

Risk and resilience

An Orkney perspective

Matthew Finn
Managing Director

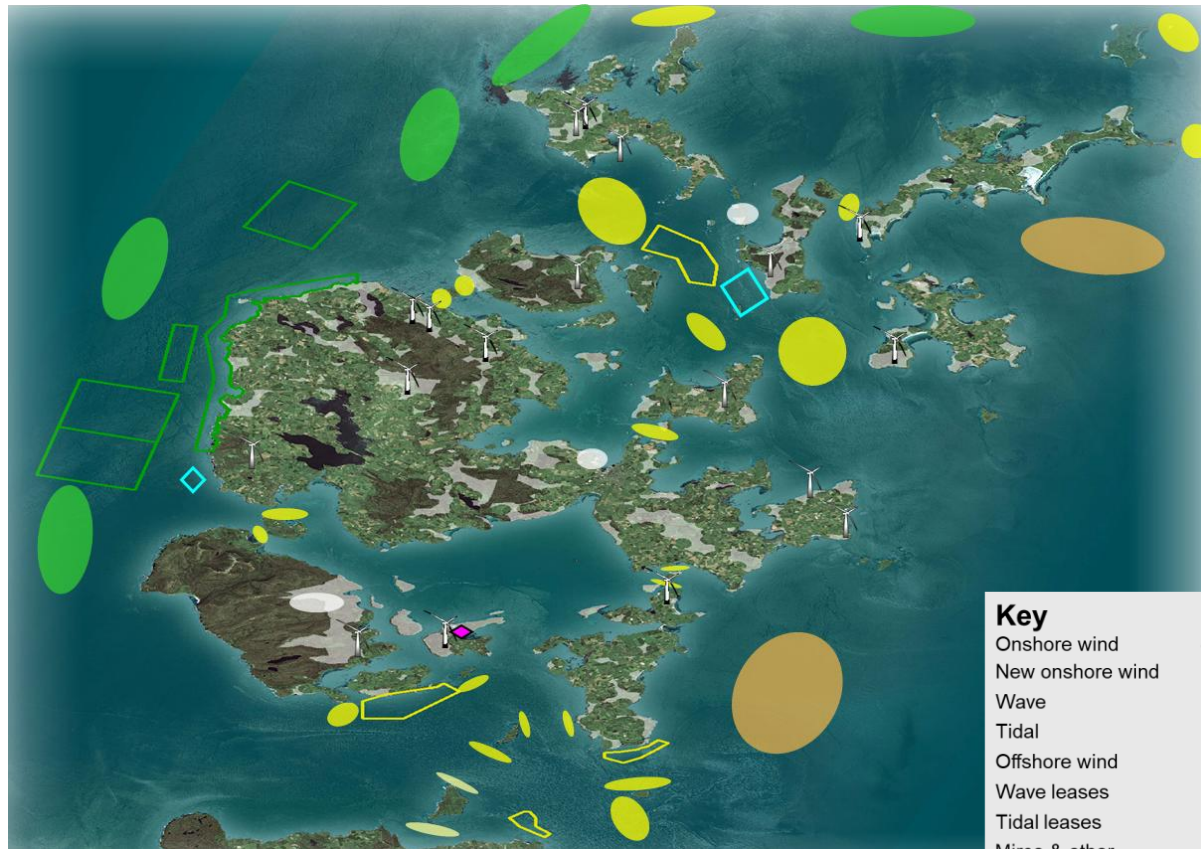
Part 1 – Orkney Context

Orkney

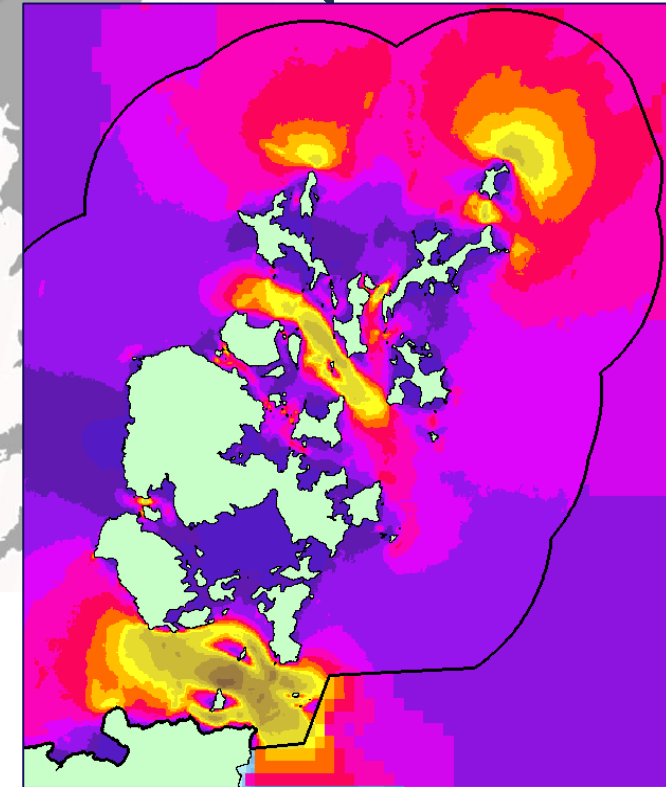
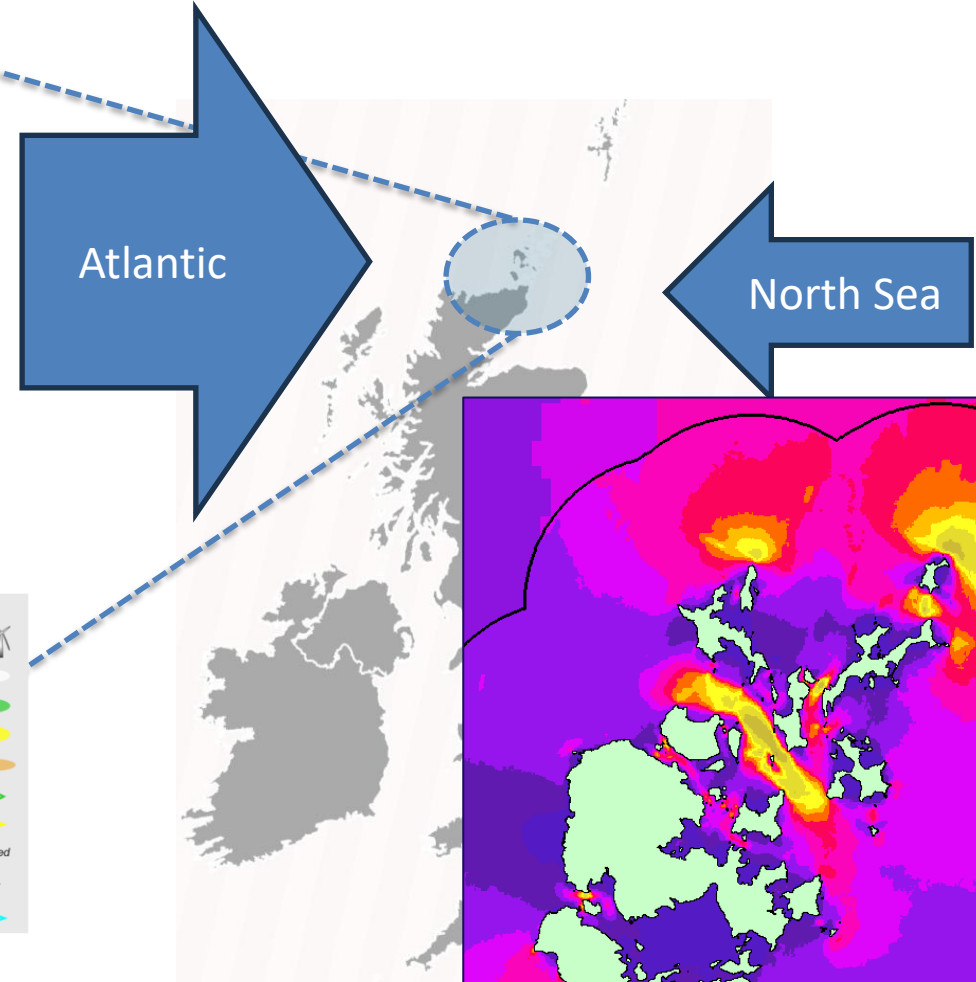
- 22,000 **people**, across 17 islands & 5000 years of innovation
- World's most productive **renewable resources**, surrounded by major **hydrocarbon reserves**
- **Maritime** crossroads & northern hemispheres largest natural harbour
- Cluster of **excellence** International **food and drink** brands & major **tourism** destination
- UK's happiest & most **sustainable community**
- Amazing **ecological diversity** & **environmental quality**



Fantastic natural resources

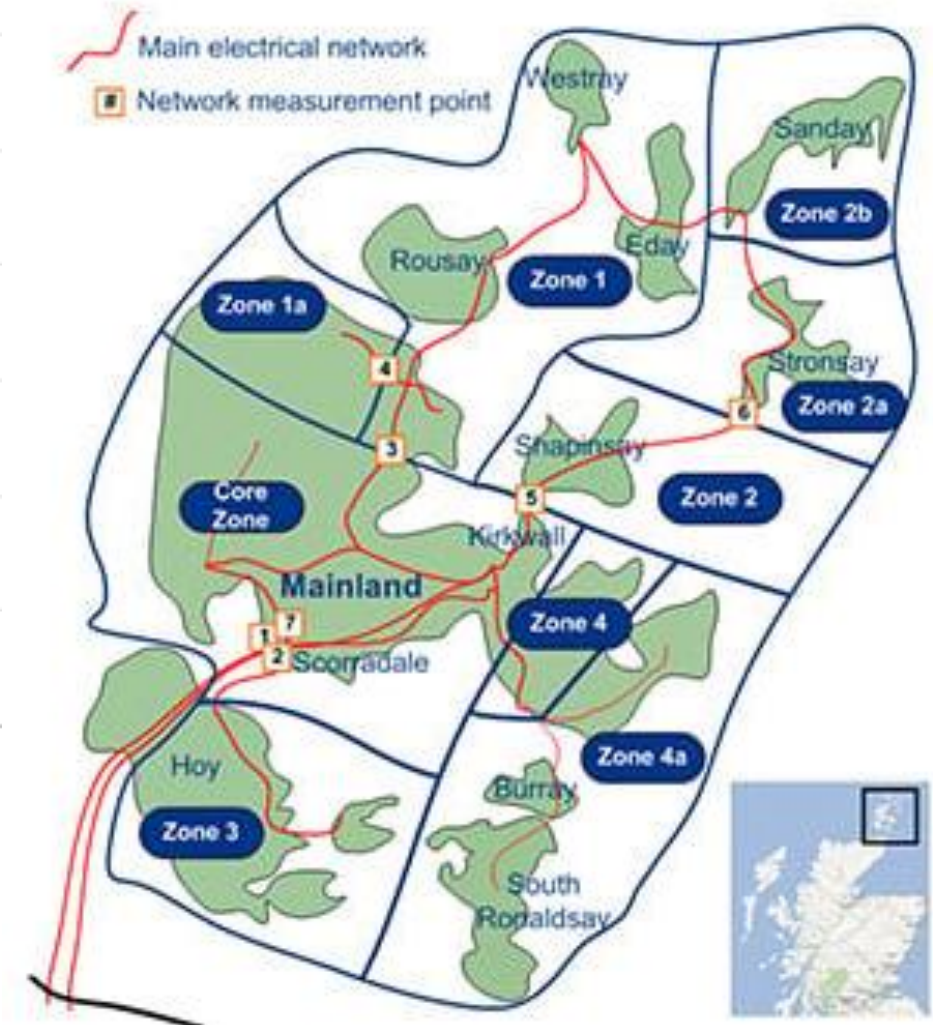
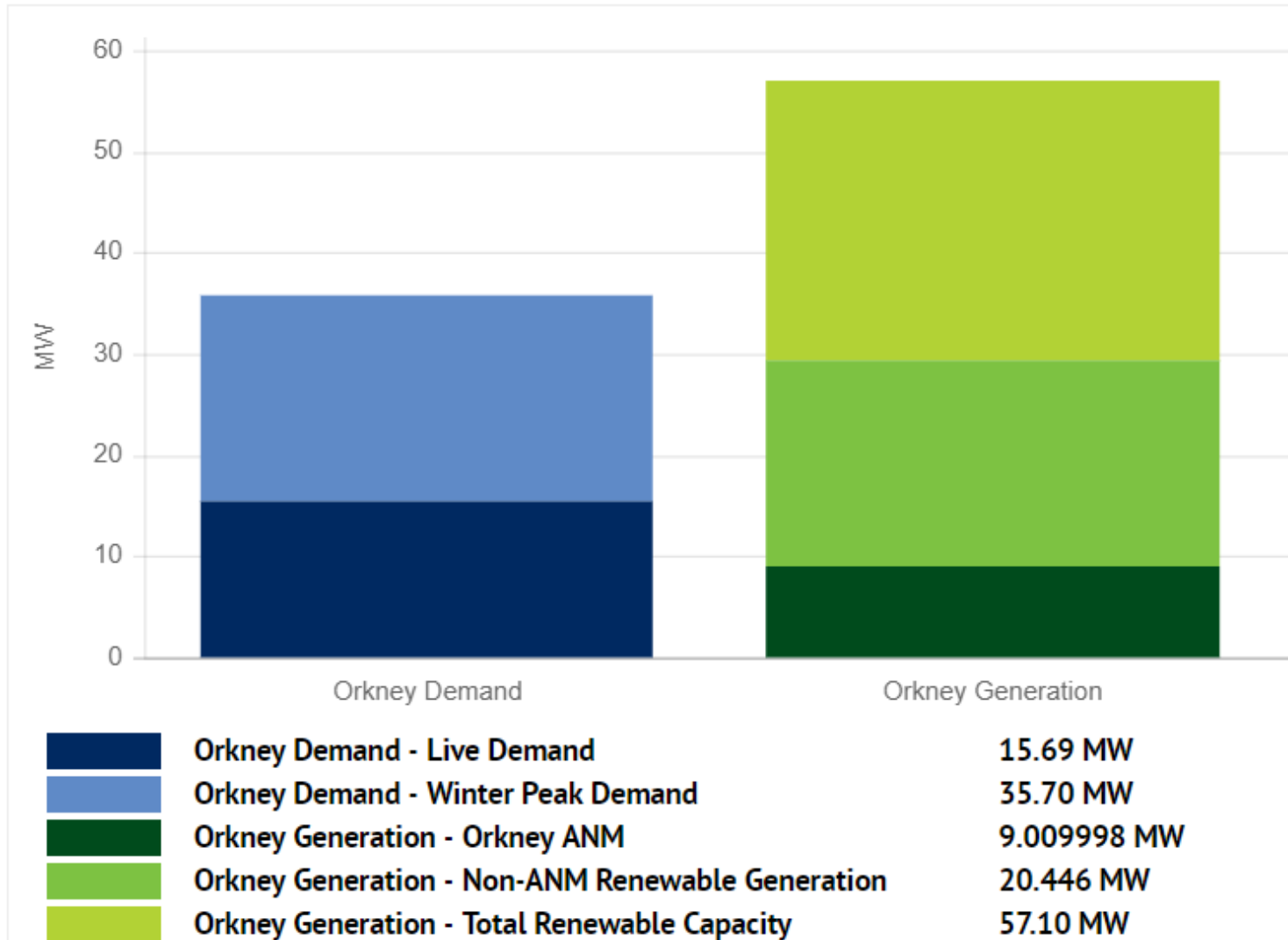


