Powering the Blue Economy

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Andrea Copping
Pacific Northwest National Laboratory

A US Department of Energy national laboratory

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The Blue Economy – what is it?

- The World Bank:

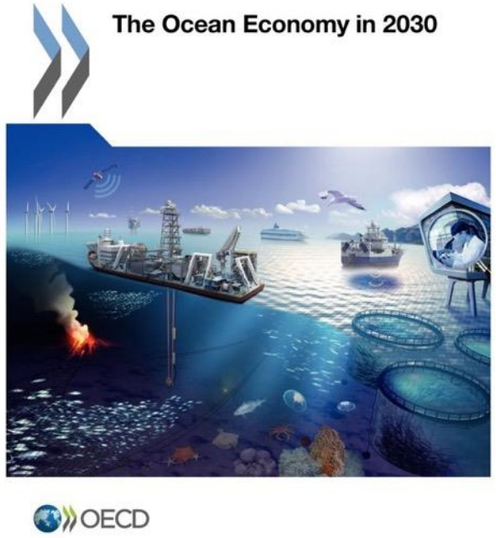
"the sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystems."

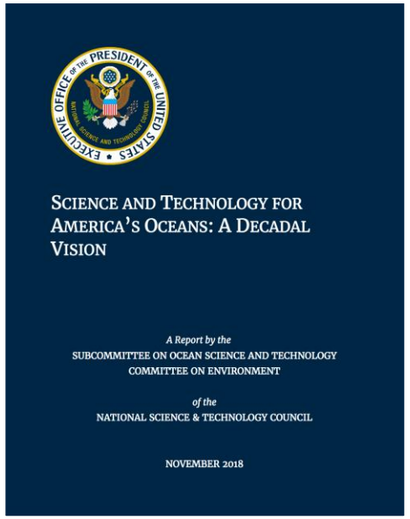
- OECD[1]: the "Blue Economy" will double from $1.5 trillion to $3 trillion in global economic value by 2030.

- *The Economist Intelligence Unit (2015):*

"The ocean will become an economic force this century " –

- The Blue Economy is a US federal administration priority, reflected in National Ocean Policy and the Decadal Vision for Ocean Science.





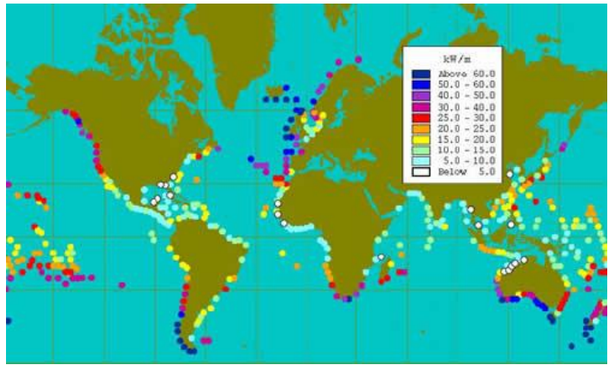
[1] Organization for Economic Cooperation and Development

Role of US DOE's Waterpower Office in Blue Economy

- Traditionally WPTO has funded marine renewable energy (MRE):
  - Early stage R&D for tidal and wave energy conversion technologies
  - Testing and validation efforts for MRE technologies and components
  - Resource characterization
  - Aggregation, analysis, and dissemination of information on MRE

