



Scottish & Southern
Electricity Networks

Scottish Hydro Electric Transmission plc

Annual report of the Managing Director of
Transmission



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This report and statement have been prepared by the Managing Director of Transmission for the directors of Scottish Hydro Electric Transmission plc (SHE Transmission) in accordance with the provisions of paragraph 4(b) of Special Condition 21, Independence of and appointment of managing director of the Transmission Business, of SHE Transmission's licence.

SHE Transmission is a wholly-owned subsidiary of SSE plc (SSE). SHE Transmission is managed and operated as part of Scottish and Southern Electricity Networks (SEN) in accordance with the direction issued by the Gas and Electricity Markets Authority (the Authority) under paragraph 9 of Special Condition 21 of SHE Transmission's licence.

This report and statement have been made as soon as practicable after the end of the calendar year 2017.

Report for the year ending 31 December 2017

As the Managing Director of Transmission, I am responsible for the conduct of the transmission business and any external transmission activities.

This year has been a successful year for SHE Transmission with significant progress across many areas including:

- Continued progress in the construction of the Caithness Moray HVDC scheme including energisation of the AC infrastructure elements of the project.
- Progression and completion of several significant schemes to facilitate connection of renewable generation across the network.
- Continued development of operations' capabilities.
- Contribution to the annual Network Outputs Assessment (NOA) in conjunction with National Grid along with significant progression of a number of strategic development schemes.

In making this report for the year 2017, I consider the above factors that are of material impact to the conduct of the transmission business.

Caithness-Moray HVDC Scheme

The flagship project, Caithness-Moray, is being built to provide the capacity for around 1.2GW of renewable generation to connect in the north of Scotland with an overall anticipated expenditure of circa £1.1bn.

It is centred on a 160km land and subsea cable running beneath the Moray Firth, using High Voltage Direct Current (HVDC) technology. As well as the requirement for HVDC converter stations connecting the HVDC cables onto the AC transmission network, the project scope also includes construction of substantial AC infrastructure (overhead line and substation works) in both Caithness and Moray, including construction of one of the largest transmission substation sites in Europe at the existing Blackhillock site in Moray.

Significant progress has been made across all elements of the Caithness Moray scheme during 2017 with the following highlights:

- Completion of all mechanical and electrical installations and commissioning at Dounreay, Thurso, Loch Buidhe, Fyriish and Blackhillock AC substations.
- First Energy milestone achieved on Dounreay, Thurso, Loch Buidhe and Blackhillock AC substations.
- Completion of installation of new OHLs between Dounreay, Thurso and Mybster substations and OHL reinforcements between Beauly, Fyriish and Loch Buidhe substations.



Caithness-Moray – Fyrish AC substation

- Continued progress on civil installation at both HVDC converter sites (Blackhillock and Spittal) along with commencement of the mechanical and electrical installations.



Caithness-Moray – AC substation is in the foreground with converter station in the background

- Installation of onshore cable works in both Caithness and Moray was completed.
- The subsea cable installation works commenced in early 2017 with the preparatory boulder clearing operation across the 113km cable route. This was followed by pre-cut trenching into which the HVDC and fibre cable bundle was placed in two separate campaigns. The landfall cable pull-in at the Caithness end and the subsea joint in the Moray Firth were successfully completed. Post-cable lay jet trenching was carried out in areas of particularly soft seabed. Rock placement operations (to provide cable

protection) commenced and continued into 2018.



NKT Victoria CLV (cable lay vessel) used to lay HVDC subsea cable

Other Significant Schemes to Facilitate Connection of Renewable Generation

Several other significant schemes were progressed or completed during 2017 to provide connections for specific generators:

- Progression of infrastructure works to enable the early connection of the Stronelaig (227MW) wind farm scheme in early 2018.



Melgarve Substation and cable route to Stronelaig Windfarm



Winter Conditions on the cable route between Stronelaig Windfarm and Melgarve Substation

- Progression of works required to connect the Dorenell (220MW) wind farm scheme in 2018 including the deployment of new composite pole technology.



Installation of Composite Poles on Dorenell Wind Farm connection project

SHE Transmission also received and completed 64 generation connection applications, within 60 days of receiving a full application, during the year.

The volume of offers requested and provided has not decreased significantly from 2016, reflecting the ongoing steady demand from renewable generators looking to connect onto the network. Government announcements in relation to future generation subsidy levels means that future generation applications are likely to reduce year on year.

