Scottish & Southern Electricity Networks

TRANSMISSION

Your Plan, Our Future: RIIO-T2

www.ssen-transmission.co.uk

RIIO-T2 STAKEHOLDER WORKSHOP

28 November 2018

Housekeeping

Safety Moment

Phones and IT

Venue and Hospitality

Reflections on 2018

RECAP

Stakeholder Workshop

8 March 2018

How we engage with stakeholders …

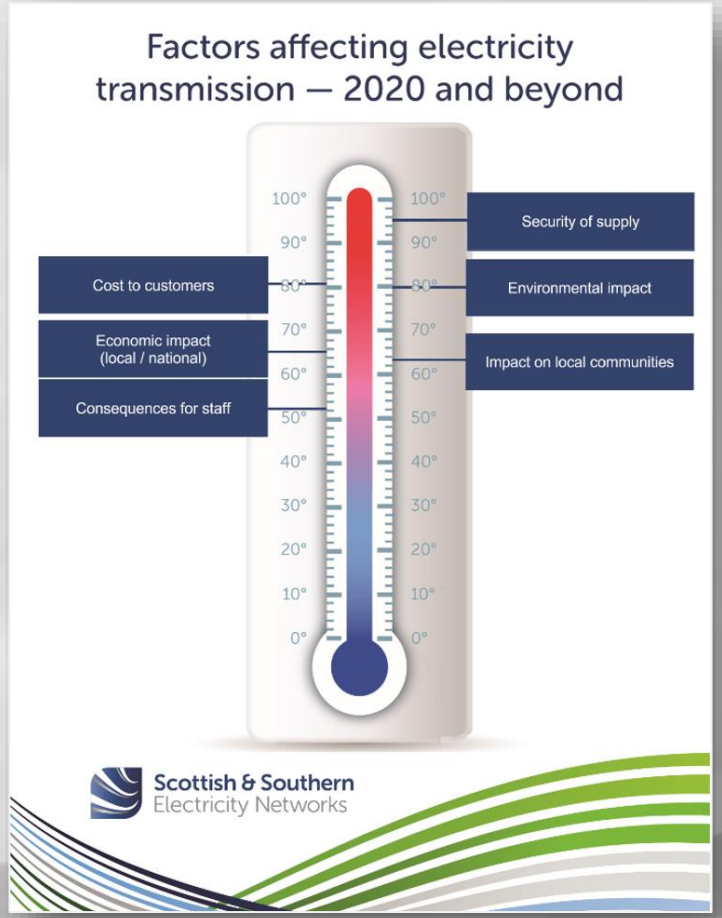
we'll provide an update on our progress and next steps today

Key Performance Indicators …

we have since reviewed our current KPIs; and plan to consult on proposals in January 2019

What next for SHE Transmission …

we published our Sustainability Strategy in May and our North of Scotland Future Energy Scenarios in August. More on this today



The output from the March workshop was that the elements of the **Energy Trilemma** – security of supply, sustainability and affordability – remain in close balance. This has strongly informed the development of the SHE Transmission **Strategic Themes** for the RIIO-T2 period.

STRATEGIC THEMES

The purpose of SHE Transmission is to deliver value for electricity customers, society and shareholders by developing, owning and operating the transmission network in a safe, reliable and sustainable way

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

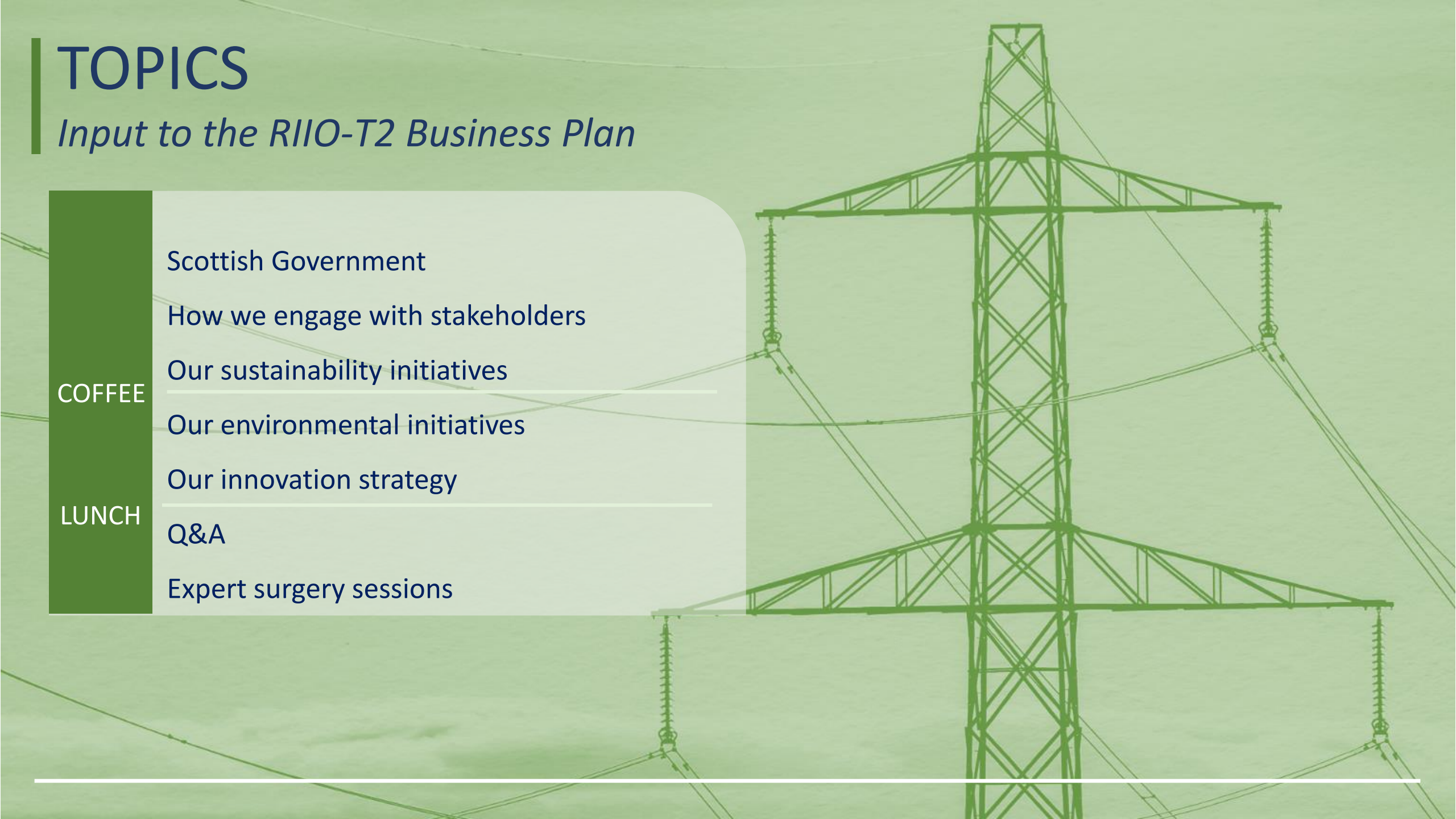
Leadership in Sustainability

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

TOPICS

Input to the RIIO-T2 Business Plan

	Scottish Government
	How we engage with stakeholders
COFFEE	Our sustainability initiatives
	Our environmental initiatives
	Our innovation strategy
LUNCH	Q&A
	Expert surgery sessions



Simon Gill

Scottish Government

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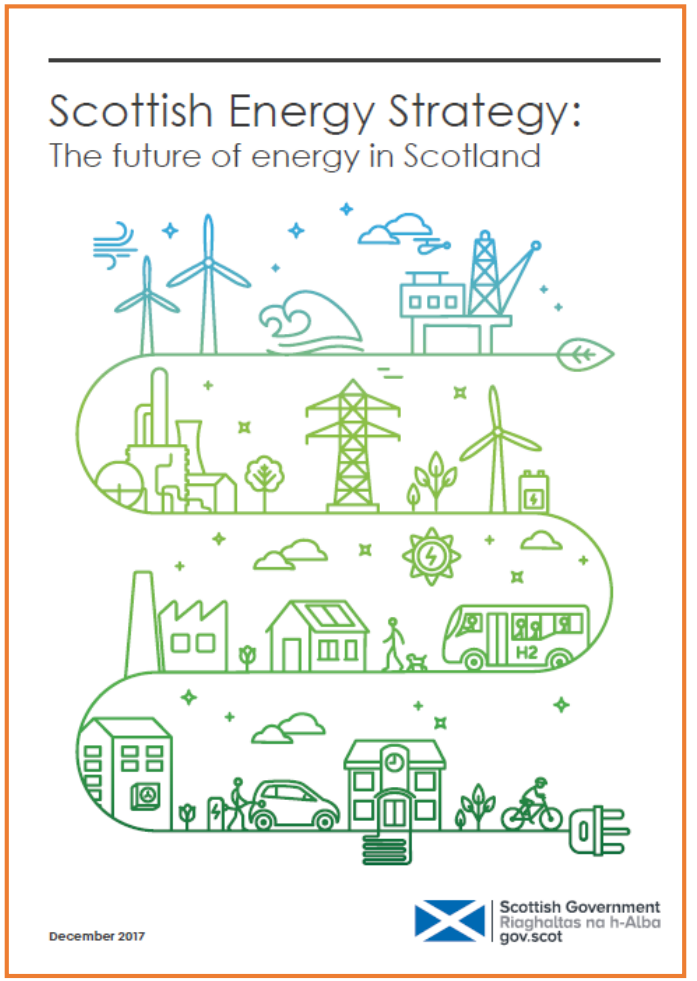
Electricity Networks and the Scottish Energy Strategy

SHE Transmission Stakeholder Workshop,
28 November 2018

Our Challenge

OUR VISION
A FLOURISHING, COMPETITIVE LOCAL AND NATIONAL ENERGY SECTOR, DELIVERING SECURE, AFFORDABLE, CLEAN ENERGY FOR SCOTLAND'S HOUSEHOLDS, COMMUNITIES AND BUSINESSES.



Our challenge …

Our Challenge

A WHOLE-SYSTEM VIEW

AN INCLUSIVE ENERGY TRANSITION

A SMARTER LOCAL ENERGY MODEL

System security and flexibly

Consumer engagement and protection

Renewable and low carbon solutions

Energy efficiency

Innovative local energy systems

Oil and gas industry strengths

Scottish Government
Riaghaltas na h-Alba
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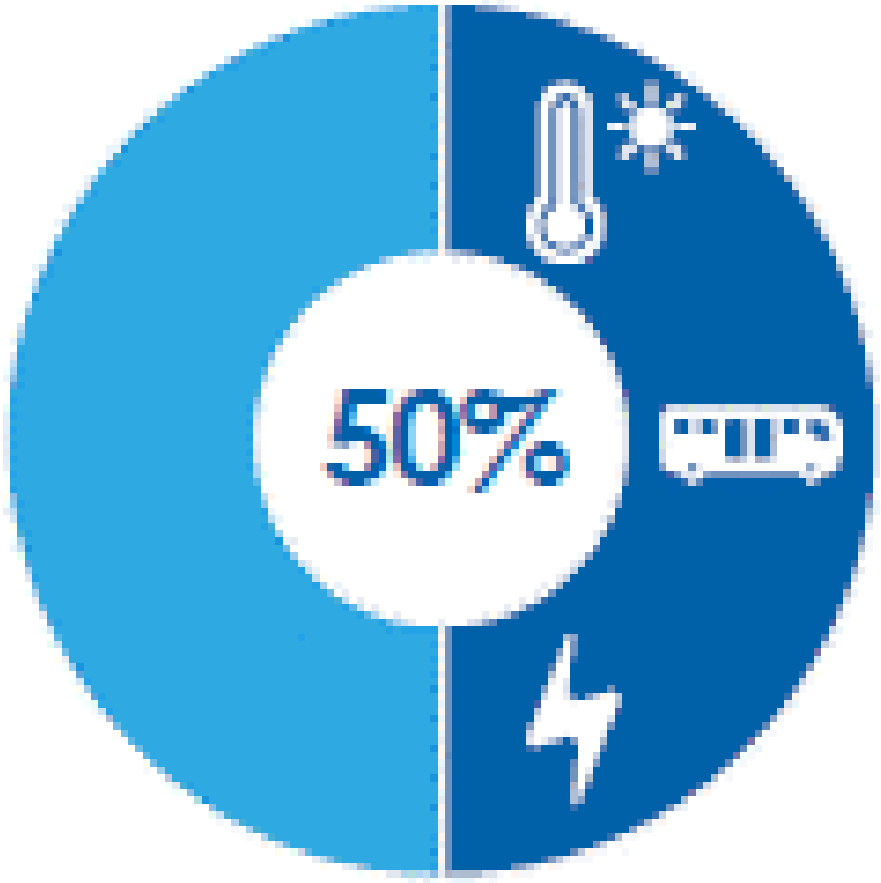
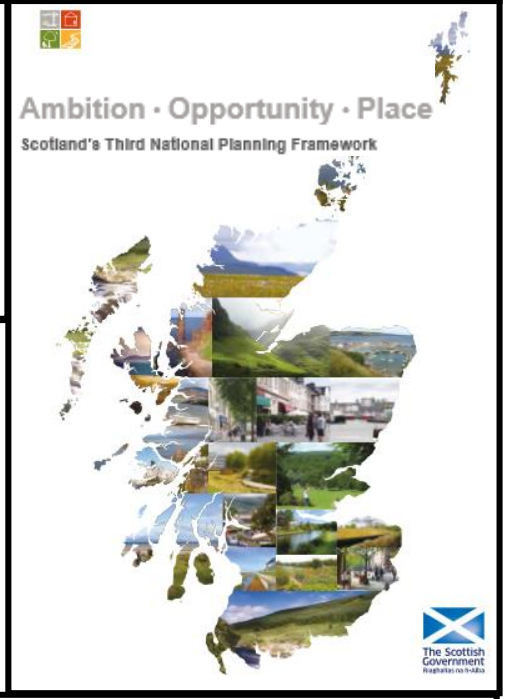
Our Challenge

