

Social Values, Beliefs, Perceptions and Knowledge Relative to Offshore Wind Energy

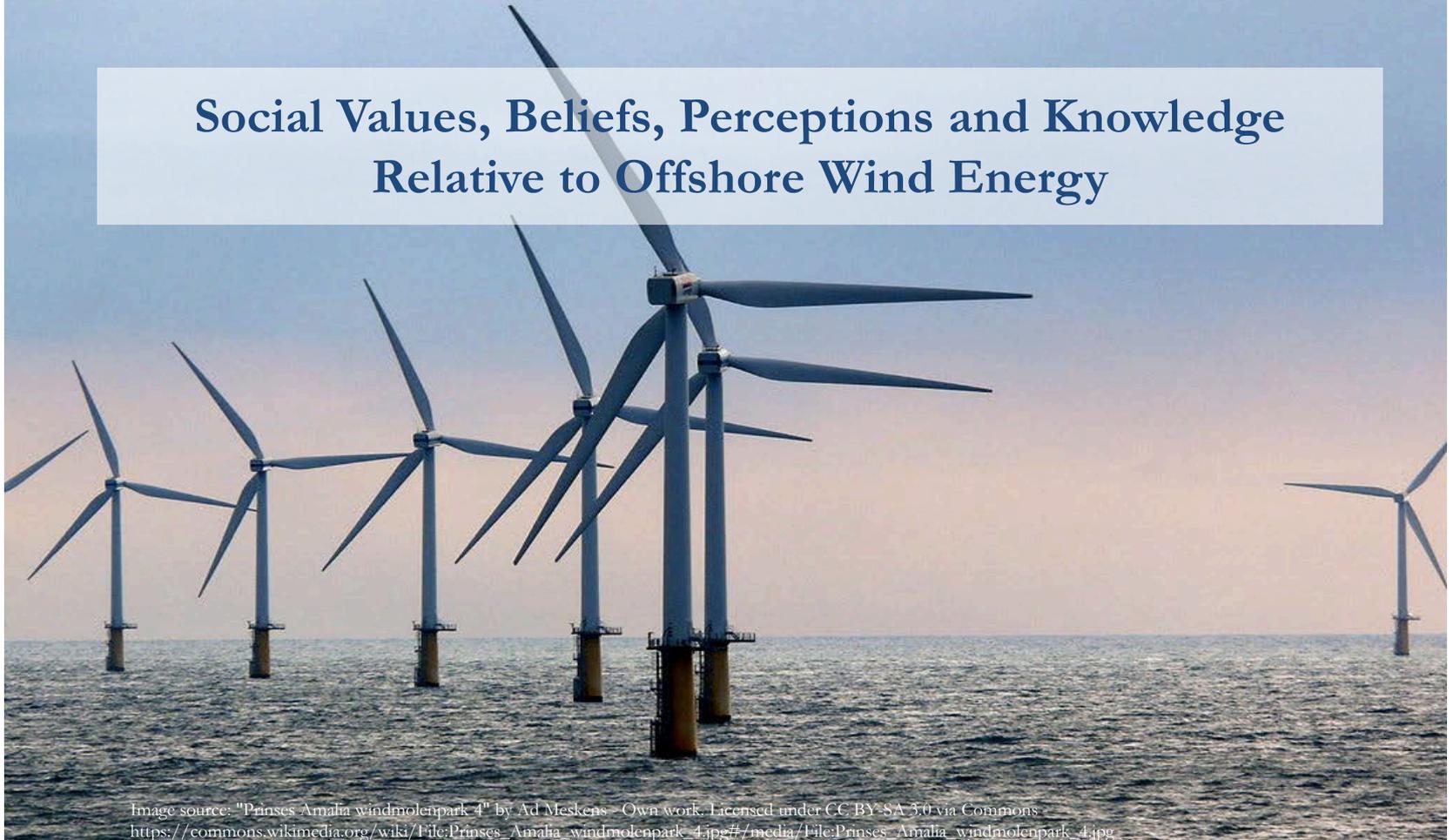


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Wednesday, February 10, 2015



NOAA Social Coast Forum



What will the energy future hold for the coastal mid-Atlantic?

- Myriad of environmental, social, and economic costs and benefits associated with all electricity generation sources
- In 2014, Bureau of Ocean Energy Management leased 124 mi² to develop offshore wind farm
 - Maryland's renewable energy standard (RES)
- Should develop electricity generation sources that:
 1. Consider public perceptions, support, concerns, beliefs, attachments in decision to develop
 2. Provide the ↑ economic benefits to society and ↓ costs
 - Can't measure benefits directly! → *stated preference*

