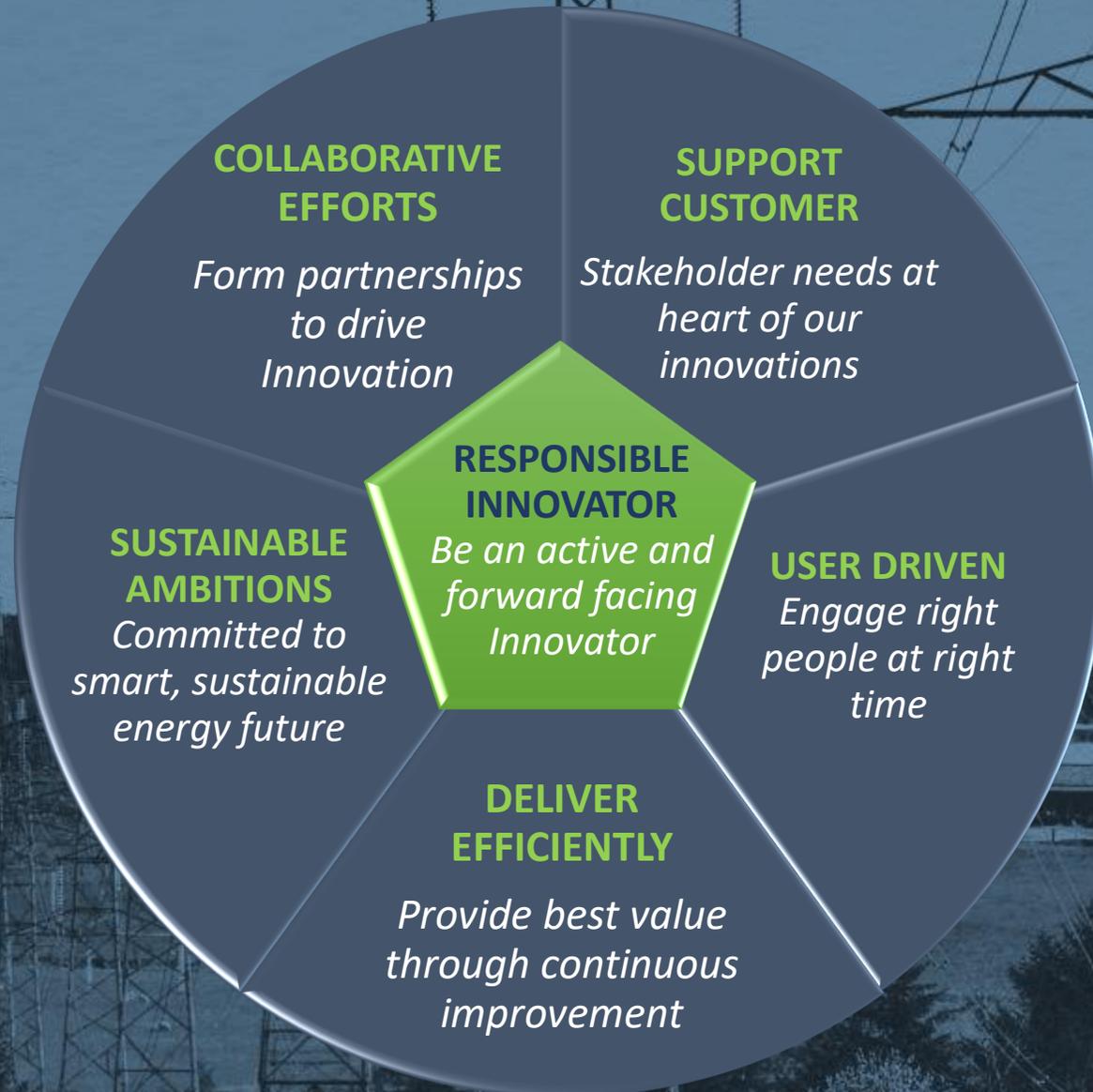
## Definition

*Identifying and proving new **ways of working** for the **long-term benefit** of our Customers, our Stakeholders and Ourselves*

# Stakeholder Event 28<sup>th</sup> November 2018 Feedback

You said . . . .	We did . . . .
<ul style="list-style-type: none"><li>• SHE Transmission need to innovate and it was generally felt that the transition to low carbon future was the right focus</li></ul>	<ul style="list-style-type: none"><li>✓ Continued to build on strategic company objective</li></ul>
<ul style="list-style-type: none"><li>• Broad support for the proposed innovation values</li></ul>	<ul style="list-style-type: none"><li>✓ Finalised proposed innovation framework</li></ul>
<ul style="list-style-type: none"><li>• Support for more collaborative working with 3<sup>rd</sup> parties including supply chain</li></ul>	<ul style="list-style-type: none"><li>✓ Refined people focused theme to reflect better needs of users and wider stakeholders</li></ul>
<ul style="list-style-type: none"><li>• Fast pace of technological change poses risk so SHE T should ensure customer money is spent wisely</li></ul>	<ul style="list-style-type: none"><li>✓ Started piece of work to develop CBA methodology that uses Ofgem CBA to ensure value for money</li></ul>
<ul style="list-style-type: none"><li>• SHE T should do more to ensure innovation is a core value that permeates through the company</li></ul>	<ul style="list-style-type: none"><li>✓ Implementation plan refined to include instilling innovation culture with necessary structure and resources in place to deliver</li></ul>

