

# Potential technological and economic futures for ORE in the UK

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Offshore  
Renewable  
Energy



THE UNIVERSITY of EDINBURGH  
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**Policy and Innovation Group**

# Introduction

- ▶ Deployment modelling and scenarios achievable at target costs and with varying competition from other generating technologies
- ▶ The economic benefit to the UK economy and supply chain associated with the achievement of each of these scenarios at a UK and global scale
- ▶ The technology innovation required to achieve this deployment and consequent economic prize to the UK economy
- ▶ Policy intervention necessary to achieve anything discussed between our two presentations
  - ▶ Results are potential outcomes that could happen **with policy intervention**

*'As we scale up our ambitions and remain world leaders in green technology, it is vital that our economy realises the economic benefits of this large-scale infrastructure programme'*

- **BEIS**, Contracts for Difference Supply Chain Plan consultation, 2021





# Deployment

Modelling and Scenarios



# The SET Plan

- ▶ The Strategic Energy Technology Plan (SET Plan) was laid out in 2015 to lead the clean energy transition in Europe.
- ▶ As part of this, the **SET Plans for Ocean Energy** and for **Offshore Wind** set **quantitative targets** to be achieved (right)

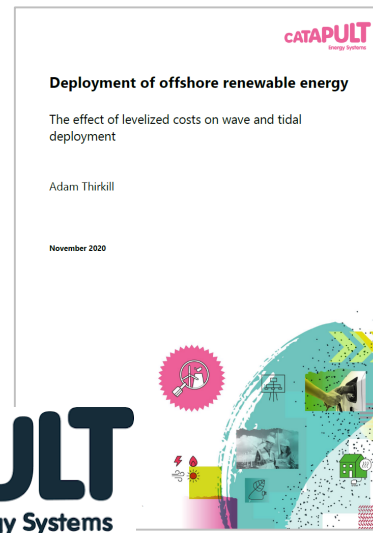


Technology	2030 target LCOE
Floating offshore wind	€90/MWh
Tidal stream	€100/MWh
Wave	€150/MWh

# Deployment Modelling

## UK

- ▶ ESME model run by the Energy Systems Catapult (ESC)
- ▶ Future Ambition (96%) Scenario
- ▶ 96% of Net Zero carbon emissions reductions achieved
- ▶ Variation in cost
  - ▶ Achievement of SET Plan target
  - ▶ Surpassing by 20% and 30%
- ▶ Variation in nuclear competition
  - ▶ Low (4 GW 2050, Hinkley Point C only) and
  - ▶ Mid (10 GW by 2050, Hinkley Point C, Sizewell C and Bradwell C) nuclear competition in energy mix



