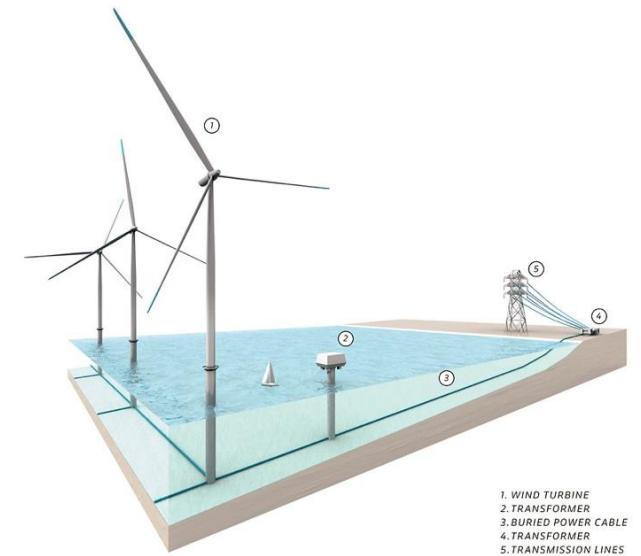


See me, hear me, touch me, feel me: Can offshore wind power find a place at Delaware's table?

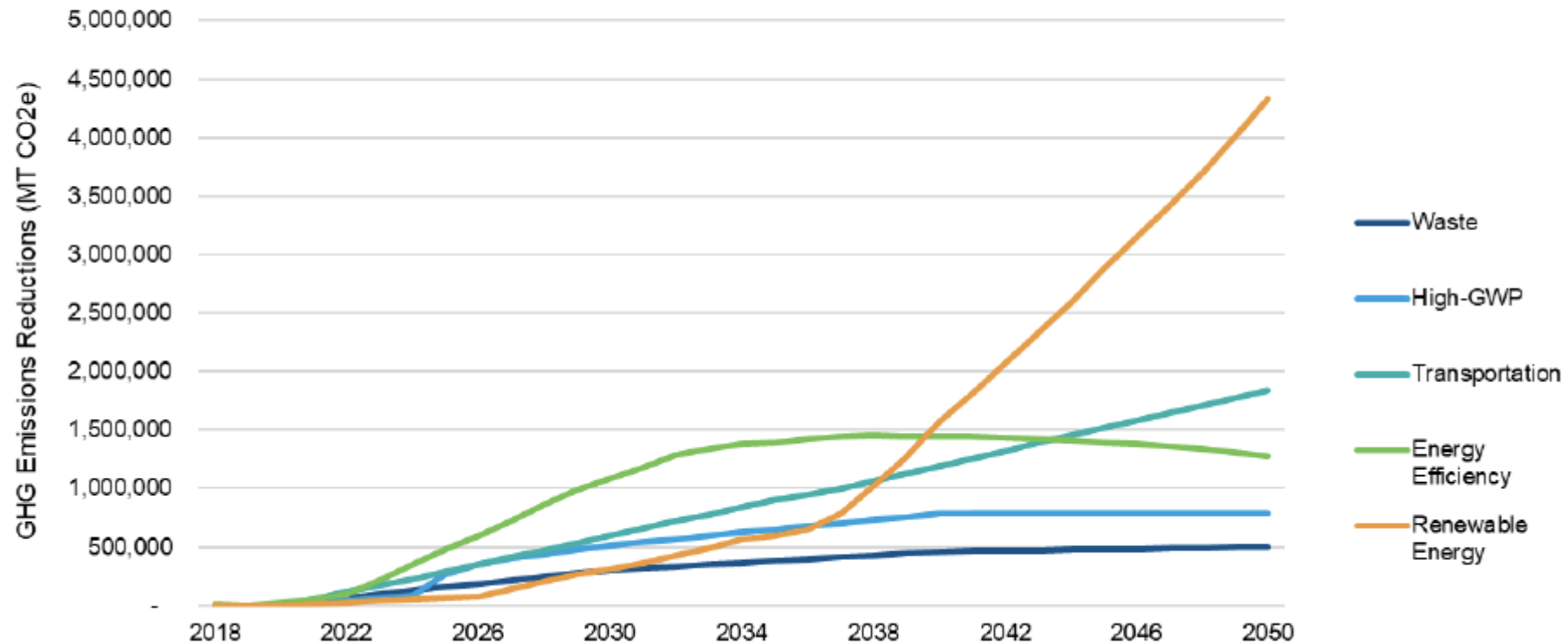
Jeremy Firestone

RASCL Summit
17 January 2024



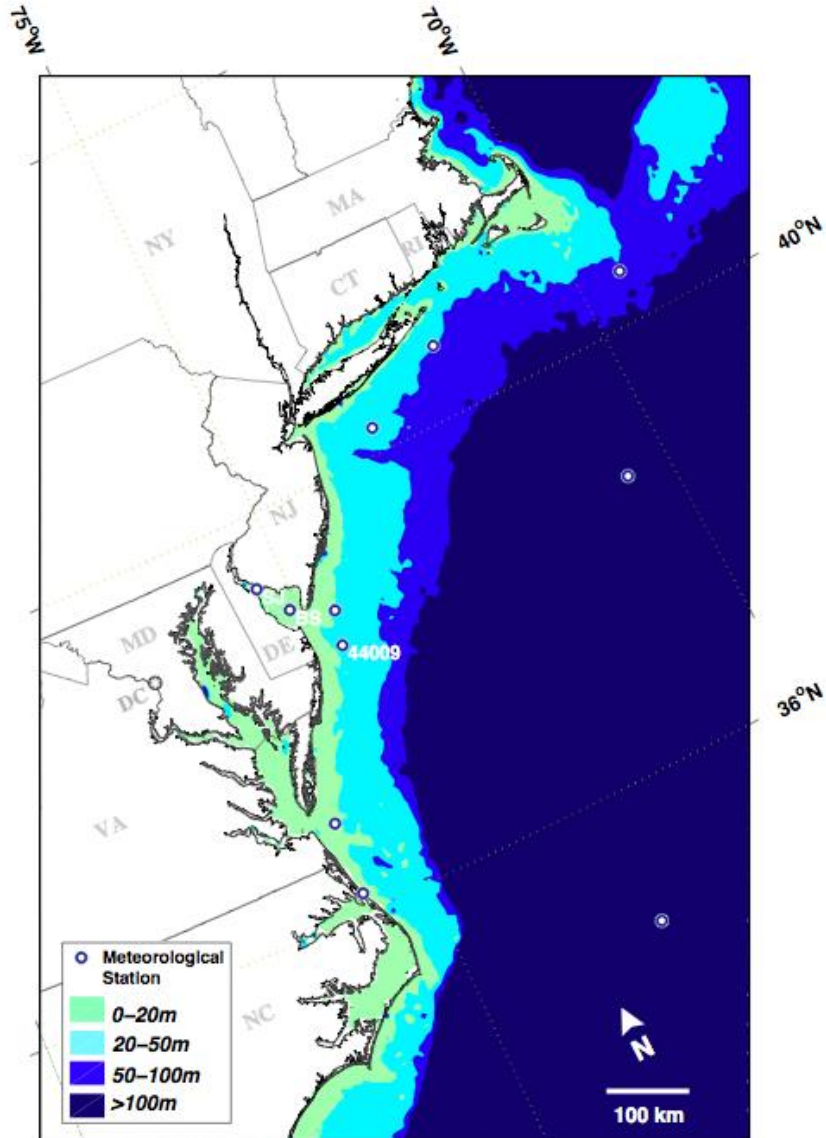
Delaware towards Net Zero?

Figure 12. Gross GHG Emissions Reductions by Mitigation Category



Source: Delaware Climate Action Plan Supporting Technical GHG Mitigation Analysis Report

Very large resource



Along the Mid-Atlantic Bight
(from Massachusetts to North Carolina)

