Strategic Infrastructure

Understanding the Carbon Impact of our Offshore Projects

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The Great Grid Upgrade

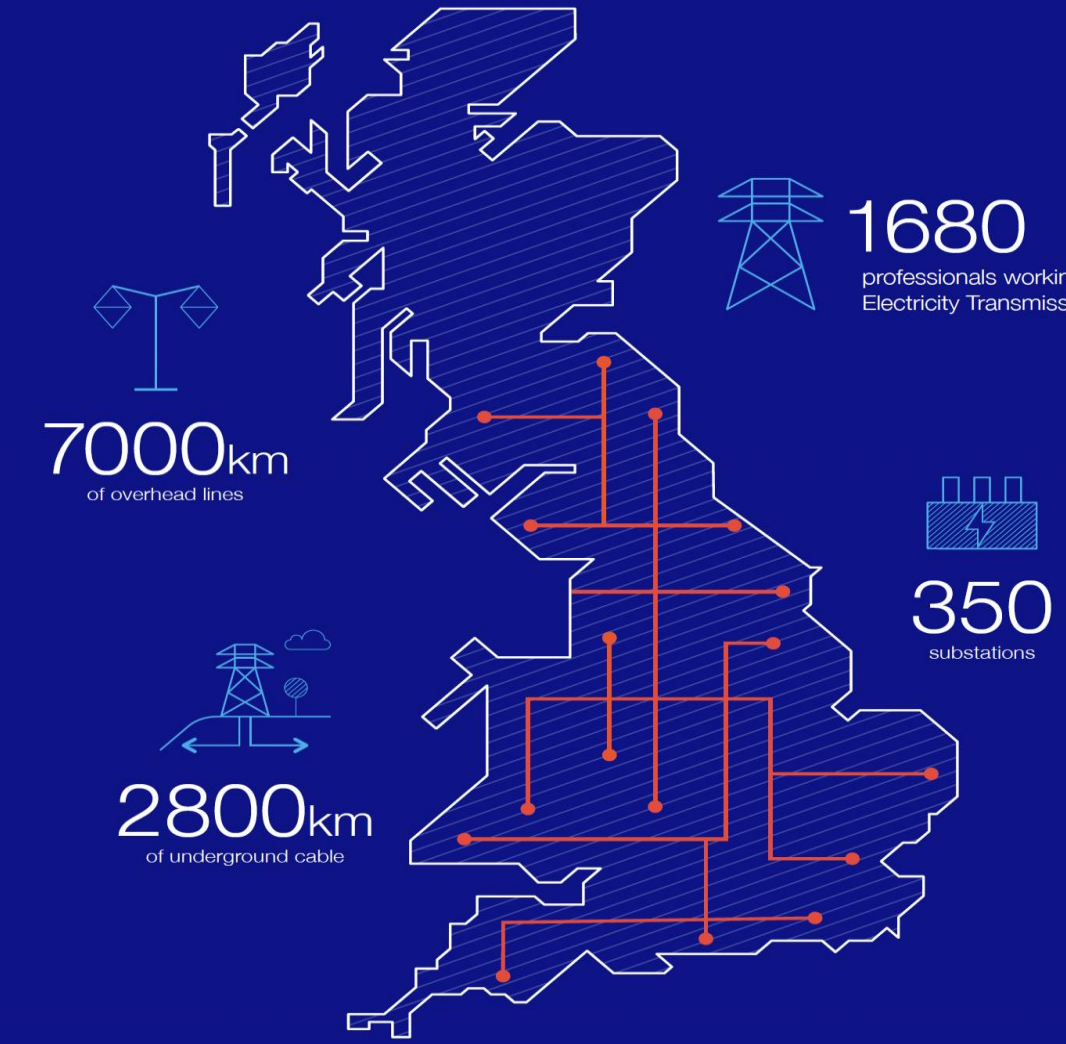
- Introduction to NGET & innovation
- Our HVDC research project
- Key Messages
- Questions

Who we are and what we do

National Grid Electricity Transmission (NGET) owns and maintains the high-voltage electricity transmission network in England and Wales. Every time a phone is plugged in, or a switch is turned on, we've played a part, connecting you to the electricity you need.

