

ENA SHE Conference

David Gardner

SSEN



Scottish & Southern
Electricity Networks

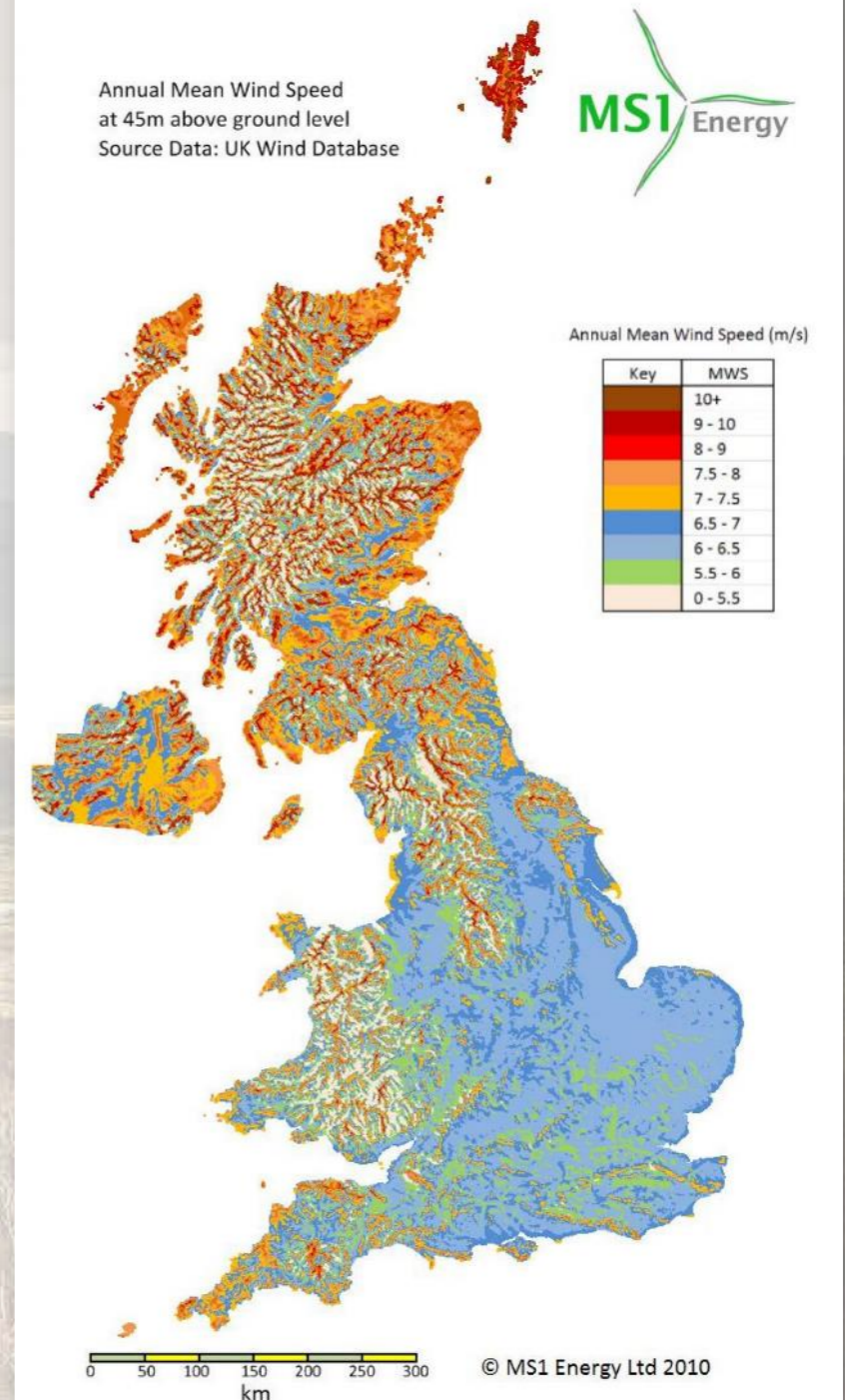
2002-2010

Putting in place the building blocks for the growth in renewables

*Government policy and enabling legislation
Essential regulatory and industry reforms*