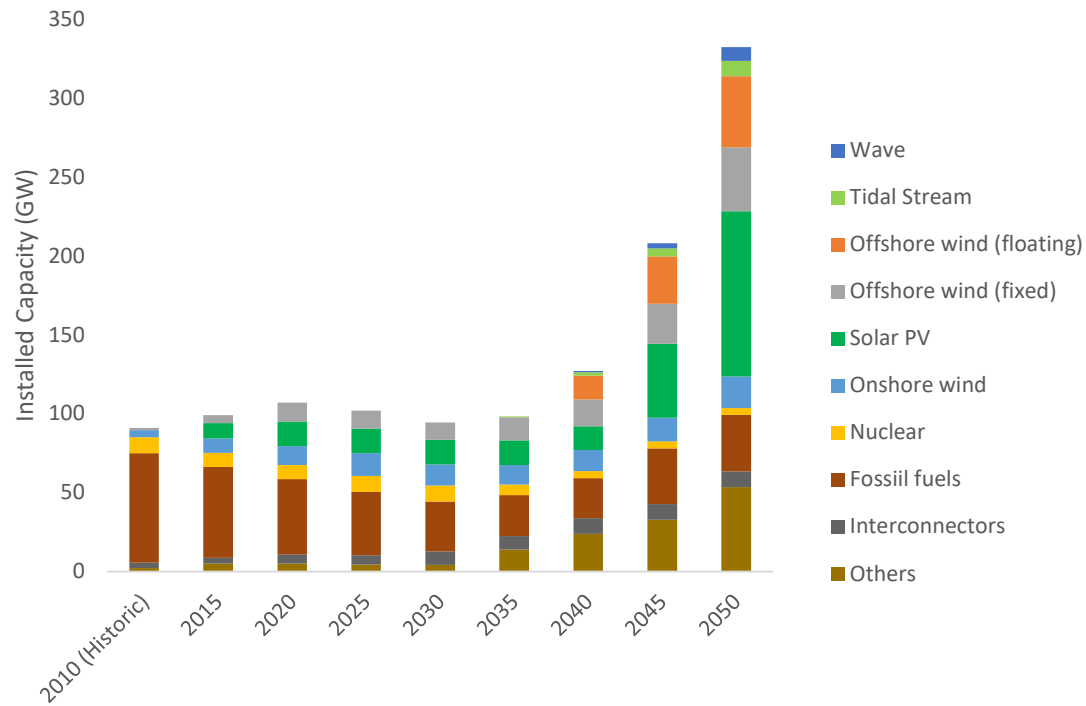
## Global

- ▶ TIMES model run by the IEA Energy Technology Perspectives (ETP) 2020 team
- ▶ Sustainable Development Scenario
  - ▶ Most ambitious of the ETP's three historical scenarios
  - ▶ Paris Agreement met