We take electricity generated across England and Wales, including from windfarms and nuclear power stations, and transport it through our network, consisting of more than 7000 kilometres of overhead line, 2800 kilometres of underground cable and 350 substations, on to the distribution system, so it reaches homes and businesses.

We're investing in the network, connecting more and more low-carbon electricity – it's a crucial role and pivotal in turning the UK's net zero ambitions into reality.



Innovation Teams across NGET

SI Innovation

New team is being formed to help SI projects achieve the scale and pace required in innovative ways.

Key Contact: Ashita Anand

ET Innovation

This team undertakes R&D under 4 key strategic themes:

Build the future network

Accelerate CC

Enhance sustainability

Improve resilience

Key Contact: Gary Stockdale

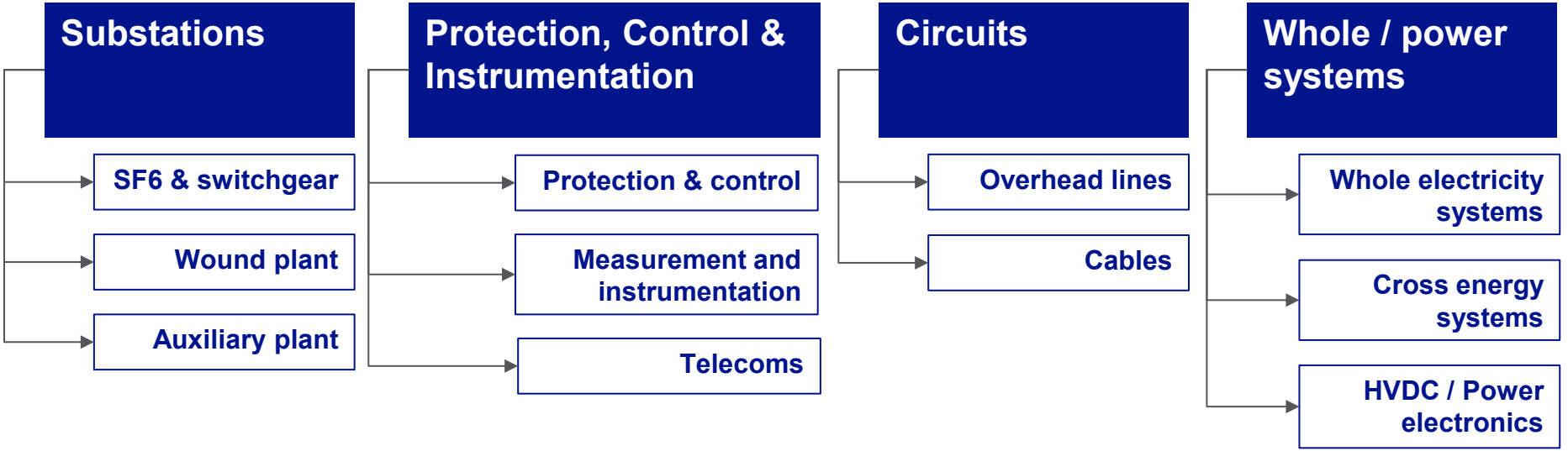
Deeside Innovation Centre

DCI provides a controlled test environment to collect valuable monitoring data to access life performance of a tested asset.

DCI also manages projects like RICA and SF6 strategy.

Key Contact: Gary Stockdale (interim) and Sean Coleman

Net Zero Innovation Portfolios



Net zero construction | **Climate resilience** | **Cyber resilience**

Stakeholder & comms | **Finance & regulation**

Types of Innovation Funding

Innovation Stimulus Funding

Ofgem's NIA provides an allowance to network licensees to fund research, development and demonstration trials that must meet six specific eligibility requirements.

Ofgem's SIF is designed to drive the innovation needed to transform gas and electricity networks for a low-carbon future with £450m available for GB networks over the five-year regulatory period

Shareholder Funded Investments

National Grid Partners, which is the investment and innovation arm of National Grid, have invested over £360 million since 2018 in energy focused startups and emerging technologies that is helping to make our networks safer, cleaner and smarter. They have reviewed over 1,500 companies to identify credible innovations such as Pathfinder for automated transmission route planning and have enabled a further £2.35bn of innovation investment from other co-investors.

