Offshore Renewable Energy Supergen Hub

Annual Assembly January 2022

Tackling the Research Challenges:
Topic A: Resource and environment characterisation
Topic G: Environmental and Ecosystem Aspects

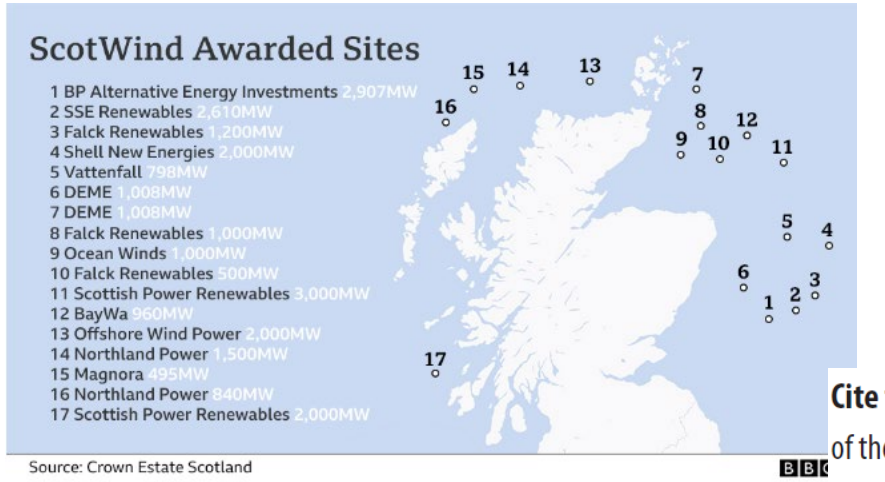
Session Chairs:
Beth Scott, David White


UNIVERSITY
A2
A1
A4

Offshore renewables expansion

The UK government will invest £20 million per year in Tidal Stream electricity as part of its flagship renewable energy auction scheme, kickstarting a brand-new chapter for the tidal industry and creating jobs across the UK.

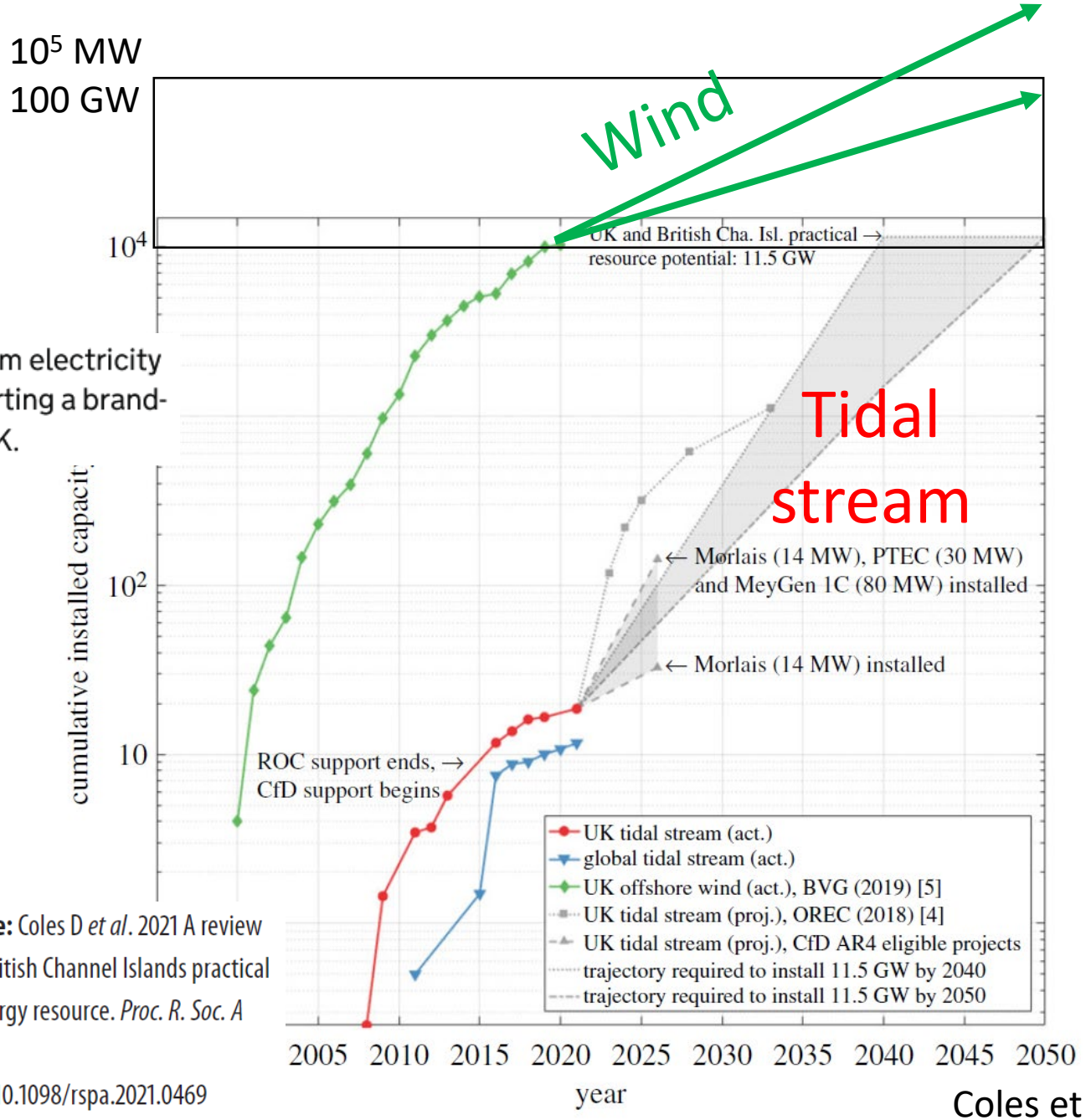
https://www.gov.uk/government/news/uk-government-announces-biggest-investment-into-britains-tidal-power
24 November 2021



