



Department  
for Transport

# Clean Maritime Plan – Workshop

11<sup>th</sup> March 2019





## Agenda

- 10:30 – 11:00    **Welcome: Minister for Transport – Nusrat Ghani MP**  
*Laura Marquis – Head of Strategy and Partnerships, Maritime Directorate, DfT*  
*Morna Cannon – Head of Clean Maritime Growth, DfT*  
*Gwilym Stone – Assistant Director, Ship Standards, Maritime & Coastguard Agency*
- 11:00 – 11:45    **Clean Maritime Plan – Economic and Technical Research**  
*Mattea Todd – Policy Advisor, Clean Maritime Council*  
*Kat Deyes – Frontier Economics*  
*Dr Tristan Smith - UMAS*
- 11:45 – 12:00    Refreshment break
- 12:00 – 13:00    **Panel Discussion: Zero Emission Shipping in the UK – The Role of Technology**  
*Chaired by Professor Alex Duffy, Strathclyde University*
- 13:00 – 13:45    Lunch
- 13:45 – 15:45    **Group Workshop on Emerging Policy Directions for the Clean Maritime Plan**  
*With presentations from: Tim Morris (UK Major Ports Group) and Aoife O’Leary (EDF)*
- 15:45 – 16:00    **Closing Remarks by Susanna May, Co-Director of Maritime Directorate, DfT**



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# Nusrat Ghani MP - Minister for Transport



## Agenda

- |               |   |
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# Laura Marquis – Head of Strategy & Partnerships, DfT Maritime



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maritime  
2050  
NAVIGATING THE FUTURE

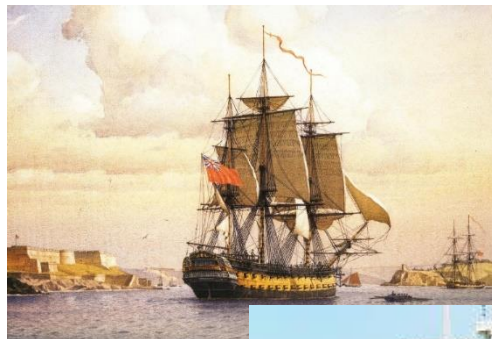


Navigating the future



## Maritime 2050: what? why?

- ▶ First long term strategy for UK maritime sector in a generation
- ▶ Setting out our ambitions to be world-leading on technology, skilled people, environment, business services...
- ▶ Ensuring we remain on the front-foot on the international maritime stage well into the 21<sup>st</sup> century
- ▶ Identifying global trends and what they mean for maritime
- ▶ Highlighting crucial role of maritime to UK success
- ▶ The impetus to anticipate and embrace change







## Maritime 2050: how?

- ▶ Call for Evidence
- ▶ Workshops: thematic & around the UK
- ▶ Interviews with sector leaders
- ▶ Expert Panel challenge & support function
- ▶ Route maps
- ▶ Applying “Futures Toolkit”
  - ▶ Horizon scanning
  - ▶ Creating scenarios of ‘future worlds’
  - ▶ SWOT analysis
  - ▶ Stress-testing our recommendations







## Strategic Ambitions

### The UK will...

- ✓ Maximise our strength in maritime professional services, retaining and enhancing our **UK competitive advantage**.
- ✓ Lead the way on **clean maritime growth**.
- ✓ Strengthen our reputation for maritime innovation, maximising benefits to the UK from new **maritime technology**.
- ✓ Be recognised as the global leader in **maritime safety and security** standards and expertise.
- ✓ Grow our **maritime workforce and transform their diversity**.
- ✓ Promote a **liberalised trading regime**.
- ✓ Support continued investment in **maritime infrastructure**.
- ✓ Strengthen our reputation as a **leading country in all international fora**.
- ✓ Promote our **UK wide maritime cluster offer**.
- ✓ **Showcase our UK maritime offer to the world**.





## Thematic approach

Infrastructure



UK competitive advantage



Environment



## Challenges and Opportunities



Trade



Security & resilience



People



Technology



## What's next

### Maintaining momentum & delivery

- ▶ Route maps
  - ✓ Technology and Innovation in UK Maritime
  - ✓ Trade
  - ✓ **Clean Maritime Plan**
- ▶ Ongoing announcements to support recommendations

- ▶ London International Shipping Week 2019



#Maritime2050



**UKMPG:** We're big investors in the U.K. & ambitious to do more. Let's deliver these recommendations, boost U.K. trade & grow jobs in the [#CoastalPowerhouse!](#)

**Baltic Exchange:** a bold strategy to strengthen the UK's position as a world-leading maritime nation.

**Lloyd's List:** The most significant factor in determining whether the strategy ultimately succeeds as a generational project...will be the industry's willingness to genuinely engage

**Trinity House:** proud to support #Maritime2050, a long-term strategy for the UK maritime sector launched today by [@transportgovuk](#) that will deliver direction & vision for government and industry to work together.



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# Morna Cannon, Head of Clean Maritime Growth, DfT Maritime



# Emissions from shipping: a crucial challenge

## Air pollution

- ▶ Air pollution is the top environmental risk to human health in the UK
- ▶ In 2016 domestic shipping accounted for 10% of the UK's total domestic NO<sub>x</sub> emissions, as well as emitting 10 times more sulphur oxides than road transport.
- ▶ Emissions from international shipping and shipping in transit have an even larger impact on UK air quality, international is 3 times higher than domestic, and shipping in transit is 6 times higher.

## Greenhouse gas (GHG) emissions

- ▶ Shipping currently accounts for 2.3% of global CO<sub>2</sub> emissions, roughly equivalent to an economy the size of Germany.
- ▶ GHG emissions from the sector are expected to grow anywhere between 50 – 250% by 2050 under a business as usual scenario.





# The need for a UK Clean Maritime Plan

Jan 2018 – Spring 2019

Spring 2019

Post - Spring 2019

## Domestic:

- Maritime 2050
- Clean Air Strategy
- Industrial Strategy

## Existing Policy Framework

## International:

- IMO GHG Strategy
- Paris Agreement
- MARPOL Annex VI

# Clean Maritime Plan

## Domestic:

Consultations on  
specific proposals,  
where relevant

## International:

IMO revised GHG  
strategy (2023)  
EEDI



# UK on the international stage

## Global shipping in 'historic' climate deal



David Shukman  
Science editor

13 April 2018



The global shipping industry has for the first time agreed to cut its emissions of greenhouse gases.

Initial IMO GHG  
Strategy  
April 2018  
*= reduce emissions by  
at least 50% by 2050*

Ongoing IMO  
negotiations incl. May  
2019 (MEPC 74)  
*= work on measures to  
reduce GHGs in the  
short, mid- and long-term*

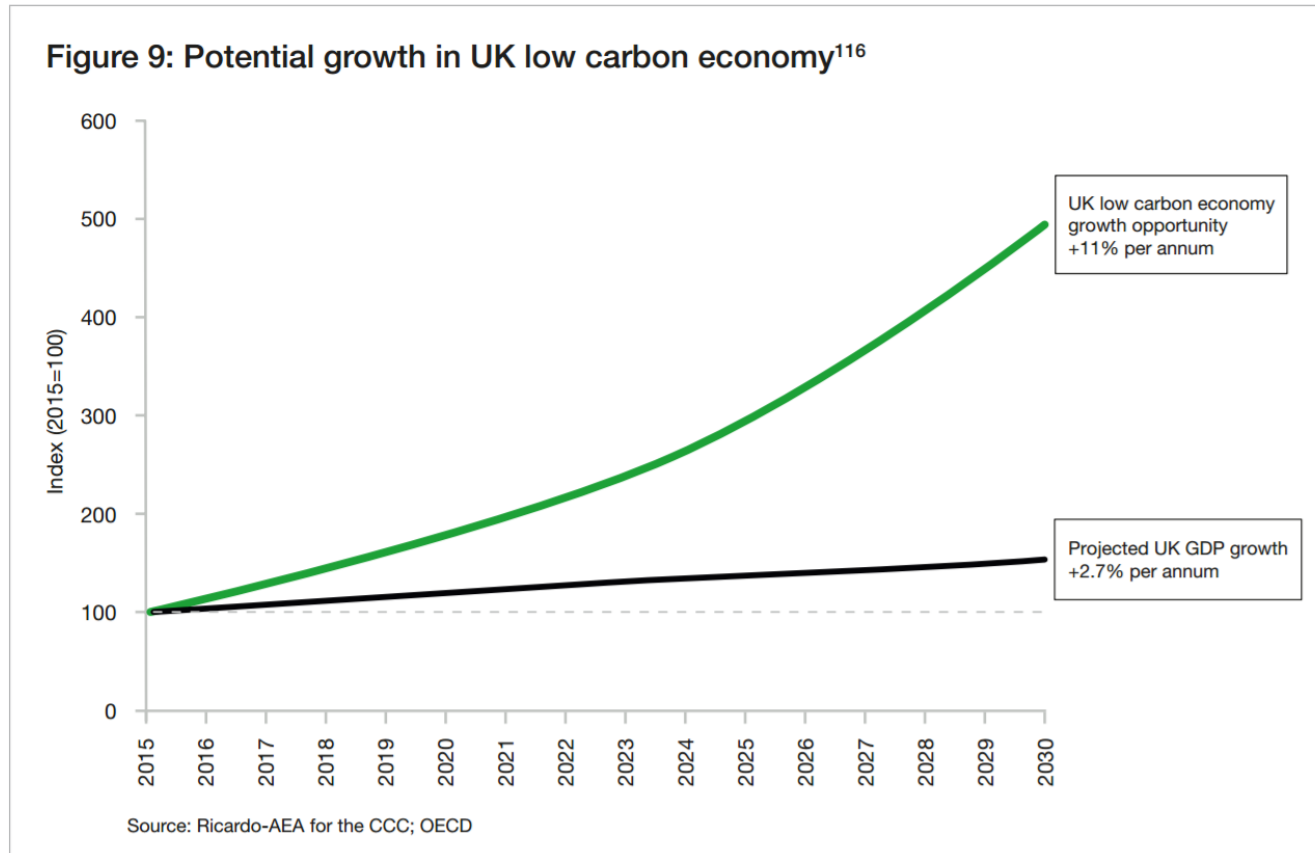
Revised IMO GHG  
Strategy 2023

Demonstrate UK action through our domestic approach in M2050 and the Clean Maritime Plan





# Maximising clean growth opportunities for the UK



A study for the Committee on Climate Change estimates that UK exports of low carbon goods and services could be worth between **£60 billion and £170 billion** by 2030.