Self Funded Innovation

Innovation is self-funded through various projects; most recent examples are:

- London Power Tunnels concrete pour
- New Plug and Switch System (PASS) bay at Willesden Substation
- Shunt Reactor Bay at Stalybridge Substation
- Bengeworth Road SF6-free substation

Net Zero Innovation In Numbers

NIA Projects

67 RIIO-T2 NIA live projects

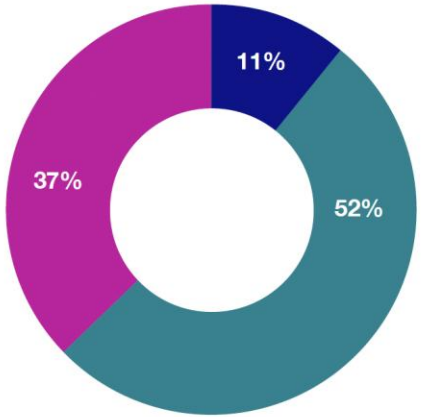
£12.1m spend on NIA projects in 2023/24

66 collaborators involved in our RIIO-T2 NIA live projects, including suppliers, partners and supporters

13 FTEs working on NIA innovation projects

27 NIA projects registered in 2023/24

£22.8m forecast spend on NIA projects in 2024/25



Distribution of Technology Readiness Level (TRL) by volume of NIA projects in RIIO-T2

- Research (TRL 2-3)
- Development (TRL 4-6)
- Demonstration (TRL 7-8)

NIC Projects

6 ongoing NIC projects

SIF Projects

2 SIF-led alpha projects registered 2023/24

1 SIF-led discovery projects worked on

Strategic Infrastructure

Our HVDC Research Project

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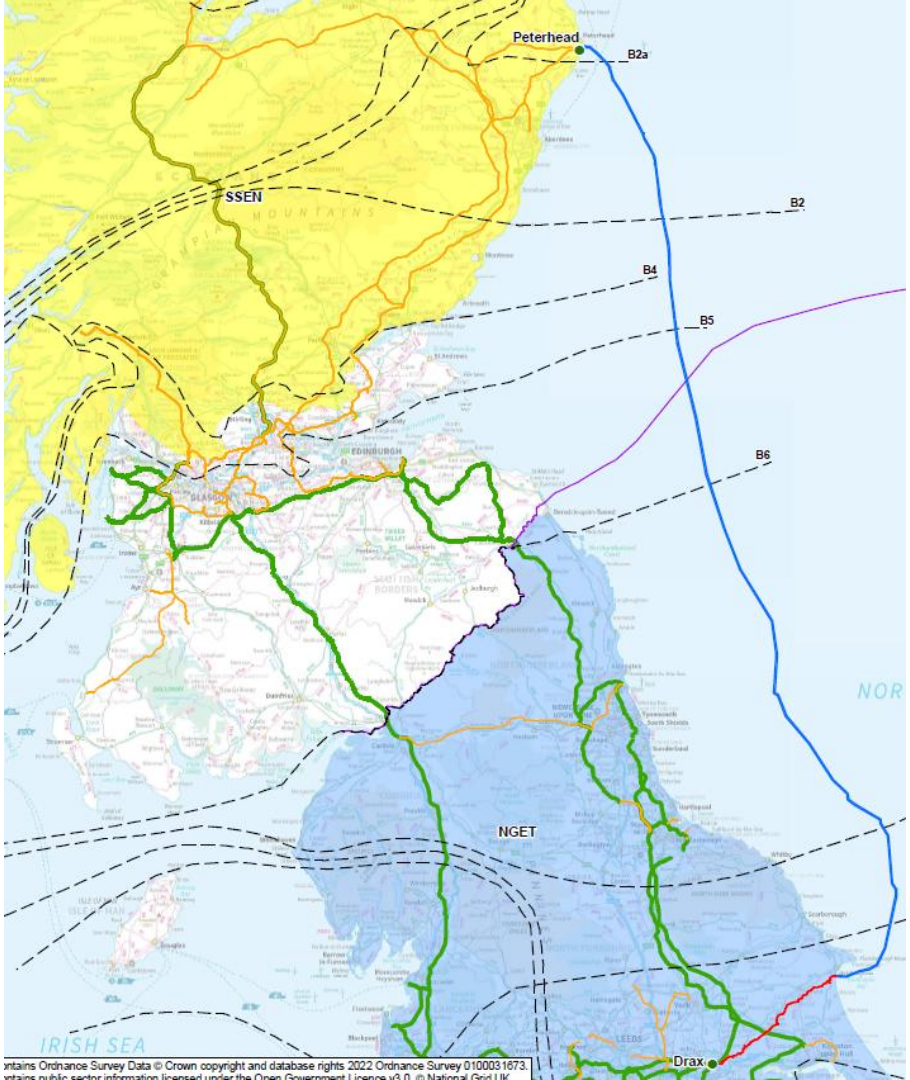
Background

