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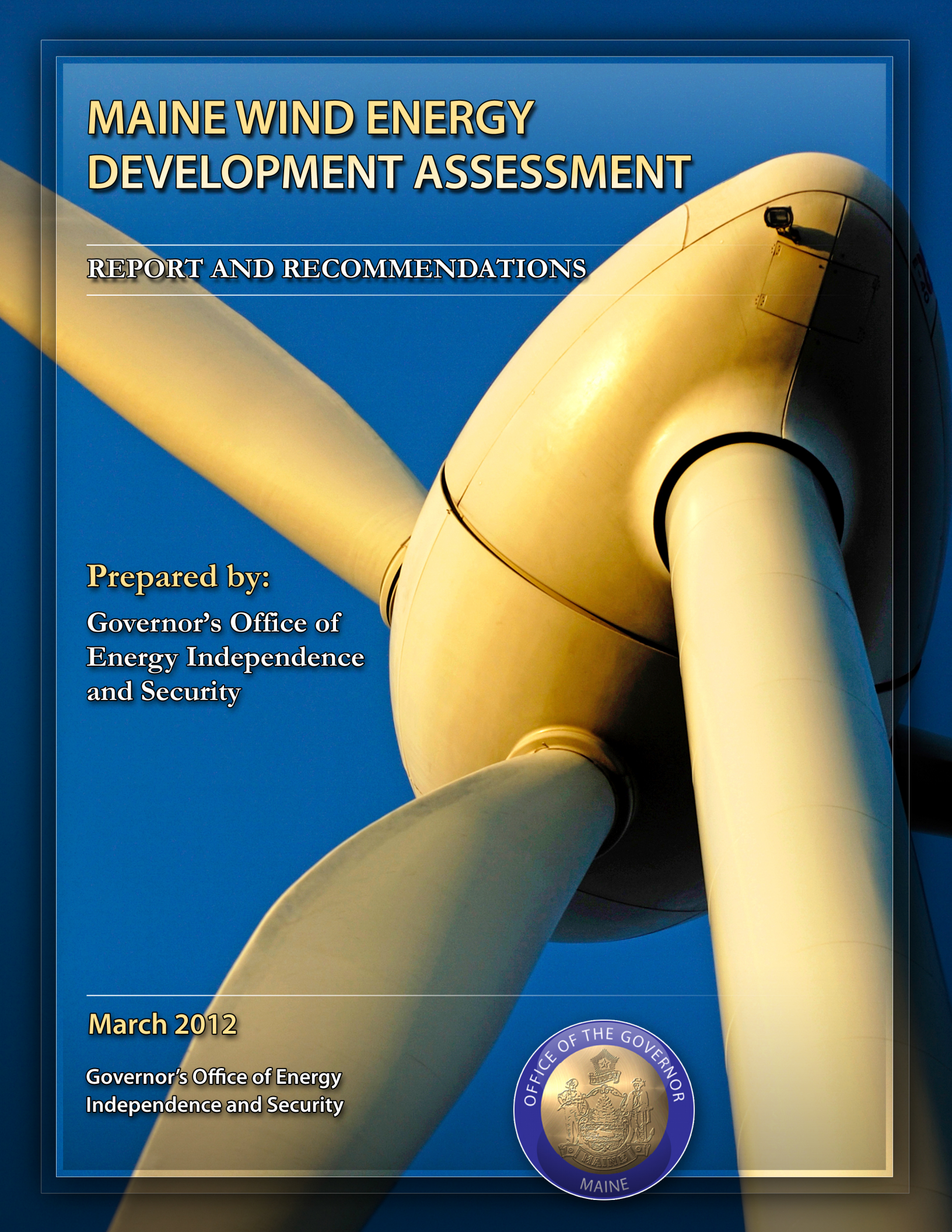
Maine Wind Energy Development Assessment, 2012

Governor's Office of Energy Independence and Security

MAINE WIND ENERGY DEVELOPMENT ASSESSMENT

REPORT AND RECOMMENDATIONS



Prepared by:

Governor's Office of Energy Independence and Security

March 2012

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MAINE WIND ENERGY DEVELOPMENT ASSESSMENT

Report & Recommendations – 2012

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Kenneth C. Fletcher
Director
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Executive Summary

The Governor's Office of Energy Independence and Security (OEIS) is responsible for assessing the State of Maine wind energy goals and recommending changes to law to achieve a cost-effective, sustainable energy, environmental and economic policy strategy. In addition, the OEIS is required to examine permitting standards and processes, visual impact criteria, decommissioning plans and other issues and formulate recommendations to improve Maine's wind energy policies.