## Guiding objectives

Clean Growth Strategy guiding principles are:

- ▶ To meet our domestic commitments at the lowest possible net cost to UK taxpayers, consumers and businesses.
- ▶ To maximise the social and economic benefits for the UK from this transition.
- ▶ Aim of today's workshop is to explore with key stakeholders how the maritime sector can respond to these objectives:
  - ▶ Share initial conclusions from economic and technical research
  - ▶ Seek views on developing policy proposals for Clean Maritime Plan



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# Gwilym Stone, Assistant Director - Ship Standards, Maritime and Coastguard Agency



Maritime &  
Coastguard  
Agency

# The Role of Regulation...

Gwilym Stone  
Assistant Director Ship Standards



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- The Role of Regulation...
  - The framework to say YES?



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- The Scope of regulation...
  - Ships
  - Supply-chain
  - Interfaces



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Coastguard  
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- Sources of regulations
  - IMO
  - National
  - Local





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# Mattea Todd, Policy Adviser, Clean Maritime Plan, DfT Maritime



# The need for a UK Clean Maritime Plan

Jan 2018 – Spring 2019

Spring 2019

Post - Spring 2019

## Consultation

Clean Maritime  
Council

Sub-groups

Stakeholder  
Workshop

## Policy Framework

Maritime  
2050

Clean  
Air  
Strategy

# Clean Maritime Plan

## Dedicated Research

External Contract led by  
Frontier Economics

## CMP Recommendations

Consultations on  
specific proposals,  
where relevant



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Credit: Shutterstock / Marci Paravia



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@transportgovuk

Follow

The Clean Maritime Council will help kick start the green maritime revolution, delivering #cleangrowth for the UK through the #maritime industry: [bit.ly/2OsEc1Y](https://bit.ly/2OsEc1Y) #GreenGB

In 2016 UK domestic shipping released  
**10 times more** sulphur oxides  
than road transport



0:31 2,885 views

7:08 am - 15 Oct 2018

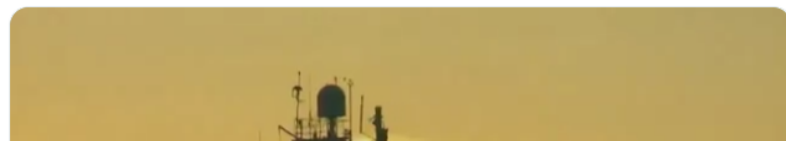
### UK works on zero emissions plan for shipping

On the occasion of the first day of Green Great Britain Week, clean shipping set on 15 October, to plot the route to zero emissions for the UK sector. The Clean Maritime Council is expected to devise a strategy to cut greenhouse gas emissions from the sector to improve air quality on and around our waterways, ports and shipping lanes.



Dept for Transport @transportgovuk · Jan 25

Find out how #Maritime2050 aims to protect the environment for the next generation [bit.ly/2sKvEpZ](https://bit.ly/2sKvEpZ) #Maritime2050



# Clean Maritime Council

RED BOX | NUS GHANI

OCTOBER 15 2018, 12:01AM, THE TIMES

## We need to tackle air pollution on the high seas

NUS GHANI



Air pollution is now the fourth greatest threat to public health after cancer, heart disease and obesity. It's an issue we cannot and will not ignore.

The government is making big commitments to improve air quality across the UK. From ending the sale of conventional petrol and diesel cars by 2040, introducing clean air zones in our most polluted cities, and incentivising the uptake of electric and ultra-low emission vehicles – we're already doing a great deal.

But industry also has a vital role to play – for instance by developing greener



# Clean Maritime Council Task and Finish Groups

## Incentives

### **Key question:**

What is the role of economic instruments in incentivising [the transition to] zero emission shipping in the UK?

## Standards and Regulations

### **Key question:**

How could government regulations encourage the development and deployment of zero emission vessels?

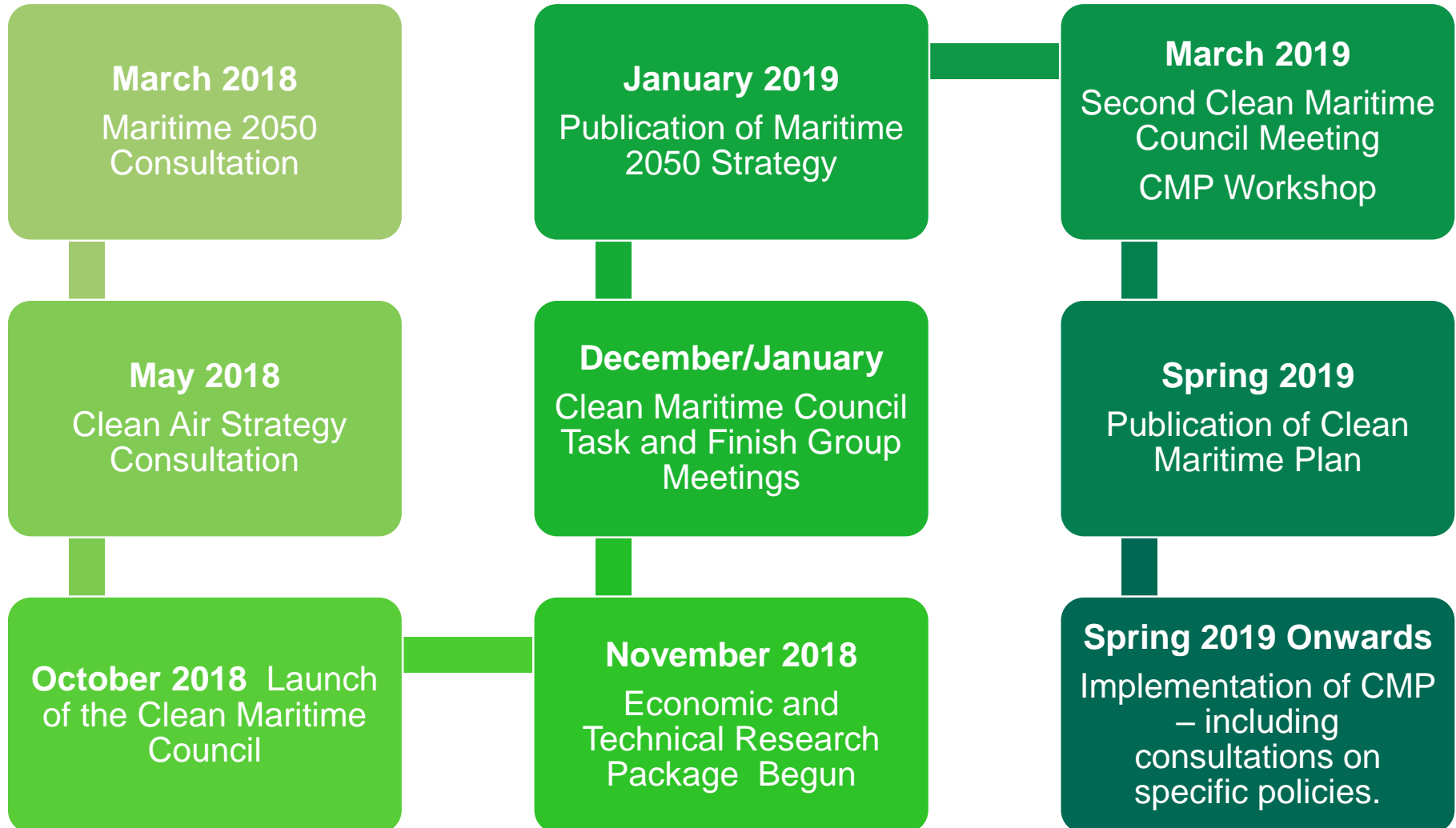
## Energy Systems Integration

### **Key Question:**

What are the emerging demand scenarios for alternative fuelling in the maritime sector?



## Timeline of Work





Jan 2018 – Spring 2019

Spring 2019

Post - Spring 2019

## Dedicated Research

Barriers

Opportunities

Scenarios

Policy interventions

Research base

Clean  
Maritime  
Plan

CMP  
Recommendations





## Next steps

- ▶ Further detail from Frontier on scenario modelling & opportunities work
- ▶ Workshop this afternoon to discuss detail on policy interventions



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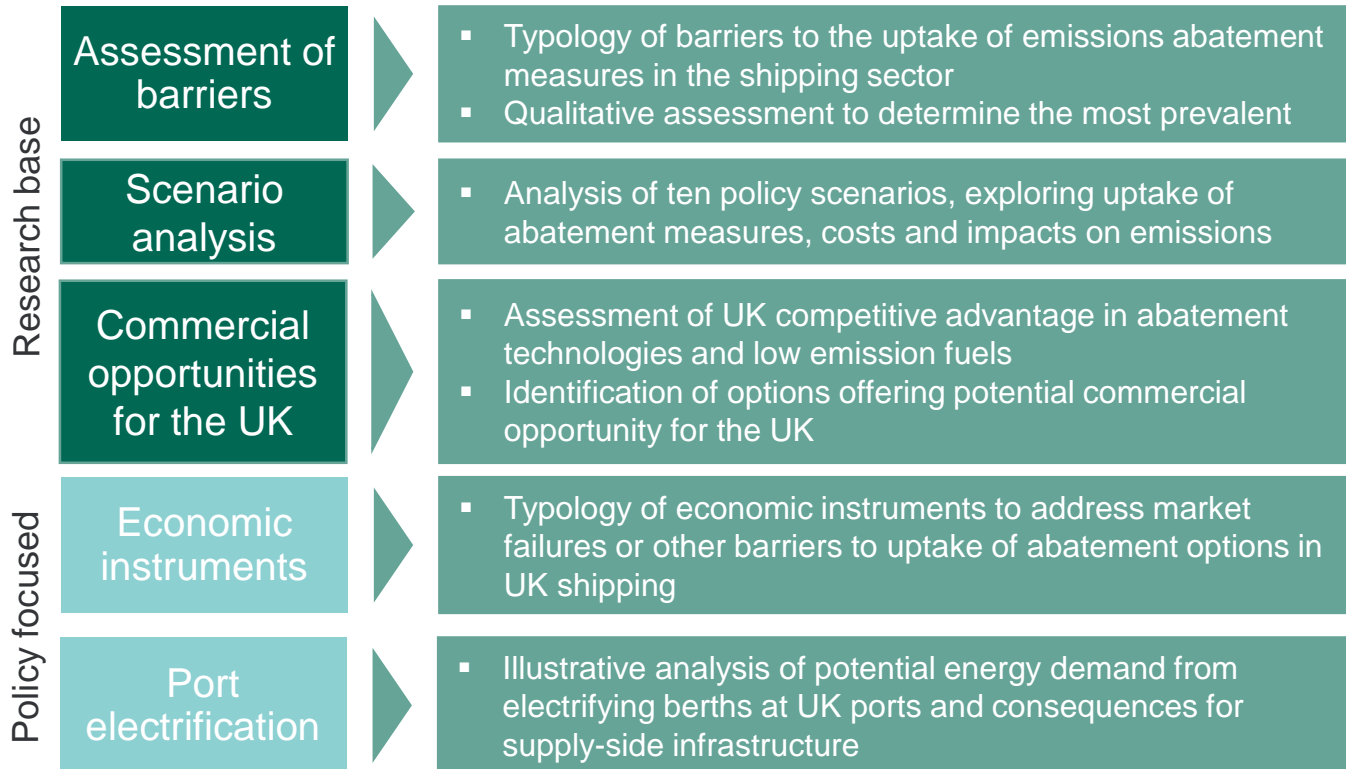
# Frontier, UMAS & E4tech



