EP1. MRE Global Policy

Leuserina Garniati

Why this module?

Relevant for:

- Project developer
- Policy researchers
- Business start ups
- Members of the wider public / observers

Significant for:

- Awareness raising of the different types of international policies in MRE sector
- Understanding key critical points for the development of MRE and how projects have been streamlined in different regions through policy and policy measures
- Discovering the different economic policy instruments the UK has developed and grown

Overview of module

- Global Energy Policy
  - Key international policies
- Europe Marine Energy Policy Landscape
  - European targets
  - Strategy
  - Kick-starting industrial development
  - Streamlining project development
- UK Example
  - UK targets
  - Policy instruments

Global Energy Policy

Key international policies

- **International targets**
  - Kyoto protocol – adopted in 1997
  - In Doha, Qatar, on 8 December 2012, the Doha Amendment to the Kyoto Protocol was adopted for a second commitment period, starting in 2013 and lasting until 2020

Source:
Kyoto Protocol https://ec.europa.eu/commission/presscorner/detail/en/MEMO_05_49
What is the Kyoto Protocol? | UNFCCC

Key international policies

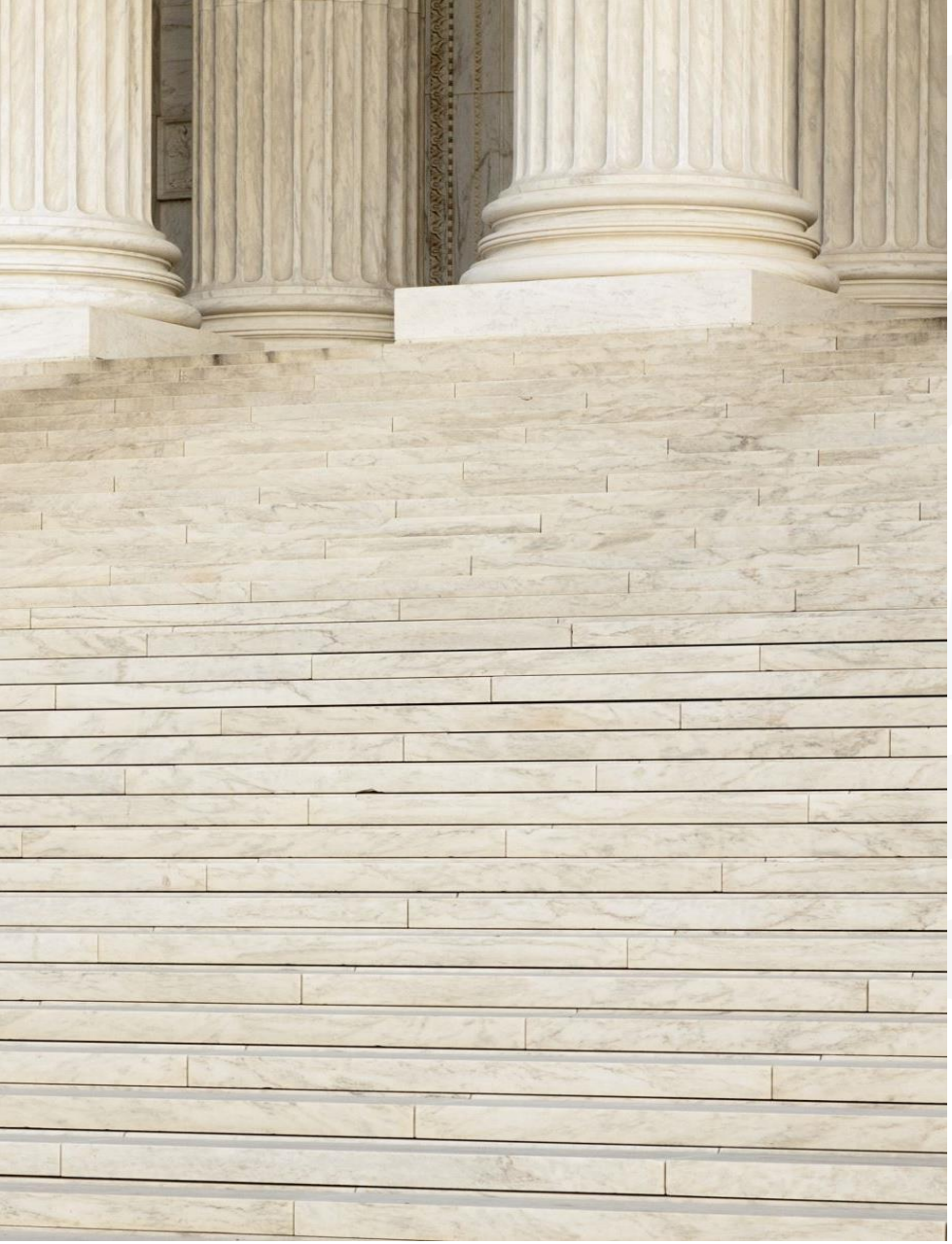
- The Paris Agreement is a legally binding international treaty on climate change.
- The main objectives the agreement:
  - Global temperature rise between 1.5 – 2.0 °C
  - NDCs
  - The EU has adopted an ambitious NDC plan within the 2030 Framework for Climate and Energy