# Innovation Framework



# Innovation Strategic Themes

- Customer Engagement
- Commercial Evolution
- Whole System Design Approach
- Energy System Transition
- Facilitating Connections
- Using Network Flexibility in Connections



## STAKEHOLDER-LED STRATEGY

Taking a Whole System approach to network operation and development to meet current and future customers' needs



## SAFE AND SECURE NETWORK OPERATION

Use data efficiently to understand, predict and get the best network performance

- Network Planning
- Data Driven Network Development
- Asset/System Management Security and Resilience
- Smart Asset Management
- Network Operations and Control System
- System Monitoring and Performance

## CONNECTIONS OPPORTUNITIES

- Supporting Thriving Communities
- Connecting for Society
- Promoting Natural Environment
- Mitigating Climate Change
- Growing Careers
- Optimising Resources



## LEADERSHIP IN SUSTAINABILITY

Trusted partner of customers and communities, realising long term benefit for society, economy and environment



## SECTOR LEADING EFFICIENCY

Integrated approach to whole life development and operation, using risk-based engineering to deliver value

- Transformational Health and Safety
- Procurement Policy
- New Technologies
- Modernised Approaches
- Transparent and Robust Decision Making
- Efficient Project Delivery

# Focus Areas



## **STAKEHOLDER-LED STRATEGY**

Taking a Whole System approach to network operation and development to meet current and future customers' needs

- **Customer Engagement**
- **Commercial Evolution**
- **Whole System Design Approach**
- **Energy System Transition**
- **Facilitating Connections**
- **Using Network Flexibility in Connections**

# Focus Areas



## **SAFE AND SECURE NETWORK OPERATION**

Use data efficiently to understand, predict and get the best network performance

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# Focus Areas



## **SECTOR LEADING EFFICIENCY**

Integrated approach  
to whole life  
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- **Transformational Health and Safety**
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# Focus Areas



## **LEADERSHIP IN SUSTAINABILITY**

Trusted partner of  
customers and  
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- **Supporting Thriving Communities**
- **Connecting for Society**
- **Promoting Natural Environment**
- **Mitigating Climate Change**
- **Growing Careers**
- **Optimising Resources**



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# Whole System Bless Kuri, System Planning

# Whole System: definition



Adopting a whole system approach to system planning, development, operation and maintenance to maximise consumer benefits and support decarbonisation



# Overview

- Definition
- Learning by doing
- Approach to whole system
- Delivering whole system