Based on the 2015 wind development goal, the State of Maine has met ~17.28 percent of its wind energy goals with 345.5 megawatts (MW) of installed land-based wind capacity. To attain Maine's 2015 goal of 2,000 MW of onshore wind, a total of 1,654.5 MW of wind would need to be installed by 2015. There are currently no off-shore wind projects in operation in Maine.

Maine continues to be a leader in wind power development in New England and the nation and significant tangible benefits are being delivered to the economy, environment and Maine people. Excellent wind resources, interest in renewable energy generation and potential economic and environmental benefits are driving development and discussion of projects through the State. Progress is being made on potential development of deep-water off-shore wind energy through research, development and deployment efforts. Developers are considering new technologies as they become available in the marketplace. However, continuing economic uncertainty, growing state and local opposition to projects and the potential expiration of the federal renewable energy production tax credit are affecting costs, financing options and permitting times.

While Maine has progressed forward in meeting its wind energy development goals and the theoretical potential for increasing installed wind capacity in Maine exists, there are several critical policy and financial issues that will influence the rate of that development, some of which are beyond the control of state government. The Governor and Maine Legislature must work together to examine policy changes that will reduce the price of electricity to Maine consumers in a manner that is environmentally responsible, optimizes economic growth, provides energy security and preserves Maine's quality of place and life.

To that end, the OEIS has consulted with experts and the public, examined the issues and provided recommendations that may be helpful in guiding policymakers to improve the process related to the permitting of wind energy development. These recommendations propose changes to wind goals and criteria for wind permitting; wind permitting process; noise and technology issues; visual and cumulative visual impact; decommissioning; offshore wind; and long-term contracting for renewable resources.

Recommendation Outline

The OEIS recommends exploring opportunities for the development of wind energy production in the state in a manner that is consistent with state and federal environmental standards and community expectations and that achieves reliable, cost-effective, sustainable energy production. These recommendations are discussed in additional detail in the "Conclusions and Recommendations" section, and analysis and rationale for the proposals are based on the accompanying reports.

Wind Goals and Criteria for Wind Permitting

1. Eliminate the statutory goal of 2,000 MW of installed wind capacity by 2015 since it is highly unlikely that level of installed capacity will be achievable.
2. Retain the statutory goals of 3,000 MW of installed wind capacity by 2020 and 8,000 MW of installed capacity by 2030 until a comprehensive re-assessment can be completed.
3. The Governor, the Legislature, the Governor's Energy Office, the Department of Environmental Protection and/or others should convene a panel to identify where in Maine expedited permitting would be allowed in a way that provides maximum energy, economic and environmental benefits and minimum harm to local residents and the environment.
4. The Legislature should clarify the significance of a quantitative "statutory goal" with respect to the action required if the goal is not achieved and/or exceeded.

Wind Permitting Process

5. Require independent analysis to evaluate the "financial capability" of a wind developer and expected output and capacity rating of a project's turbines.
6. Revise "one-size-fits-all" permitting process to allow regulators to distinguish among varying levels of project impact – with diminished or expanded oversight as the circumstances warrant.
7. Treat all "robo-communications" as a single comment in permitting process.
8. Support the LURC December 20, 2011 proposal to add a second public meeting to the permit application process to improve efficiency and provide additional opportunity for comment and information exchange.
9. Adopt a consistent regulatory scheme for wind projects to eliminate major discontinuities between LURC and DEP implementation of their wind permitting responsibilities.
10. Amend the wind law to identify "those regions and view sheds that are most critical to the state's recreational and tourism economy and would be unacceptably degraded by any significant level of wind power development" and "remove any area within fifteen miles of them from the Expedited Permitting Area (EPA)" unless the wind project is not visible from them.
11. Revise the existing permitting process to allow for areas to be removed from the EPA.
12. Make no changes to the 270-day statutory period for processing a permit application.

