



#### Renewable Energy

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### Effect of the Horns Rev 1 Offshore Wind Farm on Fish Communities Follow-up Seven Years after Construction



DTU Aqua Report No 246-2011 By Simon B. Leonhard, Claus Stenberg and Josianne Støttrup (eds.)

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National Institute of Aquatic Resources

Over the past 10 years, the onshore wind industry in the U.S. has own dramatically and as a result developers, citizens and the U.S. Brandi N ongress and the us. Confirm the development of an offshore wind projects and the us. shore wind projects and the U.S. Mineral Management Service Archae of Sold Ball the archaet of reviewing these applications and Sold Ball the industry while the state of Texas has a long to the industry while the state of Texas has a tore wind farms. Lawmakers, government agencies, comora-, non-governmental organizations and private individuals are ling whether or not to support or participate in the develop-

of an offshore wind industry, and the relative level of support brandi.carrier @boemangovand global environmental

ore wind energy competes with both onshore wind energy ventional fossil-fueled electricity. Onshore wind power and natural gas fired power are the two fastest growing segments of the electricity market. Coal power is the largest current producer of electricity in the U.S. Offshore wind will thus displace either coal, natural gas or onshore wind.

Ecological and economic cost-benefit analysis of offshore wind energy Brian Snyder\*, Mark J. Kaiser

LSU Center for Energy Studies, Energy Coast and Environment Building, Baton Rouge, IA 70803, United States

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#### ABSTRACT

Wind energy has experienced dramatic growth over the past decade. A small fractic occurred offshore, but as the best wind resources become developed onshore, there in the development of offshore winds. Like any form of power production, offshore w positive and negative impacts. The potential negative impacts have stimulated a greto the first offshore wind power proposals in the U.S. and have delayed the devel offshore wind farm in the U.S. Here we discuss the costs and benefits of offshore wind wind power and conventional electricity production. We review cost estimates for or and compare these to estimates for onshore wind and conventional power. We dev functions for offshore wind based on publicly reported projects from 2000 to 2000 limitations of the analysis. We use this analysis to inform a discussion of the conventional, onshore and offshore wind energy usage.

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#### 1. Introduction

Given the uncertainties associated with global of is difficult to compare the societal costs and benefit to fossil-fueled energy. However, one way to deve comparison of these costs would be include the based carbon offsets in the costs of conventional assumes that the costs of carbon emission credits as their ecological value which would occur if carbon represent a reduction of the specified amount of from the atmosphere.

It is perhaps less difficult to compare the costs offshore wind energy since they both have similar sions. In this case, one could simply compare the ecological costs of onshore and offshore wind.

There are several reasons why developers or law offshore wind power over fossil-fueled pow when power. Offshore wind power could be less expe competitors, either at a local or national scale, it co potential to be less expensive than its competitors, or less severe social and environmental impacts than its

In this paper, we seek to address the question, "Is i offshore wind power preferred over investments in fo onshore wind power?" We focus primarily on coal-fir representative of fossil-fueled power since it is the source of electricity in the U.S. and it is both inex-

a major source of greenhouse gases,



### **Information Needs**

- BOEM needs to evaluate environmental effects both detrimental and beneficial – of renewable energy activities on the Outer Continental Shelf (OCS).
- Extensive reviews have focused on the detriments of development; we need to investigate and quantify the range of positive environmental effects to provide balanced support to decision-making.



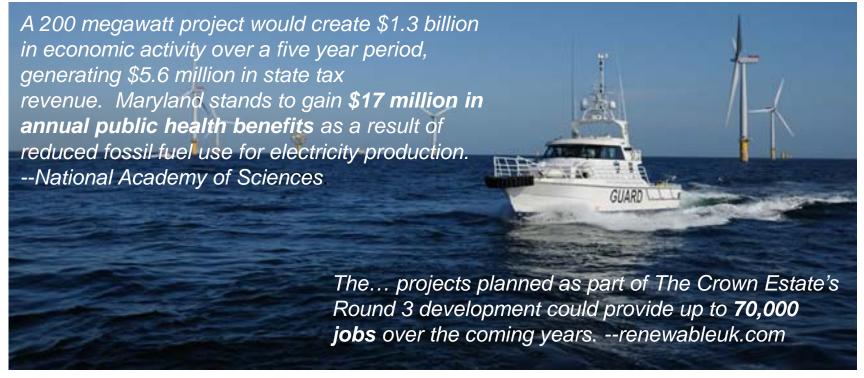
## **Background**

- National Environmental Policy Act (NEPA) analyses should consider beneficial effects (40 CFR 1508.8) of activities that "encourage productive and enjoyable harmony between man and his environment; [and] promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man..."
- To that end, BOEM should identify those activities which will promote a healthier environment as well as identify those that may do harm.



## **Objectives**

 Provide a synthesis of beneficial effects of offshore wind energy development for incorporation in NEPA analyses





### **Methods**

- Synthesize and evaluate the potential beneficial effects to the environment from offshore wind development along the Atlantic OCS. It may:
  - Include onshore and European development;
  - Draw from existing evaluations of various forms of energy production including coal-fired and nuclear power plants and evaluate these avoided consequences; and
  - Quantify potential health benefits and other societal gains.



### **Additional Information**

- Dr. Lorrie Rea's October 3, 2012 letter to Director
  Beaudreau outlined the committee's recommendation to
  investigate and quantify the range of positive
  environmental impacts of offshore renewable energy.
- Director Beaudreau's April 22, 2013 response pledged to consider including additional studies, such as this one in order to develop objective information and support informed decisionmaking.



Office of Renewable Energy Programs

brandi.carrier@boem.gov