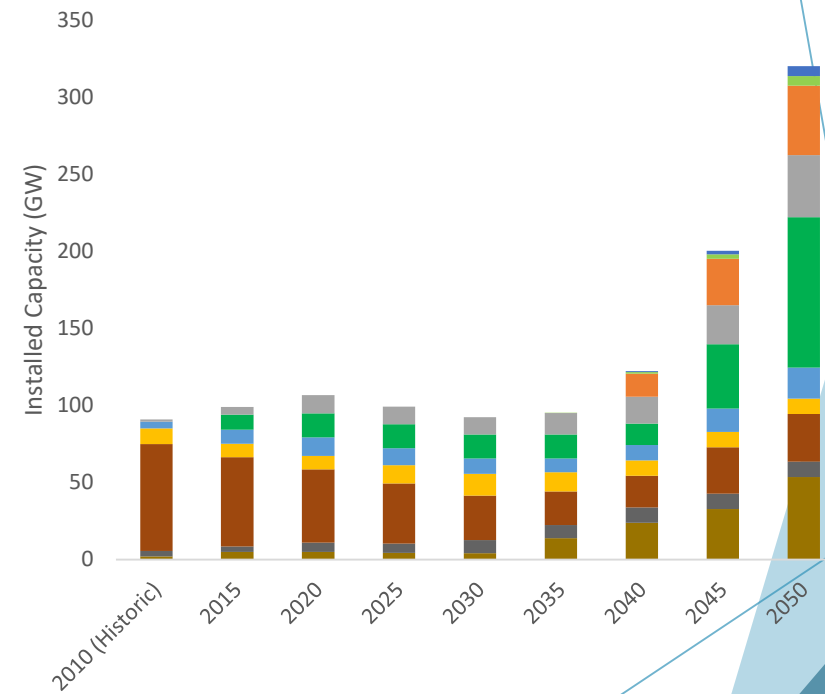


# UK electricity mix when SET Plan targets are reached

UK electricity mix with **low** nuclear competition

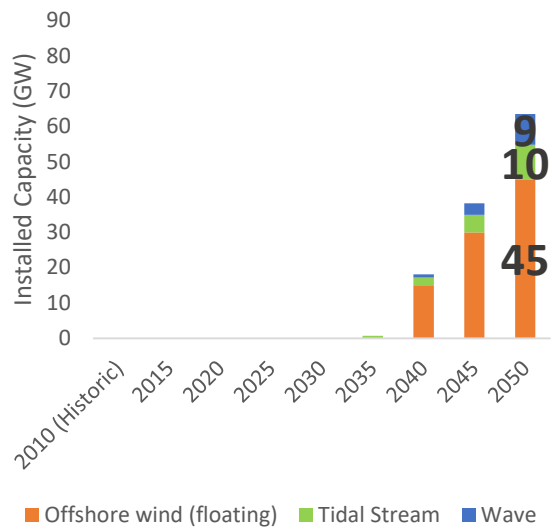


UK electricity mix for **mid** nuclear competition

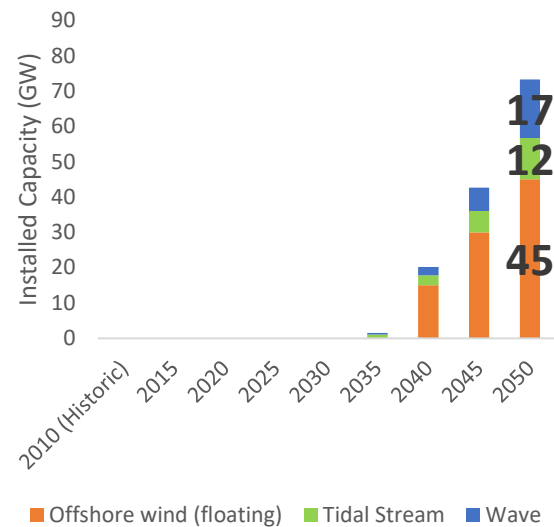


# ORE deployment and cost reduction

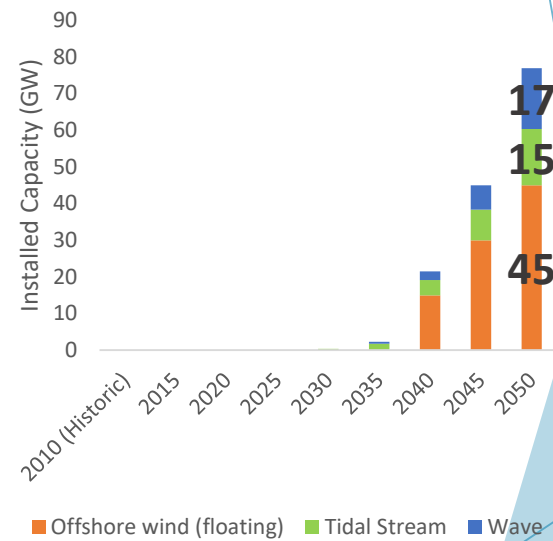
Achievement of the SET Plan targets  
(Low nuclear competition)



Surpassing the SET Plan targets by **20%**  
(Low nuclear competition)



Surpassing the SET Plan targets by **30%**  
(Low nuclear competition)