Key Dates

- 2002 Renewables Obligation (Scotland) comes into affect
- 2002 Renewable Energy Transmission Studies (RETS)
- 2004 Transmission Investment for Renewable Generation (TIRG) funding mechanism
- 2008 Climate Change Act to reduce emissions by 80% by 2050
- 2010 Transmission Access Reform: "Connect and Manage" implemented
- 2010 Planning consent granted for Beaully Denny overhead line project
- 2010 Feed-in tariffs paid for sub-5MW renewables



Onshore Renewables 2010/2012

Challenges:

- To deliver £1.2bn of CAPEX over 30 months
- Limited internal construction capability
- Main already contractor placed
- Civil contractor selection
- Relationships across contractor interfaces
- NATS Radar issues



Onshore Renewables



Transmission – My Challenges

- Grow the business by >200%
- Planned spend £3bn to £5bn in RIIO-T1
- £670m Beauly Denny overhead line challenges
- Limited construction capability
- 120 staff but we needed 400
- Politically (external) pressure
- ‘Limited’ operational team
- Outage management
- ‘Old’ 1950s assets
- RIIO-T1

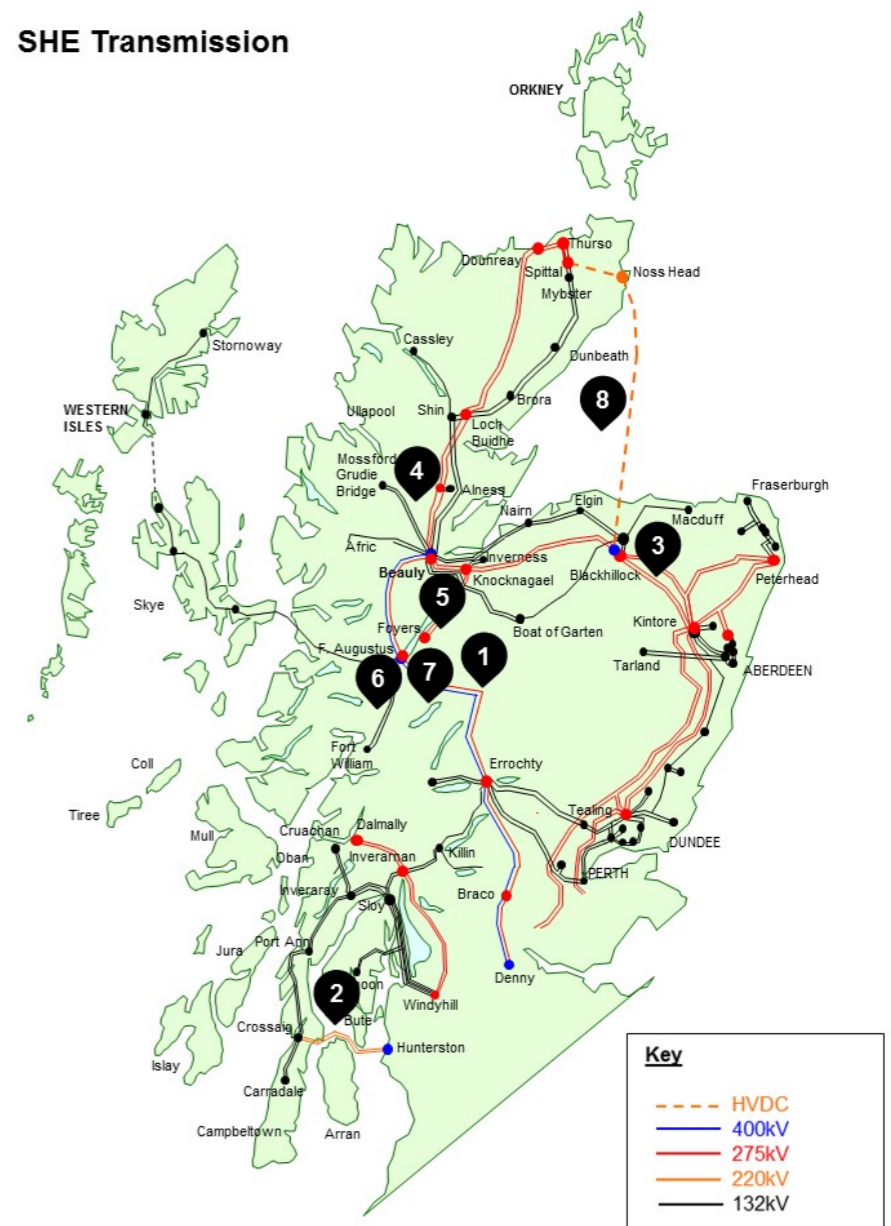
Transmission - Focus

- Leadership and trust
- Chaotic approach to projects
- SSEN Staff and Contractor Capability
- SSEN/Contractor relationships
- Impact of remote site locations
- AC Operational Safety Rules

Transmission – Key Projects

A £2.8bn track record of delivery capability, on time and under budget

1. Beauly Denny
2. Kintyre Hunterston
3. Beauly-Blackhillock-Kintore
4. Beauly Mossford
5. Foyers Knocknagael
6. Fort Augustus
7. Stronelairg
8. Caithness Moray

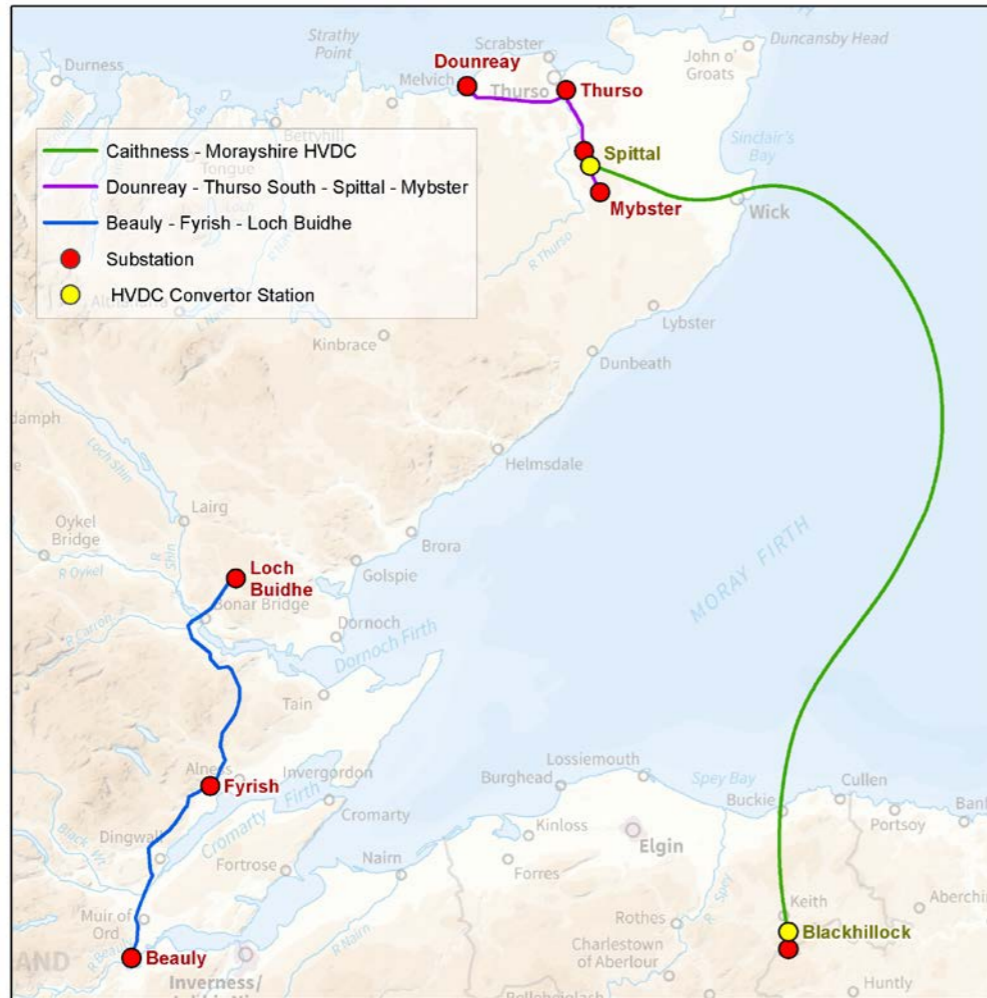


Beauly Denny Transmission Line



1. Increasing B4 boundary transfer capacity
2. 220km line 400kV/275kV line
3. Altitudes over 2500 feet
4. £670m budget

Caithness Moray - Project overview



1. Purpose to increase the B0 and B1 boundary transfer capacities to over 1000MW.
2. Onshore AC substations and overhead lines. Onshore HVDC converter stations cable and offshore HVDC cable
3. Eleven Major EPC Contracts: ABB, Balfour Beatty, Siemens, BAM Nutall, GE, Wood, NKT

