Offshore Coordination:

How a coordinated approach enables net-zero(2 of 4 webinars)

3rd November 2021

The National HVDC Centre

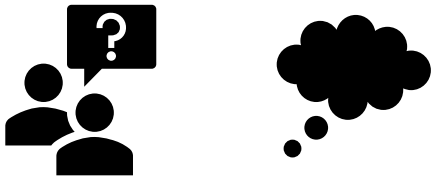
Scottish & Southern Electricity Networks

Welcome to the HVDC and Climate Change: What is HVDC and why is it important to achieving net-zero Webcast, the first in our series of 4

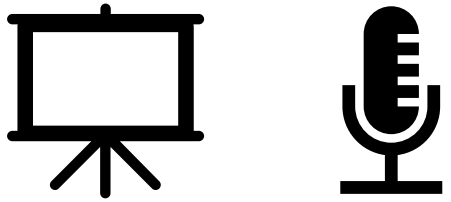
The National HVDC Centre

Due to large audience, please turn off video & put microphone on mute

Questions for speaker will be managed using MS Teams chat.



This webinar may be recorded. Link to slides will be shared after the webcast.



Considering a lot of participants are expected, it may not be possible to address all questions or comments live however we will do our best.

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Agenda:

1. Introductions
2. Overview of the HVDC Centre
3. Context
4. Video: **How a coordinated approach to offshore enables net-zero**
5. Panel Discussion

