

NETWORK DC

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2023 EUROPEAN USER'S GROUP MEETING



AGENDA

- Network DC SIF Funded Project
- Objectives
- Project Partners
- Project Phases
- Use Case
- Future works





FUTURE 2050 GRID :

2050 - under current radial connections

2050 - with an integrated approach

Integrated 15.5GW Approach 15.5GW 0 6.5GW un. 6.5GW 8.1GW 8.1GW 12.8GW 12.8GV 17.4GW 7.4GW 0.7GW 0.7GW an an

Source: "A Connected Future" report by National Grid







Scottish & Southern Electricity Networks

-NETWORK-DC







NETWORK DC

Objective:

De-risking the first implementation of HVDC Circuit Breakers (DCCB), focusing on GB HVDC Grid development and paving the way for future expansion of HVDC interconnections.





NETWORK DC – SIF FUNDED





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Shaping power transmission



PROJECT PLAN

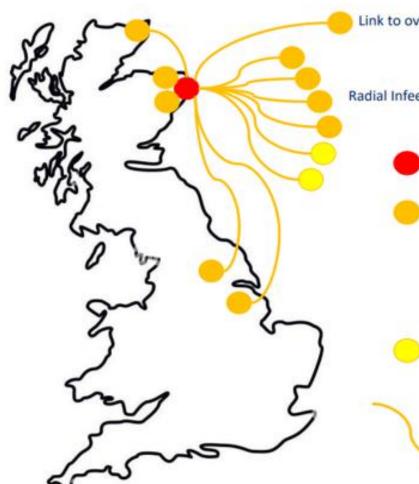
Discovery Phase	Alpha Phase	Beta Phase (Started in SEP-23)	
CBA	1. Use Case and its counterfactual	1. Appoint OEMs	
FEED	identified 2. Engagement with Manufacturers	 Design of a scheme-wide control and protection philosophy. Design of DCCB's – Functional 	
	3. Simulation and Specification of	Specification	A Future
De-risking	HVDC Requirements	4. Use OEM's proprietary equivalent	HVDC
Options	4. Development of Open Source	models to validate the DCCB parameters.	Network
	DCCB Models	5. Establish a replica of a DCCB	
Completed	Protection System Design and TEA	6. Use the replica to demonstrate	
in 2022	5. Updated CBA	performance in the GB network.	
	6. Completed in Jan 2023	7. Regulatory barriers and CBA.	
		8. Innovation roll-out and scale-up.	







THE PETERHEAD USE CASE



Link to overseas AC network

Radial Infeeds from offshore wind farms



HVDC Converter Stations Two at Peterhead One in the far north of Scotland (Spittal) Two in central England One in an another country Multiple at offshore wind farms (or other radial infeed sources)

Additional connections made possible by use of DCCBs

Links shown as single lines but all are BIPOLE connections

Recommendations for Integration of DC Circuit Breakers into DC Switching Stations

Scottish & Souther

SSEN-T is factoring DCCBs into current DCSS projects (future-proofing engineering)

> Realistic use case, incrementally built on existing HND "in flight" activities for 2030

IN NIT HVD 50



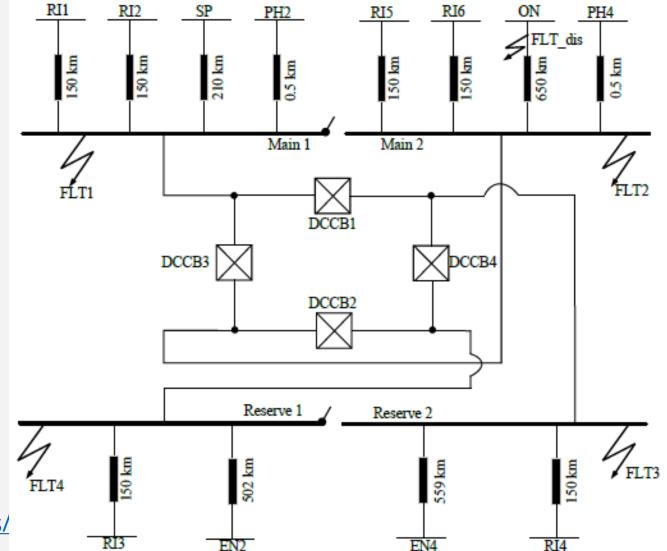


ALPHA PHASE

- RTDS for Preliminary studies
- DCCB's implementation in point-to-point HVDC Transmission system
- Modelling and testing
 - Hybrid DCCB
 - Mechanical DCCB
- DC reactor
- Use Case

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 <u>https://smarter.energynetworks.org/projects/</u> 10036946/

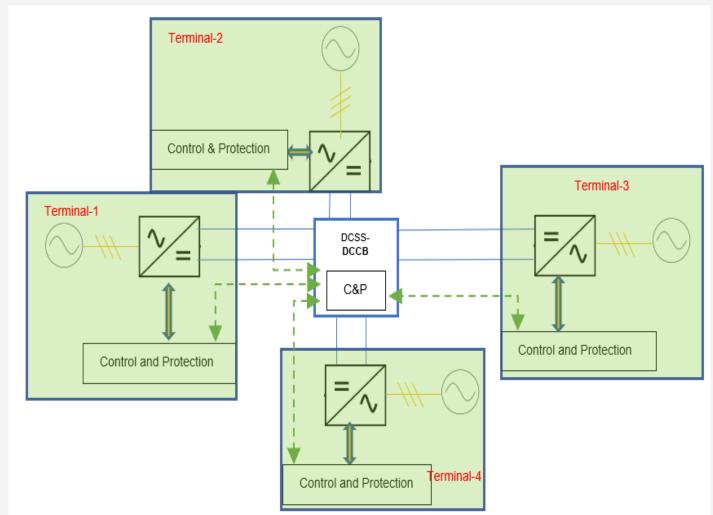






BETA PHASE PLAN:

- Started early SEP-2023
- Multiterminal Replica
- Detailed implementation of Use case and Testing
- Functional Specification of DCCB
- Performance of the DCCB in GB Network.
- NovaCor 2.0 Non-Real-Time Simulation / GTSOC and PSCAD-RSCAD Co-simulation
- Hybrid / Mechanical / VARC







Thanks for listening.

For further information, please visit **www.hvdccentre.com**; OR email : <u>info@hvdccentre.com</u> / <u>Suresh.Rangasamy@sse.com</u>



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