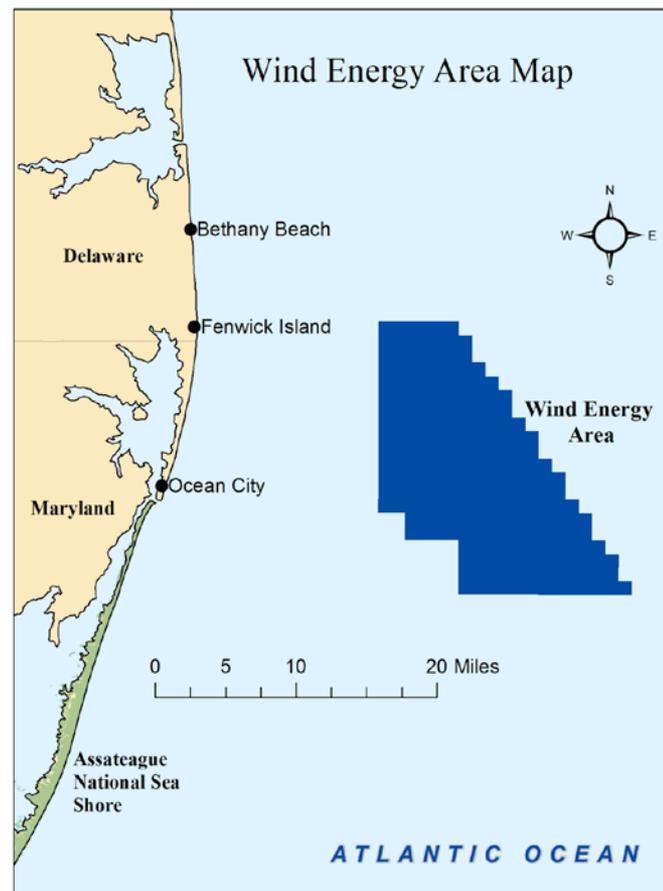
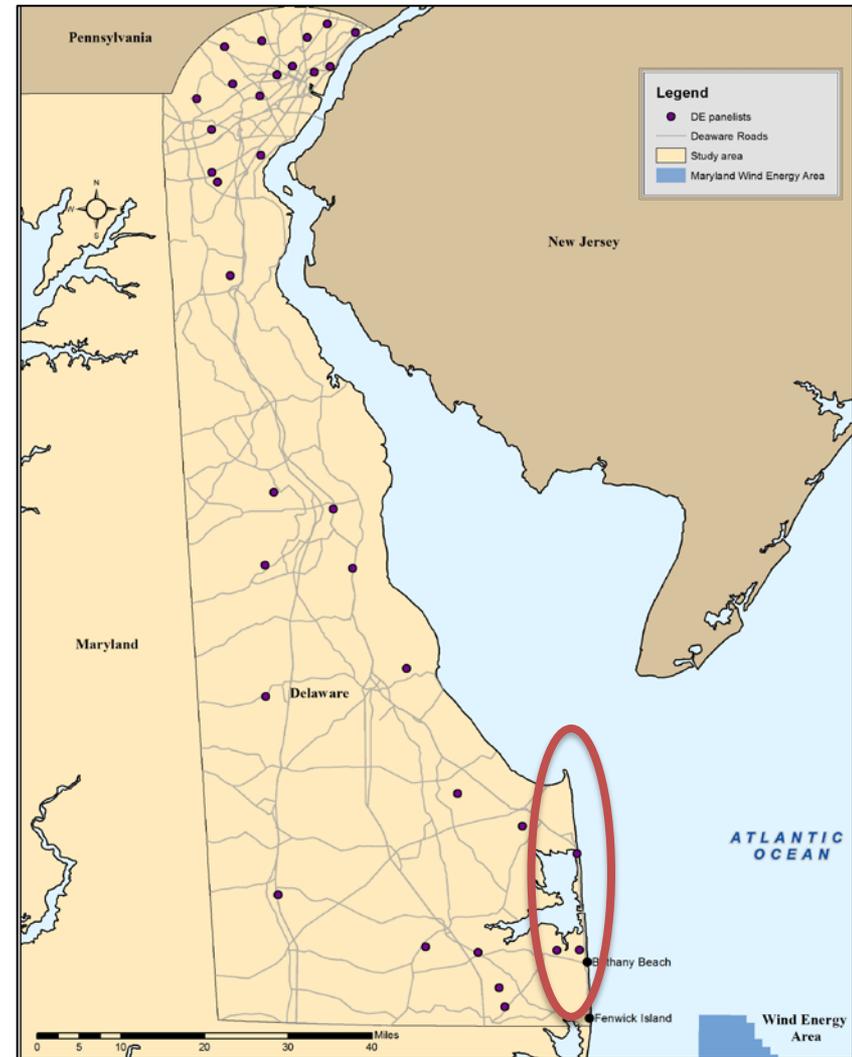


Fig 1. Maryland Wind Energy Area (WEA), map: L. Knapp

Survey and design

The DE Sample

- 2 ‘modes’: **1 mail with internet option, 1 internet only**
 - Random sample among Delaware and Maryland residents
 - Geographic sub-areas (strata)
- In total, **981 valid surveys** received
 - 408 from mail (via either web or paper) + 573 from online panel
 - ~33% response rate
- Four key survey sections
- **Data were weighted** to reflect each state’s demographics
 - Age, gender, education, and population demographics among geographic sub-areas