Development of HVDC Connections in GB

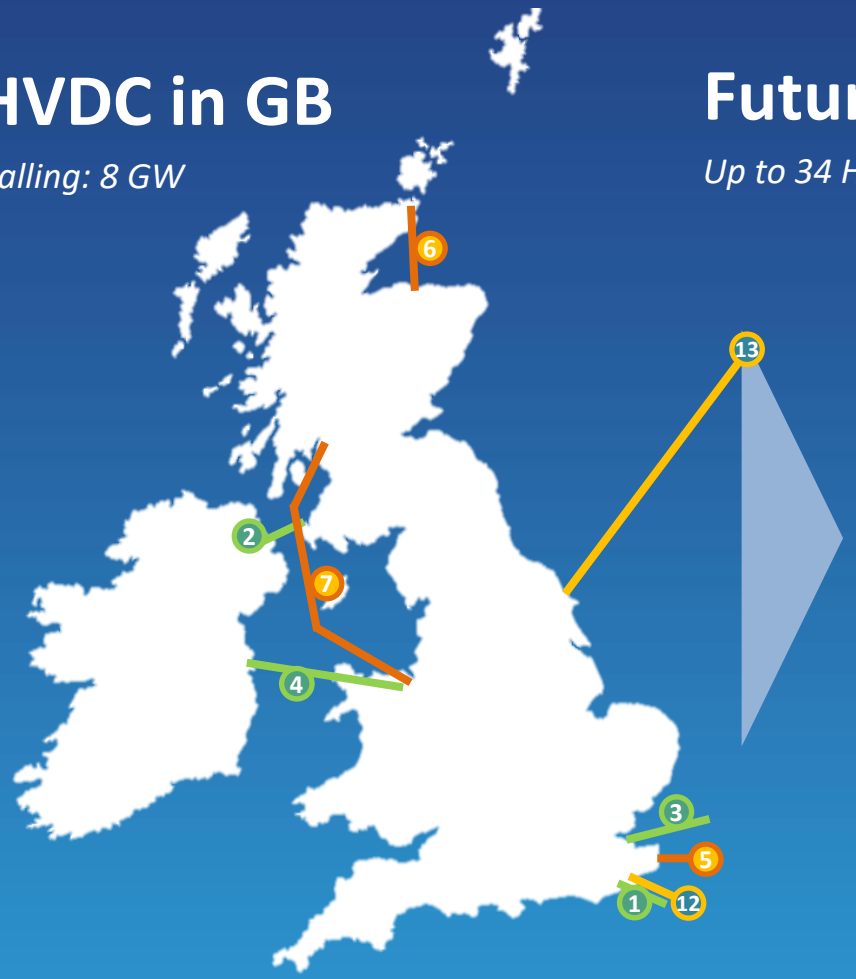
Current HVDC in GB

7 HVDC Links - Totalling: 8 GW

Interconnectors:
1) Cross Channel (IFA)
2) Moyle
3) BritNed
4) EWIC

New Interconnector:
5) Nemo

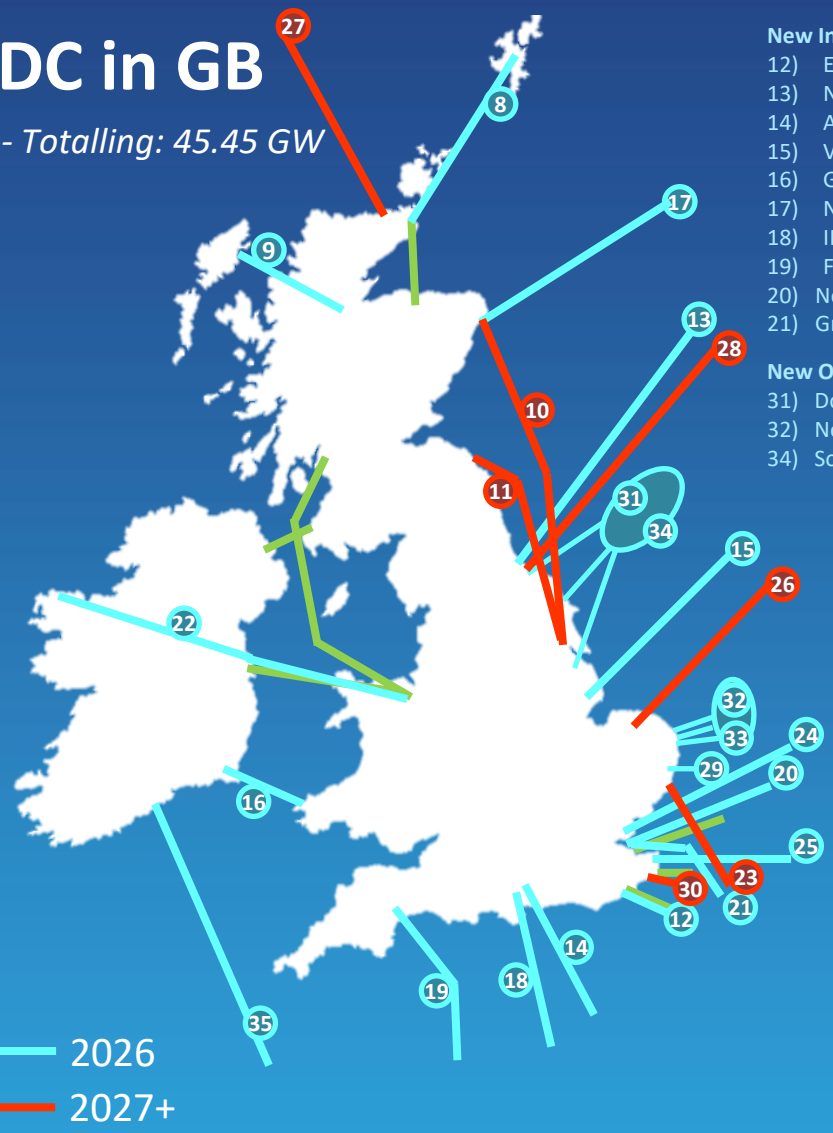
New Embedded Links:
6) Caithness – Moray
7) Western Link



Source: National Grid Interconnector Register 01 08 2019

Future HVDC in GB

Up to 34 HVDC Links - Totalling: 45.45 GW



New Island Links
8) Shetland
9) Western Isles

New Interconnectors
12) ElecLink
13) NSL
14) Aquind
15) Viking
16) GreenLink
17) NorthConnect
18) IFA2
19) Fablink
20) NeuConnect
21) Gridlink

New Offshore Wind Connections
31) Dogger Bank
32) Norfolk Vanguard
34) Sofia

New Embedded Links
10) Eastern Link 2
11) Eastern Link 1

Additional Interconnectors
26) Aminth
27) Atlantic Super Connection
28) Continental Link

The National HVDC Centre – About us

The National HVDC Centre

The National HVDC Centre is an Ofgem funded simulation and training facility available to support all GB HVDC schemes.