Noise and Best Available Technology

13. Provide post-construction noise monitoring of an approved wind project.
14. Require use of "best available control technology" to limit impacts from wind development.

Visual and Cumulative Visual Impact

15. Update the surveys of resources designated as having state or national significance.
16. Institute a standard methodology or a more formal guidance document for visual impact assessment.
17. Require "intercept surveys" to help gauge scenic impact – pre- and post-construction visual impact surveys.
18. Amend the wind law to require scenic impact evaluations to eight miles, with a fifteen mile standard option and provisions made for review to greater distances.
19. Support a clear statutory authority for permitting agencies to consider cumulative visual impacts.

Offshore Wind

20. Continue partnerships with MPUC, BOEM, state, federal, private, university, non-profit and other stakeholders in offshore wind development and corresponding energy, economic and environmental analysis.

Decommissioning

21. Incorporate into statute the LURC "Applications Guidance and Checklist" for wind projects pertaining to decommissioning planning.
22. Incorporate into statute the periodic updating of decommissioning plans with a regulatory check-in of decommissioning cost assumptions on a pre-determined schedule (*e.g.*, every three to six years).
23. Require that standard permit conditions for wind projects include requirements that decommissioning payments be made in the form of a performance bond, surety bond, letter of credit, parental guaranty or other acceptable form of financial assurance.
24. The practice of including a future estimate of the salvage values as part of the decommissioning funds needs to be carefully considered and it is recommended that there be a standard formula developed that recognizes the surplus value but at more conservative level such as no more than 50% of the total decommissioning requirements.

Long-Term Contracting

25. Adjust language in 35-A MRSA §3210-C (capacity resource adequacy) providing for long-term contracts for capacity and energy in a manner that prioritizes and promotes lower costs of electricity to ratepayers over the life of such contracts.

Maine Wind Energy Development Assessment: Report & Recommendations

I. Introduction

As required by *The Wind Energy Development Act*, enacted as Public Law 2007, Chapter 661, the Governor's Office of Energy Independence and Security (OEIS) is responsible for reporting to the Joint Standing Committee on Energy, Utilities and Technology on the "**State of Maine's wind energy goals and realization of tangible benefits"** on an annual basis. In addition, by December 2013, the OEIS is responsible, in consultation with other state agencies as appropriate, for conducting a full review of the status of meeting the goals for 2015 and the likelihood of achieving the goals for 2020.

> ***Sec. A-8. Tracking progress toward achievement of state wind energy goals.*** *The Executive Department, Governor's Office of Energy Independence and Security, referred to in this section as "the office," shall, on an annual basis, monitor and make an assessment of progress toward meeting the wind energy development goals established in the Maine Revised Statutes, Title 35-A, section 3404, subsection 2 and, by December 2013, in consultation with other state agencies as appropriate, conduct a full review of the status of meeting the goals for 2015 and the likelihood of achieving the goals for 2020. The office shall provide its assessment and recommendations under this section to the joint standing committee of the Legislature having jurisdiction over utilities and energy matters by January 15th of each year.*
>
> ***1. Assessment.*** *The assessment under this section must include:*
>
> *A. Examination of experiences from the permitting process;*
> *B. Identified successes, including tangible benefits realized from wind energy development, in implementing the recommendations contained in the February 2008 final report of the Governor's Task Force on Wind Power Development in Maine pursuant to Executive Order issued May 8, 2007;*
> *C. Projections of wind energy developers' plans, as well as technology trends and their state policy implications;*
> *D. The status of Maine and each of the other New England states in making progress toward reducing greenhouse gas emissions; and*
> *E. Recommendations, including, but not limited to, any changes regarding:*
>
> > *(1) The wind energy development goals established in Title 35-A, section 3404, subsection 2;*
> > *(2) Permitting processes for wind energy development;*
> > *(3) Identification of places within the State's unorganized and deorganized areas for inclusion in the expedited permitting area established pursuant to Title 35-A, chapter 34-A; and*

(4) Creation of an independent siting authority to consider wind energy development applications.