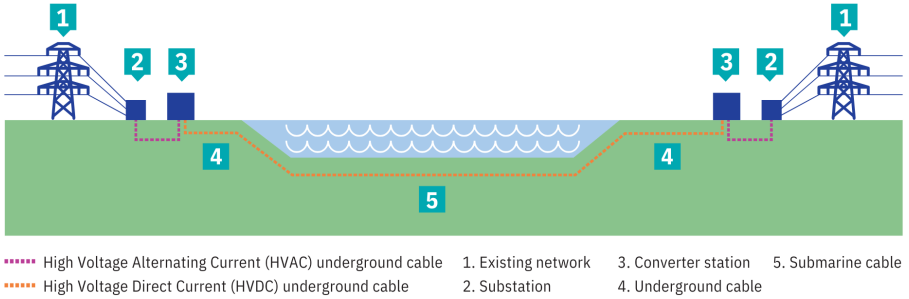
NGET and SSEN are jointly developing a subsea HVDC Link between Peterhead in Aberdeenshire and Drax in North Yorkshire.



Our research need

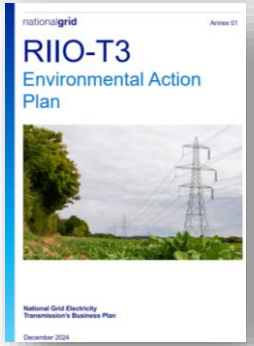
We did not have a good understanding of the carbon footprint of HVDC projects

A good understanding of each project's carbon footprint will help focus decarbonisation efforts

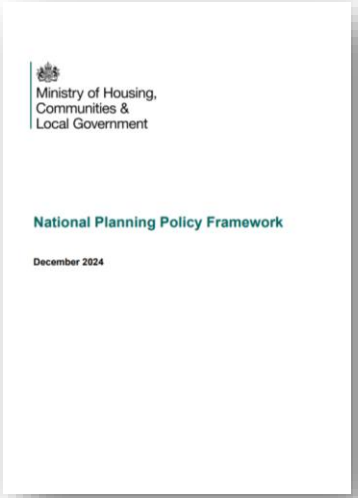


Why does this matter?

