Valuing Public Preferences for Offshore Wind Power

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Problem Statement:

With the recently released findings of the 2007 IPCC report, there is little doubt that humans have caused—and are causing—drastic changes to Earth's ocean ecosystems. Increasing greenhouse gas emissions from anthropogenic sources have only begun to impact our world. Climate change, sea level rise, and ocean acidification have emerged as serious global concerns that all of humanity must address if we are to change the course of our future. Wind power is, perhaps, one of the many parts to the solution.

Wind power capacity has been increasing steadily over the past few decades, both globally and within the U.S. As of December 31, 2006 total U.S. installed capacity for land-based wind power was 11,602 MW. Although there are no offshore projects operating in the U.S. to date, proposals for such developments are pending in Massachusetts, New York, Delaware, and Texas. Rhode Island and New Jersey also are seriously considering offshore wind power development.

For Delaware, offshore wind power is currently the only cost-competitive renewable energy resource large enough to become a significant fraction of the electric supply. Offshore wind power is commercially available and technologically feasible, and could offer both long-term and short-term benefits to Delaware; however, a number of obstacles may prevent such development, including public opposition, regulatory obstacles, and lack of incentives.

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Location	Area (km ²)	Max Turbines (GE 3.6)	Installed Capacity (MW)	Capacity Factor	Average Power Production
Delaware Bay	504	933	3,359	.36	1,209 MW
Atlantic Ocean	2,386	4,418	15,905	.39	6,203 MW
Total	2,890	5,351	19,264		7,412 MW

Figure 1: Delaware Offshore Wind Power Potential

Source: Dhanju et al. (2007)

University of Delaware researchers have recently determined Delaware has a large wind resource offshore in the Atlantic Ocean and a smaller wind resource in Delaware Bay (Figure 1, above).

Policy Research Objectives:

- 1. Delaware residents will be surveyed to determine preferences for whether, and if so, how, offshore wind development should proceed in Delaware.
- 2. Examine public positions on offshore wind power and identify reasons for support and opposition.
- 3. Develop a choice model to examine public preferences and willingness to pay for offshore wind power development in Delaware.

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Survey Development and Pre-testing:

Survey development began in March 2006. Twelve in-depth semi-structured interviews conducted in Delaware and a previous survey regarding offshore wind power conducted in Cape Cod, Massachusetts helped guide survey development. A draft survey instrument was pilot tested at the Department of Motor Vehicles (DMV) office in Wilmington, Delaware in June 2006. Individuals were surveyed and queried regarding survey comprehension, length and potential bias. Based on the queries during the pilot test, the survey instrument was modified slightly. In all, between March and September 2006, the survey went through eighteen iterations before the final survey instrument was produced.

Methods:

In September 2006, the survey was sent out to 2000 Delaware residents chosen at random. Three groups were sampled: residents along the ocean, residents along the bay, and inland residents. After accounting for bad addresses, response rate was approximately 52% (n= 955).

The mail survey contained three different "choice experiments" (CE) that describe hypothetical, constructed market scenarios in order to analyze people's preferences and willingness to pay for offshore wind power along Delaware's coast. In each CE the respondent can choose between two wind power options or a *status quo* option of no wind power (rather, increased natural gas or coal power). Each wind scenario varies over five possible characteristics: the wind farm location; its distance from shore; the amount of rent/royalty payments made to Delaware; where those payments would be funneled; and the amount of a "green energy" fee that would be added to monthly electricity bills for three years. In theory, individuals choose the option they find most appealing, given certain constraints (i.e. personal income).

Based on survey responses and the tradeoffs people make in answering these questions, a mixed logit choice



model is being developed to (1) identify individuals' preferences for offshore wind power along Delaware's coast; (2) to determine the public's willingness to pay for wind power development; and (3) to predict Delaware residents' support for a recently proposed wind farm projects currently being considered by Delaware.

