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TITLE: Risk-based approaches for consenting according to technology profile recommendations.

YEAR: 2016

SUSTAINABLE ENERGY WEEK
An initiative of the European Commission

EUSEW conference (Brussels, 14-16 June 2016)
Consenting of offshore renewable energy projects: implementing a risk based approach

Risk based approaches for consenting according to technology profile recommendations (WP3 findings)

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RiCORE
RISK BASED CONSENTING FOR OFFSHORE RENEWABLES

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 646436.

- The SDM policy
- Technology selection
- Risk profiling
- Lessons learned by the RiCORE project

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Why S,D&M?

- Political backing to achieve goal of Scotland supplying 100% of electricity demand from renewable energy sources by 2020
- The marine environment: high wave, wind & tidal resource potential
- New technologies to be deployed at relatively small scales
- Uncertainty regarding the impacts (acknowledgement that mechanisms for potential effects had an extremely limited empirical basis - collision risk, displacement & barrier effects)

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Why S,D&M?

- High cost of default standard multi-year baseline surveys
- Mobile species (those species with higher levels of natural spatio-temporal variation in abundance & distribution)
- Purpose of pre-determination surveys:
  - Primarily site characterisation for determination of proposals
  - May inform post-consent monitoring (but questions are likely to differ)
- Need for guidance

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Why S,D&M?

- Two ends of the spectrum on deciding how much baseline survey is required for project determination:
- Increase effort over greater number of years and at larger spatial scale to fully describe natural variation (the DRIPy approach)
- Improve confidence by focusing on measuring the mechanisms of effect post-deployment (a Deploy & Monitor approach)
- Consensus that standardised 2 year baseline surveys was not proportionate in all circumstances

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SDM Policy

Summary

- Best use of strategic information
- Informative at site level
- Proportionate pre-consent data

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Technology selection

- Risk based approach
  - Is best suited in context of high uncertainty
  - Will benefit learning by doing

- Main technological focus recommendation: *Novel technologies that are or are near to be in live conditions*
  - TRL 7 to 9: 11 novel technology types could benefit immediately a risk based approach, as well as bottom fixed offshore wind technology (fully mature)
  - TRL 5 to 6: 8 technology types *may* reach a sufficient level of maturity soon enough to be included in the initial deployment of the proposed risk based approach.

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Technology selection

NOVEL TECHNOLOGY THAT COULD BENEFIT IMMEDIATELY A RISK BASED APPROACH

Category	Technology type	TRL	Comments
Tidal	Tidal impoundment	9	
	Horizontal axis turbine	8	Several advanced projects
	Enclosed Tips (Venturi)	8	Advanced, but only one advanced family of products
Wave	Attenuator	8	
	Point Absorber	7	
	Oscillating Wave Surge Converter	8	Most advanced with the highest number of projects
	Oscillating Water Column	7	
Floating Wind	Spar-horizontal axis WT	7-8	
	Semi-submersible platform - Horizontal axis WT	8-9	Most advanced with the highest number of projects
	Semi-submersible platform - Vertical axis WT	7	
	Tension leg - submerged platform	7	

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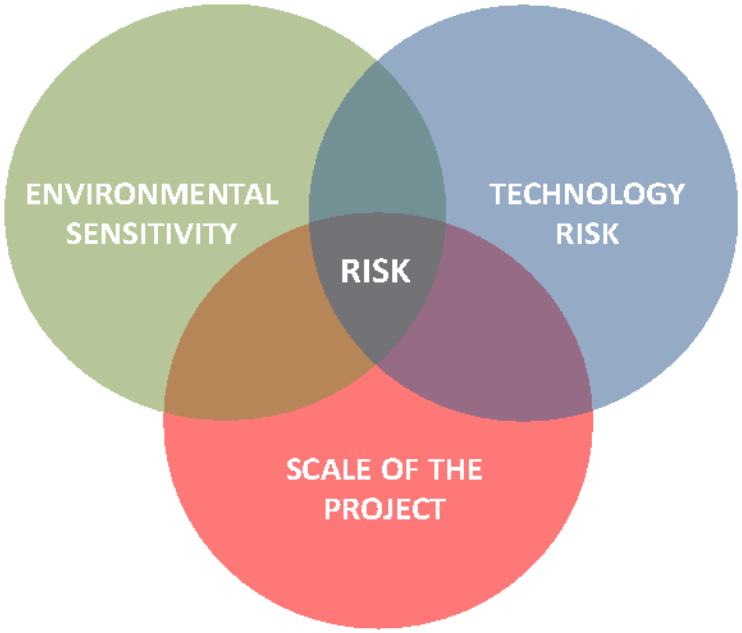
Risk profiling

Following the methodology suggested by the SDM Policy, the assessment of the risk of a MRE development is based on assessments of environmental sensitivity, project scale, and technology risk.