Operations Development

During 2017, SHE Transmission has continued to develop the operations team taking account of the increased asset base and new technologies deployed on the network.

This has seen the operations team increase from 158 Full Time Equivalents (FTE) to 177 FTE during the year with additional focus in the following key areas:

HVDC Resourcing

In preparation for the commissioning of the new HVDC link between Caithness and Moray, the operations team is in the process of finalising operating and maintenance processes for the system. This includes a long-term service agreement with the Principal Contractor, ABB, to operate and maintain the HVDC convertor stations as well as significant upskilling of existing staff in disciplines such as the Control Room, Protection and Control, and the Field Unit. Emergency call off contracts for subsea cable repairs are also being finalised.

The National HVDC Centre

Further to funding success in Ofgem's Network Innovation Competition (NIC) the National HVDC Centre was opened in Cumbernauld on 26 April 2017.



The centre is a simulation and training facility that will support and de-risk the integration of the Caithness-Moray HVDC scheme into the GB grid. It is available to support any proposed or existing GB HVDC scheme, primarily through the hosting of control replicas that will enable real-time simulation of grid operation with increasing numbers of HVDC connections with Europe and within GB.

Network Output Measures (NOMs)

SHE Transmission is working collaboratively with National Grid Electricity Transmission, Scottish Power Transmission and Ofgem to finalise the Network Output Measures Common Network Asset Methodology. This includes introducing Condition Based Reliability Monitoring (CBRM) to assist with asset condition as well as key measures for asset health and criticality. It is intended that this methodology will be submitted in October 2018.

Asset Management

An enhanced asset management function has been established and will continue to recruit during the early part of 2018. The team will focus on network resilience and reliability, smart monitoring, risk and consequence scenario planning, and asset data improvements. This includes the introduction of new information systems to manage asset data and work scheduling, and the use of drone technology to capture network condition and asset information.

SHE Transmission also has an ongoing program of works to maintain the condition of existing assets on its network. In addition to the routine asset replacement and upgrade projects there are several significant schemes in planning or underway on the network.

Significant progress was made on two such schemes during 2017:

- Development of the Beaully-Inverness-Keith project that will reconductor 102km of existing steel lattice towers. Construction works will begin in 2018.
- Construction commenced to reconductor the existing 132KV overhead line between Fort Augustus and Fort William. This scheme involves reconductoring 43km of overhead line across challenging terrain with the added complication of maintaining supplies in the Fort William region.

Network Options Assessment (NOA) & Strategic Project Development

During 2017, SHE Transmission contributed to the development of the 2017/18 NOA in conjunction with National Grid Electricity Transmission (NGET) and continued to progress development of the Scottish Island links. It's anticipated that 2018 will see ongoing focus to act upon the recommendations from the NOA along with further significant development of the island links.

Network Options Assessment and East Coast

The 2017/18 Network Options Assessment (NOA) Report was published by the System Operator (SO) in January 2018, delivering the SO's view on optimal reinforcement requirements across the GB transmission system. These recommendations affect all three Transmission Owners. From SHE Transmission's submitted list of 8 reinforcement options, based on 6 Main Interconnected Transmission System (MITS) boundaries, three 'proceed' recommendations were received from the SO for reinforcement on the east coast.

These included:

- A recommendation for SHE Transmission to proceed with a capacity increase on the existing East Coast onshore 275kV system by 2023.
- A recommendation for SHE Transmission to proceed with an incremental upgrade of the existing East Coast network from Blackhillock to Kincardine to operate at 400kV (builds on top of (l) above) by 2026.
- A recommendation for all three TOs to proceed with the East Coast Subsea High Voltage Direct Current (HVDC) Link from Peterhead to Hawthorn Pit by 2028, although it has been shown that significant benefit can be achieved by advancement by one year.

The SO found all three projects were optimal in all the future energy scenarios and optimal at their Earliest In-Service Dates (EISDs), meaning that these are very strong 'proceed' recommendations that the TO(s) should progress in the coming year to maintain their EISDs.

Islands Needs Cases

There is a strong driver from generation developers to provide a transmission link for all three Island groups (Orkney, Western Isles and Shetland) and work progressed throughout 2017 to maintain the required development programs:

- The Needs Case for Orkney was submitted on 5 March 2018 and the business is currently in full assessment mode with Ofgem on the Needs Case. The Project Assessment is due for submission in September 2018.
- The Western Isles Needs Case is under preparation and is due to be submitted in July 2018 with the Project Assessment due in January 2019.
- The Shetland Needs Case is under preparation and is due to be submitted in September 2018 with the Project Assessment due in January 2019.