Caithness Moray - Key stats

- Unlocks **1200MW** of renewable generation from across the north of Scotland
- **£1.1bn** project, largest ever single investment undertaken by SSE Group
- **First HVDC** system solely in Scotland
- Over **6 million** hours worked
- Largest substation in UK, equivalent to **24 football pitches**
- Energised **end of 2018**

Thurso 275kV Substation



Mybster AC 132/33kV Substation



		<table border="1"><tr><td>Project</td><td>Date Issued</td><td>Version</td></tr><tr><td>Mybster</td><td>28/04/2017</td><td>01</td></tr><tr><td>High Voltage</td><td>Submitted By</td><td>Checked By</td></tr><tr><td>132/33kV AC</td><td>CM</td><td>RST</td></tr><tr><td>April 2017</td><td>Processed By</td><td>Date Issued</td></tr><tr><td></td><td>IC</td><td>28/04/2017</td></tr></table>	Project	Date Issued	Version	Mybster	28/04/2017	01	High Voltage	Submitted By	Checked By	132/33kV AC	CM	RST	April 2017	Processed By	Date Issued		IC	28/04/2017
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Loch Buidhe AC 132/275kV Substation



CYBERHAWK
Aerial Inspection and Surveying Specialists

Blackhillock AC 275/400kV Substation



Spittal



