Gathering the perspectives and experience from test sites and device developers for Environmental and Socio Economic Impact Assessment of Wave Energy.

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The Environmental Interactions Of Marine Renewable Energy Technologies

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INTELLIGENT ENERGY EUROPE
FOR A SUSTAINABLE FUTURE

sowfia
Streamlining of Ocean Wave Farms Impact Assessment

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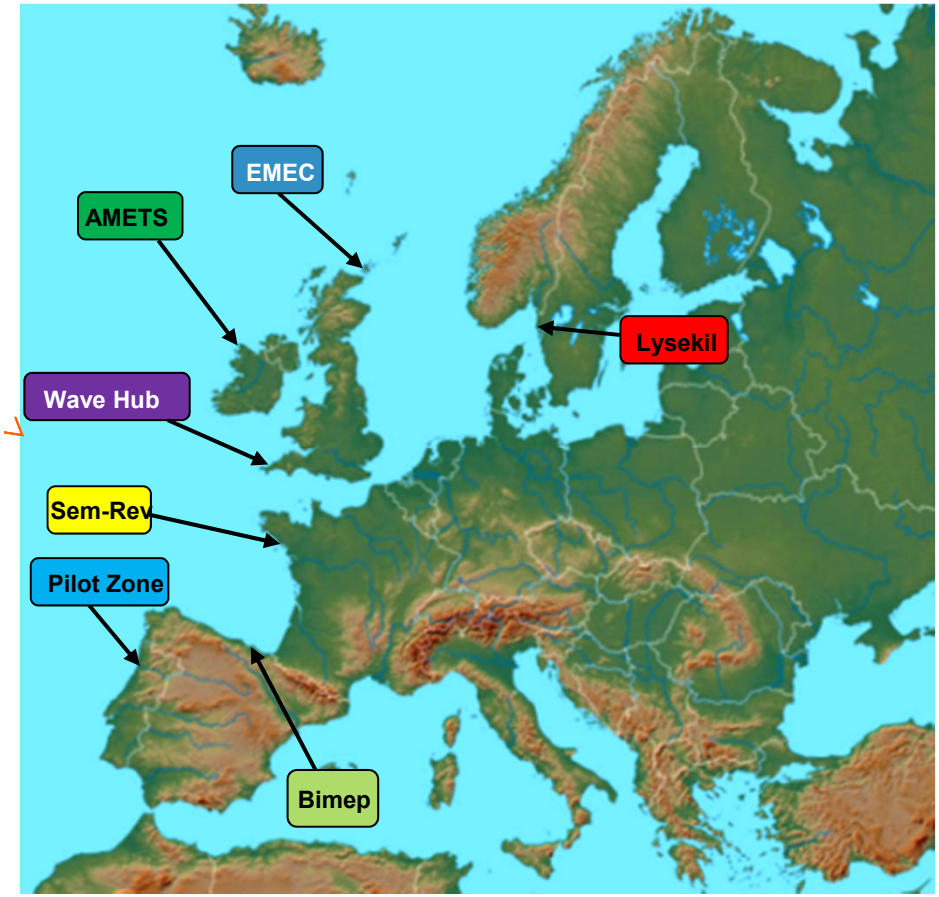
SOWFIA Project: Overview

