

## STATOIL COMMENTS TO PUC TERM SHEET – AUGUST 15, 2012

August 15, 2012

Karen Geraghty, Administrative Director  
Maine Public Utilities Commission  
18 State House Station  
242 State Street  
Augusta, ME 04333

Re: MAINE PUBLIC UTILITIES COMMISSION; Ocean Energy Long-Term Contracting;  
Docket No. 2010-235

Dear Ms. Geraghty:

Statoil North America, Inc. (“Statoil”) and its parent company Statoil ASA are pleased to submit this summary in support of the Commission’s approval of a Term Sheet (the “Term Sheet”) developed in negotiations between Statoil and the Commission Staff regarding a proposed Long-Term Contract for the output of the Hywind Maine Pilot Project (the “Project”). This letter is presented as a summary, followed by a series of attachments that support and further detail the assertions and points made in the summary.

The installation of the Hywind Demonstration project in Norway in 2009, and the tremendous amount of data and learning that this installation has facilitated, has positioned Statoil as the world leader in floating offshore wind. As a next step in a global floating offshore wind commercialization strategy (see Section 1.2 of Attachment 1), Statoil proposes to start construction in 2014 on the world’s first floating offshore wind farm, a 12 MW project to be installed off the coast of Maine (see Attachment 2).

Floating offshore wind has garnered considerable global attention in the last year. This attention is focused in United Kingdom, Spain, Portugal, Japan, France and the United States (see discussion in Section 1 of Attachment 1 and links to in-depth information in Attachment 4). Despite this interest around the globe, Statoil has chosen the Gulf of Maine as a site for this important showcase of the feasibility of floating wind because of an excellent wind resource, a strong supply chain, a unique R&D infrastructure, and the 2010 Maine Ocean Energy Act.

The 2010 Maine Ocean Energy Act created targets for Maine of 300 MW of floating wind by 2020 and 5,000 MW by 2030. According to the Maine Deepwater Offshore Wind Report (2011), this level of buildout would attract an estimated \$20 billion in private capital in the longer term to the State and create 7,500-15,000 Maine-based jobs. The proven Hywind technology and experienced team that Statoil brings position the Project as a building block for reaching these targets. Perhaps more importantly, the Hywind Maine Project realizes an opportunity that could catapult Maine into a leadership role in the global offshore wind industry, an industry that is projected to be worth up to \$1.2 trillion dollars in the next 15 years.

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Statoil is committed to creating real economic benefits in the State of Maine with the construction and operation of the Hywind Maine Project (see Attachment 3), by building competencies and creating jobs in the local economy. As an experienced industrial player in the offshore energy industries, Statoil will undertake an extended supplier development program with local companies and research institutions. This collaboration will be critically important to demonstrate the current capabilities of Maine suppliers and to develop additional capabilities for future offshore wind developments.

Statoil has shown significant commitment to the Project since 2009 (see Section 1 of Attachment 3). In anticipation of achieving commercial milestones for the Project, Statoil submitted applications for a Federal lease for the Project site and the grid connection, initiated environmental surveys, started supply chain mapping and stakeholder work, and undertook early feasibility studies. This commitment has resulted in employment of Maine citizens in each of these activities. Despite these positive developments, the Project is at a critical juncture at the time of this letter's submission: *Commission approval of the Term Sheet is required before Statoil can make additional investments in the Project.*

Please feel free to contact me if you have any questions.

Very truly yours,



Lars Johannes Nordli

Vice President - Wind Business Development, Statoil ASA



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### Attachment 1: Industrial Perspective

#### **1 Long Term Benefits**

There is a rising global interest in floating substructures as a central technology that will lead to a substantial reduction of the levelized cost of energy (LCOE) of offshore wind energy. In particular, this rising global interest is evidenced by the recent UK Energy Technologies Institute Request for Proposals, Spain's Floating Wind Turbine Real Scale Demonstration Project (FLOATGEN), Japan's Fukushima floating wind turbine project sponsored by the Ministry of Energy, Trade, and Industry, and the deployment of the world's second full-scale floating offshore wind system in Portugal. Even in this global field, Maine is well-positioned as a potential leader due to a high-quality resource, strong supply chain, unique R&D infrastructure, and the 2010 Maine Ocean Energy Act.