1. Beliefs, values, activities and attachments

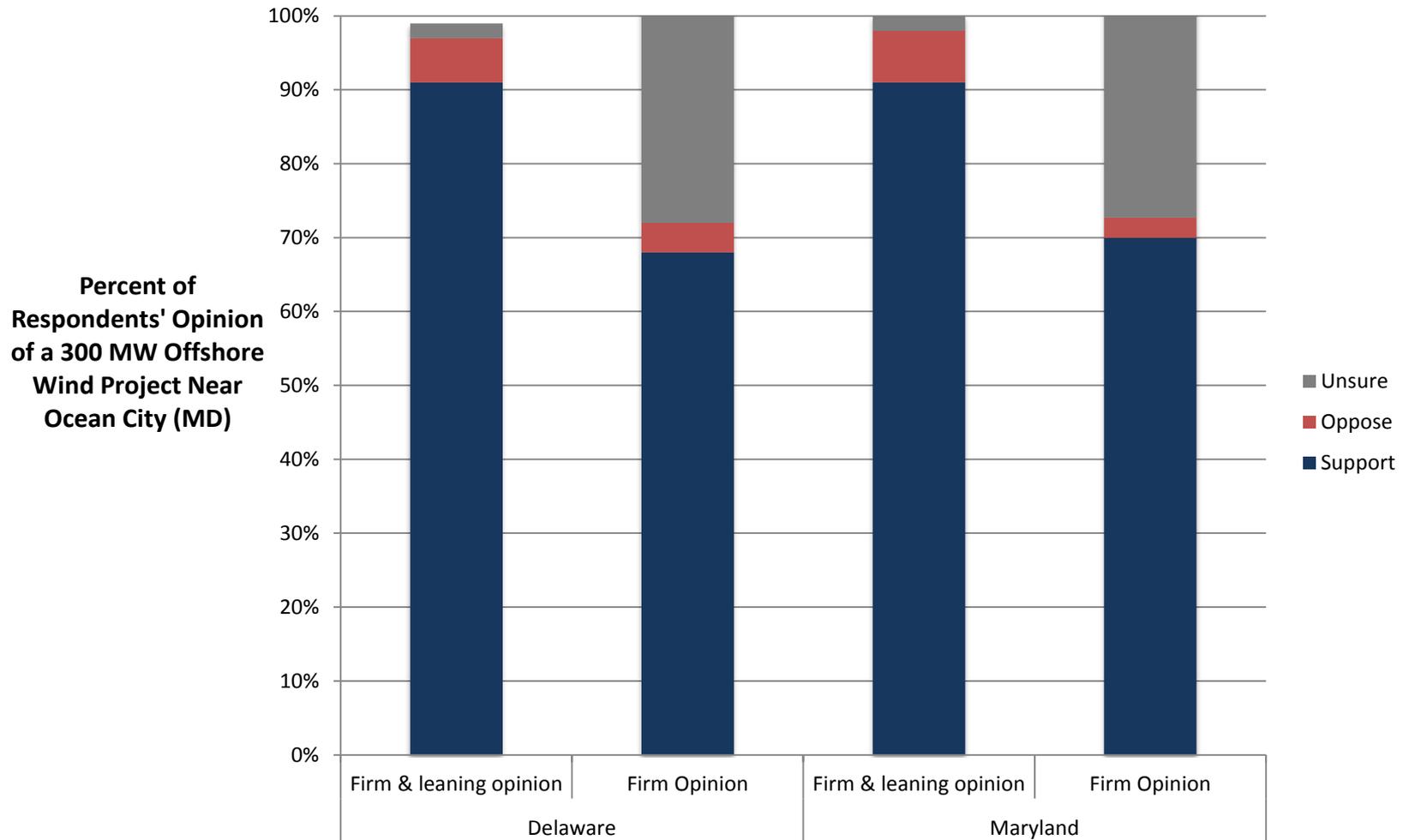
300 MW South

Viewing Distance: 9"