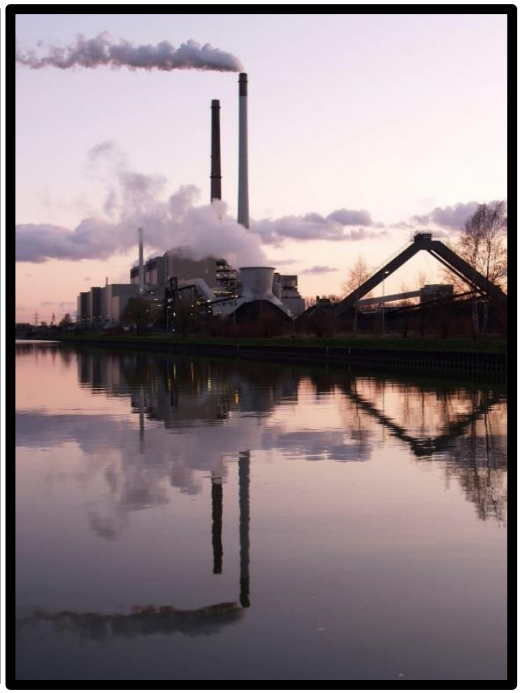


“by 2040 our homes and buildings are warmer, greener and more efficient”



“phase out the need for new petrol and diesel cars and vans by 2032”

What we have achieved so far

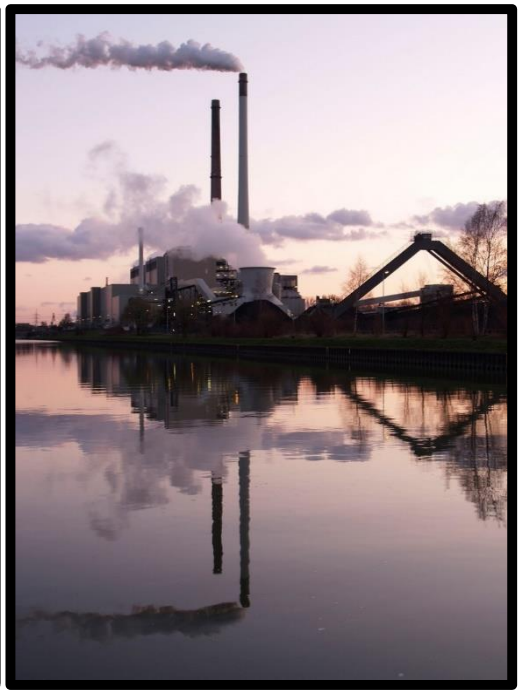


7.6 GW in Scotland

13.0 GW in Britain

We can run the system without Coal!

What we have achieved so far



7.6 GW in Scotland

A 9 MW wind turbine

We can run the system without Coal!

What we have achieved so far

7.6 GW in Scotland

A 9 MW wind turbine

An electric car that can drive 500 km + without recharging

What we have achieved so far

Grid scale battery energy storage

A 9 MW wind turbine

An electric car that can drive 500 km + without recharging

What we have achieved so far

The **ELECTRICITY NETWORKS** deliver 31,000 GWh per year to consumers in Scotland, and meet a peak demand of approximately **5.5GW**

The **GAS NETWORKS** deliver 58,000 GWh per year to consumers in Scotland, and meet a peak demand of approximately **22 GW**

Approximately £1.2 Billion is spent **RUNNING AND INVESTING** in the Electricity and gas networks in **SCOTLAND EACH YEAR**

Electricity valued **at £2 Billion** in wholesale terms was injected onto the electricity networks in Scotland

ELECTRICITY GENERATED IN SCOTLAND in 2017 had a carbon intensity of well under 100 g CO2 per kWh

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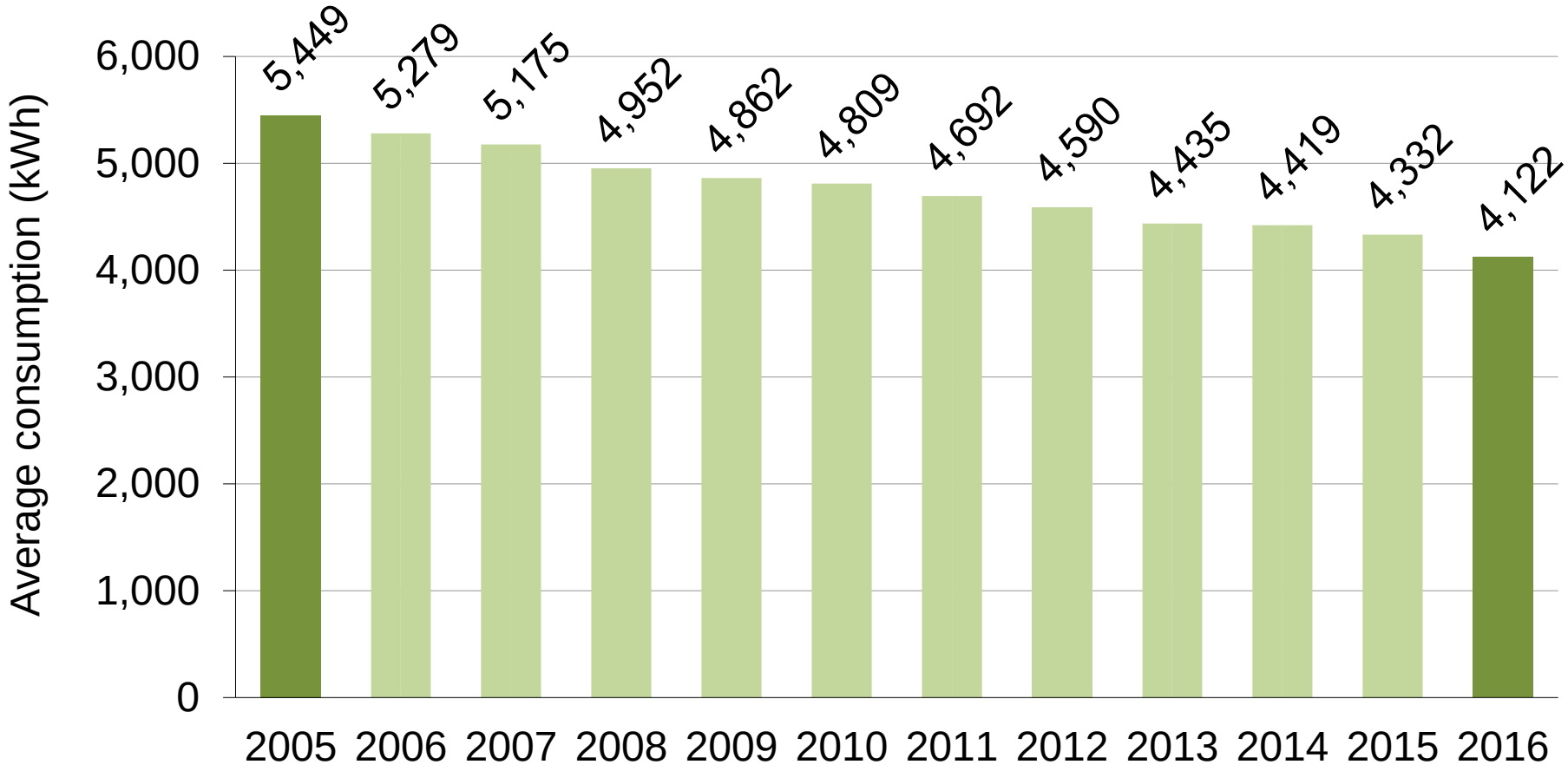
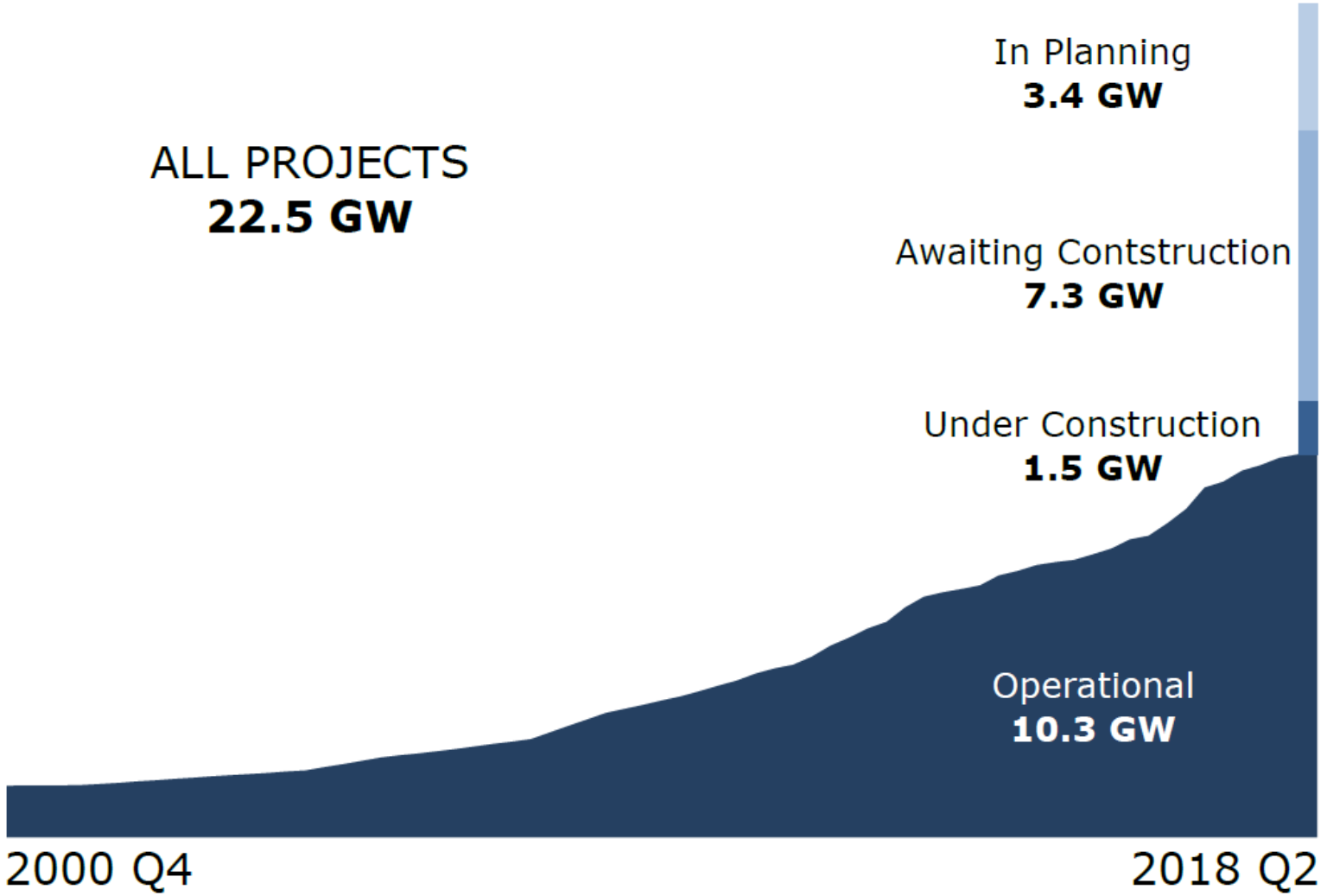
What we have achieved so far