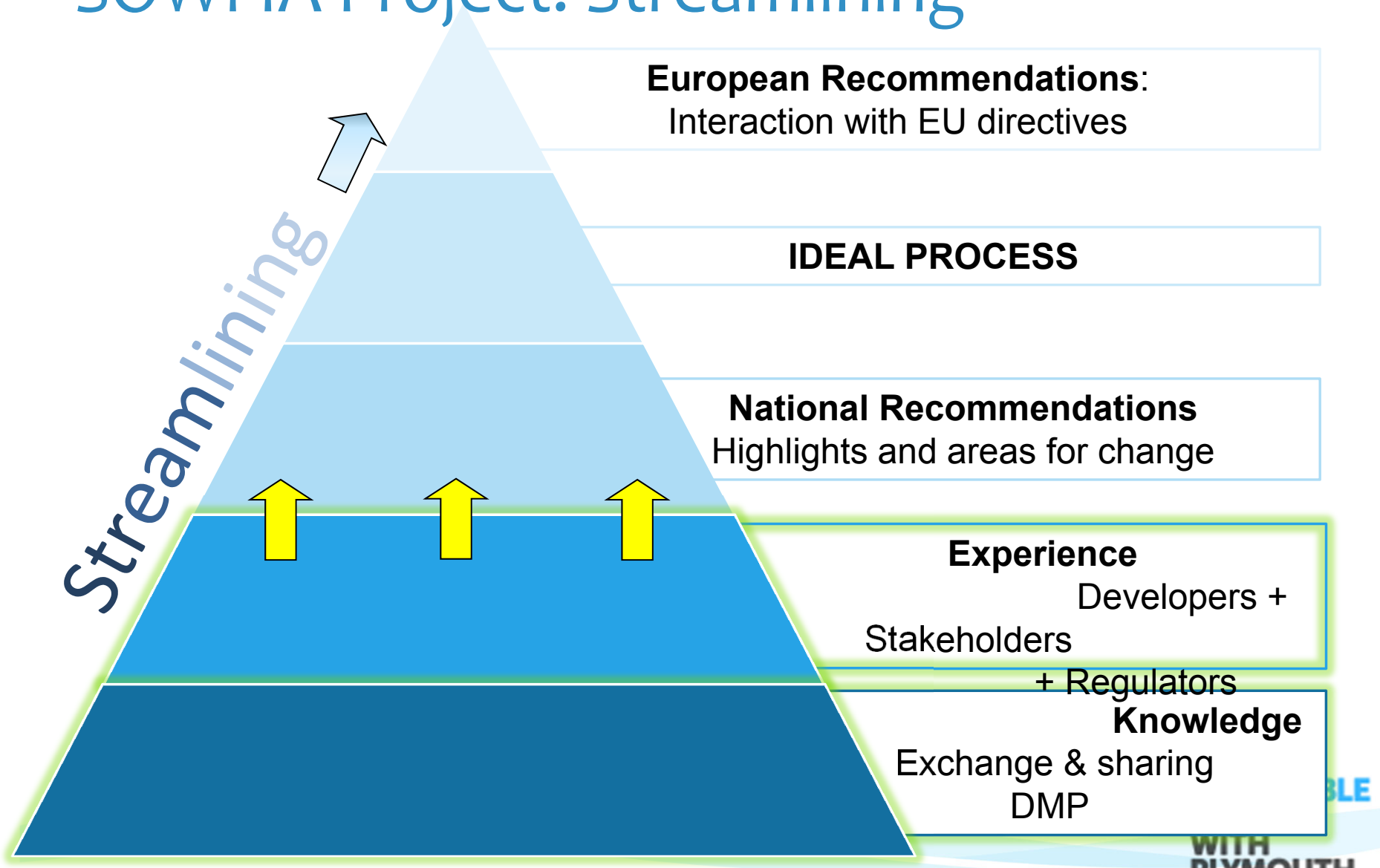


* Network of 10 EU partners
* 6+1 Wave Energy Test sites within EU

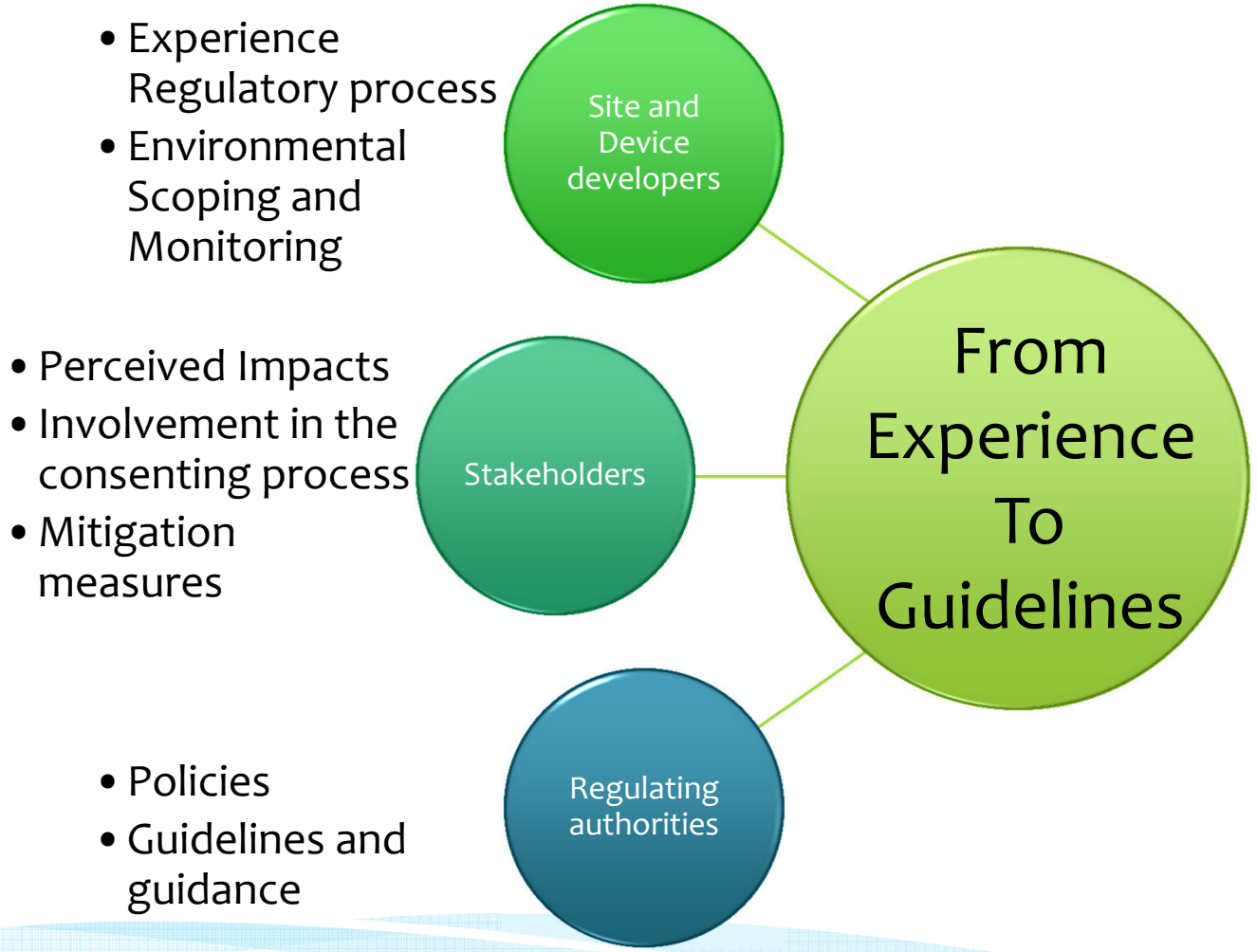
? Unknown Environmental and Socio-Economics Impacts of Wave Farms
? Uncertainties on adapting regulatory process for Wave Energy (and Tidal)
? Lack of coordinated IA policies hindering development

Experiences of Wave Energy Sites for streamlining IA process and removal of non-technological barriers