First Minister Nicola Sturgeon described the ScotWind auction as a "truly historic opportunity for Scotland's net zero economy".

She added: "The scale of opportunity represented in today's announcement exceeds our current planning assumption of 10GW of offshore wind - which is a massive vote of confidence in Scotland."

1 day ago | Comments



Coles et al. 2021

Cite this article: Coles D *et al*. 2021 A review of the UK and British Channel Islands practical tidal stream energy resource. *Proc. R. Soc. A* **477**: 20210469. https://doi.org/10.1098/rspa.2021.0469

Figure 1. Actual and projected cumulative installed capacity of tidal stream and fixed-bed offshore wind in the UK and globally

Landscape themes A & G

A: Resource and Environment Characterisation
G: Environmental and Ecosystem Aspects

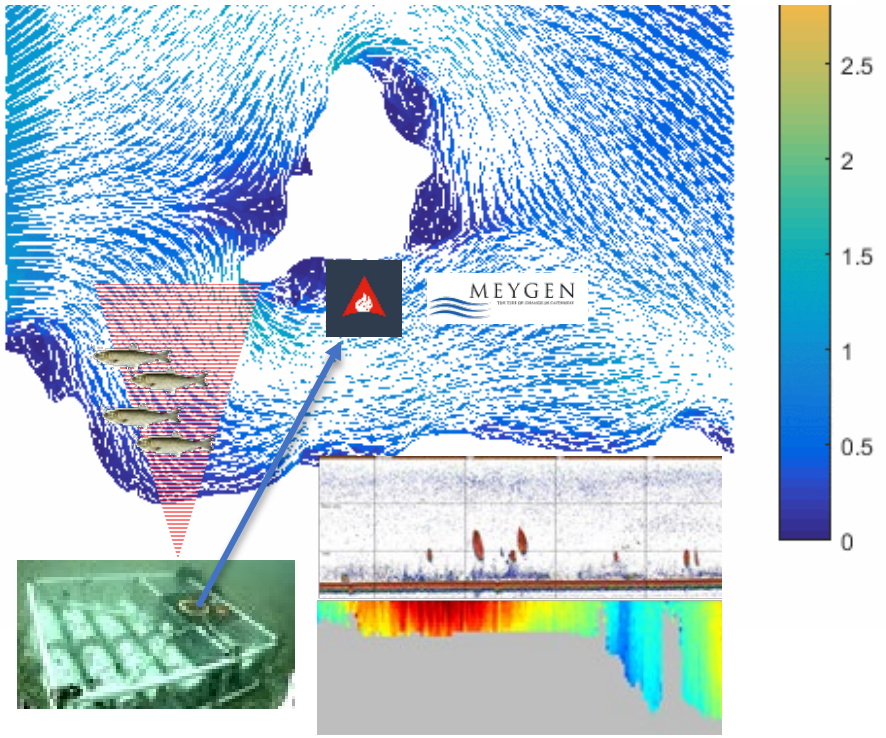
Combining themes – in fact two sides of the **same coin**

Both engineers and ecologists need to understand the physical resources at a range of spatial and temporal scales.