We have a focus on energy efficiency

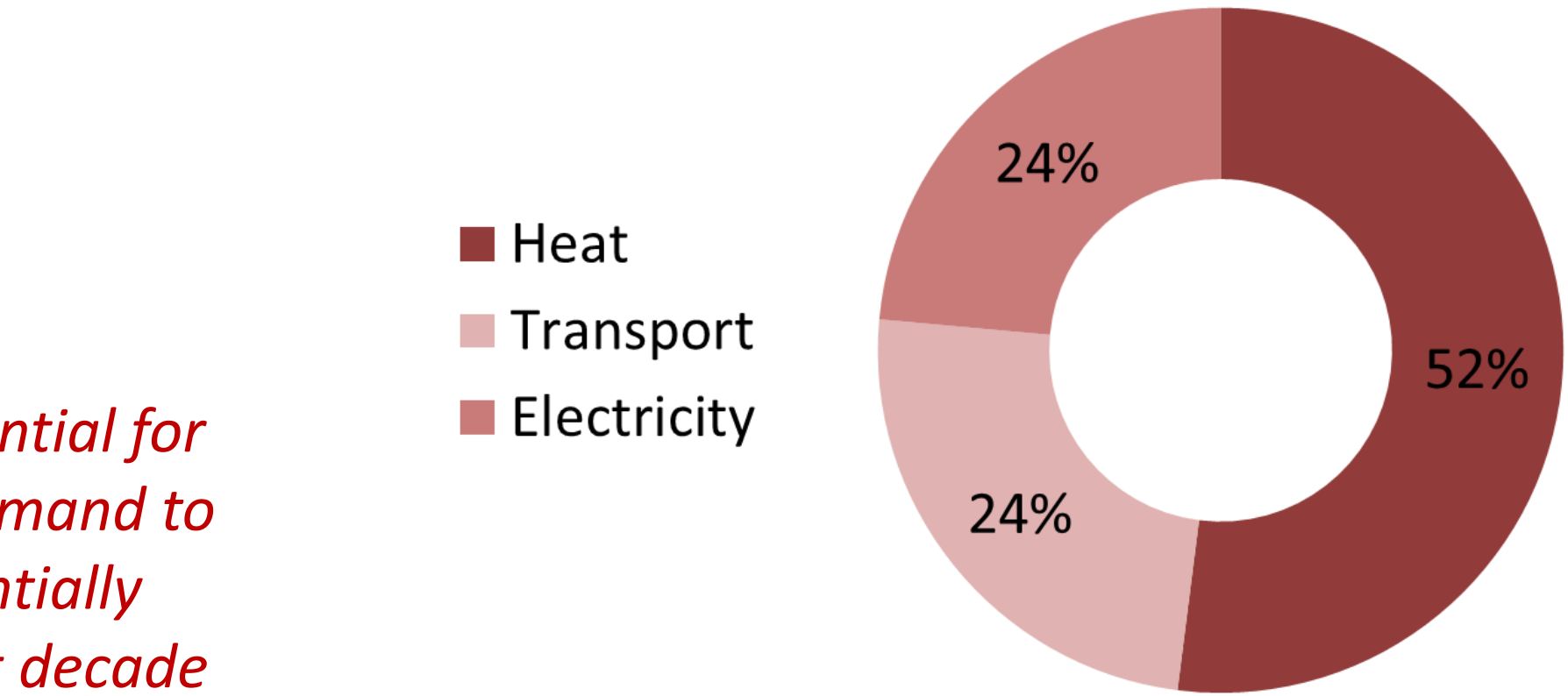
Looking forward



We want to maintain momentum in connecting renewables

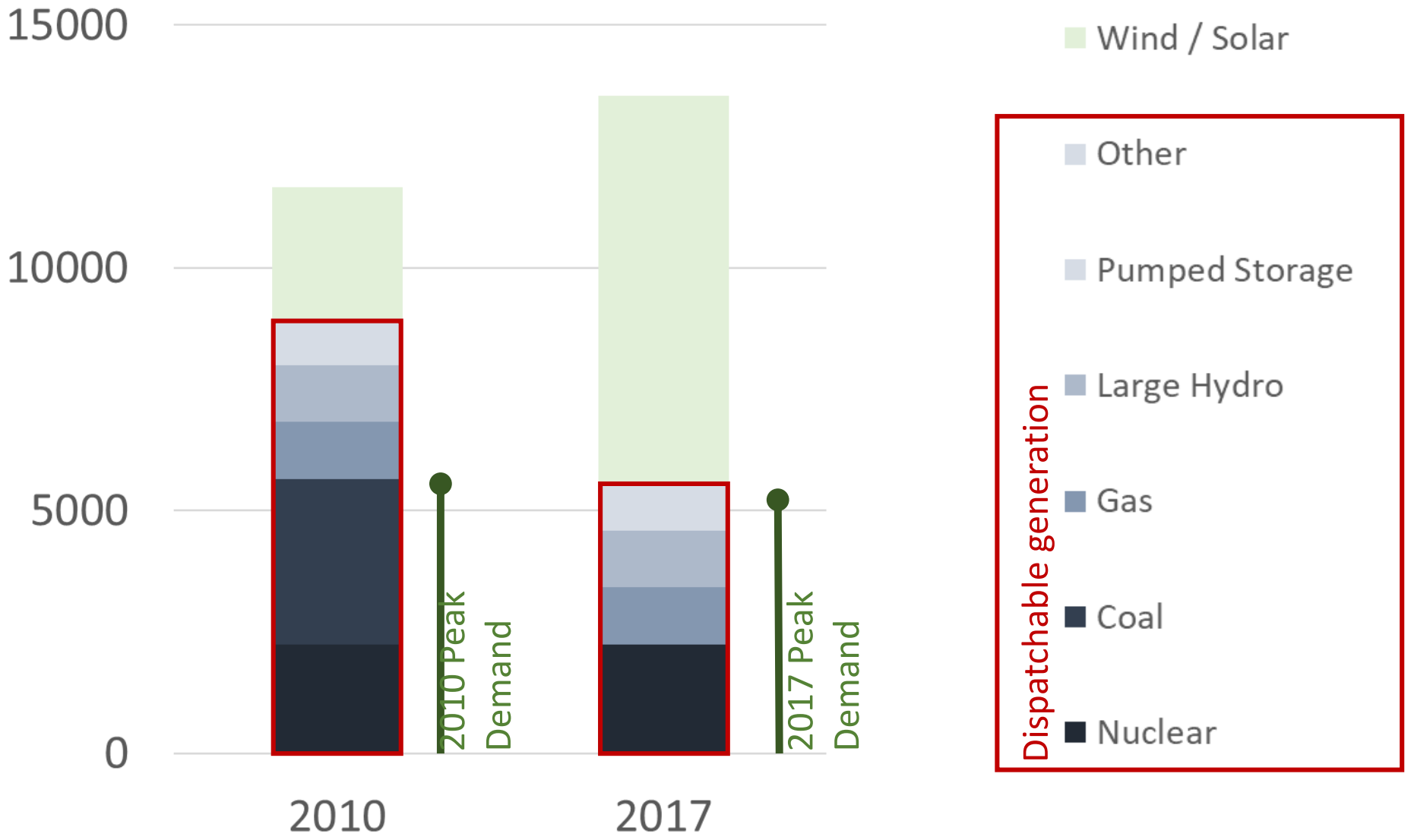
What we have achieved so far

There is potential for electricity demand to grow substantially over the next decade



Securing Supply for Scotland

Security of supply is increasingly reliant on the transmission networks raising new operability challenges. Keeping options open will be important.



By 2030 …. Our vision for Scotland's electricity networks

Scotland's consumers, economy and society are at the heart of our energy systems

Decisions which considers the impact on all consumers

A secure and resilient transmission network and System,

New, efficient transmission infrastructure that ensures we can meet our renewable energy ambitions

Transmission

Thanks….

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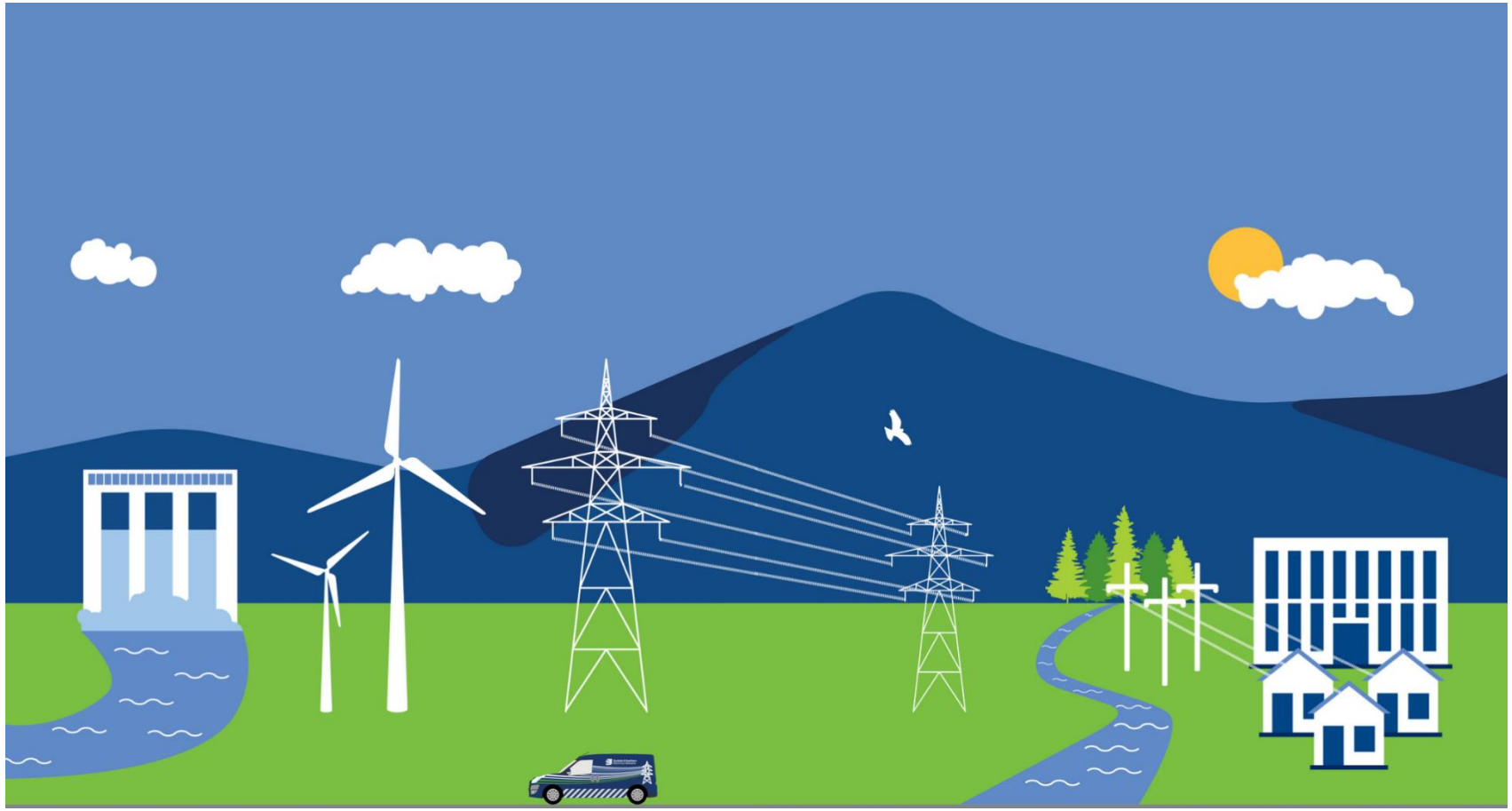
How we engage with our stakeholders

Christianna Logan

How we engage with our stakeholders

Principal customers and stakeholders

- Transmission connected generation/demand
- SHEPD and other utilities
- Local authorities
- Governments
- Contractors and supply chain participants
- Landowners
- Statutory consultees
- National Grid and SP Energy Networks
- Consumer representative groups
- Trade Bodies
- Developers
- Regulator
- Consultants



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How we engage with our stakeholders

We apply the results of our engagement in three ways

3 in the development of policy and strategic development plans;

2 in our forward planning; and

1 in day-to-day operations.

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SHE Transmission stakeholder engagement - What's the problem?

Customer satisfaction 8/10*

Across the board SSEN are very good at communicating
Connections customer

My experience with SSEN ranges from excellent to horrendous!
Connections customer

SHETL have an engagement strategy in place, but little evidence that this is driving a culture of engagement which is being embedded in the business.
…the panel found limited evidence that stakeholder engagement is having an influential role in strategic planning and operations.
Ofgem engagement panel

* Based on customer satisfaction survey score

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Current approaches - Project engagement

"SHE Transmission has been very reliable locally and have been very communicative with the local community"

Local authority representative

"In terms of engaging with communities, SSEN are doing a good job. However, they need to act on feedback from these events. "

Energy company

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Current approaches - Strategic engagement

PRINCIPAL CUSTOMERS AND STAKEHOLDER

- GOVERNMENT AND LOCAL AUTHORITIES
- COMMUNITY ENERGY GROUPS
- DEVELOPERS
- NETWORK OPERATORS
- FUTURE CUSTOMERS

We engaged with **Circa 150** customers and stakeholders

How did we engage with them?