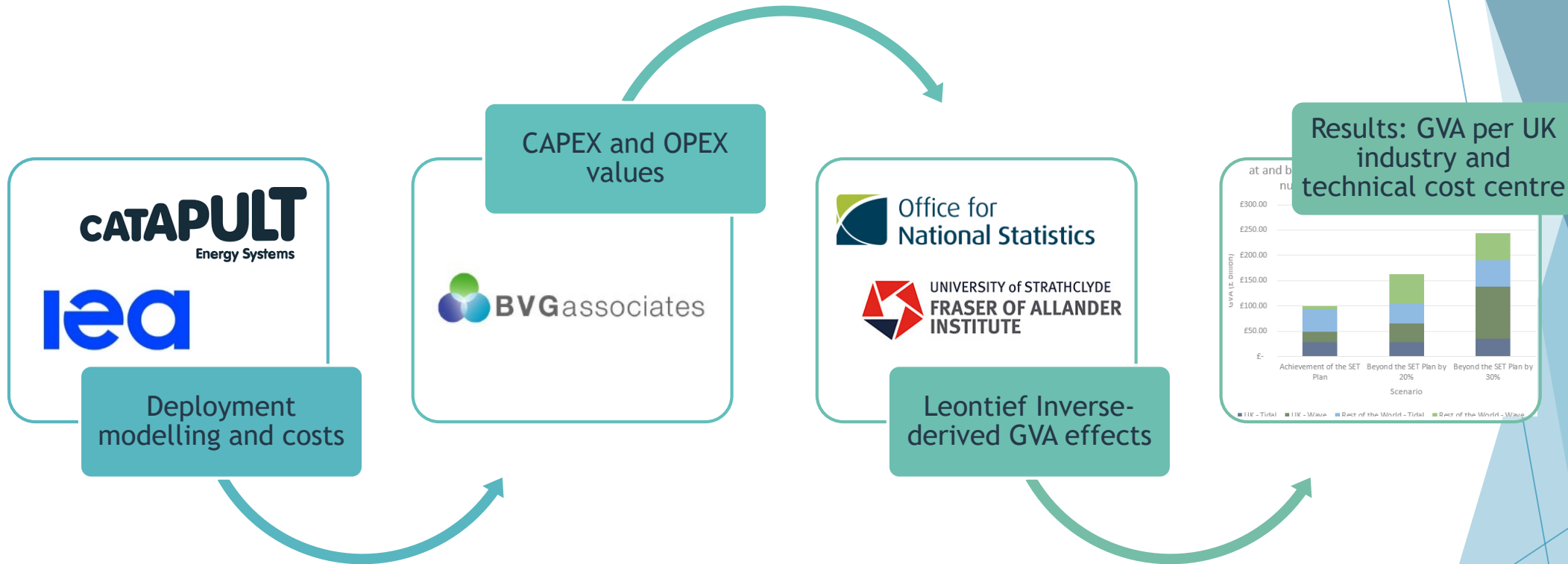
# Economic benefit

GVA Results

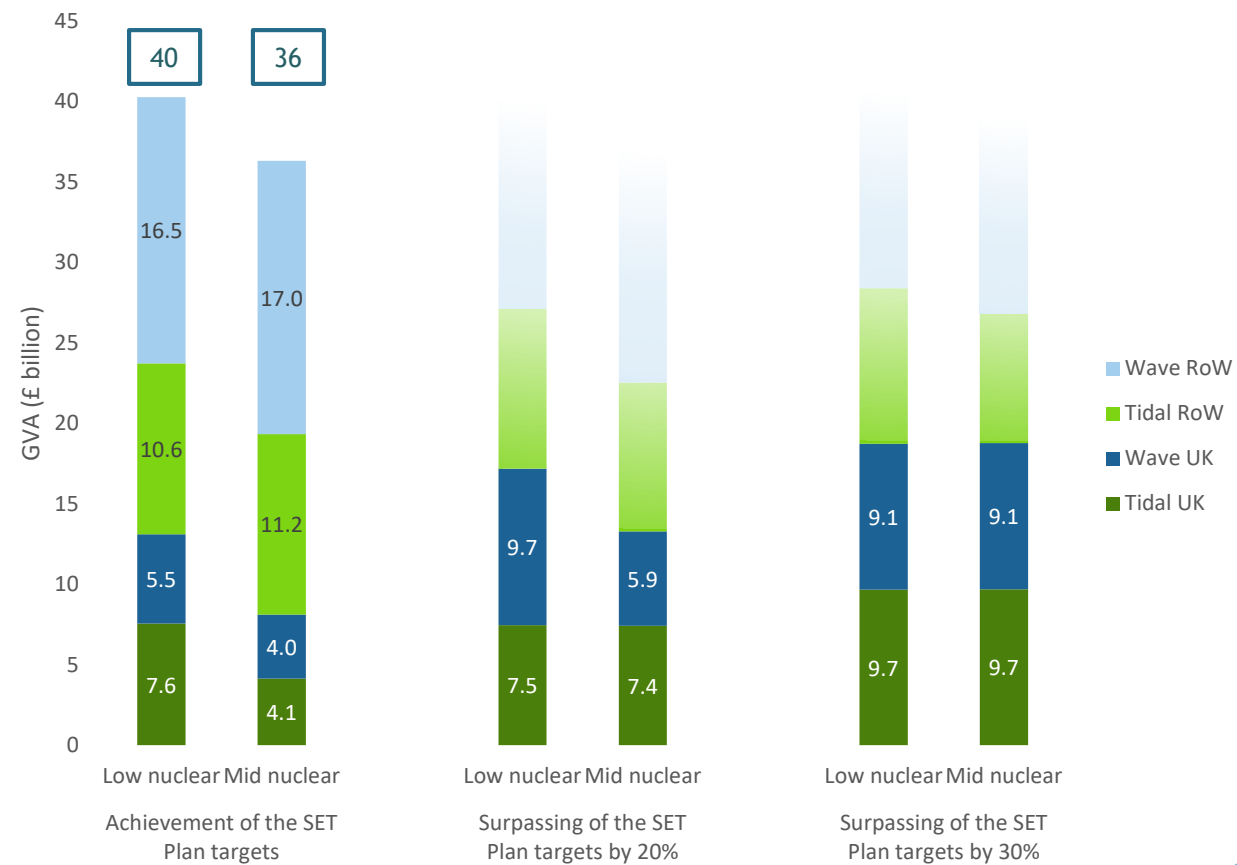




# Methodology



# GVA generated for the UK economy per scenario (£ billion)



Discount rate 3.5% (UK Treasury Green Book, 2021)  
Strong domestic supply chain assumed