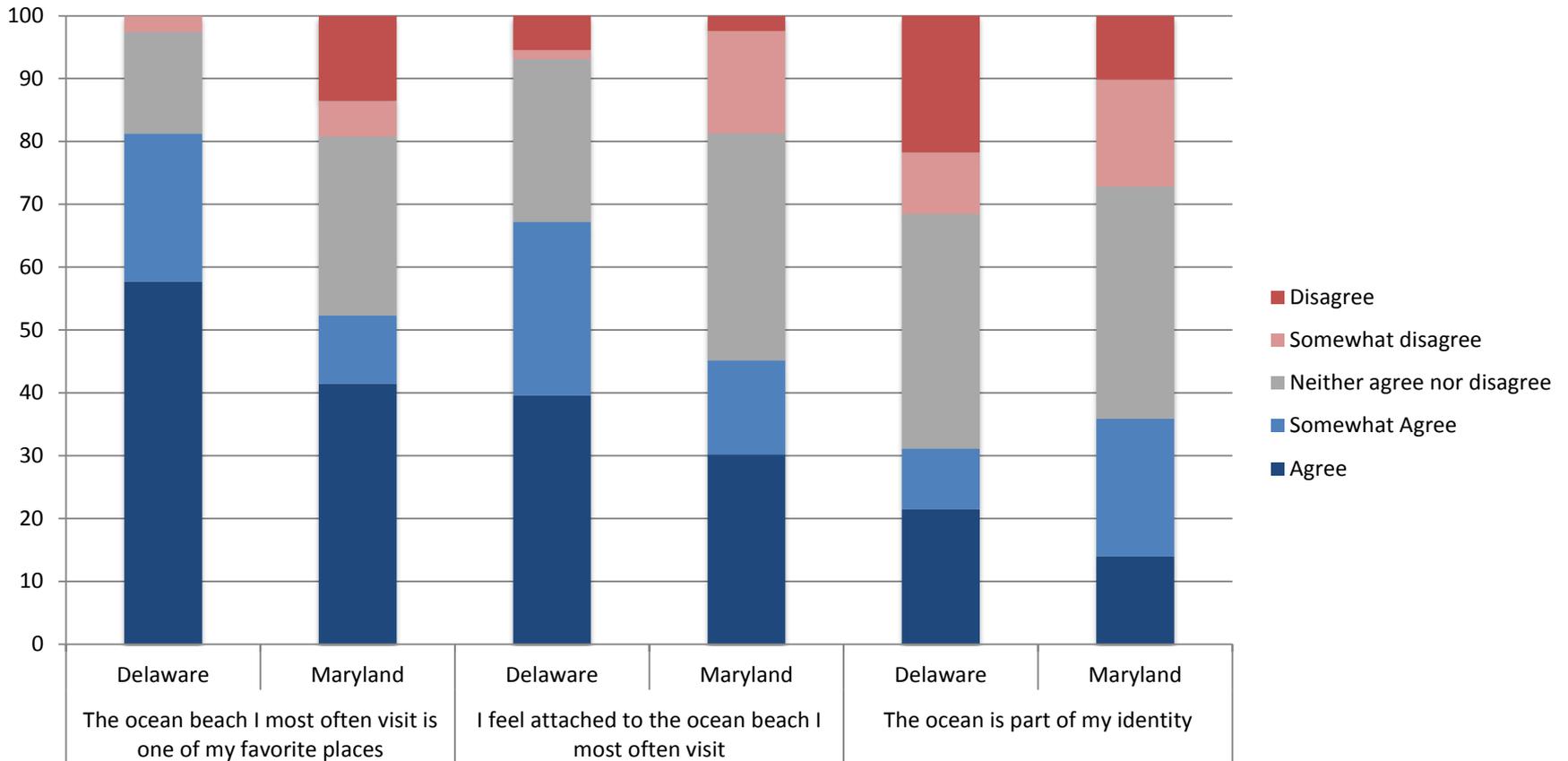


Overwhelming support for building offshore wind in mid-Atlantic

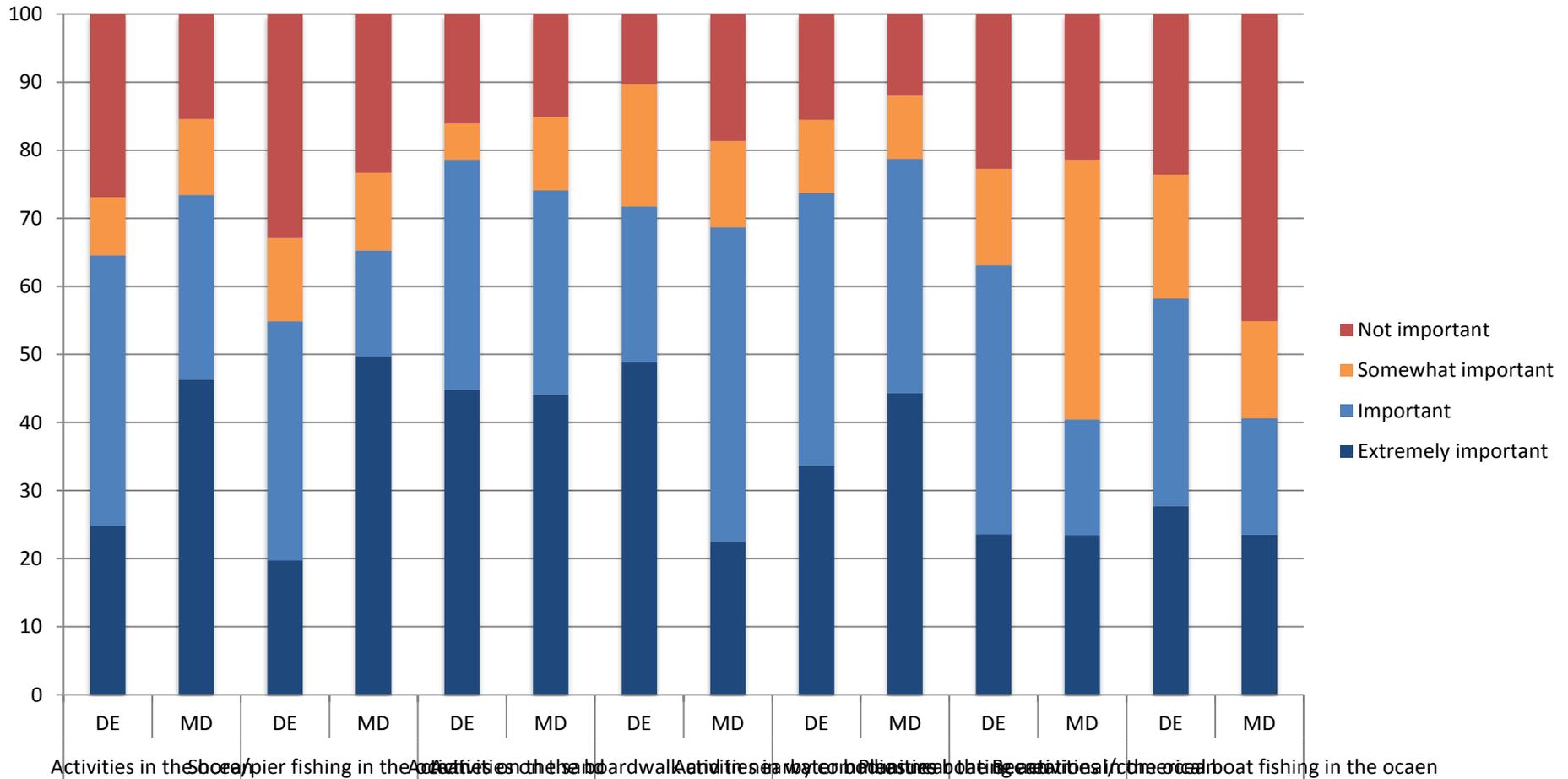
Refer to the photo insert. Would you support or oppose this project?



Delawareans rank high on attachment to the Ocean and considering their beach a favorite place



Supporters' importance of various ocean-based activities: *care much more about shore activities!*



2. ‘New Energy Development’

12 survey choice experiment versions

➤ *Keeping in mind your **monthly budget**, please respond as if you were actually faced with this vote and as if the options presented in each choice are the only available options.*

Choice 1: Please consider this set of options for Your State’s energy future.