- Working papers and blog articles published on website
- Via local press articles and energy industry insight reports
- Direct mail
- Face-to-face and telephone interviews
- Workshops in Glasgow and Inverness

> I have very much appreciated the opportunity to take part in the Future Energy Scenarios workshop.
>
> Argyll and Bute Council

> Good to see SSEN consulting on this vital segment of the future energy system (The future of Energy Efficiency and Heat and Preparing our network for Electric Vehicles).
>
> Energy UK

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Engagement outcomes

Held first transmission-specific engagement event attended by 57 delegates

In March, you helped us understand

Perceptions of our business

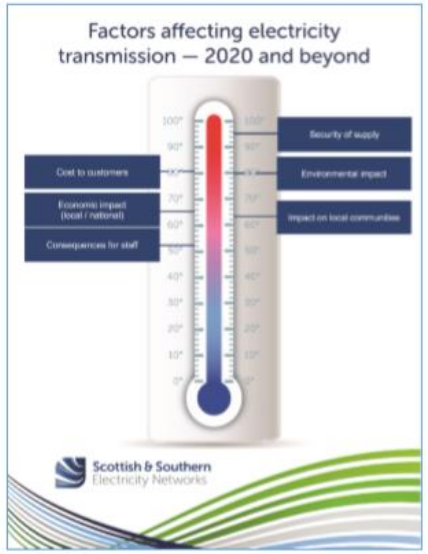
Engagement experiences

Engagement preferences

Reporting preferences

Future issues

Future priorities



Now we need to figure out how to

Improve our engagement

Best Tailor topics & methods

Demonstrate influence

Ensure value

Include end consumers

Build this into our Business Plan

88% of staff
have contact with external customers and stakeholders

60%
carried out either face-to-face or via telephone

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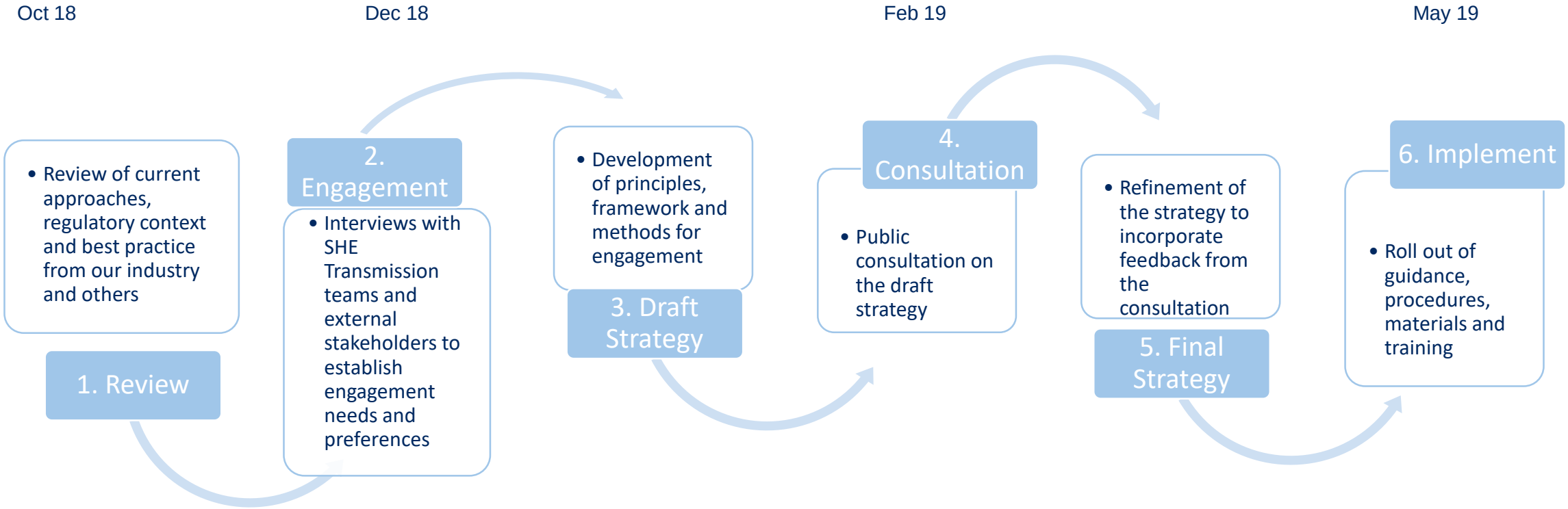
Developing a new strategy for stakeholder engagement

Developing a new strategy for stakeholder engagement



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Lessons from the water sector

- Ofwat has championed enhanced customer/stakeholder engagement
- PR19 is raising the bar in this area and we see the language Ofwat pioneers flowing into energy discussions
- All water companies have upped their game in this regard compared to their last price control, with some being genuinely innovative
- The end consumer features heavily in their engagement and Business Plans
- All of the companies had substantial support from external parties, with expertise in consumer engagement

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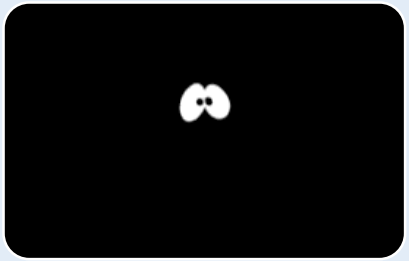
Lessons from the water sector - who

Categorisation is vital and can be based on socio-economic groups, shared values or behaviours

Some customers don’t care and don’t want to be engaged



Engaging with those who have experienced service failures is essential to capture their views and priorities

Results of research and engagement should be fed into strategic groups representing the public interest

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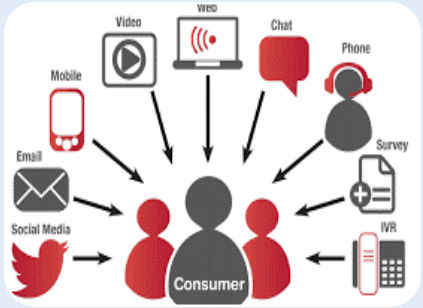
Lessons from the water sector - how

Engagement toolboxes included behavioural change programmes, partnerships and innovation



Water companies have as many as 38 different engagement channels including focus groups, online forums, social media sweeps and traditional surveys

Customer forums, deliberative events and gamification are effective ways of engaging end consumers on complex issues and explaining trade-offs in decision making

Monetising the benefits of social return on investment helped customers understand impacts beyond costs on bills

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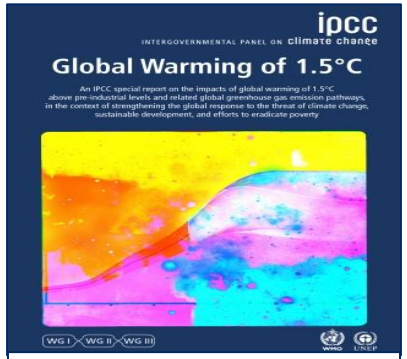
Our Sustainability Initiatives

Alex Sutton

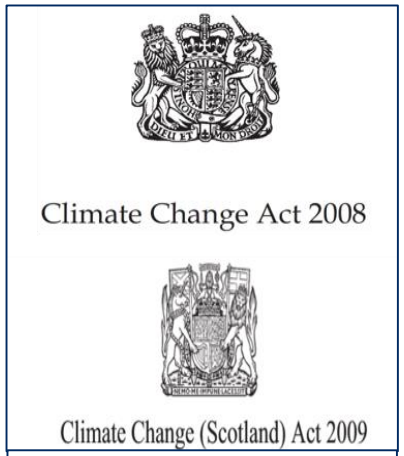
The Big Picture

Companies reporting against UN Sustainable Development Goals

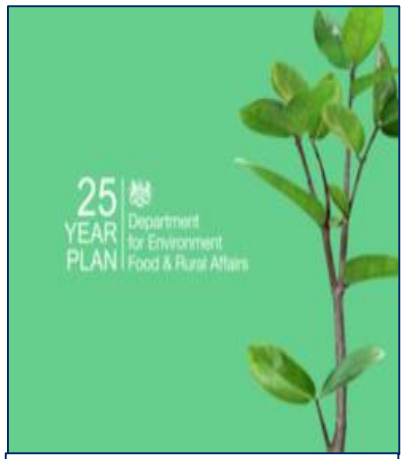
Paris Agreement COP 21



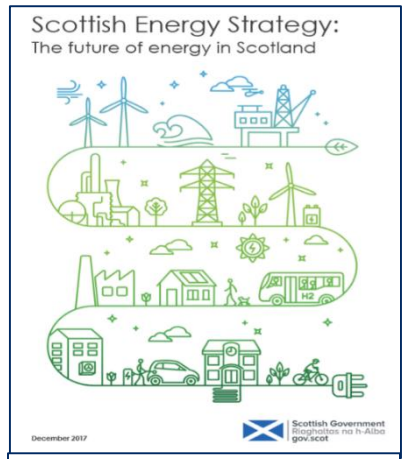
Impacts of climate change & extreme weather



UK Climate Change Act



DEFRA 25 Year Plan



Scottish Energy Strategy

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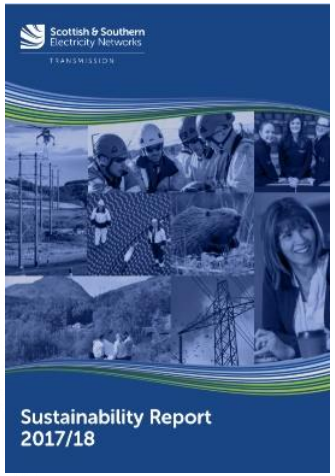
Our Approach: Transmission Sustainability Strategy



Our new stakeholder-led 'Transmission Sustainability Strategy' finalised in May 2018, and Sustainability Report 17/18, can be found at this link: www.ssen-transmission.co.uk/sustainability-and-environment/sustainability-strategy/

Next Steps: Develop and implement an action plan (short/medium and long- term) by the end of 2018 for delivering these ambitions.

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Consultation: *Help focus our approach for RIIO-T2 and prioritise our Sustainability Action Plan.*

Areas for Consultation

1. Optimising Resources: *performance expectation.*
2. Mitigating Climate Change: *priority areas for carbon reduction.*
3. Supporting Thriving Communities: *effectiveness of resilient community fund for SHE Transmission.*
4. Communicating our Sustainability Plan: *format for presenting our sustainability action plan.*

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1. Optimising Resources

Our Commitment: Managing resources to maximise sustainability.

Strategic focus	Initiatives
Seeking to keep resources in use for as long as possible, extract the maximum value from them whilst in use, then recover and regenerate products and materials at the end of each service life.	Strategic stores allowing re-use of materials
	Reuse of resources while upgrading infrastructure
	Using more sustainable resources in construction

Resource Efficiency

Minimise Waste

Sustainable Materials

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1. Optimising Resources

Our Commitment: Managing resources to maximise sustainability.

Minimise Waste – *example priorities*

- Reduce waste generated
- Increase the percentage of waste recycled
- Zero waste to landfill (excluding compliance waste)
- Reduce single-use plastics waste

Resource Efficiency – *example priorities*

- Reduce material use (e.g. steel, aluminium and copper)
- Reduce water consumption
- Reduce carbon content of construction projects
- Reduce chemical use

Sustainable Materials – *example priorities*

- Materials recycled content
- Life Cycle Assessments
- Responsible sourcing

Others?

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2. Mitigating Climate Change

Our Commitment: To manage resources over the whole asset lifecycle, working towards a science based greenhouse gas target.

Strategic focus

	Initiatives
Climate change and business resilience and reducing our greenhouse gas emissions	Understanding resilience to different warming scenarios
	Adopting a Science Based Target for our own greenhouse gas emissions
	Reducing SF_6 emissions
	Reducing our Business Carbon Footprint

Reducing our Business Carbon Footprint

Our reporting and data collection strategy is improving year on year, and as a result the reported improvements in meeting carbon reduction targets are likely to be countered by the greater amount of data collected.

This can be seen in the increased inclusion of contractor emissions within the Transmission Business Carbon Footprint (BCF). However, we have improved performance throughout the RIIO-T1 period, evident in a 9.3% reduction in our reported BCF between 2016/17 and 2017/18, bringing the total reduction since the start of the price control period in 2013 to 38.7%.

