



Open innovation and the Atlantic Maritime Strategy: how can we move from competition to cooperation?

2. How value chains can focus blue innovation

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Blue Growth Markets



Value-chain markets

Vessel construction, propulsion & fuels
Marine equipment & instrumentation
Marine autonomous systems
Maritime ICT ('Smart Ocean')
Marine & maritime services

Market categories

Transport & logistics
Leisure
Defence & security
Energy resources
Living resources
Mineral resources

Market segments

Ports & logistics		Shipping & shipbuilding	
Leisure craft, marinas		Cruise	
Naval	Surveillance	Coastal protection	Eco-systems
Oil & gas	Offshore Wind	Wave & tidal	Biofuels
Fishing	Aquaculture	Blue biotech	
Aggregates		Seabed mining	

Mature
Growth-phase
Pre-development



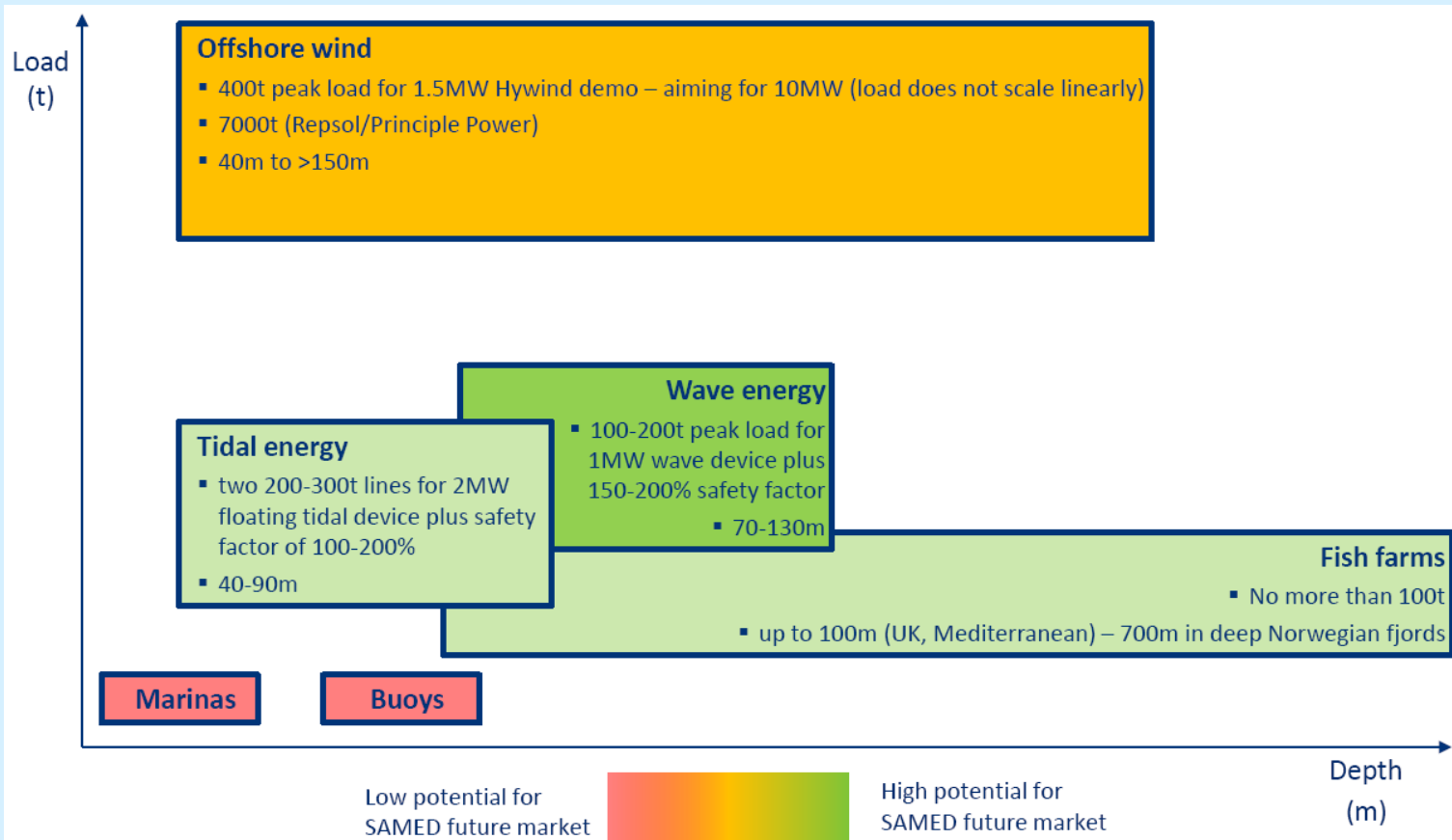
Priority Value Chains from REMCAP project