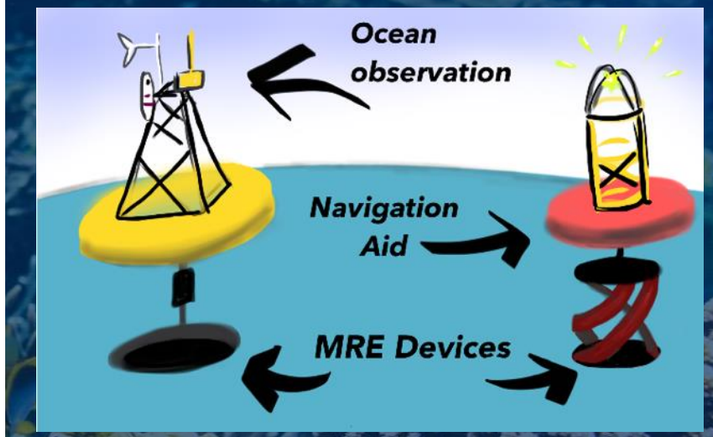
All for grid power applications

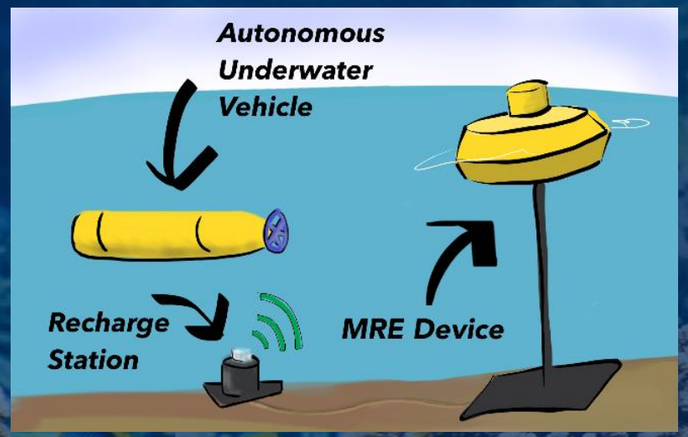
- MRE is not close to being cost-competitive with other renewables for grid scale electricity
- Potential for higher-value, lower amounts of power are closer to reality.

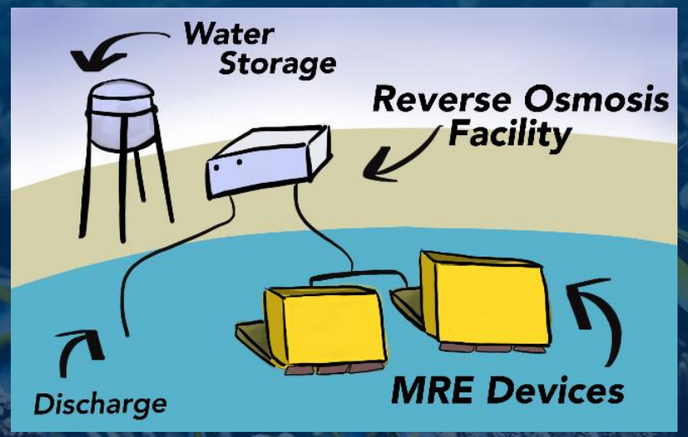


US DOE's WPTO Goals for Blue Economy

1. Addressing energy limitations and contributing to national goals for growth in the Blue Economy
2. Accelerating marine energy grid-readiness through near-term opportunities, supporting the WPTO MRE strategy and mission.







Powering the Blue Economy (PBE)

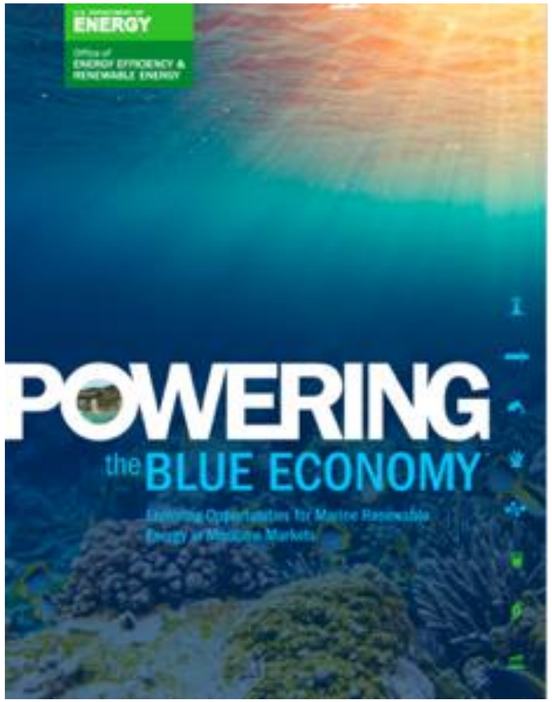
Key Attributes:

- **Potential market opportunities where MRE has unique value to meet blue economy energy needs**
- **Beneficial technology attributes of MRE to blue economy end uses:**
  - Ability to provide both electrical and mechanical power
  - Minimal surface expression improving storm survivability
  - Opportunities for co-design and integration with other infrastructure
  - Ability to leverage existing maritime supply chains
- **Supporting opportunities uniquely suited to MRE- a new strategic focus for the MRE program in US**

Developing PBE Report

- Extensive process
  - 3 day forum with end users (Dec 2017)
  - Literature review
  - Talking with many experts
  - Lots of soft sources
  - Workshops several national and international conferences