# The energy landscape is changing



Increase in low carbon generation

Increase in distributed energy resources

New technologies emerging

New technology costs falling

Delivering secure, affordable and clean energy

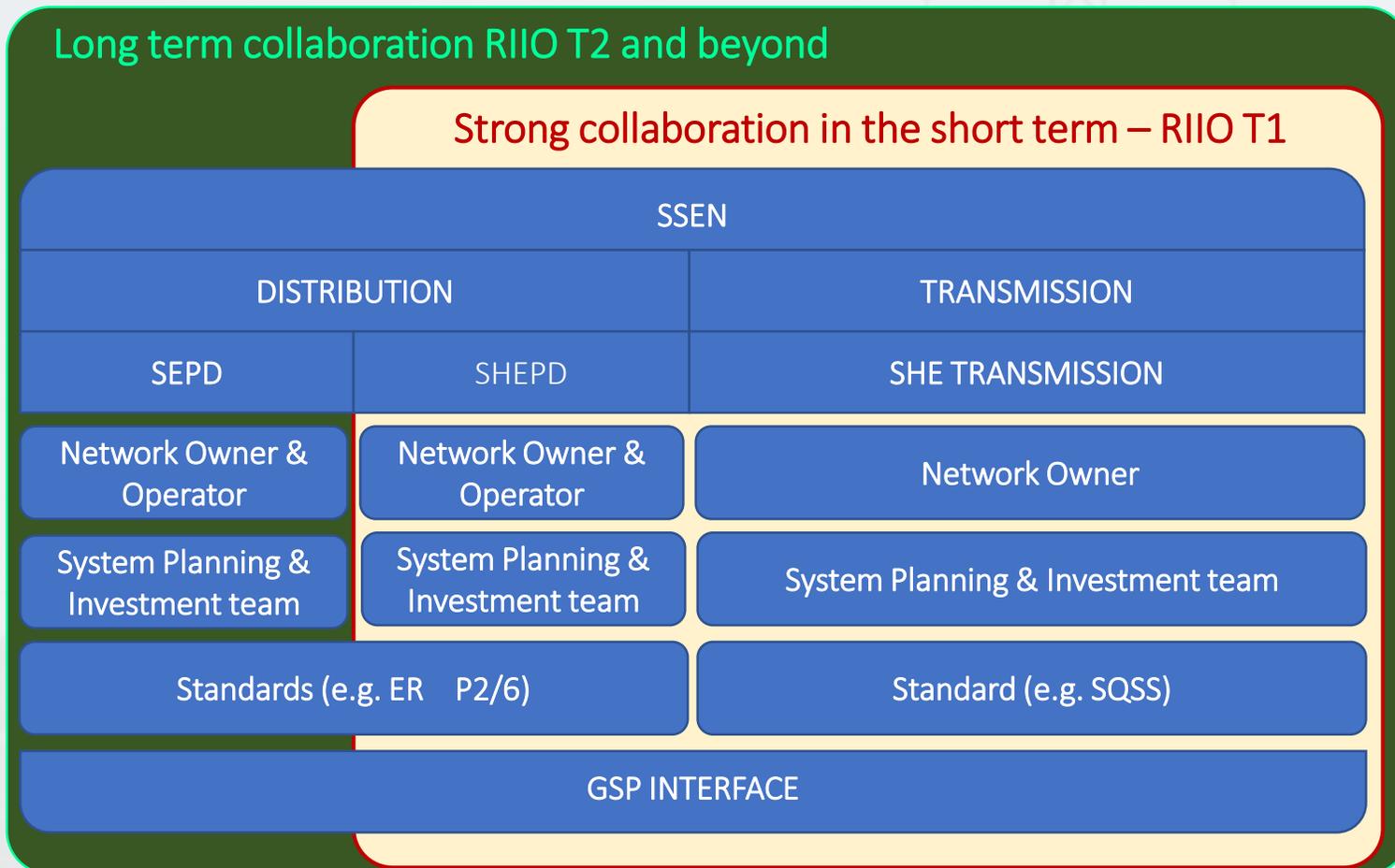
Markets to support flexibility

Networks to support flexibility

# Whole system – Direction of travel

Level	Purpose	Barriers	Aspiration
<b>Baseline</b>	To discharge existing licence obligations	None – sufficient provision within regulatory framework to meet licence obligations, however these do not adequately cover whole system	Embedded in BAU
<b>Beginner</b>	To explore whole system solutions within a single energy vector, e.g. Electricity T&D	Lack of whole system sector-specific industry frameworks to allow equitable participation of regulated and non-regulated entities	Within RIIO-T1 Exploratory and innovative work. by 2021/22
<b>Intermediate</b>	To explore whole system solutions within closely coupled energy vectors, e.g. Electricity and Gas T&D, Transport, Heat, etc.	Lack of whole system cross sector-specific industry frameworks and regulatory mechanisms	During RIIO-T2 Exploratory and innovative work – learning by trying. 2021/22 – 2025/26
<b>Advanced</b>	To explore whole system solutions beyond closely coupled energy vectors, and including wider societal impact	Lack of a national whole system framework and an understanding of how potential benefits compare with effort	Beyond RIIO-T2 Informed by learning from lower levels. Beyond 2025/26