## Work packages



## Work packages have been taken forward over the last 12 weeks to inform the Clean Maritime Plan

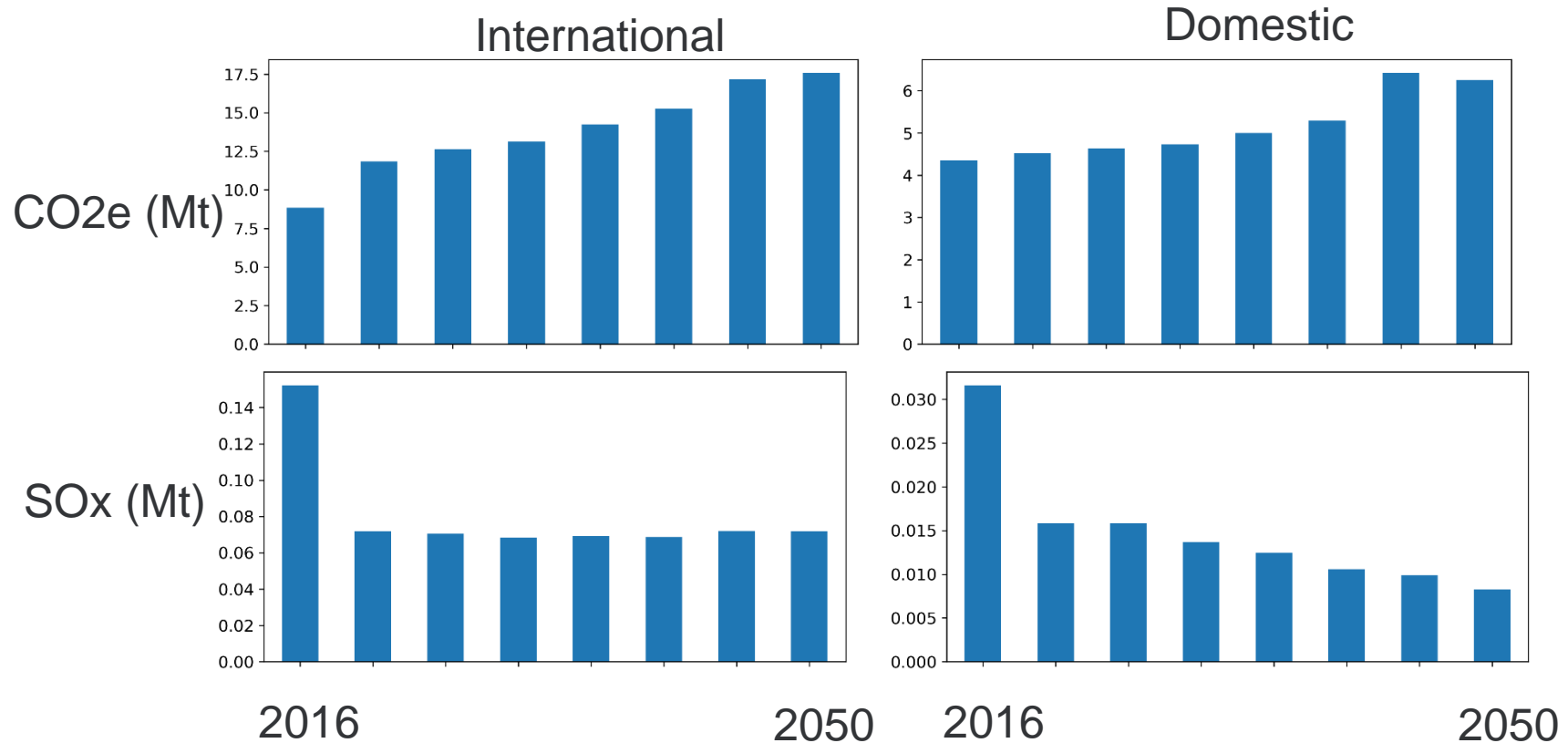




## The Case for Action

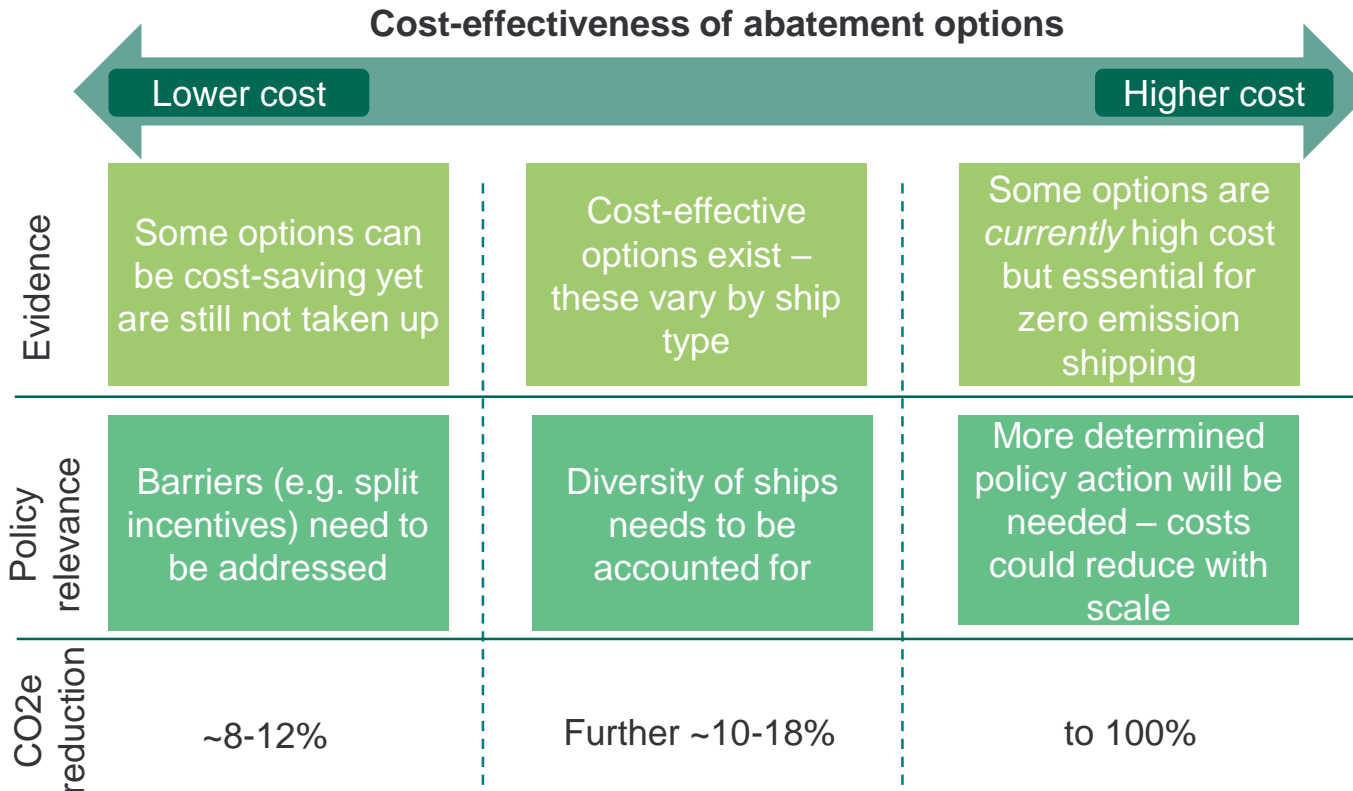


Under BAU, UK domestic and international CO<sub>2</sub>e shipping emissions are expected to increase to 2050





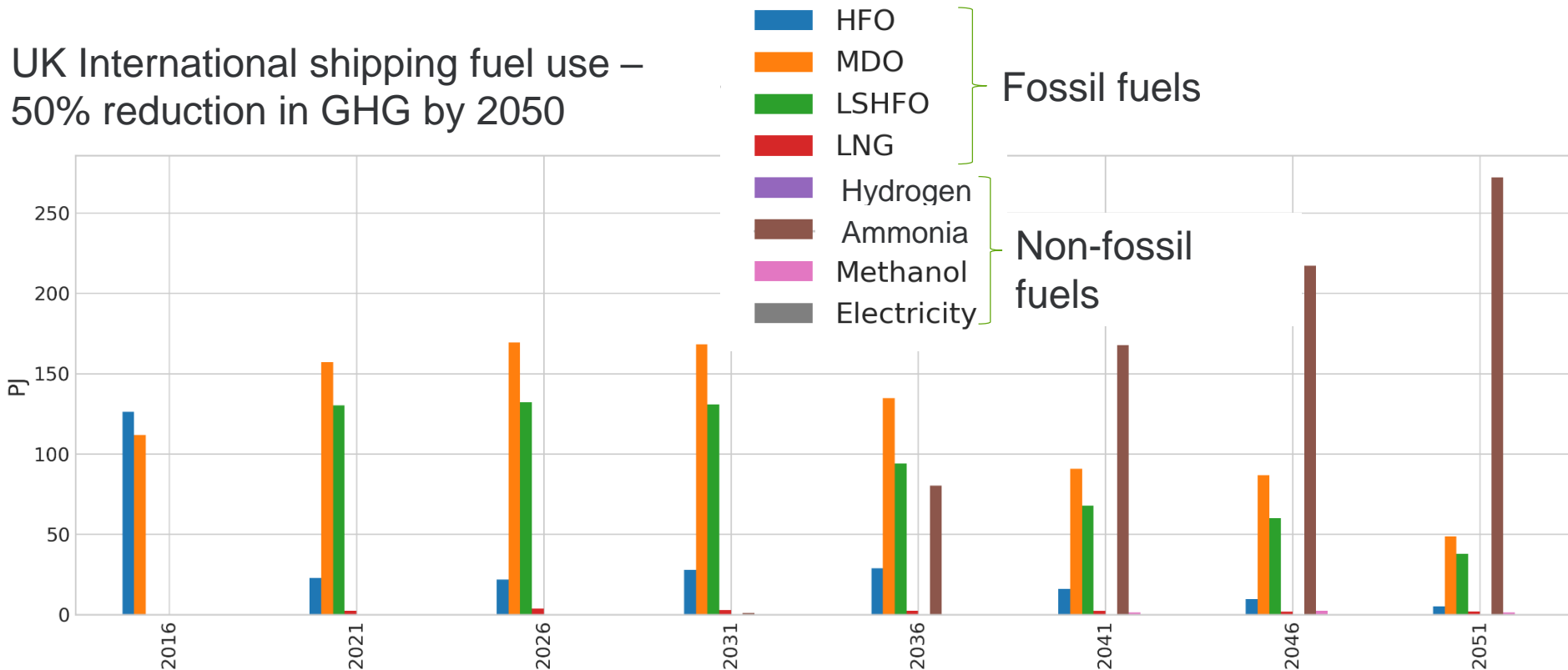
Zero emission shipping will need various abatement actions – some very cost effective. Switching to alternative fuels will be essential