The OEIS was established in the Executive Department to carry out responsibilities of the State relating to energy resources, planning and development. The office seeks to achieve all cost-effective energy efficiency in the State of Maine; provide resources to invest in renewable and clean energy projects; support investment in improving transportation and fuel efficiencies; reduce electricity prices and overall energy costs to Maine consumers; and make available the financial, regulatory and policy support to upgrade electricity and natural gas services, transmission systems and infrastructures. The OEIS identifies opportunities and partners with state, regional, federal, and private-sector partners to integrate energy, environmental and economic policies into a cohesive and sustainable energy strategy.

The OEIS has been monitoring the progress and has made an assessment of the State's progress toward meeting the wind energy development goals established in the Maine Revised Statutes, Title 35-A, section 3404, subsection 2 and the realization of the tangible benefits of wind energy developments as well as other considerations and pertinent questions included in the law.

According to the statute, the goals for wind energy development in the State are that there be:

Photo: courtesy of CEI

A. At least 2,000 MW of installed capacity by 2015; and
B. At least 3,000 MW of installed capacity by 2020, including 300 MW or more from generation facilities located in coastal waters, or in proximate federal waters; and
C. At least 8,000 MW of installed capacity by 2030, including 5,000 MW from generation facilities located in coastal waters or in proximate federal waters.

Maine Installed Wind Goals

Total Wind MW	On-shore	Off-shore	By When
2,000	**2,000**	**-**	**2015**
3,000	**2,700**	**300**	**2020**
8,000	**3,000**	**5,000**	**2030**

To accomplish the above task, the OEIS has conferred with both the Department of Environmental Protection (DEP) and the Land Use Regulation Commission (LURC), the State's

two permitting and regulatory entities responsible for permitting wind energy projects. The OEIS has also met with and had discussions with wind energy developers and members of the public to gauge process and progress of wind energy development in the State.

The information and recommendations in this report are based primarily on the following resources:

- Coastal Enterprises, Inc., Perkins Point Energy Consulting and Synapse Energy Economics, Inc. – *Maine Wind Assessment 2012, A Report* **(Appendix A)**
- Maine Land Use Regulation Commission – *Report of OEIS Assessment of Cumulative Visual Impacts from Wind Energy Development* **(Appendix C)**
- London Economics International (LEI), *MPUC RPS Report 2011 – Review of RPS Requirements and Compliance in Maine* **(Appendix B)**
- New England States Committee on Electricity (NESCOE), *Renewable Resource Supply Curve Report*, 2011 **(Appendix B)**
- Maine Department of Environmental Protection
- Maine Land Use Regulation Commission

II. Assessment of Progress Toward Meeting Wind Energy Development Goals

A total of eight large-scale wind energy development projects are operating in the State of Maine with a total capacity of 345.5 megawatts (MW). These facilities are exclusive of a number of non-utility "community" scale wind projects that are also operational. In addition, there are two large-scale wind energy development projects under construction or in operational testing mode (at the time of publication) with a potential total of 84.8 MW of capacity, three projects that have been permitted but not yet under construction with a potential of 216 MW and at least four wind energy projects under review with the total potential capacity of 250.1 MW. Other Maine-based wind projects are in discussion or appear in ISO-NE's queue (Independent System Operator – New England) but are not far along enough to be counted by either the DEP or LURC as a serious project at this time. There are no off-shore wind projects in operation or under development in Maine at this time.

Currently Operating Maine Wind Plants

Project	MW Installed	# Turbines	Ave. Size (MW)
Kibby	132.0	44	3
Rollins	60.0	40	1.5
Stetson I	57.0	38	1.5
Mars Hill	42.0	28	1.5
Stetson II	25.5	17	1.5
Spruce Mtn	20.0	10	2
Beaver Ridge	4.5	3	1.5
Vinalhaven	4.5	3	1.5
Total	**345.5**	**183**	**1.9**

Note: Excludes small, "community-scale" wind.

Source: Synapse Energy Economics, tabulation of data from multiple sources, including NRCM, US DOE/EE/RE Wind Power America New England Wind Project database, Maine developer web sites as compiled by CEI, January 31, 2012.