Ofgem determination takes us from Innovation to BAU for RIIO-T2

The National HVDC Centre

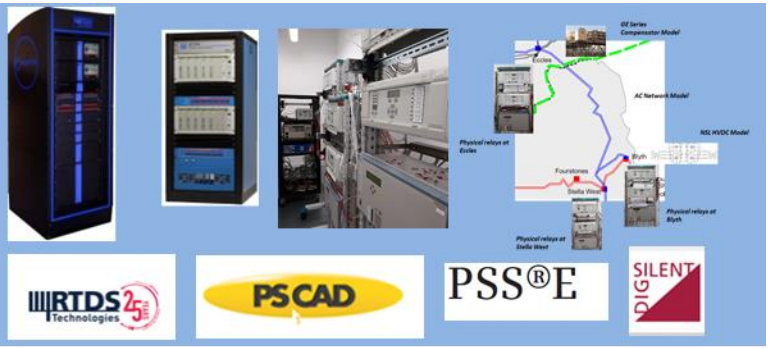
part of Scottish & Southern Electricity Networks

together with nationalgrid SP ENERGY NETWORKS

Tools

RTDS and HiL environment
(Enhanced Testing, Multi- Device Grid Integration, Protection & Control system, modification acceptance, post event investigation validation analysis)

Simulation environment (RTDS->EMT->RMS)
(Validation, Benchmarking, analysis)



Systems

Collaboration
(models, analysis, direction)

Codes, Standards, R&D
(expert input, workstream support)

The National HVDC Centre · SP ENERGY NETWORKS · Scottish & Southern Electricity Networks · nationalgrid · nationalgridESO · Grid Code · cigre · PROMOTioN PROGRESS ON MESHED HVDC OFFSHORE TRANSMISSION NETWORKS · entsoe · EPRI ELECTRIC POWER RESEARCH INSTITUTE

Skills

Structured Training
(Webinars, Courses, Application & Implementation)

Control training
(Operator Certification, Scenario Planning, Updates)

Research dissemination
(Analysis Techniques, Risk Quantification, Solution Definition)

The National HVDC Centre is part of Scottish & Southern Electricity Networks and is funded through the Electricity Network Innovation Competition as the Multi-Terminal Test Environment (MTTE) Project. Scottish and Southern Electricity Networks is a trading name of Scottish Hydro Electric Transmission plc, Registered in Scotland No. SC213461, having its Registered Office at Inveralmond House, 200 Dunkeld Road, Perth, PH1 3AQ; and is a member of the SSE Group www.ssen.co.uk

Scottish & Southern Electricity Networks

Overview of the HVDC Centre: the Team

A team of HVDC experts; providing experience across: academia, system operator, power systems consultancy, transmission innovation and HVDC manufacturers.

Ben Marshall

HVDC Technology Manager

Simon Marshall MA

Centre Manager

Ian Cowan MEng MIET

Lead Simulation Engineer

Bharath Ponnalagan CEng

Senior Simulation Engineer

Colin Cameron

ICT Engineer

Dr Linda Rowan

Technical Project Officer

Habibur Rahman

Simulation Engineer

Nikhil Sharma

Simulation Engineer

Fabian Moore

Simulation Engineer

Recruiting

Simulation Engineers

Context (1)

- Meeting the net zero objectives depends on enabling offshore transmission
- The development of offshore transmission networks to-date has been led by individual wind farm developers
- The department for business, energy and industrial strategy (BEIS) is leading an industry consultation on using a more coordinated approach (The Offshore Transmission Network Review – OTNR)
- Ofgem and National Grid ESO are partners in BEIS OTNR, and running consultations on coordinating the development of offshore networks with their stakeholders
- This webinar aims to focus on high level technical concepts surrounding how you would achieve a coordinated offshore network using HVDC solutions

https://www.gov.uk/government/groups/offshore-transmission-network-review

https://www.ofgem.gov.uk/publications/consultation-changes-intended-bring-about-greater-coordination-development-offshore-energy-networks

https://www.nationalgrideso.com/projects/offshore-coordination-project

Context (2)

