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The Ocean Renewable Energy Group

# Technical, operational or financial: the risk mix facing ocean energy projects

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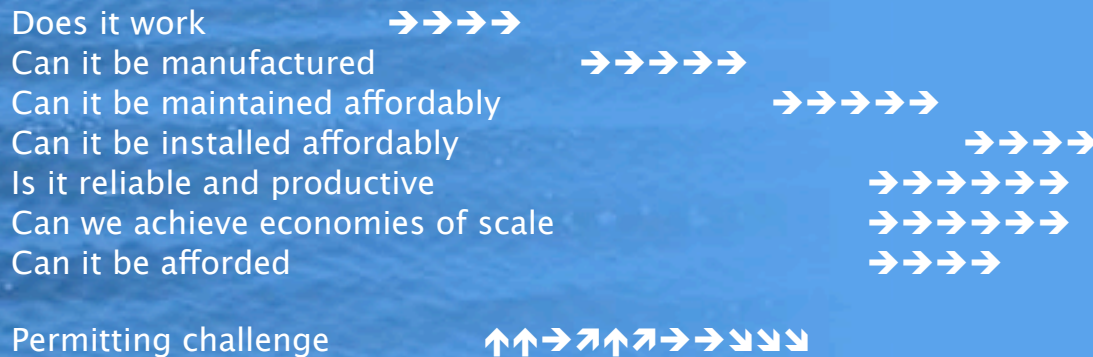
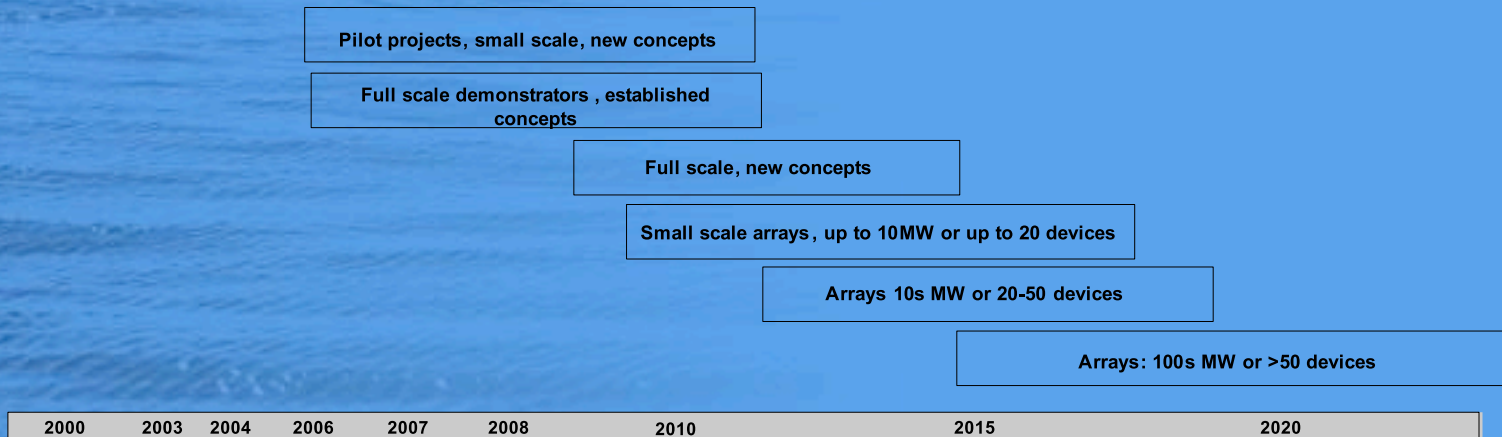
Executive Director

