

# FINAL REPORT

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## **2011 SURVEY OF MARINE RECREATIONISTS' ATTITUDES TOWARDS POTENTIAL OFFSHORE WIND ENERGY IN SOUTH CAROLINA**



**Clemson University  
Clemson, South Carolina**

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# *2011 Survey of marine recreationists' attitudes towards potential offshore wind energy in South Carolina*

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## *Final Report*

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## Executive Summary

The overall goal of the project was to evaluate attitudes towards offshore windpower among stakeholders with interest in using the coast and marine waters off the North Myrtle Beach and Georgetown areas of South Carolina. For a guiding framework, we chose an Exploratory mixed methodology with three connected phases, which resulted in approximately 17 hours of interviews with information providers and experts and 657 completed questionnaires from marine recreationists. Readers are encouraged to this entire report as representative of marine recreationists in both communities, and not representative of *all* community residents, visitors, or state residents. Results of the survey indicate:

### General findings

- The majority of respondents possessed high levels of place attachment to the areas identified for potential offshore wind energy.
- Approximately 73% of marine recreationists reported some level of support for offshore wind energy in the study areas.
- Although respondents are supportive of wind energy in the area, they reported less likelihood to perform civic actions to support wind energy.
- Approximately 25% of respondents reported some level of opposition to offshore wind energy in the study areas.
- Aesthetic impacts or opposing wind energy because it is believed to *decrease the scenic and natural beauty* received the highest reason for opposition.
- Potentially more disagreement may exist among respondents in the category of opposition compared to support.
- Similar to the results for likelihood of engaging in civic action to support wind energy, respondents generally seemed to lack a willingness or high likelihood to engage in civic action to oppose wind energy.
- Respondents generally reported a moderate level of interest in wind energy related activities.
- As reported by respondents, limited behavior change, such as displacement or increases in recreation use, may occur due to wind energy
- On average, respondents possessed moderate levels of beliefs in the occurrence of climate change but generally believe human action *can* influence climate.

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### *Segmentation groups*

- Four distinct groups were identified who differ statistically and conceptually in their levels of opposition and support for offshore wind energy development.
- The group termed as *supporters* was the largest segmentation group, containing 49% of the sampled population and is characterized by high levels of support and low levels of opposition.
- The second largest segmentation group, termed *neutral*, comprised 22% of marine recreationists sampled, and individuals in this group generally possess moderate levels of support and opposition.
- The *pros and cons* group identified both reasons to support and oppose offshore wind energy and accounted for 18% of the population.
- The smallest group was the *opposition* group (11% of the sampled population) and was characterized by high levels of opposition and low levels of support.

### *Comparison across communities*

- Responses compared across communities for support of wind energy indicated significantly higher support in the N. Myrtle Beach area than the Georgetown area.
- Communities did not differ in their likelihood to engage in civic action to support offshore wind energy.
- Compared to differences in communities regarding support of offshore wind energy, less difference in opposition existed.
- Numerous differences existed between communities in their likelihood to engage in civic action in opposition towards wind energy.
- Marine recreationists in the North Myrtle Beach area expressed moderate but higher interest in going to a wind energy museum, eating at a local restaurant that uses wind energy, and scuba diving near a wind turbine.
- Marine recreationists in the North Myrtle Beach area reported more agreement that they would *buy property or more property in the area* in response to wind energy than respondents in the Georgetown area.
- Georgetown marine recreationists also reported a lower likelihood of being displaced due to wind energy development (i.e., *stop using the coastal recreation resources in the area*).
- The percent of respondents in three of the segmentation groups (*supporters*, *pros and cons*, and *neutral*) were very similar across communities.
- The *opposition* segmentation group possessed more members of the Georgetown area sample than the North Myrtle Beach area sample.

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## 1.0 Introduction and rationale

### *Problem/Need & Target Audience*

The South Carolina Sea Grant Consortium listed “Identify sustainable community-based economic development and management strategies to support traditional and emerging coastal-dependent business and industry” as a priority for 2010-2012 under Strategic Area 3, Goal 3, Objective 2. This proposal specifically addressed the need for: “Identification and evaluation of the potential environmental, economic, and policy issues and concerns or consequences from offshore energy development (oil, gas, and wind) off the South Carolina (SC) coast” under this objective. This research addresses this priority by identifying the marine recreationists’ attitudes and potential behavioral responses to local wind energy development. This evaluation is important to informing regional outreach and marketing efforts and for identifying a portion of the public’s attitudes towards offshore wind energy.

Although assessments of attitudes towards offshore wind energy outside of the U.S is abundant (e.g., Aitkin, McDonald, & Strachan, 2008; Devine-Wright, 2005; Ellis, Barry, & Robinson, 2007; Eltham, Harrison, & Allen, 2008; Graham, Stephenson, & Smith, 2009; Haggett, 2008; Hindmarsh & Matthews, 2008; Moller, 2006; Toke, 2005; Warren, Lumsden, Down, Birnie, 2005), studies investigating attitudes towards offshore wind energy facilities in the U.S. suggest that aesthetic values, potential location of facilities, and region specific attitudes influence opposition as well as support of offshore wind energy facilities (e.g., Blaydes, Firestone, & Kempton, 2008; DeSantis & Reid, 2004; Firestone, 2007; Firestone & Kempton, 2007; Firestone, Kempton, & Krueger, 2009; Haughton, Giuffre, & Barrett, 2003; Kempton et al., 2005). However, these studies focus largely on attitudes towards the proposed ‘Cape Wind’ project in the Nantucket Sound of Massachusetts. These studies also suggest that attitudes and perceptions about wind energy could vary greatly among different coastal communities, and residents and tourists. Therefore understanding the attitudes of local stakeholders regarding the potential development of coastal wind energy appears instrumental for developing future outreach and education regarding these facilities and to the future success of these projects (also supported by Devine-Wright, 2011; Wolsink, 2000).

### *Status of South Carolina coastal windpower generation planning*

Clemson University, Coastal Carolina University (CCU), South Carolina Energy Office, Santee Cooper, and the SC Sea Grant Consortium are cooperating to examine the feasibility of offshore windpower generation sites on the South Carolina (SC) coast. The rationale for this research effort is based on the state’s strategic position to serve as an industrial hub for windpower development. Furthermore, offshore wind resources are situated close to growing tourism and

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recreation-dependent coastal communities, are located in shallow waters, and are near outstanding port facilities.

This effort in SC began in 2006 with the Southeast Offshore Wind Power Symposium. The primary focus of the resulting feasibility studies has been on gathering physical data in the Georgetown County and North Myrtle Beach areas for windpower development locations within one to four miles from the mainland. Testing has included deployment of two 50 meter meteorological towers along the coast in Horry (on mainland across from Waites Island) and Georgetown (Hobcaw Barony) counties to collect wind data. In March 2009, The Palmetto Wind Research Project, involving Santee Cooper, CCU and the SC Energy Office, was launched, and collaborators are now engaged in deploying a series of wind-measuring buoys off the coastline at Winyah Bay, near Georgetown and Waites Island, near Little River. This buoy data will be used to determine the best location for an offshore platform to measure upper level winds similar to those encountered by an offshore wind turbine.

#### *Attitudes of stakeholders toward offshore wind energy development*

The project proposed here fills a gap in current efforts. Based on discussions with the agencies and institutions involved in the SC feasibility studies, we understand there has been no in depth empirical investigation of local stakeholders' attitudes and potential behaviors related to offshore wind energy or assessment of the potential impacts of offshore wind energy on the SC coast's tourism economy. However, other states on the Atlantic coast, such as Delaware (Firestone, Kempton & Krueger, 2007) and New Jersey (Mills & Rosen 2006), conducted social-economic surveys of coastal residents and tourists as input for impact analysis and planning. Understanding potential responses by marine recreationists (including tourists and residents) to offshore wind energy (e.g., support or opposition, destination preferences) can both strengthen public outreach and marketing strategies and inform strategic planning.

Focusing on the response of marine resource recreationists, which includes tourist activities, is extremely relevant because the economy on the South Carolina coast is highly dependent on these user groups. According to the Travel Industry Association (2008), Horry county was the leader in domestic (in-state and out-of-state) travel expenditures in 2007 among all of South Carolina's 46 counties (\$3.1 billion or 32% of total for SC). Georgetown County ranks 8th and received \$261.32 million (or 2.7% of total for SC) in domestic travel expenditures in 2007. Similarly, the contribution of tourism to South Carolina's economy is considerable. According to the U.S. Travel Association (2009), tourism accounted for 12.6% of total state employment and provided total wages and salaries of \$7.3 billion and total tourism value added income (direct, indirect, and induced) of \$11.6 billion (7.6% of the state economy) in 2007. Also, tourism's fiscal impact in 2007 was \$1.2 billion in state and local tax revenues and \$1.4 billion in

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federal revenues. Furthermore, a majority (62.9%) of travel spending comes from out-of-state and international tourists.

Studies of stakeholder perspectives (tourists and residents) that have occurred in other US Atlantic states (e.g., Delaware, North Carolina, Massachusetts, New Jersey) suggest that opinions differ between states and at the regional level (Firestone, Kempton, & Krueger, 2009). Therefore, it is advisable to conduct regional level investigations to inform offshore wind energy planning in SC. The ecological, cultural, social, and political conditions vary along the SC coast and the contribution of tourism, marine recreation and real estate values to the economy of specific local SC coastal communities also varies. North Myrtle Beach is more urban and tourist focused, while Georgetown is more rural and residential. Destination attributes such as amenities, level of urbanization, and opportunities for nature-based and marine-based experiences also vary along the coast. From the perspective of marine recreationists (including tourists and residents), certain beaches and recreation areas may be attractive due to the relative pristine quality of the landscape (Woosnam, Jodice, Von Harten, & Rhodes, 2008) while others may be attractive due to proximity to urban amenities (Oh, Draper, & Dixon, 2009).

Opinions may also differ depending on perception of lost or gained opportunities (Hoagland, Schumacher, Kite-Powel, & Duff, 2006). For example, wind energy may benefit recreational fishing by serving as fish attractors, create opportunities for tours focused on sustainable energy, or attract additional tourists interested in sustainable destinations and accommodations. In addition, if the offshore wind energy facility becomes a marine protected area to prevent accidents or damage to turbines, this may be viewed as a negative or positive impact.

Therefore, response to potential offshore wind energy SC coast could vary depending on the community characteristics, and preferences and perspectives of stakeholder groups. Ultimately, income for tourism and recreation businesses and services in communities with offshore wind energy could be impacted negatively or positively, depending on whether tourists and recreationists decide to seek alternate coastal destinations (without offshore wind farms) or become attracted to coastal destinations with sustainable energy systems.

In coastal communities, proposals to alter near shore waters by installing man-made industrial objects have historically raised significant opposition among coastal landowners and recreationists. The most well-known example of opposition is the Cape Winds project in Nantucket Sound. Vehement opposition to this project ultimately slowed development of offshore wind facilities throughout the US. The strongest objection to the Cape Winds project pertained to the loss of aesthetic appeal for the area due to the visibility of the towers from shore, but opposition also included environmental impacts and worries among fishermen about the possible creation of a marine protected area or other barriers to fishing (e.g., Kempton et al. 2005; Firestone, 2007). These environmental and aesthetic concerns united a well-financed opposition group which mounted an aggressive campaign against the project (Watson & Courtney, 2004). In Texas, opposition from environmental, tourism and other groups concerned

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about the unsightly turbines and potential harm to birds was also an issue (Mufson & Eilperin, 2006). These situations reinforce the importance of understanding stakeholders' attitudes and beliefs regarding future planned wind energy projects.

Despite the importance of understanding the social context for predicting future success of wind energy projects, there have been a limited number of studies investigating socioeconomic impacts and attitudes regarding *offshore* windpower in the United States. These studies confirm that aesthetic values, size and location of facilities, concern regarding environmental impacts, and region specific attitudes influence opposition as well as support of offshore windpower facilities. Wolsink (2007) indicates that stakeholders' perception of potential impacts on landscape values is the strongest determinant of supportive or oppositional attitudes toward offshore windpower projects. Ladenburg (2008) reviewed seven public attitude studies and found higher preferences for offshore relative to land-based windpower development and that these preferences are dependent on the specific location of the offshore facility.

A study of offshore windpower impacts on beach tourism in Delaware (Blaydes, Firestone and Kempton, 2008) indicated 1) that potential for loss of beach tourism caused by nearshore wind facility development existed, 2) that tourists' potential avoidance of the location diminished with the facilities' increasing distance from shore, and 3) that tourists exhibited interest in taking a boat tour of an offshore wind facility. A comparative study of Delaware and Cape Cod residents (Firestone, Kempton and Krueger, 2007) indicated that Delaware residents were more supportive of offshore wind farm development than those in Cape Cod. A study of people visiting the New Jersey shore indicated that 72% were neither more or less likely to visit the shore for vacations or day trips if Wind Turbines were located off the New Jersey Shore and that concern over aesthetic impacts diminished with distance from shore (Mills & Rosen, 2006). Therefore understanding the attitudes of local stakeholders regarding the potential development of coastal wind energy appears instrumental for developing future outreach and education regarding these facilities and to the future success of these projects in South Carolina.