*Refer to the **Wind Energy Area Map** and to the insert for the **simulated views of the wind projects**. Each simulation indicates the viewing location of a given wind power project option.*

11a. If the vote were held today, which option would you vote for?

| | Wind Power | | Natural Gas |
|--|-------------------------------|-------------------------------|---|
| | Option A | Option B | Option C |
| Location | South | South | N/A |
| Size of energy project | 33 wind turbines (~200 MW) | 125 wind turbines (750 MW) | Expansion of electricity generation from natural gas. |
| Increase to your electricity bill | \$1.50/month | \$5/month | \$0/month |

I would vote for...
(Check one)

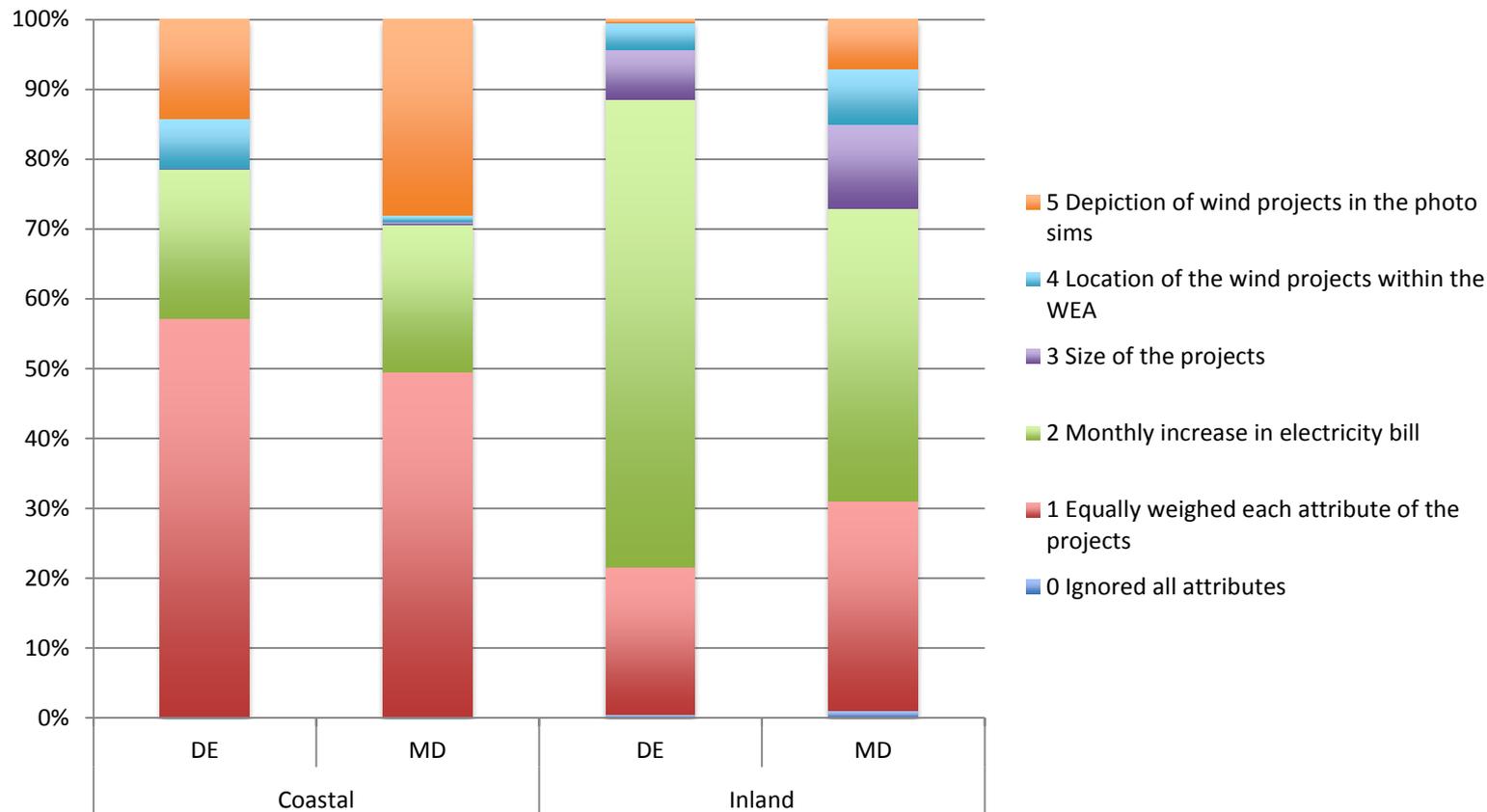
Fig 2. Sample referenda question (Choice 1 of 3/respondent)

Majority (73%) of respondents willing to pay a monthly premium for electricity from offshore wind...

| | Wind Power | | Natural Gas |
|--|-------------------------------|-------------------------------|--|
| | <i>Option A</i> | <i>Option B</i> | <i>Option C</i> |
| Size of energy project | 33 wind turbines (~200 MW) | 125 wind turbines (750 MW) | Expansion of electricity from natural gas. |
| Increase to resident's electricity bill | \$1.50/month | \$5/month | \$0/month |
| Respondents' vote | 40% | 33% | 27% |
| *There were some slight but likely insignificant (1-3%) differences between Maryland and Delaware residents. | | | |

Coastal population think much less about price premiums alone – recognize tradeoffs

‘Of the following, which did you most take into account during the choice experiment?’



- Respondents (68%, DE and 78% MD) willing to pay a monthly premium for electricity from offshore wind
- **Viewshed impacts matter (for some) when making WTP choices**

Delawareans and Marylanders (~90%) strongly support building offshore wind power & a Maryland RES is in place... Now what?