##### *1.1 Legislative Foundation of a Pilot Park: The Ocean Energy Act*

During its 2010 session, the Maine Legislature enacted An Act to Implement the Recommendations of the Governor's Ocean Energy Task Force (the "Ocean Energy Act"). The Ocean Energy Act amended existing law to adopt a State goal of at least 300 MW from generation facilities located in coastal waters or proximate Federal waters by 2020 and 5,000 MW by 2030.

The Ocean Energy Task Force concluded that a "stepping stone" project would be required in order to start building a strong offshore wind industry in Maine. As floating wind technology is new and supply chains are immature, the costs of developing and commissioning this technology for the first time in multiple-unit scale will be significantly higher than in a future commercial scale. Therefore, the Ocean Energy Act authorized the Commission to provide a substantial near-term above-market power price for the first floating wind pilot project. While the Legislature required the Commission to find quantifiable "tangible economic benefits" to the State from the pilot project, it recognized that Maine's investment would be recovered through the development of the long-term investment of a basis for full scale commercial projects. Consequently, the Ocean Energy Act does not require, or authorize the Commission to require, any particular level of "tangible economic benefits" as a condition of approving a long-term contract. While the Project will give positive contributions to the economy in the State in the short term, the longer term benefits and value to Maine of this strategic Project can be substantial.

##### *1.2 Path from Pilot to Commercial*

Having proven its technical viability through a full scale demonstration unit in Norway, Statoil

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has developed a strategy for the commercialization of the Hywind technology. This strategy has three distinct steps. The first step is a pilot-scale park. The second is a medium-sized commercial-scale park (~500 MW). In a third and final step the technology will be available to Statoil and other wind farm developers globally, for larger build-outs. Statoil sees the United States as a potential market for the second step in the commercialization of Hywind and is actively reviewing potential sites in several regions of the country. The Gulf of Maine is one of these potential sites. The Hywind Maine Pilot Project will strengthen the supply chain, test permitting and siting procedures, leverage installation, operations, and maintenance assets and ultimately improve Maine's ability to compete with other regions in America for a 500 MW farm.

### 2 Short-term benefits

As part of Statoil's commitment to the Project and in an effort to fulfill the requirements under the Ocean Energy Act, Statoil hired Professor Charles Colgan from the University of Southern Maine to analyze the direct and indirect job and value creation in the State that will result as a direct consequence of the Project. Additionally, the National Renewable Energy Laboratory (NREL) was contracted to provide its projection of the short-term economic benefits of the project, using a version of their Jobs and Economic Development Impact (JEDI) model for floating offshore wind that is currently under development with funds from the US Department of Energy. As these analyses show, Statoil is committed to exploring and quantifying the economic benefits of the Project to the greatest extent possible given the current state of the art.

Statoil will rely on the 3<sup>rd</sup> party reports from Dr. Colgan and NREL to evaluate the total direct and indirect economic impacts to Maine from the Project. The total Capital Expenditures for the project is estimated to USD [REDACTED]. Statoil estimates that [REDACTED] will be spent in Maine or allocated to Maine suppliers. In addition, O&M costs are estimated to [REDACTED] [REDACTED]. It is realistic to expect that approximately [REDACTED] of the annual operation and maintenance costs will be awarded to Maine contractors.

#### 2.1 Professor Charles Colgan

Dr. Colgan's work is based on the assumptions that 40% of capital expenditures and 40% of operational expenditures will go to Maine based companies. These numbers are in line with Statoil's early phase assessment of capabilities that exist or can realistically be developed in Maine, seeking to maximize local content.

**Job creation:** Based on Dr. Colgan's analysis, the direct and indirect job numbers in Table 1 are projected (both part time and full time jobs included). Years 1-5 represent the development and



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construction phase of the Project (Year 1=2012). Years 6 and later represent the production/operational phase.