#### *Policies regarding wind farm development - Why does public opinion matter?*

Current social, economic and political conditions have stimulated new efforts and interest in developing offshore windpower in the US, and planning and resource evaluation phases of offshore wind farms are occurring in several states. However, despite the enthusiasm, efforts to develop offshore wind farms suffer from a lack of adequate investment which can be attributed to the opposition of local communities, technical and infrastructure problems, and bureaucratic barriers (Dimitropoulos & Kontoleon, 2008). Certain barriers have been identified as particularly problematic in the US: 1) slow progress in developing a final regulatory system for offshore wind energy and 2) the high cost of development requires sufficient government subsidies and

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these are more modest in the US than in Europe, where development has already occurred (Snyder & Kaiser, 2009).

Recently the regulatory problem has improved. The final rule on *Renewable Energy and Alternate Uses of Existing Facilities on the Outer Continental Shelf* goes into effect on June 29, 2009 (see: Federal Register / Vol. 74, No. 81 / Wednesday, April 29, 2009, p. 19638). This rule establishes a program to grant leases, easements, and rights-of way (ROW) for renewable energy project activities on the Outer Continental Shelf (OCS) and establishes methods for sharing revenues generated by this program with nearby coastal States. With this policy established, implementation and progress toward offshore windpower development on the US Atlantic coast is now expected to proceed more quickly (Nesi, 2009). As such, to overcome financial barriers, public support in favor of government investment to offset the high cost of development is now particularly important. Given these issues, successful offshore wind energy development on the SC coast depends on outreach informed by a clear understanding of the attitudes and potential behavioral responses of marine resource users.

#### *Assessing stakeholders' attitudes toward wind farms*

Research examining attitudes, willingness to pay, and behavioral intent use established social theory to help operationalize these concepts and are important for developing models that predict changes in coastal tourism and recreation income or the likelihood of opposition/litigation to development efforts. Some studies have looked at the relationship of attitudes to behavioral intent to oppose or support windpower development and resource management actions. Johansson and Laike (2007) examined the relative importance of visual perception and attitudinal factors to public intention to oppose local wind turbines in Sweden. The study included an assessment of emotional state regarding the visual characteristics of wind turbines on a site, attitudes towards the turbines, perception of significant others' opinions of local wind turbines, and intention to oppose local turbines. Other variables assessed were socio-demographics, place of residence and general attitude towards wind power. Regression analysis demonstrated that intention to oppose was related to personal attitude towards the effects of wind turbines on landscape aesthetics and recreation, and general attitude towards wind power.

Stern (2008) investigated attitudes of local people around three protected areas to assess the drivers of oppositional or supportive behaviors toward management of the protected areas. Stern found that rational cost-benefit assessments played only a minor role and that attitudes regarding the trust-worthiness of the agency were most important in predicting these behaviors. Similarly, research examining support or opposition to fire management actions such as prescribed fires also indicate that attitudes toward the importance of the location for recreation or business, previous recreational use, trustworthiness of the agency, and the perceived benefits of the management action all influenced supportive or oppositional intentions (Gardner, Cortner &

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Widaman, 1987; Abt, Kuypers & Whitson, 1990; Vogt, Winter & Fried, 2005). A survey of West Virginia residents (Center for Business and Economic Research, 2006) examined willingness to pay for energy efficient electricity and attitudes toward State support of renewable energy programs in the State. Despite strong support for government investment in alternative energy, most respondents were reluctant to pay premiums for electricity produced by renewable or alternative means.

Recent studies of SC coastal visitors and recreationists suggest that natural viewsapes may be an important predictor in selection of destinations. For example, popular viewscape-dependent coastal activities listed by respondents (N=366) in a 2004 survey of SC coastal visitors were walking for pleasure (70.2%), beach swimming (62.6%), pleasure driving (34.7%), watching wildlife (19.9%), bird watching (10.7%), golfing (18.6%), saltwater fishing (6.6%), guided nature tour (6.3%), canoeing/kayaking (1.6%). A 2006 South Carolina beach access study found that beach tourists generally favor beaches with a moderate level of commercial development—a few low rise hotels, restaurants, and stores well spaced along the beach, rather than high levels of commercial development (Oh, Draper & Dixon, 2009). This finding suggests that there is a threshold effect beyond which additional development is less attractive. The same study found that 82.7% of respondents (beach tourists) were repeat visitors to the SC coast and 65.7% visited a SC beach two or more times in the last 12 months (Oh, Dixon & Draper, 2006). Furthermore, they found that visitors to SC beaches were most satisfied with the natural beauty of the area relative to other features, and 50.8% reported that location was the major factor in deciding to visit a South Carolina Beach. Focus groups conducted with SC marine recreational anglers in 2005 also indicated that the pristine aesthetic conditions in some SC coastal regions (e.g. Beaufort) are attractive to recreational anglers (Woosnam, Jodice, Von Harten & Rhodes, 2008).

These studies further suggest that offshore windpower in South Carolina has the potential to either attract marine recreationists interested in sustainable destinations and renewable energy (i.e., South Carolina is being innovative in sustainable tourism and use of offshore wind power and I want to see it), or deter those who prefer more natural viewsapes.

## 1.1 Objectives

The overall goal of the project was to evaluate attitudes towards offshore windpower among stakeholders with interest in using the coast and marine waters off the North Myrtle Beach and Georgetown areas of South Carolina. North Myrtle Beach and Georgetown have been the primary focus of the offshore windpower feasibility studies for South Carolina. These communities also provide an interesting contrast of visitor types (e.g., motivations, activities), resident characteristics, and amount of existing tourist development.

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Objective 1: Identify the range of marine recreationists attitudes and concerns regarding offshore windpower in the North Myrtle Beach and Georgetown area.

Objective 2: Identify attitudes and some behavioral intentions (supportive or oppositional behaviors) among marine recreationists based on narrative scenarios describing potential offshore wind energy in the North Myrtle Beach and Georgetown area.

Study variables: The project evaluated the following variables.

- Past use history
- Place attachment
- Support towards potential offshore wind energy
- Opposition towards potential offshore wind energy
- Likelihood of performing civic actions in support or opposition
- Interest in wind energy related activities
- Potential displacement
- Beliefs in the occurrence of global climate change
- Beliefs in the human influence on global climate change
- Visitation to Oceanfront Park in North Myrtle Beach
- Demographic information

## **1. 2 Informal advisory board**

In order to meet the objectives of this study, it was critical that the research was substantially grounded in a clear understanding of the political arena and technical issues concerning windpower development in South Carolina. Since the investigators have significant expertise in social analysis, but do not have expertise in local political relationships or energy development, an informal advisory board was created prior to initiation of the research. Additionally, the informal advisory board was consulted throughout the project development and research process. The purpose of the advisory board was to objectively inform the researchers, but not to direct the research methods, analysis, or final reporting. Specifically, four professionals who have extensive familiarity with current issues of windpower development in SC were invited to serve as informal advisors during this process.

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## 2.0 Methods

### 2.1 Study design and rationale

For a guiding framework, we chose an Exploratory mixed methodology (Creswell & Plano Clark, 2011; Greene, Caracelli, & Graham, 1989) with three connected phases (i.e., Exploratory Sequential Design; Creswell, Plano, Clark, Gutmann, & Hanson, 2003). First, in Phase 1, we conducted interviews marine recreationists, local citizens, tourists (non-county residents visiting the area), and wind energy experts from both communities. Next, based on Phase I results we developed a measurement instrument (Phase 2), which in Phase 3, we administered to marine recreationists in both GTN and NMB areas. We selected this sequential process (i.e., the Instrument Development Variation; Creswell & Plano Clark, 2011) because 1) not all quantitative measures or instruments for the phenomenon under investigation were available, 2) some variables were unknown, and 3) due to the novelty of the investigation, numerous frameworks or theories were applicable (Morgan, 1998; Morse, 1991).

Such a mixed-methods approach, using both a quantitative survey and qualitative semi-structured interview, were used in this study (Tashakkori & Teddlie, 2003). Mixed-methods studies enhance the strength, reliability, and validity of study findings for several reasons. First, this approach allows questions to be addressed in a depth and manner not feasible when either surveys or focus groups are used alone (Tashakkori & Teddlie, 2003). Second, mixed-methods allow the researcher to draw stronger conclusions through triangulation. This is particularly important in this study since scant information exists regarding marine recreationists' attitudes and behavioral intentions related to the development of wind energy on the SC coast. As is used here, triangulation is a process that can be used to judge and enhance the reliability of research findings by seeking a convergence of results using multiple methods and data sources (Denzin, 1978; Green, Caracelli, & Graham, 1989; Tashakkori & Teddlie, 2003). Third, mixed-methods provide opportunities for presenting a greater diversity of divergent viewpoints (Henderson, 2006; Tashakkori & Teddlie, 2003). For example, the open-ended nature of the interviews can reveal the breadth of attitudes or behavioral intentions held by a population regarding windpower. Finally, mixed-methods may be used to strengthen the development of research instruments by allowing one phase of research, such as focus groups, to inform the development of other phases (Green et. al, 1989).

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## 2.2 Semi-structured interviews

During Phase 1, we conducted semi-structured individual interviews (*M length* = 50 minutes; *N* = 17) using a modified Seidman Method (Seidman, 2006) to understand the variety of opinions (i.e., opposition and support) regarding proposed wind energy development in the region and both communities. We used purposeful sampling to select participants to capture a diversity of viewpoints across numerous respondent categories (Creswell, 2007). We audio-recorded each interview to identify response patterns through Inductive Open-Topic (Creswell, 2007; Richards & Morse, 2007). As an outcome, the results from Phase 1 informed measurement approaches for a paper questionnaire with quantitative measurements developed in Phase 2.

## 2.3 Questionnaires

### 2.3a – Item Construction

#### *Support and opposition*

During Phase 2, we developed measurement items (following DeVellis, 2003; Noar, 2003), which represent two related domains regarding attitudes towards proposed offshore wind energy development: *Support* and *Opposition*. Finally, each category for support and opposition was developed into items and ultimately measured using a seven point Likert scale (1 = completely disagree, 7 = completely agree).

#### *Place attachment*

We adapted previously validated measures (specified below) for the context of each community and its marine recreation resources to measure a second order factor of place attachment. Specifically, the second order factor of place attachment reflected three related first order dimensions: 1) *place identity* (Hammitt, Kyle, & Oh, 2009; Kyle, Graefe, & Manning, 2005; Raymond, Brown, & Weber, 2010), 2) *place dependence* (Hammitt, Kyle, & Oh, 2009; Kyle, Graefe, & Manning, 2005; Raymond, Brown, & Weber, 2010), and 3) *community social attachment* (Brehm, Eisenhauer, & Krannich, 2004; Devine-Wright, 2011; Raymond, Brown, & Weber, 2010). Similar to the items for opposition and support, each place attachment item was measured using a seven point Likert scale (1 = completely disagree, 7 = completely agree).

#### *Opinions about climate change*

We used the literature to construct a pool of items to represent two global level belief constructs (beliefs in the occurrence of climate change, and beliefs in anthropogenic causation of climate change). The *Occurrence* construct measured visitor's belief that the primary physical impacts





from recent climate change are happening (ACIA, 2004; Baker, 2001; Chapin et al., 2006; Dai, 2006, 2011; Dai, Trenberth, & Karl, 1998; Maibach, Roser-Renouf, & Leiserowitz, 2009; Leiserowitz, Smith, & Marlon, 2010; Parmesan, 2006; Parmesan & Gailbraith; Parmesan & Yohe, 2003; Pauli, Gottfried, & Grabherr, 1996; USGCRP, 2010) and the *Anthropogenic Causation* construct measured people's beliefs that human behaviors contribute to climate change (Dodman, 2009; IPCC, 2007; Maibach, Roser-Renouf, & Leiserowitz, 2009; Leiserowitz, Smith, & Marlon, 2010; Philander, 2008; Satterthwaite, 2008; USGCRP, 2010).

Both Occurrence and Anthropogenic Causation were measured using a seven point Likert scale rating agreement to the statements in Table 1 (1 = completely disagree, 7 = completely agree). Therefore, as aggregate measures, a score of 1 conceptually represents a low belief in Occurrence or Anthropogenic Causation, and a score of 7 theoretically equals a high belief in Occurrence or Anthropogenic Causation.

### **2.3b – Pilot testing and validation**

Following the identification of items and scales, experts ( $N = 4$ ) reviewed all items, and the definitions of the constructs for content validity and item clarity. To further assess item clarity and conceptual agreement, we conducted a pilot study with state residents, visitors to the region, and other recreationists ( $N = 32$ ). Each respondent in the pilot study was encouraged to provide written and verbal feedback to communicate their understanding of the items used to measure support, opposition, and place attachment. We used the results of the expert review and the pilot study to guide slight revisions in item wording to improve readability and clarity.