Source:
Paris Agreement https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf
Ramos et al., (2021), https://doi.org/10.1016/j.rser.2020.110608

Country MRE Policy

- How government body manages a regional MRE industry and promotes the greater use of MRE for electricity production.
- Nations with relatively mature MRE industries have accumulated plenty of experience in MRE policy.
- Specific policies vary across nations.

Source: Yang et al., (2019) https://doi.org/10.1016/j.marpol.2018.11.038



MRE Policy Category

1. Non-Market Incentive Policies

- National Strategy
- Specific Laws
- Renewable Portfolio Standards (RPS)
- EIA Process
- Information Publicity Strategy

2. Market Incentive Policies

- Public Funding Programme
- Tax Preference
- Feed-in Tariff
- Tradeable Renewable Certificate (TRC)
- Contracts for Difference (CfD)

Source: Yang et al., (2019) https://doi.org/10.1016/j.marpol.2018.11.038

Example of Non-Market Incentive Policies

Policy Category	Description	Example
National Strategy	National and region-wide plans identifying the general goal of MRE sector and the corresponding roadmaps identifying the phased targets and specific means to achieve those goals	UK Marine Energy Technology Roadmap 2014 defines targets for 2050 Ireland's Offshore Renewable Energy Development Plan 2014 Denmark's Partnership for Wave Power Roadmaps defines targets for 2030
Specific Laws	MRE legislation developed and used by the government to guide the MRE industry	Norway – issued the Ocean Energy Bill in 2010 regulates offshore renewable energy production US – Marine and Hydrokinetic Renewable Energy Act of 2013 intends to advance research, development, and demonstration of MRE technologies

Source: Yang et al., (2019) https://doi.org/10.1016/j.marpol.2018.11.038

Example of Non-Market Incentive Policies

Policy Category	Description	Example
RPS	Regulation supported by Law, forces electricity provider to render a certain amount of MRE-based power. RPS is supplemented by TRC	Since 2012, the Korean government has enforced utility companies with the capacity of over 500MW to provide an obligatory portion of their total electricity production in the form of RE.
EIA Process	Potential environmental impact of MRE project are required to be assessed	Sweden – all MRE projects are subject to EIA process Korea – EIA process is implemented for generation facilities exceeding certain power capacity varying with MRE type Portugal – EIA process is required only if MRE device is located within ecologically reserved area.
Information Publicity Strategy	Information regarding MRE and related projects are made publicly available	Ireland – Ocean Energy Portal launched in 2014 and enhanced in 2015 US – Tethys Database

Source: Yang et al., (2019) https://doi.org/10.1016/j.marpol.2018.11.038

Example of Market Incentive Policies

Policy Category	Description	Example
Public Funding Programme	Set and administered by public agencies to support organisations in MRE activities Fund derives from Gov. tax revenue and individual donation	Canada – Office of Energy Research and Development of Natural Resources committed $13 M since 2010 France – Environment and Energy Agency (EEA) and National Research Agency (NRA) awarded financing to 9 MRE projects in 2016 Sweden – Swedish Energy Agency provided $6.04 M since 2015 UK – Marine Renewables Providing Fund is a $ 28.12 M special fund
Feed-in Tariff	Market push strategy entitling power companies to fixed and higher sales prices for MRE electricity	Spain – 0.073$/kW.h (0.065$/kW.h after first 20 years) France – 0.16$/kW,h Ireland - 0.23$/kW.h Italy - 0.36$/kW.h

Source: Yang et al., (2019) https://doi.org/10.1016/j.marpol.2018.11.038

Example of Market Incentive Policies

Policy Category	Description	Example
TRC	A power generating company can be granted TRC if it renders certain amount of MRE-based power. Intangible commodity and can be sold in a government-oriented market	Since 2012 Norway and Sweden have built a joint green certificate market where one certificate is awarded per MW.h of MRE electricity
CfD	Ensures MRE generators are paid the difference between the strike price (electricity price reflecting MRE technology investment) and reference price (average market for electricity)	UK has used CfD to replace Renewables Obligation since 2016 At present, the draft strike prices for wave energy and tidal stream is £310/MW·h and £300/MW·h respectively.