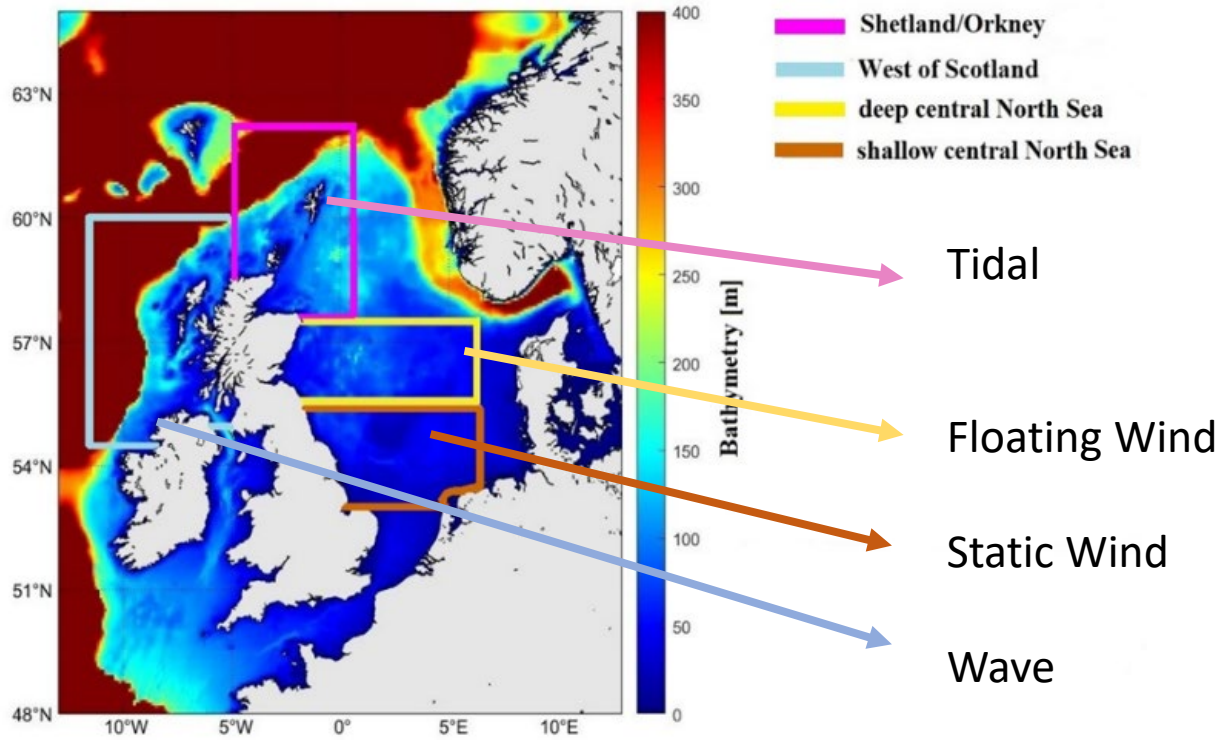
Landscapes A & G : CORE

Fine scale to large scale physical/ecosystem aspects (WP1-5)