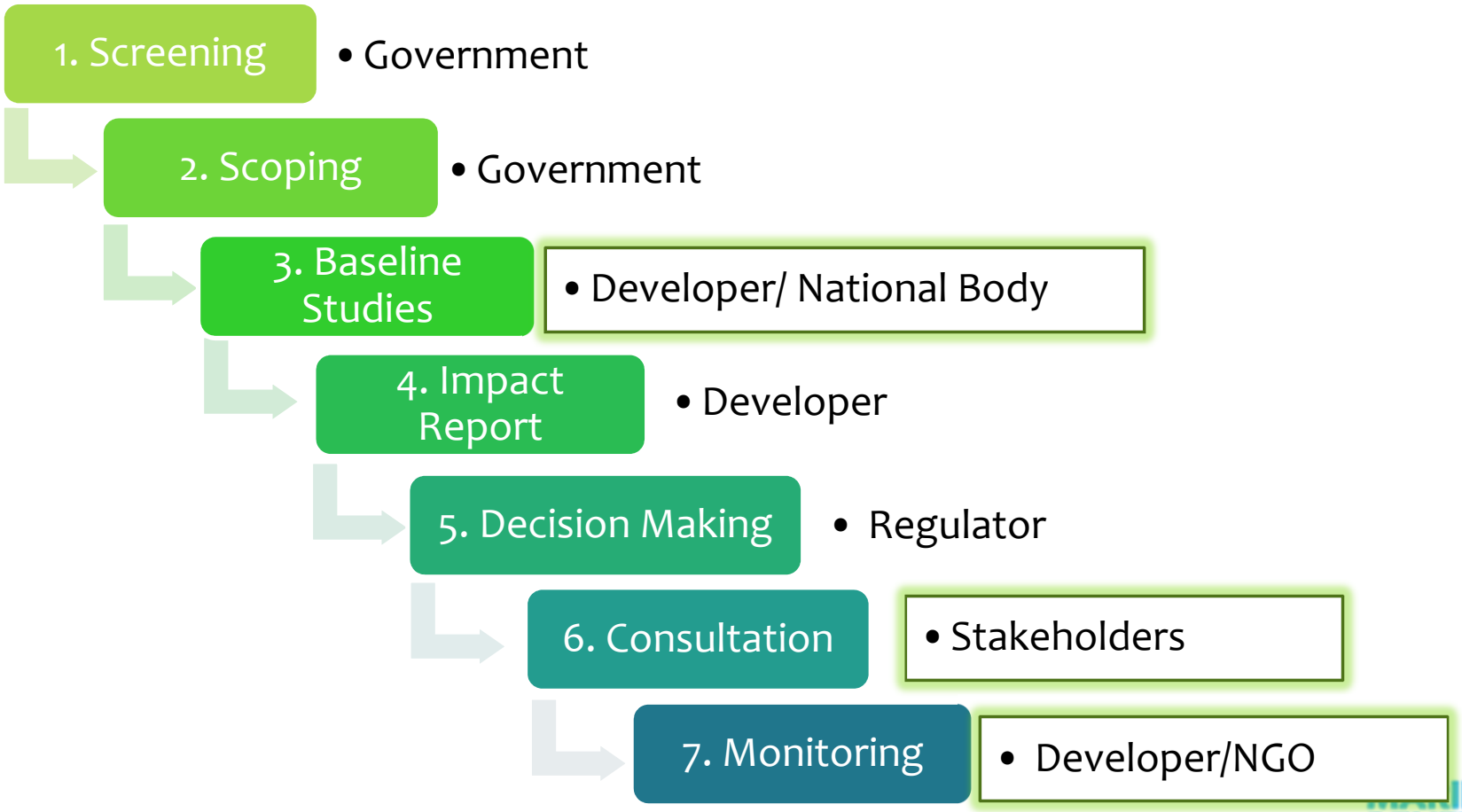
SOWFIA Project: Streamlining



SOWFIA Project: Interactions

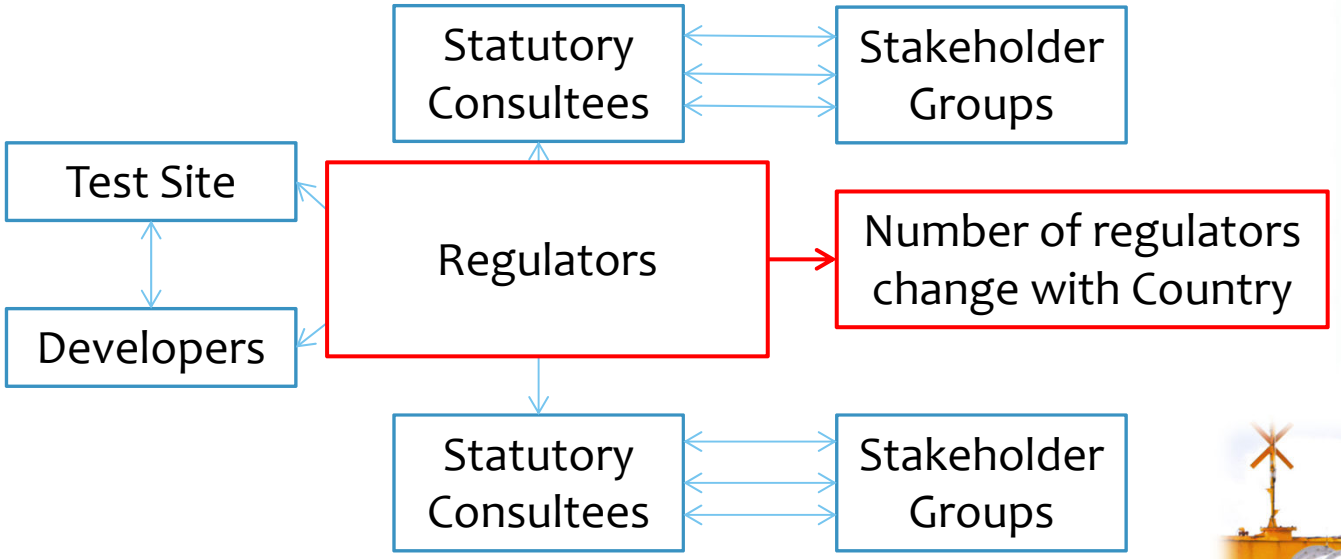


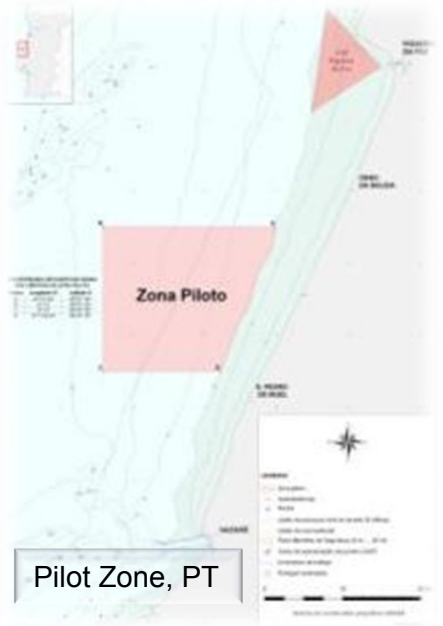
Consenting Process



*Adapted from EquiMar Guidelines

Key Players: Interactions and issues





Pilot Zone, PT


OE Buoy

What to study?

* Wide range of receptors/factors
  - Physical
  - Biological
  - Socio Economic
* Significance of Impacts
* Alternative and mitigation strategies

Guidance
Common Methodology
External Experiences

What's available?

	Receptor	Wave Hub	EMEC	Lysekil	Pilot Zone	AMETS	SEM REV	BIMEP
Physical Impacts	Bathymetry	✓	✓			✓	✓	
	Morphology	✓	✓		✓	✓	✓	
	Hydrodynamics	✓	✓		✓	✓	✓	✓
Biological Impacts	Benthos	✓	✓	✓	✓	✓	✓	✓
	Fish & Shellfish	✓	✓	✓				✓
	Plankton studies	✓						
	Marine Mammals	✓	✓	✓	✓	✓		✓
	Marine Ornithology	✓	✓		✓	✓		
Socio- Economic Impacts	Landscape & Visual	✓	✓			✓		
	Archeology	✓						
	Navigation and Shipping	✓						
	Fisheries	✓						
	Economics	✓						
	Noise	✓						
	Tourism	✓	✓					