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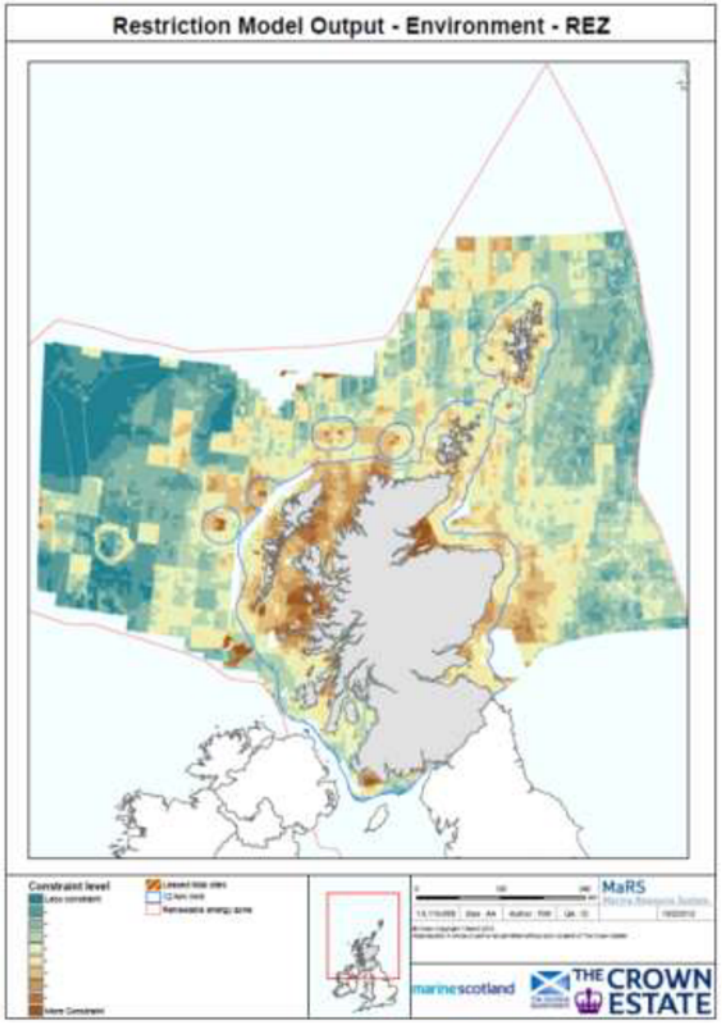
Risk profiling

1) ENVIRONMENTAL SENSITIVITY

- Similar to Strategic Environmental Assessment in approach and undertaken over relatively large spatial scale.
- Darker brown = higher sensitivity
- Map combination of 19 different sensitivity layers, each of which were weighted.
- Included:
  - Seabird distributions
  - Marine protected areas
  - Marine mammal distributions
  - Fish spawning grounds



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2) SCALE OF THE PROJECT

Generation capacity

Scale	Criteria	Assessment
Small Scale	Up to 10 MW	Low
Medium Scale	More than 10 MW, to 50 MW	Medium
Large Scale	More than 50 MW	High

Area occupied by the project

Scale	Wind	Wave	Tidal	Assessment
Small Scale	< 2 km^2	< 1,5 km^2	< 1 km^2	Low
Medium Scale	2 - 10 km^2	1,5 – 7,5 km^2	1 - 5 km^2	Medium
Large Scale	> 10 km^2	> 7,5 km^2	> 5 km^2	High

Project duration

Time Scale	Criteria	Assessment
Short	1-3 Years	Low
Medium	3-10 Years	Medium
Long	>10 Years	High

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3) TECHNOLOGY RISK

- **Physical presence of the devices.**
- **Physical presence of moorings, mooring lines and supporting structures.**
- **Dynamic components of the devices**
- **Chemicals.**
- **Acoustic effects.**
- **Electromagnetic fields**

- **Seafloor integrity**
- **Marine dynamics**
- **Landscape**
- **Birds**
- **Ichtyofauna**
- **Benthic communities.**
- **Marine mammals.**
- **Electromagnetic fields**