Planned, Proposed or Under Construction Wind Plants in Maine

Project	MW Installed
Bingham	49.7
Bowers Mtn/ Passadumkeag	69.1
Blue Hill	34.2
Dundee	32.0
Fletcher Mtn	60.0
Highland	117.0
Kibby Expansion	33.0
Longfellow/ Black Mtn	40.0
Record Hill	50.6
Revised Oakfield	150.0
Saddleback Ridge Wind Project	33.0
Spruce Mtn Increase	18.0
Timber Wind – Canton	22.0
Timber Wind – Dixfield	33.0
Wind Proj. Phase 4 (MPS Queue #8)	250.0
Wind Proj. Phase 5 (MPS Queue #9)	150.0
Total	**1,141.6**

Source: Synapse Energy Economics, tabulation of data from multiple sources, including NRCM, US DOE/EE/RE Wind Power America New England Wind Project database, Maine developer web sites, ISO-NE interconnection queue, MPS interconnection queue, as compiled by CEI, January 31, 2012. **NOTE:** OEIS compilation of projects include only LURC/DEP projects under construction, testing or review.

III. Summary of Progress Toward Meeting Wind Energy Development Goals

Based on the 2015 wind development goal, and taking into account only the DEP and LURC projects that are operational, under construction, approved/permitted but not yet under construction or operational, and under review:

- The State of Maine has met 17.28 % of wind energy goals with 345.5 MW of installed capacity.
- The percentage would rise to 21.52 % if all 84.8 MW of capacity under construction or testing are operational.
- The percentage would rise to 32.32 % if all 216 MW approved/permitted but not yet under construction are constructed and operational.
- The percentage would rise to 44.82 % if all 250.1 MW under review are constructed and operational.

In the accompanying report, *Maine Wind Assessment 2012, A Report*, published by Coastal Enterprises, Inc. (CEI) on January 31, 2012, the combination of existing and proposed, planned or under-construction wind farms in Maine – 345.5 MW existing plus 1,141.6 planned (*Note:* CEI report includes additional projects not currently under consideration by LURC/DEP) – totals 1,487.1 MW. The percentage of wind energy goals reached if all are constructed by 2015 would be ~ 74.4%, falling short of the goal by 512.9 MW. To attain Maine's 2015 goal of 2,000 MW of onshore wind, a total of 1,654.5 MW of wind would need to be installed between now and 2015 – 2,000 MW (goal) minus 345.5 MW (operating).

IV. Summary of Wind Energy Development Projects in Maine

Projects in Operation in LURC jurisdiction

- Kibby I (Kibby Wind Power Project)
  - TransCanada Maine Wind Development, Inc.
  - Kibby Township and Skinner Township, Franklin County
  - 132 MW
  - 44 turbines
  - LURC permit and planned development subdistrict prior to the *Wind Energy Act*; DEP reviewed small portion of the generator lead line passing through an organized town

- Stetson I (Stetson Wind Project)
  - Evergreen Wind V, LLC (First Wind)
  - T8 R3 NBPP and T8 R4 NBPP, Washington County

- 57 MW
- 38 turbines
- LURC permit and planned development subdistrict, prior to the *Wind Energy Act*; DEP license for the generator lead line

- Stetson II (Owl Mountain and Jimmey Mountain Wind Project)
  - Stetson Wind II, LLC (First Wind)
  - T8 R4 NBPP, Washington County
  - 25.5 MW
  - 17 turbines
  - LURC permit under the *Wind Energy Act*

Total in Operation: 214.5 MW

Projects in Operation in DEP jurisdiction

- Beaver Ridge Wind
  - Patriot Renewables
  - Freedom
  - 4.5 MW
  - 3 turbines
  - Local permit only

- Fox Islands Wind
  - Fox Islands Wind, LLC
  - Vinalhaven, Knox County
  - 4.5 MW
  - 3 General Electric 1.5 MW turbines
  - DEP small scale wind certification issued June 5, 2009
  - Project in operation

- Mars Hill Wind
  - Evergreen Windpower, LLC (First Wind)
  - Town of Mars Hill, Aroostook County
  - 42 MW
  - 28 General Electric 1.5 MW turbines
  - Project in operation