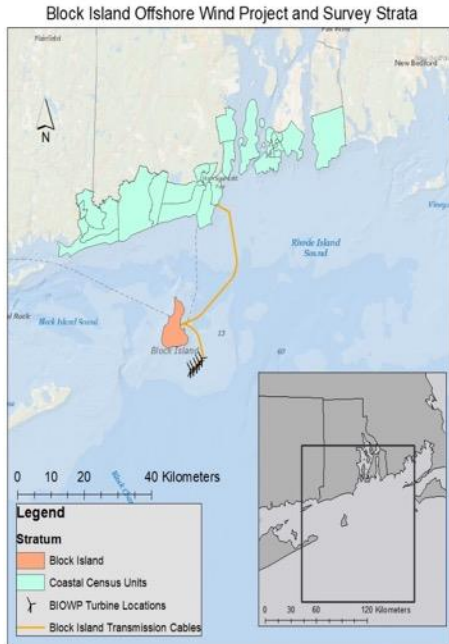
0-20m depth: 58 GW

0-100m depth: 340 GW

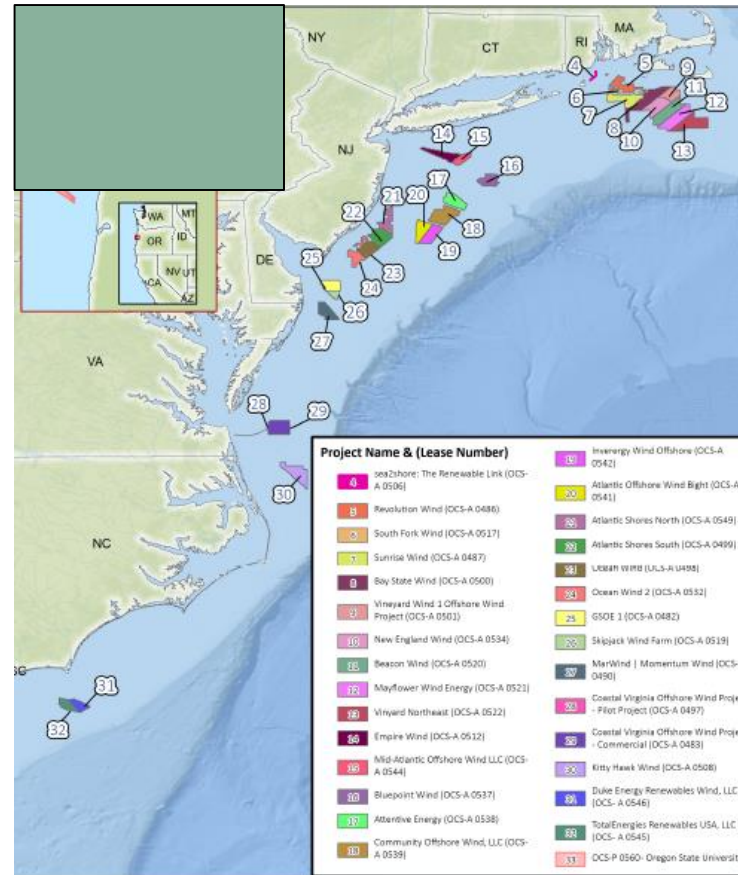
Kempton, Garvine, Dhanju et. al. 2007

US Development Context

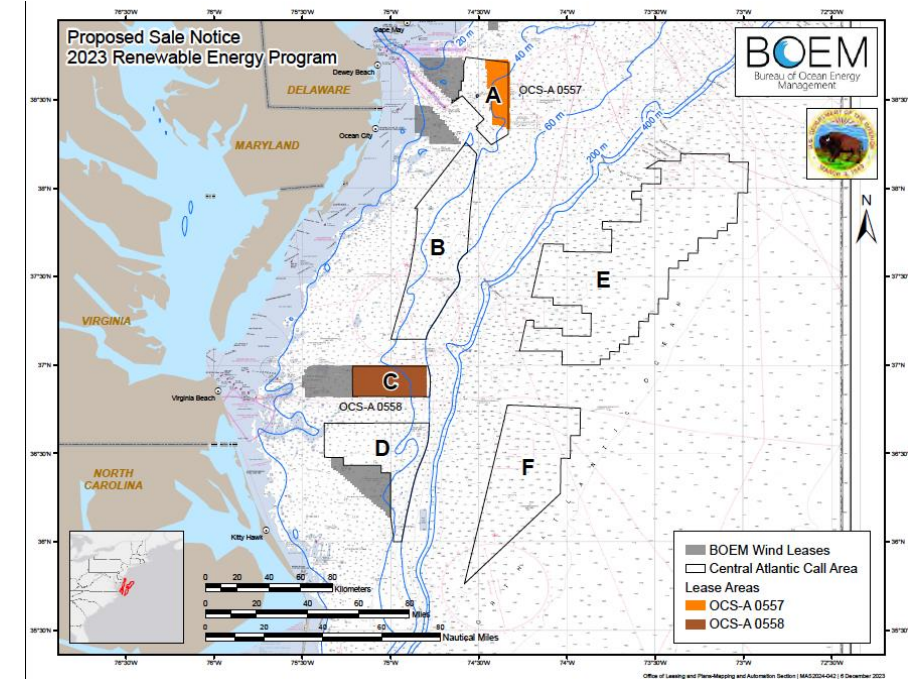
42* MW installed; >60,000 MW planned



Russell, et al, 2020



BOEM, 2023



- States firmly in the game
 - MA, RI, CT, NY, NJ, MD, VA, CA



First (13 MW) Turbine Installed at Vineyard Wind, October 2023



First (11 MW) Turbine Installed at South Fork Wind, November 2023

- **But**, many projects **delayed** or **cancelled** in 2023 given fixed price contracts and increases in costs due to:
 - Inflation
 - General supply chain woes
 - Lack installation vessels

- **On the other hand**, Dominion Power’s 2.6GW project off Virginia is coming in under expected cost at **\$77MWh**

Table 3: Summary of OSW projects on the eastern seaboard

Status	Number of Projects	Lease Areas	Contracting States	Capacity in MW	Announced Commercial Operations Date
Operational	2	RI, VA	RI, VA	42	Operational
Under Construction/Final Investment Decision	3	MA, MA/RI, RI		1,636	2024-2026
Under Permitting	9	ME, NY NJ, MD, VA	ME, NY NJ, MD, VA	8,754	2024-2028
Possible Rebid/Work Stopped	4	MA, DE	NY, MD	3,396	2026-2029
Withdrawn	9	MA, RI, NJ	CT, MA, NY	7,968	2025-2029
Planning/Site Control	11	ME, MA, RI/MA, NY/NJ, NJ, DE	NY	14,451	TBD
Total All Projects				36,247	

DNREC Proposed OSW Procurement Strategy

December 2023

(assume 800 MW project)

Table 4: Total costs and benefits (2022\$/MWh)

Scenarios	Total Present Value Costs	Total Present Value Benefits	Net Present Value Impacts (Total Benefits – Total Costs)
Mid-price gas, conservative wind learning rate	\$68	\$53	-\$15
Mid-price gas, moderate wind learning rate	\$64	\$53	-\$11