# Learning and development from within



Transmission & Distribution (T&D) have different functions

- ✓ Different framework codes
- ✓ Different planning standards

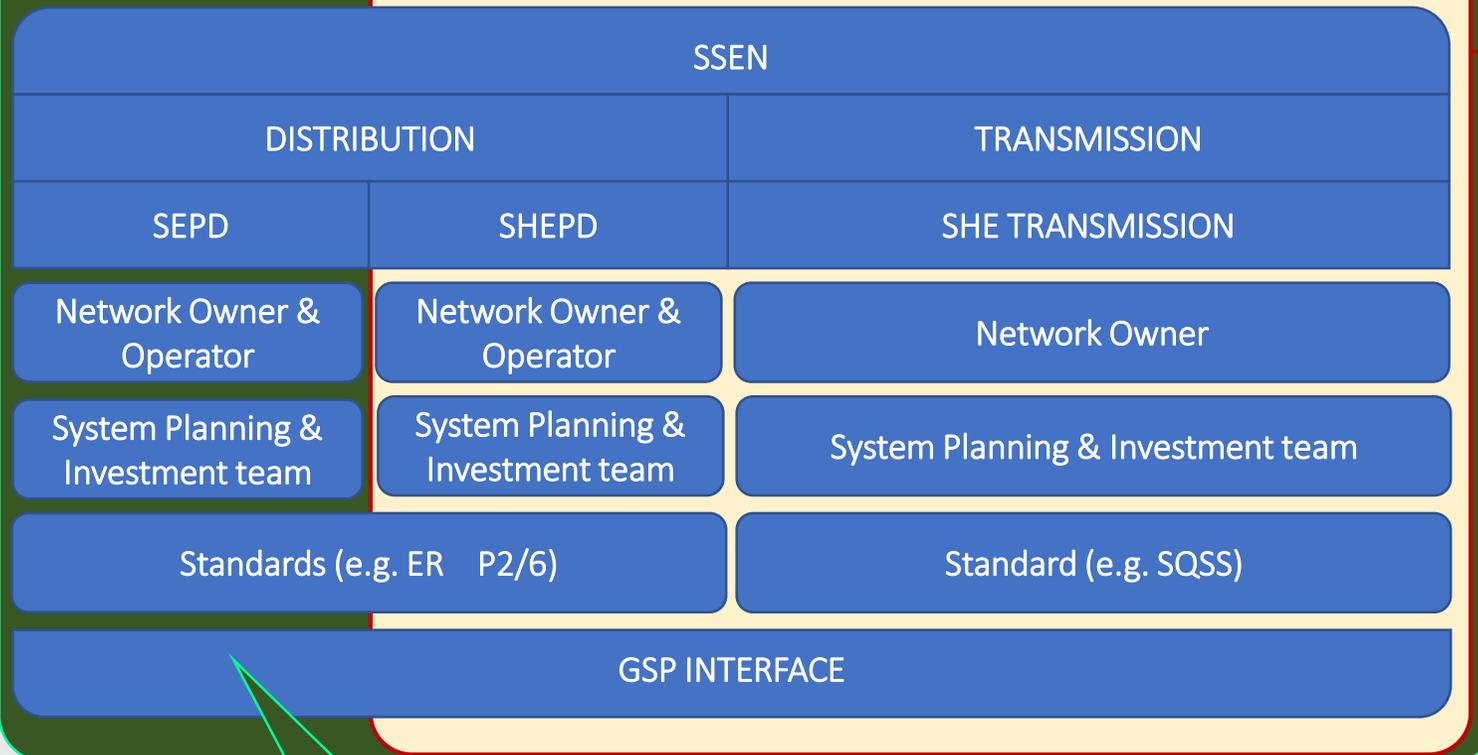
Opportunity for collaboration

- ✓ Vertical integration in the SSEN (T&D)
  - Office space & data sharing
  - Derogation allows efficiency of operations
- ✓ Common geographical area
  - Adjoined network
  - Customers and Stakeholders
  - Future energy landscape evolution

# Learning and development from within

## Long term collaboration RIIO T2 and beyond

### Strong collaboration in the short term – RIIO T1

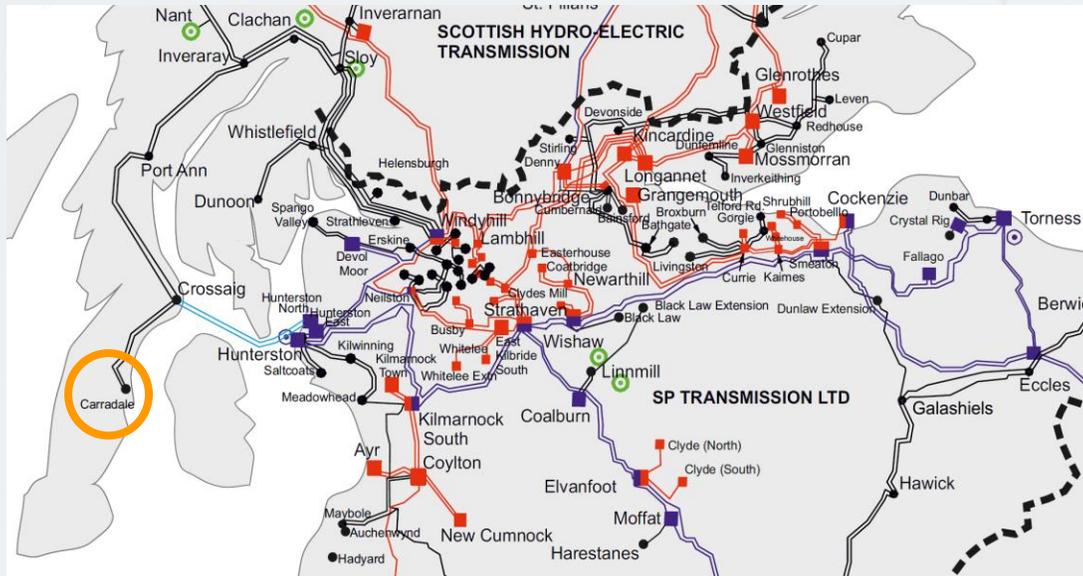


Immediate and greatest potential for planning and development of whole system solutions in the North of Scotland

### Opportunity for standardising whole system approach across SSEN North & South

- ✓ Accommodating different TO (NGET) in the South
- ✓ Industry wide whole system initiatives (ENA Open Networks) play an important role