3D Hydro Dynamic, ADCP and Acoustic Fish School from MeyGen Tidal site



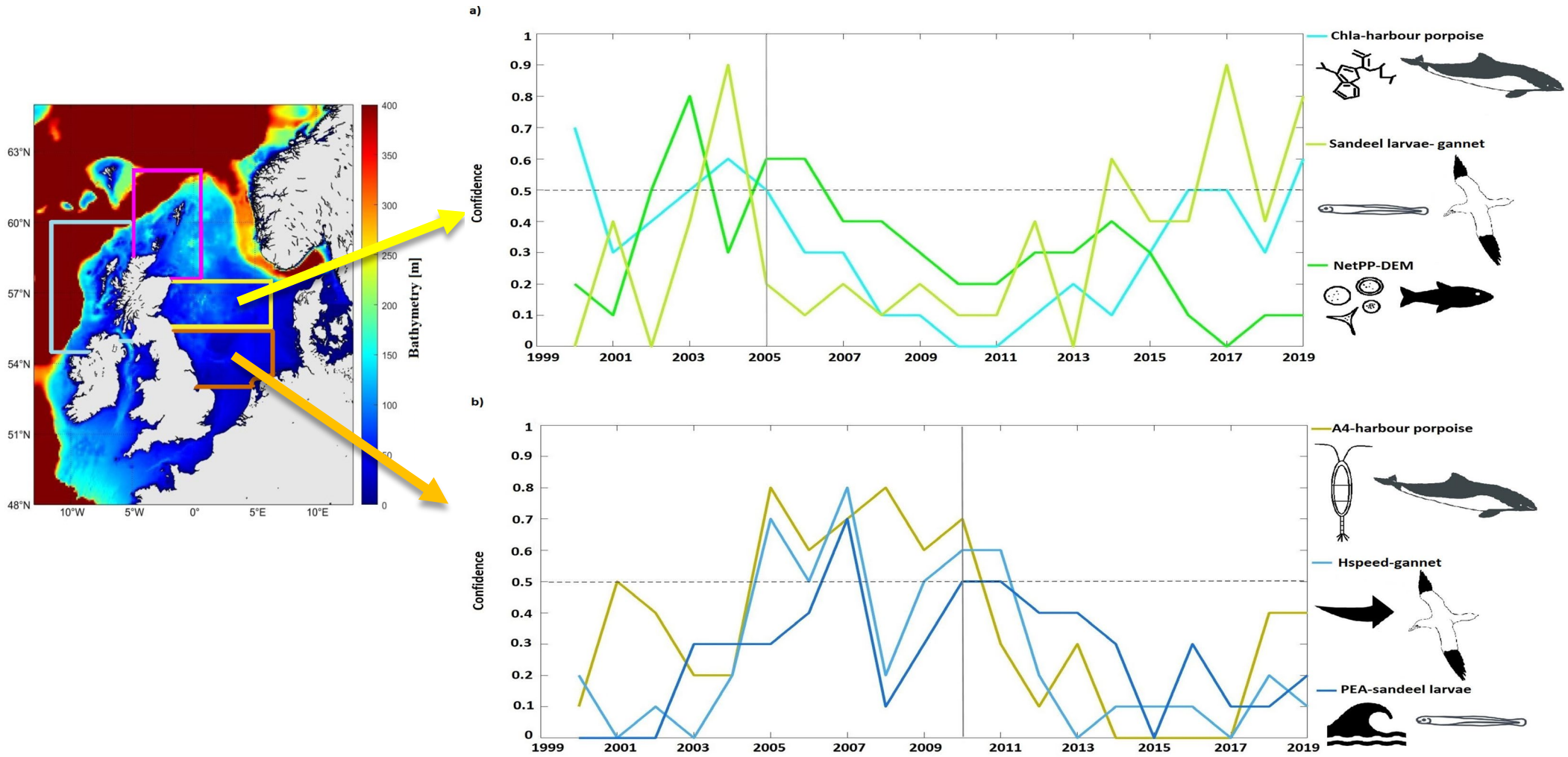
Whole UK waters information for Offshore wind, wave and tidal in contrasting large habitat /ecosystem types



Supergen Offshore Renewable Energy

UKRI Engineering and Physical Sciences Research Council

Bayesian (AI) approaches to 30 year relationships show large changes in the confidence of indicators over time: Clues to mechanistic drivers



