Policy for the offshore wind challenge

The case of the Danish energy islands

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Policy for transformation

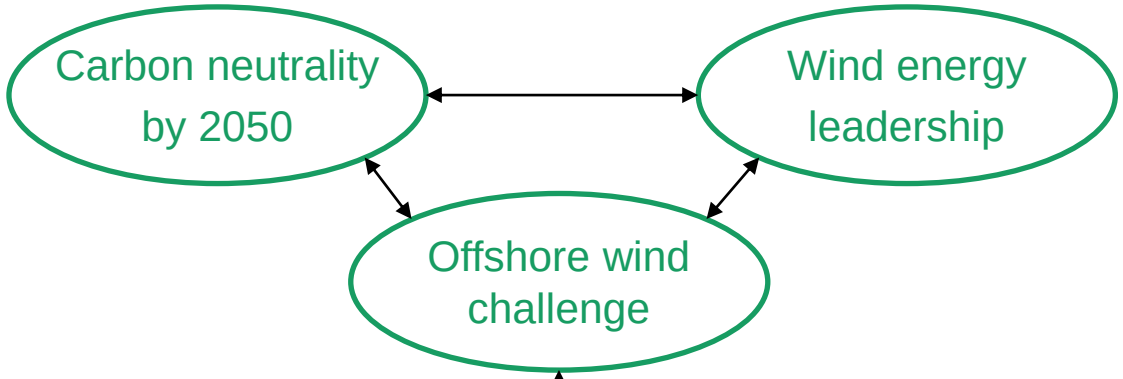
Mission-oriented approach

1. Establish mission
2. Foster bottom-up solutions

Criteria for success

1. Mission development
   - Bold/inspirational, widely relevant
   - Ambitious but realistic; targeted, measurable, time-bound
   - Cuts across sectors/disciplines/actors
   - Long view
2. Market creation / tilting
3. Policy assessment
4. Public sector capabilities

GRAND CHALLENGES / OVERARCHING GOALS



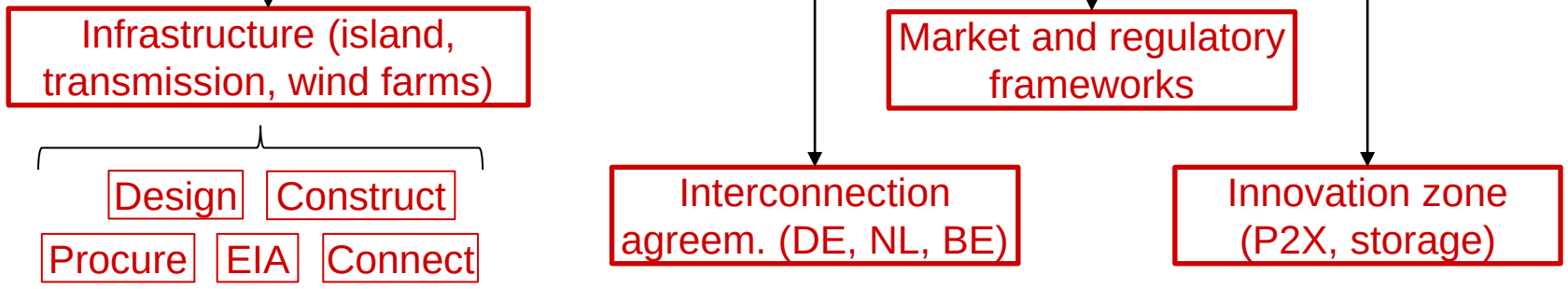
MISSION

Establish world's 1st energy islands
(5 GW by 2033; 12 GW thereafter)

Criteria for success:

- **Mission development**
- **Market creation / tilting**
- Policy assessment
- **Public sector capabilities**

PROJECTS



Is the project economically feasible?

Cost comparison (values in 2020 EUR)		
	Total cost *(annual cost)*	**Cost/GDP**
Energy Islands (5 GW) (2024-2033)	€13.9 bn *(€1.4 bn/yr)*	0.38%[1]
Energy Islands (12 GW) (2034-2043)	€34.4 bn *(€1.7 bn/yr)*	0.42%[1]
Great Belt Bridge (1988-1998)	€5.2 bn *(€0.5 bn/yr)*	0.23%
Apollo Mission (moon landing) (1961-1973)	€224.5 bn *(€17.3 bn/yr)*	0.38%

[1]Assumes 2% GDP growth per year

Cost distribution		
	2024-2033 (5 GW)	**Full Project (12 GW)**
Danish State	5%-17%	4%-15%
Energinet (TSO)	34%	37%
Private co-owner	5%	4%
Private developers	44%-56%	44%-55%

Assumptions:

- Danish State bill:
  - 50.1% of island
  - 0-20% of wind farm costs

Potential barriers

Profit condition

- Energy islands: Must be economically profitable.
- Apollo project: Costs “staggering sum”; is “an act of faith and vision, for we do not know what benefits await” (JFK 1962).

Cost-benefit analysis – ill-suited for transformation

- Static
- Unknown benefits

Selected technologies enabled by Apollo	
Sector	**Spin-off technologies**
Consumer	-Freeze-dried food -Shock-absorbing foam (shoes) -Cordless electronics (e.g., drills)
Industry	-Solar panels -Liquid methane fuel -Earthquake simulators
Medicine	-Medical imaging (CAT/MRI scanners) -Implantable auto. heart defibrillators -Computer-programmable pacemakers

Mazzucato (2021) *Mission Economy*

Conclusion

Main takeaways:

- Mission-oriented approach well-suited for offshore wind challenge
- Energy islands
  - Utilizing mission-oriented approach
  - Economically feasible
  - Key barriers: profit condition + cost-benefit analysis

Next Steps:

- Further literature review
- Interviews

Further reading

Mission-oriented approach

- Mazzucato, Mariana. 2021. Mission Economy: A Moonshot Guide to Changing Capitalism. London: Allen Lane, an imprint of Penguin Books.
- Mazzucato, Mariana, Rainer Kattel, and Josh Ryan-Collins. 2020. “Challenge-Driven Innovation Policy: Towards a New Policy Toolkit.” Journal of Industry, Competition and Trade 20 (2): 421–37. https://doi.org/10.1007/s10842-019-00329-w.
- Ruttan, Vernon W. 2006. Is War Necessary for Economic Growth? Military Procurement and Technology Development. Oxford ; New York: Oxford University Press.

Energy islands:

- Links to political agreements: https://ens.dk/en/our-responsibilities/wind-power/energy-islands/denmarks-energy-islands
- Links to market dialogs, discussion papers, and other relevant documents on the North Sea island: https://ens.dk/en/our-responsibilities/wind-power/energy-islands/energy-island-north-sea