**Table 1 – Direct and Indirect Employment**

	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6+</b>
Direct Employment	10	21	19	233	233	20
Indirect Employment	6	12	12	59	58	10
<b>Total</b>	<b>16</b>	<b>32</b>	<b>31</b>	<b>292</b>	<b>291</b>	<b>30</b>

The estimates in Table 1 should be considered conservative with respect to the multiplier effects.

**Direct and Indirect Economic Benefits from the Project:** In addition to job creation that results from the Project, Table 2 below summarizes Dr. Colgan’s projections of how much in earnings will be generated from these jobs directly and estimates the “multiplier” effect on Maine economic activity resulting from local expenditures (in thousands USD).

**Table 2 – Estimated Total Earnings Generated in Maine**

	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6+</b>
Employment	16	32	31	292	291	30
Wages & Salaries (Thousands Nominal \$)	\$660	\$1,410	\$1,440	\$6,570	\$7,360	\$1,777
Regional Output (Thousands Nominal \$)	\$1,020	\$2,060	\$1,940	\$8,890	\$9,200	\$2,011

The Regional Output represents the total earnings, while the Wages & Salaries is the portion of the total earnings resulting from the estimated employment numbers.

The terms in this section are further described in Dr. Colgan’s report summary, Attachment 5.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

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### Attachment 2: Project background

#### **1 Statoil background**

Statoil's parent, Statoil ASA, has more than 40 years' experience in offshore oil and gas and is the world's leading maritime operator in waters deeper than 100 meters. Statoil is committed to sustainable development in the 37 countries where it operates. In fact, the company was ranked in 2011 by Fortune Magazine as the #1 most socially responsible company in the world. In addition, in 2012 Statoil was ranked by Transparency International as the most transparent company of the world's 105 biggest publicly listed companies. The U.S. is one of Statoil ASA's important and most rapidly growing regions of development, and Statoil now has offices in Connecticut, Texas, Washington DC, Alaska and North Dakota. Statoil will also open an operational base in Maine if the Project is realized.

Statoil ASA has been engaged in the wind power sector for almost a decade. Leveraging on the company's core competencies with offshore energy projects, Statoil ASA's wind efforts are now focused solely on offshore wind. Statoil ASA's offshore wind developments are currently focused in Europe where its first offshore wind farm, the 88 turbine, 317 MW Sheringham Shoal project off the UK east coast, will be completed this year. Statoil is also a member of the Forewind consortium, which is developing the 9000 – 13000 MW Dogger Bank offshore wind project in the UK.

The Hywind floating wind concept was developed in-house at Statoil ASA in order to make deep-water areas, with stronger winds and potentially less constraints, accessible to offshore wind development. The conceptual development of Hywind started in 2001, arising from the idea of applying knowledge from the oil and gas industry to wind turbines, to develop a robust concept for future wind developments intended for areas out of reach by traditional concepts. The concept was model tested before a full-scale demonstration unit (2.3 MW) was deployed in Norwegian waters in 2009. The demonstration unit ("Hywind Demo") is installed at a water depth of 656 feet/(200 m), about 6 miles/(10 km) off the coast of Norway.

The performance of the Hywind turbine has exceeded expectations. Power production has been excellent, with an average capacity factor of 50% in 2011 (compared to around 30% for US onshore wind). To date, the Hywind Demo has delivered more than 21 GWh of renewable energy to the grid. The Hywind Demo was built as an R&D unit equipped with sophisticated instrumentation, from which Statoil has learned that floating wind turbines are both technically feasible and a good alternative to bottom-fixed solutions.