- Rollins Mountain Wind
  - First Wind
  - Lincoln, Penobscot County
  - 60 MW
  - 40 General Electric 1.5 MW turbines
  - DEP permit issued April 21, 2009
  - Project in operation

- Spruce Mountain Wind
  - Patriot Renewables
  - Woodstock, Oxford County
  - 20 MW
  - 10 Gamesa 2.0 MW turbines
  - Project in operation

  Total in Operation: 131 MW

Projects in LURC Jurisdiction Under Construction

- Bull Hill Wind Project
  - Blue Sky East, LLC (First Wind)
  - T16 MD, Hancock Co.
  - 34.2 MW
  - 19 turbines
  - LURC permit

  Total Under Construction: 34.2 MW

Projects Permitted in LURC jurisdiction but not yet under construction

- Kibby II (Kibby Expansion Project)
  - TransCanada Maine Wind Development, Inc.
  - Chain of Ponds Township and Kibby Township, Franklin County
  - 33 MW
  - 11 turbines
  - Under appeal
  - LURC permit under the *Wind Energy Act*

  Total Permitted, not yet under construction: 33 MW

Projects Approved by DEP but not yet operational

- Oakfield Wind
  - Evergreen Wind Power II, LLC (First Wind)
  - Oakfield, Aroostook County
  - 150 MW total, expansion of previously approved 51 MW project
  - 34 General Electric 1.5 MW turbines
  - DEP permit issued January 17, 2012
  - Appealed to BEP February 16, 2012

- Record Hill Wind
  - Record Hill Wind, LLC, subsidiary of Independence Wind
  - Town of Roxbury, Oxford County
  - 50.6 MW
  - 22 Siemens 2.3 MW turbines
  - DEP permit issued August 20, 2009,
  - Project in operational testing mode as of drafting of this report

- Saddleback Ridge Wind
  - Saddleback Ridge Wind, LLC (Patriot Renewables)
  - Carthage, Oxford County
  - 33 MW
  - 12 General Electric 2.75 MW turbines
  - DEP permit issued October 6, 2011
  - Appeal Denied by BEP February 16, 2012

Total Approved by DEP but not yet operational: 233.6 MW

Projects Reviewed and Withdrawn in LURC jurisdiction (i.e., application has been or is in the process of being withdrawn with the intention to re-submit)

- Bowers Wind Project
  - Champlain Wind, LLC (First Wind)
  - Carroll Plantation (Penobscot County) and Kossuth Township (Washington County)
  - 69.1 MW
  - 27 turbines
  - LURC permit reviewed, but applicant is in the process of withdrawing, stating an intention to re-submit at a later date.

- Highland Wind Power Project
  - Highland Wind, LLC (Independence Wind)
  - Highland Plantation and Pleasant Ridge Plantation, Somerset County
  - 117 MW
  - 39 turbines
  - LURC permit review, but application was withdrawn in May 2011 with intent to re-submit at a later date.

Total Reviewed but withdrawn with intent to re-submit: 186.1 MW (If re-submitted, the sizes of these projects are likely to change.)

Projects Under Review by DEP

- Canton Mountain Wind
  - Canton Mountain Wind, LLC (Patriot Renewables)
  - Canton, Oxford County
  - 22 MW
  - 7 General Electric 2.75 MW turbines
  - Application accepted for processing, January 13, 2012

- Passadumkeag Wind Park
  - Passadumkeag Wind Park LLC (Noble Environmental Power LLC)
  - Grand Falls Township, Greenbush, Penobscot County
  - 42 MW
  - 14 Vestas 3.0 MW turbines
  - Application accepted for processing February 27, 2012

Total projects under review by DEP: 64 MW

V. Resolve, Chapter 93, LD 1366 (Resolve, To Clarify the Expectation for the 2012 Assessment of Progress on Meeting Wind Energy Development Goals)

Per RESOLVE, Chapter 93, LD 1366, the OEIS issued a request for proposals (RFP) for a consultant to assist the OEIS in its annual assessment of progress on meeting the wind energy development goals. Coastal Enterprises, Inc. (CEI), Perkins Point Energy Consulting and Synapse Energy Economics, Inc. were chosen to prepare the economic and energy information and data needed to permit the OEIS to formulate substantive recommendations based on the information and data. The CEI report is a companion piece to this wind energy development assessment and should be read in conjunction with this assessment.