Source: Yang et al., (2019) https://doi.org/10.1016/j.marpol.2018.11.038

European MRE Policy Landscape

MRE as Part of Net Zero

- Wind and solar energy as the backbone of the EU's future electricity system.
- Ocean energy is a perfect partner:
  - Tidal stream
  - Wave energy

Source: Ocean Energy Europe 2020

https://www.oceanenergy-europe.eu/wp-content/uploads/2020/05/200414-Ocean-energy-in-the-Offshore-Renewables-Strategy-Final.pdf

Need for European MRE Policy

- To meet the ambitions goals set for the 2030-2050 horizon, the EU needs to diversify its low-carbon generation capacity – including to MRE
- Ocean Energy Forum (OEF) in 2015
- The roadmap: Building Ocean Energy for Europe in 2016
- Full commercial MRE faces challenges:

Source: Ramos et al., (2021), https://doi.org/10.1016/j.rser.2020.110608

Need for European MRE Policy

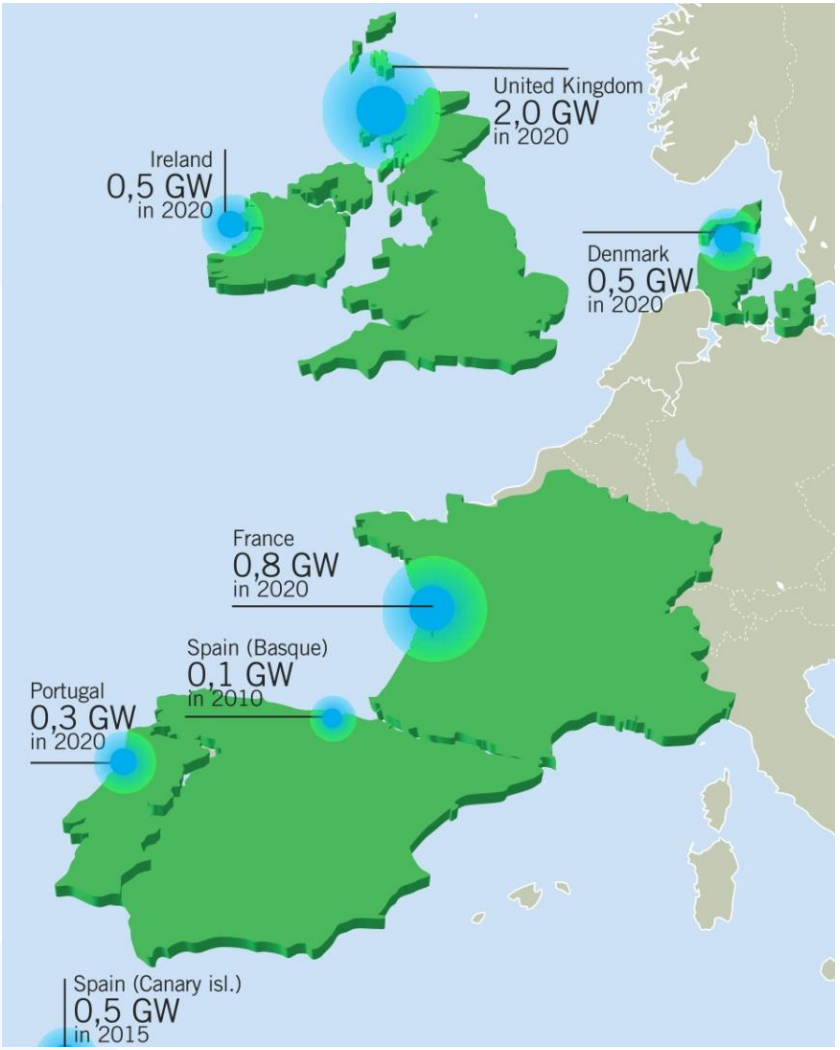
- To progress, must be accompanied by the development of policy and legal instruments
- This should include:
  - MRE-specific development plans
  - Clear and stable legislations for licensing and consenting procedures of MRE projects
  - Legal certainty and predictability