Spittal 800MW HVDC Converter Station



IGBT Valve installation at Spittal

Purpose built specialist cable laying vessel



CLV Victoria underway from Ulsteinvik, Norway

Subsea: Scar Plough – Trenching mode



CAITHNESS-MORAY OVERVIEW 1

£643.5m

spent with UK-based suppliers



10,971

years of employment
supported in the UK



4,975

years of employment
supported in Scotland

£265.5m

Gross Value Added to Scotland's economy

SSEN TRANSMISSION PERFORMANCE OVERVIEW

Over 300% growth of SHE Transmission driven by renewable generation

Expenditure forecast £3.4 billion, of this c.70% through uncertainty mechanisms

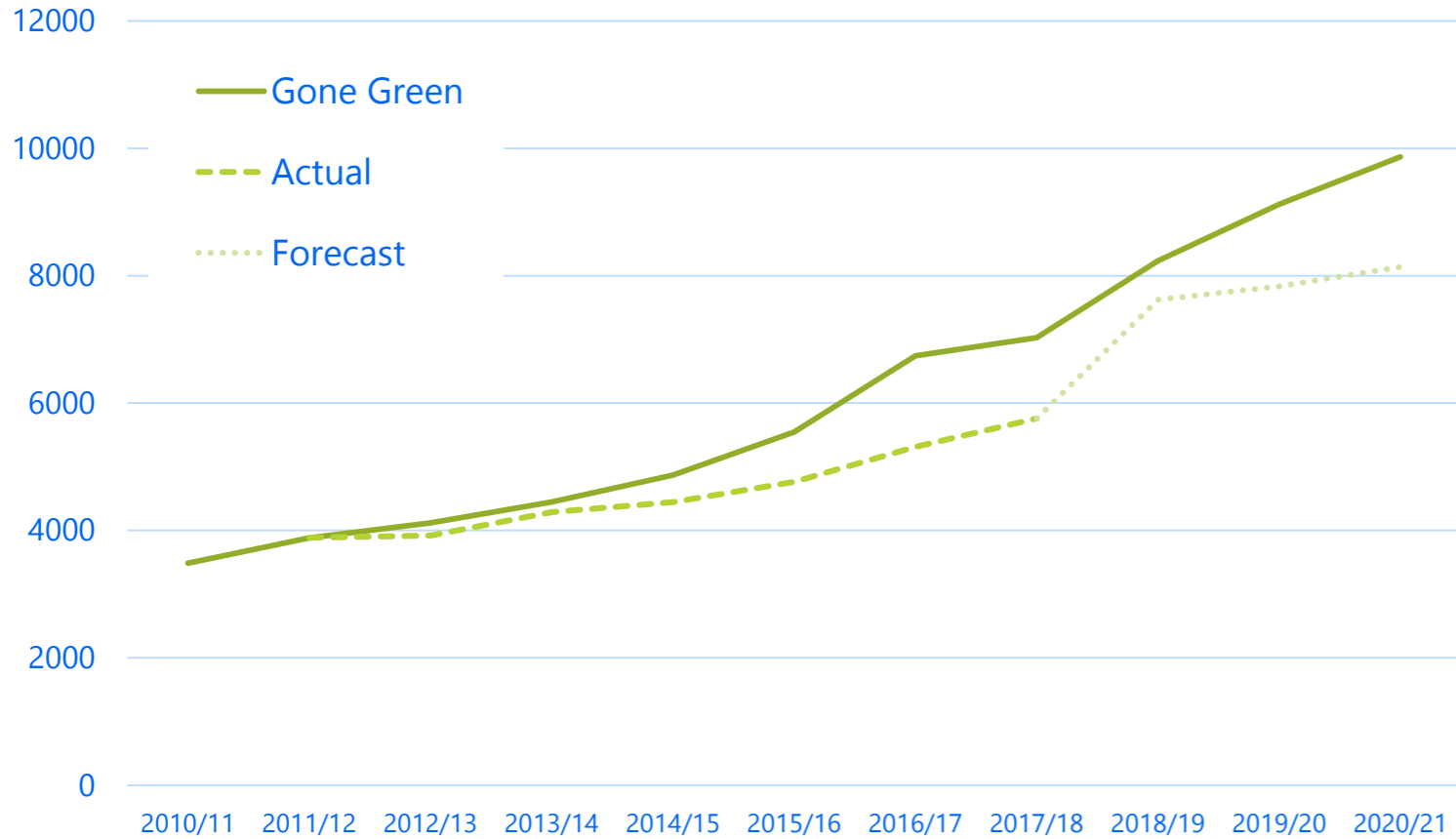
System reliability maintained at 99.999%

Connection offers made on time and delivered at customers' timescales

Customer satisfaction at 80%

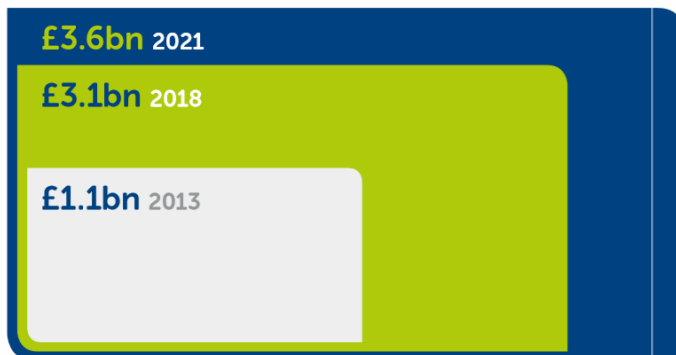
Leadership in sustainability

Use of new technology and ways of working to achieve efficiency in operation



Regulated Asset Value (RAV) at end of year

The RAV is a useful indicator of the growth in the size of our network over the price control period and we are forecasting that by March 2021 it will reach £3.6bn.