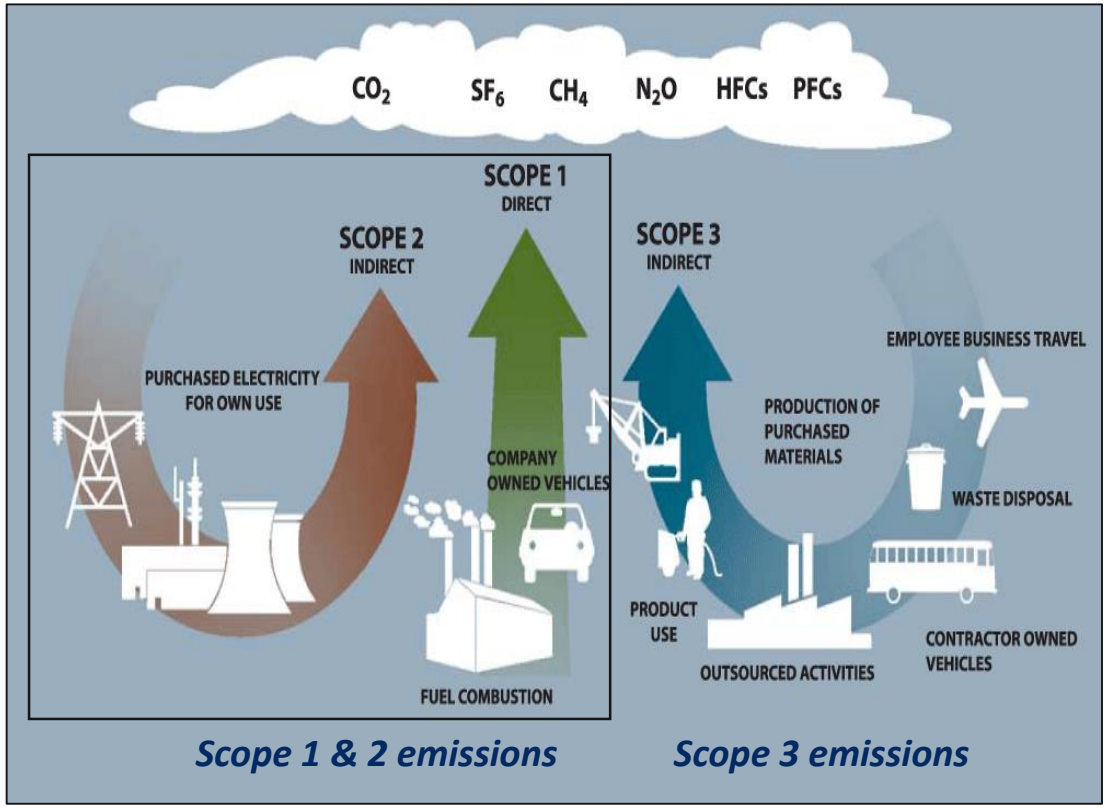
Some of the key elements of our BCF include the GHG emissions outlined below.

Data gathered[2]		2017/18	2016/17
Building energy usage (tCO_2e) (Buildings electricity, Buildings other, Substation electricity)	*Scope 2*	3,604.2	2517.85
Business transport (tCO_2e) (Road, Air and Rail)	*Scope 3*	814.6	652.86
Operational transport (tCO_2e) (Road, Air and Rail)	*Scope 1*	13,764.2	5230.62
Fugitive Emissions (tCO_2e) (Sulphur Hexafluoride - SF_6)	*Scope 1*	7,452.0	5759.74
Electrical losses (tCO_2e)	*Scope 3*	87,000.92	110,004.3

Scottish & Southern Electricity Networks

2. Mitigating Climate Change

Our Commitment: To manage resources over the whole asset lifecycle, working towards a science based greenhouse gas target.



SCIENCE BASED TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

GHG Protocol Scope 1, 2 & 3 Emissions

Direct Control	Scope 1 - Emissions from operations that are owned or controlled by the reporting company.
Direct Control	Scope 2 – Emissions from the generation of purchased or acquired electricity, steam, heating, or cooling consumed by the reporting company.
Less Control	Scope 3 – All indirect emissions (not included in Scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.

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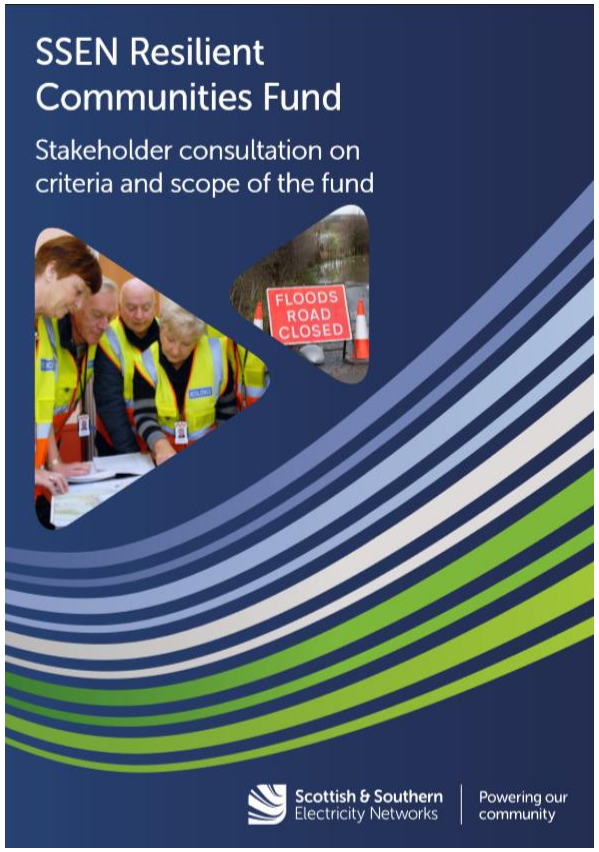
3. Supporting Thriving Communities

Our Commitment: To maximise the local social and economic benefits of our investments.

Strategic focus

	Initiatives
Maximising the benefit that local communities receive from project investment, community support investment and local volunteering.	Giving back to local communities
	Using local supply chains
	Helping communities become more resilient



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3. Supporting Thriving Communities

Our Commitment: To maximise the local social and economic benefits of our investments.

Supporting communities through our SSEN resilient communities fund.

What does the fund support?

The fund provides grants of between £1,000 and £20,000 to support projects across the North of Scotland that achieve one of the following criteria:

1. Vulnerability - To protect the welfare of vulnerable community members through enhancing their resilience and improving community participation and effectiveness.
2. Resilience for Emergency Events - to enhance community facilities, services and communication specifically to support the local response in the event of a significant emergency event.

The Resilient Communities Fund is used to support projects that will help the communities during extreme weather events or when electricity supply is lost across the North of Scotland. Examples of support include: emergency resilience hubs, satellite phones and resilience vehicles.

Around £256,000 awarded to local communities in 2017/18. Future years will vary depending on the value of Stakeholder Engagement incentive we receive.

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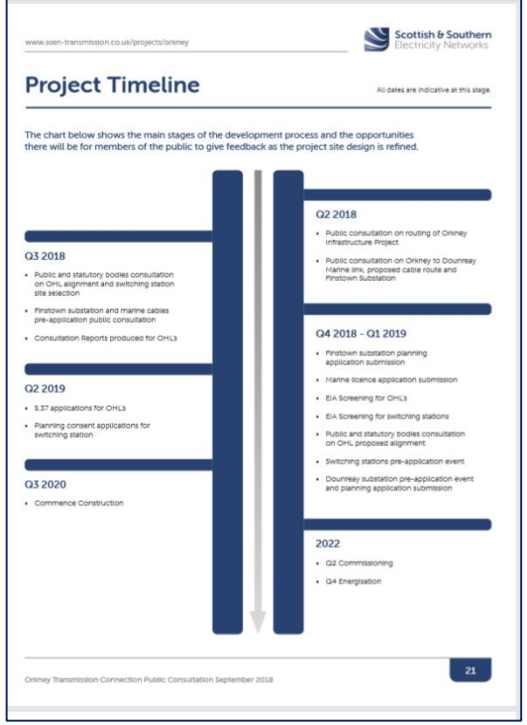
4. How should we communicate our Sustainability Action Plan?

Our Action: Develop a short (2018-2019), medium (2020-2021) and long term Action Plan (2021+) for delivery of targets and new approaches.

1. Summary Timeline/Gantt Chart: *summary milestones documented in a timeline*



www.ssen-transmission.co.uk/projects/orkney

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Project Timeline

All dates are indicative at this stage.

The chart below shows the main stages of the development process and the opportunities there will be for members of the public to give feedback as the project site design is refined.

Q3 2018
- Public and statutory bodies consultation on OHL alignment and switching station site selection
- Finstown substation and marine cables pre-application public consultation
- Consultation Reports produced for OHLs

Q2 2019
- S.37 applications for OHLs
- Planning consent applications for switching station

Q3 2020
- Commence Construction

Q2 2018
- Public consultation on routing of Orkney Infrastructure Project
- Public consultation on Orkney to Dounreay Marine link, proposed cable route and Finstown Substation

Q4 2018 - Q1 2019
- Finstown substation planning application submission
- Marine licence application submission
- EIA Screening for OHLs
- EIA Screening for switching stations
- Public and statutory bodies consultation on OHL proposed alignment
- Switching stations pre-application event
- Dounreay substation pre-application event and planning application submission

2022
- Q2 Commissioning
- Q4 Energisation

Orkney Transmission Connection Public Consultation September 2018

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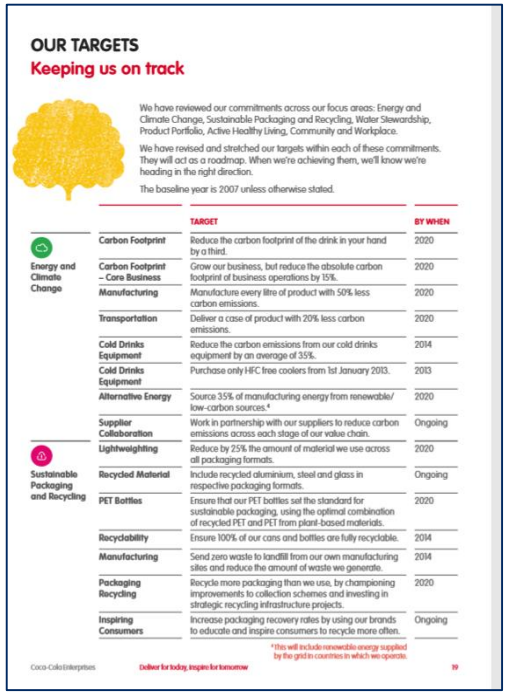
2. List of Milestone Targets: *action lists to track progress (example from Coca-Cola)*



OUR TARGETS

Keeping us on track

We have reviewed our commitments across our focus areas: Energy and Climate Change, Sustainable Packaging and Recycling, Water Stewardship, Product Portfolio, Active Healthy Living, Community and Workplace.

We have revised and stretched our targets within each of these commitments. They will act as a roadmap. When we're achieving them, we'll know we're heading in the right direction.

The baseline year is 2007 unless otherwise stated.

		TARGET	BY WHEN
Energy and Climate Change	Carbon Footprint	Reduce the carbon footprint of the drink in your hand by a third.	2020
	Carbon Footprint – Core Business	Grow our business, but reduce the absolute carbon footprint of business operations by 15%.	2020
	Manufacturing	Manufacture every litre of product with 50% less carbon emissions.	2020
	Transportation	Deliver a case of product with 20% less carbon emissions.	2020
	Cold Drinks Equipment	Reduce the carbon emissions from our cold drinks equipment by an average of 35%.	2014
	Cold Drinks Equipment	Purchase only HFC free coolers from 1st January 2013.	2013
	Alternative Energy	Source 35% of manufacturing energy from renewable/ low-carbon sources.*	2020
	Supplier Collaboration	Work in partnership with our suppliers to reduce carbon emissions across each stage of our value chain.	Ongoing
Sustainable Packaging and Recycling	Lightweighting	Reduce by 25% the amount of material we use across all packaging formats.	2020
	Recycled Material	Include recycled aluminium, steel and glass in respective packaging formats.	Ongoing
	PET Bottles	Ensure that our PET bottles set the standard for sustainable packaging, using the optimal combination of recycled PET and PET from plant-based materials.	2020
	Recyclability	Ensure 100% of our cans and bottles are fully recyclable.	2014
	Manufacturing	Send zero waste to landfill from our own manufacturing sites and reduce the amount of waste we generate.	2014
	Packaging Recycling	Recycle more packaging than we use, by championing improvements to collection schemes and investing in strategic recycling infrastructure projects.	2020
	Inspiring Consumers	Increase packaging recovery rates by using our brands to educate and inspire consumers to recycle more often.	Ongoing

*This will include renewable energy supplied by the grid in countries in which we operate.

Coca-Cola Enterprises — Deliver for today, inspire for tomorrow — 19

3. Summary Narrative Report: stating what we are doing and what we are going to do. *(example from Yorkshire Water)*

2. We protect and enhance our rivers, surface water and ground water bodies

Our targets for this area are:

5-Year Objective
- To fully understand and manage our assets and their impact on the environment.

2013/14 Target
- Seven river catchment systems with plans in place
- 1.6 serious pollution incidents per 10,000 km of sewer.

2014/15 Target
- PR14 plan for key rivers for the Water Framework Directive (WFD)
- River Wiske sustainable catchment planned
- Specific pollution reduction targets for all categories of incidents.