Wave

	Receptor	Humber	G. Garrard	Scroby sand	Rampion	Islay OWF
Physical Impacts	Bathymetry	✓	✓	✓	✓	✓
	Geology	✓	✓	✓	✓	✓
	Hydrodynamics	✓	✓	✓	✓	✓
Biological Impacts	Benthos	✓	✓	*	✓	✓
	Fish & Shellfish	✓	✓	✓	✓	✓
	Nature Conservation		✓		✓	
	Marine Mammals	✓	✓	*	✓	✓
	Marine Ornithology	✓	✓	*	✓	✓
	Landscape & Visual	✓	✓	✓	✓	✓
	Archeology	✓	✓	✓	✓	✓
				✓	✓	✓
				✓	✓	✓
				✓	✓	✓
					✓	✓
						✓
Socio- E	Tourism	✓	✓			✓
	Other uses	✓	✓	✓	✓	✓

Wind

Common procedures for tests and evaluation

Importing of experience

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Importing Experience from "could" to "do"

Receptor	Investigation	Wind Turbines	WECS		Import
Hydrology	Changes in sediment	Fixed structure	Affected by energy removal		✗
Geomorphology	Water quality		Less water column occupied		✓
Birds	Avoidance farms		Diving birds	Migratory	✗
	Collision with structures		Diving birds	Migratory	✗
Harbor Porpoises	Avoidance farms	Construction	Investigation needed - Risk of strangling		✗
Seals	Avoidance farms	Construction	Investigation needed - Risk of strangling		✗
Benthic Fauna	Loss of habitat		Expected increase in stock		✓
	Change in structure		Expected increase variety		✓
	Bio fouling		On mooring and body		✓
	Hard bottom substrate		Low increase of stock due to absence of foundations		✗
Fish	Fish biomass		Trawling exclusion	Reef effect	✓
	Sand eel		EMF impacts		✓
Socio-Economic	Public Perception	Public need information			✓
	Visual impacts	Preferred at sea			✓
	Tourism		Impacts on Surf areas		✗

Legend

- Positive Impact
- More Monitoring
- Negative Impact
- Neutral Impact
- Expected Positive

✓ OW data can be used to add confidence about WECs EIA

✗ OW data can not be used to add confidence on WECs EIA

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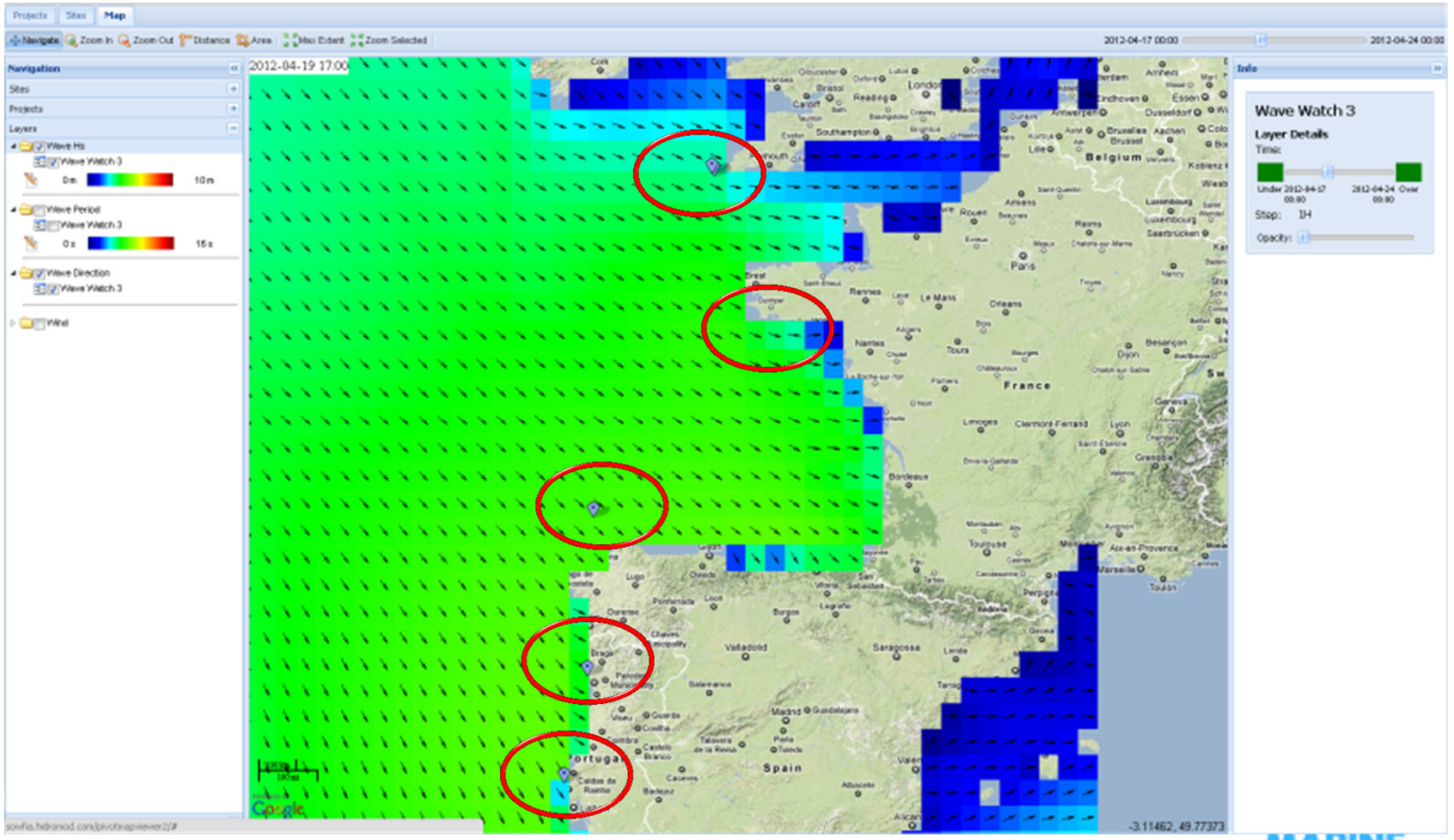
Experience: Common Platforms