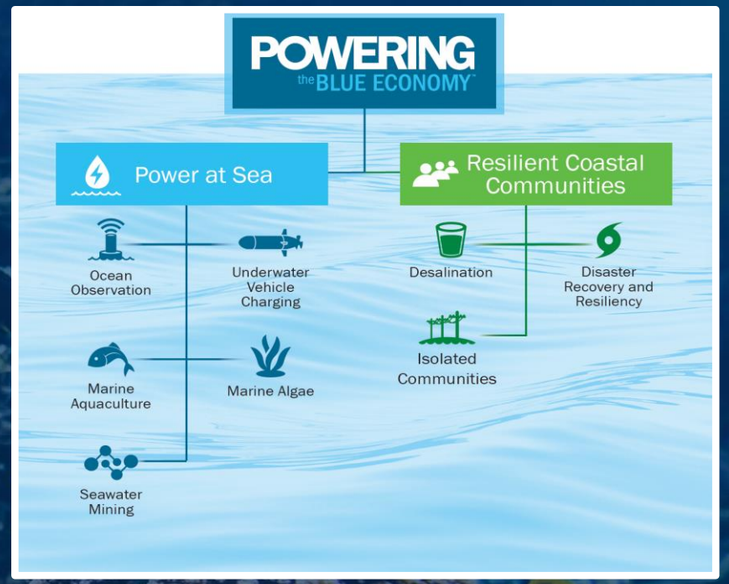
- Formal Request for Information for comments (April 2018)
- Resolved ~ 500 distinct comments
- Final report released in April 2019
- Efforts to get word out and discuss report, esp. with end users

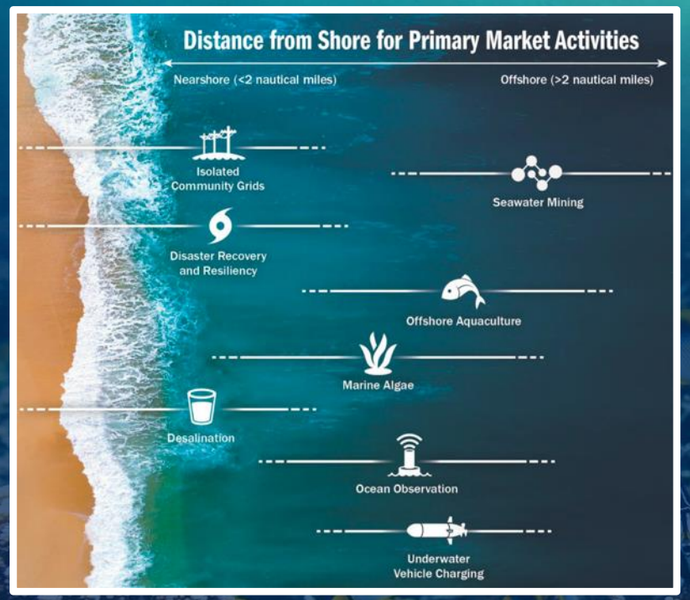


https://www.energy.gov/eere/water/downloads/powering-blue-economy-report

Powering the Blue Economy

- Eight end uses (or ”markets”)
- Divided between Power at Sea and Resilient Coastal Communities





PBE – Power at Sea & Coastal Communities

Power at Sea

- Where there are few/no other sources of power
- Ocean observations & underwater recharge of AUVs
  - Scientific
  - Military/homeland security
  - Commercial
- Offshore aquaculture
- Growth of marine algae for biomass
- Mining seawater

Resilient Coastal Communities

- Remote communities, replacing diesel for electricity
- Desalination of seawater
- Coastal resiliency and disaster recovery

Prizes and Challenges

- US DOE and various partners are using prizes to:
- Attract researchers and entrepreneurs, not the usual suspects
- Short timeframes, specific goals and stage-gates
- Prizes at several stages
- Use American Made Challenge platform - https://americanmadechallenges.org
- First ones:
  - Waves to Water
  - Powering the Blue Economy – Ocean Observation