Key	
Onshore wind	40 MW existing
New onshore wind	100-200 MW
Wave	500-1000 MW
Tidal	500-2,500 MW
Offshore wind	1000 MW
Wave leases	550 MW
Tidal leases	500 MW
Mirco & other	2.5 MW
Gas & other	20 MW
EMEC sites	5 + 7 MW



>5,000MW theoretical potential
(or ~3 nuclear power stations)

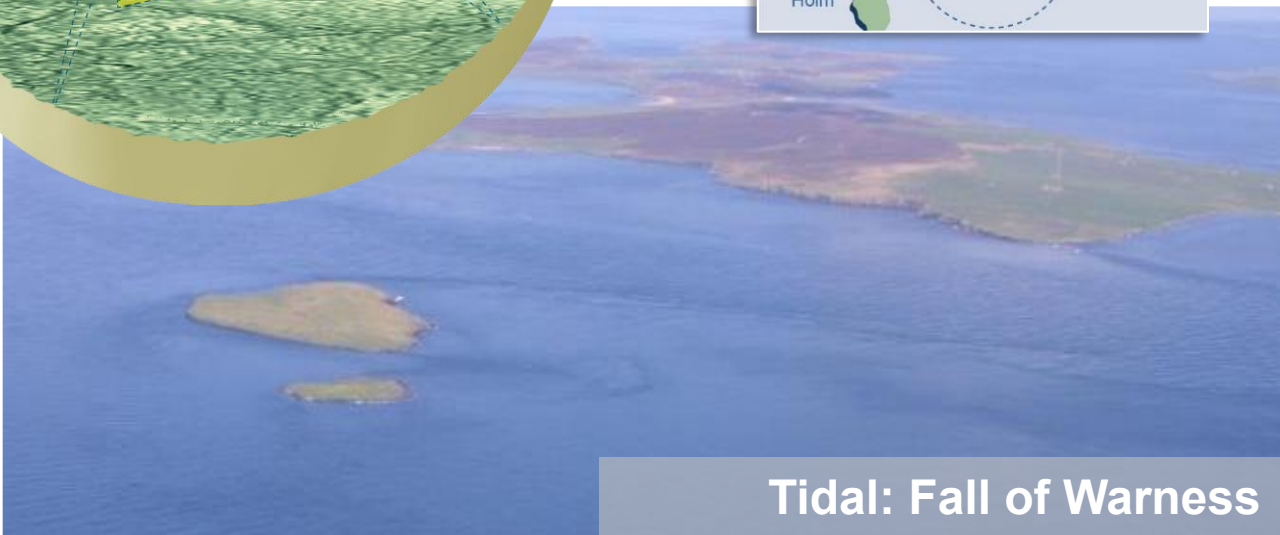
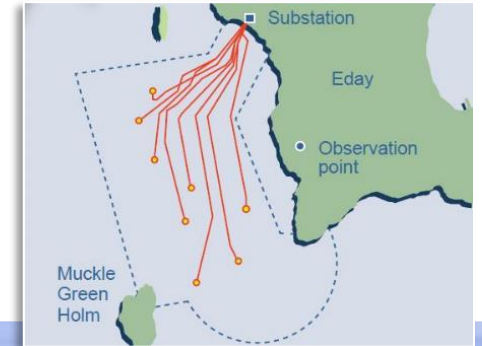
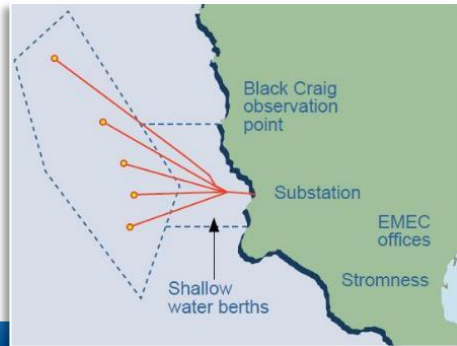
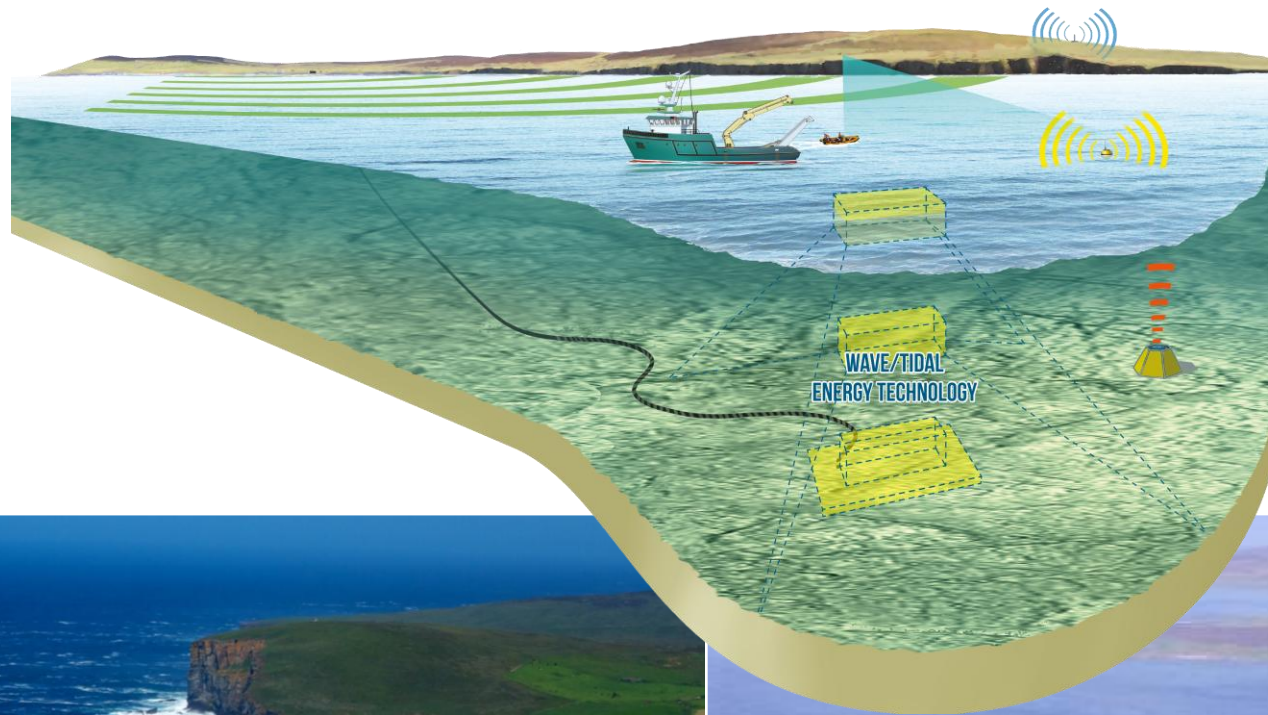
Current Grid Setup