Even meeting the minimum ambition of the IMO Initial Strategy means a rapid shift away from fossil fuels

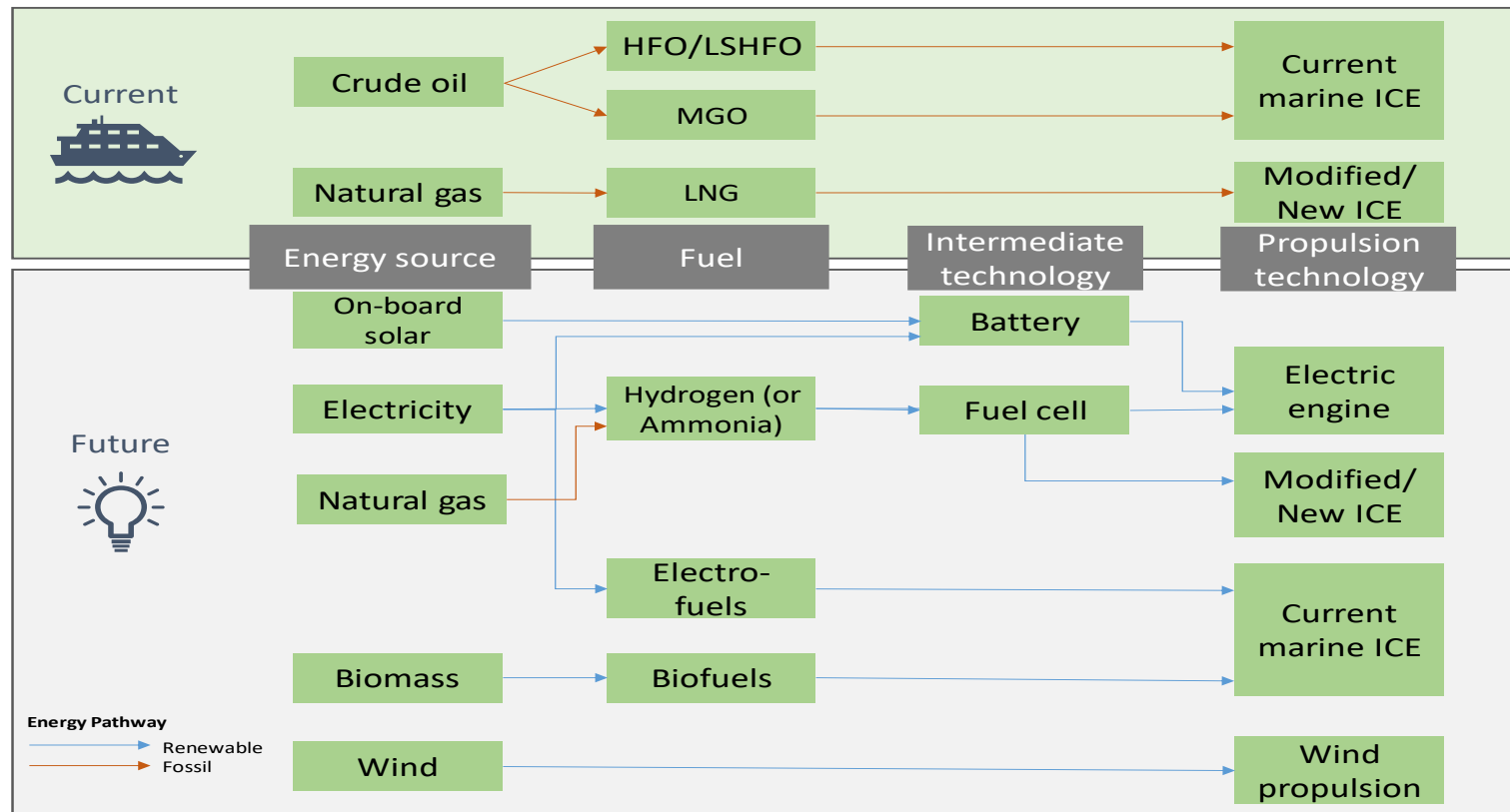
UK International shipping fuel use –  
50% reduction in GHG by 2050







There are many potential fuel pathways – each  
with different costs and emissions





# The Economic Opportunity for the UK



The UK has particular economic strengths in several technologies and professional services – with good opportunities in many more

### **Hydrogen production technologies**

Current strength in electrolysis, reformers and CCS, plus world-leading research

### **Ammonia production technologies**

Current strength in ammonia catalyst supply and fertilisers; green ammonia demonstrator

### **On-board batteries**

Current strength in battery chemistry; Faraday Challenge

### **Electric propulsion**

Current strength in integration of electrical drives into vehicles + vessels; Stephenson Challenge

### **Professional services**

Global leader in maritime support services such as finance and legal

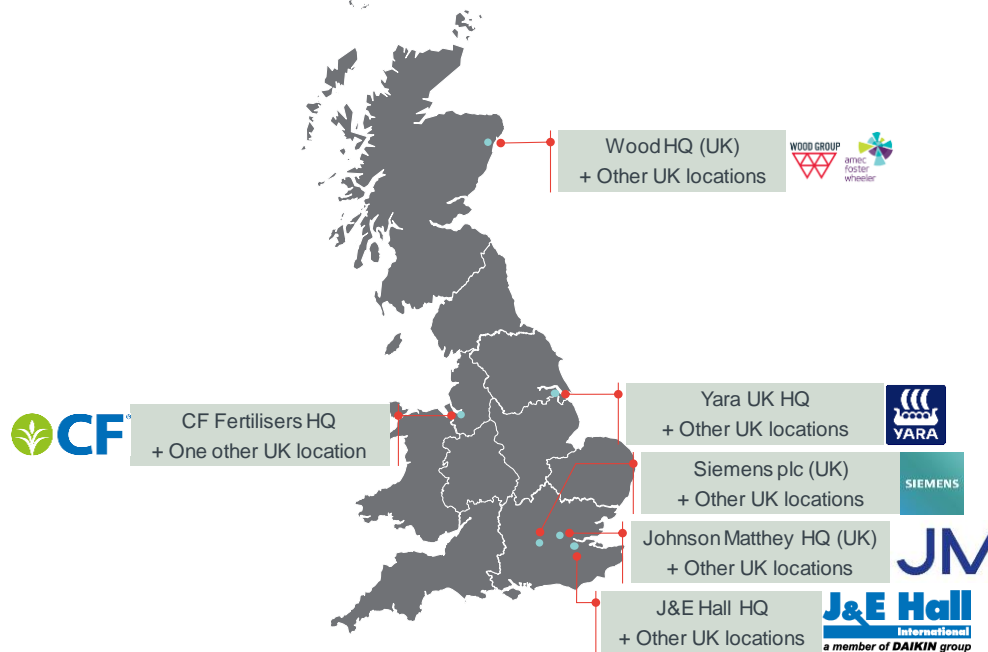
Opportunities also likely for:

- Wind propulsion
- Air lubrication



## The UK has firms already competing on a global scale in relevant markets e.g. ammonia production

Location of selected UK firms who are relevant to ammonia's use in maritime applications

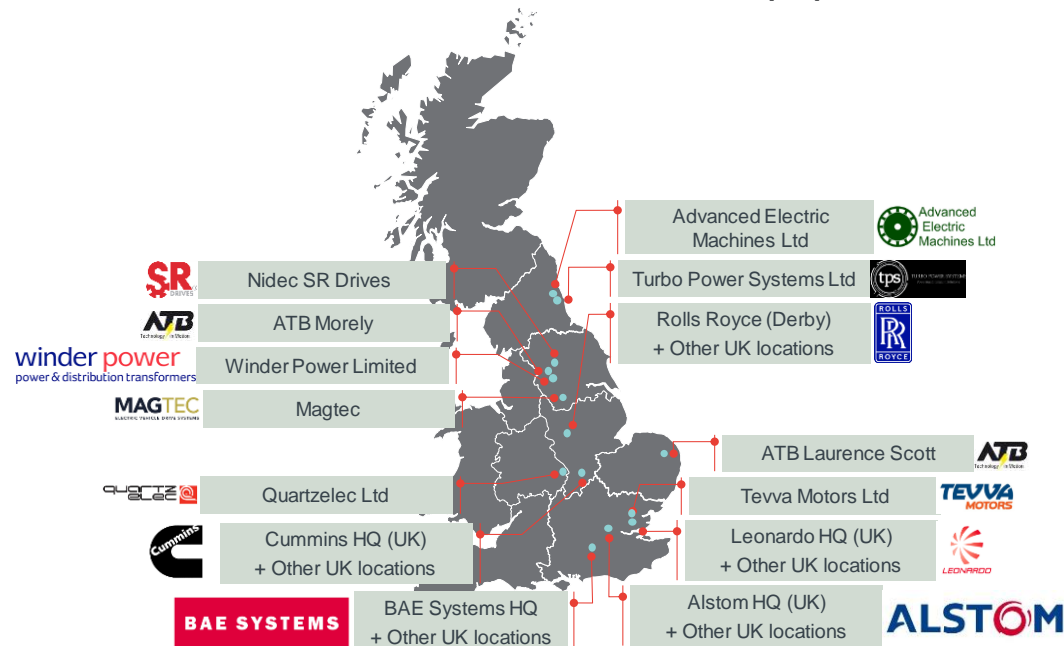


Source: Frontier and E4tec (forthcoming)



## The UK has firms already competing on a global scale in relevant markets e.g. electric propulsion

Location of selected UK firms who are relevant to electric propulsion in maritime applications



Source: Frontier and E4tec (forthcoming)



## Scenario analysis with ammonia as a lead future fuel suggests the potential market could be worth £bns

Fuel	Sub-technology offering UK opportunity	Estimated future global market for ammonia for shipping in 2050
Ammonia production technologies	Reformer + CCS	£400 – 600 billion
	Electrolyser	
	Ammonia synthesis	



# Questions & next steps

- ▶ Questions?
  
- ▶ Workshop this afternoon to discuss particular policy ideas based on emerging conclusions from research:
  - ▶ How does the sector take forward commercialization of clean shipping technologies? Is there a role for Government intervention?
  - ▶ What are the implications of clean shipping for infrastructure and energy systems?
  - ▶ How do we stimulate innovation in clean shipping?