### **2.3c – Sampling design and locations**

Using the final measures developed in Phase 2, we administered a five-page anonymous questionnaire to marine recreationists in May and August of 2011. To assist in the selection of intercept sites to administer the questionnaire, we asked respondents during Phase 2 interviews to identify ideal locations to intercept marine recreationists in both communities. We subsequently visited and observed recreationists' interactions and site activity at the recommendation locations to inform final site selections. To ensure diversity in the sample (e.g., tourists versus local residents), we selected two boat ramps, one beach, one coastal walking area, and one marina in each community and used a Simple Random Probability sampling method (Vaske, 2008) to intercept marine recreationists. We used a purposeful stratification to diversify sampling across days of the week and time of day (Bryman, 2008; Vaske, 2008).

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Table 1. *Intercept locations by county*

Type of site	Georgetown County	Horry County
Boat landings	East Bay landing South Island Ferry landing	Cherry Grove landing John Causey landing
Beach	Local neighborhood	Cherry Grove beach
Coastal walking area	Harbor Walk/Downtown	Cherry Grove pier and Ocean Blvd.
Marina	Georgetown landing marina	Cricket Cove marina

Trained researchers informed each group about the purpose of the study (including required IRB information) and one member from each group completed the questionnaire (randomized by closest birthday). We consistently provided every respondent with two elements of information about proposed wind energy in the area. First, we used a color map identifying the political boundaries of each community and the general area of offshore waters proposed for wind energy development. We instructed respondents to address items in the questionnaire, including place attachment questions, related directly to the area identified on the map (see paragraphs below).

*Please review the map prior to answering the questions in this survey. The questions in this survey focus on the shoreline and waters in, and near, the Georgetown, SC area. This includes city areas, beaches, intercoastal waters, and off shore waters, and is outlined in red on the map provided by the field researcher. This outlined area is referred to throughout the survey as the “Georgetown coastal area” or simply as the “area.”*

*Please review the map prior to answering the questions in this survey. The questions in this survey focus on the shoreline and waters in, and near, the North Myrtle Beach, SC and Little River, SC area. This includes city areas, beaches, intercoastal waters, and off shore waters, and is outlined in red on the map provided by the field researcher. This outlined area is referred to throughout the survey as the “North Myrtle Beach coastal area” or simply as the “area.”*

Second, we provided a paragraph describing the proposed project (see paragraphs below). However, we did not identify any potential benefits or drawbacks that proposed offshore wind energy may provide.

*The purpose of the remaining questions in this survey is to understand people’s opinions about potential offshore wind energy in the Georgetown coastal area. A small number of wind turbines are being considered for the feasibility of placement in the waters*

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*near Georgetown, SC. Each turbine would potentially extend 300 feet above the water's surface. Although the exact placement of these turbines has not yet been determined, the turbines near Georgetown would potentially be located approximately 3 miles from shore. Please refer to the provided map when answering questions about the "Georgetown Coastal Area." Your answers are extremely important and will help others understand your views regarding this topic.*

*The purpose of the remaining questions in this survey is to understand people's opinions about potential offshore wind energy in the North Myrtle Beach coastal area. A small number of wind turbines are being considered for the feasibility of placement in the waters near North Myrtle Beach/Little River, SC. Each turbine would potentially extend 300 feet above the water's surface. Although the exact placement of these turbines has not yet been determined, the turbines near North Myrtle Beach/Little River would potentially be located within federal waters, which are 4 or more miles from shore. Please refer to the provided map when answering questions about the "North Myrtle Beach Coastal Area." Your answers are extremely important and will help others understand your views regarding this topic.*

### **2.3c – Data management and analysis**

We used standard calculations for leverage, kurtosis, and skewness to identify statistical outliers and to verify univariate and multivariate normality of the data (Tabachnick & Fidell, 2001). A small number of cases ( $N = 19$ ) were excluded from subsequent analysis due to extreme violations of multivariate normality. Next, we evaluated the research questions using SPSS 18.0 software to identify the descriptive statistics (e.g., means and standard deviations). We also used means testing (ANOVA and t-tests) to evaluate statistical mean differences between communities, county and non-county residents, and activity groups. A K-means cluster analysis using 3 – 7 group solutions was applied to the data and the four group solution was the strongest statistically and conceptually. An alpha level of 0.05 was used for all statistical comparisons.

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### 3.0 – Results

#### 3.1 – Interview results

Approximately 850 minutes (~ 14 hours) of interviews were conducted with 17 respondents that represented eight categories. Results from the interviews revealed six main categories of support for proposed offshore wind energy in the region: 1) to increase energy independence, 2) to help the environment, 3) to benefit future generations, 4) to improve marine habitat, 5) to provide a positive reputation for the area, and 6) to improve the local economy. The interview results also indicated five main categories which may contribute to opposition of proposed offshore wind energy in the region: 1) a perceived decrease in scenic beauty, 2) lack of productivity, 3) damage to the marine environment, 4) displacement of visitors/tourists, and 5) harm to the local economy.

Table 2. *Respondent categories and number of respondents participating in Phase I interviews*

Respondent category	Respondents
Beach side residents	4
Captains and marine users (e.g., beach users, anglers, sailors, SCUBA divers)	14
Community leaders	4
Marina managers and operators	2
Researchers and research assistants	3
Resort owners and managers	4
Tourists	4
Regional wind energy leaders	6

*Notes.*  $N = 17$ ; an individual respondent may have membership in multiple categories

Table 3. *Response categories and noticeable connections to respondent type*

Categories for support	Categories for opposition	Connection to respondent type
Increase energy independence		
	Decrease scenic beauty	Beach side residents
Help the environment		
	Lack productivity	
Benefit future generations		
	Harm the marine environment	Marine users
Improve marine habitat		Marine users
	Displace visitors	
Provide positive reputation		Community leaders
	Harm the local economy	
Improve the local economy		Community leaders Resort owners and managers

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### **3.2 – Questionnaire results**

(see Appendix C for the example of the questionnaire)

#### **3.2a – Response rate and representation**

During Phase 3, we physically approached 632 visitors on-site and 481 elected to participate in the study, yielding a 76% response rate and achieving a 95% confidence level with a 4.55% confidence interval. We also collected responses through an internet survey to neighborhood residents in Georgetown County and received a 44% response rate. The internet and on-site sample are aggregated in the report. We recorded observational and conversational data (e.g., gender, group size, opposition to discussing wind energy) to evaluate non-response bias, with one pattern observed. Potential respondents who self-identified as first time visitors declined participation. This pattern appeared in approximately 16% of cases and most visitors cited “lack of time”, high air temperatures, and fatigue as the primary reason for not participating in the study. Readers are encouraged to review and interpret the results as representative of marine recreationists in both communities, and not representative of *all* community or state residents.

#### **3.2b – Description of the overall sample**

In the questionnaire, respondents self-reported their demographic categories using standard classes from the U.S. Census Bureau (USCB, 2011). The aggregated sample from both communities indicates the majority of respondents (97.1%) resided in the United States, and 57% were within county residents. The median age of respondents was 54 years. More males (64.7%) than females (35.3%) completed the questionnaire, and most respondents self-reported their race as white (89.0%). Considering education level, 32.2% reported possessing a four-year college degree, and 10.8% possessed a high school diploma. Income was well dispersed with 57.3% having a household income of less than \$100,000 prior to taxes.

We compared statistical differences in six demographics and three visit characteristics across the two communities using Analysis of Variance (ANVOA) and Cross Tabulations, which resulted in three identified differences ( $p > 0.05$ ), indicating similar visitors (demographically) utilize both area's marine recreation resources. Specifically, respondent groups across communities differed in within county residency, income, and gender. Race did not influence the degree of support or opposition ( $p > 0.05$ ) for proposed offshore wind energy. However, women were more likely to report higher levels of support than men and local residents and individuals with higher income were more likely to express opposition ( $p < 0.05$ ).

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Table 4. *County of residence*

*Do you live in the United States?*

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	638	97.1	99.4	99.4
No	4	0.6	0.6	100.0
Total	642	97.7	100.0	
Missing	15	2.3		
Total	657	100.0		

Table 5. *Gender*

*What is your gender?*

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	407	61.9	64.7	64.7
Female	222	33.8	35.3	100.0
Total	629	95.7	100.0	
Missing	28	4.3		
Total	657	100.0		

Table 6. *Education*

*What is the highest level of formal schooling you have completed?*

	Frequency	Percent	Valid Percent	Cumulative Percent
Less than high school	5	0.8	0.8	0.8
Some high school	10	1.5	1.6	2.3
High school graduate	69	10.5	10.8	13.1
Some college - no degree	99	15.1	15.5	28.6
Two year college degree	81	12.3	12.7	41.3
Four year college degree	206	31.4	32.2	73.6
Graduate or professional degree	169	25.7	26.4	100.0
Total	639	97.3	100.0	
Missing	18	2.7		
Total	657	100.0		

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Table 7. *Race/ethnicity*

*What is your race/ethnicity?*

	Frequency	Percent	Valid Percent	Cumulative Percent
American Indian	8	1.2	1.2	1.2
Asian	5	0.8	0.8	2.0
Black	42	6.4	6.6	8.6
Hawaiian or Pacific Islander	2	0.	0.	8.9
Hispanic or Latino/a	7	1.1	1.1	10.0
White	567	86.3	89.0	99.1
Other	6	0.9	0.9	100.0
Total	637	97.0	100.0	
Missing	20	3.0		
Total	657	100.0		

Table 8. *Income*

*Which category best describes your total household income in U.S. dollars during 2010 before taxes?*

	Frequency	Percent	Valid Percent	Cumulative Percent
Less than \$24,999	24	3.7	4.3	4.3
\$25,000 to \$34,999	44	6.7	7.9	12.3
\$35,000 to \$49,000	67	10.2	12.1	24.3
\$50,000 to \$74,999	96	14.6	17.3	41.6
\$75,000 to \$99,999	87	13.2	15.7	57.3
\$100,000 to \$149,999	91	13.9	16.4	73.7
\$150,000 to \$199,999	51	7.8	9.2	82.9
> or = to \$200,000	95	14.5	17.1	100.0
Total	555	84.5	100.0	
Do not wish to answer	65	9.9		
Missing	37	5.6		
Total	102	15.5		
Total	657	100.0		

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Table 9. *County resident calculated by zip code*

	Frequency	Percent	Valid Percent	Cumulative Percent
YES -resident of Horry or Georgetown county	339	51.6	57.0	57.0
NO - non-resident of Horry or Georgetown county	256	39.0	43.0	100.0
Total	595	90.6	100.0	
Missing	62	9.4		
Total	657	100.0		

Table 9. *Calculated age*

Valid	495
Missing	162
Mean	51.57
Median	54.00
Std. Deviation	15.26
Percentiles	
25	40.00
50	54.00
75	64.00

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### 3.2c – Responses for the total sample

Table 10. *Past use history*

*Please tell us about your past use history of the coastal area. The term “coastal recreation activities” refers to the recreation-based activities you do in the Georgetown coastal area (for example, fishing, viewing the ocean, swimming, general beach use, boating, etc.):*

		Including today, how many days in the last month (30 days) have you used the area for coastal recreation activities?	Including today, how many days in the last year (12 months) have you used the area for coastal recreation activities?	Including today, how many years (total) have you used the area at least once for coastal recreation activities?
N	632	637	634	632
	25	20	23	25
Mean		7.59	56.12	16.70
Median		4.00	20.00	12.00
Std. Deviation		8.34	86.68	15.57

Marine recreationists used the coastal recreation resources an average of eight days within a month and 56 days in a calendar year. Over 50% of the respondents reported using the coastal recreation resources for at least once for 13 years (non-consecutive).

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Table 11. *Place attachment.* Percent responses, means, and standard deviations of place attachment items. Items ranked by highest mean within dimension (1 = low place attachment, 7 = high place attachment)

*We would like to know more about you and the coastal area (referred to below as the “area” or “here”). Please rate your agreement with the statements.*

	Place attachment item	<div>Completely disagree<div>←————→</div>Completely agree</div>							Mean ( <i>SD</i> )
Place identity (M = 6.04)	I identify strongly with this area	1.9	0.6	1.9	11.4	9.1	19.	55.9	6.07 (1.35)
	This area is very special to me	1.7	0.5	1.1	8.6	8.7	18.1	61.3	6.22 (1.26)
	I am very attached to this area	2.2	0.6	1.5	11.9	10.5	18.1	55.2	6.03 (1.38)
	This area means a great deal to me	1.9	1.1	1.9	12.2	13.3	17.4	52.3	5.96 (1.39)
Place dependence (M = 5.64)	This area is the best place for the coastal recreation activities I like to do	1.8	1.7	1.4	12.9	13.1	19.0	50.1	5.91 (1.41)
	I enjoy doing coastal recreation activities in this area more than in any other location	2.8	2.3	2.9	14.6	13.8	19.4	44.2	5.69 (1.55)
	Participating in coastal recreation activities in the Georgetown coastal area is more important to me than doing them in any other area	3.7	2.9	3.1	17.8	13.8	17.5	41.3	5.53 (1.65)
	No other place can compare to this area for the types of coastal recreation activities I do	5.9	2.9	4.3	17.9	14.6	18.3	36.1	5.32 (1.76)
Social/community attachment (M = 5.38)	The people in this area are very important to me	2.5	1.7	2.9	14.3	15.8	23.2	39.6	5.67 (1.47)
	Many of my friends and/or family are in this area	4.2	2.8	3.2	16.8	15.4	19.5	38.2	5.48 (1.65)
	People in this area mean a great deal to me	6.3	3.4	4.4	17.2	16.7	19.5	32.5	5.23 (1.76)
	I have a lot of ties with the people in this area	8.3	4.4	4.8	18.7	15.8	16.4	31.6	5.05 (1.88)
	PLACE ATTACHMENT TOTAL	3.6	2.1	2.8	14.5	13.4	18.8	44.9	5.68 (1.76)

Respondents reported relatively high levels of place attachment. The place identity dimension received the highest attachment followed by place dependence. Social community attachment, although high, received the lowest scores by respondents.