Experience: Issues for concerns

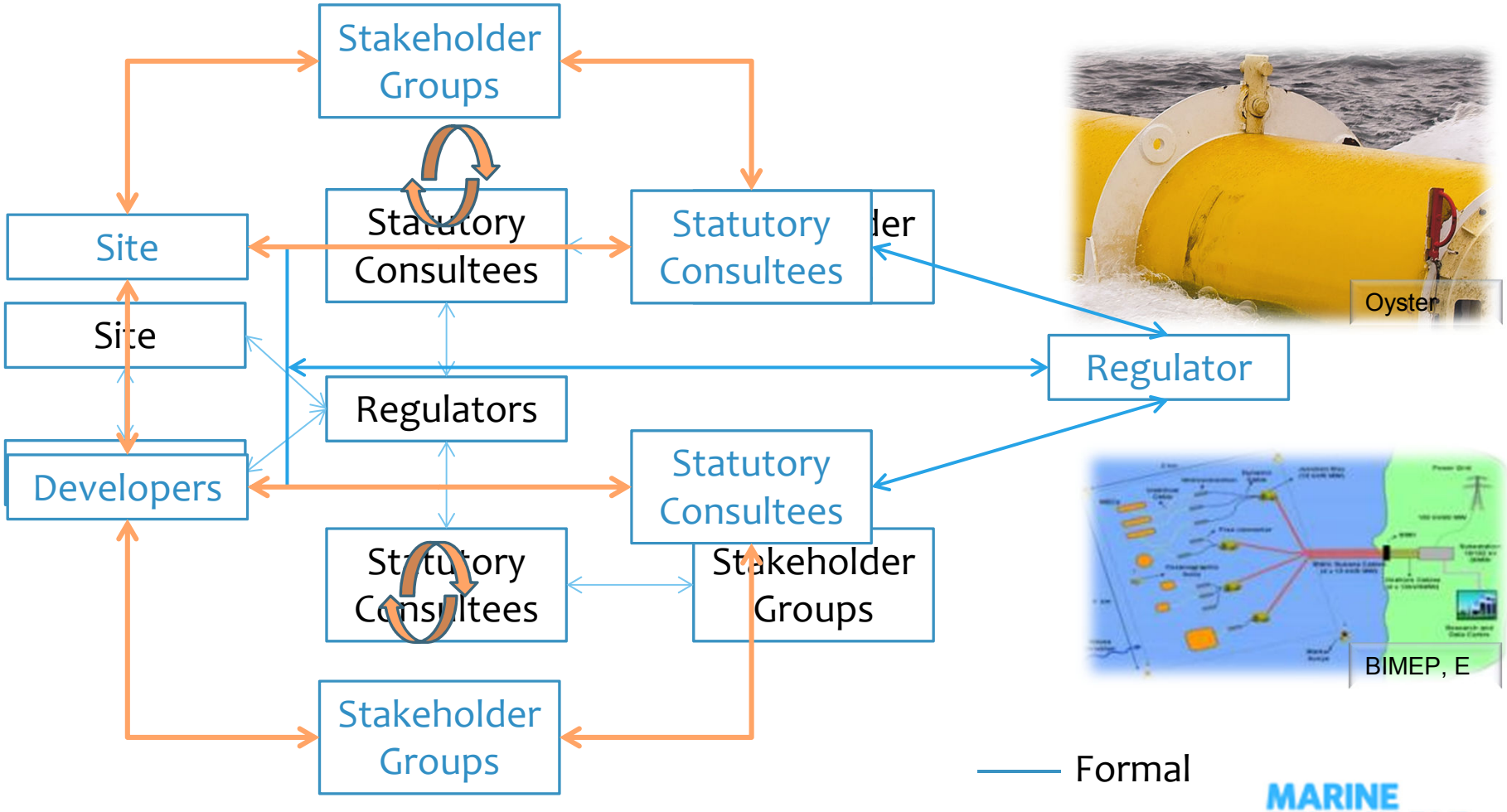
* Marine mammals and Birds collision with Structures
  - Monitoring methodology and accuracy of the system
* Bio-fouling
  - Effect on the marine environment
* Subaqueous noise
  - Disturbance to species