- **Majority of public is willing to pay at or more than the state's renewable energy law for offshore wind power (68% of DE and 78% of MD) – now, the how the process is carried out is what matters**
- **Will be important for U.S. Wind Inc. to make environmental impact studies transparent and accessible, as well as solicit public involvement and participation in the process**
 - Considered #1 and #2 most important factor to consider in a public review process for an offshore wind project in both MD and DE

Delawareans and Marylanders (~90%) strongly support building offshore wind power & a Maryland RES in place... Now what?

- While supporters tend to prefer to engage in activities adjacent to the Ocean... opponents will likely want to evaluate conflicting uses that occur in the water - most as the largest share of opponents believed local fishing (commercial and recreational) will be harmed
- Impacts will be felt differently across the state, and aspects depending on coastal vs. inland— important for understanding how to efficiently allocate costs and ultimately weigh tradeoffs across effected communities (visual vs. cost. vs. placement/distance vs. size)
- State perspective: focus efforts on minimizing visual impacts as much as costs on end consumer

Acknowledgements

- Jeremy Firestone, Meryl Gardner, George Parsons

- Funding through:



- What it took...

- 1 'priming' letter (2,000)
- 2 survey packets (2 x 1,800)
- 3 rounds of follow-up post cards (1,100 x 3)
- 27 bagels, 3 large pizzas, 6 pots of coffee, and 4 Chinese food lunches
- = 8,940 headaches

- ... thanks to an amazing crew of fellow Marine Policy graduate students!
 - Pre-testing the survey at the DMV: Kathy Harris
 - An assembly that helped stuff, seal, stamp and input survey data: Lance Noel, Michelle Burt, Heather Thompson, Bill Bessmer, and Yosef Shirazi

Questions?



Contact:

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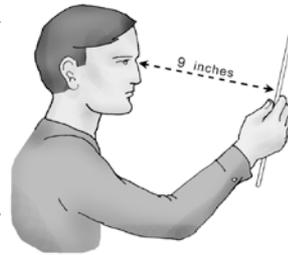
367 G ISE Lab
University of Delaware
221 Academy Street
Newark, DE 19711

Closing thought

- *Should we – and if so – to what extent - integrate values, beliefs, perceptions, and attitudes into our choices for the future of electricity generation in our coastal communities?*

750 MW South

Viewing Distance: 9"