High-price gas, conservative wind learning rate	\$68	\$71	\$3
High-price gas, moderate wind learning rate	\$64	\$71	\$7

The net benefits are conservative because they do not use the most recent, final social cost of carbon values adopted by US EPA (2023) which (using a 2% discount rate and 2020 dollars as DNREC has) are almost \$100/metric ton of CO₂ higher (\$230 in 2030) than used by DNREC. EPA 2023

Barriers to wind power are more social and cultural than technological

How to minimize those social, economic and environmental costs and maximize benefits during any Delaware transition to incorporate wind power/energy?



Social acceptance
of wind

Step back and think about Offshore Wind in an Energy Justice Framework

Process

Procedural justice

**How stakeholders are
included in decision
making processes**

Outcome

Distributive justice

**Whether the benefits
and burdens of energy
projects are
distributed fairly**

Process Fairness/Procedural Justice

- **Community concerns** often driven by
 - **Lack of trust** of government and/or developers
 - Feeling the community has no influence and perceptions of **box checking**
 - Feeling the process lacks **transparency**
- **Perceived barriers to inclusion**
 - **Understanding** the process
 - **Money** as a driver of decision-making
 - **Mis/dis-information**
- **Potential strategies to address**
 - Early and continued outreach
 - Build trust
 - Avoid surprises
 - Improve the environmental review process

Distributive Justice

- **Costs**

- Aesthetics
- Disturbance of livelihoods
- Community disruption
- Economic impacts (e.g., tourism)
- Ecosystem impacts

- **Benefits**

- Community Benefit Agreements
- Investments in community building
- Host agreements
- Community Ownership