Source: Ramos et al., (2021), https://doi.org/10.1016/j.rser.2020.110608

European MRE Policies

3 Communications issued by the EC:

- 2008 - Offshore Wind Energy
- 2014 - Blue Energy
- 2014 – Building Ocean Energy for Europe



Source: European targets https://ec.europa.eu/clima/policies/strategies/2030_en
Offshore Wind target by 2050 https://ec.europa.eu/energy/topics/renewable-energy/onshore-and-offshore-wind_en
Ramos et al., (2021), https://doi.org/10.1016/j.rser.2020.110608

Source: EU-OEA
European Ocean Energy Roadmap 2010 – 2050

European MRE Action Plan

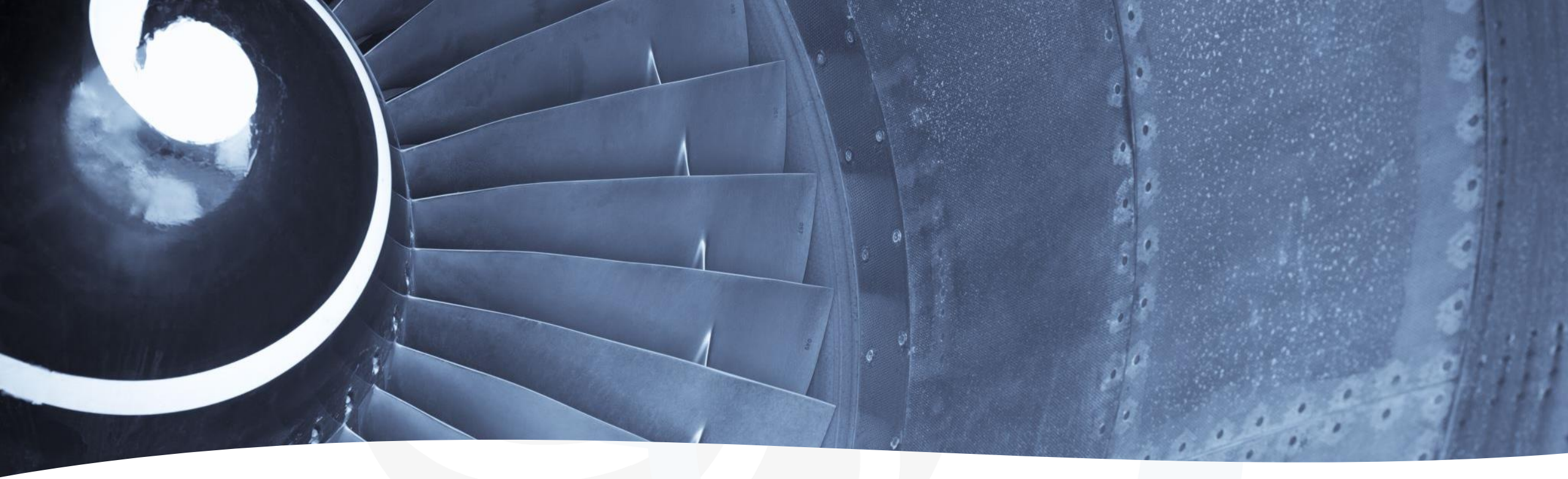
- Action Plan 1: A European phase-gate technology development process for sub-systems and devices (2018–2025)
- Action Plan 2: An Investment Support Fund for ocean energy farms (2018–2025)
- Action Plan 3: An EU Insurance and Guarantee Fund to underwrite project risks (2018 - Launch)
- Action Plan 4: De-risking environmental consenting through an integrated programme of measures (2017–2018)

Source: Ramos et al., (2021), https://doi.org/10.1016/j.rser.2020.110608

2020 MRE targets defined in NREAP and progress made until 2019

		Offshore Wind (*MW*)	Wave & Tidal (*MW*)	Total (*MW*)
France	2019 Progress	2	220	222
	2020 Target	6000	380	6380
Ireland	2019 Progress	25.20	0	25.20
	2020 Target	555	75	630
Portugal	2019 Progress	8.40	2	10.40
	2020 Target	27	6	33
Spain	2019 Progress	5	5	10
	2020 Target	700	150	850
United Kingdom	2019 Progress	9945	20	9965
	2020 Target	12990	1300	14290