# Current whole system planning activity



Carradale GSP

## Reinforcement driver

- Large embedded generators at Carradale GSP

## Conventional approach

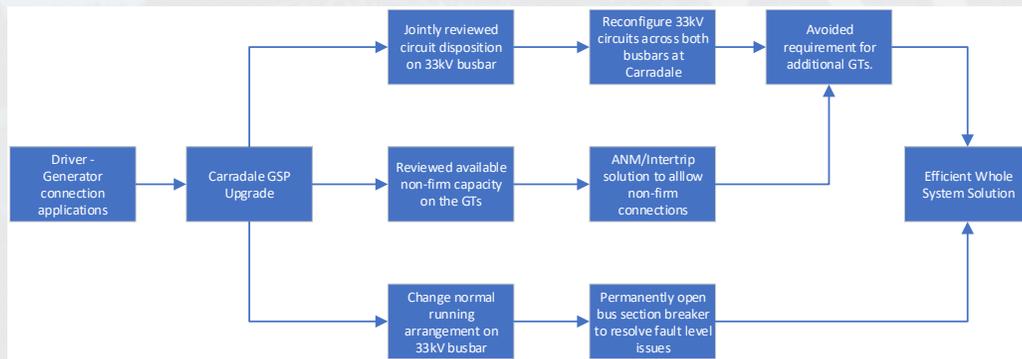
(System requirements addressed independently)

- Replace existing 2 x 90MVA Grid Transformers (GTs) and 2x60MVA GTs with 6 x 120MVA GTs

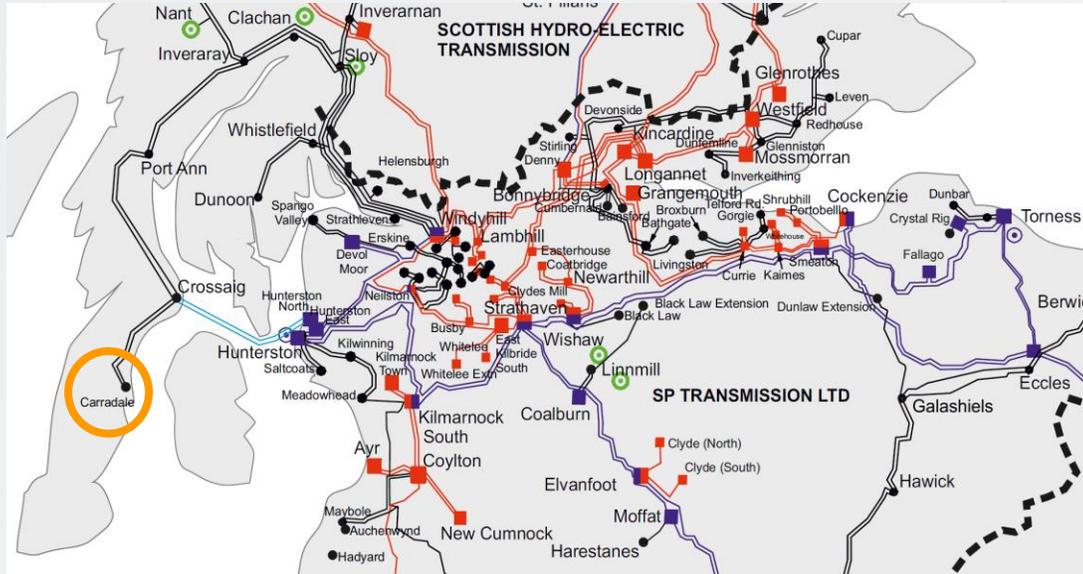
## Whole system approach

(System requirements addressed jointly)

- 4 x 120MVA GTs to replace existing GTs
- Modified running arrangement to resolve fault level issues
- Utilise non-firm capacity on the GTs to enable generation connection



# Current whole system planning activity



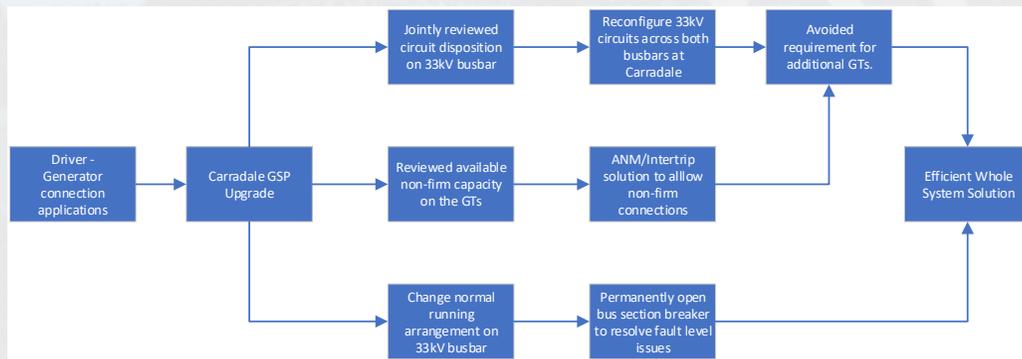
Carradale GSP

## Challenges

- Agreement on solution
- Responsibility and decision making
- Funding of solution exploration work
- Funding or solution
- Works required for future connections
- Increased works on either T or D side
- Sharing of information between T and D