Flotta Oil Terminal



Grid connected test sites



Wave: Billia Croo

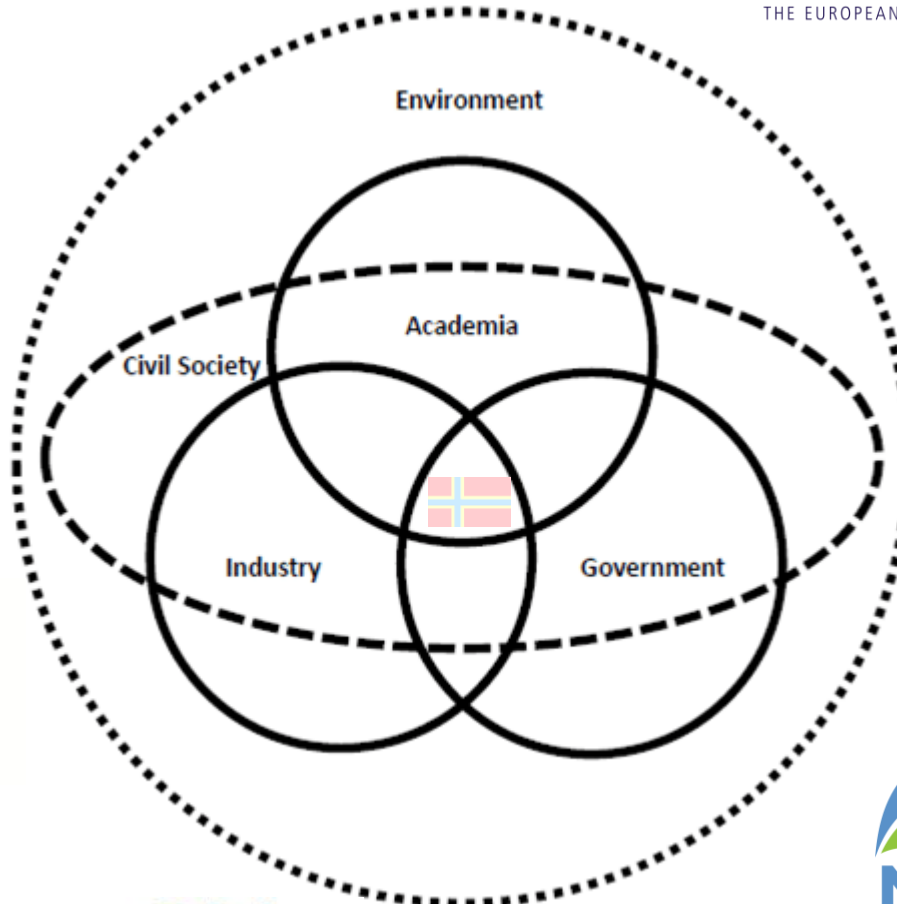
Tidal: Fall of Warness

Who is involved locally

EMEC

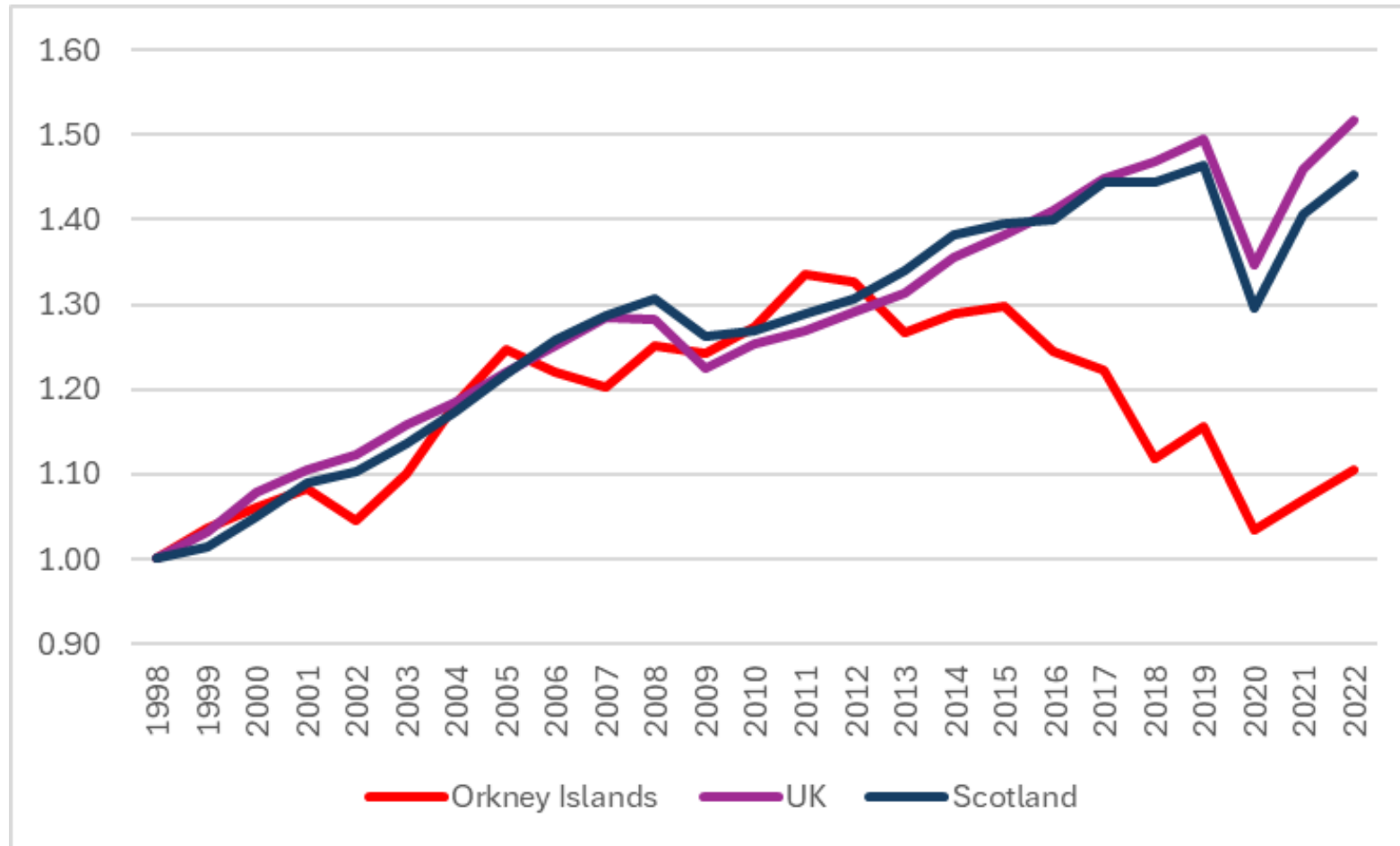
THE EUROPEAN MARINE ENERGY CENTRE LTD

EMEC
THE EUROPEAN MARINE ENERGY CENTRE LTD

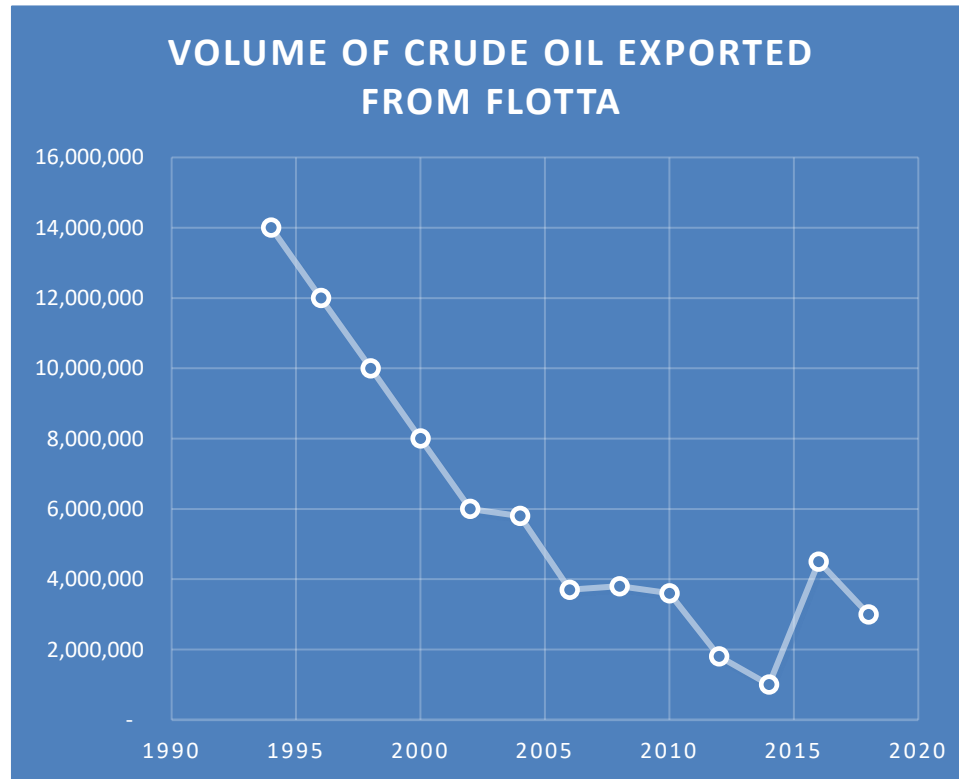


Part 2 – Challenges (Risks)

Regional gross value added (inflation adjusted and compared to 1998) ONS

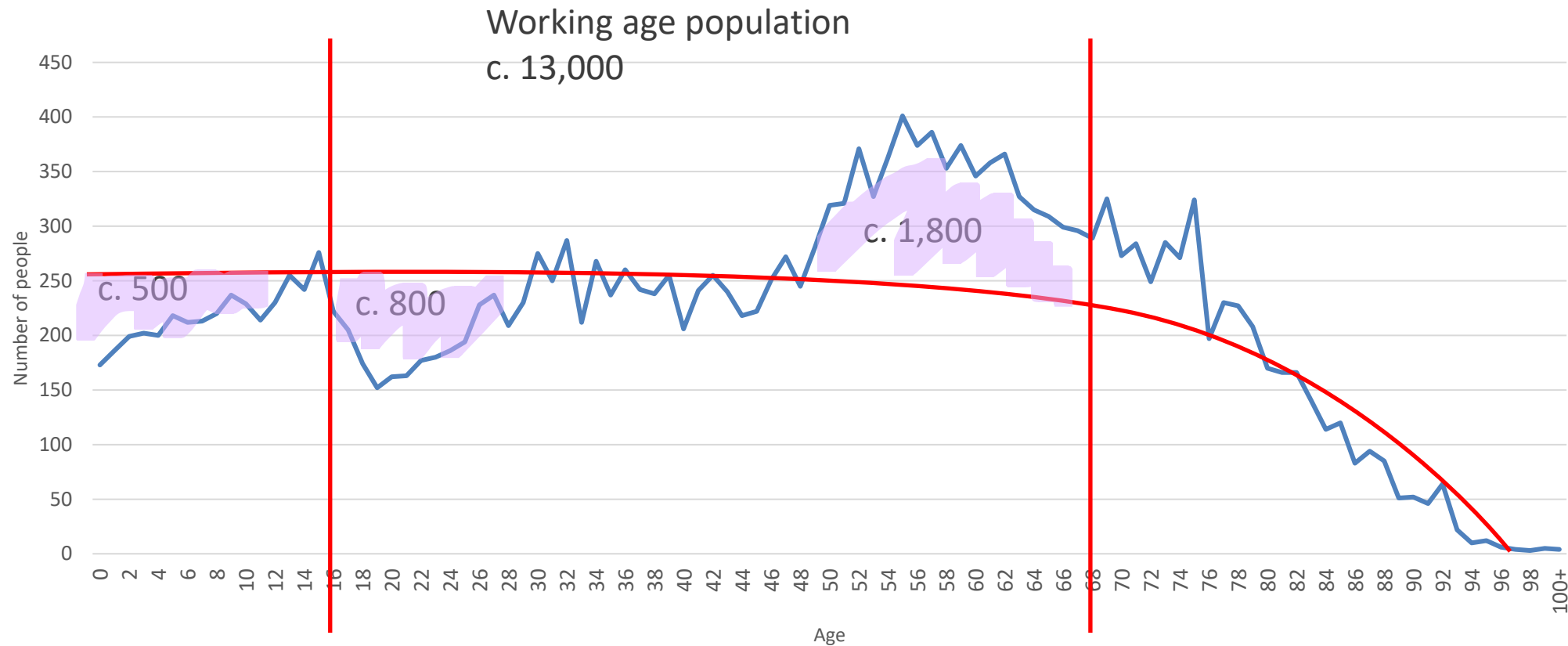


Oil terminal in decline



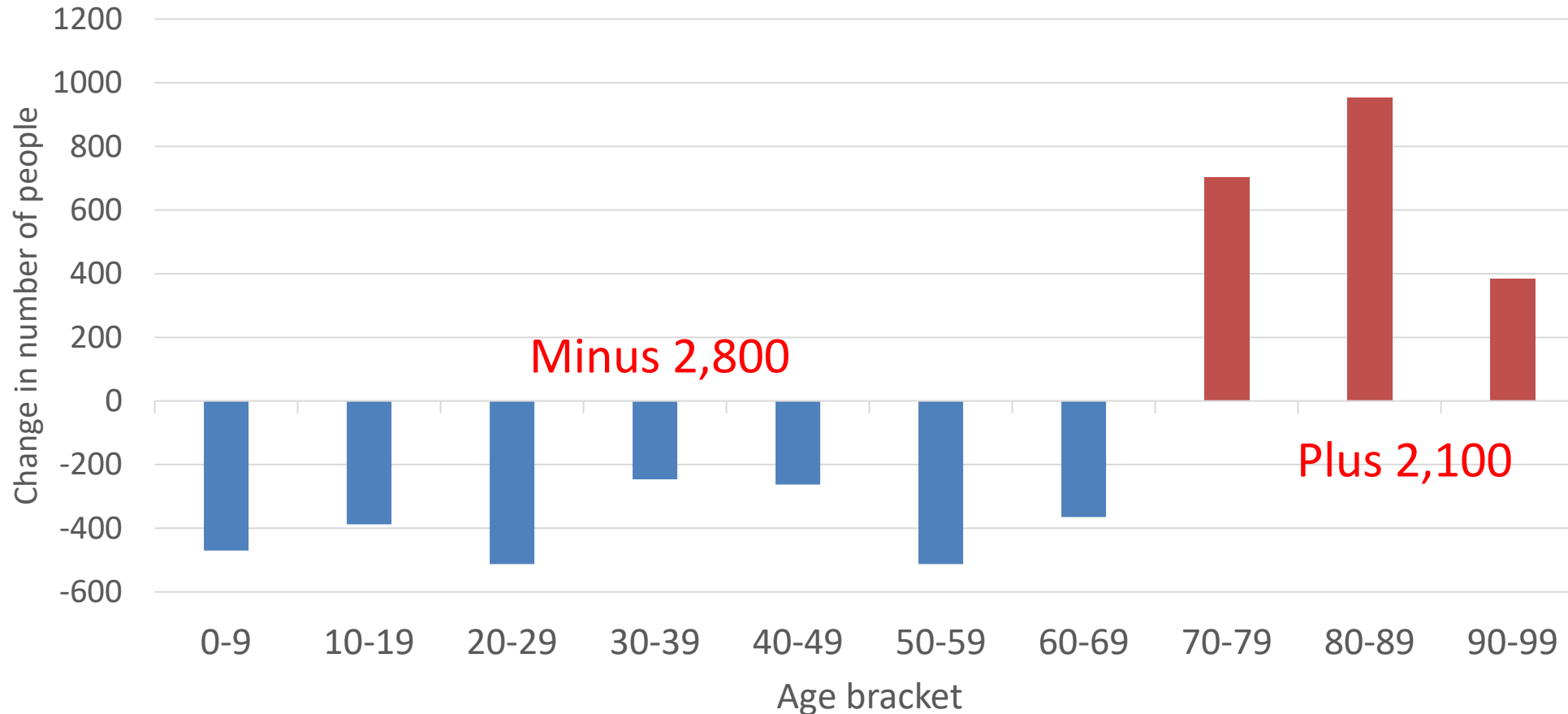
- Recent redundancies
- New owners
- Current cessation of production assumption 2032
- Flotta estimate they contribute £30 million annual GVA to Orkney
- Critical activity threshold to maintain local authority assets

Demographics



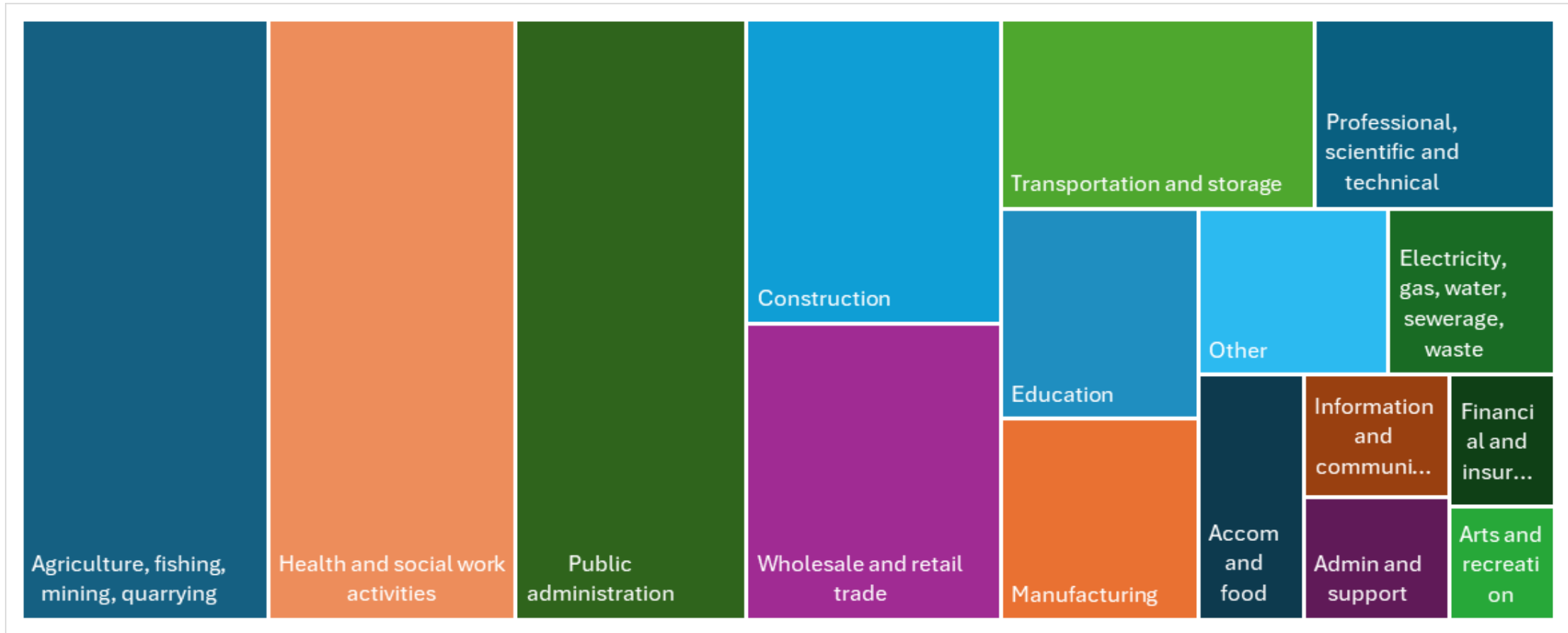
2022 Census data

Expected change in population 2018 – 2043, National Registers for Scotland



Would suggest we need over 100 **extra** young and working age people per year just to stand still