#### **2 Pilot park objectives**



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The Hywind Maine Project consists of four floating turbines of 3MW capacity each, to be installed in 2016, 12 nautical miles (nmi) off the coast of Maine. The key objectives of the Project are to:

- Demonstrate scalability of costs, thereby building credibility in the market for the commercialization of floating wind parks.
- Utilize the Hywind Demo experience to demonstrate a more cost efficient design.
- Reduce the technical, time, and cost risks in a large park development – advancing the general knowledge base for floating offshore wind.
- Build a domestic industry, strengthening the ability of the U.S. and Maine supply chains to deliver according to industry expectations.
- Generate public acceptance of offshore wind turbines.
- Prove environmental feasibility. The Hywind concept is a gentle solution in marine environments with its small seabed footprint and no need for piling operations. An important output from the Project will be to demonstrate this statement through real-life testing and in dialogue with key state and federal agencies to build confidence in moving to a large scale deployment.

### 3 Project status

In addition to the significant investment that Statoil ASA has undertaken to build the Hywind Demo in Norway, the Hywind Maine Project has spent significant resources in developing the option of a pilot project in Maine. In anticipation of obtaining a power purchase agreement, the Project has undertaken a number of time critical actions in order to keep a 2016 installation option open:

- **Feasibility report:** Statoil contributed to the Maine Deepwater Wind Feasibility Report that was developed by the University of Maine in 2010/11.
- **Lease application:** The Project submitted an unsolicited application for a 25 year commercial lease to the Bureau of Ocean Energy Management (BOEM) in October 2011. It is expected that BOEM will issue a Request for Competitive Interest (RFCI) in July 2012.
- **State applications:** Statoil plans to file relevant state applications in Q1 2013.
- **Environmental surveys:** The Project has contracted [REDACTED] to be its Environmental Impact Assessment (EIA) coordinator. Survey protocols for birds and bats have been agreed with relevant agencies, and surveys were initiated in May 2012. A plan for additional surveys and studies has been developed and is planned to be executed over the next few months.
- **Grid:** The Project filed a grid connection application in November 2011. A feasibility study was completed by Central Maine Power on behalf of ISO-NE, and it concluded that



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- a grid connection can be arranged with a limited amount of modification work. The Project is now preparing the follow up Interconnection System Impact Study to be performed this fall.
- **Stakeholder outreach:** The Project has started dialogue with some key organizations and held successful “Open House” information sessions for the public on June 25-27, 2012 in Boothbay, Rockland and Portland. Statoil believes early interaction with key stakeholders is an important part of the development work.
  - **Supplier activities:** Two construction studies were carried out in 2010 with potential Maine based suppliers. This work was brought forward by three assembly studies in 2011. The studies gave valuable input to the Project. Follow-up studies (pre-FEED) are planned to be initiated in the 1<sup>st</sup> quarter of 2013. A mapping of Maine suppliers is initiated and the supply chain activities will be stepped up over the next few months. Timewise, concept selection for the Project is planned for 2013, and contract preparations will continue from then leading up to the final investment decision during the fall of 2014. All supplier contracts should be awarded by mid-2015 for delivery in 2015 and 2016.
  - **R&D collaborations:** Statoil has since 2009 established a close relationship with the Advanced Structures and Composites Center at the University of Maine. A study on structural materials development is ongoing, and a significant extension and step-up of this collaboration is planned in the Project’s next phase (described in Attachment 3).

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### Attachment 3: Specific local content and supply chain initiatives

Statoil has a long tradition of developing strong and sustainable local suppliers in the markets where it operates and has developed an extended program to actively engage and work with local supply chains. Statoil's operating model relies on having suppliers committed to provide good quality products and services. As a result, the future direct value and jobs creation in the Hywind Maine Project will to a large extent be generated by the future suppliers to the Project. This section describes specific initiatives that Statoil has undertaken or is planning, to build a strong local supply chain and ensure a local foothold in Maine.

#### **1 Current engagements**

The Project is still in an early phase, and suppliers are yet to be selected. However, in the planning, stakeholder outreach and environmental studies Statoil has already engaged 10-15 local consultants delivering services to the Project on a full or part time basis:

- [REDACTED]: Environmental Impact Assessment coordinator. A local vessel is used for environmental survey planning.
- [REDACTED]: Legal services.
- [REDACTED]: Communications services/ local contact person.
- Dr. Charles Colgan (Bangor based): Large-scale economic benefits
- [REDACTED]: Power grid interconnection consultants.
- [REDACTED], Right of Way/land agent for the onshore cable

The Project plans to take on additional local resources to the team as the Project matures. In the very near term, Statoil also plans to engage a local Fisheries Liaison Officer, and plan to initiate technical and environmental surveys that will trigger additional activity to Maine suppliers.