Confidence in indicators

Confidence in indicators

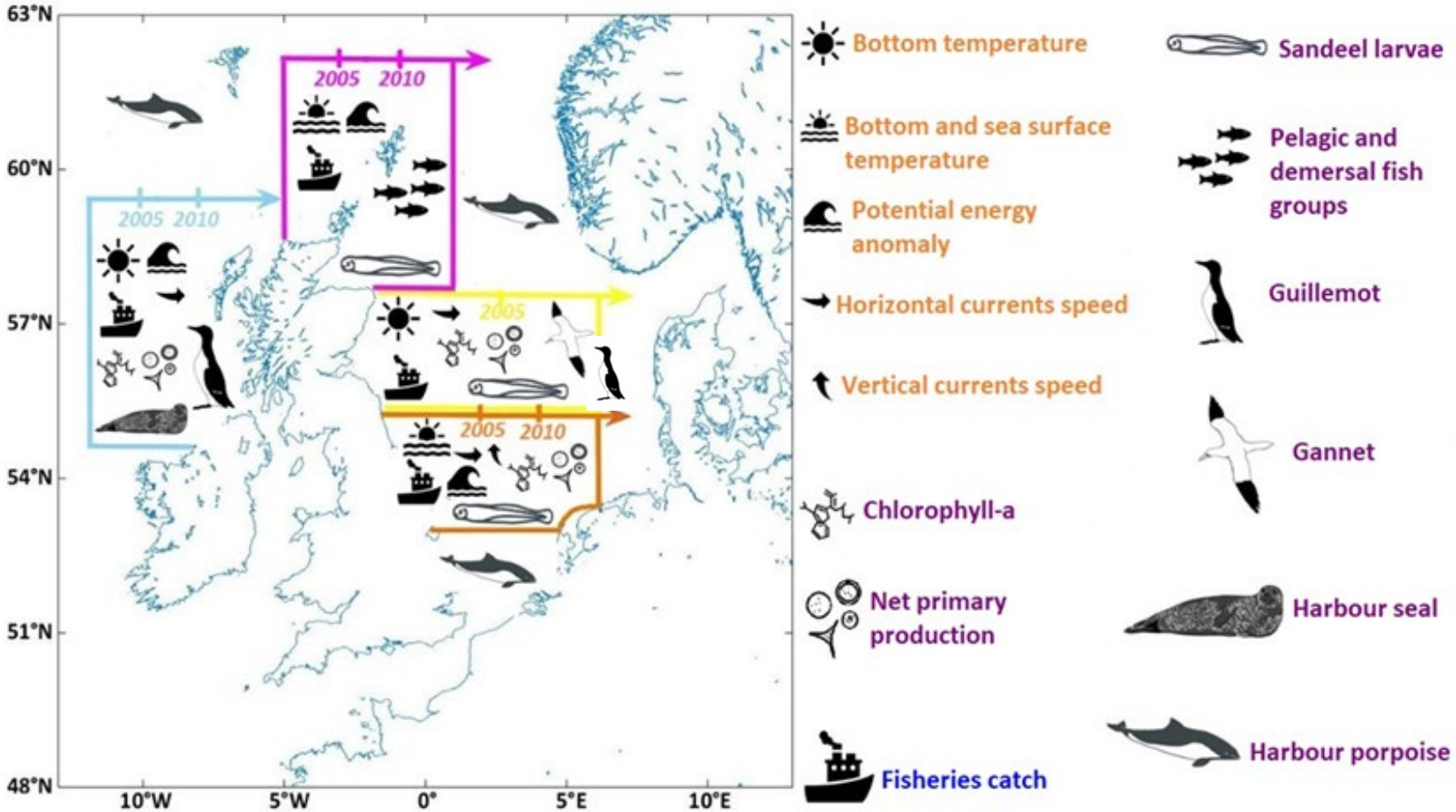
Trifonova et al. 2021

Ecological Indicators
Volume 129, October 2021, 107997

Different habitats have different best indicators: Using both level of confidence and hidden variables

Next Steps:
Understanding mechanism of change

- Understanding which habitats are most likely to remain resilient under climate change and renewables
- Prioritise protections against the human induced drivers that effect resilience