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Table 12. *Support for offshore wind energy.* Percent responses, means, and standard deviations of support items. Items ranked by highest mean (1 = low support, 7 = support)

*The list below represents reasons that some people support offshore wind energy. Please tell us if these are reasons that you support offshore wind energy in the coastal area.*

***“I SUPPORT OFF SHORE WIND ENERGY IN THE COASTAL AREA BECAUSE I THINK IT WILL...”***

	<div> <div>Completely disagree</div> <div>←</div> <div>→</div> <div>Completely agree</div> </div>							Mean (SD)
Increase energy independence (from foreign sources, produce own energy)	7.0	2.8	2.9	7.3	11.5	20.0	48.6	5.68 (1.80)
Help the environment (prevent pollution, decrease reliance on fossil fuels)	6.7	2.9	2.9	7.3	12.5	19.5	48.1	5.67 (1.79)
Benefit future generations (help the community into the future)	7.4	2.6	1.5	8.3	13.3	20.4	46.4	5.64 (1.80)
Improve the local economy (more jobs, new businesses, increase property values)	9.4	2.6	5.1	14.4	16.0	21.5	31.0	5.53 (1.59)
Give the area a positive reputation (new reason to visit, be a green energy leader)	8.8	3.7	5.4	10.2	14.9	24.0	33.0	5.23 (1.89)
Improve the marine habitat for fish (attract fish, improve recreational fishing)	8.7	3.0	3.1	18.2	13.2	18.2	35.5	5.21 (1.88)
Bring new people to the area to live and/or visit	10.8	3.1	4.6	20.0	15.5	16.7	29.3	4.93 (1.93)
<b>SUPPORT TOTAL</b>	<b>8.4</b>	<b>2.9</b>	<b>3.6</b>	<b>12.2</b>	<b>13.8</b>	<b>20.1</b>	<b>38.8</b>	<b>5.41 (1.76)</b>

Respondents seem supportive of wind energy in the Georgetown and North Myrtle Beach areas (M = 5.41). *Increase energy independence* received the highest level of support (M = 5.68) and *bring new people to the area* received the lowest support (M = 4.93).

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Table 13. *Likelihood of performing civic actions in support of offshore wind energy.* Percent responses, means, and standard deviations of civic actions items for support of offshore wind energy. Items ranked by highest mean (1 = not very likely, 3 = very likely)

*Please tell us how likely you are to take these actions to support offshore wind energy in the coastal area*

	I am NOT very likely to perform this action to <u>SUPPORT</u> wind energy	←————→	I am very likely to perform this action to <u>SUPPORT</u> wind energy	Mean (SD) of likelihood	Would not perform the action at all to <u>SUPPORT</u> wind energy
Vote in a formal election	10.3	11.1	30.3	2.38 (0.80)	48.3
Sign a petition	12.7	10.5	24.0	2.24 (0.85)	52.7
Talk to family and friends	14.8	15.1	22.8	2.15 (0.83)	47.3
Attend a public meeting	11.3	11.0	15.1	2.10 (0.84)	62.6
Write a letter or email to a public official	9.1	8.9	10.2	2.04 (0.83)	71.9
Write an opinion article in the newspaper or internet	7.8	5.2	6.1	1.91 (0.85)	80.9
Donate or invest money	13.2	5.0	6.6	1.73 (0.86)	75.1
Pay for higher energy costs	13.1	5.4	6.2	1.72 (0.84)	75.3
Volunteer time	13.2	8.0	5.7	1.72 (0.79)	73.0
<b>CIVIC ACTION IN SUPPORT TOTAL</b>	<b>11.7</b>	<b>8.9</b>	<b>14.1</b>	<b>1.99 (0.83)</b>	<b>65.2</b>

Although respondents are supportive of wind energy in the area, they report less likelihood to perform civic actions to support wind energy. For example, approximately 81% (highest) of respondents reported they would not *write an opinion article in the newspaper or internet* and approximately 47% (lowest) of respondents reported they would not *talk to family and friends*. For respondents who indicate they would engage in civic action in support of wind energy, 30.3% reported they were *very likely* to vote in a formal election and 24.0% indicated they would *sign a petition*.

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Table 14. *Opposition towards offshore wind energy.* Percent responses, means, and standard deviations of support items. Items ranked by highest mean (1 = low support, 7 = support)

*The list below represents reasons that some people oppose offshore wind energy. Please tell us if these are reasons that you oppose offshore wind energy in the Georgetown coastal area by responding to the following statement.*

***“I OPPOSE OFF SHORE WIND ENERGY IN THE COASTAL AREA BECAUSE I THINK IT WILL...”***

	<div> <div>←</div> <div>Completely disagree</div> <div>→</div> <div>Completely agree</div> </div>							Mean (SD)
Decrease the scenic and natural beauty (harm ocean views, be a visual eye-sore)	24.6	14.4	9.8	15.7	8.3	9.6	17.6	3.68 (2.20)
Ultimately, not be as productive as promised (only produce when wind is blowing, not meet energy demands)	22.2	13.4	12.2	19.6	11.4	7.0	14.2	3.62 (2.05)
Negatively influence the marine environment (harm animals/plants, influence natural cycles)	26.4	12.8	12.8	23.1	7.2	5.7	12.0	3.37 (2.00)
Drive visitors and residents away from the area	33.7	12.1	11.3	18.0	9.3	4.9	10.8	3.15 (2.04)
Harm the area's economy (job loss, repel new businesses, decrease property values)	34.2	14.5	13.1	18.3	6.9	4.4	8.7	2.97 (1.93)
Bring too many new people to the area to live or visit	36.2	14.4	13.9	22.9	4.9	2.6	5.1	2.74 (1.73)
<b>OPPOSITION TOTAL</b>	<b>29.6</b>	<b>13.6</b>	<b>12.2</b>	<b>19.6</b>	<b>8.0</b>	<b>5.7</b>	<b>11.4</b>	<b>3.26 (1.96)</b>

On a seven point scale, respondents generally report low levels of opposition ( $M = 3.26$ ). Aesthetic impacts or opposing wind energy because it will *decrease the scenic and natural beauty* received the highest reason for opposition ( $M = 3.68$ ) and *bring too many new people to the area* ( $M = 2.74$ ) was the lowest. 17.6% of respondents completely agree that wind energy will *decrease the scenic and natural beauty*. Additionally, the standard deviations for opposition items are relatively larger compared to support items, which indicates more disagreement may exist among respondents in their strength of opposition.

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Table 15. *Likelihood of performing civic actions in opposition of offshore wind energy.* Percent responses, means, and standard deviations of civic actions items for opposition of offshore wind energy. Items ranked by highest mean (1 = not very likely, 3 = very likely).

*Please tell us how likely you are to take these actions to oppose offshore wind energy in the coastal area.*

	I am NOT very likely to perform this action in <u>OPPOSITION</u> of wind energy	←————→	I am very likely to perform this action in <u>OPPOSITION</u> of wind energy	Mean (SD) of likelihood	Would not perform the action at all in <u>OPPOSITION</u> of wind energy
Vote in a formal election	1.9	2.4	12.2	2.63 (0.68)	83.5
Talk to family and friends	3.0	1.7	11.2	2.52 (0.79)	84.1
Sign a petition	3.3	1.9	11.5	2.49 (0.81)	83.4
Pay for higher energy costs	4.5	4.8	16.9	2.48 (0.77)	73.9
Attend a public meeting	3.1	2.5	9.7	2.43 (0.81)	84.6
Donate or invest money	3.3	3.9	11.0	2.42 (0.78)	81.7
Write a letter or email to a public official	4.2	4.2	11.4	2.36 (0.81)	80.2
Volunteer time	3.5	4.6	9.3	2.34 (0.79)	88.8
Write an opinion article in the newspaper or internet	4.4	3.9	10.2	2.31 (0.84)	81.5
<b>CIVIC ACTION IN OPPOSITION TOTAL</b>	<b>3.5</b>	<b>3.3</b>	<b>11.5</b>	<b>2.44 (0.81)</b>	<b>82.4</b>

Similar to the results for likelihood of engaging in civic action to support wind energy, respondents generally seem to lack a willingness or high likelihood to engage in civic action to oppose wind energy. Specifically, approximately 85% reported they would not *attend a public meeting* (highest) to oppose wind energy and 74% reported they would not *pay for higher energy costs* (lowest) in opposition of wind energy. However, of the respondents who indicated they would pay for higher energy costs, 16.9% reported they were highly likely to perform this action in opposition of wind energy.

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Table 16. *Interest in wind energy related activities.* Percent responses, means, and standard deviations of items for interest in wind energy related activities. Items ranked by highest mean (1 = absolutely desire, 7 = very high desire). Remainder of respondents reported “don’t know”

*Please tell us how interested you are in these wind energy related activities in the coastal area.*

	<div style="display: flex; justify-content: space-between; align-items: center;"> <span><b>Absolutely no desire</b></span> <span>←————→</span> <span><b>Very high desire</b></span> </div>							<b>Mean (SD)</b>
Eat at a local restaurant or stay in lodging (hotel, etc.) that uses wind energy	10.8	1.5	2.3	22.9	16.5	18.1	28.1	4.99 (1.87)
Go on a boat ride to view and tour offshore wind turbines	12.7	3.4	5.4	21.3	17.2	16.4	23.7	4.71 (1.95)
Attend an educational program about wind energy	9.2	2.6	3.8	30.9	20.7	13.0	12.8	4.52 (1.67)
Go to a wind energy museum	16.5	4.1	5.2	28.9	17.6	13.1	14.7	4.25 (1.91)
Fish near wind turbines	17.0	4.8	3.7	32.4	14.1	11.2	16.8	4.23 (1.92)
Scuba dive near wind turbines	33.9	4.1	4.8	35.0	7.6	6.0	8.6	3.31 (1.97)

Respondents generally report a moderate level of interest in wind energy related activities. This claim is supported by the moderate mean scores (approximately 4.5) and high levels of respondents indicating 4 out of 7 (22.9 to 35.0%). However, 63% of respondents reported some level of interest in *eating at a local restaurant or staying in lodging that uses wind energy*. Additionally, approximately 57% indicated at least some level of interest to *go on a boat ride to view or tour offshore wind energy*.

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Table 17. *Potential displacement or addition.* Percent responses, means, and standard deviations of items for potential displacement or additions. Items ranked by highest mean (1 = completely disagree, 7 = completely agree).

*Please rate your agreement with the following statements.*

**“IF OFFSHORE WIND ENERGY WAS PRESENT IN THE COASTAL AREA, I WOULD...”**

	<div> <div>←</div> <div>Completely disagree</div> <div>Completely agree</div> <div>→</div> </div>							Mean (SD)
Use the coastal recreation resources in the coastal area MORE often	17.7	3.8	3.9	45.9	8.5	6.9	13.3	3.98 (1.83)
Buy property (or buy more property) in the coastal area	20.0	5.0	4.2	46.5	9.5	6.1	8.7	3.74 (1.76)
Use the coastal recreation resources in the coastal area LESS often	45.9	9.8	6.6	25.6	3.4	3.7	5.0	2.62 (1.82)
Stop using the coastal recreation resources in the coastal area	49.8	10.3	6.2	24.9	3.9	2.5	2.3	2.40 (1.66)

These results indicate limited behavior change, such as displacement or increases in recreation use, may occur due to wind energy ( $M < 3.98$ ). However, a large amount of respondents (46 to 25%) reported they did not agree or disagree with the statements (i.e., 4 out of 7), which may indicate they need more information to make a decision regarding the item. Regardless, approximately 50% completely disagreed that they would *stop using the coastal recreation resources in the area*. However, 12.1% reported they would *use the coastal recreation resources less often*.



Table 18. *Beliefs in the occurrence of climate change.* Percent responses, means, and standard deviations of items for beliefs in the occurrence of climate change. Items ranked by highest mean (1 = completely disagree, 7 = completely agree).