#### **2 Planned supply chain initiatives**

Growing an offshore wind industry requires competent suppliers. A demonstration project is a good opportunity to build and strengthen offshore wind competence in Maine. Statoil commits to undertake an extended supplier development process for the Hywind Maine project, using its broad offshore energy competence and experience to nurture supplier development in Maine.

Statoil is currently performing a general assessment of the regional supply potential for Hywind in Maine. The result of the early phase screening show that a number of Maine companies have capabilities in central parts of the value chain. This includes, but is not limited to vessels and harbors, steel manufacturing, construction infrastructure, logistics and transportation, onshore electrical facilities, marine operations and installation, consultancy work and verifications as well as research and development. The conclusion from the early assessment of the potential for assembly and installation along the Maine Coast supports the belief that through a proactive

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[REDACTED]

cooperation between all parties – including local communities, the industry, and state and Federal agencies – the development of infrastructure for construction and assembly in Maine is feasible.

In the Project's next phase, the Supplier Development process will be initiated. A systematic assessment of relevant suppliers will be undertaken, entering into dialogue with potential suppliers on how to strengthen their capability to deliver to the Project, and holding supplier events to attract suppliers to the Project at all levels. Statoil is committed to work with suppliers to verify or develop capabilities, seeking to pre-qualify Maine-based suppliers to the greatest extent possible.

The extended supplier development program for Hywind Maine is outlined below. The goal of this program is to strengthen and maximize the local contribution to supplying to the offshore wind industry in general and the Hywind Maine project in particular. This will benefit the Maine suppliers in the long term within all areas where capabilities are present or can be developed.

[REDACTED]

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[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
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[REDACTED]	[REDACTED]	[REDACTED]
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[REDACTED]

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[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]



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[REDACTED]

[REDACTED]

### 3 Long term potential for Maine suppliers in an offshore wind industry

The Hywind concept is based upon recognized work methods and equipment from both the marine and the oil and gas industries. The industry experience in these two industries is directly transferable to the tasks and operations to be performed. Hence, learning obtained on one project will also provide industry synergies to other projects and concepts by leveraging the capabilities within the marine industry.

For a future offshore wind industry in Maine, Statoil's early assessment is pointing to the following opportunities for growth for Maine suppliers:

- Existing yards currently manufacturing vessels and other marine structures can expand to **floating substructures**. This could fill available overcapacity or generate new areas of business by expanding existing or setting up separate production lines.
- **Assembly site development** is an important element to develop a cost competitive and lasting floating offshore wind industry. The Hywind concept is assembled in sheltered waters with stable and foreseeable weather windows. Statoil has confirmed the presence of suitable locations to establish assembly facilities for any floating offshore wind concept with the potential to be scaled up to take commercial capacities.
- **Turbine/substructure transition sections** can be established as a new area for large scale manufacturing. Today, this is normally supplied from the turbine manufacturer.
- **The wind turbine generator** and related operations represent a substantial part of the expenditures for any wind project. There are currently no turbine suppliers located in the State of Maine. If plans for larger parks in the New England region are solidified, this could attract such industry players to the benefit of industrial development in Maine.
- **Accessory fabrication** will become a growth area for smaller and medium sized workshops. Examples are outfitting structures like bumpers, cranes, access decks, etc.