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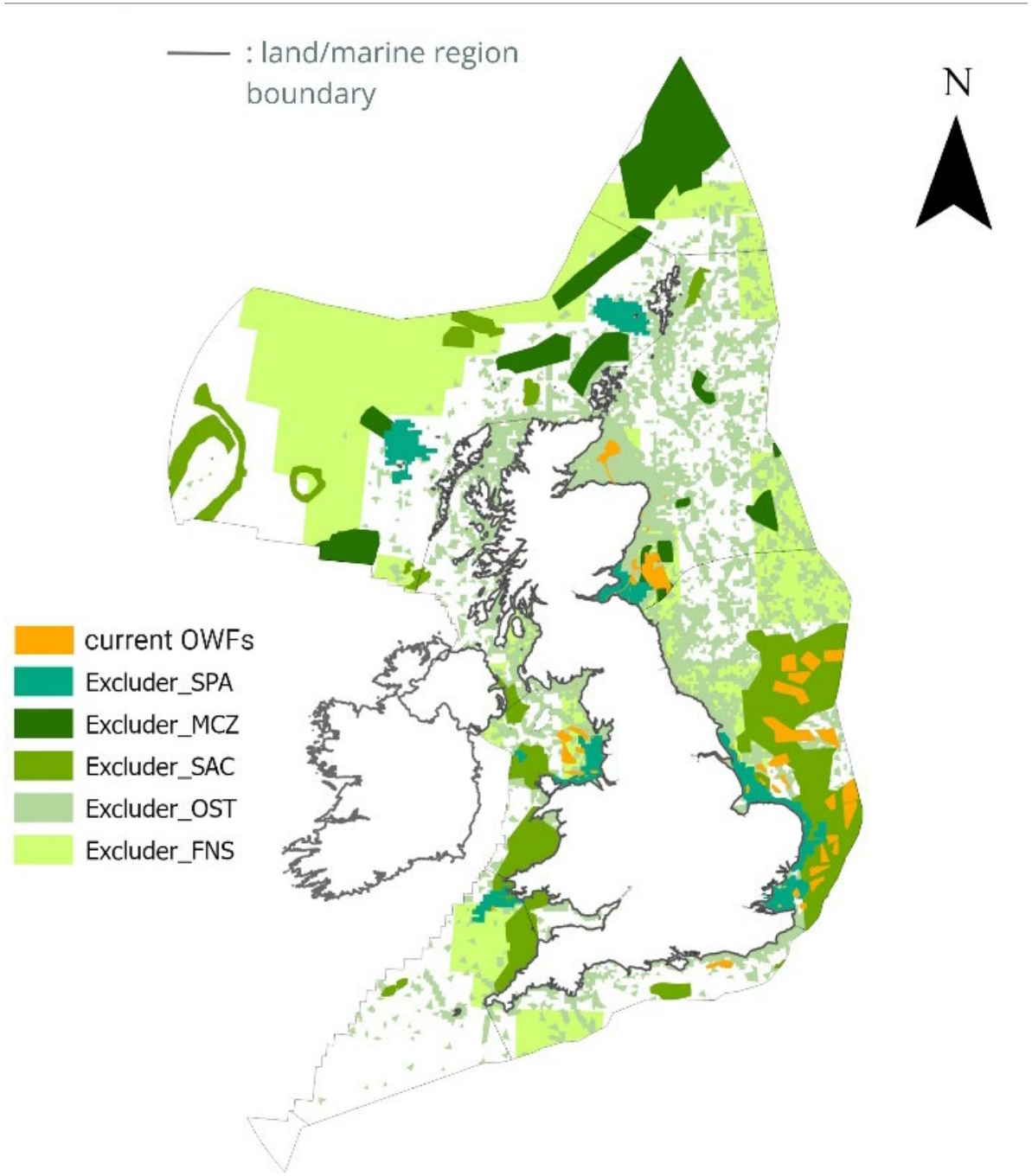
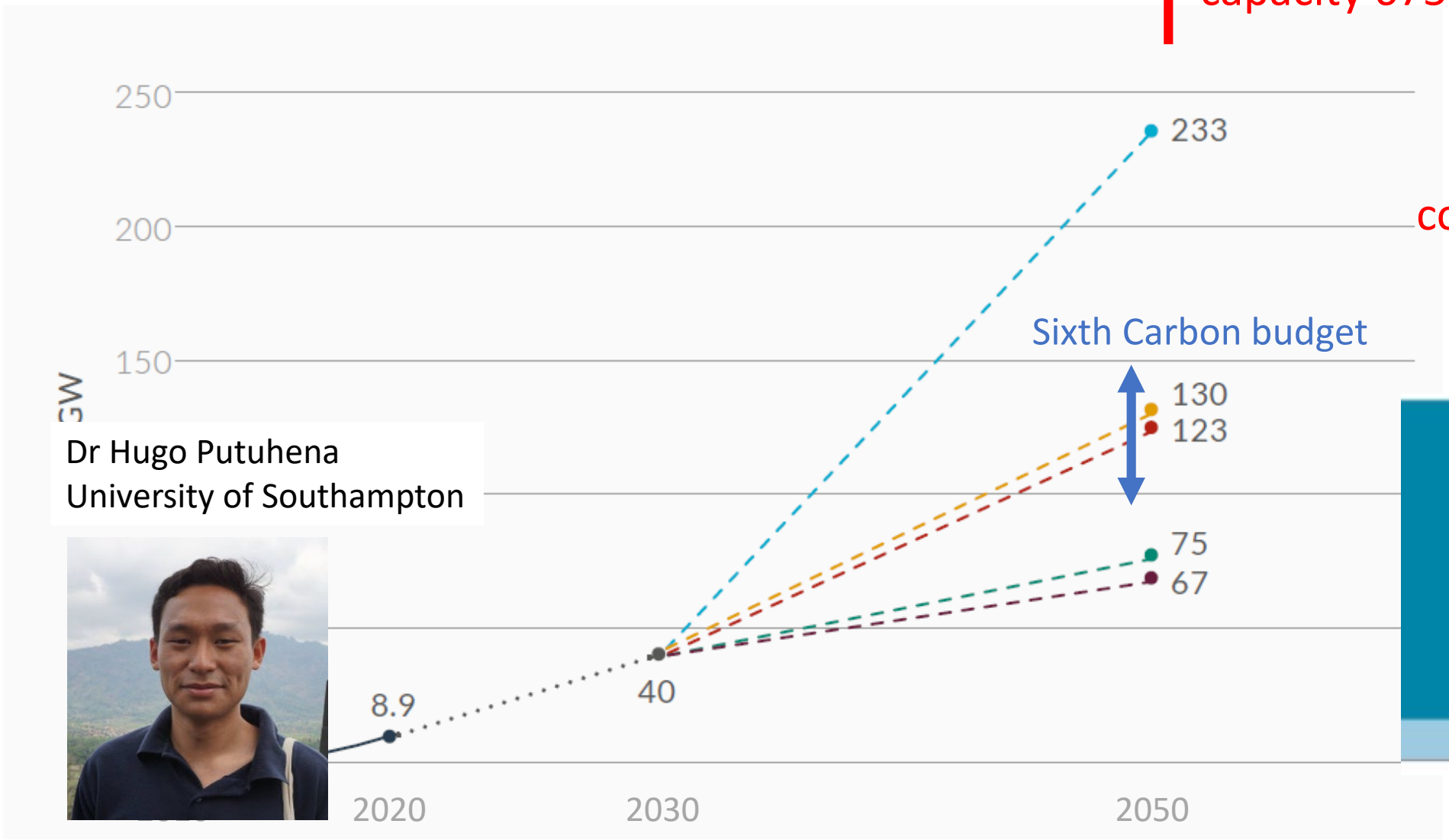
Spatial constraints