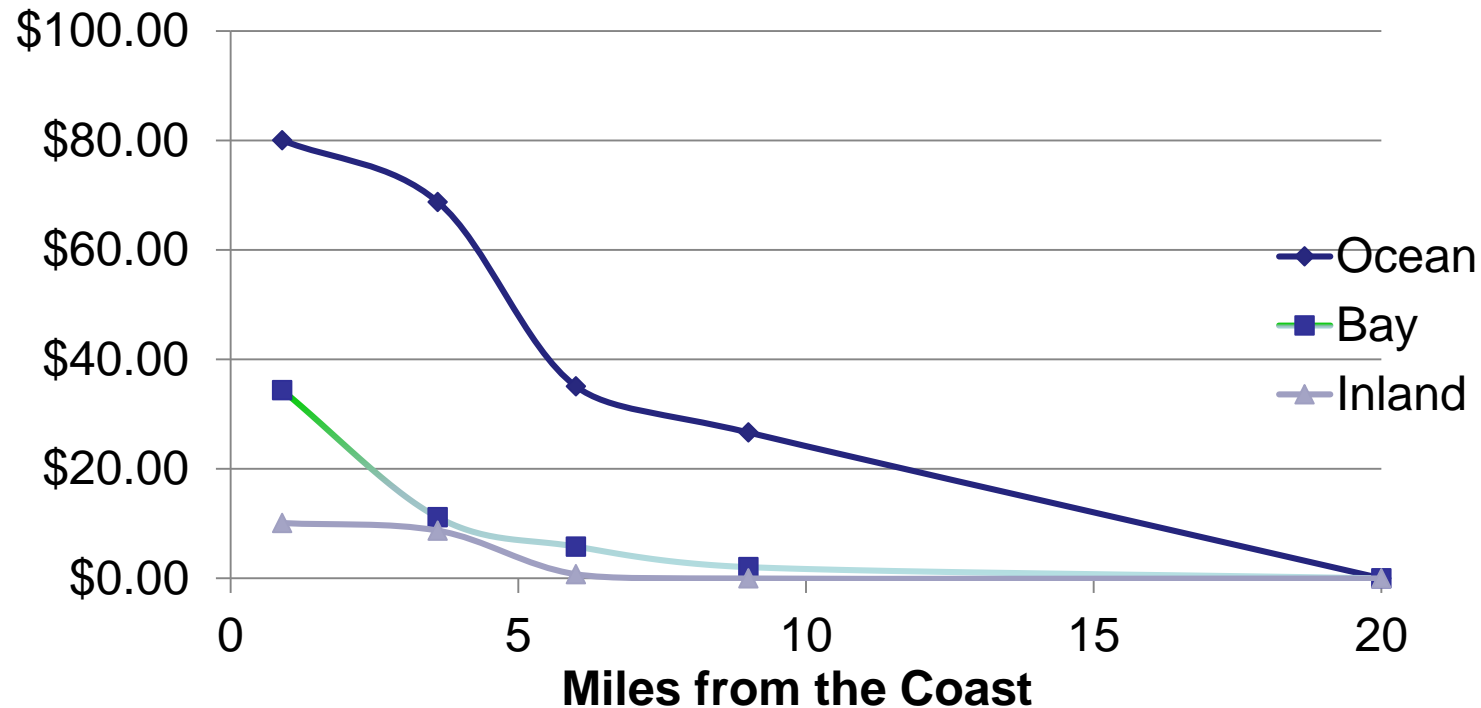


DE - US Wind Term Sheet “Agreement”

- Offshore Transmission Facilities and Export Cables
 - Lease of 3Rs Beach in DE Seashore State Park for a cable
 - Payment of \$350K/year, increasing at 3% per year
- “Community benefits”
 - 150,000 renewable energy credits (RECs) per year
 - \$40M for various items such as
 - Dredging
 - Workforce development
 - Environmental education scholarships
 - DE State Parks Climate Resiliency fund

OSW Projects are a visual dis-amentiy

BUT marginal benefits level off quickly with distance



Annual external cost in perpetuity per DE household
(by distance turbines from coast and HH location)

Opposition ≠ NIMBY

- Not in my backyard (NIMBY) tends to be used more as a **pejorative**
- a **description of opposition; not an explanation**
- May be better seen as “**place protective action**”
 - Devine-Wright, 2009
 - Oceans as a special place,
 - Kempton, Firestone, et al 2005
 - Coastal/Ocean environment as a place of **beauty, family bonding, pristineness, recreation**
 - Russell, Firestone et al., 2019



5-turbine Deerfield Wind project on US Forest Service Lands in Vermont.