*Some people have different opinions about global climate change and whether it is actually happening, or if global climate change is caused partially by human actions. We are interested in knowing what you think.*

**“ON AVERAGE, AROUND THE EARTH, I BELIEVE THE FOLLOWING ARE HAPPENING...”**

	<div> <div>Completely disagree</div> <div>←————→</div> <div>Completely agree</div> </div>							Mean (SD)
The number of flooding events are increasing	5.9	3.0	5.6	22.2	19.6	16.6	27.2	5.05 (1.71)
The areas affected by drought are increasing	5.8	2.3	5.4	22.1	22.4	17.9	24.1	5.03 (1.65)
Air temperature is increasing	6.1	3.1	5.5	20.5	23.0	16.7	25.0	5.02 (1.69)
The amount of ocean ice is decreasing	5.9	3.0	5.8	24.1	21.7	13.7	25.9	4.97 (1.69)
Permanently frozen soil in the arctic is now thawing	5.9	3.0	6.4	22.5	23.7	14.2	24.3	4.95 (1.69)
The temperature of the ocean is increasing	6.2	2.5	6.2	23.7	22.0	16.6	22.9	4.94 (1.66)
Sea level is rising	5.8	2.3	4.7	28.2	20.4	15.4	23.2	4.94 (1.64)
Mountain environments are losing snow	6.4	3.9	6.5	24.5	19.9	15.5	23.3	4.87 (1.72)
<b>OCCURRENCE TOTAL</b>	<b>6.0</b>	<b>2.9</b>	<b>5.8</b>	<b>23.5</b>	<b>21.6</b>	<b>19.6</b>	<b>24.5</b>	<b>4.97 (1.69)</b>

On average, respondents possessed moderate beliefs in the occurrence of climate change ( $M = 4.97$ ). Additionally many of the respondents reported a 4 of 7, indicating they are perhaps not sure if climate change is happening.



Table 19. *Beliefs in the human influence on climate change.* Percent responses, means, and standard deviations of items for beliefs in the human influence on climate change. Items ranked by highest mean (1 = completely disagree, 7 = completely agree).

*Some people have different opinions about global climate change and whether it is actually happening, or if global climate change is caused partially by human actions. We are interested in knowing what you think.*

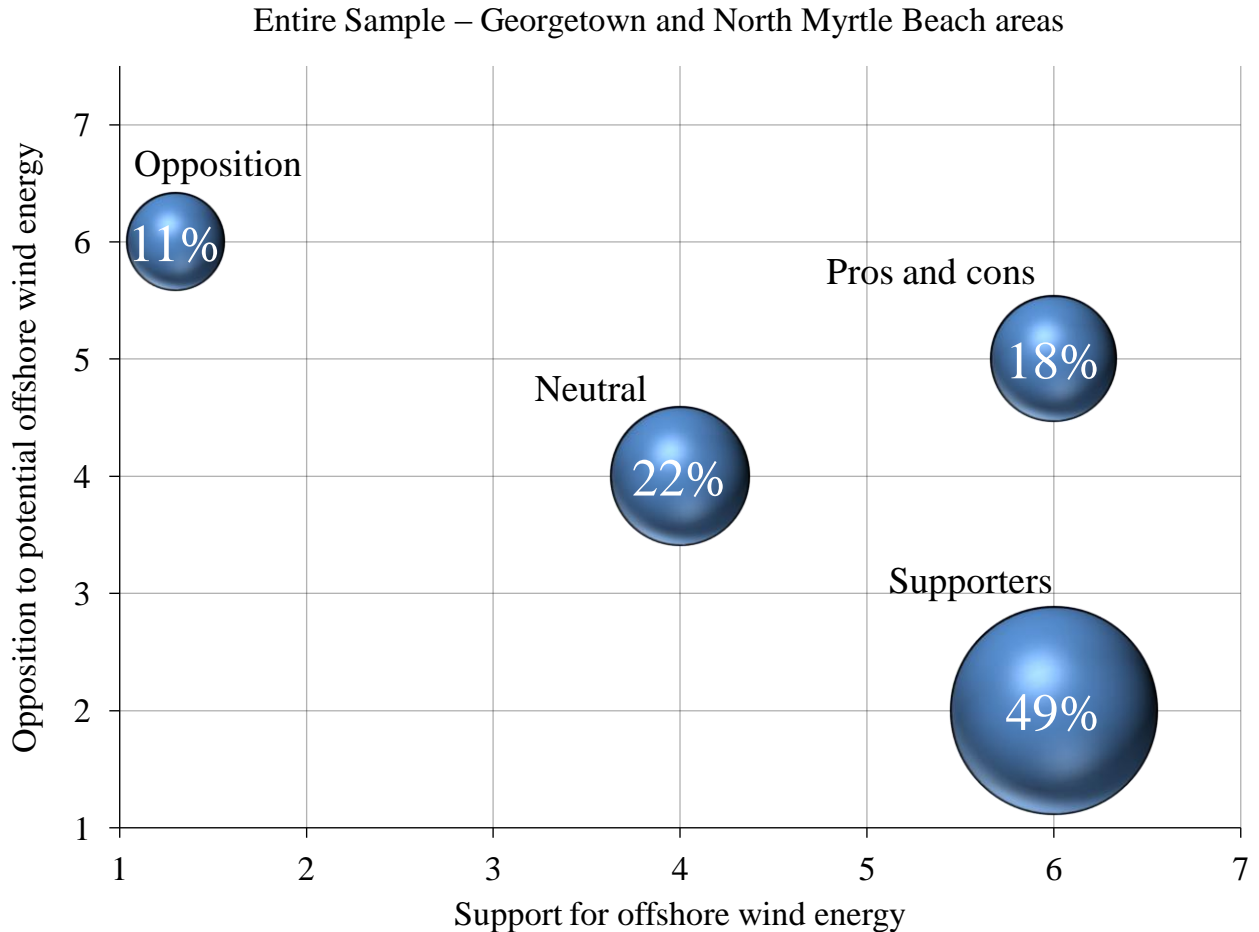
**“I BELIEVE THE FOLLOWING CONTRIBUTE TO CHANGES IN CLIMATE AROUND THE EARTH”**

	<div> <div>←</div> <div>Completely disagree</div> <div>Completely agree</div> <div>→</div> </div>							Mean (SD)
Clear cutting of forests	6.2	3.0	3.4	16.4	17.6	20.7	32.7	5.42 (1.77)
Pollution from factories	6.4	2.7	3.6	12.5	18.9	22.2	33.9	5.37 (1.75)
Driving gas powered automobiles	6.4	2.2	3.4	14.8	21.9	18.6	32.7	5.30 (1.70)
Burning fossil fuels, such as oil and coal	6.6	3.1	2.8	14.7	20.7	18.6	33.5	5.30 (1.70)
Clearing land for human use	6.2	2.1	3.8	14.0	16.6	21.9	35.3	5.29 (1.73)
Airplane travel	8.1	4.0	5.8	25.5	16.4	15.9	24.3	4.83 (1.80)
<b>HUMAN INFLUENCE TOTAL</b>	6.7	2.9	3.8	16.3	18.7	19.7	32.1	5.25 (1.76)

Although most respondents seem skeptical about climate change *currently* happening, they generally believe human action *can* influence climate (M = 5.25). The belief that *clear cutting forests* can influence climate received the highest belief (M = 5.42) and the belief that *airplane travel* can influence climate received the lowest score from respondents (M = 4.83).



Figure 1. *Segmentation results.* Levels of opposition, support, and the percent membership in each category. Items ranked by highest mean (1 = low support and low opposition, 7 = high support and high opposition).



This figure reveals that five distinct groups of marine recreationists exist based on their levels of support and opposition for potential offshore wind energy. The percent displayed and the size of the bubble represents the percent of the population. The segmentation is based on reported support and opposition levels (attitudinal) and not likelihood to engage in civic action (behavioral). The groups possess the following characteristics.

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**Supporters:** This is the largest segmentation group, containing 49% of the sampled population and is characterized by high levels of support ( $M = 6$ ) and low levels of opposition ( $M = 2$ ). The average age of members in this group is 51 years and 50% of this group reported income below \$100,000 annually. Approximately, 57% of the people in this group have at least a four-year college degree and 54.3% of supporters report that their primary residence is located in Georgetown or Horry counties. *Supporters* tend to report positive beliefs in the occurrence ( $M = 5.67$ ) of climate change. On average, members in this group express moderate levels ( $M = 4$  or 5 for most activities) of interest in engaging in wind energy related activities and score significantly higher in their level of interest than members of the *neutral* or *opposition* group. Individuals in the *supporters* group express the most potential to buy property (or more property) ( $M = 4.29$ ) or use the coastal recreation resources more often ( $M = 4.59$ ) in response to offshore wind energy development. The table below displays the percent of members reporting they would engage in a specific civic action in support of offshore wind energy development.

Table 20. *Members of the support group reporting they would engage in civic action*

Action	Support
Vote in a formal election	70%
Talk to family and friends	70%
Sign a petition	67%
Write a letter or email to a public official	60%
Attend a public meeting	52%
Volunteer time	40%
Donate or invest money	38%
Write an opinion article in the newspaper or internet	26%
Pay for higher energy costs	22%

**Neutral:** This is the second largest segmentation group comprising 22% of marine recreationists sampled. Individuals in this group generally possess moderate levels of support ( $M = 4$ ) and opposition ( $M = 4$ ). Approximately, 55% of the individuals in this group report annual household incomes below \$100,000 and 36% reported possessing a four-year college degree. In this sample, 55% of supporters report that their primary residence is located in Georgetown or Horry counties. Members in this group report the lowest level of place attachment ( $M = 5.32$ ) compared to any other group. *Neutral* respondents report moderate beliefs in the occurrence ( $M = 4.72$ ) of climate change. This group is less likely to express interest in most wind energy related activities than members in the *supporters* or *pros and cons*, but more likely than members of the *opposition* group. Most members of this group express limited potential for recreational displacement ( $M < 2.63$ ) due to offshore wind energy development. The table below displays the percent of members reporting they would engage in a specific civic action in support or opposition of offshore wind energy development.

Table 21. *Members of the neutral group reporting they would engage in civic action*

Action	Support	Opposition
Vote in a formal election	30%	15%
Attend a public meeting	30%	13%
Talk to family and friends	29%	13%
Sign a petition	28%	15%
Pay for higher energy costs	15%	15%
Donate or invest money	8%	14%
Write a letter or email to a public official	7%	15%
Volunteer time	3%	14%
Write an opinion article in the newspaper or internet	3%	13%

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**Pros and cons:** The *pros and cons* group seems to identify both reasons to support ( $M = 6$ ) and oppose offshore wind energy ( $M = 5$ ) and accounts for 18% of the population. Members in this group are the youngest, on average of any group ( $M = 44$  years old), with the lowest income (60% make less than \$75,000) and education (43% report possessing at least a four-year college degree). Approximately 44% of *pros and cons* report that their primary residence is located in Georgetown or Horry counties. Respondents report positive beliefs in the occurrence ( $M = 5.32$ ) of climate change. Most members of this group express a low potential for displacement ( $M < 3.30$ ) due to offshore wind energy development. The table below displays the percent of members reporting they would engage in a specific civic action in support or opposition of offshore wind energy development.

Table 22. *Members of the pros and cons group reporting they would engage in civic action*

Action	Support	Opposition
Talk to family and friends	55%	10%
Vote in a formal election	48%	13%
Sign a petition	43%	9%
Attend a public meeting	38%	9%
Write a letter or email to a public official	33%	12%
Volunteer time	32%	12%
Pay for higher energy costs	27%	14%
Write an opinion article in the newspaper or internet	25%	14%
Donate or invest money	24%	10%

**Opposition:** The smallest group (11%) is characterized by high levels of opposition ( $M = 6$ ) and low levels of support ( $M = 1$ ). Individuals in this group report significantly higher income and education than any other group (41% report household incomes equal to or exceeding \$200,000 and 53% report graduate or professional degrees). Members in this group tend to be older compared to other groups ( $M = 59$  years old). Approximately, 90% of *opposition* members tend to report that their primary residence is located within Georgetown or Horry Counties and 81% are men. 85% of the opposition group were sampled in the Georgetown area. Members in this group report the highest level of place attachment ( $M = 6.60$ ) and place identity ( $M = 6.81$ ) compared to any other group. *Opposition* members tend to report lower beliefs in the occurrence of climate change ( $M = 3.85$ ) than other segmentation groups. Respondents in this group express limited to no interest in engaging in wind energy related activities. Members of this group report a higher potential of using the area less often due to the placement of offshore wind energy ( $M = 4.13$ ) than any other group. The table below displays the percent of members reporting they would engage in a specific civic action in opposition of offshore wind energy development.