Source: Ramos et al., (2021), https://doi.org/10.1016/j.rser.2020.110608

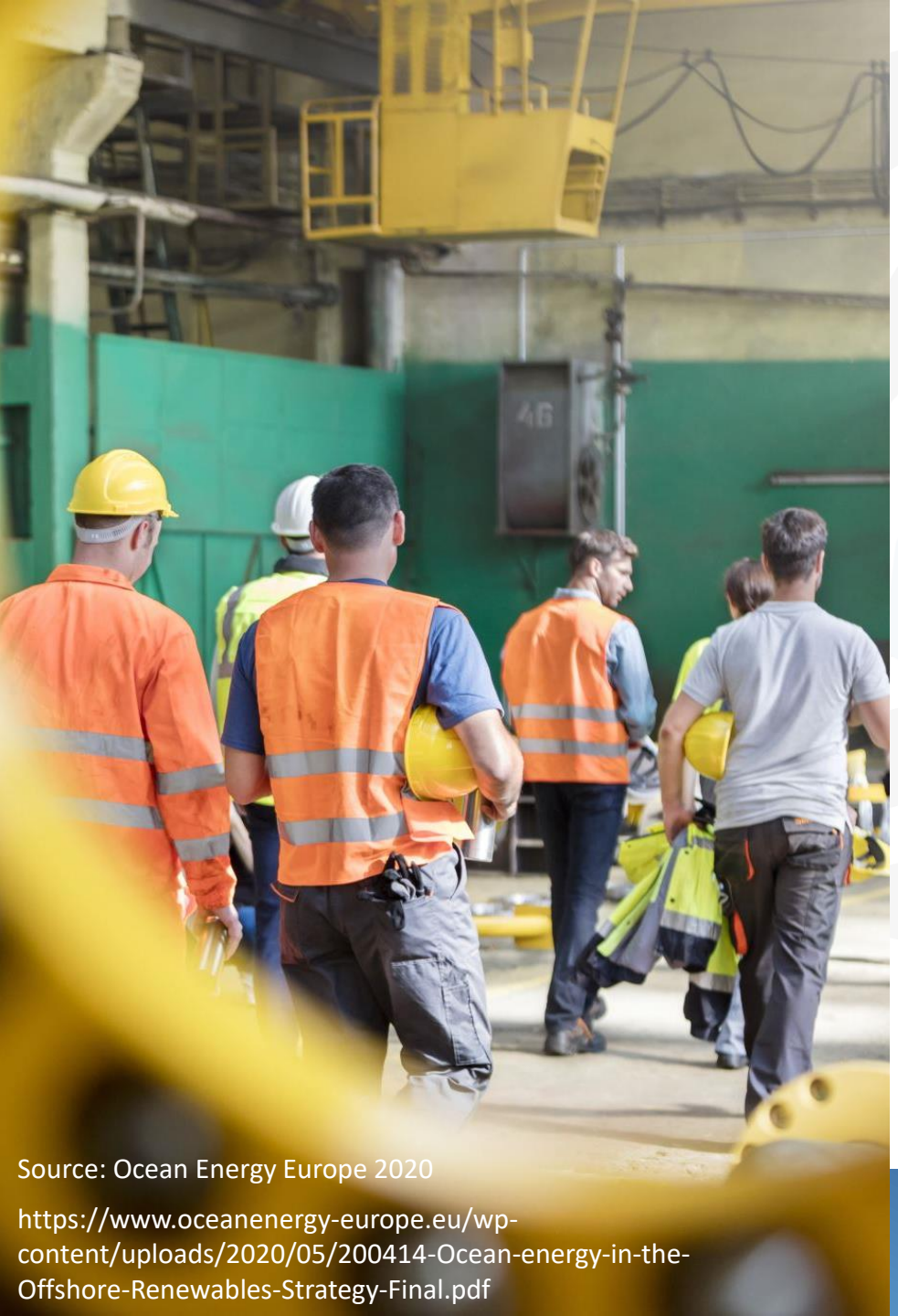


European MRE Industry as a whole

Source: Ocean Energy Europe 2020

https://www.oceanenergy-europe.eu/wp-content/uploads/2020/05/200414-Ocean-energy-in-the-Offshore-Renewables-Strategy-Final.pdf