2017/18 Target
- Targets to be set after Ofwat determination of our business plan for the period 2015-2020 (known as PR14).

What we're doing

River catchment plans

During AMP5 we've carried out extensive investigations to understand our impact on the river, surface water and ground water environments. This allows us to relate our impacts to the WFD compliance targets for water bodies, to achieve Good Ecological Status or Good Ecological Potential for heavily modified water bodies. Both of these standards seek to return water bodies to near natural conditions.

In the Humber River Basin this is dependent on many factors like pollution from agriculture, mines, drainage from towns and cities and waste water, as well as invasives and changes to natural level or flow.

For an example of this, see our Don Catchment Pilot

Through PR14 and the National Environment Programme (NEP) we've developed an agreed programme of solutions which will contribute to achieving 'Good' status for water bodies in the Humber Basin. This accounts for a significant component of our Investment Programme within PR14.

Click here for more information on our PR14 business plan.

Our Environmental Quality investment programme for AMP6
- Meeting the obligations of the Water Framework Directive
- Taking responsibility for Combined Sewer Overflows monitoring
- Investing in catchment management for Drinking Water Protected Areas
- Taking responsibility for biodiversity and fish passage on our land and assets.

Pollution

Pollution caused by our assets can have a large impact on the health of rivers, surface water and ground water, and damage our reputation with regulators and customers. Pollution can come from a variety of assets:
- Water and waste treatment works
- Clean water distribution mains
- Sewers and sewerage pumping stations.

We measure our number of pollution incidents based on KPI's introduced by Ofwat and the EA in 2012 (which include 2011 performance). Our figures can be compared to the rest of the industry and are scored red (worse than industry average), amber (average) or green (better than average).

Click here to see details of EA Pollution Incident Category numbering.

Click here to see the Water Pollution Performance Figures for 2011 & 2012.

We recognise that this is a significant area for improvement and are implementing new pollution reduction plans in 2013 and will report on this in 2014.

Click here to read our Telemetry Enhancements Project case study.

What we're going to do

By the end of 2014/2015 we'll understand how the environmental health of our rivers needs safeguarding and improving to help us effectively deliver our plans from April 2015. To do this we will have:
- Commenced engagement with partners to deliver PR14 river improvements in an innovative way
- Understood the links between our activities and the risks we pose to the river environment
- Mitigated those risks by developing risk-based asset reliability and criticality plans
- Developed our long-term investment planning strategy.

Scottish & Southern Electricity Networks

Coffee Break

Your Plan, Our Future: RIIO-T2

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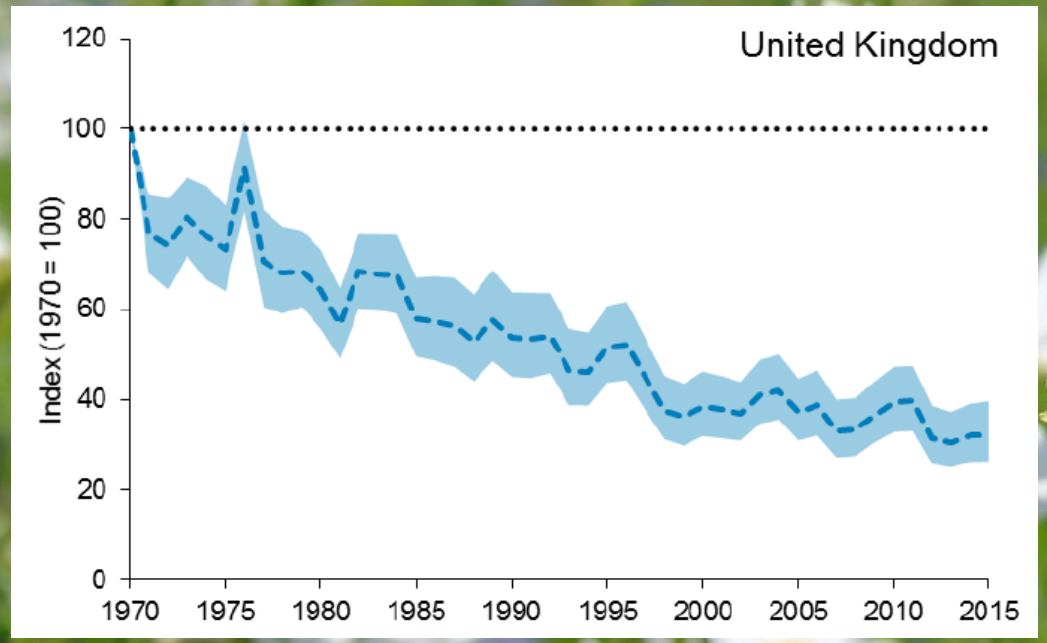
Our Environmental Initiatives

Richard Baldwin

Biodiversity



ECOSYSTEMS SERVICES

TYPE OF SERVICE	EXAMPLES
Supporting Services	Nutrient cycling, Soil formation
Provisioning Services	Food, Freshwater, Wood, Fuel
Regulating Services	Climate regulation, Disease Regulation, Flood Regulation, Water Purification
Cultural Services	Aesthetic, spiritual, educational, recreational

Source: www.keepscotlandbeautiful.org

‘Development that leaves biodiversity in a better state than before’

Scottish & Southern Electricity Networks

Biodiversity

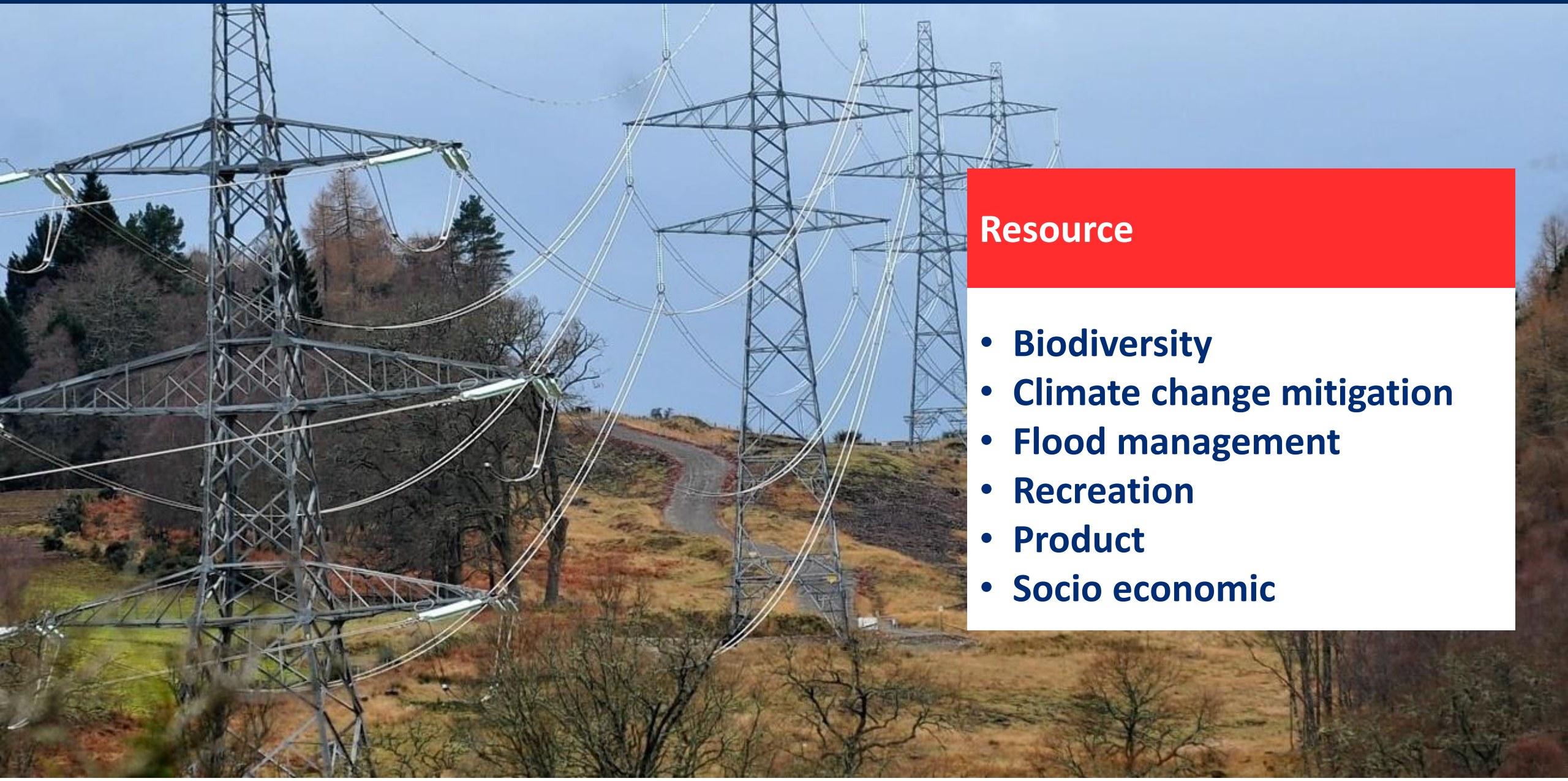
Current commitments:

- "No net loss" on projects consented from 2020
- "Net gain" on projects consented from 2025
- Collaborate to improve biodiversity on existing assets

- Marine –limited stage of development

Thurso South Substation

Forestry and Woodland

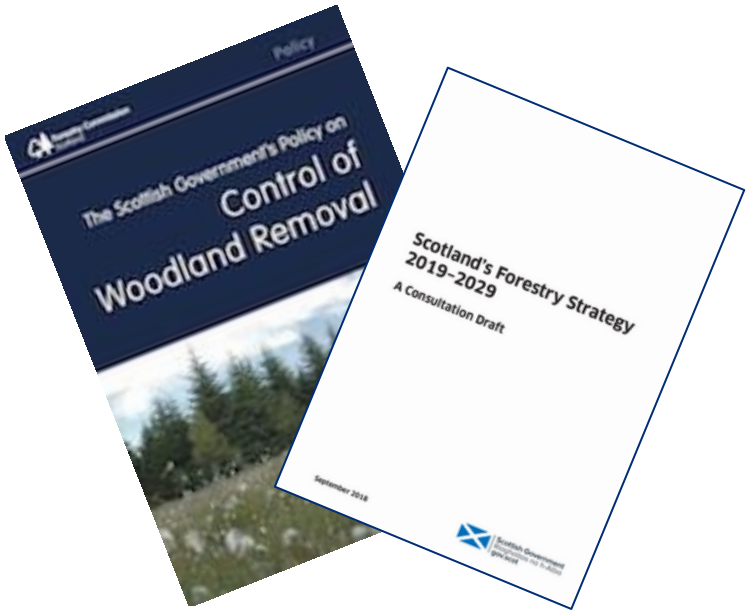


Resource

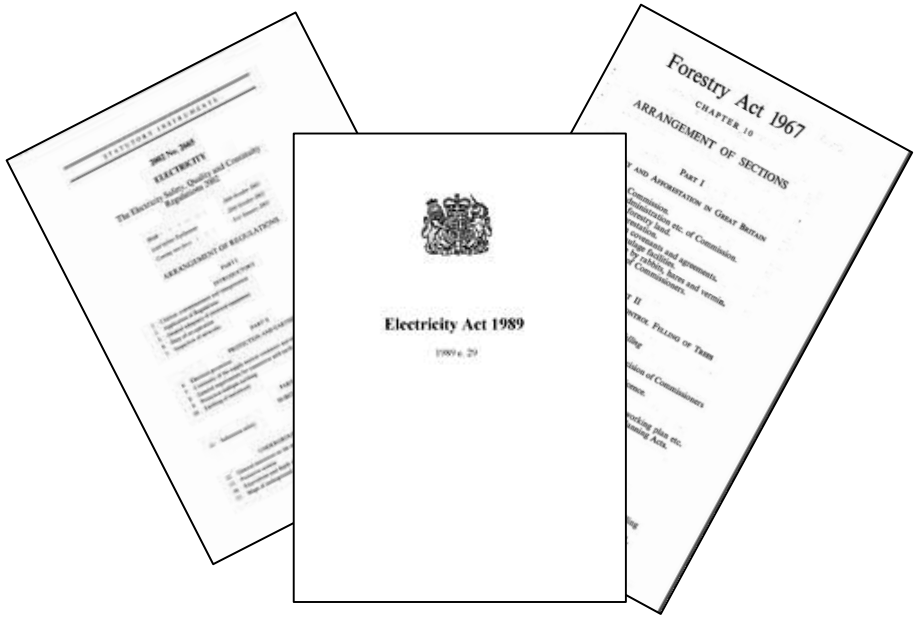
- Biodiversity
- Climate change mitigation
- Flood management
- Recreation
- Product
- Socio economic