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# Panel Discussion: Zero Emission Shipping – the Role of Technology & Innovation

*Chair: Professor Alex Duffy, University of  
Strathclyde and MarRI-UK*



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# Diane Gilpin – Smart Green Shipping Alliance.



TECHNOLOGY DEMONSTRATOR

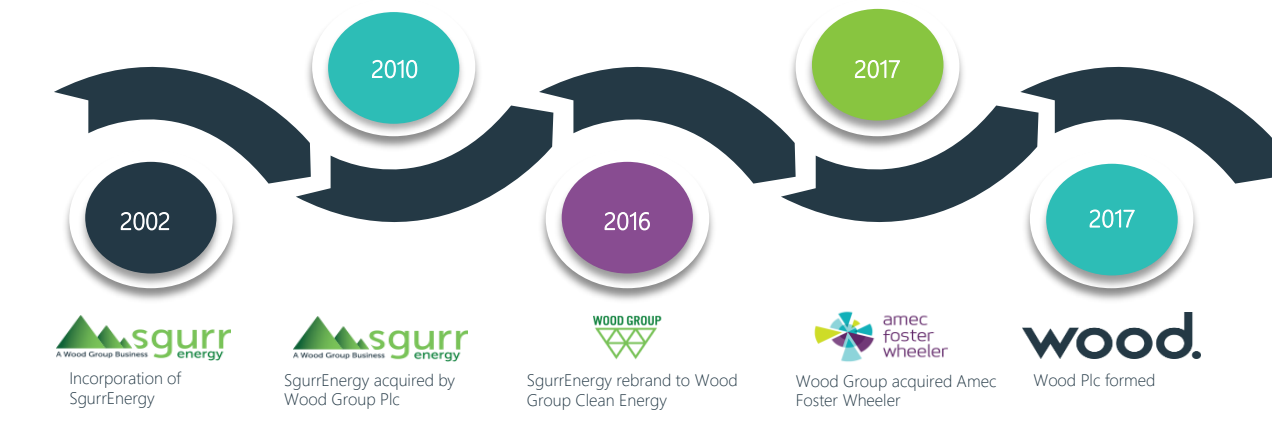


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Fergus Tickell - Wood.

# Wood Plc

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A new global leader in  
technical, engineering and  
project services

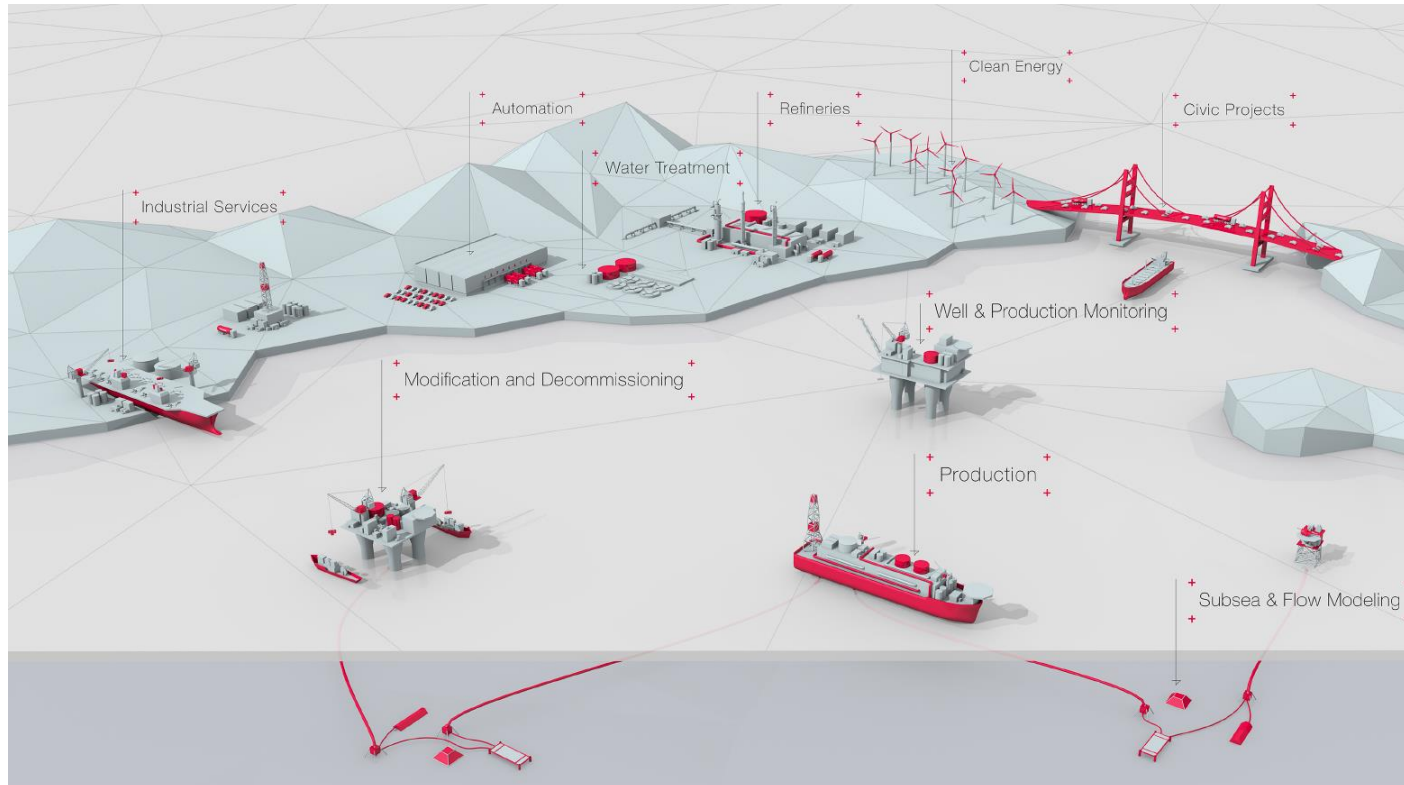
**\$11BN**  
over \$11bn revenue

**60+**  
Operating in  
more than 60  
countries

**160+**  
Over 160  
years  
experience



# Wood capabilities



# SWIFTH2Project

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## Overview

- SWIFTH2 Hydrogen Ferries Feasibility Study
- Funded by LCITP
- Involving:
  - vessel design
  - hydrogen generation (electrolysis)
  - storage& pipe infrastructure
  - port infrastructure including dispensing
  - renewables integration (wind)
- Supporting Scottish Government targets
- Fit with vessel replacement programme



## SWIFTH2 – Partners

wood.

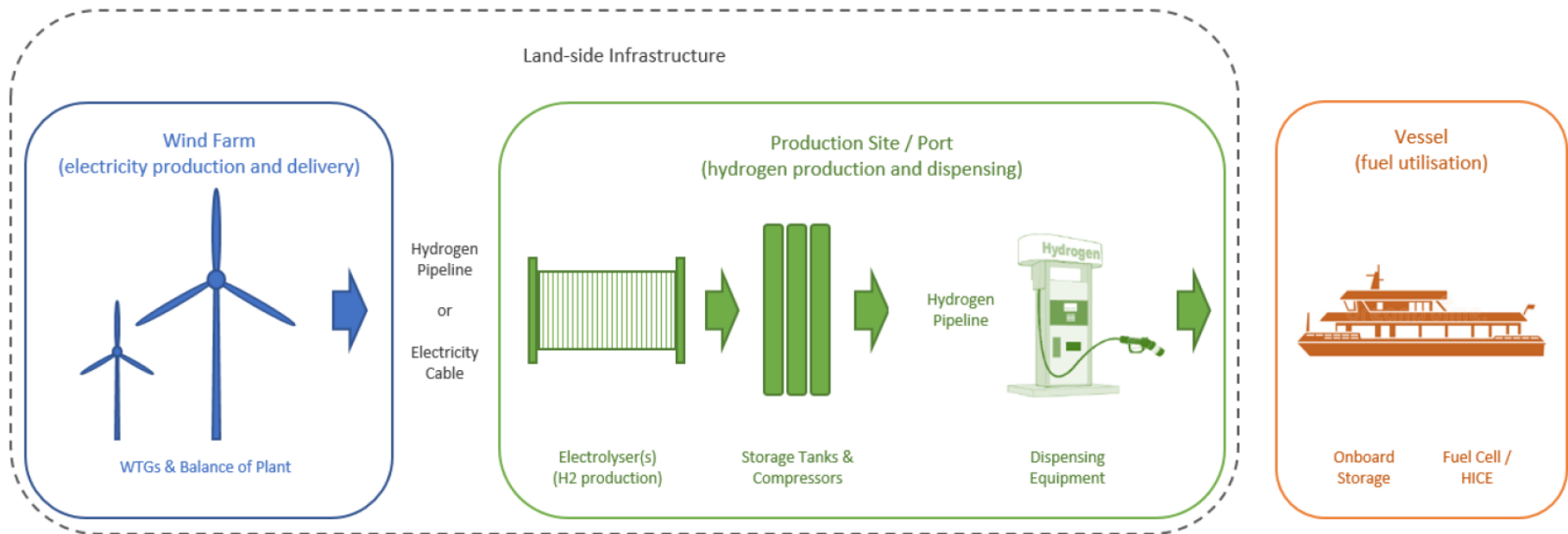


**SIEMENS** Gamesa  
RENEWABLE ENERGY

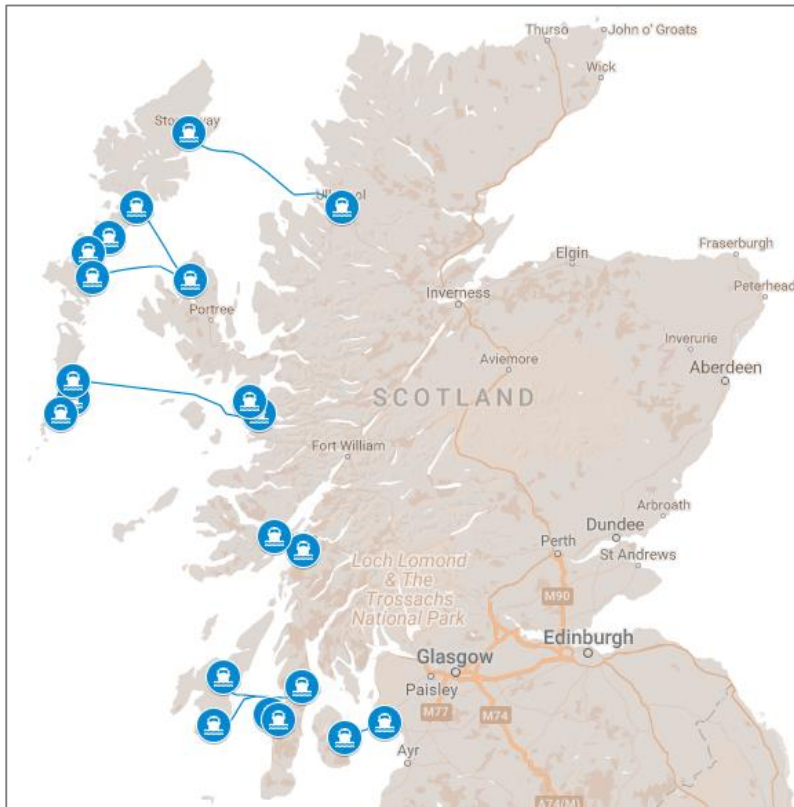




# SWIFTH2 – Proposed Development



# SWIFTH2 - Overview



- CMAL owned vessels operated by CalMac
- 9 mainland and inter-island ferry routes assessed:
  - Ullapool – Stornoway
  - Uig - Tarbert – Lochmaddy
  - Kennacraig - Ports Askaig / Ellen
  - Mallaig - Lochboisdale – Armadale
  - Ardrossan – Brodick
  - Craginure – Oban
  - Leverburgh – Berneray
  - Barra – Eriskay
  - Gigha - Tayinloan