- Anchoring & mooring systems
 - Major cost centre for marine energy & aquaculture
 - Scope for low-impact, low-cost solutions
- Novel marine fuels
 - All marine ops need low-Sulphur/Nox & low carbon
 - Bio-based fuels eg algae
- Autonomous systems
 - Marine energy & aquaculture applications
 - Potential step-change in O&M cost reduction



Innovative Low-cost Foundations



Value Chain for Anchor Solutions

- Durable, compliant mooring lines
- Lightweight installation rigs
- Grout-free rock anchors
- Geotechnical pile design tools
- Sub-bottom characterisation tools

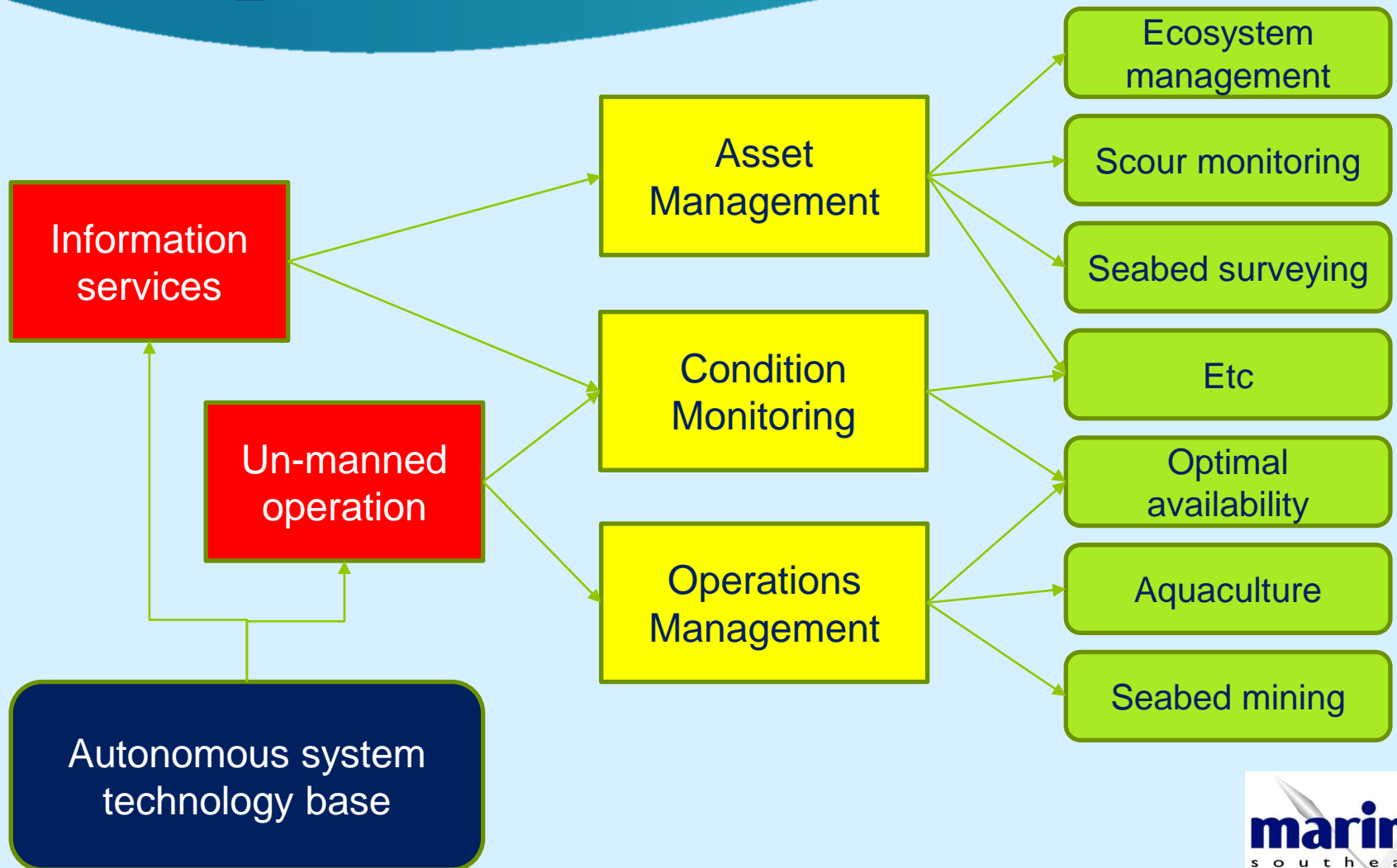
- Increasing use of autonomous vehicles & systems