Return on Regulatory Equity (RoRE)

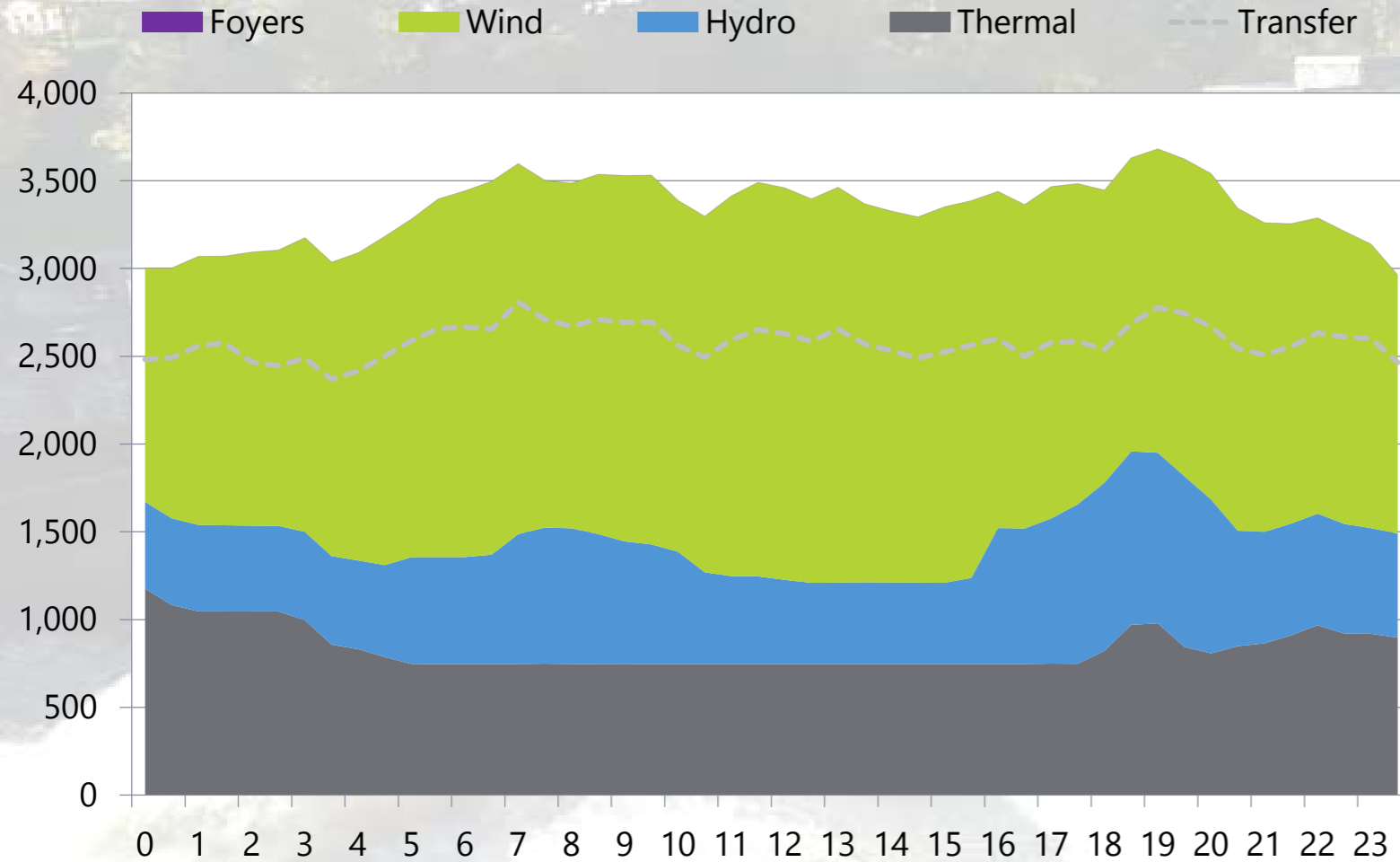
9.7%

(excluding Transmission Investment for Renewable Generation (TIRG))

Return on Regulatory Equity (RoRE)

(8 year average for RIIO-T1)

TUESDAY 16 OCTOBER 2018



In the north of Scotland...

83% of connected generation is renewable technologies

Peak demand is around one third of peak generation

Under prevailing conditions, there is a net export to the south

All GB energy users benefit...

Our strategic investment appraisal determines the costs (infrastructure, subsidy) are outweighed by the benefits (carbon, wholesale energy)

Take-Aways Messages for Successful SHE

- Decisive Leadership
- Collaborative Teamwork
- Good Contractor Relationships
- Detailed Planning
- Early Design Freeze
- Rigorous Quality Control
- Risk Management (Schedule and Cost)
- Early Engagement with Operations Unit
- Rigour in SHE
- Skilled People

Questions?



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