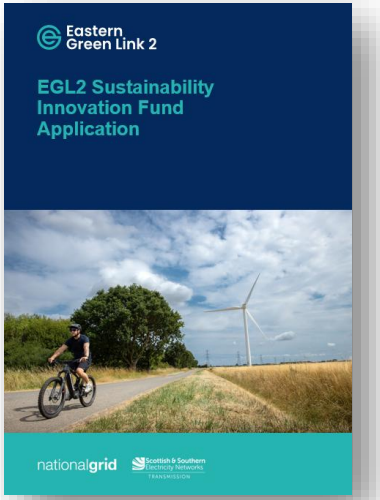
Business commitments



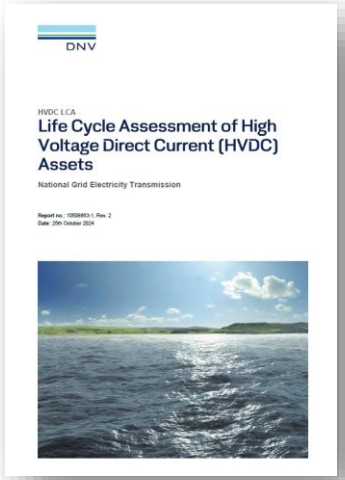
External Requirements

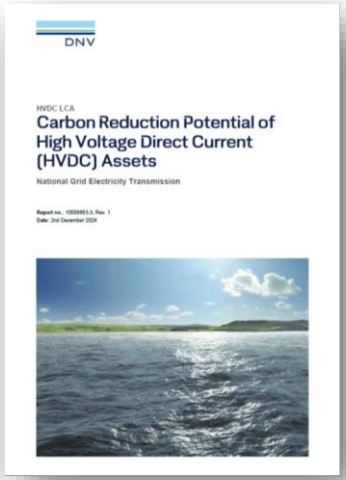


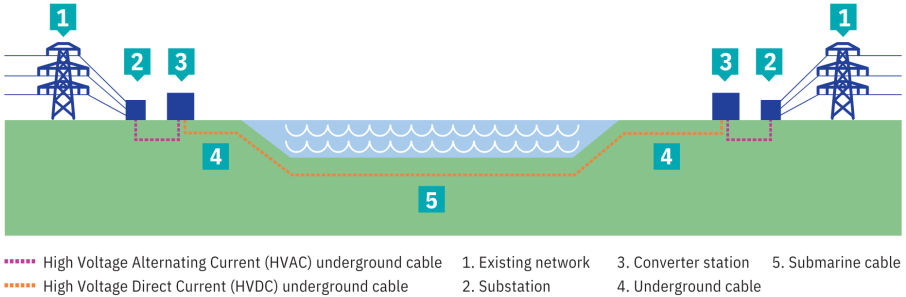
Driving decarbonisation



The research





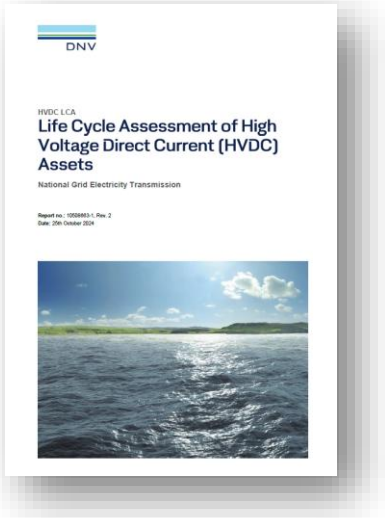


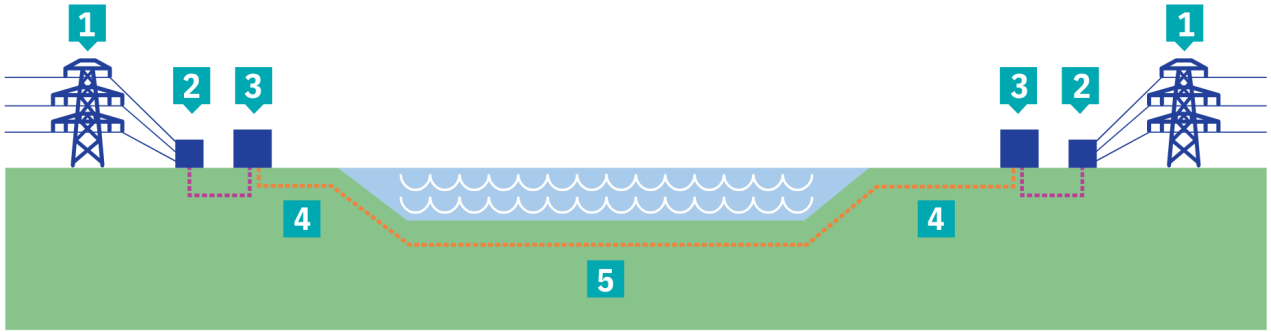
2GW HVDC Link

- 2 X 2GW Converter Stations
- 20 km of underground cable
- 100 km of subsea cable