Low-cost Anchoring

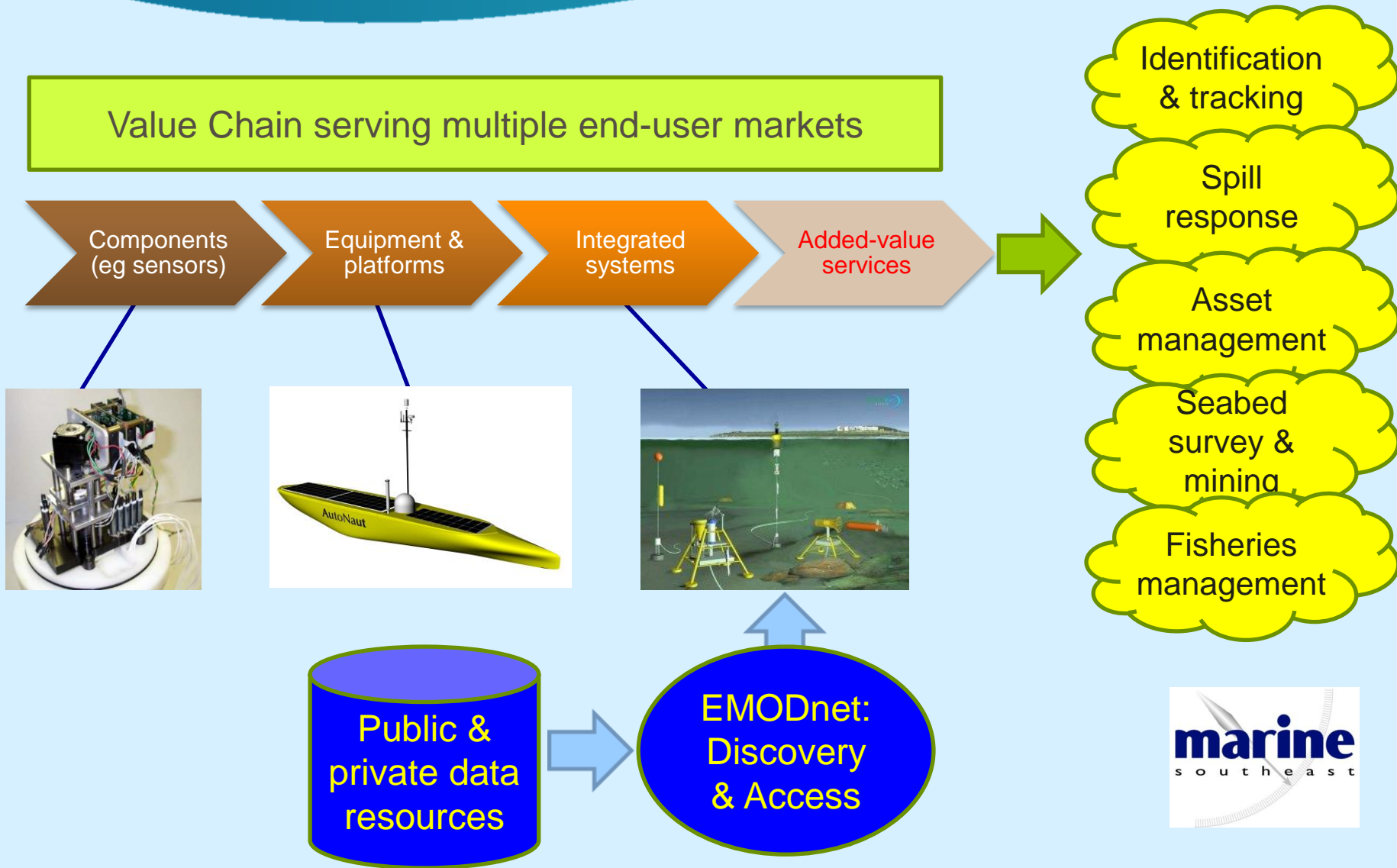
- Foundations are major cost burden for wave and tidal
 - Impact piles are costly & noisy, and depend on specialist vessels
 - Gravity anchors are costly & limited in load capacity
- SAMED screw pile technology
 - Collaboration of MSE and Sustainable Marine Energy Ltd
 - Supported by DECC
- Prototype rig fabricated & trialled
 - Four pilot anchors installed off Yarmouth
- Also major opportunity in mooring of aquaculture facilities