Cape Wind, Nantucket Sound, Massachusetts



Socially-constructed aspects of wind projects

May be more important than the physical effects

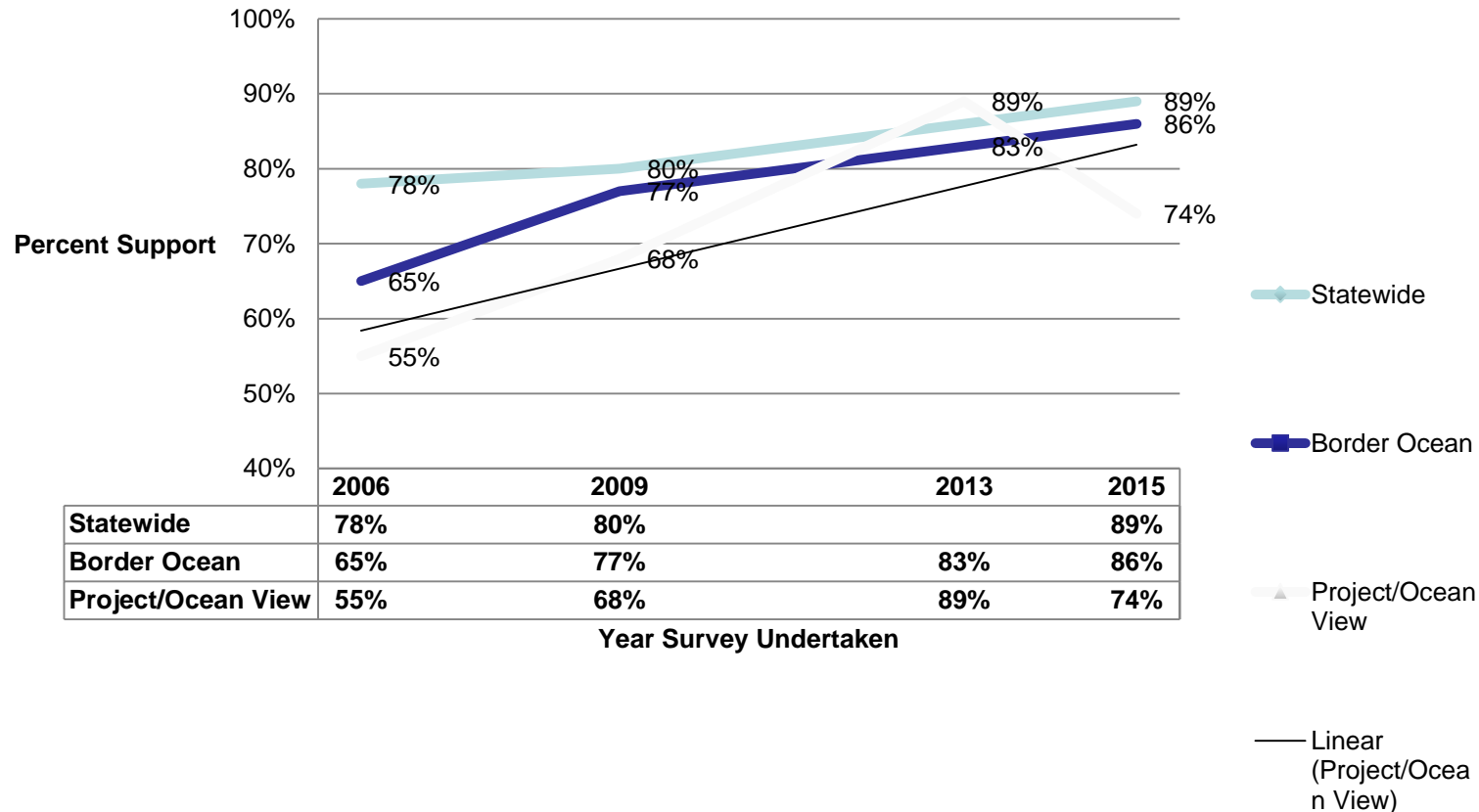
- Such as representation of a **clean energy future**

Block Island Residents OSW Turbine Description

Description	Support	Oppose
Impressive	77.3%	42.5%
Too Big	3.0%	79.8%
Attractive	30.8%	0.0%
Unattractive	2.4%	79.8%
Beautiful	28.9%	0.0%
Industrial	11.4%	83.8%
Amazing	40.4%	0.0%
Ordinary	0.0%	2.5%
Add to the island/coastal character	33.9%	0.0%
Detract from the island/coastal character	7.0%	87.7%
Symbolic of clean energy progress	97.1%	13.8%
Cause intangible loss where all you see is the ocean	21.6%	68.1%

Delawareans support for OSW has grown over time

Percent Support of Offshore Wind Power by Delaware Residents by Area



Opposition/Support of the Block Island project before and one-year after (Panel Study)



	Block Island		Coastal Rhode Island	
	Pre-installation	One-year operation	Pre-installation	One-year operation
Oppose	15%	10%	9%	5%
Lean Oppose	1%	3%	1%	3%
Neutral	1%	2%	1%	2%
Lean Support	13%	4%	30%	21%
Support	70%	81%	58%	68%

Delawareans more willing to support a local OSW project if it is understood to be part of the Energy Transition

(survey from 2009)

Are individuals who “have not yet made up their mind” about a local project more or less likely to support that project if it was the *first* of many (300) projects?