Table 23. *Members of the opposition group reporting they would engage in civic action*

Action	Opposition
Talk to family and friends	87%
Sign a petition	89%
Attend a public meeting	83%
Write a letter or email to a public official	83%
Vote in a formal election	82%
Donate or invest money	80%
Volunteer time	72%
Write an opinion article in the newspaper or internet	70%
Pay for higher energy costs	63%

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### 3.3 – Responses compared across communities

Table 24. *Support towards offshore wind energy compared across two communities.* Percent responses, means, standard deviations, and differences between communities in responses to *support* items. (1 = low support, 7 = support)

*The list below represents reasons that some people support offshore wind energy. Please tell us if these are reasons that you support offshore wind energy in the coastal area.*

#### “I SUPPORT OFF SHORE WIND ENERGY IN THE COASTAL AREA BECAUSE I THINK IT WILL...”

		<div>Completely disagree ←————→ Completely agree</div>								$\chi^2$	Mean (SD)	t-value*
Help the environment (prevent pollution, decrease reliance on fossil fuels)	GTN	8.7	4.0	3.2	8.7	13.9	15.9	45.7	23.86*	5.45 (1.94)	- 4.03*	
	NMB	3.3	1.2	2.5	4.9	10.3	25.5	52.3		6.03 (1.44)		
Benefit future generations (help the community into the future)	GTN	9.7	4.0	1.7	9.4	14.6	18.3	42.3	23.68*	5.40 (1.95)	- 4.55*	
	NMB	3.7	0.4	1.2	6.6	11.1	23.9	53.1		6.05 (1.42)		
Increase energy independence (from foreign sources, produce own energy)	GTN	9.2	3.5	3.7	8.7	12.1	15.1	47.8	27.66*	5.48 (1.96)	- 3.73*	
	NMB	3.3	1.7	1.7	5.0	10.3	28.1	50.0		6.02 (1.43)		
Give the area a positive reputation (new reason to visit, be a green energy leader)	GTN	11.6	4.9	6.9	12.6	14.1	18.5	31.4	40.14*	4.94 (2.04)	- 5.18*	
	NMB	4.1	1.6	2.9	6.1	16.4	33.2	35.7		5.71 (1.50)		
Improve the marine habitat for fish (attract fish, improve recreational fishing)	GTN	11.5	3.3	4.5	19.3	12.8	16.0	32.8	22.19*	4.97 (1.99)	- 4.13*	
	NMB	4.1	2.5	0.8	16.5	14.0	21.9	40.1		5.60 (1.60)		
Improve the local economy (more jobs, new businesses, increase property values)	GTN	12.8	3.2	5.7	16.0	14.5	19.2	28.6	23.67*	4.88 (2.01)	- 4.50*	
	NMB	3.7	1.7	4.1	11.6	18.6	25.2	35.1		5.56 (1.54)		
Bring new people to the area to live and/or visit	GTN	14.6	4.7	5.7	21.3	15.1	14.4	24.1	40.40*	4.57 (2.04)	- 6.33*	
	NMB	4.5	0.4	2.9	17.7	16.0	20.6	37.9		5.53 (1.58)		
SUPPORT TOTAL	GTN	9.7	4.3	4.3	10.9	17.3	23.7	29.8	28.61*	5.10 (1.87)	- 4.69*	
	NMB	3.4	1.3	1.3	7.2	15.7	36.4	34.7		5.79 (1.35)		

\*indicates the distribution of responses or the mean differences in responses between communities are statistically different at  $p < 0.05$   
Responses compared across communities for support of wind energy indicate significantly higher support in the N. Myrtle Beach area than the Georgetown area. Disagreement occurred on all items, although both samples are generally supportive ( $M > 5$ ) or moderate ( $M \sim 4$ ) in their support.

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Table 25. *Likelihood of performing civic actions in support of offshore wind energy.* Percent responses, means, standard deviations, and differences between communities in responses to civic action items. (1 = not very likely to perform action, 3 = highly likely to perform action)

*Please tell us how likely you are to take these actions to support offshore wind energy in the coastal area*

		I am NOT very likely to perform this action to <b>SUPPORT</b> wind energy	↔	I am very likely to perform this action to <b>SUPPORT</b> wind energy	Would not perform the action at all to <b>SUPPORT</b> wind energy	$\chi^2$	Mean (SD)	t-value*
Vote in a formal election	GTN	8.8	9.5	30.0	51.7	7.89*	2.44 (0.78)	1.52
	NMB	13.0	13.9	30.7	42.4		2.31 (0.82)	
Sign a petition	GTN	11.6	8.8	21.7	57.9	11.76*	2.24 (0.86)	0.01
	NMB	14.6	13.3	27.9	44.2		2.24 (0.84)	
Talk to family and friends	GTN	14.0	13.0	22.1	50.9	6.67	2.16 (0.84)	0.32
	NMB	16.1	18.6	24.0	41.3		2.13 (0.82)	
Attend a public meeting	GTN	10.1	11.3	15.9	62.7	1.97	2.16 (0.82)	1.29
	NMB	13.4	10.5	13.8	62.3		2.01 (0.85)	
Write a letter to a public official	GTN	7.0	8.7	9.7	74.6	6.44	2.11 (0.81)	1.28
	NMB	12.6	9.2	10.9	67.4		1.95 (0.85)	
Write an opinion article	GTN	5.5	4.5	5.8	84.3	9.96*	2.02 (0.85)	1.43
	NMB	11.7	6.3	6.7	75.3		1.80 (0.85)	
Pay for higher energy costs	GTN	13.8	5.6	5.9	74.7	0.73	1.69 (0.83)	- 0.70
	NMB	11.9	5.1	6.8	76.3		1.79 (0.87)	
Donate or invest money	GTN	10.9	4.5	5.3	79.2	10.35*	1.73 (0.85)	-0.04
	NMB	17.2	5.9	8.8	68.1		1.74 (0.87)	
Volunteer time	GTN	10.5	7.8	4.8	77.0	10.28*	1.75 (0.78)	0.55
	NMB	17.9	8.5	7.3	66.2		1.68 (0.81)	
CIVIC ACTION TOTAL	GTN	10.2	8.2	13.5	68.1	1.04	2.03 (0.82)	0.61
	NMB	14.3	10.1	15.2	60.4		1.96 (0.83)	

\*indicates the distribution of responses or the mean differences in responses between communities are statistically different at  $p < 0.05$

Mean differences are not significant across communities, which indicates on average the communities do not differ in their likelihood to engage in civic action to support offshore wind energy. However, the dispersion of scores, most notably in the column specifying “not performing the action at all” appears significantly different between communities on four items. This indicates more people in North Myrtle Beach may engage in civic action in support of wind energy than Georgetown in the following areas: 1) signing a petition, 2) writing an opinion article, 3) donating or investing money, and 4) volunteering time. However, as noted in the previous section, the general likelihood of marine recreationists engaging in civic action in support of wind energy is relatively low regardless of community.

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Table 26. *Opposition towards offshore wind energy compared across two communities. Percent responses, means, standard deviations, and differences between communities in responses to oppose items. (1 = low support, 7 = support)*

*The list below represents reasons that some people oppose offshore wind energy. Please tell us if these are reasons that you oppose offshore wind energy in the coastal area by responding to the following statement.*

**“I OPPOSE OFF SHORE WIND ENERGY IN THE COASTAL AREA BECAUSE I THINK IT WILL...”**

		<div>Completely disagree ←————→ Completely agree</div>								$\chi^2$	Mean (SD)	t-value*
Ultimately, not be as productive as promised (only produce when wind is blowing, not meet energy demands)	GTN	23.1	11.7	10.9	17.4	12.5	8.6	15.8	13.16*	3.74 (2.12)	1.74	
	NMB	20.6	16.2	14.5	23.2	9.6	4.4	11.4		3.44 (1.91)		
Decrease the scenic and natural beauty (harm ocean views, be a visual eye-sore)	GTN	24.5	13.8	9.1	14.1	7.8	11.2	19.3	6.92	3.78 (2.26)	1.42	
	NMB	24.8	15.2	10.9	18.3	9.1	7.0	14.8		3.52 (2.11)		
Negatively influence the marine environment (harm animals/plants, influence natural cycles)	GTN	27.0	11.8	13.1	22.3	8.6	6.5	10.7	6.68	3.36 (1.98)	- 0.11	
	NMB	25.4	14.5	12.3	24.6	4.8	4.4	14.0		3.38 (2.03)		
Drive visitors and residents away from the area	GTN	34.4	11.5	9.6	18.2	9.6	5.7	10.9	4.57	3.18 (2.07)	0.52	
	NMB	32.5	13.2	14.0	17.5	8.8	3.5	10.5		3.10 (1.99)		
Bring too many new people to the area to live or visit	GTN	38.6	13.6	14.4	24.3	3.9	1.8	3.4	13.43*	2.60 (1.62)	- 2.57*	
	NMB	32.0	15.8	13.2	20.6	6.6	3.9	7.9		2.97 (1.88)		
Harm the area’s economy (job loss, repel new businesses, decrease property values)	GTN	35.0	13.6	11.5	19.6	7.8	3.4	9.1	7.82	2.98 (1.96)	0.23	
	NMB	32.8	16.2	15.7	16.2	5.2	6.1	7.9		2.95 (1.91)		
OPPOSITION TOTAL	GTN	22.1	16.5	13.3	17.9	16.3	10.1	3.7	19.41*	3.35 (1.81)	0.64	
	NMB	21.1	18.8	18.4	20.2	6.3	7.6	7.6		3.25 (1.82)		

\*indicates the distribution of responses or the mean differences in responses between communities are statistically different at  $p < 0.05$

Compared to differences in communities regarding support of wind energy, less differences in opposition exist. Higher opposition exists in the Georgetown for one item: the belief that wind energy will be *ultimately, not be as productive as promised*. However, marine recreationists in N. Myrtle Beach are more likely to oppose wind energy because they think it may *bring too many new people to the area to live or visit*.



Table 27. *Likelihood of performing civic actions in opposition of offshore wind energy.* Percent responses, means, standard deviations, and differences between communities in responses to *civic action* items. Items ranked by highest mean (1 = not very likely to perform action, 3 = highly likely to perform action)

*Please tell us how likely you are to take these actions to oppose offshore wind energy in the coastal area*

		I am NOT very likely to perform this action to <b>OPPOSE</b> wind energy	↔	I am very likely to perform this action to <b>OPPOSE</b> wind energy	Would not perform the action at all to <b>OPPOSE</b> wind energy	$\chi^2$	Mean (SD)	t-value*
Vote in a formal election	GTN	2.3	3.0	17.0	77.8	26.95*	2.66 (0.66)	1.22
	NMB	1.3	1.3	4.2	93.3		2.44 (0.81)	
Sign a petition	GTN	3.3	2.5	15.9	78.3	23.32*	2.58 (0.74)	2.46*
	NMB	3.3	0.8	4.2	91.7		2.10 (0.97)	
Talk to family and friends	GTN	3.3	2.3	15.3	79.2	20.58*	2.58 (0.74)	1.58
	NMB	2.5	0.8	4.5	92.1		2.26 (0.93)	
Attend a public meeting	GTN	2.8	3.3	13.4	80.6	18.93*	2.55 (0.74)	2.82*
	NMB	3.8	1.3	3.8	91.2		2.00 (0.95)	
Write a letter to a public official	GTN	4.2	5.5	14.5	75.8	15.42*	2.42 (0.78)	1.52
	NMB	4.2	2.1	6.3	87.4		2.17 (0.91)	
Write an opinion article	GTN	5.3	5.0	12.0	77.8	10.46*	2.30 (0.83)	- 0.23
	NMB	2.9	2.1	7.1	87.9		2.34 (0.86)	
Pay for higher energy costs	GTN	3.6	5.4	20.4	70.7	11.74*	2.57 (0.70)	2.54*
	NMB	5.9	3.8	11.0	79.2		2.24 (0.88)	
Donate or invest money	GTN	2.3	6.1	14.1	77.5	26.87*	2.53 (0.68)	2.72*
	NMB	5.0	0.4	5.9	88.7		2.07 (0.99)	
Volunteer time	GTN	4.0	6.3	11.8	78.0	17.32*	2.35 (0.77)	0.42
	NMB	2.6	1.7	5.1	90.6		2.27 (0.88)	
CIVIC ACTION TOTAL	GTN	3.5	2.9	10.4	77.3	23.66*	2.48 (0.71)	4.70*
	NMB	3.5	1.6	5.8	89.1		2.21 (0.81)	

\*indicates the distribution of responses or the mean differences in responses between communities are statistically different at  $p < 0.05$

Numerous differences exist between communities in their likelihood to engage in civic action in opposition towards wind energy. Specifically, marine recreationists in Georgetown are more likely engage in civic action to oppose wind energy than marine recreationists in N. Myrtle Beach. Additionally for those that express a likelihood of engaging in civic action, Georgetown respondents report a higher likelihood to do the following: 1) donate or invest money, 2) pay for higher energy costs, 3) attend a public meeting, or 4) sign a petition.