## Benefits

- Defer high cost transmission works
- Maximise utilisation of assets
- Common T/D connection queue
- Efficient solution to reduce works
- Enable early generator connection
- Remove barriers to generation connection
- Coordinate with asset condition based works



# Approach to whole system

*“We should regard the boundaries that delineate one system from another as places of connection and exchange rather than barriers that separate or isolate.”*

*Daniel Christian Wahl*

- ✓ Understanding how developments in other systems impact our system requirements
- ✓ Collaborating with others to identify and develop whole system solutions.
- ✓ Recognising that we may reach dramatically different solutions
- ✓ Understanding the true potential benefits of whole system to inform the right level of proportional effort
- ✓ Innovation and review of planning and operational standards
- ✓ Focussing on the interrelationships rather than individual parts of the system

# Approach to whole system

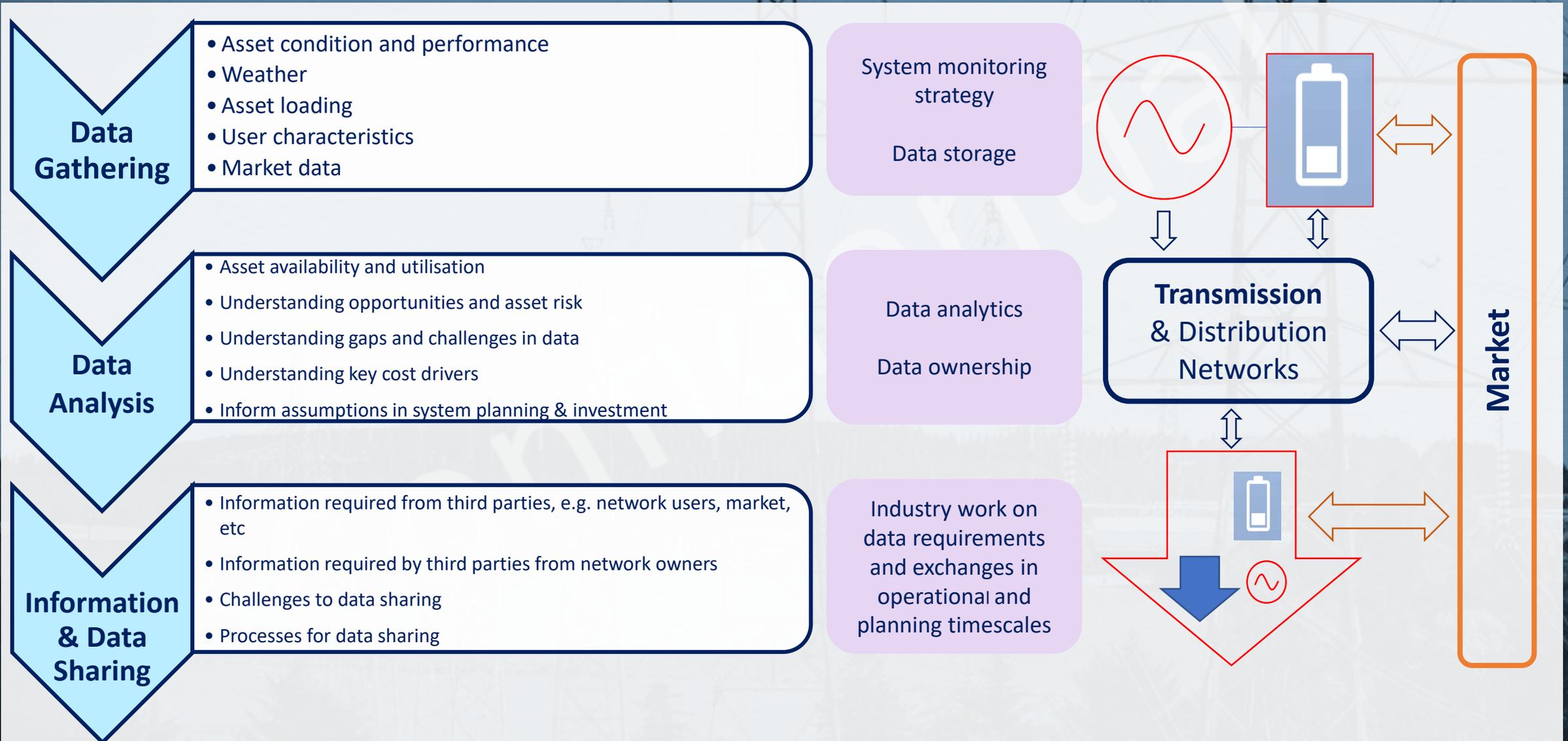
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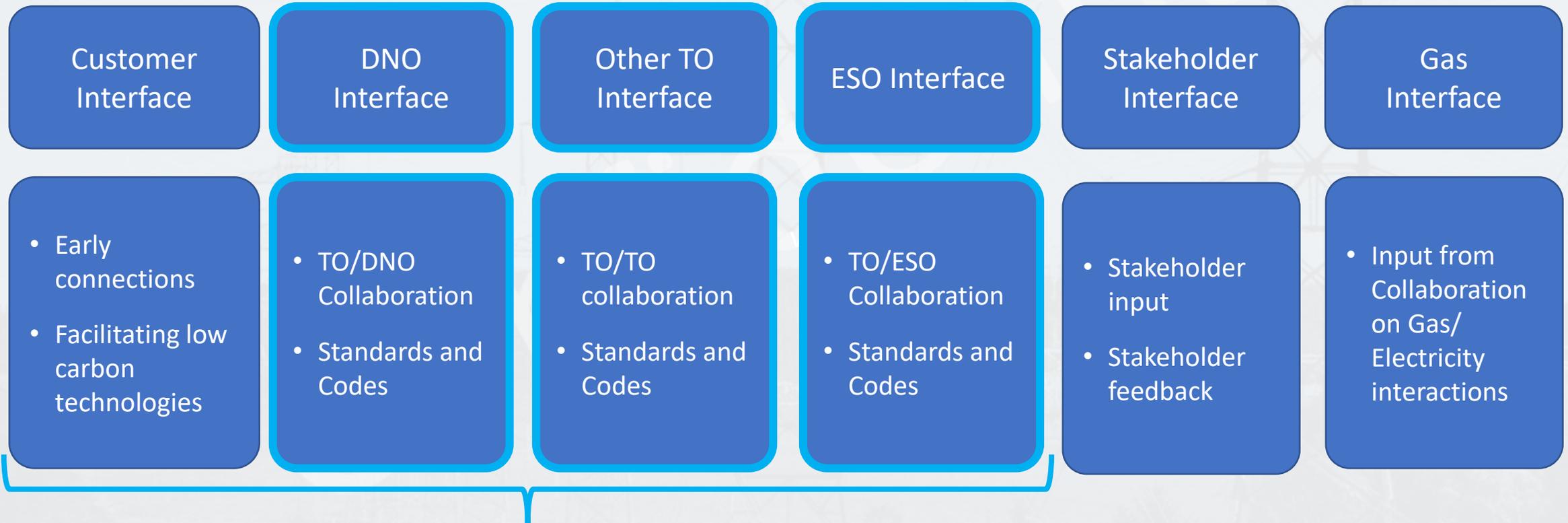
**Data  
Collaboration  
Focus areas**