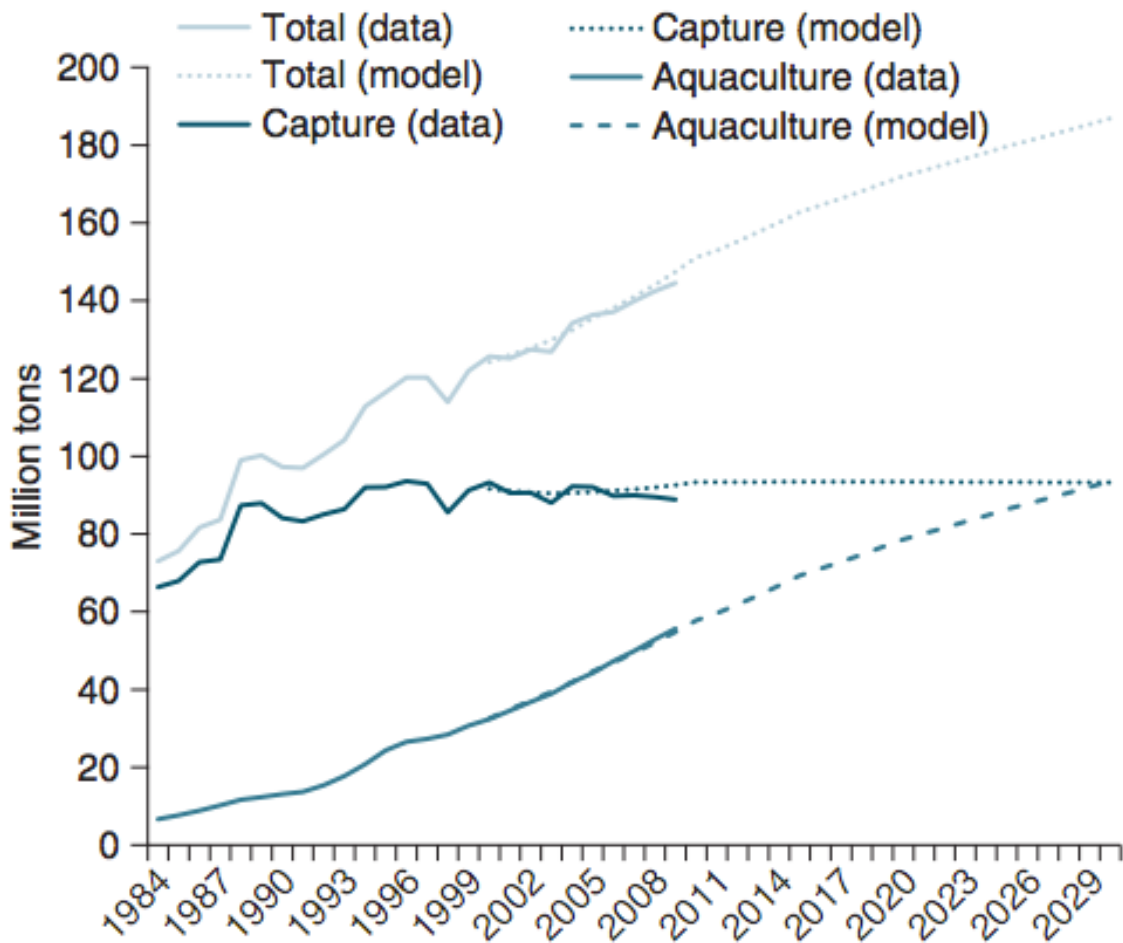
Autonomy in Blue Economy



Autonomous Systems supporting Information Services



Aquaculture: Global Opportunity

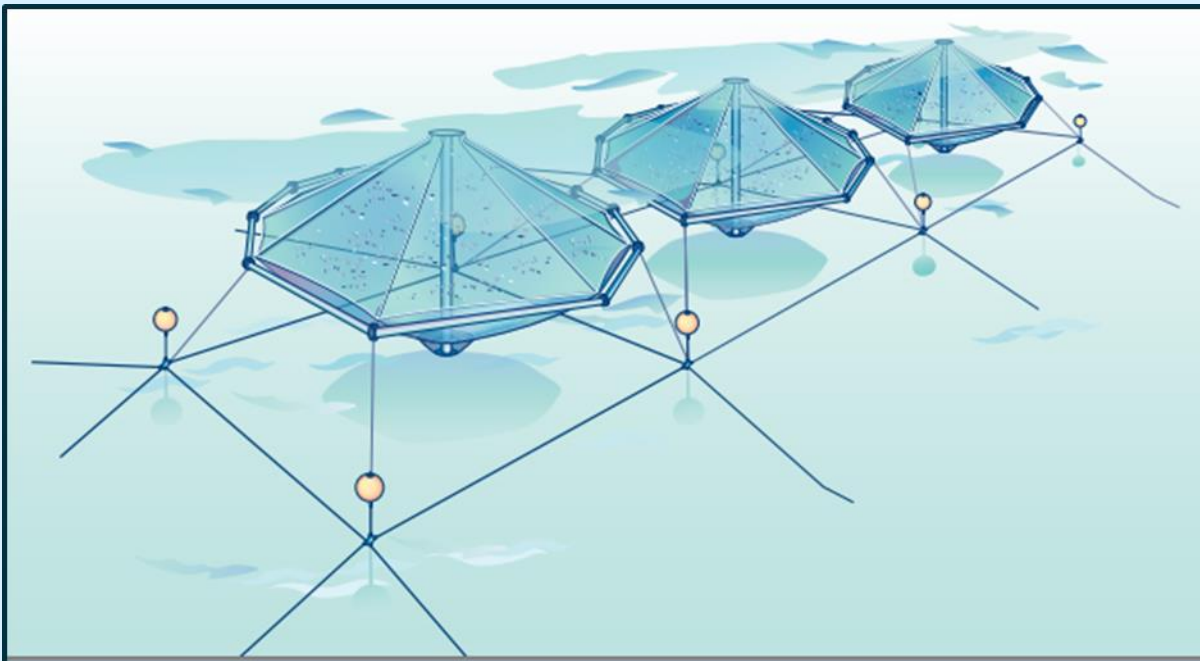


Sources: FishStat and IMPACT model projections.

- Aquaculture production to increase from 50MT to 90MT in 15 years
 - Around 8% growth pa
- Assumes level capture production
 - Only with improved productivity
- What are the business opportunities?

Offshore Aquaculture Opportunities

- Mooring & anchoring systems
- Deployment, maintenance, repair, retrieval
- Monitoring, controls, autonomy, unmanned platforms
- Operations support, feed supply, export to shore etc



Concluding Remarks

- Blue Growth is real but high-level and top-down
- Businesses need to see more bottom-up focus:
 - Customer groups within growth markets
 - Innovation opportunities using their specific core expertise
- Value chains can prioritise innovation topics
 - Serving multiple blue growth markets (eg offshore/marine energy and aquaculture)
- Regional clusters (eg MSE, MM, PMBA, Oceano etc) can build inter-region consortia
 - Complementary expertise and facilities
 - Well-placed for Interreg and other programme funding



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