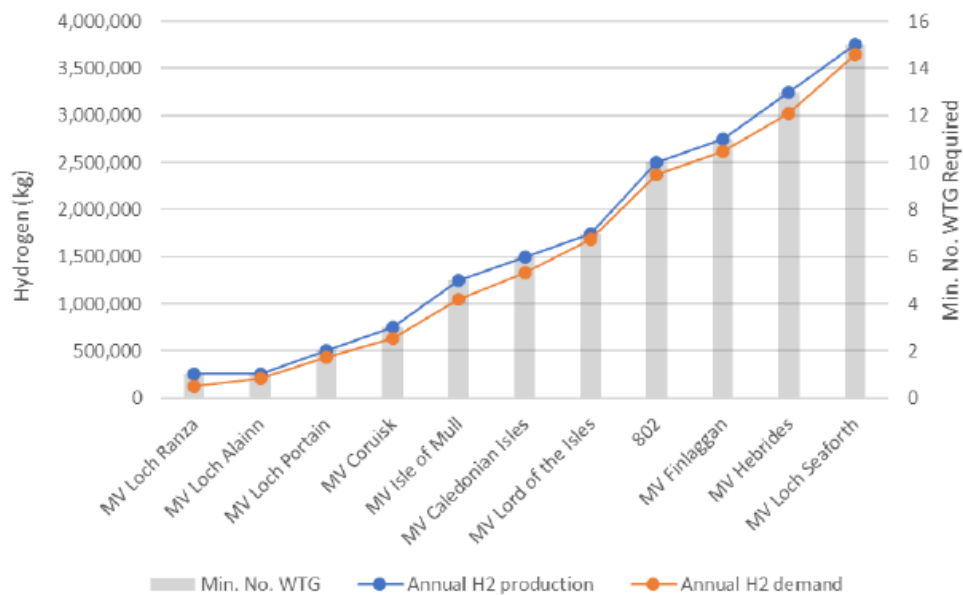
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## SWIFTH2 - Methodology

Activities undertaken as part of the feasibility study:

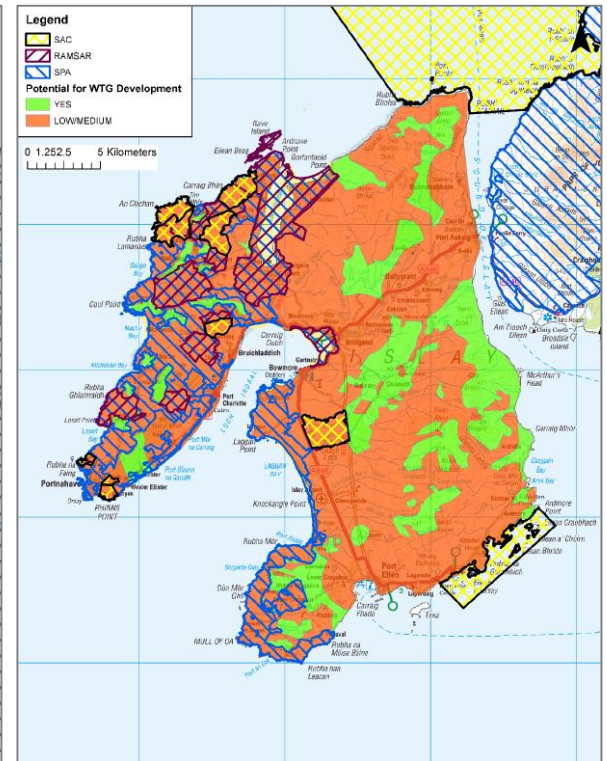
- Modelling of existing fleet energy demand profiles.
- Sizing and specification of equivalent hydrogen power-train.
- Assessment of islands to determine suitability based on:
  - The size of hydrogen production plant required at port.
  - Wind resource and energy yield assessment.
  - Wind farm land-use and planning review.
  - Wind farm accessibility.
  - Solar resource assessment.

## SWIFTH2 – Wind Farm Sizing



Wood's energy modelling, in collaboration with CMAL and Siemens-Gamesa, has determined the size of wind farm required to produce enough hydrogen for each ship operating the ferry routes.

Wood's environmental team assessed each island's land-use and planning regime to assess suitability for wind farm construction.



## SWIFTH2 – Results

The results of the study indicate that the inter-island ferry route between Barra and Eriskay is the most viable, with Stornoway to Ullapool being viable also.

These two routes have been recommended for detailed study in the next phase. Taking forward both a long and short distance route for the next phase of SWIFTH<sub>2</sub>

Island	Score	Weighted Score	Ferry Route
Eriskay	19	88	Barra - Eriskay
Lewis & Harris (S-U)	17	78	Stornoway - Ullapool
Skye (U-T-L)	16	78	Uig - Tarbert - Lochmaddy
Lewis & Harris (U-T-L)	17	76	Uig - Tarbert - Lochmaddy
Barra	18	75	Barra - Eriskay
Gigha	17	75	Gigha - Tayinloan
Lewis & Harris (L-B)	17	74	Leverburgh - Berneray
North Uist	15	74	Uig - Tarbert - Lochmaddy
Skye (M-L-A)	15	73	Mallaig - Lochboisdale - Armadale
Berneray	15	72	Leverburgh - Berneray
South Uist	15	70	Mallaig - Lochboisdale - Armadale
Mull	15	69	Oban - Craignure
Islay	14	60	Kennacraig - Port Askaig / Port Ellen
Arran	13	52	Ardrossan - Brodick



# TimberLINK

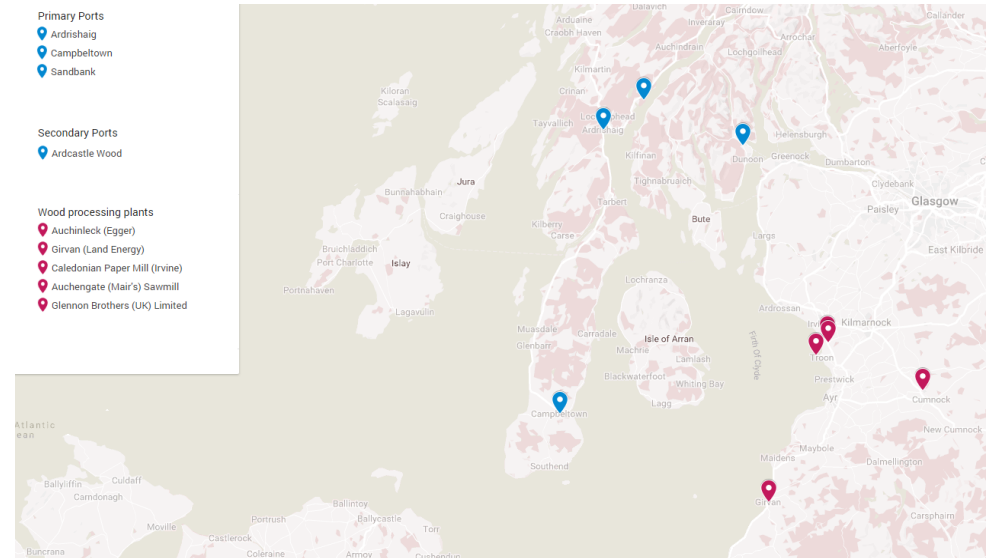
- Public service contract to support modal shift funded by Scottish Government
- Subsidy to create a Road Equivalent Tariff
- Principally an initiative to reduce environmental and community impacts
- 100k tonnes of timber a year transported
- Reduced timber lorry movements by over 1Mkm per annum
- 50% of emissions from the shipping; 50% from road haulage to and from ports





# TimberLINK

- Modal shift project
  - 100k tonnes timber per annum from:-
    - Ardrishaig
    - Campbeltown
    - Sandbank
- To
- Troon
  - Ayr
  - Girvan





# TimberLINK Study

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- TimberLINK Hydrogen Feasibility Study (similar methodology to SWIFTH2)
- Funded by Forestry Commission Scotland, Scottish Enterprise, Highlands & Islands Enterprise, Scottish Power Renewables
- Involving:
  - vessel design
  - hydrogen generation (electrolysis)
  - storage& pipe infrastructure
  - port infrastructure including dispensing
  - renewables integration (wind)
- First step towards decarbonising timber transport sector





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# Elson Martins – The Carbon Trust



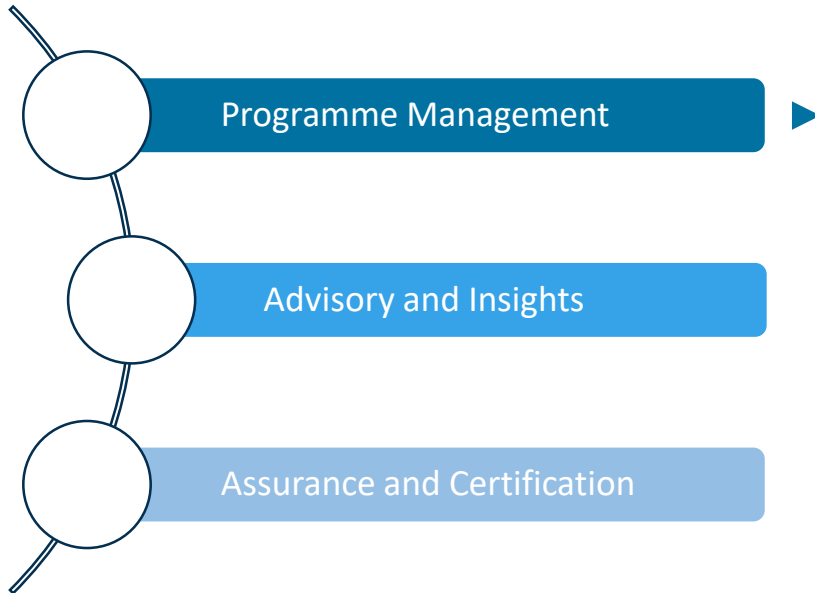
# Low Emissions Vessels in Offshore Wind

Clean Maritime Plan Workshop, London, UK  
11 Mar 2019



# Carbon Trust and our Offshore Wind Accelerator (OWA) programme

At the Carbon Trust we help organisations worldwide contribute to and benefit from a more sustainable future.