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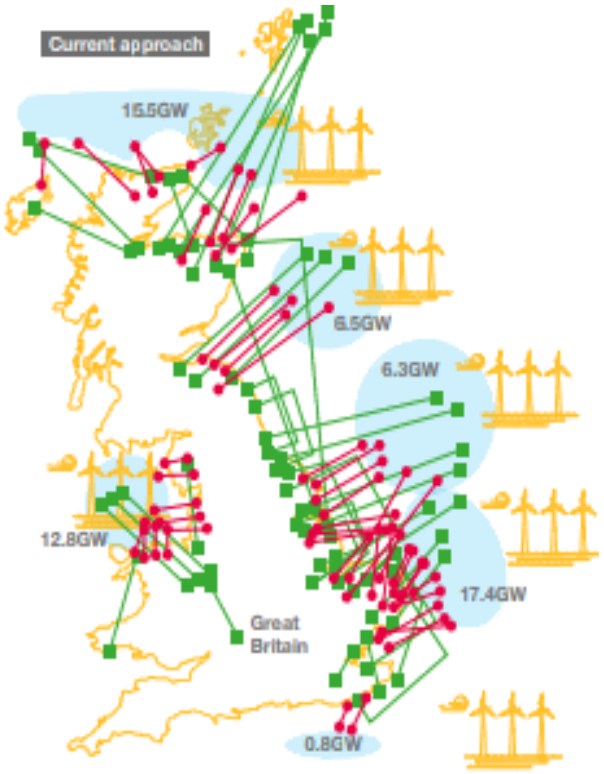
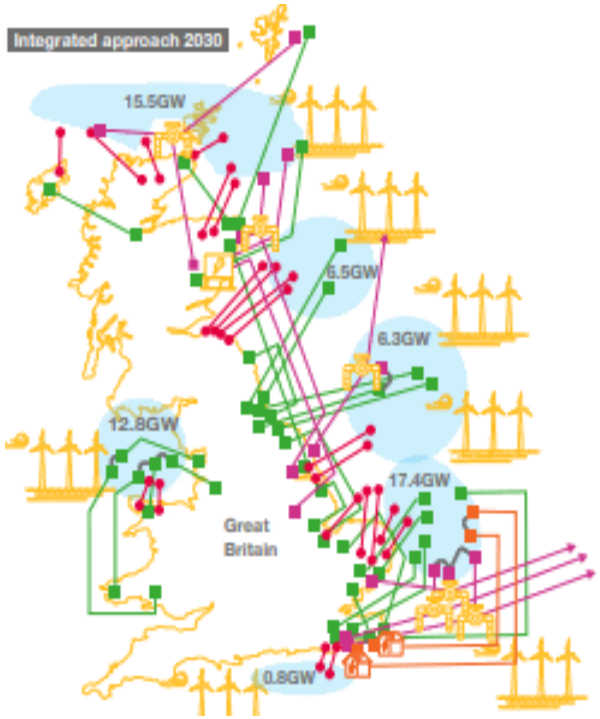
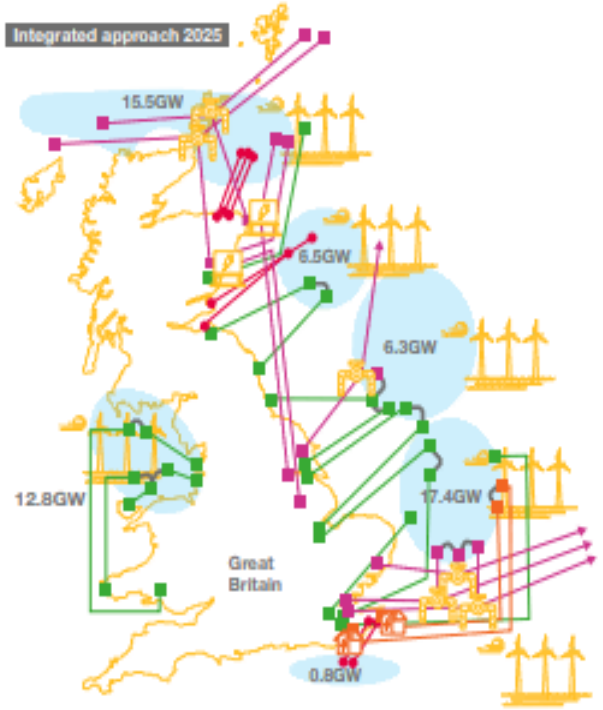
Status Quo



Integration from 2030



Integration from 2025



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Video: How a coordinated approach to offshore enables net-zero

Panel Discussion

Panel members

Ben Marshall, HVDC Technology Manager, The National HVDC Centre

Dr Biljana Stojkovska , Offshore Coordination Technical manager, National Grid ESO

Moderator: **Fabian Moore**, Lead Simulation Engineer, The National HVDC Centre

Future Webinars

3) Building a Better Network: A technical discussion on how HVDC can enable a more stable network whilst integrating renewable generation.