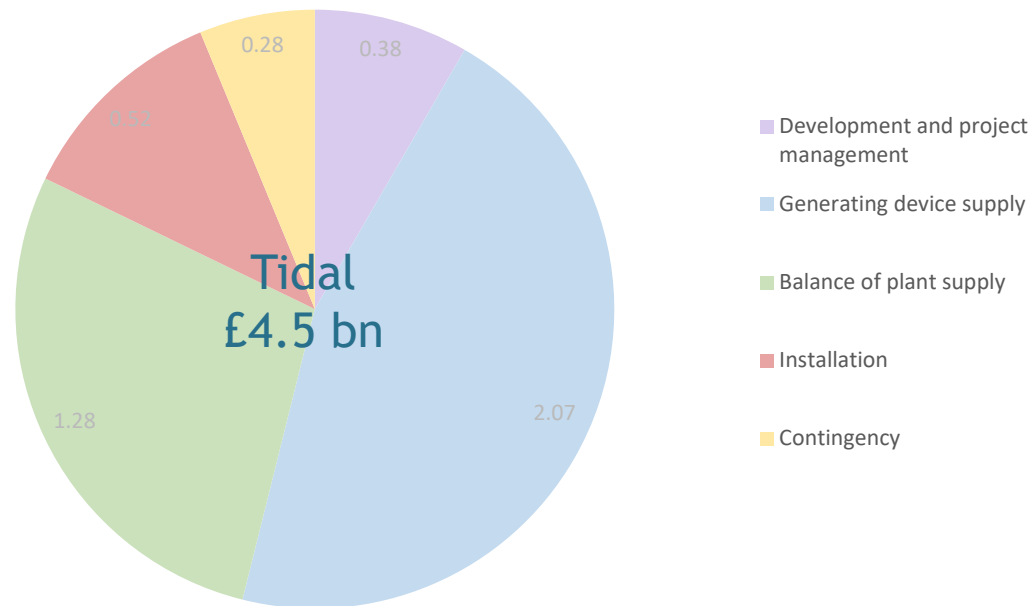


# GVA in the supply chain

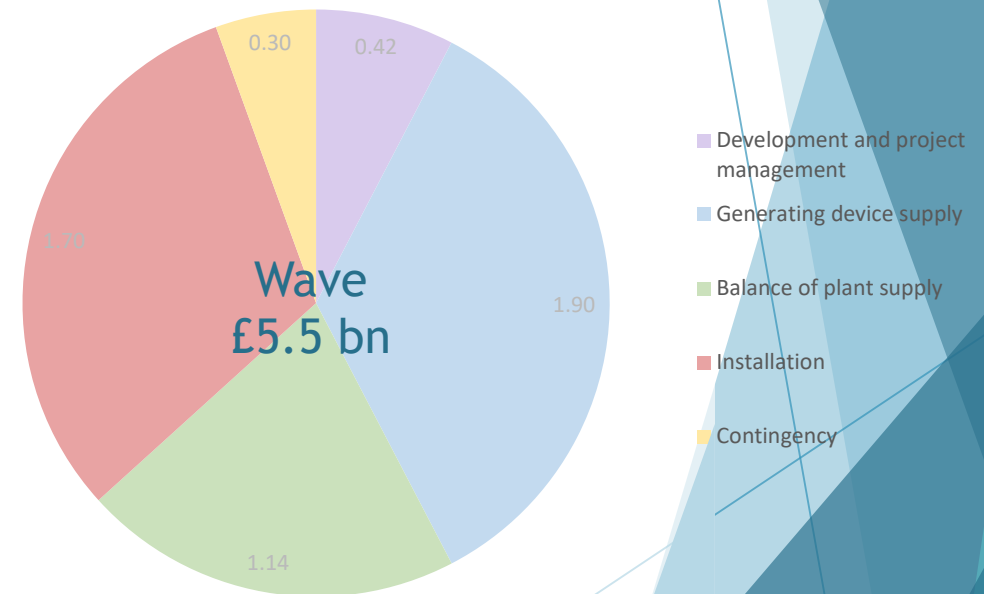
Ongoing work

# GVA in the supply chain

GVA per cost centre  
**Tidal** deployment in the UK  
Low leakage, discounted, low nuclear scenario  
(£ billion)



GVA per cost centre  
**Wave** deployment in the UK  
Low leakage, discounted, low nuclear scenario  
(£ billion)



Cost breakdown source: BVG Associates, Ocean Power Innovation Network  
Value Chain Study (Summary Report), 2019  
Discounted for inflation at 3.5% (UK Treasury Green Book, 2020)

# Ongoing work on supply chain and GVA

- ▶ Ongoing work: assessing the impact of increasing local content - through the application of targeted investment in specific areas of the supply chain – on GVA results



# Summary

- ▶ With appropriate policy intervention to enable the achievement of the SET Plan targets:
  - ▶ Potential deployment of between 64 GW and 77 GW of floating offshore wind, tidal stream and wave could be achieved by 2050
  - ▶ GVA of £40bn would be generated for the UK economy from the wave and tidal stream elements