Survey Area	More	Less
Ocean Border Communities	71%	10%
Statewide	57%	9%

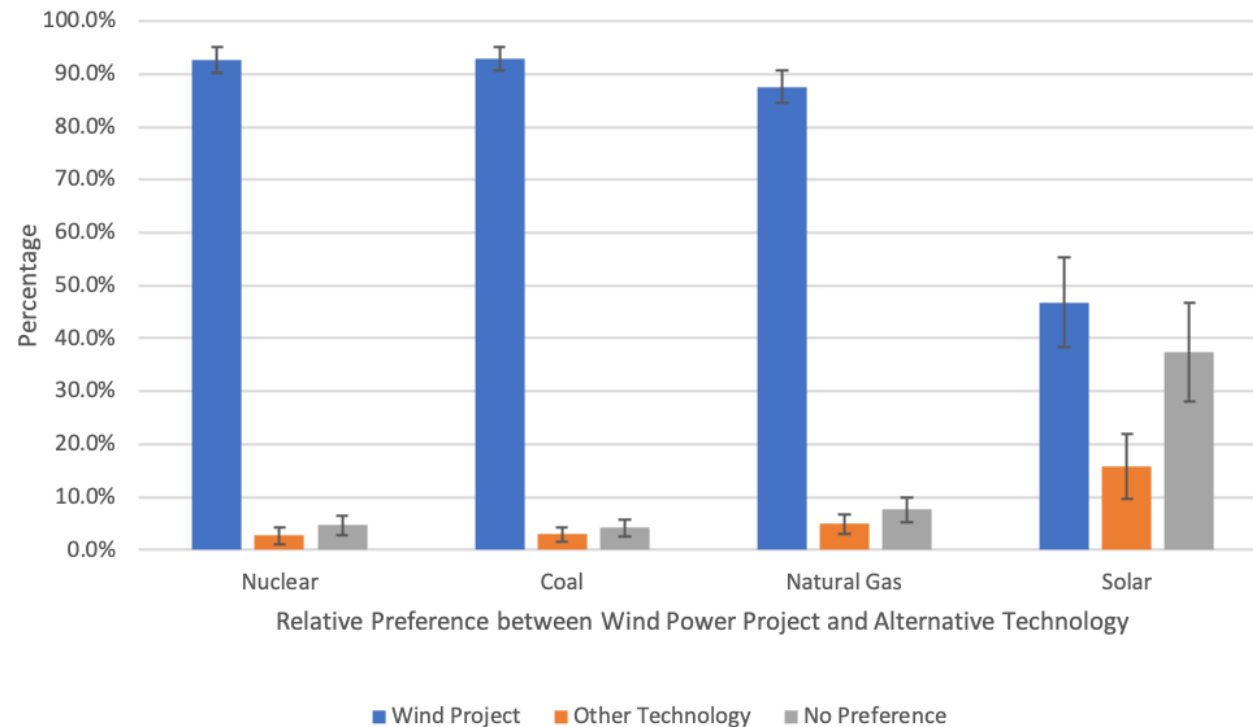
Recognize that Attitudes are typically measured quite narrowly

- The choice presented is **offshore wind power** or **nothing**
 - Yet, the societal choice is how to meet demand and includes coal, natural gas, nuclear, solar, hydro, geothermal, oil and energy efficiency (Firestone and Kirk, 2019)
- The choice is **presented as a one-off**, when in an energy transition, it is part of something larger

Societal Choice rather than wind or nothing

Would you rather live near your Wind Project or a [“fuel”] Plant?

A respondent could then select among four options:
wind project, [“fuel”] plant, no preference, or don’t know.



(Firestone and Kirk, 2019)

Think Global; Act Local

Jeremy Firestone

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UD Wind Turbine, Lewes, DE