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- **Mooring line fabrication** will become an area of mass production of goods with stringent production quality control requirements. Production facilities as close as possible to the installation sites will be prioritized to limit logistics cost and quality risk. Capacity extensions in mooring line fabrication may become necessary. New mooring line materials are planned for qualification testing, which could also allow fiber rope manufacturers to enter the industry.
- **Anchor manufacturing** is typical steel serial production. Several anchor solutions are suitable for the Hywind concept. Proximity to the installation site is an advantage, thus large-scale build-out may create opportunity for manufacturing of anchors.
- **Cable manufacturing** is another growth area as an industry builds up. A large number of in-field cables will be delivered and reeled on board the installation vessels. Since vessel day rate versus deck capacity always will be an issue for economic optimization, the shortest possible transit distance will be sought.
- **Sea transport** is an integrated part of the value chain for floating wind. Practically any transport will be by either a vessel, a barge or by wet tow. Short mobilization time will be a competitive advantage for the service providers, as developers will seek to minimize transit fuel and crew costs. Assuming that the majority of the assembly and completion activities will be performed along the Maine Coast, it will be a focus to identify suitable ports and harbors where vessels can be based when not mobilized.
- **Marine support** is a key component of all aspects of marine operations and will have to be reinforced in a similar way.

### 4 Technology development collaboration with the University of Maine

On May 30, 2012, the Hywind Maine Project filed a funding application to the Department of Energy's Advanced Technology Demonstration Project Funding Opportunity Announcement (FOA) and hopes to contribute to this program by showcasing a floating offshore wind park in Maine. As part of the application to DOE, Statoil has committed itself to developing technology that can be transferred to the U.S. industry by its engagement with strong U.S. technology partners.

One important effort in this regard is the [REDACTED] million Technology Development program that Statoil has defined with the University of Maine. This program will engage the capabilities and competence of the University to the benefit of the offshore wind industry. The University of Maine will have a team of ten personnel involved in the collaboration, including senior level researchers, technicians, and graduate students. In addition 5 undergraduate students are expected to participate in the program activities. The program will last for the next five years with activities within materials development, development of design solutions, and advanced structural testing of materials and components. The work started in June 2012 and has four sub areas:

1. **Composite turbine tower design and qualification**, where UMaine will assess a turbine tower design in composite material, suitable for the next generation offshore turbines.

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The tower will undergo qualification testing towards extreme loads at the University's laboratories. Leading composite manufacturing firms in Maine are assumed to be involved in test model design and construction.

2. **Concrete substructure design**, where UMaine will assess concrete substructure solutions with focus on industry development in Maine. Incumbent concrete fabricators are assumed to contribute in this process. Concrete substructures are assumed to provide a cost competitive alternative for large scale offshore wind parks.
3. **Fatigue design** for floating structures, where UMaine will qualify design solutions that are robust against the environmental loading that causes fatigue risk and reduced design life time. Maine based steel fabricators are anticipated to be involved in the construction work prior to the testing. Once qualified, the design can be implemented in offshore wind projects, as well as adapted for general industrial use.
4. **Fiber based mooring system**, where UMaine will contribute by time dependent qualification testing of selected mooring rope designs.



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### **Attachment 4: Global interest in floating offshore wind**

**Energy Technologies Institute Request for Proposals:** Information on this effort can be found at [http://eti.co.uk/downloads/related\\_documents/All\\_Energy\\_2012\\_draft\\_v0\\_4\\_-\\_Andrew\\_Scott.pdf](http://eti.co.uk/downloads/related_documents/All_Energy_2012_draft_v0_4_-_Andrew_Scott.pdf)

**Spain's Floating Wind Turbine Real Scale Demonstration Project (FLOATGEN):**  
Information on this effort is not public.

**Japan's Fukushima floating wind turbine project sponsored by the Ministry of Energy, Trade, and Industry:** Information on this effort can be found at [http://www.sintef.no/project/Deepwind%202012/Deepwind%20presentations%202012/Opening/Arakawa\\_C.pdf](http://www.sintef.no/project/Deepwind%202012/Deepwind%20presentations%202012/Opening/Arakawa_C.pdf).

**Deployment of the world's second full-scale floating offshore wind system in Portugal:**  
Information on this effort can be found at [http://www.principlepowerinc.com/news/press\\_PPI\\_WF\\_deployment.html](http://www.principlepowerinc.com/news/press_PPI_WF_deployment.html).