The Ocean Renewable Energy Group

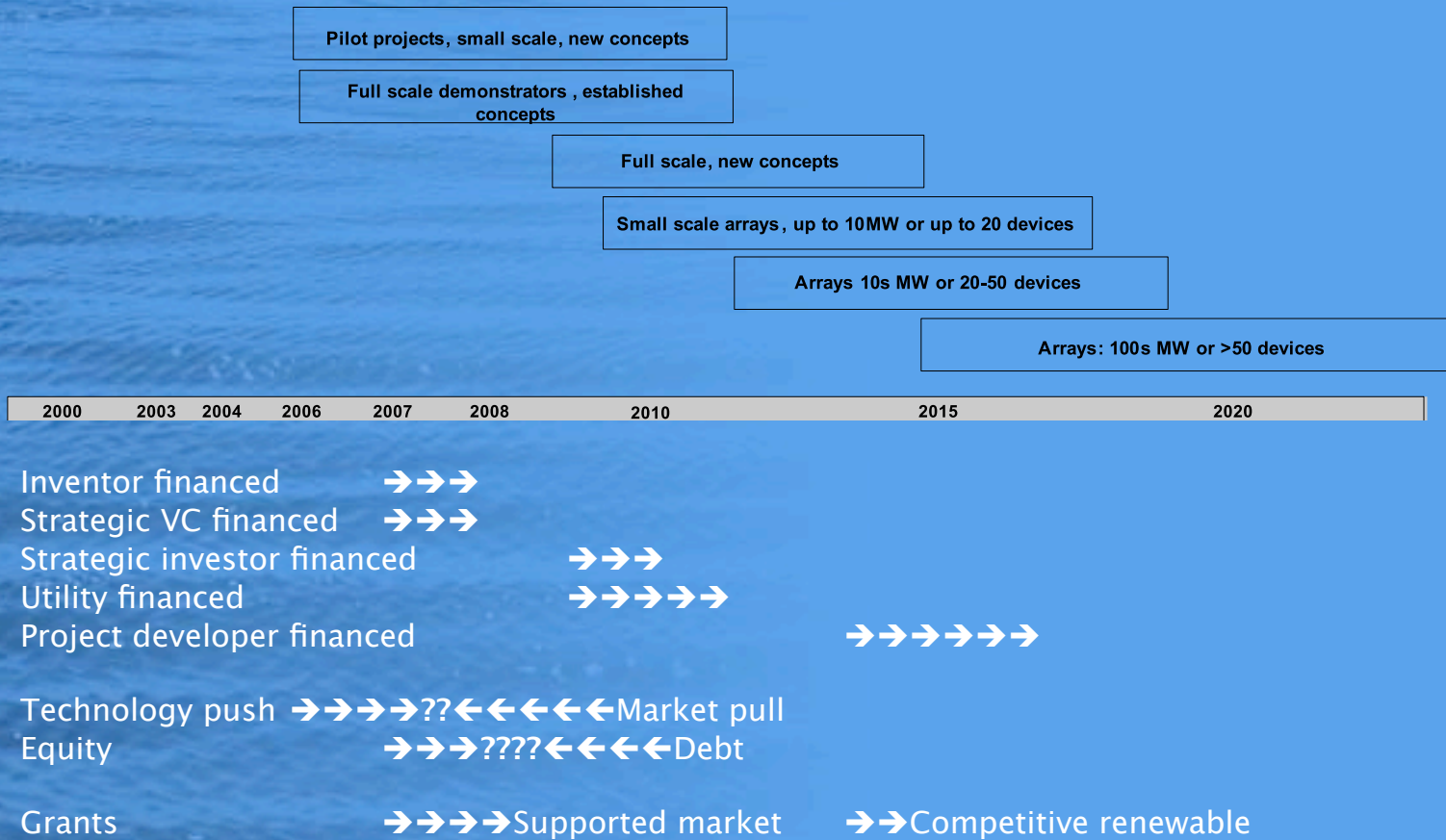
## Moving thinking beyond technology and project

- Looking along the UK Roadmap
- Thinking about the technical, financial and operational landscape
- Focusing on where experience gets integrated to reduce risk
- Discussing the likely critical points in the sector
- Recognising the external risks