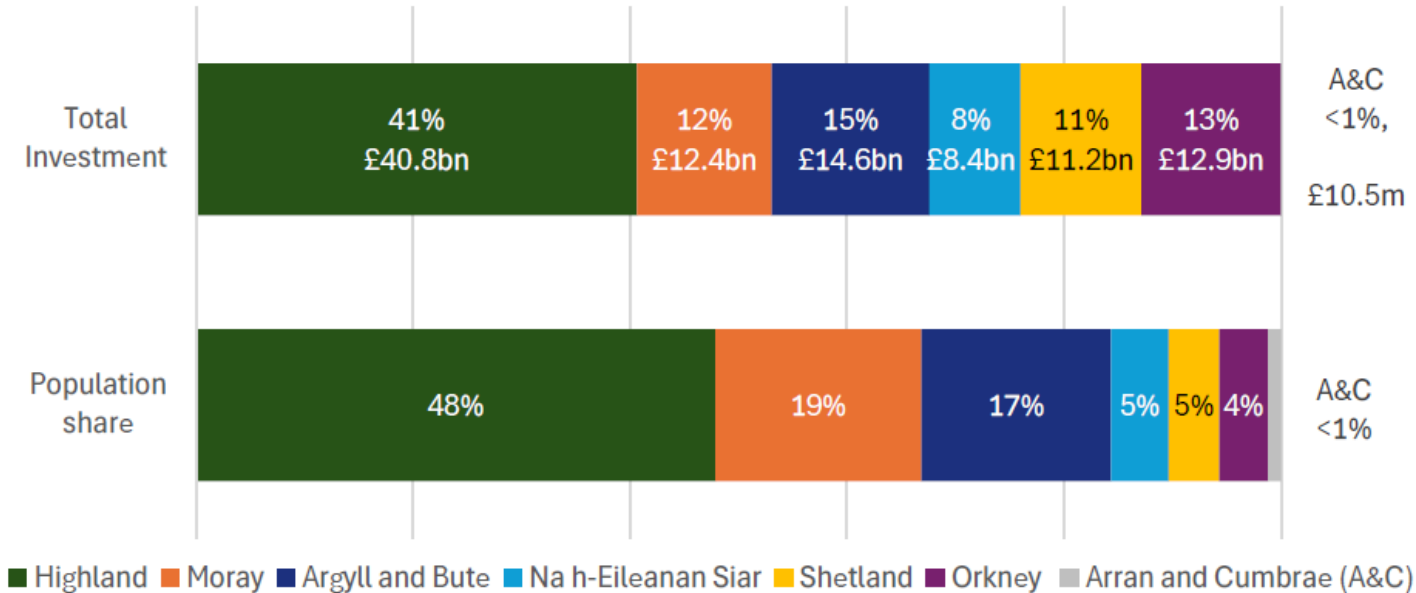
Existing Sectors



ONS data Orkney GVA by sector

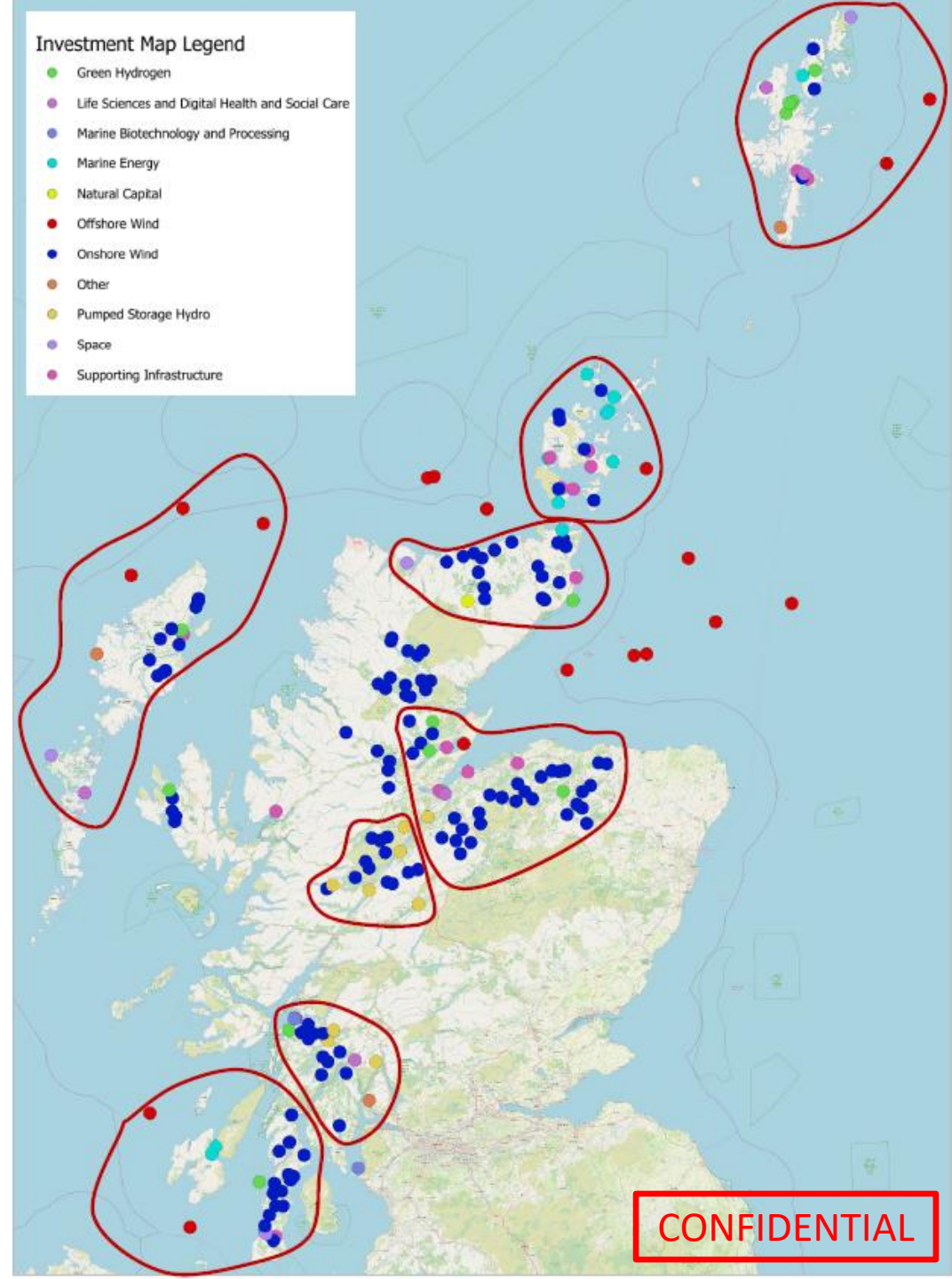
Regional Transformative Opportunities

Economic activity by LA:



Jobs created in Orkney:

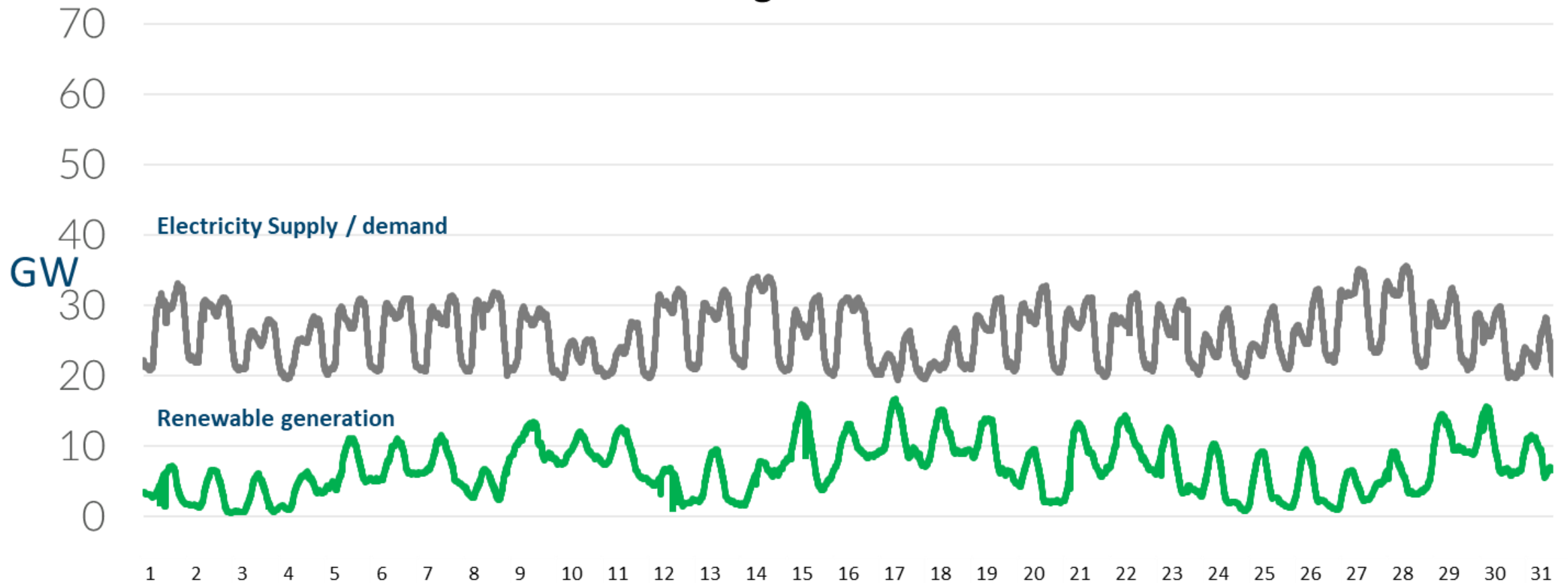
Scenario	Investment	GVA	Job years	Operational jobs
Unadjusted	£12.89bn	£11.08bn	11,960	830
Adjusted	£9.45bn	£8.1bn	8,550	560



CONFIDENTIAL

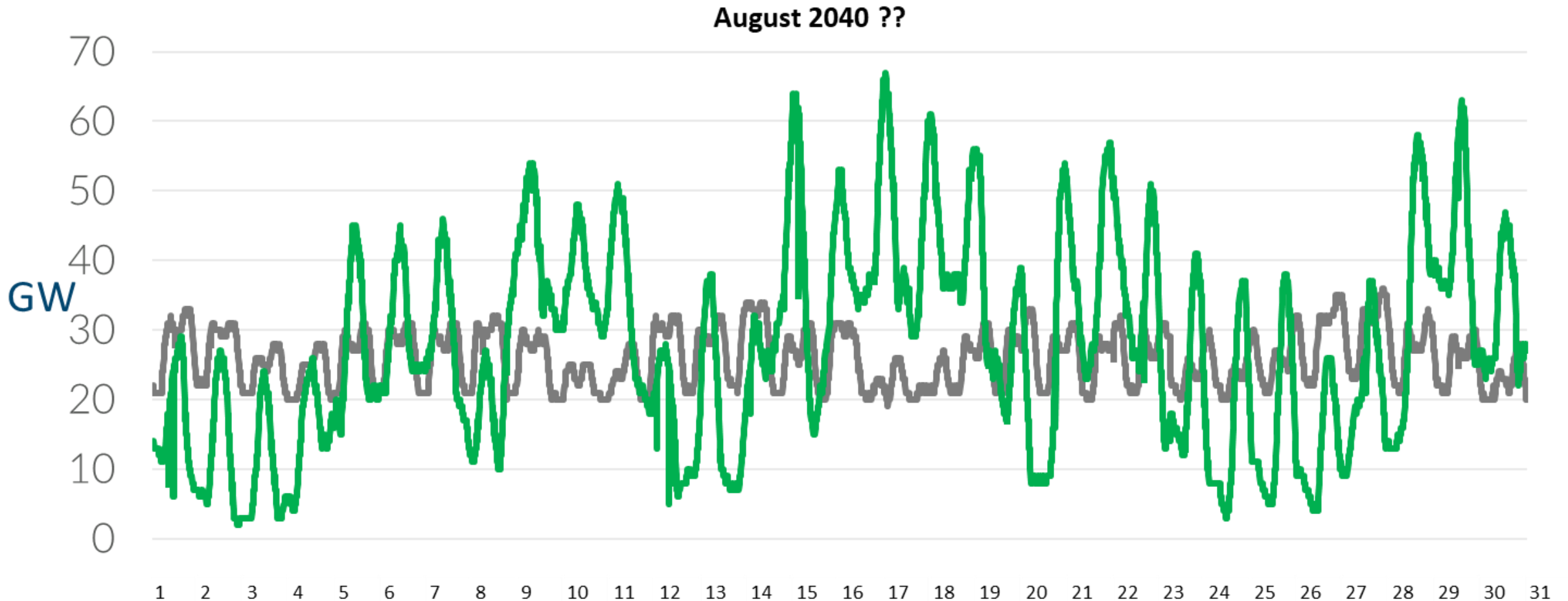
UK Energy System Today

August

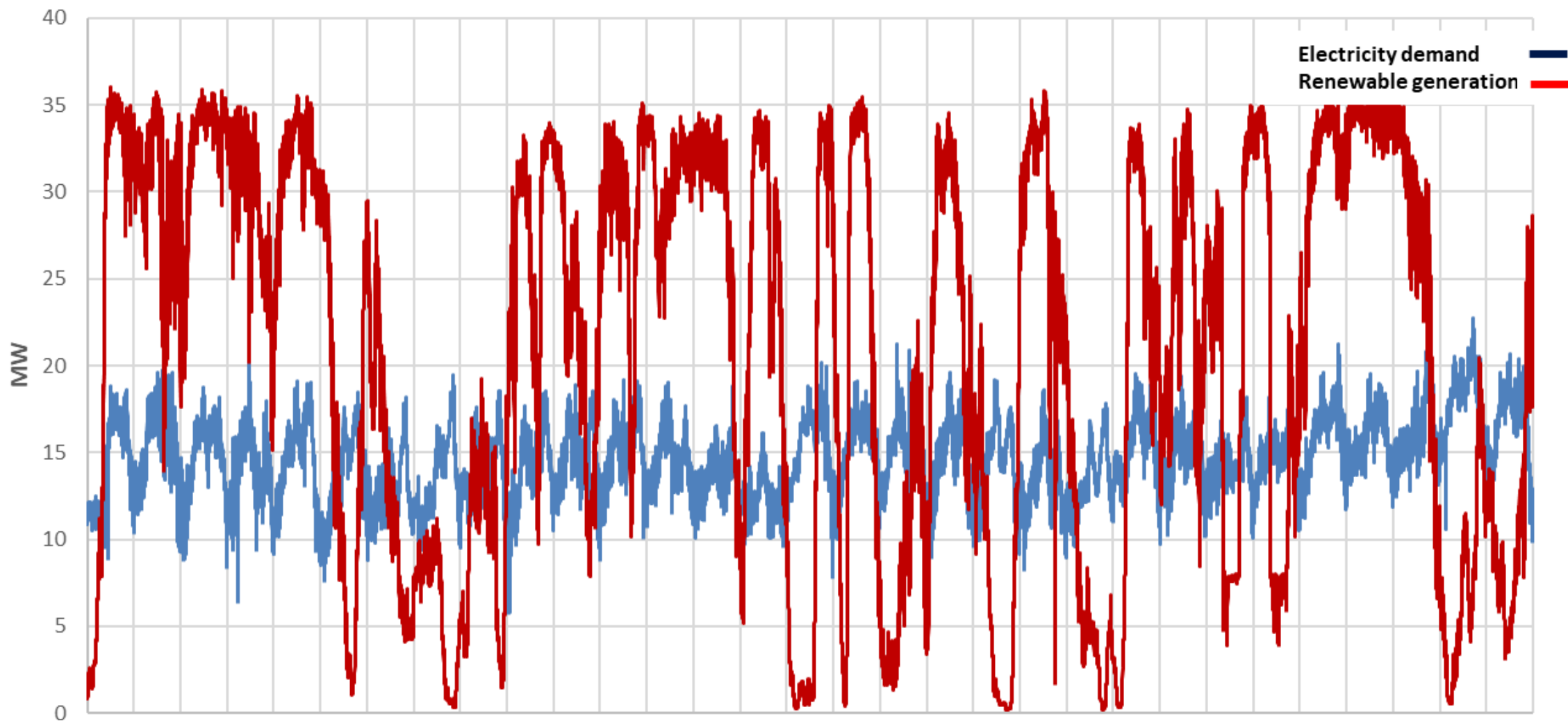


UK electricity system – 2040

(4x current renewables)