- Tidal and wave energy devices are currently being deployed from Norway to Portugal
- Mediterranean and coastal regions will be host to assembly, installation and maintenance activities.
- Offers significant economic opportunities beyond deployment sites.
- Northern and Central European countries are already manufacturing components today and will increasingly do so



Source: Ocean Energy Europe 2020

https://www.oceanenergy-europe.eu/wp-content/uploads/2020/05/200414-Ocean-energy-in-the-Offshore-Renewables-Strategy-Final.pdf

Summary of Key Benefits to the EU

- A driver of job creation and economic growth
- A route to achieving the EU's renewable energy targets
- Maximising the value and security of renewable energy portfolios

aquatera
environmental services and products

Strategy for the sector

- By end of 2030 von der Leyen Commission - 100,000 homes powered by the ocean
- By 2030-2035 – achieving €0.10/kWh through large scale deployment
- By 2050 – 100 GW installed in Europe and global leadership

Source: Ocean Energy Europe 2020

https://www.oceanenergy-europe.eu/wp-content/uploads/2020/05/200414-Ocean-energy-in-the-Offshore-Renewables-Strategy-Final.pdf

Kick-starting industrial development

- Member States revenue support will unlock a significant project pipeline
- Pilot and pre-commercial farms are essential to decrease the costs of wave and tidal stream and establish these technologies.

Source: Ocean Energy Europe 2020
https://www.oceanenergy-europe.eu/wp-content/uploads/2020/05/200414-Ocean-energy-in-the-Offshore-Renewables-Strategy-Final.pdf

Kick-starting industrial development

- Blended EU instruments to finance ‘valley of death’ technologies
  - Financing costs associated with innovative ocean energy farms can make up as much as 50% of total project costs.
  - Several funds and programs already exist

Source: Ocean Energy Europe 2020
https://www.oceanenergy-europe.eu/wp-content/uploads/2020/05/200414-Ocean-energy-in-the-Offshore-Renewables-Strategy-Final.pdf

Kick-starting industrial development

- Insurance & guarantee to enable the first pilot farms
  - Commercial insurance?
  - Manufacturer guarantees?
  - All risk remains with investors?
  - A European Insurance and Guarantee Fund

Source: Ocean Energy Europe 2020
https://www.oceanenergy-europe.eu/wp-content/uploads/2020/05/200414-Ocean-energy-in-the-Offshore-Renewables-Strategy-Final.pdf

Kick-starting industrial development

- Building international partnerships to mutualise investments
  - Sharing the cost of early technology development
  - Other nations have already shown interest
  - International partnerships could allow European technologies to progress

Source: Ocean Energy Europe 2020
https://www.oceanenergy-europe.eu/wp-content/uploads/2020/05/200414-Ocean-energy-in-the-Offshore-Renewables-Strategy-Final.pdf

Kick-starting industrial development

- EIB as an export bank supporting EU global leadership European funds
- Several European companies have already found opportunities to export their devices and programs

Source: Ocean Energy Europe 2020
https://www.oceanenergy-europe.eu/wp-content/uploads/2020/05/200414-Ocean-energy-in-the-Offshore-Renewables-Strategy-Final.pdf