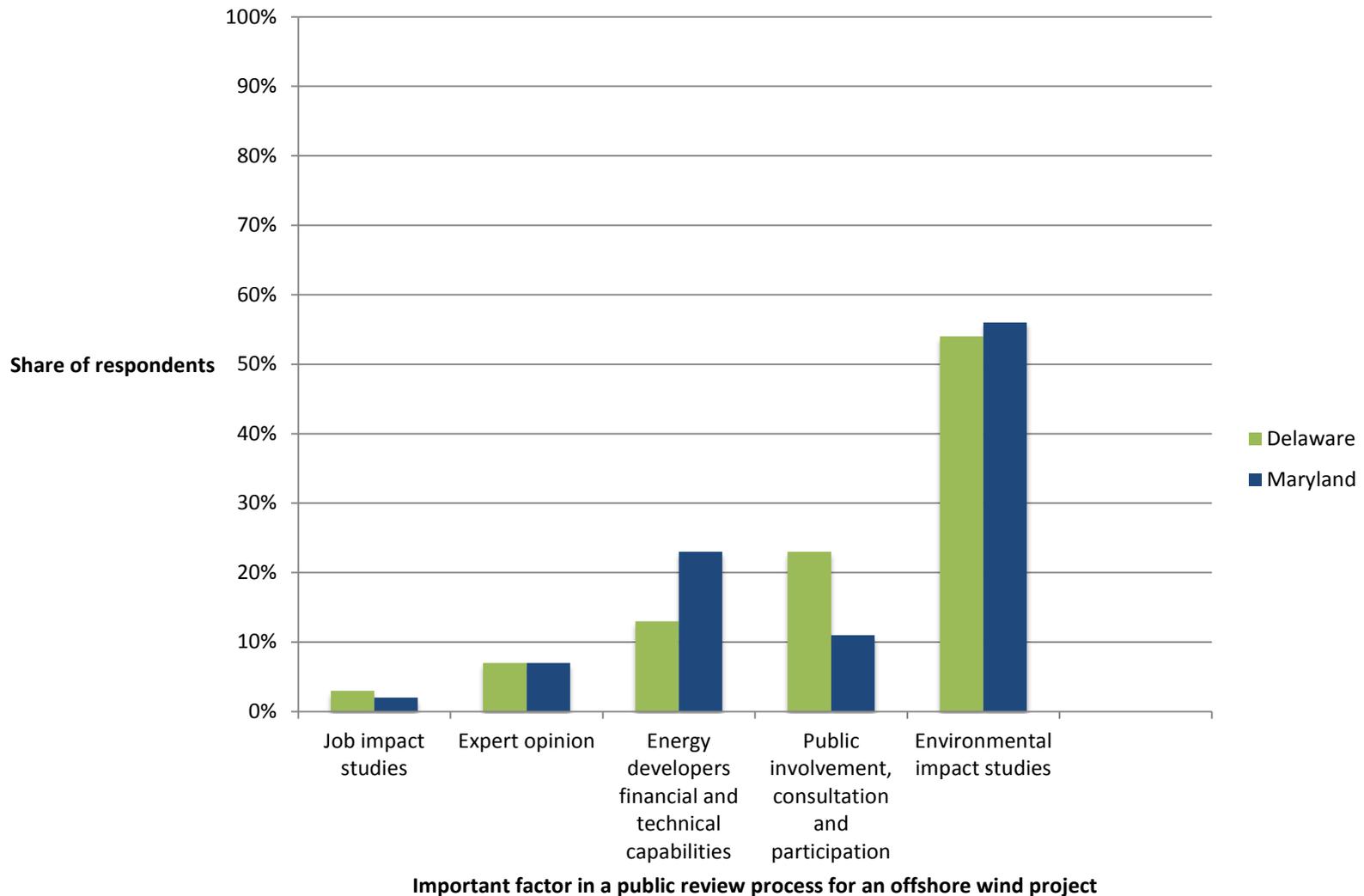


200 MW South

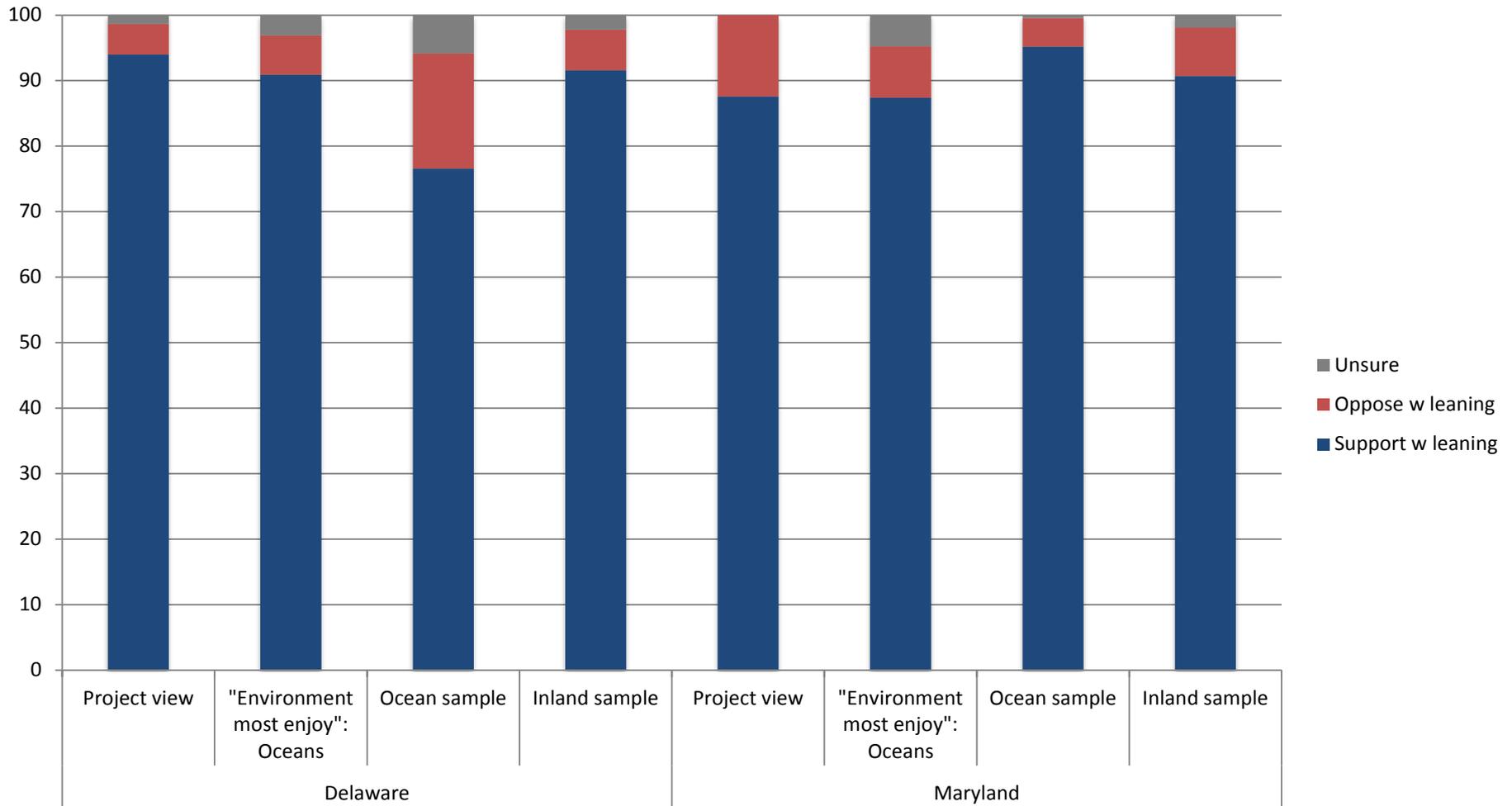
Viewing Distance: 9"