While the above factors have impacted the operation of the transmission business during the year, it is my opinion that adequate staff, resources and finances were available to the business.

During the year ending 31 December 2017, it is my opinion that the transmission business was efficiently and effectively managed and operated in accordance with SHE Transmission's duty under section 9(2)(a) of the Electricity Act 1989 and the transmission licence.

I report on the matters pertinent to the discharge of my responsibilities below.

Staff and Resources

Adequate staff and resources were available to the transmission business during the year ending 31 December 2017.

During the last calendar year, staff numbers increased by 3.4 FTE, taking the headcount to 450.8 full time equivalent ("FTE") staff directly employed by SHE Transmission at 31 December 2017. In addition to transmission staff, services are provided by Scottish Hydro Electric Power Distribution plc ("SHEPD") along with corporate services from SSE Services plc.

As part of the SSEPD management structure and SSE Services plc corporate structure, the resources available to the transmission business include the use of premises and staff and these are subject to the conditions under paragraph 9 of Special Condition 2I of SHE Transmission's licence. Use of premises and staff is subject to service level agreements and annual audits on cross subsidy are undertaken and submitted to Ofgem.

All staff employed by SSE are notified of SHE Transmission's obligations under Special Condition 2B of SHE Transmission's licence.

Finance

Adequate finance was available to the transmission business during the year ending 31 December 2017. SHE Transmission's financial year for both statutory and regulatory reporting is 1 April to 31 March. Hence, this report covers a part of financial year 2016-17 and a part of financial year 2017-18. In respect of financial year 2016-17, the regulatory accounts were approved by the directors on 19 July 2017. Regulatory accounts for the financial year 2017-18 are currently under preparation and will be available for approval in July 2018.

Looking ahead; Arrangements for the year ending 31 December 2018

It is my opinion that adequate arrangements have been made for the year ending 2018 for the efficient and effective management and operation of the transmission business in accordance with SHE Transmission's duty under section 9(2)(a) of the Electricity Act 1989 and the transmission licence.

These arrangements allow SHE Transmission to maintain full managerial and operational independence of the transmission business from SHE Transmission's affiliates and related undertakings (subject to the direction issued by the Authority under paragraph 9 of Special Condition 21 of SHE Transmission's licence).

In respect of financial year 2017-18, on 19 July 2017 the directors approved a Certificate of Availability of Resources that confirmed their reasonable expectation that SHE Transmission would have sufficient financial resources and financial facilities for the subsequent 12 months. This covers the period to 31 March 2018. The Availability of Resources statement for 2018-19, covering the period up to 31 March 2019, is in the process of being updated and this will be available for approval and will be submitted to Ofgem in July 2018 in accordance with the licence.

Adequate staff and resources will be available to the transmission business for the planned programme of works. Toward the end of the 2017 calendar year a full bottom up review of resources was undertaken and this identified that an overall headcount of 481.7 FTE is required, an increase of 30.9 FTE on the headcount at the end of 2017. Recruitment toward this increased headcount will continue throughout 2018.

The additional FTE have been identified to respond to several challenges facing the transmission business. Firstly, the unprecedented coincidence of the needs case and project assessment development for the Island projects has meant additional resources are required across a variety of teams within the business. It is envisaged that most these resources will transition into the construction teams should the Island projects progress to this stage. Secondly the enhancement of the operations team and the introduction of HVDC technology to the network will place new demands on the business and additional resource is required to adequately respond to these demands.

During 2016 and reported last year, SHE Transmission undertook a capital restructuring exercise. There has been no further restructure in 2017. SHE Transmission is adequately funded at 31 December 2017 having diverse sources of funding comprising External Loans with EIB at £650m along with £1,063.1m Internal Loan Stock all repayable on 2021 and beyond. SHE Transmission also has £179m of net inter-company balances payable/repayable on demand. Cash and Bank balances amounted to £17m.

At 31 December 2017, SHE Transmission had access to the groups £1.3bn committed Revolving Credit Facility maturing in July 2022 and a £200m Bilateral committed facility from Bank of China maturing November 2022. In addition to this there was a £200m EIB facility (split £100m SHET and £100m SSE plc) available to March 2018. These were drawn on 9 March as 10-year Term Loans.

Therefore, in my opinion, the available staff, resources and finance are adequate for the year ahead.

David Gardner

Managing Director of Transmission