Orkney electricity system – today



Grid Challenges

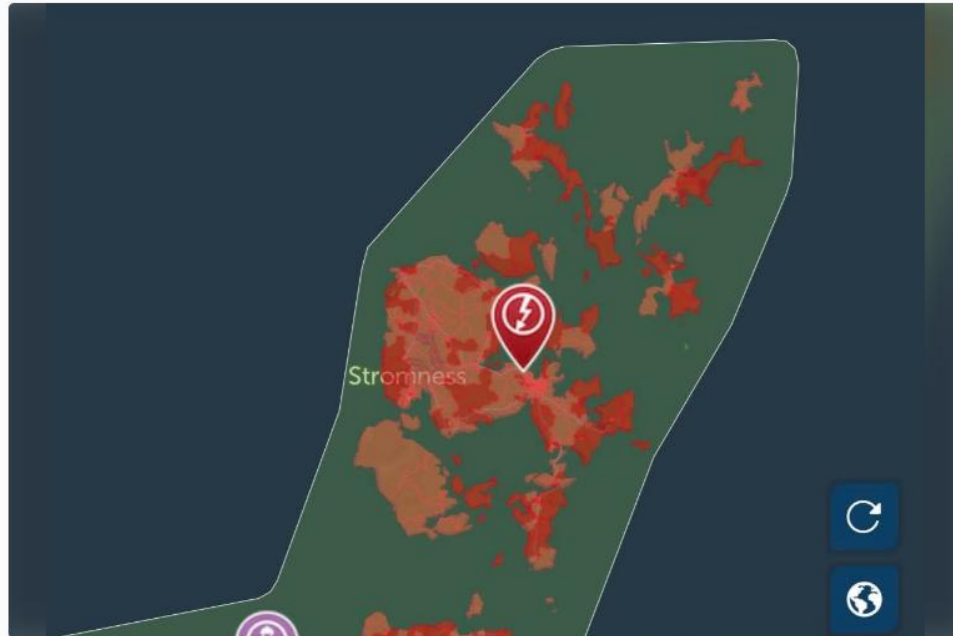


North Ronaldsay:

- 6 weeks offline, running from gen set
- No FIT (not reimbursed)
- Houses transitioned to electric to self consume, now paying full grid rates



Grid Challenges



The power outage last Wednesday caused disruption across Orkney.

Caithness windfarm fault behind Orkney blackout, confirm SSEN

News • 24/11/2025

Orkney was plunged into darkness last week as a result of a fault at a Caithness windfarm, SSEN has confirmed.

The energy company says it is continuing to investigate the reasons for the blackout, which affected every home on the mains grid, last Wednesday evening.



Regulations

Plans for huge wind farm paused over 'unfair' grid charges



Experts say Scotland has huge offshore wind potential

Kevin Keane >

Scotland environment, energy and rural affairs correspondent

20 January 2026 · 263 Comments

Updated 21 January 2026

A huge wind farm planned off the north coast of Scotland will not be built unless "unfair" transmission charges are overhauled, the developer has warned.

The 125-turbine West of Orkney wind farm had planned to generate enough electricity to power two million homes by 2029.



Community
Energy
Scotland

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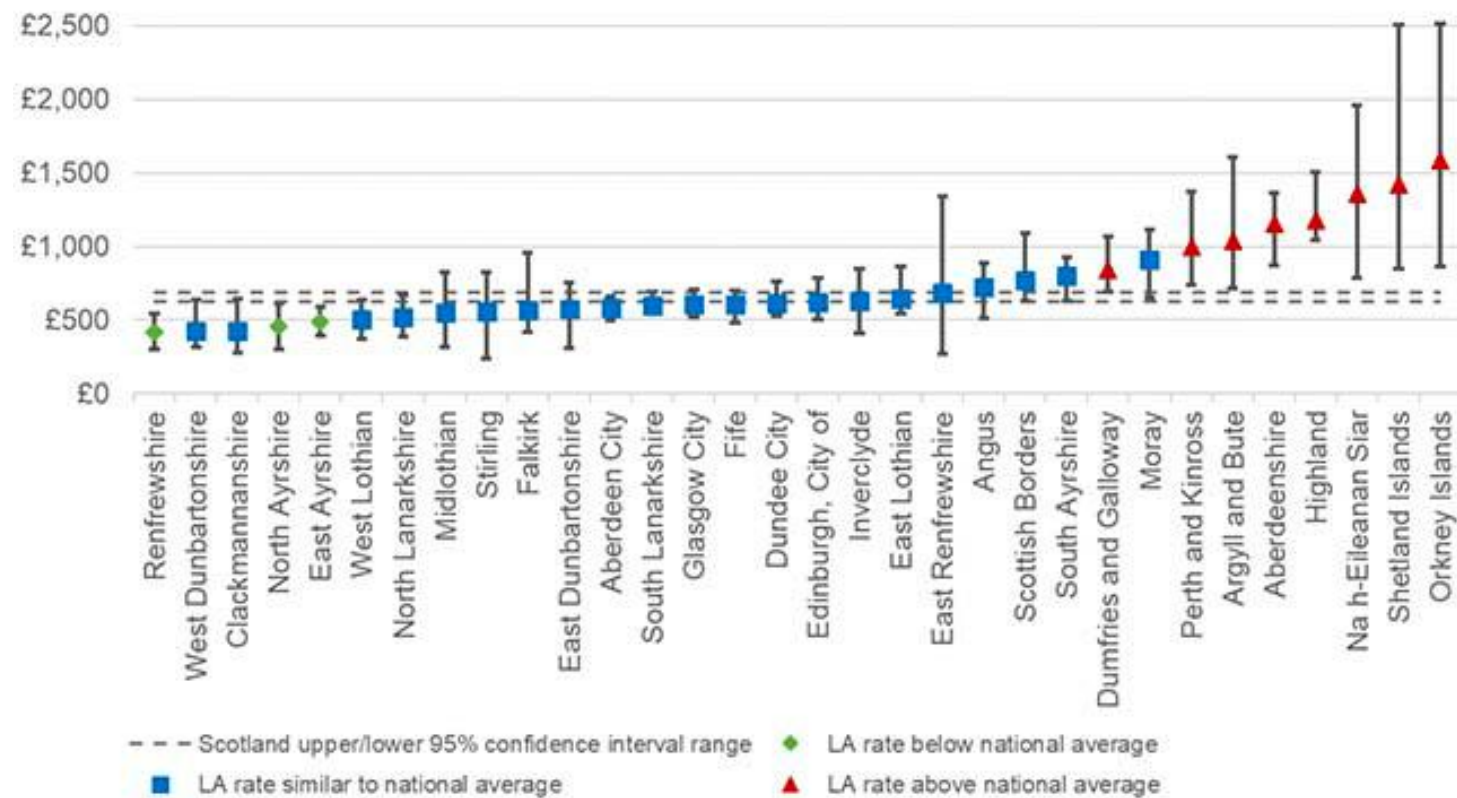
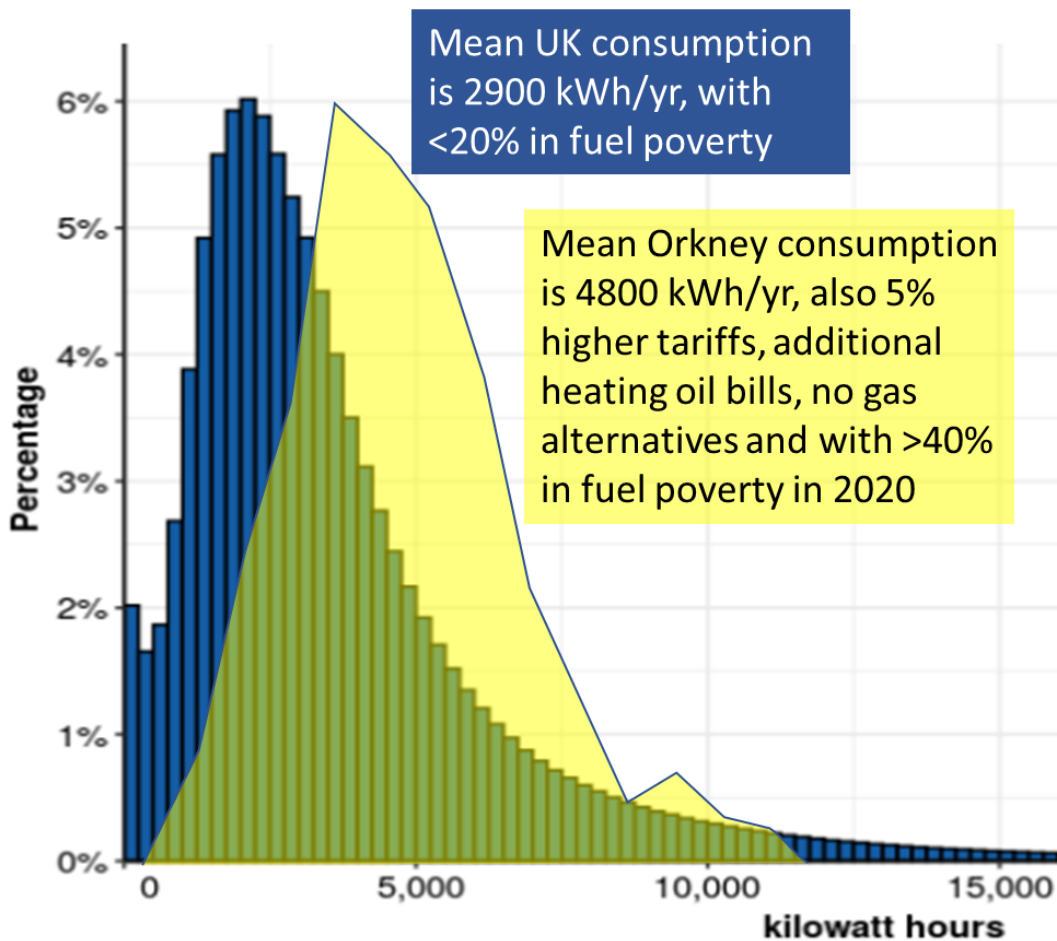
Home ▾ Services ▾ Membership Resources Policy ▾ Projects More ▾ Q

Potential Sector Standstill Under New Grid Connection Reform Process

January 9, 2026 / News, CES News, Industry News

- Enduring Arrangements captures any project that requires a transmission impact assessment.
- In broad terms, these are projects with capacity 5 MW or greater in England and Wales, 200 kW or above in mainland Scotland and 50 kW in the Scottish islands.

Fuel Poverty



Section 4 – Achievements (Resilience)