The lifecycle research

3	Converter Stations	84,138,322 kg CO2e
4 & 5	Underground and submarine Cable	262,700,508 kgCO2e

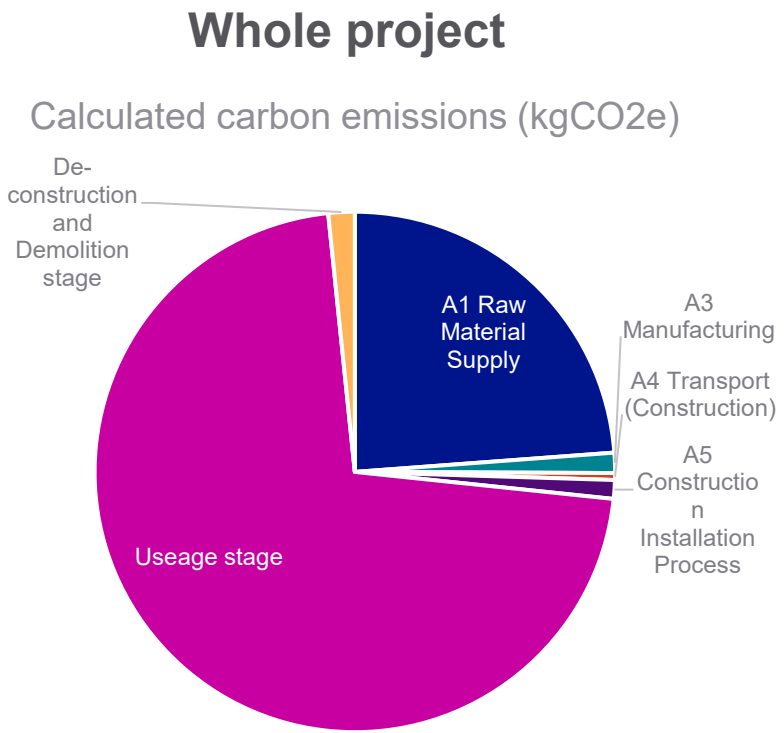




High Voltage Alternating Current (HVAC) underground cable
High Voltage Direct Current (HVDC) underground cable

1. Existing network
2. Substation
3. Converter station
4. Underground cable
5. Submarine cable

Learning from LCA



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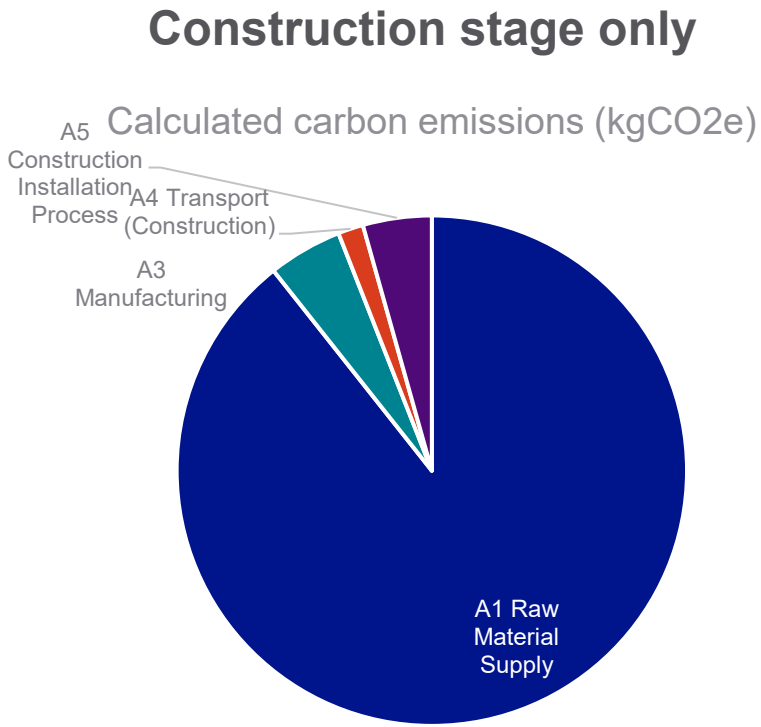
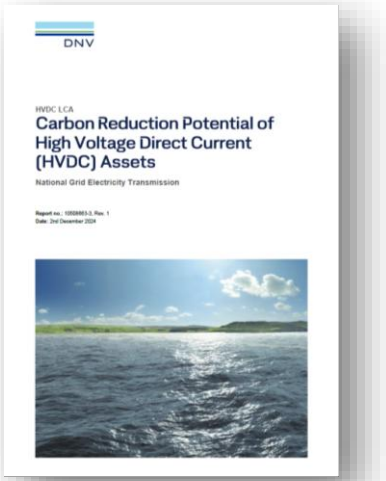
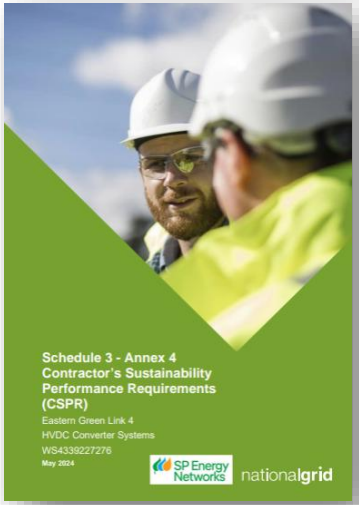