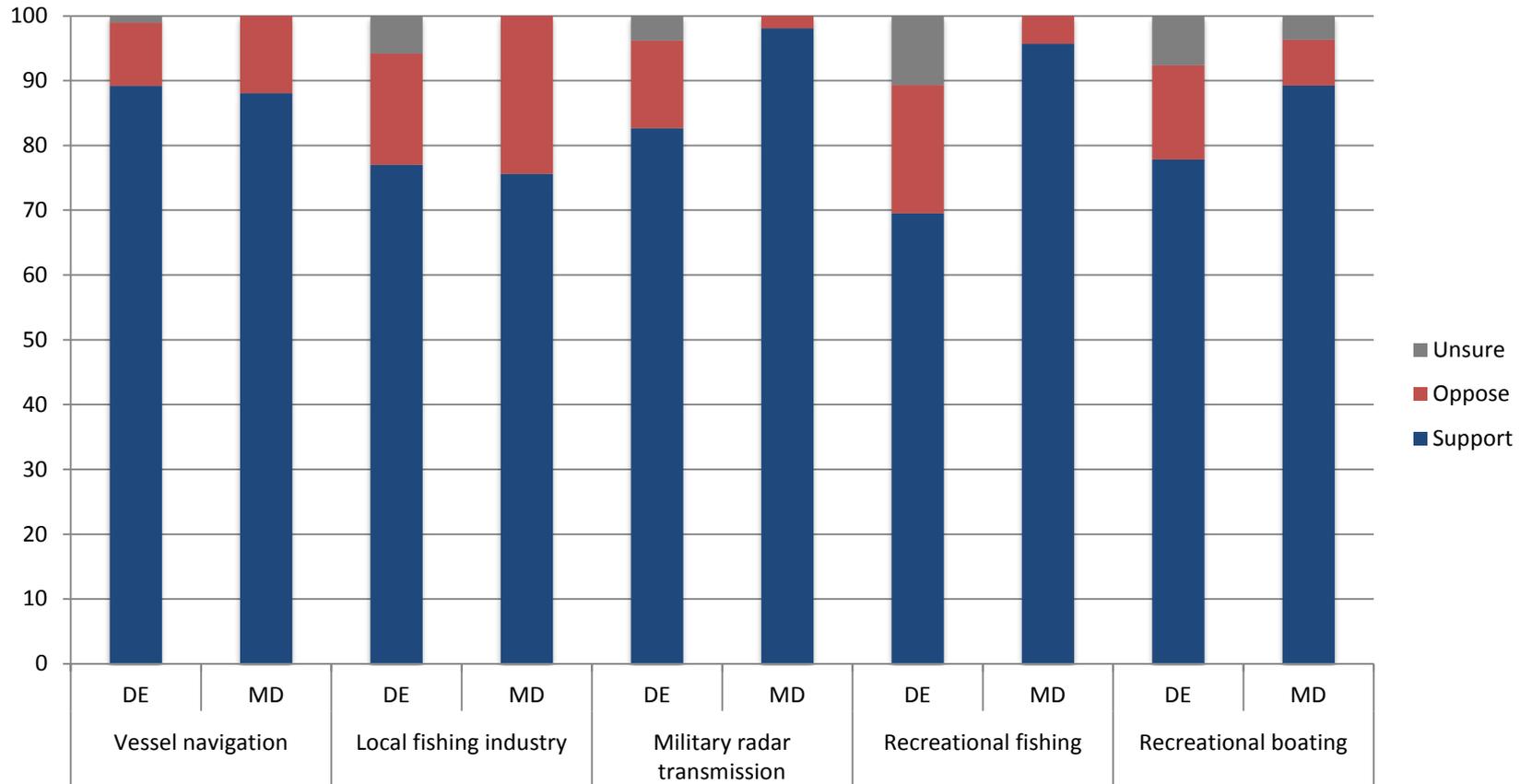
Respondents consider environmental impact studies to be important factor in a public review process for offshore wind project



Support & Opposition with Ocean place attachment: Having a home with a project 'view', enjoy the ocean environment the most, and proximity (ocean sample vs. inland sample)



Believed negative effects from building an offshore wind project ('harm')



Additional Slides

Upcoming Steps

- **Models:** determine significant underlying factors for a) support/opposition and b) WTP choices
 - Control for project characteristics (in choice experiment) and demographics
 - Calculate the WTP and social welfare benefits as result of building project
- **Methods paper**
 - Several questions indicate similar responses across strata with mail vs. online
- **Spatial statistics**
 - GIS modeling – calculate home distance to shoreline (vertex)
 - Differences in WTP across landscape

Methods

- Multi-mode approach
 - Representative set of age and socioeconomic population and
 - Glean survey method influences

- 981 valid surveys
 - 573 from an online panel sample
 - 408 from the mail sample (completed either via the web or paper survey)
 - Surveys completed January through April, 2015

Four Survey Sections

1. 'Your Opinions on Wind Power'

- General opinions about developing an offshore wind project in the Maryland MWEA
- Perceived effects on various environmental, social, economic and other aspects

2. 'New Energy Development'

- Respondents were presented with a choice experiment (Figure 2) and prompted to vote for the energy development option scenario that they most prefer for their region
- During this time, respondents were prompted to view what the wind project will look like offshore from either Ocean City, Maryland (MD respondents) or Fenwick Island, Delaware (DE respondents). Simulated project views from the respondents' respective state were provided (Fig. 3, 4)
- All simulated offshore projects depict 6 MW Alstom offshore wind turbines with 150 m rotor diameters. [2]
- Choice sets included: two offshore wind projects with varying project characteristics (Fig.5) in the MWEA ~11 miles from shore. An “opt-out” alternative assumed a new natural gas project would be built instead

3. General Questions

- General and specific aspects of respondent preferences regarding environmental attitudes and behavior, world views (e.g.. climate change beliefs and views of government) as well as beach and ocean going activities

4. Household Questions

- The final section included a detailed question on respondents' second homes in coastal/beach areas in adjacent communities to the Maryland WEA.
- Standard socio-economic and demographic questions (age, education, employment, etc.) were also asked.

Offshore wind project attributes in choice experiment

| Location | Project size (MW) | Energy surcharge (\$/month) |
|--|--|--|
| <ul style="list-style-type: none">• North• South• Entire energy area (North + South) | <ul style="list-style-type: none">• 200• 300• 500• 750• 1000 | <ul style="list-style-type: none">• \$1.50• \$5• \$25• \$75• \$100 |

+ Photo-simulations (differed across states & different viewing locations)

Price didn't matter as much for coastal respondents

'Of the following, which did you least take into account during the choice experiment?'