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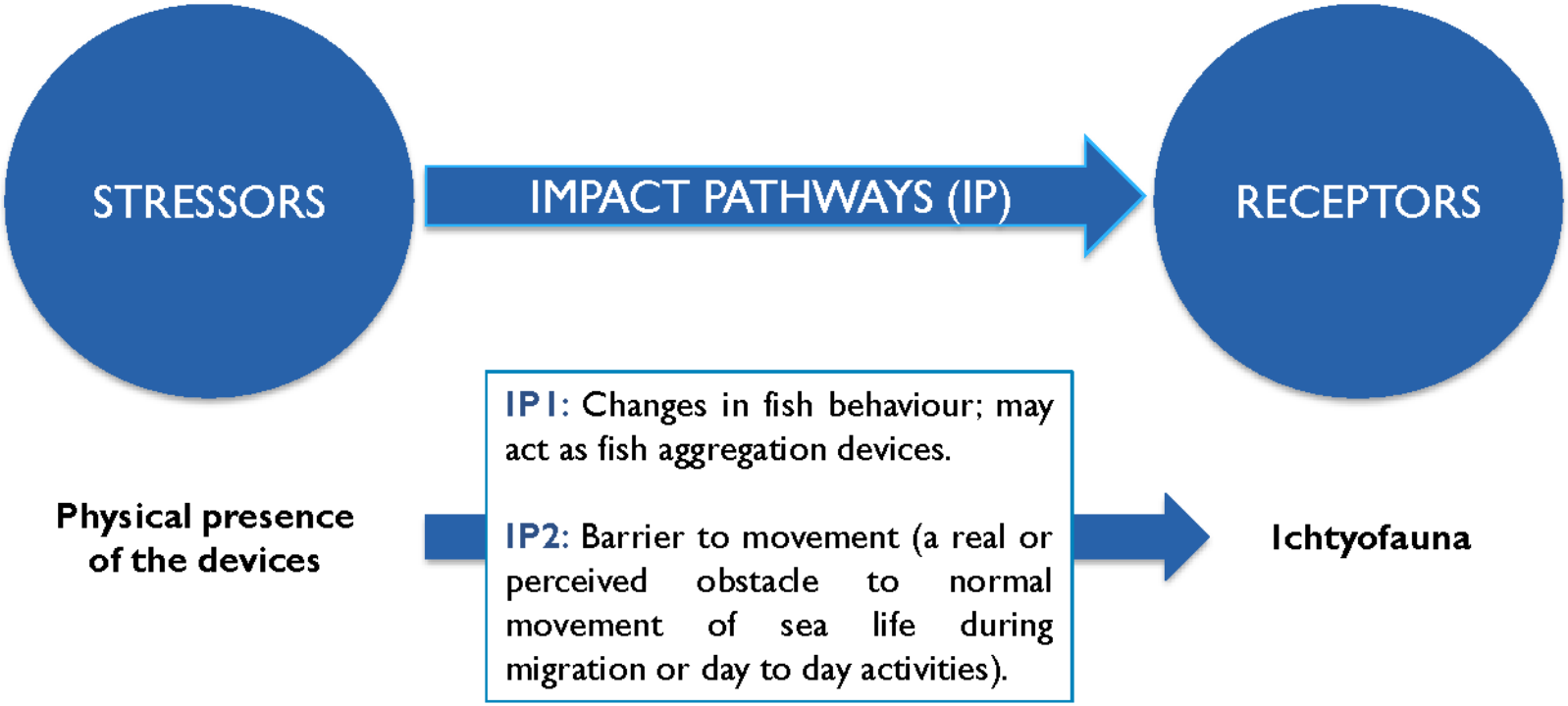
3) TECHNOLOGY RISK



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Risk profiling

4) INTEGRATIVE ASSESSMENT

Environmental Sensitivity Risk								GM score	Overall risk
Physical environment				Biotic environment				1 – 1.60	Low
Marine Dynamics	Seafloor integrity	Water quality	Landscape	Benthos	Fish	Marine mammals	Birds	1.61 – 2.20	Medium
								2.21 – 3.0	High
GM									

Technology Risk	GM score	Overall risk
$TR_{Construction} = ((IP_1)(IP_2)(IP_3).....(IP_n))^{1/n}$	1 – 1.60	Low
$TR_{Operation} = ((IP_1)(IP_2)(IP_3).....(IP_n))^{1/n}$	1.61 – 2.20	Medium
$TR_{Decommissioning} = ((IP_1)(IP_2)(IP_3).....(IP_n))^{1/n}$	2.21 – 3.0	High
$TR = ((TR_{Construction})*(TR_{Operation})*(TR_{Decommissioning}))^{1/3}$		

Scale of the project Risk	GM score	Overall risk
	1 – 1.60	Low
SPR = ((Generation Capacity)*(Area of the project)*(Project Duration))$^{1/3}$	1.61 – 2.20	Medium
	2.21 – 3.0	High

OVERALL RISK	GM score	Overall risk
	1 – 1.60	Low
Overall Risk = ((ESR)*(TR)*(SPR))$^{1/3}$	1.61 – 2.20	Medium
	2.21 – 3.0	High

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Lessons learned

- Member States can adopt the approach
  - Risk-based approach needs to be coherent with conservation objectives
- Role of technical expertise & opinion
  - Recommendations made regarding technology risks and project scale risks
- Different standards of data will mean differences in approach
  - Approach to be tailored to country specific context
- S, D&M can be applied in a phased manner for higher risk projects
  - Importance of post-consent monitoring – "learning by doing"

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