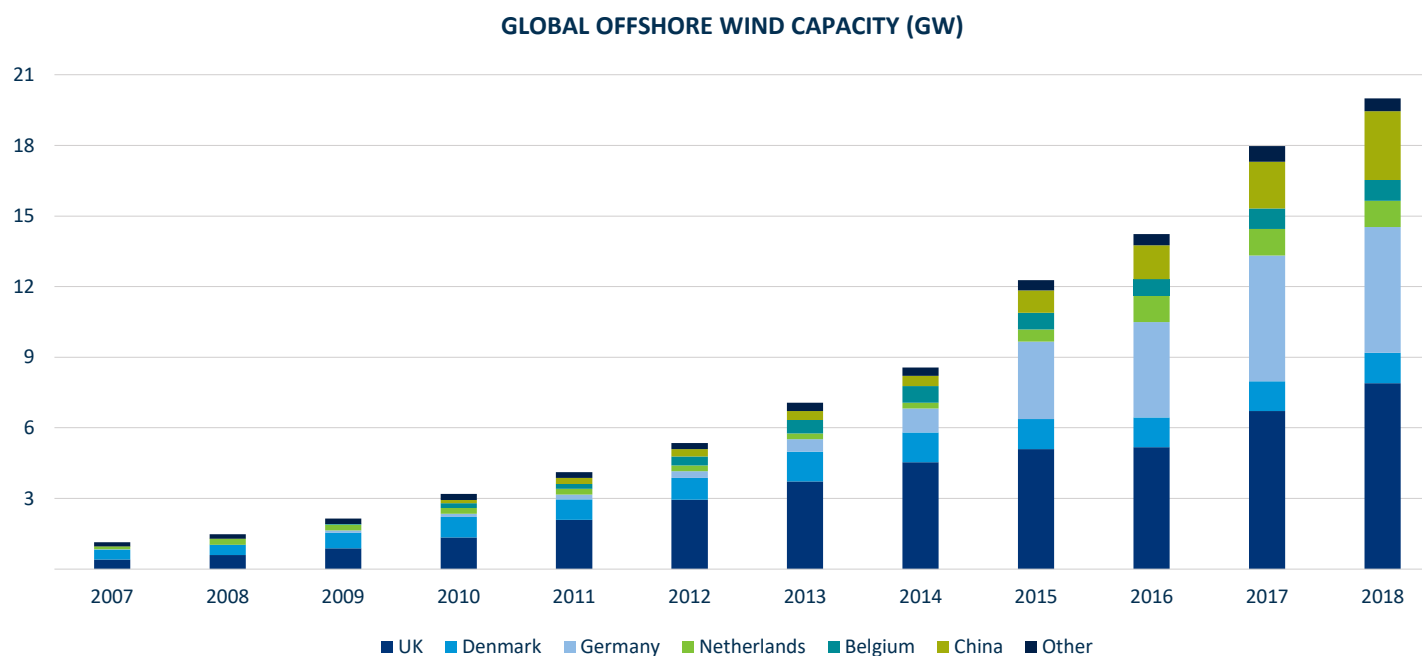


## OWA

Industry-led programme centred on the cost reduction and de-risking of offshore wind, promoting wide industry engagement



# Offshore wind is set to grow and transform the energy and maritime sectors



Current global offshore wind project pipeline is around 38GW.

Industry is increasingly cost-competitive.

UK offshore wind sector deal has just been announced – 30GW by 2030.



Source: Carbon Trust analysis, 2019

# Offshore wind is set to grow and transform the energy and maritime sectors

## TYPICAL OFFSHORE WIND VESSELS

### JACK-UP VESSELS



*Need to enable effective, safe and controlled transportation and installation operations.*

### WINDFARM SERVICE VESSELS



*Need to enable fast and safe access to wind turbines for servicing operations.*

### SERVICE OPERATIONS VESSELS



*Need to enable effective and safe access to wind turbines for servicing operations.*

More capable vessels are increasingly critical.

Client expectations are higher than before.

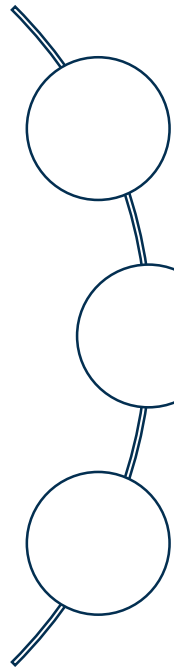
Possible peak demand in the medium-long term could result in bottlenecks.

To minimise time of offshore operations and to maximise operability and accessibility of vessels is typically critical in offshore wind, with the end goal of safely maximising net income. To minimise emissions has been a second order priority but the context and the discourse from industry are changing.



Image sources: Van Oord (left), Tidal Transit (centre), Esvagt (right)

# The OWA is now looking to support the development of low emissions vessels for offshore wind



## **AIM: FUTURE-PROOF THE INDUSTRY AND EXPLORE THE POTENTIAL OPPORTUNITIES**

Assess the technological alternatives, engage and learn from different stakeholders and industries, support innovative concepts, reduce emissions and cost

## **FOCUS: WINDFARM SERVICE VESSELS**

Highly used, smaller scale, fuel intensive vessels. Work could look at Service Operations Vessels at a next stage.

## **TECHNOLOGIES: HYBRID, LNG-BASED, HYDROGEN-BASED, FULL ELECTRIC...**

Looking at both propulsion system and needed infrastructure. Taking into account reference vessel operational profiles and use cases.



# Further initiatives are needed and both Government and industry play a key role in decarbonising the maritime sector

## SUCCESS FACTORS



- ✓ Policy and regulation will need to set up the right framework and incentives
- ✓ Market will need to have a long-term vision and execution plan
- ✓ Sector and cross-sector synergies will have to be explored jointly

Carbon Trust is looking closely at this area – the Low Emissions Vessels is just the first step.





# THANK YOU

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# Nick Hey – Wightlink

## Why Diesel/Electric Hybrid? Other challenges





## Electric Challenges

**Service – 40 minutes sailing, 20 minutes in berth x 22 trips, 24/7.**

**Shore electrical connection: Tidal range 3.4 metres, electrical supply in the Terminal at max, power to Portsmouth Gunwharf area at max.**

**Harbour tidal current: 5knt.**

**So, Victoria of Wight:** Battery System – Wartsila designed hybrid system employing 2 x 600+ kWh battery packs using Corvus Orca 2 batteries.

Voiths, control system and drivers/motors – 4 x 21 R5/150 Voith propellers utilising Voith electronic control from 3 helm positions with joysticks and 1 helm position with wheels & levers.

Training Issues





## **LNG Challenges**

**No LNG supplier. Delivery - daily road tankers, via ship tanker?  
Weight of LNG tank on Victoria – berth depth limited.  
Brittany Hornfleur craning LNG container on in France.  
LNG Bunkering – Requires vessels to bunker more.  
LNG Bunkering Facility – A COMAH Regulated Barge in  
Portsmouth City?**

**So, Victoria of Wight:** Designed fuel savings: 10 – 15%.

Generators: Wartsila W6L20 x 4, Total Engine Power: 4800 kW.

Voith Propellers driven by 4 x (Wartsila supplied) Marelli 950kW, 660V, 51.8Hz variable speed water cooled drive motors, controlled by 4 x Wartsila propulsion drives.

Fuel: Marine Gas Oil. Sulphur Content 0.1%, lowered from 0.2% in 2008. (HFO lowered 4.5% to 1.5% in 2008, ceased 1<sup>st</sup> Jan 2015).

Own bunkering barge facility in the harbour serving its Eastern Solent Fleet.

## **Other Challenges for 2050 – Timescales?**

Engaging Owners:	Deep Sea, Domestic Vessels, Ports. Ships 35 year lifespan Delivery, space for retrofitting? Is it BATNEEC?		
Other Energy Sources:	Due to immense fuel quantities involved, it took 5 years for fuel refineries to remove the Heavy Fuel Oil standard. Many were on MGO already. Next fuel timescale? Sails not practical.		
Laws/Reporting/MBM:	Deep Sea GT5000 and above Domestic Vsl GT5000 and above,  Both – ESOS Phase 2  Deep Sea – SEEMP, Domestic – Optional	IMO, EU MRV EU MRV Draft UK MRV	Ship Centric Safety – Mstr, 1 officer. THETIS
Building new ships delivery	Latest Energy Efficiency Design Index	2 years planning, 2 year	

Previous Company Reports – Showing independently verified GHG reductions since 2007 i.e. 15%.



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# Chris Thorne – Energy Technologies Institute





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# Panel Discussion



## Agenda

- 10:30 – 11:00    **Welcome: Minister for Transport – Nusrat Ghani MP**  
*Laura Marquis – Head of Strategy and Partnerships, Maritime Directorate, DfT*  
*Morna Cannon – Head of Clean Maritime Growth, DfT*  
*Gwilym Stone – Assistant Director, Shipping Strategy, MCA*
- 11:00 – 11:45    **Clean Maritime Plan – Economic and Technical Research**  
*Mattea Todd – Policy Advisor, Clean Maritime Council*  
*Kat Deyes – Frontier Economics*  
*Dr Tristan Smith - UMAS*
- 11:45 – 12:00    Refreshment break
- 12:00 – 13:00    **Panel Discussion: Zero Emission Shipping in the UK – The Role of Technology**  
*Chaired by Professor Alex Duffy, Strathclyde University*
- 13:00 – 13:45    Lunch
- 13:45 – 15:45    **Group Workshop on Emerging Policy Directions for the Clean Maritime Plan**  
*With presentations from: Tim Morris (UK Major Ports Group) and Aoife O’Leary (EDF)*
- 15:45 – 16:00    **Closing Remarks by Susanna May, Co-Director of Maritime Directorate, DfT**



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# Workshop: Shaping the Clean Maritime Plan



## Workshop Agenda

- 13:45 – 14:00    **Key Issues**  
*Morna Cannon – Head of Clean Maritime Growth, DfT*  
*Tim Morris – Chief Executive, UK Major Ports Group*  
*Aoife O’Leary – Senior Legal Adviser, Environmental Defense Fund*
- 14:00 – 15:00    **Facilitated discussion**  
*Each table will be discussing one of three topics: Commercialisation; Energy Systems Integration; Innovation.*
- 15:00 – 15:15    Refreshment break
- 15:15 – 15:45    **Reporting back**  
*Chaired by Morna Cannon (DfT) & Adam Chase (E4-Tech)*



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# Key Issues



## Emerging conclusions from research

- ▶ Efficiency measures alone will be insufficient. Alternative propulsion (fuels, electrification, primary renewables) necessary.
- ▶ Specific technology for specific conditions (e.g. journey type, vessel type, geography).
- ▶ Range of technologies possible and should be supported
  - ▶ Increase support for innovation throughout the maritime technology life-cycle, and do so collaboratively
  - ▶ Reduce barriers to commercialization, and address negative externalities – higher cost of clean shipping technologies
  - ▶ Reduce infrastructure-related barriers



## Innovation

### Emerging Policy Direction – Maritime 2050

- ▶ Aspirational ambitions. Government aims to **launch a number of “zero-emission shipping ambitions” in the Clean Maritime Plan** which could include:
  - ▶ Medium term:
    - A group of hydrogen or ammonia powered domestic vessels in operation.
    - At least one major port in the UK to have all ship-side activity zero emission (including non-road mobile machinery like cranes, as well as ships while docked in port).
  - ▶ Long term:
    - Aim to have all domestic ferries zero emission by 2050.
- ▶ Collaboration:
  - ▶ In line with proposals in the UK Clean Air Strategy, the government has now established the Clean Maritime Council, working closely with research bodies like MarRI-UK to ensure strong collaboration between government, industry and academia in this field. Over the next year government will consider the potential role for the Council in directing funding into green technologies for shipping.