Streamlining project development

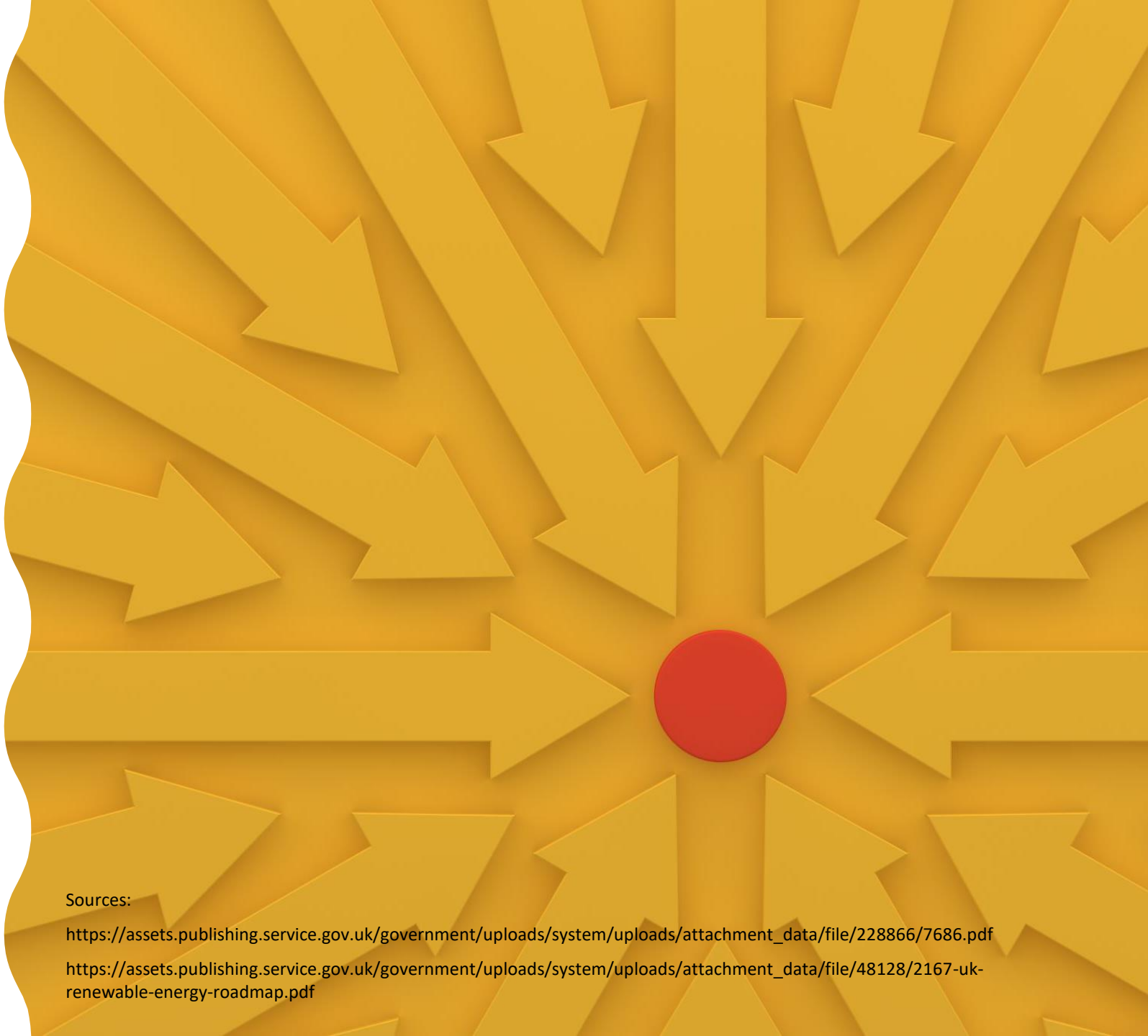
- Streamlined consenting and licensing procedures to accelerate deployment
- State Aid guidelines should facilitate demonstration projects financing
- Marine Spatial Planning must take ocean energy into account

Source: Ocean Energy Europe 2020
https://www.oceanenergy-europe.eu/wp-content/uploads/2020/05/200414-Ocean-energy-in-the-Offshore-Renewables-Strategy-Final.pdf

UK Examples

Renewable Energy targets in UK

- Renewable energy contribution targets in the UK and devolved administrations:



Sources:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/228866/7686.pdf

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48128/2167-uk-renewable-energy-roadmap.pdf

MRE Potential for the UK

- Wave and tidal energy has the potential to meet up to 20% of the UK's electricity demand representing 30-50 GW installed
- Between 200-300 MW of generation capacity may be able to be deployed by 2020, and at the higher end of the range up to 27 GW by 2050
- UK is seen as a world leader and focal point for the development of wave and tidal technologies

Source: https://www.gov.uk/guidance/wave-and-tidal-energy-part-of-the-uks-energy-mix

MRE Policies towards commercialisation

- Offshore Wind Sector Deal
- Marine Energy Plan for Wales
- Northern Ireland's Offshore Renewable Energy Strategic Action Plan

Source: Ramos et al., (2021), https://doi.org/10.1016/j.rser.2020.110608

Policy aspects of MRE in the UK

Current non-technical barriers:

- Removal of ring-fenced wave and tidal funds – detrimental to industry
- Electricity price competition with offshore wind – less private investment in wave and tidal
- Lack of government prioritisation and support

Current contributing factors:

- Commitment to increase renewable energy uptake as a result of emissions targets (international, EU and national)

- UK marine developers searching opportunities for technology development elsewhere
- If government support unchanged – threat for the marine energy industry in the UK