Forestry and Woodland

Policy/Strategy



Legislation



Efficiency – safeguard the energy consumer

Scottish & Southern Electricity Networks

Forestry and Woodland

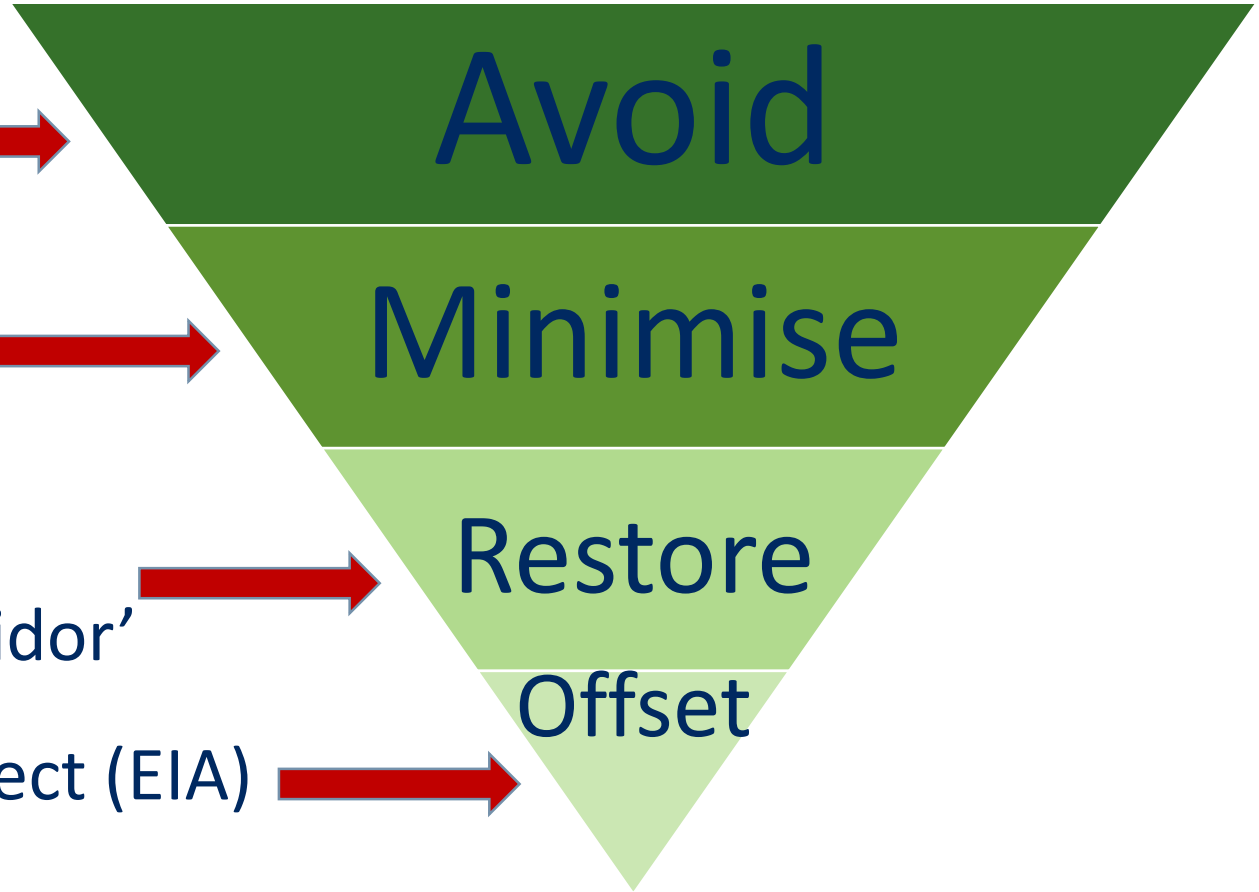
Current position:

Route and site selection →

Micro-site →

Regenerate old wayleaves
Replace out with ‘Operational Corridor’ →

‘Significant’ environmental effect (EIA) →



Scottish & Southern Electricity Networks

Forestry and Woodland

Future position?

- Actively promote no net loss of ‘native’ and ‘nearly-native’ woodland for new projects”

By

- Regeneration of old corridors
- Managed regeneration of new corridors
- Supporting local woodland schemes

Native
50% native species in canopy

Nearly-native
40-50% native species in canopy

Ancient
Scottish Ancient Woodland inventory (excl. land replanted with non-natives)

(Scotland’s Native Woodlands 2014 – Forestry Commission Scotland)

In RIIO T2, this could cost the consumer up to £2.5m

Landscape and visual amenity

Landscape and visual amenity

	Overhead	V	Underground
Cost	Most economical		Up to 20 times greater
Faults	Higher number (typically 24hrs to repair)		Lower number (typically 3+ weeks to repair)
Flexibility	High potential for future upgrade		Low potential for future upgrade
Landscape & Visual	Highly visible		Impacts limited to changes in vegetation
Hydrogeology /Habitats	Lower direct impact (small footprint)		Higher direct impact (groundwater, habitats)
Ornithology	Collision risk		No collision risk

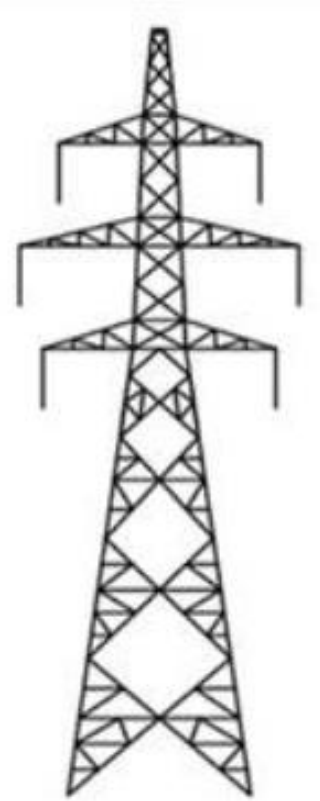
Landscape and visual amenity

Current position:

Our preferred approach is an overhead line:

- Efficient (lower cost)
- Flexible – future uprating
- Faults – return to service

- Where through EIA there are significant effects:
  - Consider UGC



Landscape and visual amenity

VISTA

- £500m Ofgem fund
- Reduce visual impact of existing assets in National Parks/NSAs

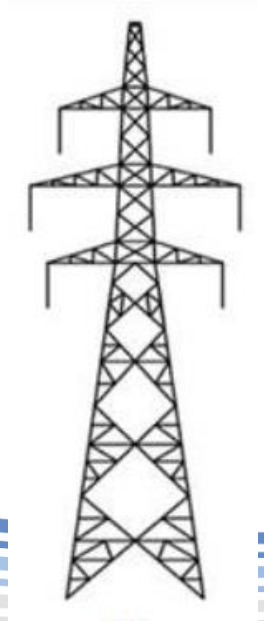
- 4 underground cable projects (£55m for 20km)
- 6 landscape projects (£2.5 for planting and tower painting)

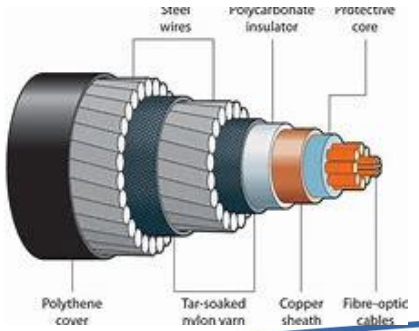
https://www.ssen-transmission.co.uk/sustainability-and-environment/vista/

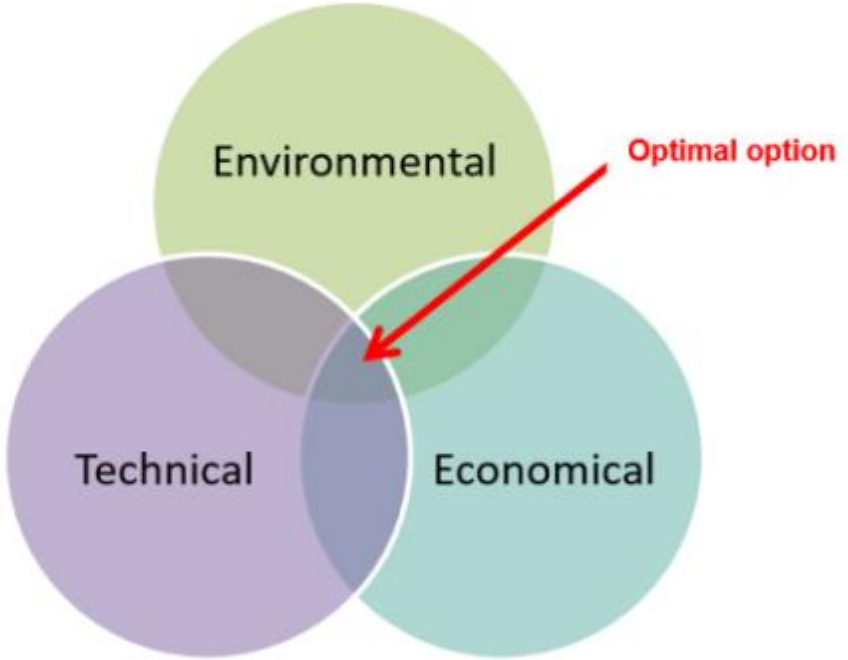
Landscape and visual amenity

Future position?

- Publish technology options position statement
  - No preference for technology type
  - Steel lattice, alternative structures, UGC







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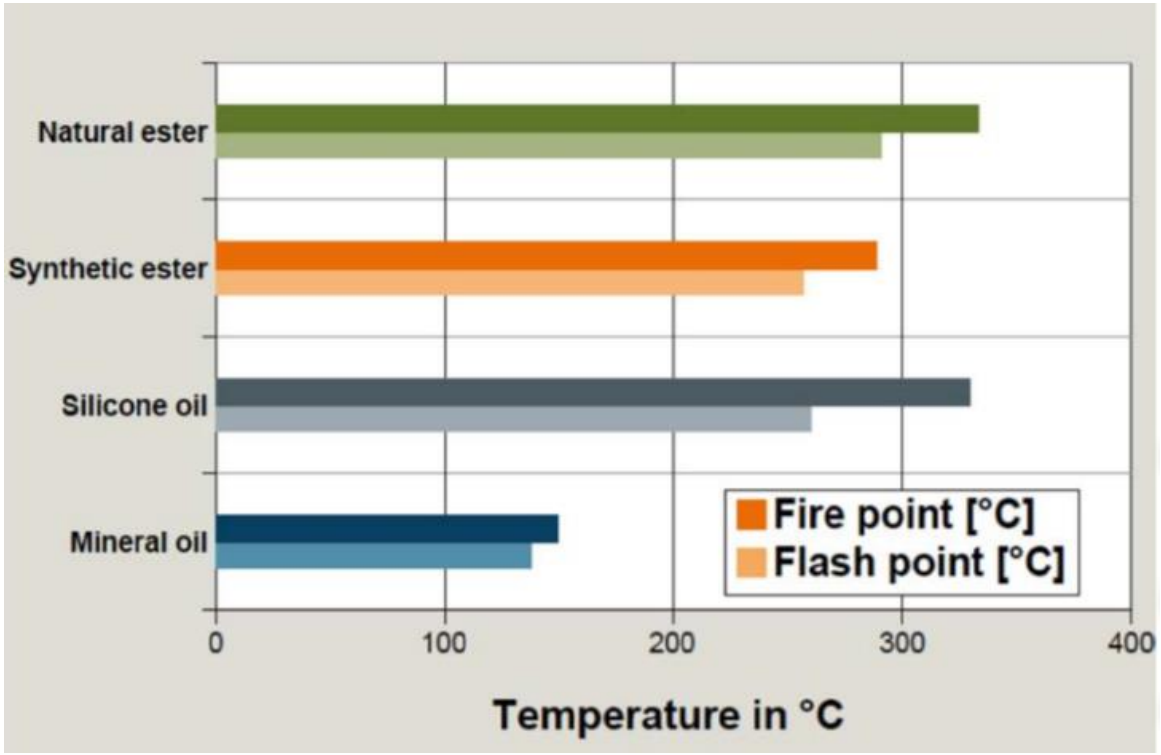
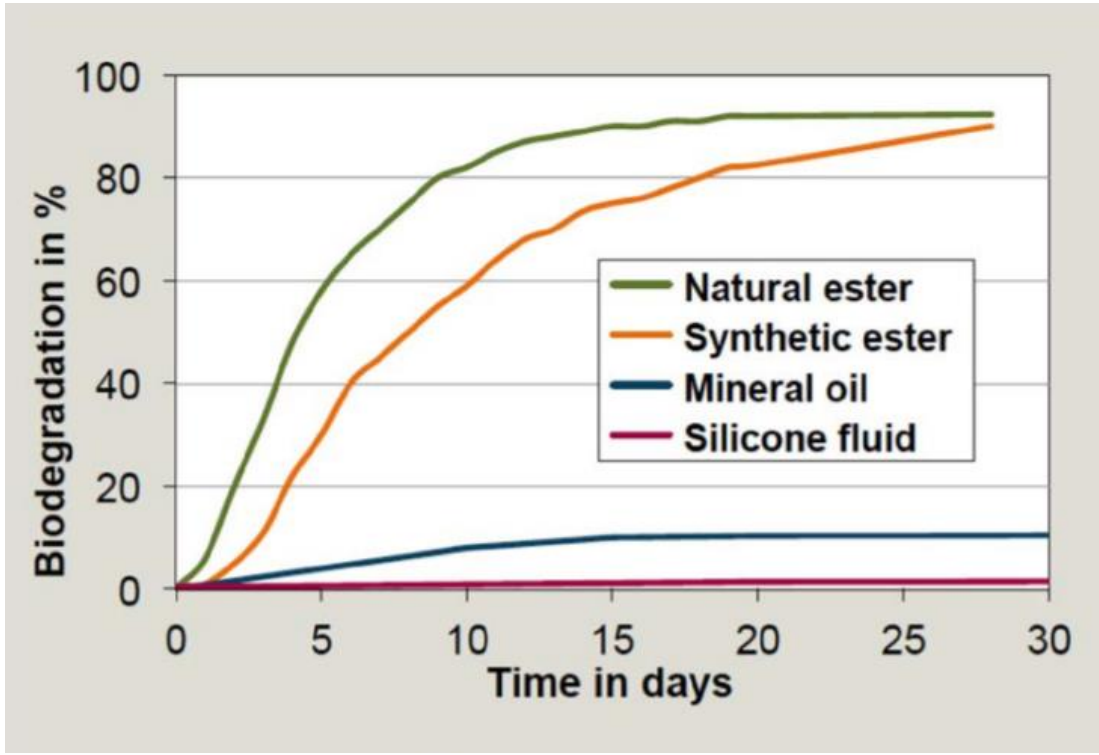
Oil management