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Table 28. *Interest in wind energy activities compared across two communities.* Percent responses, means, standard deviations, and differences between communities in responses to *interest in wind energy activity* items. Items ranked by highest mean (1 = absolutely no desire, 7 = very high desire)

Please tell us how interested you are in these wind energy related activities in the coastal area

		Absolutely no desire ←————→ Very high desire								$\chi^2$	Mean (SD)	t-value*
Attend an educational program about wind energy	GTN	11.6	2.1	4.1	27.3	20.6	14.4	19.8	9.73	4.66 (1.82)	0.80	
	NMB	9.3	2.8	3.7	31.0	26.9	14.8	11.6		4.54 (1.61)		
Fish near wind turbines	GTN	17.4	4.3	4.0	29.0	12.9	12.1	20.4	14.04*	4.33 (2.03)	1.72	
	NMB	16.2	5.6	3.2	38.4	16.2	9.7	10.6		4.05 (1.80)		
Go on a boat ride to view and tour offshore wind turbines	GTN	14.6	3.6	5.6	20.5	15.9	13.3	26.6	14.86*	4.66 (2.04)	- 0.88	
	NMB	9.3	3.1	4.9	22.7	19.6	21.8	18.7		4.80 (1.77)		
Go to a wind energy museum	GTN	19.5	4.9	5.4	30.0	15.1	12.1	13.1	14.56*	4.05 (1.96)	- 3.47*	
	NMB	11.2	2.7	4.9	26.9	22.0	14.8	17.5		4.60 (1.79)		
Eat at a local restaurant or stay in lodging (hotel, etc.) that uses wind energy	GTN	13.7	2.3	2.3	24.1	13.2	18.3	26.1	22.67*	4.80 (1.99)	- 3.37*	
	NMB	5.8	0.0	2.2	20.8	22.1	17.7	31.4		5.32 (1.59)		
Scuba dive near wind turbines	GTN	38.5	4.7	4.1	33.9	6.2	5.2	7.5	14.26*	3.10 (1.96)	- 3.45*	
	NMB	25.7	3.2	6.0	37.2	10.1	7.3	10.6		3.67 (1.94)		

\*indicates the distribution of responses or the mean differences in responses between communities are statistically different at  $p < 0.05$

Marine recreationists in North Myrtle Beach express moderate but higher interest in going to a wind energy museum, eating at a local restaurant that uses wind energy, and scuba diving near a wind turbine. 20.4% of marine recreationists in Georgetown report a *very high desire* to fish near wind turbines compared to 10.6% in North Myrtle Beach.



Table 29. *Potential displacement and additions compared across two communities.* Percent responses, means, standard deviations, and differences between communities in responses to *interest in wind energy activity* items. Items ranked by highest mean (1 = completely disagree, 7 = completely agree)

Please rate your agreement with the following statements

**“IF OFFSHORE WIND ENERGY WAS PRESENT IN COASTAL AREA, I WOULD...”**

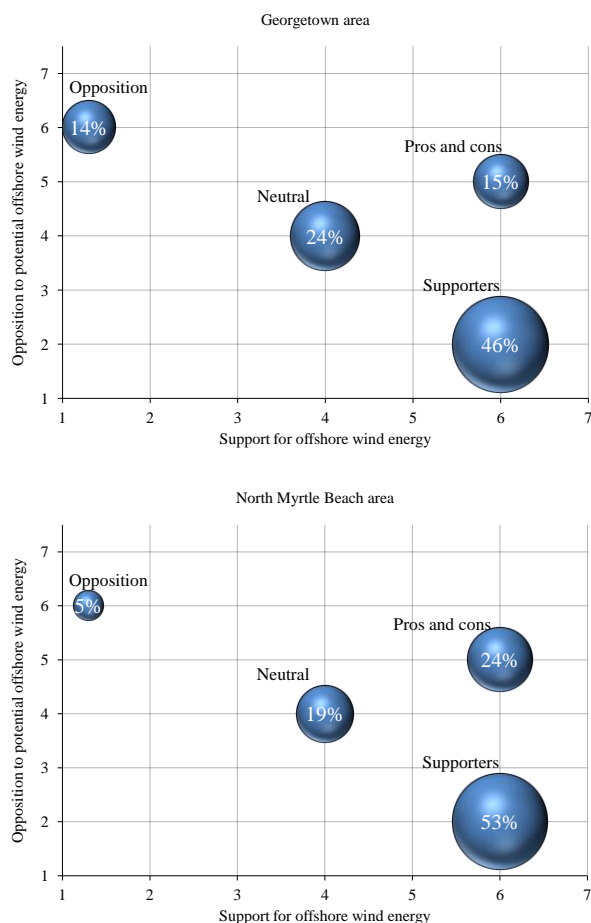
		<div> <div>Completely disagree</div> <div>←————→</div> <div>Completely agree</div> </div>								$\chi^2$	Mean (SD)	t-value*
Buy property (or buy more property) in the area	GTN	25.6	4.7	4.0	47.8	5.2	5.0	7.7	42.27*		3.48 (1.79)	- 4.89*
	NMB	10.5	5.4	4.6	44.4	16.7	7.9	10.5			4.17 (1.62)	
Stop using the coastal recreation resources in the area	GTN	53.0	10.0	5.7	24.9	2.7	1.7	2.0	9.38		2.28 (1.59)	- 2.38*
	NMB	44.6	10.8	7.1	25.0	5.8	3.8	2.9			2.60 (1.74)	
Use the coastal recreation resources in the area LESS often	GTN	48.0	9.5	5.2	25.9	3.2	3.5	4.7	4.65		2.56 (1.81)	- 1.06
	NMB	42.3	10.5	8.8	25.1	3.8	4.2	5.4			2.72 (1.84)	
Use the coastal recreation resources in the area MORE often	GTN	21.6	3.5	4.5	48.6	5.3	5.5	11.0	31.76*		3.73 (1.82)	- 4.43*
	NMB	11.3	4.2	2.9	41.4	13.8	9.2	17.2			4.38 (1.77)	

\*indicates the distribution of responses or the mean differences in responses between communities are statistically different at  $p < 0.05$

Marine recreationists in North Myrtle Beach report more agreement that they would *buy property or more property in the area* than respondents in the Georgetown area. Georgetown marine recreationists also report a lower likelihood of being displaced due to wind energy development (i.e., *stop using the coastal recreation resources in the area*). Respondents in the N. Myrtle Beach sample indicate they would be more likely to *use the coastal recreation resources in the area MORE often* in response to wind energy development.



Figure 2. *Segmentation results across communities.* Levels of opposition, support, and the percent membership in each category compared across communities. Items ranked by highest mean (1 = low support and low opposition, 7 = high support and high opposition).



Differences in group membership differ significantly across communities.

**Supporters:** This is the largest segmentation group for both communities at 46% for the Georgetown area and 53% for the North Myrtle Beach area. This group is characterized by high levels of support ( $M = 6$ ) and low levels of opposition ( $M = 2$ ).

**Neutral:** This is the second largest segmentation group for the Georgetown area comprising 24% of marine recreationists and the third largest group for the North Myrtle Beach area at 19%. Individuals in this group generally possess moderate levels of support ( $M = 4$ ) and opposition ( $M = 4$ ).

**Pros and cons:** Members of the *pros and cons* group seems to identify both reasons to support ( $M = 6$ ) and oppose wind energy ( $M = 5$ ) and accounts for 24% of the population in the North Myrtle Beach area and 15% in the Georgetown area.

**Opposition:** The smallest group (14% in the Georgetown area and 5% in the North Myrtle Beach area) is characterized by high levels of opposition ( $M = 6$ ) and low levels of support ( $M = 1.5$ )





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## 5.1 Appendix A. Additional reasons for support

*Are there any additional reasons that you support offshore wind energy in the coastal area?*

1. Save money Lord knows we need it.
2. Resource carbon emission, resource oil dependence, keep electric cost power.
3. Renewable resources always great idea.
4. Clean energy. Not depend on other countries for energy.
5. I believe all we can provide to support our environment and economic resources is a positive contribution to this area and our world.
6. Less oil from overseas.
7. Independence.
8. I don't believe it will negatively effect the environment so I find it to be a good thing.
9. Using natural energy sources- decreasing reliance on outside resources.
10. If the energy from the turbines is affordable (not passed on ton sonsumer) it is a great idea. I guess it would take some of the load off the main grid during peak power consumption (hot summers/cold winters).
11. It is time to move to the future and stop the slow environmental growth. We have the technology. Lets use it.
12. Good source of energy.
13. Save our planet.
14. Clean energy, save on fuel.
15. To limit the consumption of non-renewable resources.
16. decrease oil usage, cleaner air. It seems to work well for calif - palm springs is where I have seen the most wind mill, some in Hawaii alternative energy
17. Would like to see this as more of a green area
18. Stop foreign oil imports
19. Cleaner energy
20. Clean, renewable source of energy
21. I think there is a beauty to wind turbines, especially the turning of the blades
22. Generate energy at work
23. Clean source of energy, reuses off-shore drilling
24. Clean energy is the future
25. Set an example and get started in renewables
26. No oil spills
27. Hopefully it will spread to more states
28. I support offshore wind energy anywhere it can be placed without negatively impacting the environment. Energy and independence derived from this outweigh any arguments based on offshore aesthetics
29. Bring the community together as one
30. Reduce nuclear and fossil fuel pollutants
31. The environment needs a break
32. We have to rely on local means to support the growing need for lean energy
33. Came from an area in the northeast where wind energy is efficently used and lengths the

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34. it will benefit all and hurt none
35. Set the trend for other coastal regions to harness available natural energy
36. They may be more detrimental to recreational boaters and cause negative economic effects.
37. Good, good, good for environment!
38. Habitat for marine life.
39. It is the right thing to do, however they need to be spread out as to not center on an area.
40. Humanitarian responsibility.
41. Great untapped resource!
42. Great alternative.
43. Wind is good.
44. More education on the subject to help those who do not know about wind energy.
45. To continue to provide activities especially for the diverse cultures of people that hear about this location.
46. If the energy from the turbines is affordable (not passed on to consumer) it is a great idea. I guess it would take some of the load off the main grid during peak power consumption (hot summers/cold winters).
47. Clean energy, save on fuel.
48. Great Fish habitat plus its energy that is harnessed by wind. Use what is given to us
49. It's worthwhile to research, in addition to drilling for oil off shore.
50. Common Sense!!
51. Anything to help get this nation independent again.
52. Clean-no danger to public if a mishap as 3 Mile island
53. overall improvement to environment
54. Improve perception area around the world
55. I would support offshore wind energy if it were very cost efficient and help drastically reduce energy bills. Also the US has to find ways to produce energy with our own resources to eliminate foreign ownership and dependence.
56. Hopefully lower power bills
57. We need start to find other resources of energy. Western states like California are already using wind energy & it is great that SC is trying to do the same.
58. Preservation
59. If successful could provide wind energy. This is very important. I have seen wind farms in the Netherlands. They were beautiful.
60. Good for overall economy
61. A fossil fuel contributes to the effect of global warming it is important to know that we take a step forward in limiting the impact we have on this environment
62. It's a good idea.
63. Because it preserves the natural beauty of N. Myrtle Beach & because it's a unique way of generating energy.
64. Saving in energy cost for population
65. Renewable energy rocks
66. Anything to do to relieve oil dependence.
67. Many Reasons
68. Whatever it takes to use off all fossil fuel.
69. I like what I have seen on my last two visits to Myrtle Beach and family reunion and this trip today.
70. Save energy
71. Create more jobs
72. It will start the Green for Green energy-solar power
73. Promotes energy & not depending on other countries
74. Don't want them on farm land

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75. The distance offshore will be the greatest obstacle. Three miles is too close. This would effect property values. Environmentalists would not allow. Must go as far off as possible.
76. May decrease electric bill!
77. Potential of improved fish habitats
78. Also support oil exploration
79. For help on electricity bill
80. Markers for lost vessels
81. Drill more natural gas
82. Replace nuclear energy
83. I don't think it could be anymore of an eyesore than the factories around here
84. good example of caring fo rthe environment and renewable energy
85. Lesser dependent on foreign oil and interests in other countries resources. This could also cut back on man made oil spill disasters in near future.
86. The resource is here - we need to utilize it
87. Better fishing
88. Be as important as european countries
89. Wind energy is great a slong as the private sector does all the development. The government will not do it effeciently.
90. Anything that we can do to lessen the dependency on foreign oil I am in favor (to a point).
91. Decrease reliance on coal and/or nuclear energy
92. Improved reputation for South Carolina
93. It is good to actually have someone start the trend of having offshore turbines, plus they won't really be that noticable 3 miles out.
94. It is just makes a lot of cents
95. Any way to generate energy that is clean is good
96. Clean energy
97. Myrtle Beach is uniquely situated to benefit from and be a leader in wind energy. It is crucial for future generations to find alternatives to fossil fuels. Myrtle Beach could be a leader in this growing industry and this could be a new job sector outside of traditional tourism.
98. lower energy costs, offers jobs, environmental reasons

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## 5.2 Appendix B. Additional reasons for opposition

*Are there any additional reasons that you oppose offshore wind energy in the coastal area?*

1. Unsightly I don't believe cost is as cost-productive as promoted.
2. My desire is that turbines not be clumped together in an excessive amount that I have noted in other parts of the country.
3. Bad news
4. Being able to see from shore.
5. We need to protect environment.
6. I like oil drilling.
7. Transmission cost. Consumer interest due to the true cost.
8. If too close to shore, very noisy
9. Harmful to birds, potentially
10. To stop any negatively to renewable energy
11. Strong potential for coastal surveillance radar dismytion-becomes a homeland security issue- airborne & surface
12. Deep sea fishing
13. No one wants to see a wind generator on or around a national refuge or important coastal ecosystem
14. I oppose any subsidies being directed to inefficient green energy projects
15. I have seen in Missouri, its of no use- waste of taxpayers money-put out electrical field
16. Potentially lowering the cost of electricity may actually put greater demand in place for more energy consumption there by negating the benefit of more energy production.
17. Scenic, Pollution qw now have a very senic & Prostie environment & lets keep it that way.
18. Neither oppose or support
19. Wind mills kill many local and migrating birds.
20. Damaged or Pollution if it get destroyed
21. Isn't waves general more productive. I would prefer hironic disassiation of H2O or geothermal.
22. I would oppose this if the paper planning & research was not done correctly.
23. I just hope birds are not hurt. I don't know much about this.
24. Depends what the turbunes will be used for ( Local residents energy, who will own, will money go back to local economy, etc).
25. Need to just drill for oil
26. The power from the turbines could have an effect on the irrattation and the winds in the area.
27. Noise of the turbines and expenses in setting them up.
28. Overpopulation
29. Distance from shore
30. Potential impact to migrating birds
31. It will close down a large fishing area
32. Doesn't make economical sense
33. I think offshore wind energy is a great idea.
34. restrictions on fishing area, these areas must stay open with no restrictions on fishing
35. Drill more natural gas
36. It make boaters hesistant to enter coastal waters. Could complicate recreational activities
37. Energy efficient for the cost. Drill for oil and gas instead.
38. Not the government
39. The plan won't accomplish the goals because of political reasons. Who will pay for all this???