Maritime planning policies – England & Wales

- Marine and Coastal Access Act 2009
  - Marine Management Organisation (MMO) established as the single competent authority for maritime affairs
  - Welsh case: 20-year Welsh National Marine Plan issued in 2019
  - English case: MMO responsible for elaboration of 20-year marine plans

Source: Ramos et al., (2021), https://doi.org/10.1016/j.rser.2020.110608

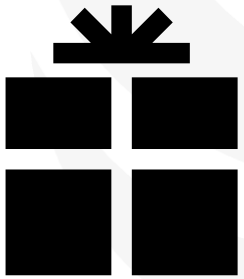
Maritime planning policies - Scotland

- Marine (Scotland) Act 2010
  - Sets statutory basis for planning, licensing, and conservation
  - Marine Scotland created
  - Marine Protected Areas created
  - National Marine Plan
  - Sectoral plans developed ad hoc
  - Specific policies proposed

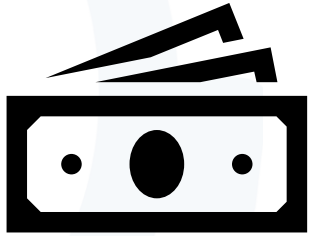
Source: Ramos et al., (2021), https://doi.org/10.1016/j.rser.2020.110608

Economic Policy Instruments

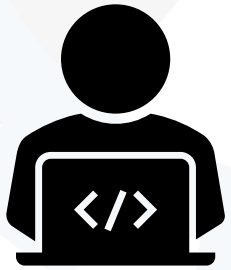
Environmental taxes & permits



Grants



Incentives & Subsidies



Enabling programmes

Environmental Taxes & Permits

- **Environmental taxation**

Is a tool that can be used to meet national or regional environmental objectives. It can target either the pollutant (the actual emission) or the product (the manufacture of which causes pollution)

Environmental Taxes & Permits

- **Tradable pollution permits:**
  - An alternative means to control emissions level
- **Green Certificates:**
  - Similar to the pollution permits, but the main difference is that the GC is held as proof of environmentally beneficial ('green') activity rather than a legal requirement to pollute

Incentives & Subsidies

- Feed in tariffs(FITS) and Contracts for difference(CfDs) - UK
- Low Carbon Infrastructure Transition Programme (LCITP) – Scotland
- Innovation Power Purchase Agreement - UK
- Investment support
- Fast-tracked planning

MRE Review Report P909
https://www.marineenergywales.co.uk/wp-content/uploads/2019/03/uk_marine_energy_2019.pdf
https://www.gov.scot/policies/renewable-and-low-carbon-energy/low-carbon-infrastructure-transition-programme/

Grants

- **Best examples of wave and tidal grants in the UK**

- Marine Energy Array Demonstrator (MEAD)
- Marine Renewables Deployment Fund (MRDF)
- Marine Renewable Proving Fund (MRPF)
- Marine Renewables Commercialisation Fund (MRCF)
- Saltire Tidal Energy Challenge Fund

Enabling programmes – Wave and tidal

- Research – PRIMaRE (World), OES Environmental (World), FP6 and 7, H2020 (EU)
- Regulatory support - Marine Scotland, ORJIP(UK)
- Technology support – FORSEA(EU), Waters 1 and 2 (Scotland), ORE Catapult
- Wave energy Scotland (Scotland)
- Infrastructure – Local Governments, Scottish government,
- Test sites – EMEC, FaB Test, Dynamic Marine Component Test facility (DMaC), South West Mooring Test Facility (SWMTF), Marine Energy Test Area (META)
- Capacity building –Scotland (SDI, HIE,SE)

https://www.wavehub.co.uk/our-services/partner-facilities

Enabling programmes - Offshore wind

- Research – OWJIP (UK), Offshore Wind Innovation Exchange (UK), Fit for Offshore Renewables, ORE Catapult
- Technology support – Clean technology incubator programmes by Carbon trust (UK), TenT (Europe)
- Infrastructure – Ports (Methyl Energy Park Fife, Belfast) , UK (Infrastructure reports NRIP 1 & 2)
- Test sites – NAREC, Levenmouth Demonstration site, National Offshore Anemometry Hub (NOAH)
- Capacity building - Range of training programmes, Enterprise areas (regional development)

https://ore.catapult.org.uk/testing-validation/facilities/demonstration/
https://cdn.ymaws.com/www.renewableuk.com/resource/resmgr/publications/supply_chain_review_31.01.20.pdf