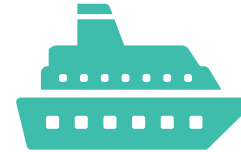
Our achievements to date



More wave and tidal energy devices
than anywhere in the world



Highest uptake of EVs
in Scotland



Piloting electric ferries



Developing green hydrogen and e-fuel solutions



Generated >100% of electricity from renewables
since 2013



1 in 10 households
make their own power



Pioneers of new grid-smart technologies and local supply models

Generation

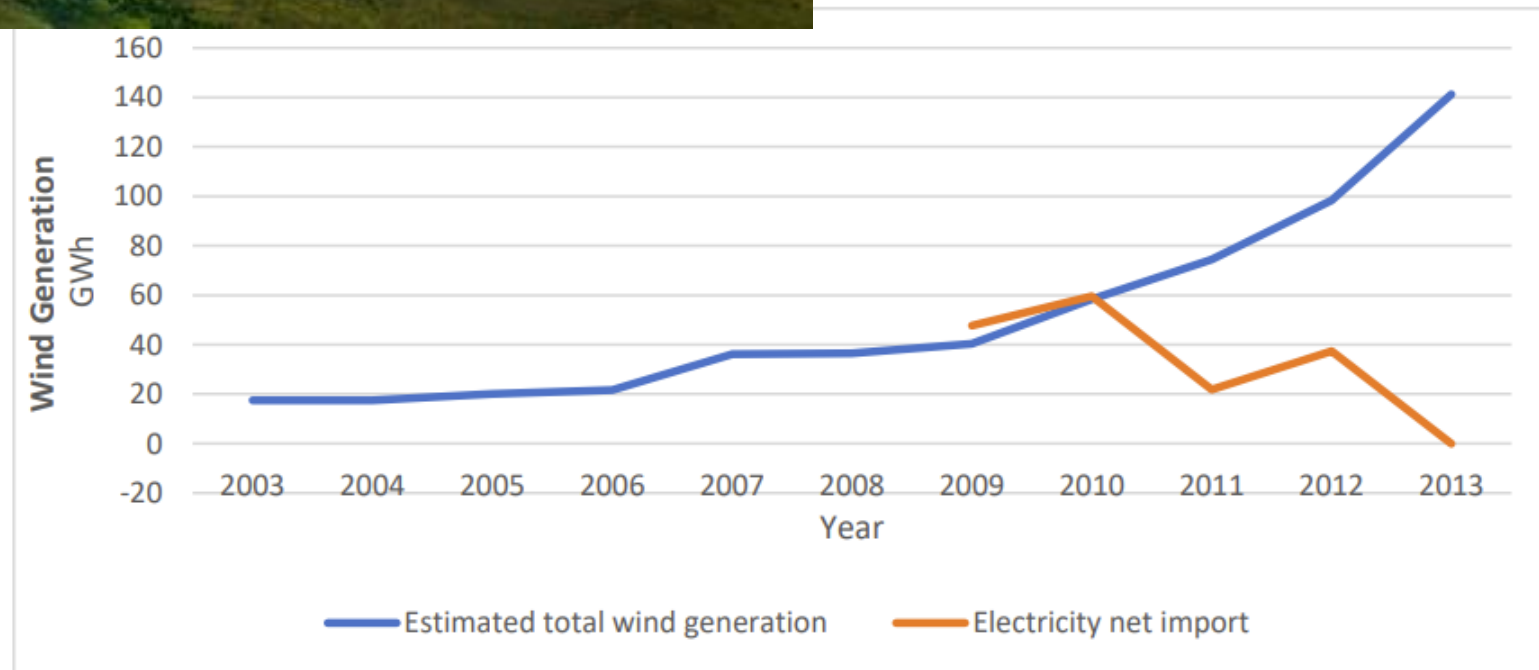
Early Wind



Modern Wind



Orkney has produced over 100% of electrical demand from renewables since 2013



Ocean energy technologies



35

devices

22

developers

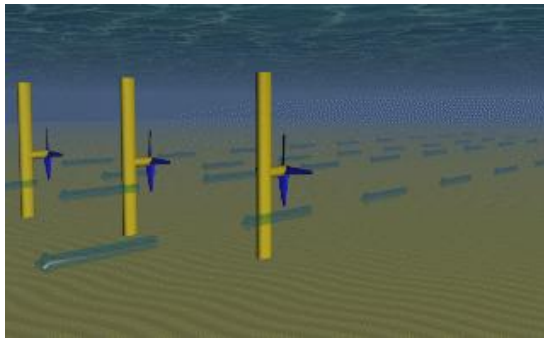
11

countries

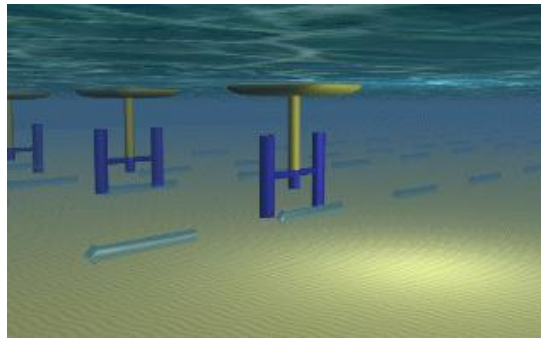


Tidal energy concepts

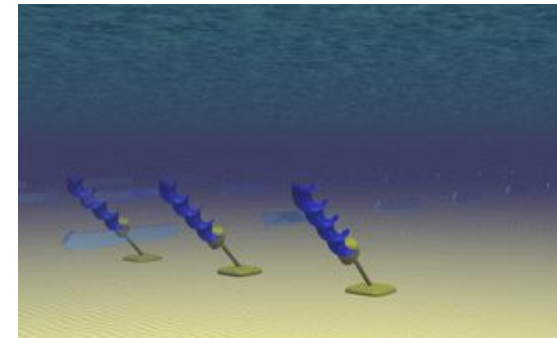
Horizontal axis



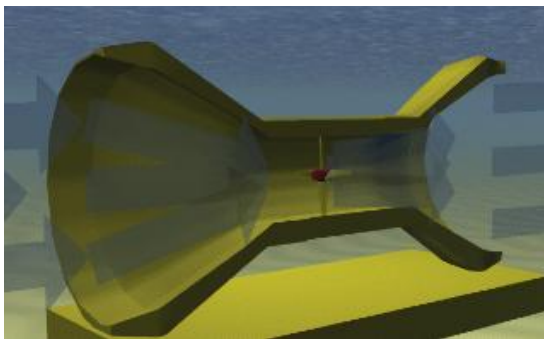
Vertical axis



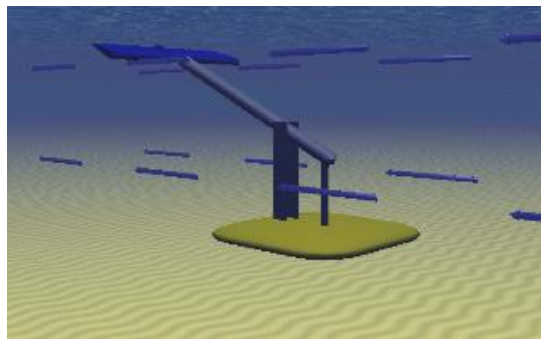
Archimedes screw



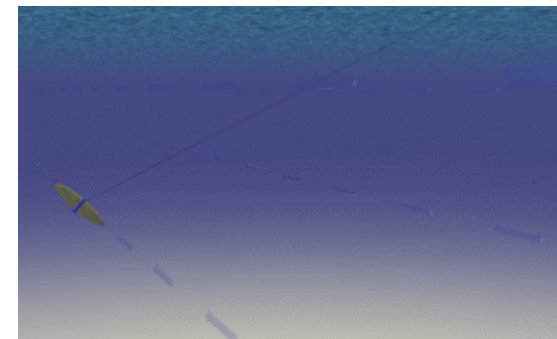
Venturi effect



Oscillating hydrofoil



Tidal kite



Iterative testing

2010



2011-13



2016-18



2021-25+

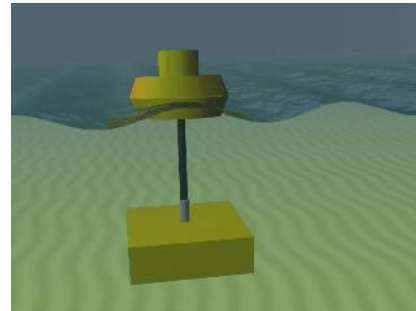


Wave energy concepts

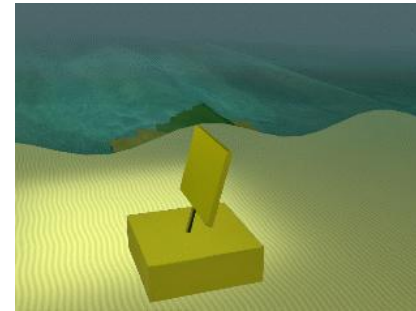
Attenuator



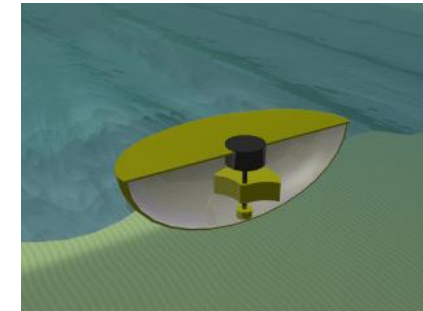
Point absorber



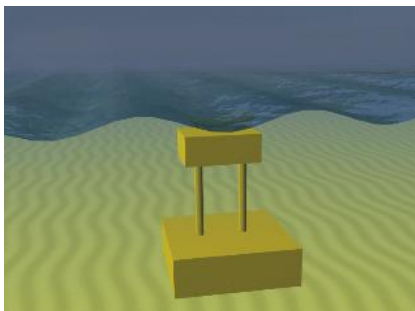
Oscillating wave surge



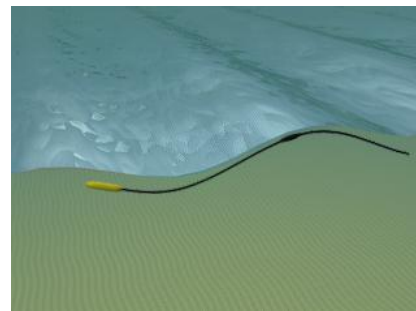
Rotating mass



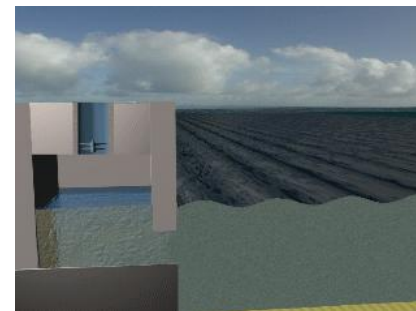
Pressure differential



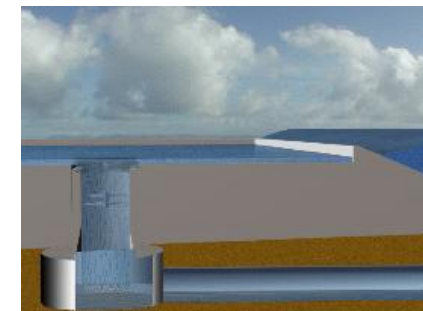
Bulge



Oscillating water column



Overtopping

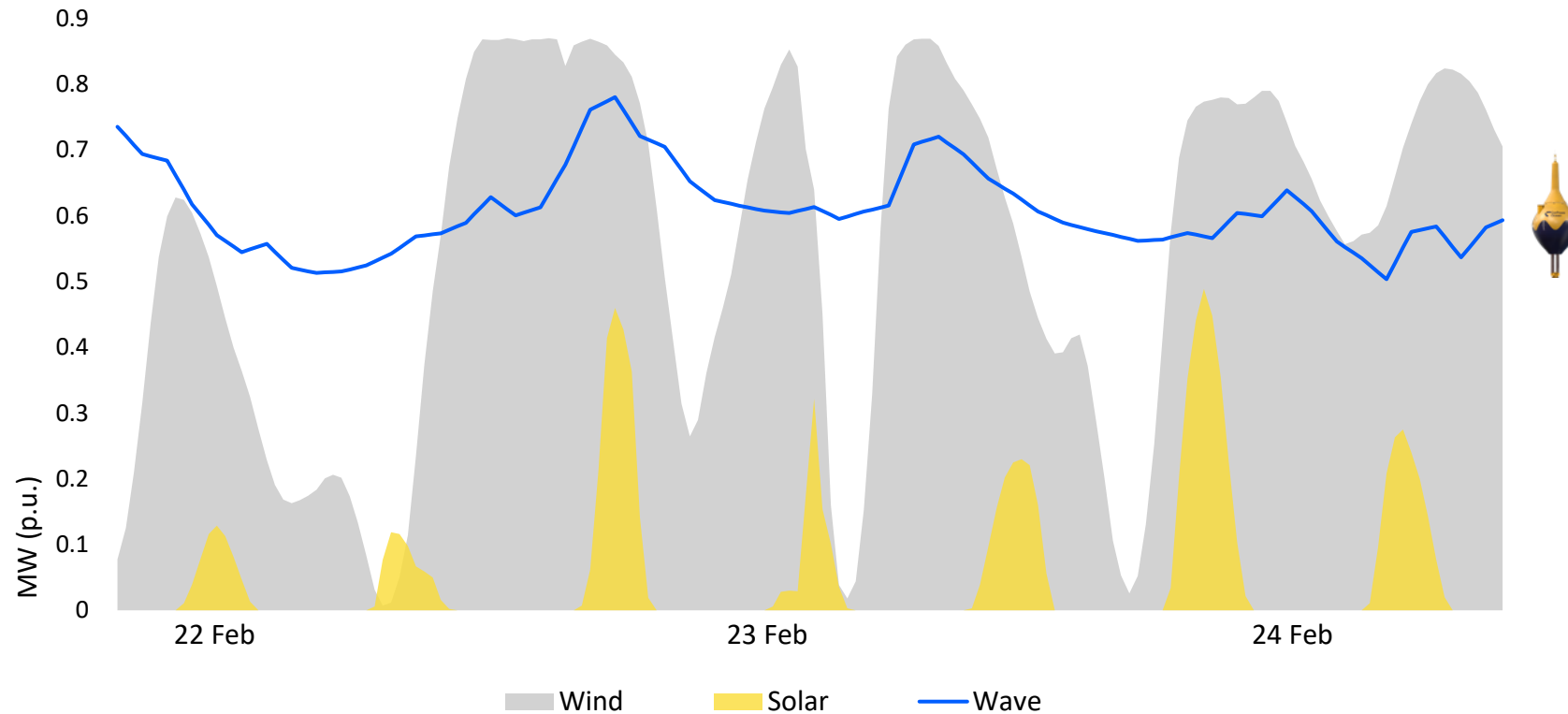


CorPower C4

High efficiency wave technology



Wave Generation



UEDIN: Dispatch cost reductions up to £1.5B/year with 10GW by 2040



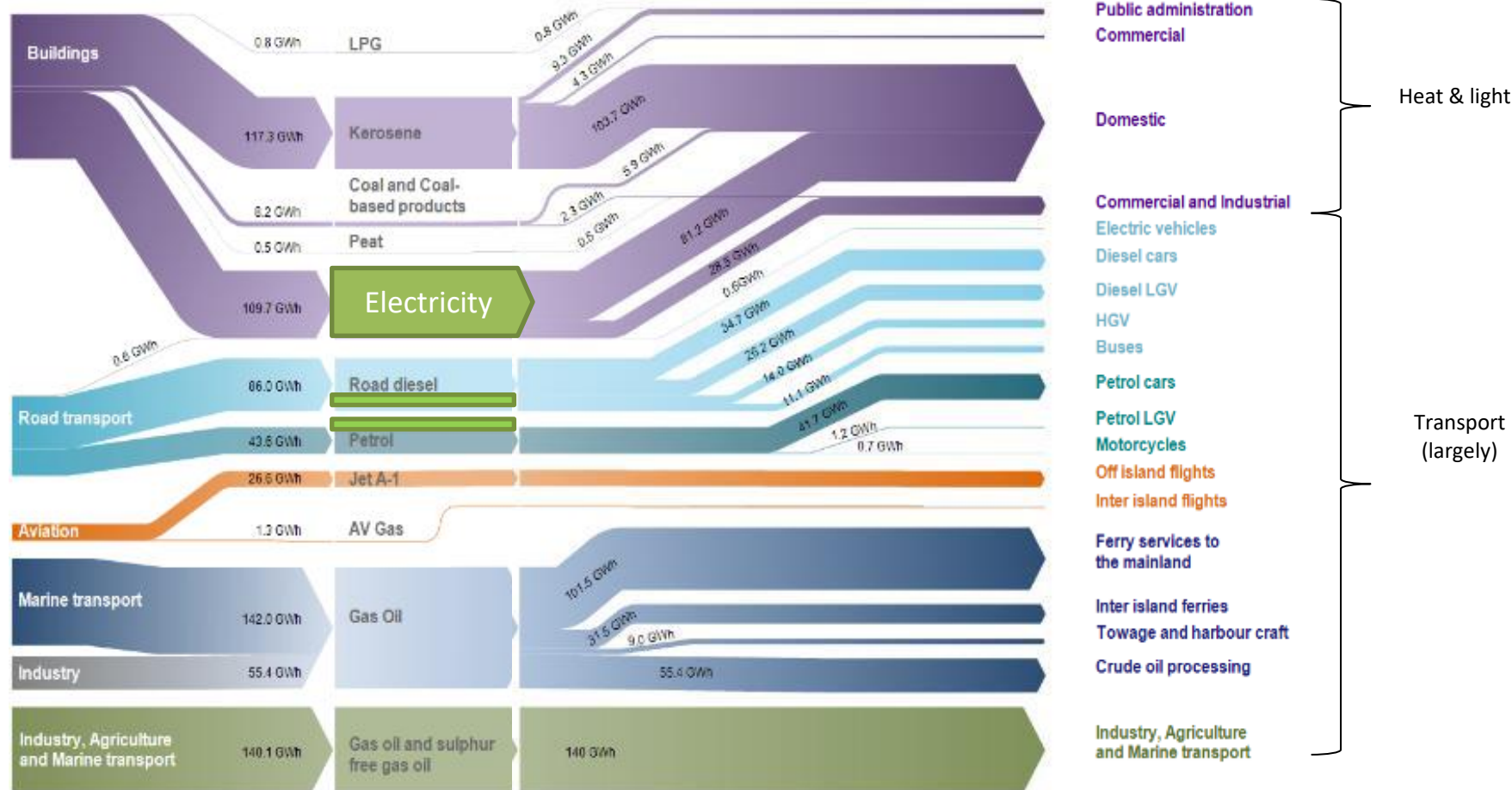
LUT: By 2050, 30GW+ would enable the lowest cost energy system