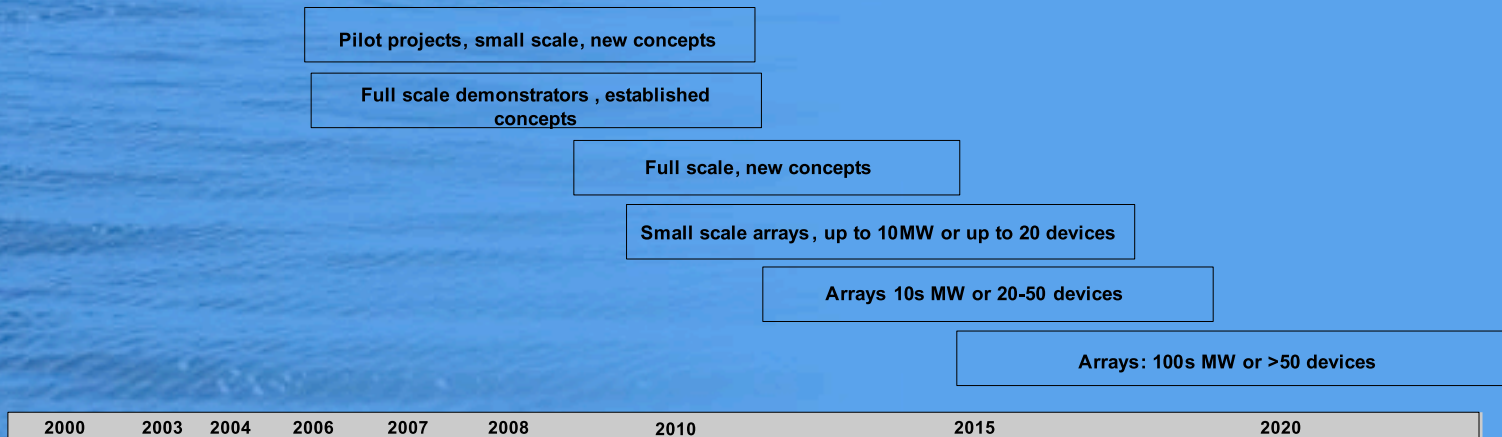
# The Technical Landscape



# The Financial Landscape



# The Operational Landscape



Inventor planned and managed  
 Inventor lead partner team  
 Large industrials involved  
 Utility experience involved  
 Tech Transfer (O&G, power etc)  
 Supply and service sector growth  
 Specialised project developers  
 Outsourced maintenance etc  
 Dispatch controlled



Risk





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# The experience curve

	R&D – 1 ofs	Pilots – 3-20 ofs	Scale up – 50s and more
Difficulty	No small marine projects	<< 3-20x Increased operational and financial challenges	Experience and expertise <i>Simplifies</i>
Cost	5-10x commercial	3-5x commercial	Establishing commercial
Permitting	All the challenges of being first	May not be any more difficult	More appropriate to scale
Financing	Love money	Buying experience	Exploiting early market price
Strategic partners	Hesitant	Buying experience	In sales mode

# The needed

- Large industrials – materials, components, manufacturability, reliability, credibility, insurability, financability
- Other industries – oil and gas experience is too costly – but can we afford not to use it?
- Utilities – interconnection/integration expertise, project development and finance, market for electricity, influence to secure supported market
- Finance and insurance – transformation

# Critical points

- Between technology developer and system refiner/  
manufacturer
- Between technologies that need to consolidate, not  
appear to compete
- Between large industrials playing to be in the game and  
having them create winners
- Between utilities being project sponsors and being  
project developers and customers
- Attracting specialist support while the sector market is  
still too small to offer serious business
- Attracting project developers preoccupied by  
established renewables

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When the room is full of lawyers, financiers and insurers,  
we know we have made it!



# External risks

- The pathway needs political support
  - Ignored – another solution like hydrogen!
  - Lost opportunity – all renewables are created equal!
  - Let someone else prove it!
- The big fix is tempting
  - Nuclear
  - Clean coal
- Split-personality green society
  - NIMBY
  - NAME
  - NIMLT

# Our 5 year

- Demonstrate that ocean energy is a power solution (CC, energy and coastal economy)
- Build the manufacturing, supply and service chain
- Build a market and financial development pathway
- Support the pathway for the disruptive and refining technologies that are still coming