Date: Friday 5 November 2021

Time: 13:00-14:00 GMT

Click here to register: https://forms.office.com/r/P3mk00v4JD

4) HVDC R&D Strategy for Coordinate Offshore: Exploring the innovations required to meet net-zero.

Date: Thursday 11 November 2021

Time: 13:00-14:00 GMT

Click here to register: https://forms.office.com/r/0etQ5natdM

Co-ordination of design= control coordination

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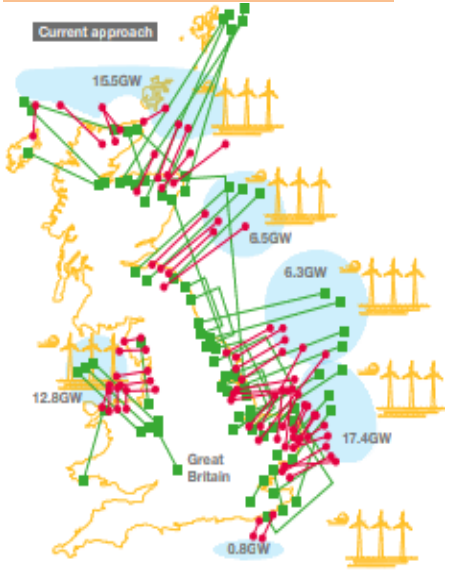
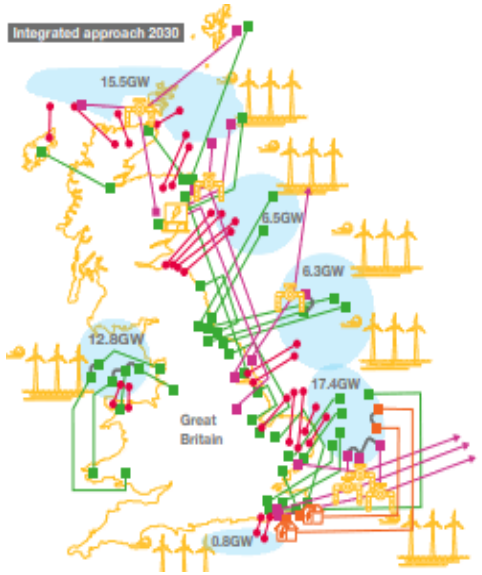
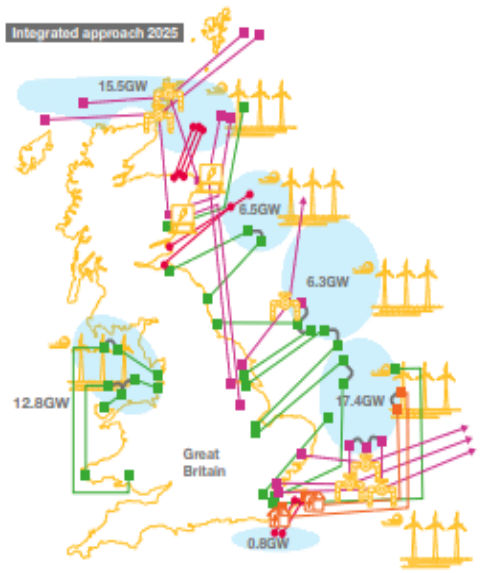
Status Quo



Integration from 2030



Integration from 2025



- Point-point Project arrangements
- Onshore performance is project-defined;
- Many individual small convertors, geographically spread on edges of network incrementally harder to deliver; &
- Impacting onshore system reinforcement and driving need for system support.

- Multi terminal, Multi-Project, integrated with MPI
- Onshore performance = product of combination of projects & control systems- ***if technical needs are clear.***
- Larger strategically located convertors, providing support to the onshore network and each other- ***if specifications are co-ordinated.***
- Complementing & optimising onshore system reinforcement and providing system support –***if design, testing and operation is co-ordinated***

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Thanks for listening.

Any questions, please?

- For further information, please visit **www.hvdccentre.com** ; OR email: **info@hvdccentre.com**
- **https://www.hvdccentre.com/technical-films/**

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