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**5.3 Appendix C. Questionnaire.** The questionnaire for both the Georgetown and North Myrtle Beach area are identical except for the words “Georgetown” and “North Myrtle Beach.” The Georgetown representation is below.

**Opinions about Potential Offshore Wind Energy in the Georgetown Coastal Area (South Carolina)**


Important questions for people using coastal resources



After you complete this questionnaire, please return it to the field researcher

All responses are confidential  
Thank you for your cooperation

This study is conducted by:



Researcher Use Only:

Activity \_\_\_\_\_ Time \_\_\_\_\_ Date \_\_\_\_\_ Survey Staff \_\_\_\_\_ Location \_\_\_\_\_

Please review the map prior to answering the questions in this survey. The questions in this survey focus on the shoreline and waters in, and near, the Georgetown, SC area. This includes city areas, beaches, intercoastal waters, and off shore waters, and is outlined in red on the map provided by the field researcher. This outlined area is referred to throughout the survey as the “Georgetown coastal area” or simply as the “area.”

1. Please tell us about your past use history of the Georgetown coastal area. The term “coastal recreation activities” refers to the recreation-based activities you do in the Georgetown coastal area (for example, fishing, viewing the ocean, swimming, general beach use, boating, etc.):

a. Including today, how many days in the last month (30 days) have you used the Georgetown coastal area for coastal recreation activities? \_\_\_\_\_

b. Including today, how many days in the last year (12 months) have you used the Georgetown coastal area for coastal recreation activities? \_\_\_\_\_

c. Including today, how many years (total) have you used the Georgetown coastal area at least once for coastal recreation activities? \_\_\_\_\_

2. We would like to know more about you and the Georgetown coastal area (referred to below as the “area” or “here”). Please rate your agreement with the statements. (circle one number for each row)

	Completely disagree	←	→	Completely agree			
This area is very special to me	-3	-2	-1	0	1	2	3
I am very attached to this area	-3	-2	-1	0	1	2	3
I identify strongly with this area	-3	-2	-1	0	1	2	3
This area means a great deal to me	-3	-2	-1	0	1	2	3
This area is the best place for the coastal recreation activities I like to do	-3	-2	-1	0	1	2	3
I enjoy doing coastal recreation activities in this area more than in any other location	-3	-2	-1	0	1	2	3
Participating in coastal recreation activities in the Georgetown coastal area is more important to me than doing them in any other area	-3	-2	-1	0	1	2	3
No other place can compare to this area for the types of coastal recreation activities I do	-3	-2	-1	0	1	2	3
The people in this area are very important to me	-3	-2	-1	0	1	2	3
I have a lot of ties with the people in this area	-3	-2	-1	0	1	2	3
Many of my friends and/or family are in this area	-3	-2	-1	0	1	2	3
People in this area mean a great deal to me	-3	-2	-1	0	1	2	3

The purpose of the remaining questions in this survey is to understand people’s opinions about potential offshore wind energy in the Georgetown coastal area. A small number of wind turbines are being considered for the feasibility of placement in the waters near Georgetown, SC. Each turbine would potentially extend 300 feet above the water’s surface. Although the exact placement of these turbines has not yet been determined, the turbines near Georgetown would potentially be located approximately 3 miles from shore. Please refer to the provided map when answering questions about the “Georgetown Coastal Area.” Your answers are extremely important and will help others understand your views regarding this topic.

3. The list below represents reasons that some people support offshore wind energy. Please tell us if these are reasons that you support offshore wind energy in the Georgetown coastal area. (circle one number for each row)

**“I SUPPORT OFF SHORE WIND ENERGY IN THE GEORGETOWN COASTAL AREA BECAUSE I THINK IT WILL...”**

	Completely disagree	←	→	Completely agree			
Improve the local economy (more jobs, new businesses, increase property values)	-3	-2	-1	0	1	2	3
Give the area a positive reputation (new reason to visit, be a green energy leader)	-3	-2	-1	0	1	2	3
Increase energy independence (from foreign sources, produce own energy)	-3	-2	-1	0	1	2	3
Help the environment (prevent pollution, decrease reliance on fossil fuels)	-3	-2	-1	0	1	2	3
Improve the marine habitat for fish (attract fish, improve recreational fishing)	-3	-2	-1	0	1	2	3
Benefit future generations (help the community into the future)	-3	-2	-1	0	1	2	3
Bring new people to the area to live and/or visit	-3	-2	-1	0	1	2	3

4. Are there any additional reasons that you support offshore wind energy in the Georgetown area? (please check one)

☐ No ☐ Yes. What are the additional reasons? \_\_\_\_\_

5. The list below represents reasons that some people oppose offshore wind energy. Please tell us if these are reasons that you oppose offshore wind energy in the Georgetown coastal area by responding to the following statement. (circle one number for each row)

**“I OPPOSE OFFSHORE WIND ENERGY IN THE GEORGETOWN COASTAL AREA BECAUSE I THINK IT WILL...”**

	Completely disagree	←	→	Completely agree			
Harm the area’s economy (job loss, repel new businesses, decrease property values)	-3	-2	-1	0	1	2	3
Decrease the scenic and natural beauty (harm ocean views, be a visual eye-sore)	-3	-2	-1	0	1	2	3
Ultimately, not be as productive as promised (only produce when wind is blowing, not meet energy demands)	-3	-2	-1	0	1	2	3
Negatively influence the marine environment (harm animals/plants, influence natural cycles)	-3	-2	-1	0	1	2	3
Drive visitors and residents away from the area	-3	-2	-1	0	1	2	3
Bring too many new people to the area to live or visit	-3	-2	-1	0	1	2	3

6. Are there any additional reasons that you oppose offshore wind energy in the Georgetown coastal area? (please check one)

☐ No ☐ Yes. What are the additional reasons? \_\_\_\_\_

7. Please tell us how likely you are to take these actions to support or oppose offshore wind energy in the Georgetown coastal area. (circle one number for each row)

	I am very likely to perform this action to <b>OPPOSE</b> wind energy	←	I am NOT likely to perform this action at all in response to wind energy	→	I am very likely to perform this action to <b>SUPPORT</b> wind energy		
Attend a public meeting	3	2	1	0	1	2	3
Donate or invest money	3	2	1	0	1	2	3
Pay for higher energy costs	3	2	1	0	1	2	3
Sign a petition	3	2	1	0	1	2	3
Talk to family and friends	3	2	1	0	1	2	3

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# 2011 Survey of marine recreationists' attitudes towards potential offshore wind energy in South Carolina

	I am very likely to perform this action to <b>OPPOSE</b> wind energy	I am NOT likely to perform this action at all in response to wind energy					I am very likely to perform this action to <b>SUPPORT</b> wind energy
	3	2	1	0	1	2	3
Write an opinion article in the newspaper or internet	3	2	1	0	1	2	3
Write a letter or email to a public official	3	2	1	0	1	2	3
Volunteer time	3	2	1	0	1	2	3
Vote in a formal election	3	2	1	0	1	2	3

8. Please tell us how interested you are in these wind energy related activities in the Georgetown coastal area. (circle one number for each row, or mark the last column for "I don't know")

	Absolutely no desire						Very high desire	Don't know
	-3	-2	-1	0	1	2	3	
Attend an educational program about wind energy	-3	-2	-1	0	1	2	3	<input type="checkbox"/>
Fish near wind turbines	-3	-2	-1	0	1	2	3	<input type="checkbox"/>
Go on a boat ride to view and tour offshore wind turbines	-3	-2	-1	0	1	2	3	<input type="checkbox"/>
Go to a wind energy museum	-3	-2	-1	0	1	2	3	<input type="checkbox"/>
Eat at a local restaurant or stay in lodging (hotel, etc.) that uses wind energy	-3	-2	-1	0	1	2	3	<input type="checkbox"/>
Scuba dive near wind turbines	-3	-2	-1	0	1	2	3	<input type="checkbox"/>

9. Please rate your agreement with the following statements. (circle one number for each row)

**"IF OFFSHORE WIND ENERGY WAS PRESENT IN THE GEORGETOWN COASTAL AREA, I WOULD..."**

	Completely disagree						Completely agree
	-3	-2	-1	0	1	2	3
Buy property (or buy more property) in the Georgetown coastal area	-3	-2	-1	0	1	2	3
Stop using the coastal recreation resources in the Georgetown coastal area	-3	-2	-1	0	1	2	3
Use the coastal recreation resources in the Georgetown coastal area LESS often	-3	-2	-1	0	1	2	3
Use the coastal recreation resources in the Georgetown coastal area MORE often	-3	-2	-1	0	1	2	3

Some people have different opinions about global climate change and whether it is actually happening, or if global climate change is caused partially by human actions. We are interested in knowing what you think.

10. Please tell us what you think by circling your level of agreement with the following statements. (circle one number for each row)

**"ON AVERAGE, AROUND THE EARTH, I BELIEVE THE FOLLOWING ARE HAPPENING..."**

	Completely disagree						Completely agree
	-3	-2	-1	0	1	2	3
The temperature of the ocean is increasing	-3	-2	-1	0	1	2	3
The areas affected by drought are increasing	-3	-2	-1	0	1	2	3
Air temperature is increasing	-3	-2	-1	0	1	2	3
Permanently frozen soil in the arctic is now thawing	-3	-2	-1	0	1	2	3
Mountain environments are losing snow	-3	-2	-1	0	1	2	3
The number of flooding events are increasing	-3	-2	-1	0	1	2	3
Sea level is rising	-3	-2	-1	0	1	2	3
The amount of ocean ice is decreasing	-3	-2	-1	0	1	2	3

11. Please tell us what you think by circling your level of agreement with the following statements. (circle one number for each row)

**"I BELIEVE THE FOLLOWING CONTRIBUTE TO CHANGES IN CLIMATE AROUND THE EARTH"**

	Completely disagree						Completely agree
	-3	-2	-1	0	1	2	3
Clear cutting of forests	-3	-2	-1	0	1	2	3
Driving gas powered automobiles	-3	-2	-1	0	1	2	3
Burning fossil fuels, such as oil and coal	-3	-2	-1	0	1	2	3
Airplane travel	-3	-2	-1	0	1	2	3
Pollution from factories	-3	-2	-1	0	1	2	3
Clearing land for human use	-3	-2	-1	0	1	2	3

12. Have you visited the onshore wind turbine at Oceanfront Park in the city of North Myrtle Beach?

☐ No ☐ Yes ☐ Don't know

13. Do you live in the United States? (check one)

☐ Yes. What is your U.S. zip code? \_\_\_\_\_

☐ No. What country do you live in? \_\_\_\_\_

14. In what year were you born? \_\_\_\_\_

15. What is your gender? (check one)

☐ Male ☐ Female

16. What is the highest level of formal schooling you have completed? (check one)

☐ Less than high school ☐ Some college ☐ Four-year college graduate

☐ Some high school ☐ Two-year college graduate ☐ Graduate or professional degree

☐ High school graduate

17. What is your race/ethnicity? (check all that apply)

☐ American Indian or Alaska Native ☐ Hawaiian or Pacific Islander ☐ White

☐ Asian ☐ Hispanic or Latino/Latina ☐ Other

☐ Black or African American

18. Which category best describes your total household income in U.S. dollars during 2010 before taxes? (check one)


☐ Less than \$24,999 ☐ \$50,000 to \$74,999 ☐ \$150,000 to \$199,999

☐ \$25,000 to \$34,999 ☐ \$75,000 to \$99,999 ☐ \$200,000 or more

☐ \$35,000 to \$49,999 ☐ \$100,000 to \$149,999 ☐ Do not wish to answer

**Thank you for your help!** If you have questions regarding this survey, please contact:

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