SSEN significant holdings

- Transformer/reactor oil
- Fuel Oil
- Oil filled cables
- Lubricant/plant

Transformer - Ester Based alternative





Source: Seimens – Alternative Transformer Fluids, 2018

Oil management

Transformer Comparison

Transformer (typical)	Oil capacity (litres)	Typical cost (3)	Synthetic ester cost differential
132/33 kV (120 MVA)	31,000	£700,000	21% increase
275/132kV (480 MVA)	84,000	£2,000,000	15% increase

N.B. Reduced mitigation requirements will further reduce differential (fire)

Oil management

Current position:

53% of our transformers were installed before 2006*

*Oil storage regulations 2006

Historical sites

- Examples of ‘unbunded’
- Ad-hoc identification and management of contaminated land

New sites

- Design and maintenance specification (bund, SuDS, oil interceptors)
- Agreed with SEPA
- Not using Synthetic Ester fluid

SEPA
Scottish Environment Protection Agency

Oil management

Future position:

Baseline legacy substation risk

- Asset condition/contamination/refill frequency/pathway/receptor)

Risk	Action
1	Low risk - no action
2	Moderate risk – monitor and control
3	High risk – implement remedial work

Install synthetic ester fluid in transformers

- New (or asset replacement) at high risk sites (132kV)
- Technical (e.g. Fire risk)
- Environmental (pathway/receptor)

Innovation Strategy

David Paton

Your Plan, Our Future: RIIO-T2

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Overview

RIIO-1 Transmission Innovation Activities

Innovation Strategy Development

Innovation Principle and Values

Next Steps and Opportunities

SHE Transmission Innovation Definition

Identify and prove ***ways of working which are*** *new* ***to SHE Transmission***
for
the ***long-term benefit***
of
our Customers, our Stakeholders and Ourselves.

Why are we updating our Innovation Strategy?

The Electricity Industry is changing in response to evolving Government Policy, Energy Trilemma, new Technology and Customer choice.

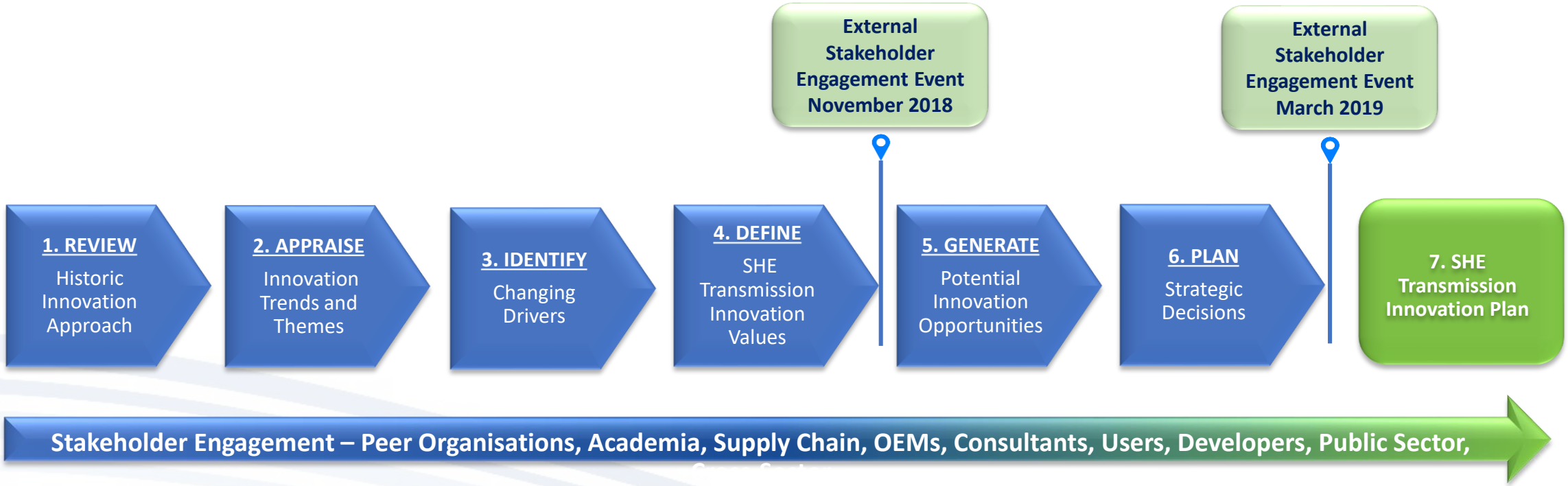
Industry Trends

1. Shifting power-generating sources
2. Customer choice and changing energy demands
3. Evolving policy landscape
4. The Smart, Flexible Energy System and the DSO transition
5. Uncertainty and choices for the electricity network companies

Innovation Themes

1. Network improvements and system operability
2. Transition to a low carbon future
3. New technologies and commercial evolution
4. Customer and stakeholder focus
5. Safety, health and environment

Innovation Strategy Development

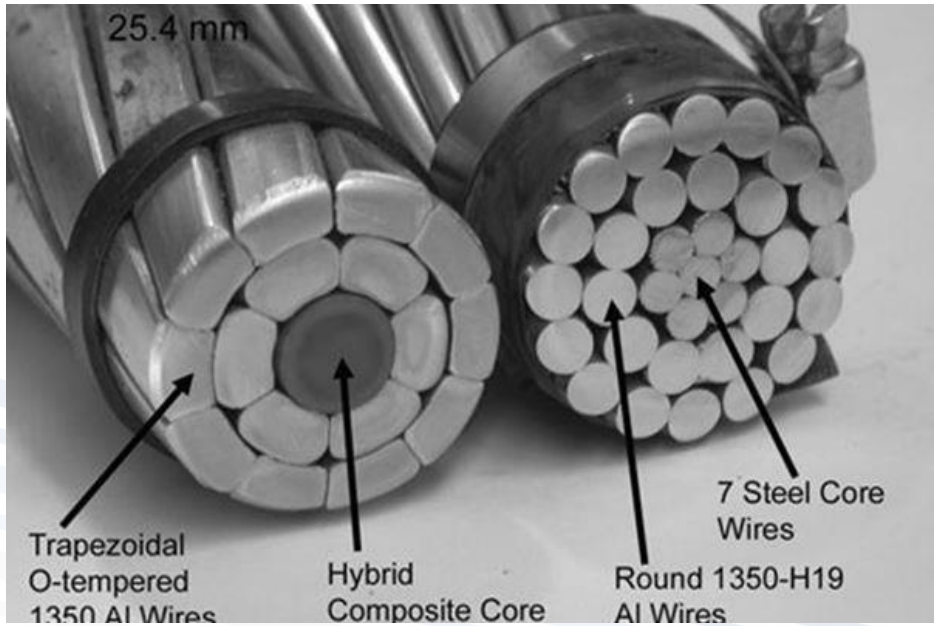


Innovation in Practice

RIIO-T1 Innovation

Business as Usual Funded

- HVDC
- Station Bus to IEC 61850
- ACCC Conductor
- Geographical Information System
- Cyberhawk
- Alternative Approach
- Flexible Connections
- ……..



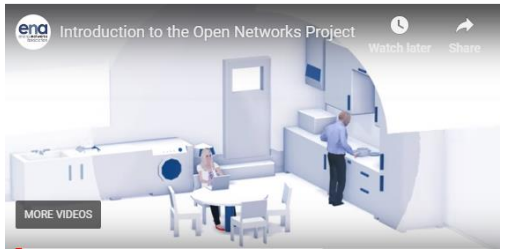
3rd Party Funded

- Multi Terminal Test Environment
- NeSTS – New Suite of Transmission Structures
- RAINMAN
- Dynamic Line Rating
- ……..

Innovation Landscape

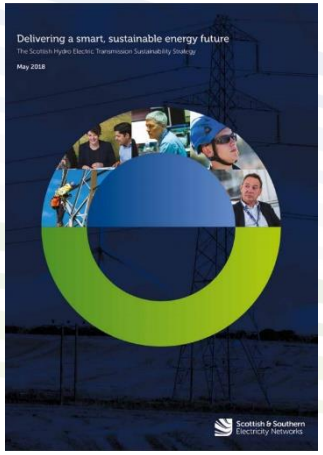
3. IDENTIFY
Changing Drivers

Customer + Stakeholder



External - OFGEM, ENA and more..)

Internal - (SSE and SSEN)



Ofgem Reforms

3. IDENTIFY
Changing Drivers

Innovation Decisions summarised below:

- *Fund majority innovation through Business as Usual*
- *Focus innovation stimulus funding on projects which support the energy transition*
- *Greater coordination with other public sector innovation funding*
- *Increased third party involvement in network innovation project*

SHE Transmission Innovation Principle

4. DEFINE

SHE Transmission Innovation Values

RESPONSIBLE INNOVATOR

Be an agile, responsive and future facing Innovator

SHE Transmission Innovation Values

4. DEFINE

SHE Transmission Innovation Values

Potential Innovation Opportunities

5. GENERATE
Potential Innovation Opportunities

What areas could we look to focus our efforts in?

a. Network improvements and system operability	b. Transition to a low carbon future	c. New technologies and commercial evolution	d. Customer and stakeholder focus	e. Safety, health and environment
Network Automation	Distribution System Operator Transition	Alternative Construction Methodologies	Accelerated Connections	Alternative Asset Inspection Methods
Maximise Asset Life	Energy Storage Network Integration	Adoption of New Market Models	Flexible Customer Connections	Environmental factors
Digital Substation Evolution	Whole System Considerations	Deployment of New Technologies	Provision of Data	Advanced Materials in Design and Construction

Strategic Decisions

	Optimise Core Business				Enhance Core Business				Disrupt Core Business			
	✓*Incremental improvement* ✓*Enabling and not blocking* ✓*Following best practice* ✓*Implementing new policy*				✓*Driving Innovation Progress and Forward facing* ✓*Driving ENA Open Networks* ✓*Working within existing frameworks* ✓*Shaping industry policy*				✓*No holds barred* ✓*Driving Ofgem* ✓*Future Customer focused* ✓*Heading for procedural change* ✓*Steering national & international policy*			
	Decision	**EFFORT**	**VALUE**	**RISK**	**Decision**	**EFFORT**	**VALUE**	**RISK**	**Decision**	**EFFORT**	**VALUE**	**RISK**
SF6 Replacement Strategy	*Install SF6-free equipment on new (132kV) projects*	**M**	**M**	**M**	*Replace SF6 in all existing GIB (where market ready)*	**H**	**M**	**M**	*Remove X% of SF6 AIS CBs and replace with SF6 free alternative*	**H**	**H**	**H**

Next Steps

- Draft Strategy
- Extensive mapping of Innovation areas
- Agree Innovation Target Areas
- Review Strategic Decisions with Stakeholder
- Finalise Strategy

Morning wrap-up

Dave Gardner

Lunch

Afternoon expert surgery sessions

- The Connections process (Alex Stuart)
- Innovation (David Paton)
- Sustainability (Alex Sutton)
- Environment (Richard Baldwin)