Dr Hugo Putuhena
University of Southampton

ORE Supergen Hub work in progress….



Offshore wind expansion



‘Whole ocean’ UK capacity 675-1000 GW

All constraints

Co-locate with ecological constraints

Dr Hugo Putuhena
University of Southampton

ORE Supergen Hub work in progress….

Theme A and G Presentations

A1 Better Measurement Techniques For Forecasting And Resource Characterisation

A2 Improved Modelling Tools For Resource And Loading Assessment

G1 Fit-for-purpose Approaches To Environmental Monitoring

G3 Ecosystem Modelling

FORTUNE: Floating Offshore Wind Turbine Noise.
Dr Denise Risch - Marine Mammal Ecologist, Scottish Association for Marine Science

Accounting for Current in Wave Buoy Measurements.
Dr Samuel Draycott - Dame Kathleen Ollerenshaw Fellow, Univ. of Manchester

Veers' Extension to Non-neutral Incoming Winds (VENI).
Dr Marco Placidi - Senior Lecturer - University of Surrey

V-SCORES (Validating Surface Currents at Offshore Renewable Energy Sites).
Dr Benjamin Williamson - Lead Scientist - University of Highlands and Islands

WTIMTS - Wave-Turbulence Interaction and Measurement for Tidal Stream.
Dr Michael Togneri - Postgraduate Research Assistant, Swansea University

FASTWATER: Freely-Available mesoScale simulation Tool for Wave, Tides and Eddy Replication. *Dr Chris Old - Chancellor's Fellow, University of Edinburgh*

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Discussion session themes

Research outcomes and impacts

- How would you describe the contribution your research makes to the theme challenges?
- How might your work be taken up by industry and other stakeholders in practice?

Supergen Hub structure and network

- How did your flex fund project come about?
- How does the flex fund scheme fit with your research direction?
- How does the ORE Supergen Hub network benefit your work?

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