Methodology and Monitoring

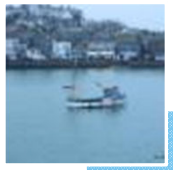
* Navigational Risks
* Recreational Users – Surfing Communities
* Fisheries: Conflict of use

Social Interactions and Mitigation

Experience: Engaging Stakeholders



Perspective from Stakeholders



Local Businesses

- Participation in the consultation process as activities directly affected from wave energy development.
- Liaison groups for mitigation and planning of activities
- FLOWW

Conservation Groups

- Participation in consultation process is limited and concerns are raised with regards to potential negative effects on the natural environment in the proximity of the sites
- Improvement and continuous monitoring could reduce concerns
- Early and open discussion is favoured

Local Communities

- Community support based on robust information aimed to reduce concerns and conflicts of use
- Lack of engagement and information with feeling that development is often masked by overly positive discussion on economic benefits

*Response from Survey of Stakeholders at Wave Hub Site (Bailey, De Groot, Magagna and Stokes)

Including views in the Consultation

* Different requirements depending on the Stakeholders interests
  - Efficient Monitoring
  - Impact Evaluation
* Open interactions and evaluation of alternative
* Early stage involvement in the consultation process
* Broader and in-depth information of the local communities
  - Easy to read data

Summarizing…

* Different procedures albeit common EU directives → uniformity of consenting process
* Common methodologies for testing aimed at removing uncertainties
* Sharing and integrating environmental data in common database
* Early engagement of stakeholders group envisaged from both Stakeholders and Developers → Concerns and mitigation strategies

Including views in the Consultation

Ocean energy Workshop
22nd May, 2012 – Gothenburg, Sweden

Taking Wave Energy Forward:
Implementation and Community Integration

Consultation process	1)How can communication between developers and stakeholders be improved? 2)What are the strengths and weaknesses of current consultation processes? 3)Is there a more effective way to get stakeholders involved in the decision-making process?
Integration of stakeholders' interests in the project planning	1)How can stakeholder interests be effectively integrated into project planning? 2)What type of mechanisms can be put in place to ensure that stakeholders' views are taken into account in terms of alternative solutions (location, type of devices, power)? 3)At what stage should dialogue take place and how should alternatives be addressed?