## Commercialisation

Emerging Policy Direction - Maritime 2050:

- ▶ Government will **assess how economic instruments could support the transition to zero emission shipping in the medium to long term**
- ▶ Government will **consider the merits of introducing a medium term/long-term target for emissions of GHGs and air quality pollutants from UK**





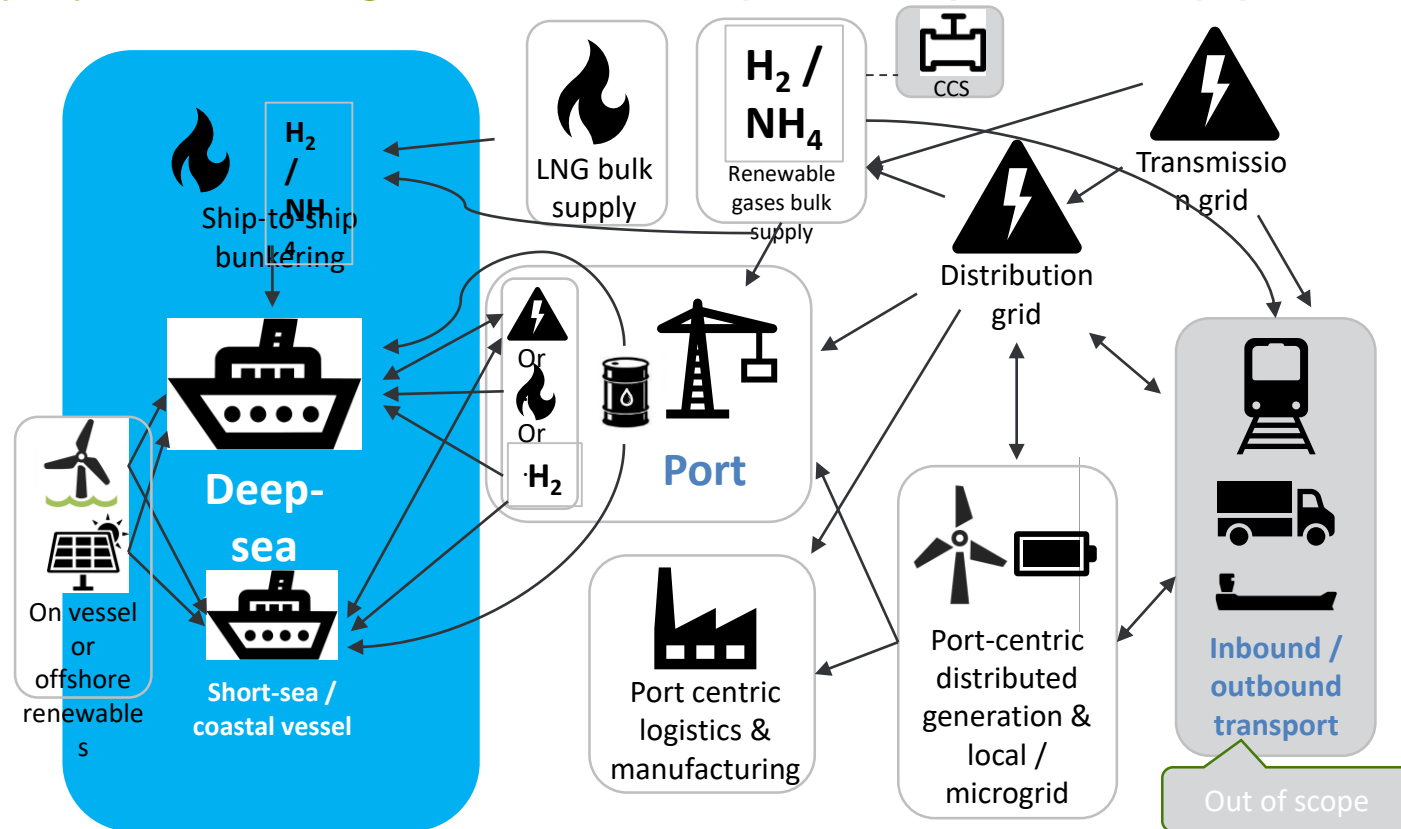
## Energy systems integration

Emerging Policy Direction (Maritime 2050)

- ▶ Government will work to **better understand the capacity of the UK's energy networks to support an increase in demand for green energy from our ports and shipping sectors**. It will also consider the role the maritime and offshore renewables sectors can play in decentralised energy generation

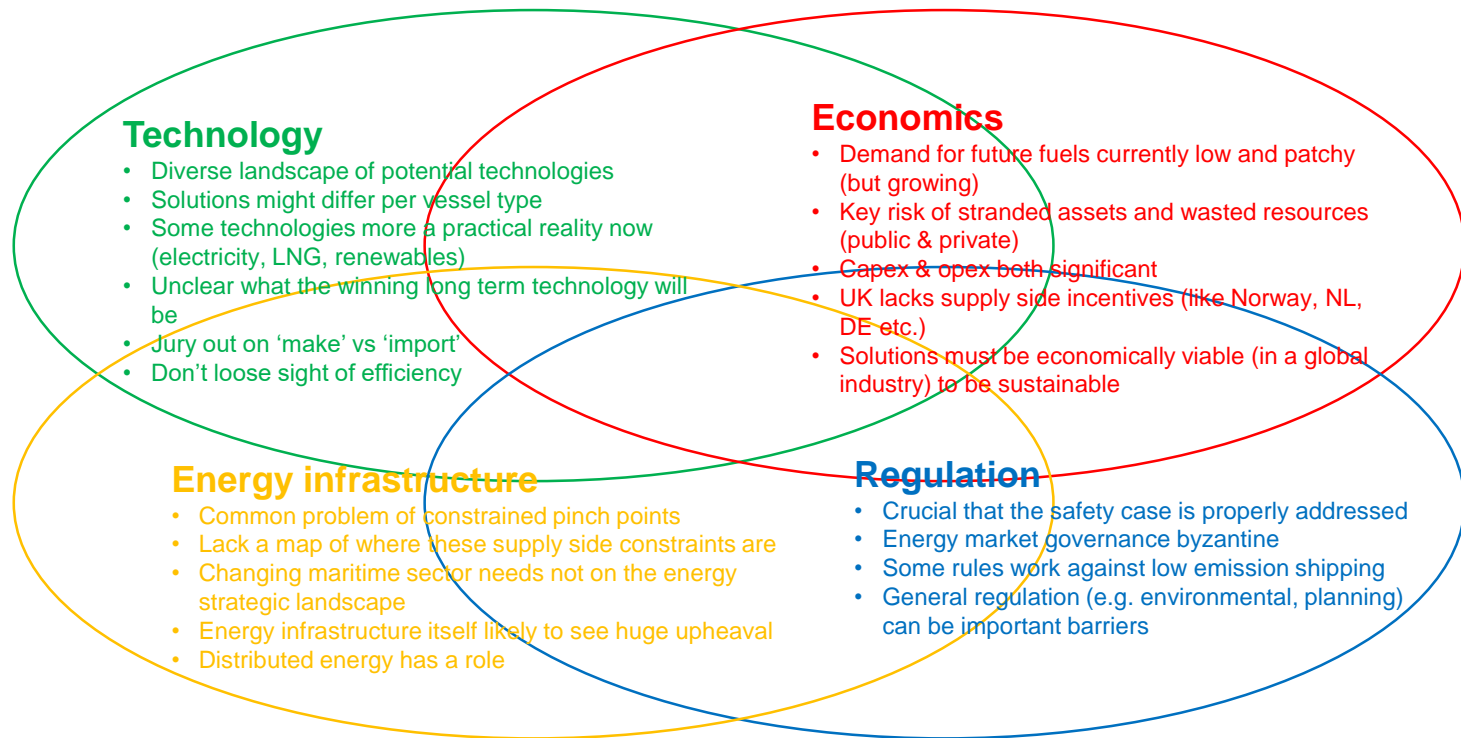


## Energy systems integration – a complicated picture of pipes & wires





## More than physical – need to address interlocking barriers & enablers





## Key issues for the Clean Maritime Plan

- ▶ Commercialisation:
  - ▶ Q1. In which technologies, fuels or professional services does zero emission shipping offer the UK the greatest commercial opportunity?
  - ▶ Q2. How could a pricing scheme to incentivise zero emission shipping work?
- ▶ Energy Systems Integration:
  - ▶ Q1. How can we solve the chicken and egg problem of demand and supply for zero emissions propulsion options?
  - ▶ Q2. What do we need to do on landside infrastructure for wider and faster roll out?
  - ▶ Q3. Are there emerging opportunities for clean shipping 'clusters' in the UK? What would need to happen to make them world-leading?
- ▶ Innovation:
  - ▶ Q1. What are our ambitions for the sector? Fill in the blank 'By 2035, the UK will have \_\_\_\_\_'
  - ▶ Q2. How do we best work together to plug the gap in maritime zero emission innovation?



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# Discussion



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# Reporting Back



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Susanna May  
Co-Director, Maritime, DfT





## Concluding remarks

- ▶ Clear opportunity for the UK to be a world leader in the transition to clean shipping, building on its strong maritime heritage and playing to its strengths
- ▶ A number of challenges exist including current higher costs of clean technologies and supporting infrastructure
- ▶ Clear need for private and public sector to collaborate to ensure guiding principles of clean growth strategy are delivered – delivering the clean shipping transition at lowest cost and maximizing benefit to UK plc



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