C4 composite hull Viana do Castelo



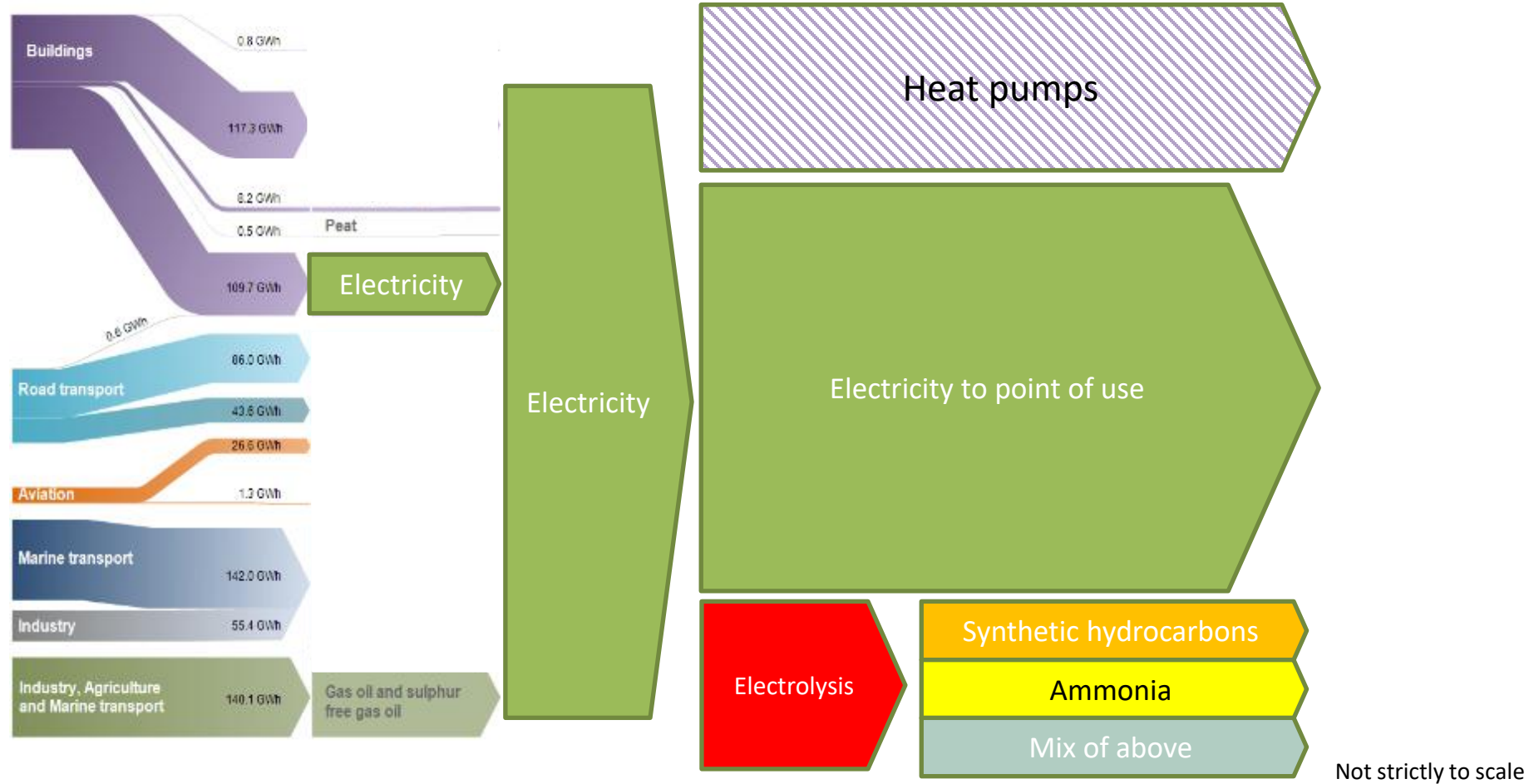
Demand

Orkney Energy 2024



Only 20% of the job's done!

Orkney Energy 2030+



Small Ferries



Artemis EF-12 Workboat XL

'Zevi 1' A 12-passenger electric workboat designed for efficient and comfortable transport within Orkney waters. Powered by advanced hydrofoil technology, it offers reduced carbon emissions and a smooth, quiet passenger experience.



Artemis EF-24 Passenger

A 100% electric passenger ferry which carries 50-60 passengers. Its cutting-edge hydrofoil technology coupled with its energy efficient design enables greater range, reduced operating costs and helps reduce the environmental impact.

Bigger Ferries



Even Bigger Ferries

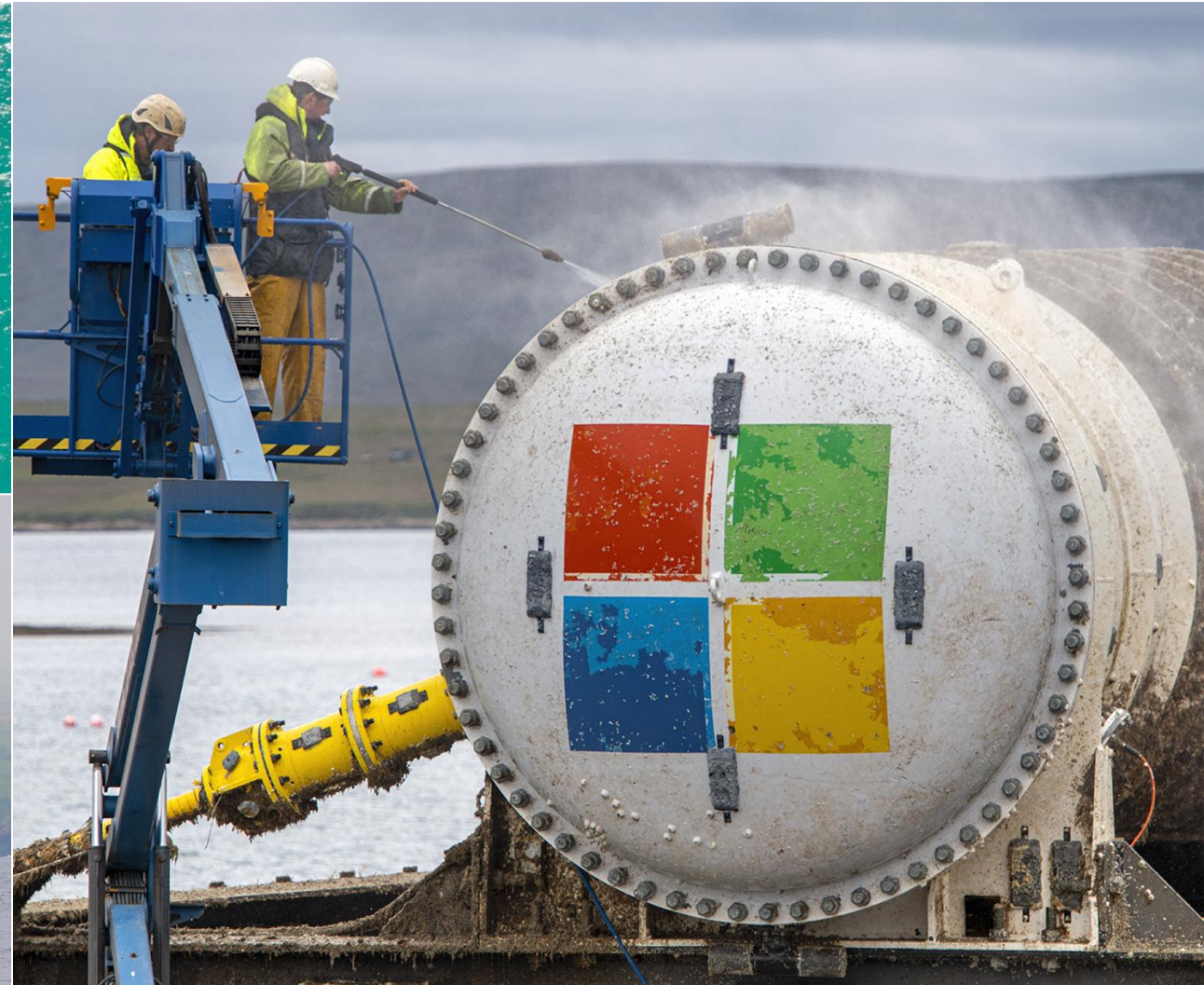
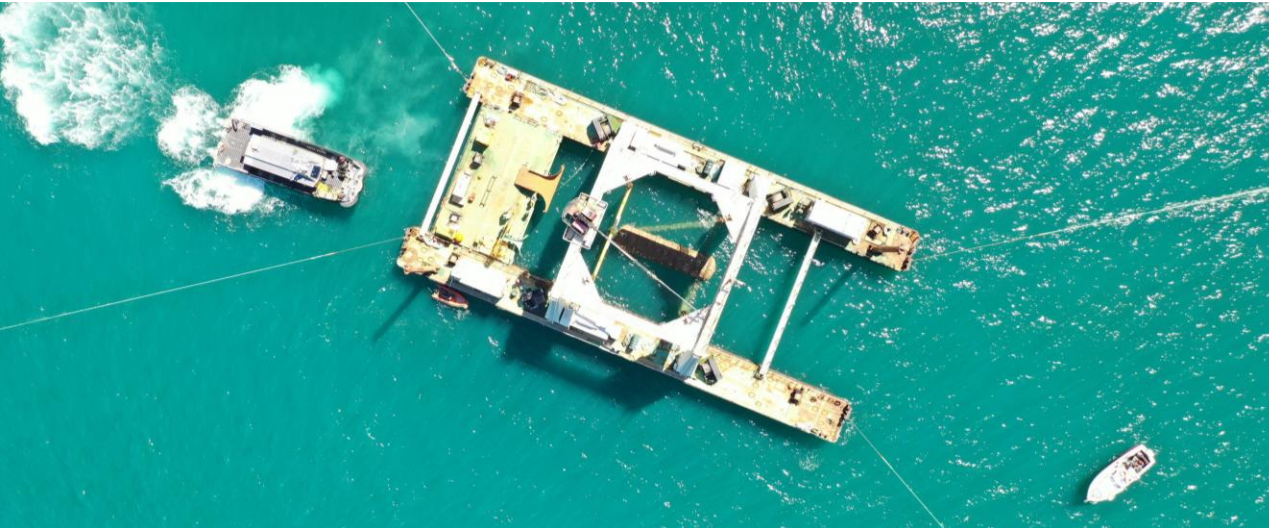