# Data



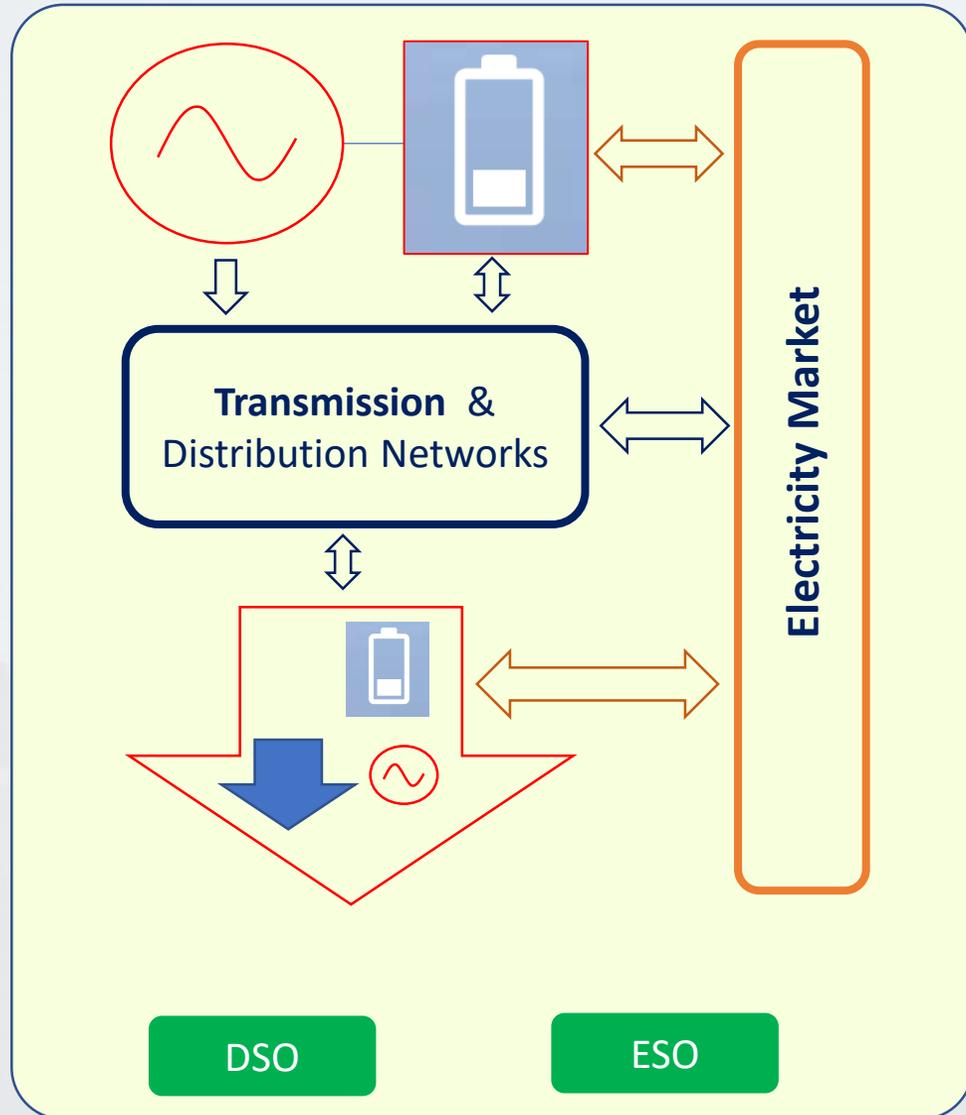
# Collaboration

Focusing on whole system areas where we can deliver best value for consumers. Work is ongoing to develop our understanding of potential benefits from these compared to the traditional approach.

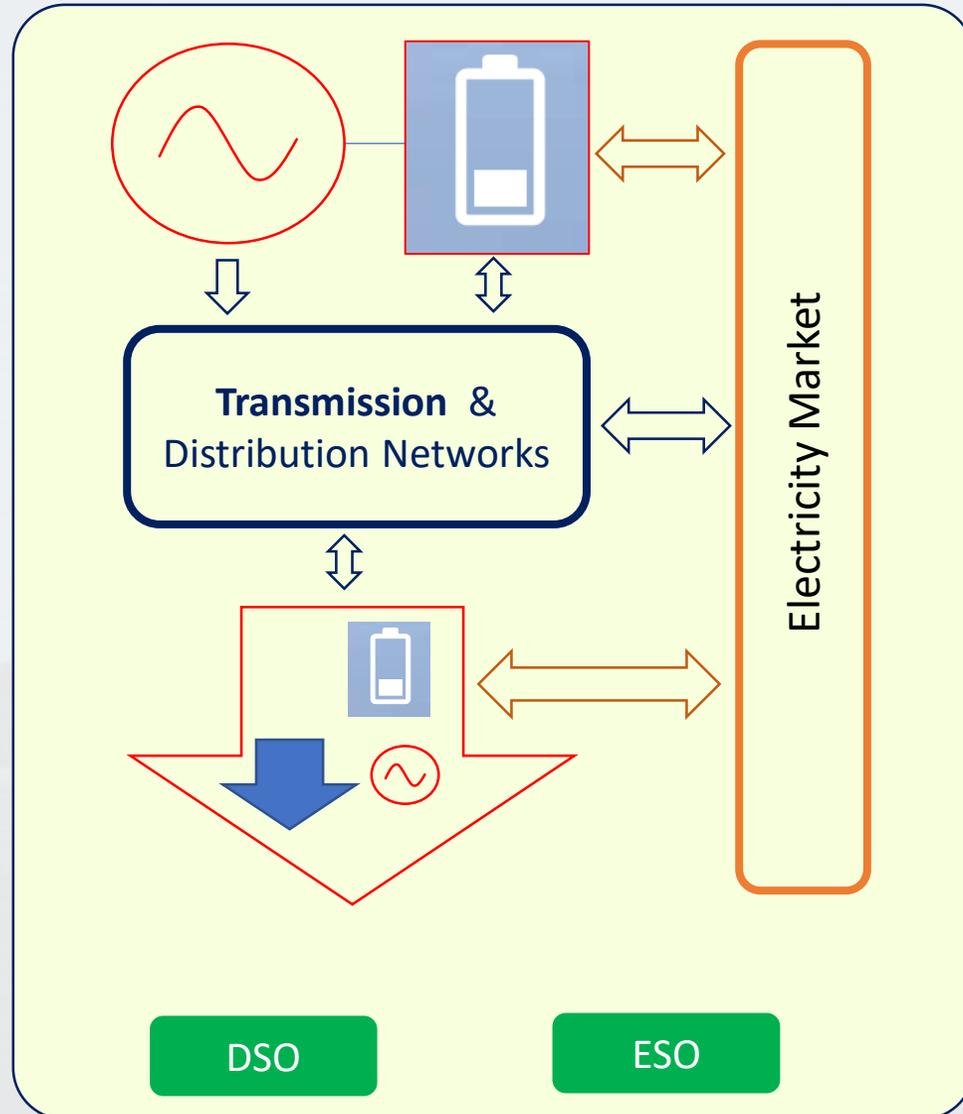


*Some existing codes cover this but improvements required  
Grid Code, STC, CUSC, DCODE, SQSS, BSC*

# Collaboration



# Areas of focus



INVESTMENT PROCESSES

NETWORK PLANNING

PLANNING STANDARDS

HANDLING UNCERTAINTY

COST BENEFIT ANALYSIS

DATA EXCHANGES

DSO – TO

ESO – TO

DNO – TO



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**Thank you!**