Attachment 5: Professor Charles Colgan report



# Economic Impacts of the Proposed Hywind Offshore Wind Power Pilot Project

Charles S. Colgan PhD

Center for Business and Economic Research

Muskie School of Public Service

University of Southern Maine

Portland, Maine 04014

June 2012

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The Hywind Offshore Wind Power Project is a pilot offshore wind power development designed to test the viability of offshore wind development in Maine. The project is being proposed by the Norwegian firm Statoil and is under review by the Maine Public Utilities Commission under a program established by the State of Maine to encourage the testing of prototype wind power. The economic impacts on Maine from the development and operation of the facility are a part of the review criteria.

In order to estimate the impacts on the economy of Maine, Statoil provided information based on their current best estimates of the costs and timing of the development and operation of the proposed facility in order that an economic impact analysis could be undertaken. This data was analyzed using a set of econometric models of the Maine economy developed by Regional Economic Models Inc (REMI) of Amherst, MA and maintained by the University of Southern Maine's Center for Business and Economic Research. These models have been used to analyze the Maine economy as affected by proposed developments, including several studies of onshore wind power projects in Maine employing the process used here.

For purposes of the analysis, a time period of 25 years is examined, with the first 5 years comprising the development phase and the remaining 20 years comprising the operations period. The development phase is divided into 3 years for planning and permitting, followed by a 2-year construction and installation period. These time periods are for analysis purposes only and do not necessarily correspond to the time it will actually take from the present to the beginning of power generation. However, the 5-year development phase is typical of many wind power projects and so represents a reasonable basis for planning. Project delays beyond the periods assumed here will result in a change in the timing but not the magnitude of the impacts.

The construction and operation of the Hywind Maine project will require inputs from both within Maine and outside of Maine. In general, the turbines, blades, nacelles, and towers along with electrical transmission equipment will come from outside of Maine, as there are no Maine-based manufacturers of these products. However, Maine firms can do construction of the landside facilities needed for the construction and operation of the project, along with the installation of the generating equipment in the marine environment. Maine has already seen the installation of a substantial wind power generating capacity onshore, and this development has encouraged the development of a competitive expertise in wind power among a number of Maine firms. Statoil expects that 40% of its capital and operating expenditures will be spent in Maine.



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Table 1 shows the economic impacts based on information provided by Statoil:

	Year 1	Year 2	Year 3	Year 4	Year 5	Average Year 6+
Employment	16	32	31	292	291	30
Regional Output (Thousands Nominal \$)	\$1,020	\$2,060	\$1,940	\$8,890	\$9,200	\$2,011
Wages & Salaries (Thousands Nominal \$)	\$660	\$1,410	\$1,440	\$6,570	\$7,360	\$1,777

Table 1

Employment in this analysis is measured as “jobs” including both full and part time jobs. It includes construction workers many of whom are employed for short periods to work on specific tasks and others who may be employed full time year round. The construction industry will account for about two thirds of the jobs during the development phase. Construction jobs are also a large sector of employment in the operations phase because maintenance activities are similar to the construction phase in that maintenance frequently involves removing and reinstalling turbines.

Changes in regional output<sup>1</sup> and in wages and salaries are also shown in Table 1. Regional output is the value of the output of goods and services in the region calculated on a value added basis. The change in regional output reflects the project’s contribution to the total value of goods and services in the Maine economy.

	Year 1	Year 2	Year 3	Year 4	Year 5	Average Year 6+
Direct Employment	10	21	19	233	233	20
Indirect Employment	6	12	12	59	58	10
Total	16	32	31	292	291	30

TABLE 2

Table 2 distinguishes between the employment directly employed by Statoil and its subcontractors involved in the development and operation of the project. The “indirect employment, also called the “multiplier” effect, are those jobs that are supported in other industries because of direct

<sup>1</sup> Gross Domestic Product-State as defined by the Bureau of Economic Analysis. See [www.bea.gov](http://www.bea.gov).

**[Attachment 6 Redacted]**