Waves to Water Prize

Stage I: CONCEPT - closed

90 DAYS: June 13, 2019 to September 11, 2019

Stage II: DESIGN - now open

120 DAYS: November 14, 2019 to March 13, 2020

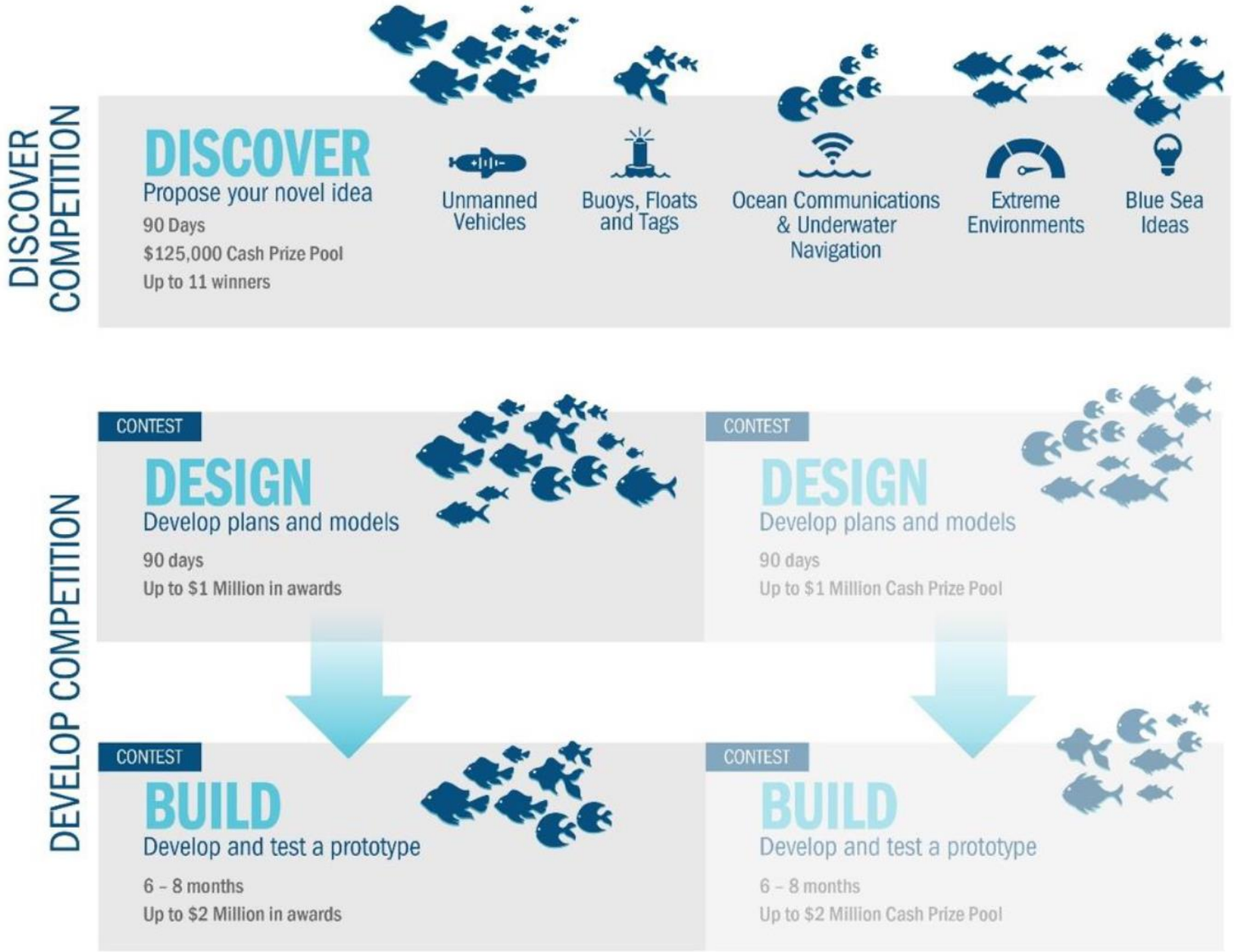
Stage III: CREATE

150 DAYS: May 2020 to September 2020 (anticipated)

Stage IV: DRINK

180 DAYS: October 2020 to April 2021 (anticipated)

PBE: Ocean Observation Prize



Open now!

PBE Team at National Labs

PNNL

- Andrea Copping
- Rob Cavagnaro
- Nolann Williams
- Dori Overhus
- Debbie Rose

NREL

- Rebecca Green
- Scott Jenne
- David Greene
- Al LiVecchi
- Rob Raye

Thank you!

Andrea Copping

Andrea.copping@pnnl.gov

1.206.528.3049