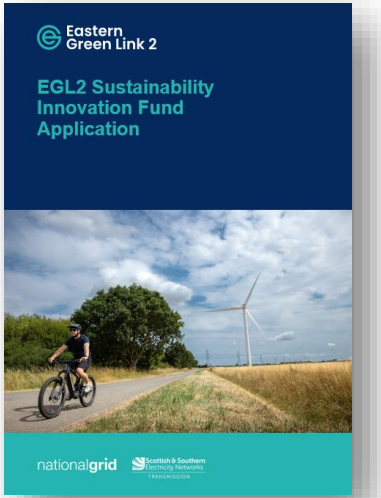
The reduction research



Carbon Reduction Option	Carbon Emissions Avoided (kgCO2e)	Construction (A1-A5) Emissions Avoided (%)	Total Emissions Avoided (%)
MMC VSC	61,786,453	-	8.2
SF6-free GIS (air insulated)	2,601,597	-0.03	0.35
Replacing diesel with HVO during construction	5,192,190	1.41	0.69
Eco- rock armour	25,794,358	6.99	3.44
Local rock armour	1,033,183	0.28	0.14
30% PFA cement	8,114,400	2.2	1.08
Replacing marine fuel oil with HVO	1,927,978	0.52	0.26
Low carbon copper (cables only)	6,532,753	1.77	0.87
Solar PV	- (195,000)	-	-0.01
Aggregate (reused)	87,774	0.02	0.01

How we are using the data within our projects



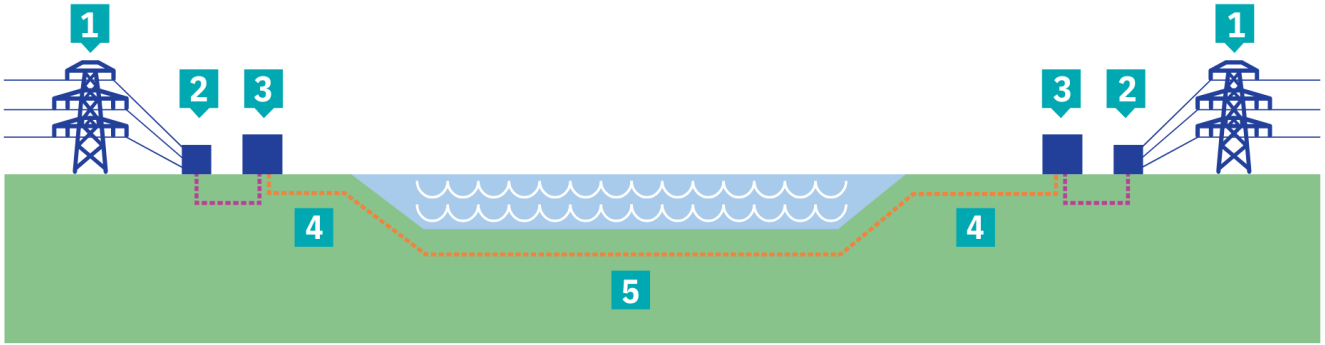


Key Messages

Don’t focus only on the numbers

Drive decarbonisation early

Supply chain collaboration is key



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