Sustainable Energy Test Environment

Phase 2 Demonstrators

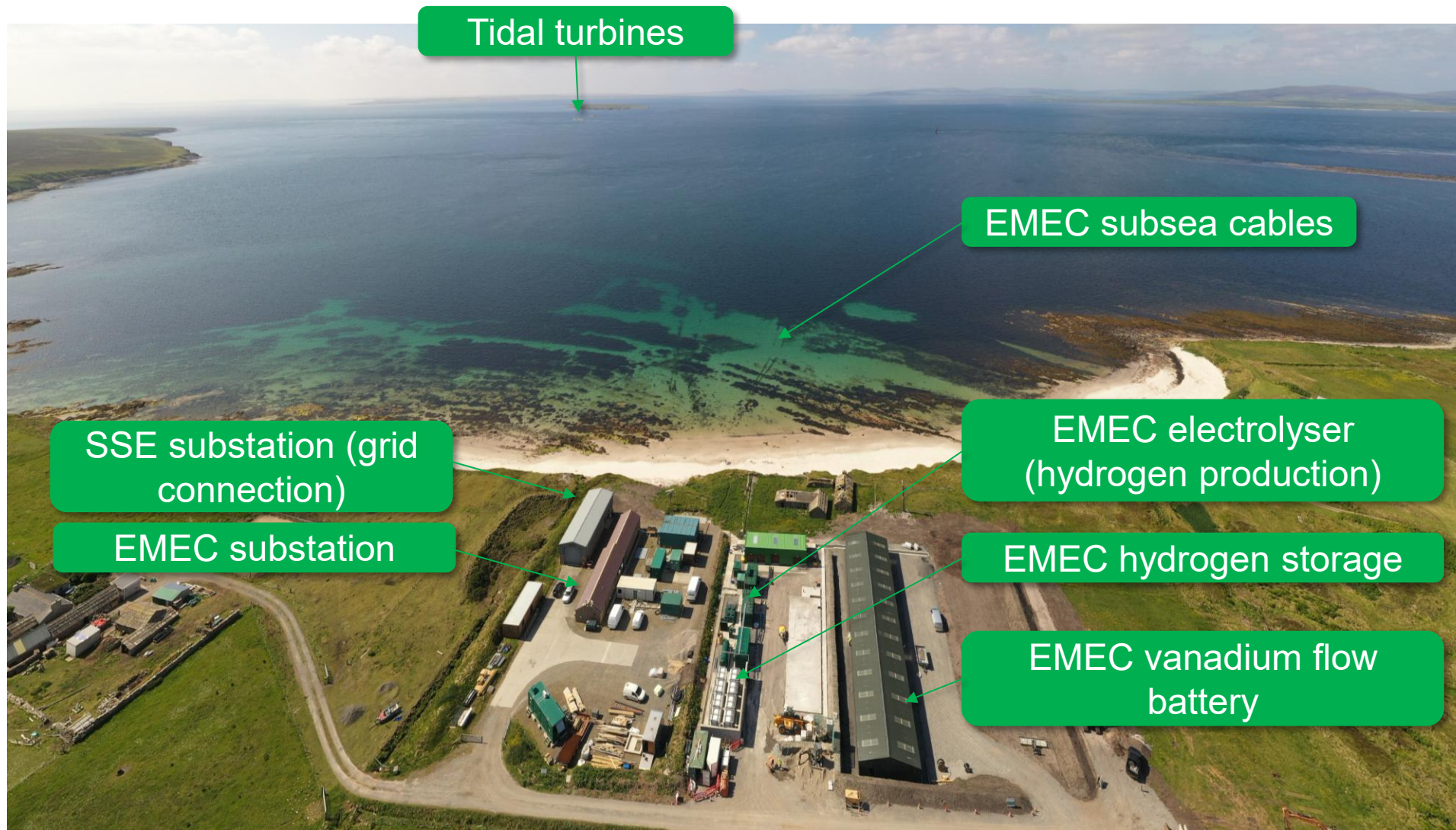


Data Centres

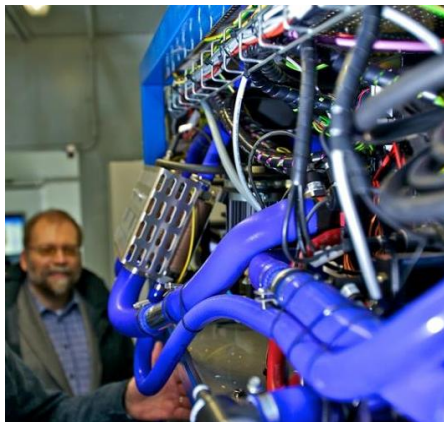


Shifting energy vectors

Hydrogen R&D starting point



Hydrogen ecosystem



End use projects

Refuelling



Maritime



E-fuels



Aviation >>>

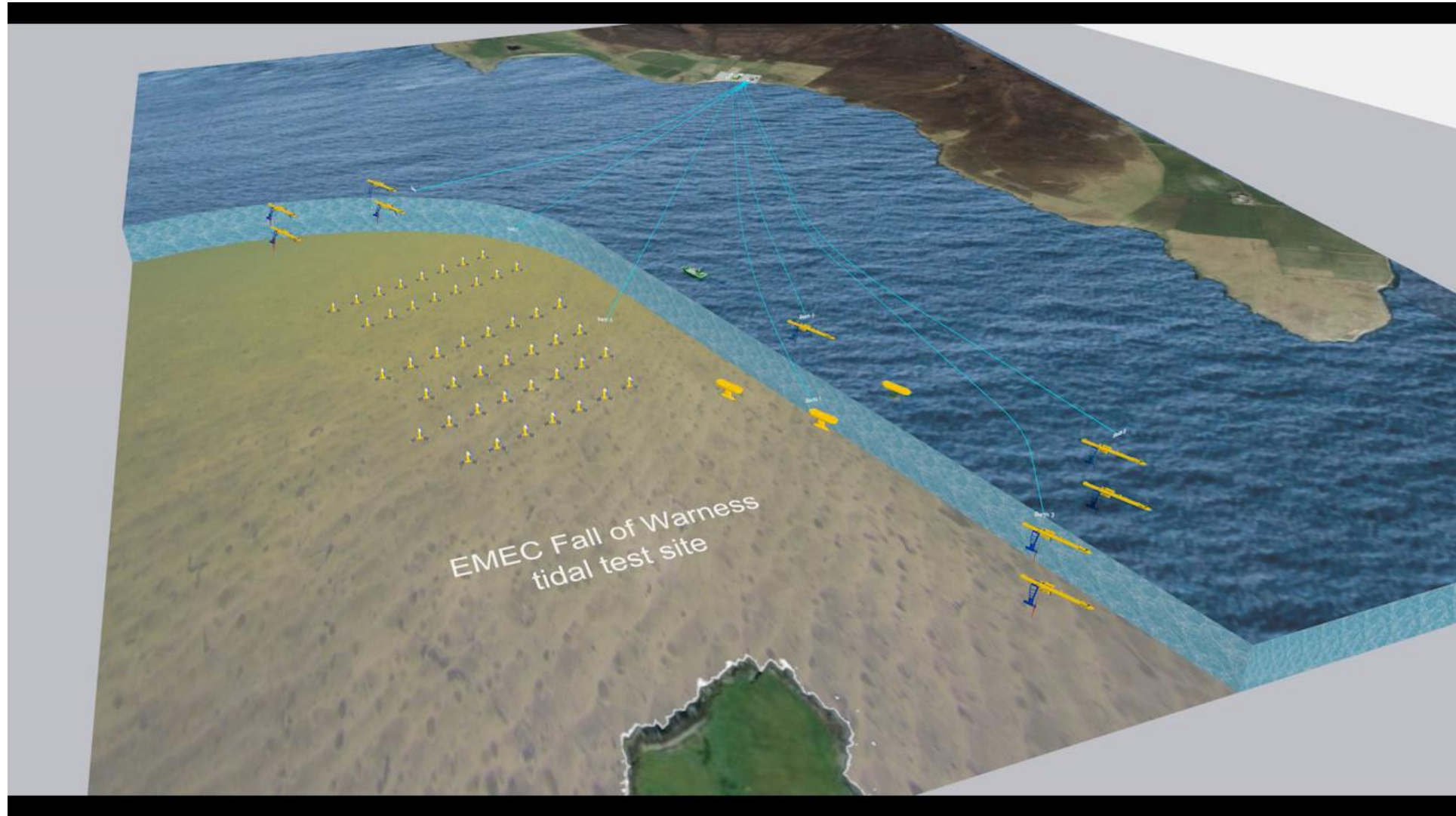
Section 4 – What's Next

New Grid Connection



- 220 MW Transmission connection
- Goes live in 2028
- Largest ever construction project in Orkney
- Cost likely to be £1B+

EMEC tidal expansion



Orkney to be home to UK's largest publicly-owned wind farm

22ND OCTOBER 2025 [ORKNEY](#) [WIND FARMS](#) [LOCAL GOVERNMENT](#) [SCOTLAND](#)



By Lucy Jackson
Multimedia Journalist

News

National Wealth Fund backs Orkney Islands Council's community wind farm project

Local Auth.

Clean energy

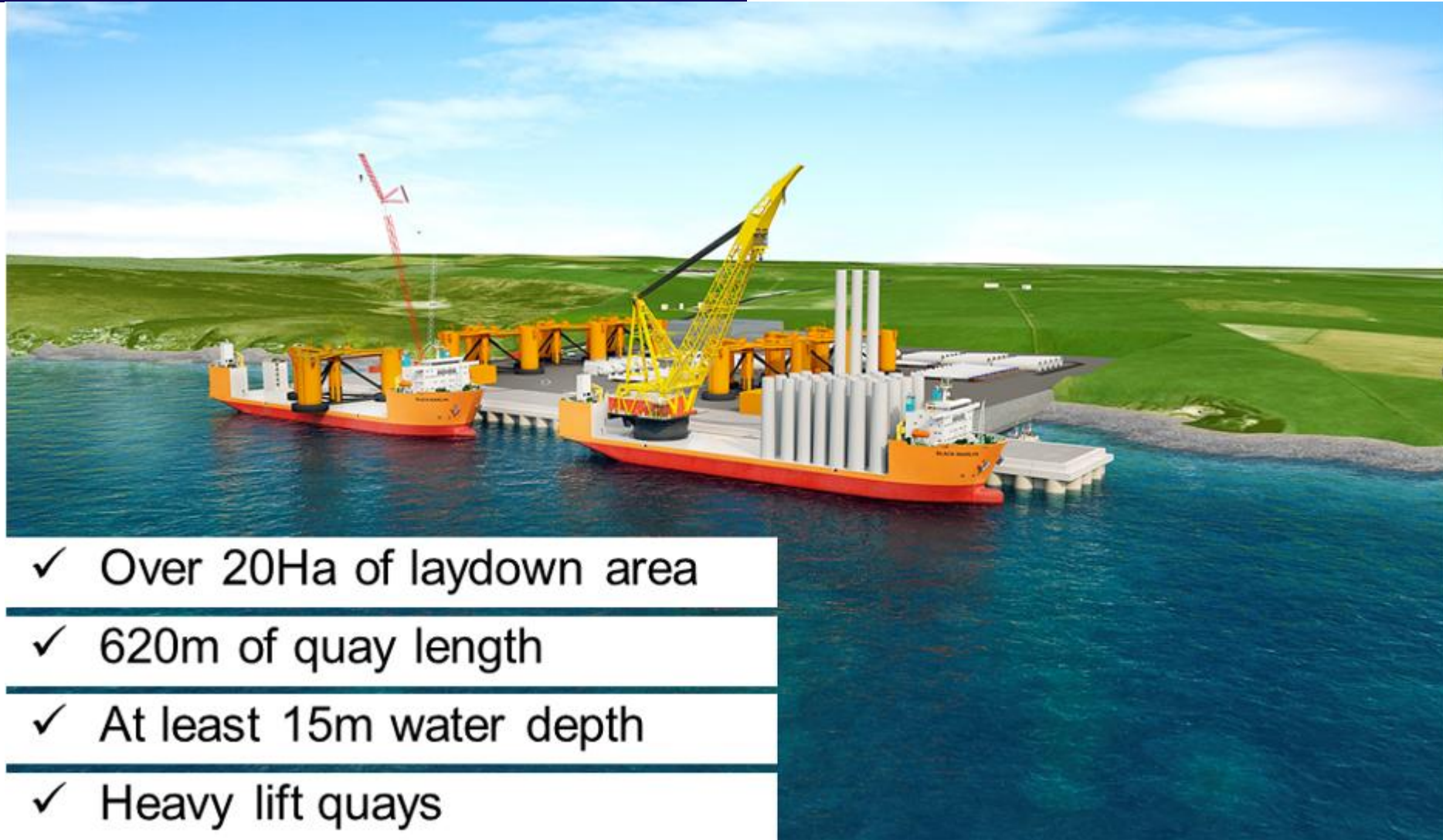
21 October 2025

Orkney Islands Council (OIC) has secured a loan from The National Wealth Fund (NWF) for its six-turbine wind farm at Quanterness.

Flotta Hydrogen Hub



Scapa Deep Water Quay

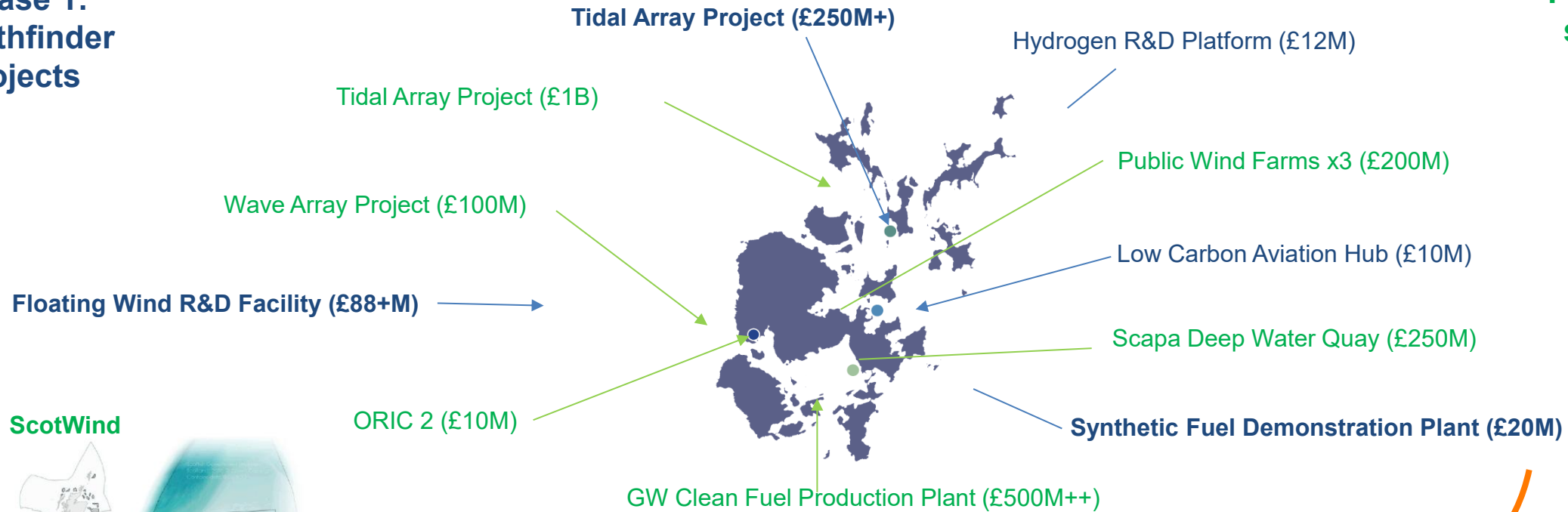


- ✓ Over 20Ha of laydown area
- ✓ 620m of quay length
- ✓ At least 15m water depth
- ✓ Heavy lift quays

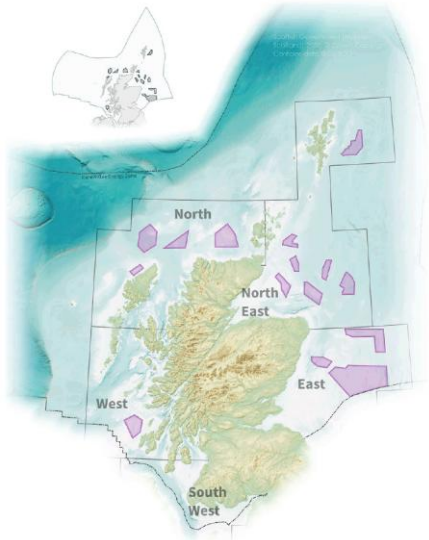
Growth Opportunities

Phase 1: Pathfinder projects

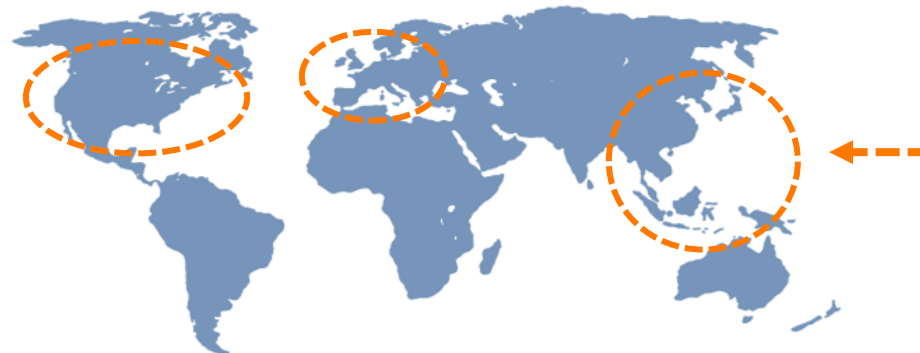
Phase 2: Larger scale build out



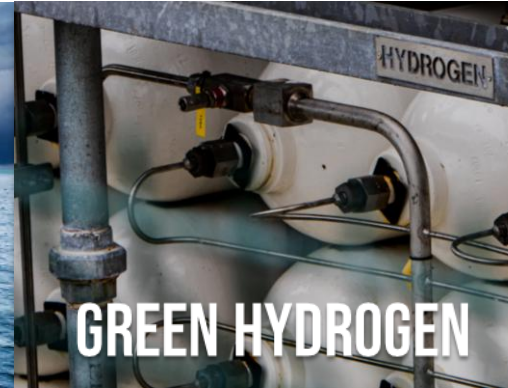
ScotWind



Export Opportunities



**International Centre
for Excellence (£33M)**



Any Questions – Matthew.Finn@emec.org.uk

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