The areas of additional examination to meet the requirements of the Resolve include the following:

Statewide Permitting Standards: All statewide permitting standards that apply to wind development, including but not limited to noise standards, visual standards, setback requirement and decommissioning plans.

Visual Impact Criteria: The criteria used during the permitting process to consider the visual impact of an expedited grid-scale wind energy development, the permits issued and any potential changes that could be made to the criteria, including, but not limited to potential changes to the criteria that require the primary siting authorities to consider

insignificant the visual impacts greater than 8 miles from a scenic resource of state or national significance as defined in the Maine Revised Statutes, Title 35-A, section 3451, subsection 9.

Decommissioning Plans: The quality of submitted decommissioning plans and potential recommendations for mechanisms to provide financial assurance for funding decommissioning.

Permitting Process: The time required for completing the permitting process, including the time required for conducting environmental surveys and preparing and submitting the applications and the associated costs.

Greenhouse Gas Emission Reductions: The accuracy of the estimates generated by state agencies and wind energy developers for greenhouse gas reductions that are a result of wind energy development in Maine. Potential recommendations for a standardized protocol for estimated greenhouse gas emission reductions as a result of wind energy development in Maine, if necessary.

Number of Wind Turbines Necessary to Meet Wind Energy Goals: The number of wind turbines necessary to meet the goals, market conditions, development trends, emission goals, siting policies, cumulative impacts and other factors that may make it necessary to amend wind energy development goals.

Expedited Permitting Areas: Whether places should be removed from expedited permitting areas, including, but not limited to mountain area protection subdistricts, as described by the Department of Conservation, Maine Land Use Regulation Commission Rule Chapter 10.

Additional Areas of Examination

- Methods by which permitting authorities could consider the cumulative impact on natural resources at the state or regional level, including but not limited to mountain areas and to scenic resources of state or national significance as defined in the Maine Revised Statutes, Title 35-A, section 3451, subsection 9.
- Economic effects of wind energy development on the tourism industry.
- Costs associated with transmission upgrades for the purpose of transmitting wind energy.
- Implications of the intermittency of wind power for regional markets and the grid, including capacity charges, the forward capacity market and electricity price volatility.

The OEIS has prepared recommendations based on these considerations, as outlined in the CEI report.

VI. Wind Development – Economic Assessment

Maine currently has 345.5 MW of operating on-shore wind generation with an additional 84.8 MW under construction or in operational testing. There are 216 MW of permitted projects that are not yet operational. An additional 250.1 MW are under review or have been withdrawn with the intention to re-submit. Assuming all projects are permitted and built, including those that have been withdrawn, Maine's installed capacity would be ~896.4 MW. Based on the current rate of existing and proposed projects, it is unlikely that 1103.6 MW of new projects will be brought forth in the next 36 months.

One of the contributing factors to the rate of wind generation development is the inherent economics of on-shore wind power. As London Economics International (LEI) identified in the January 30, 2012 *MPUC RPS Report 2011 – Review of RPS Requirements and Compliance in Maine*, the projected all-in-levelized costs for on-shore wind generation in Maine is $109/MWh (LEI, Figure 70, page 113) based on an average capital cost of $2.56 million per MW.

Wind generation relies on four primary funding sources:

1. Energy prices;
2. Renewable energy certificate (REC) prices;
3. Federal production tax credits; and
4. Capacity payments.

1. *Energy Prices.* Since 2007, there has been a decline in the average Maine Hub Day Ahead (DA) Locational Marginal Price (LMP) which has reduced revenue to wind generation. In 2007, the average DA LMP for Maine was $64.42/MWh increasing to $75.97/MWh in 2008. In 2009, the average DA LMP decreased to $39.60/MWh. The average DA LMP for 2010 was $46.70/MWh and was $45.61/MWh in 2011. As compared to the 2007-2008 time period, current DA LMPs are 35% lower.

2. *Renewable Energy Certificate (REC) sales.* It is reported that REC prices are generally higher in other New England states than Maine but there is considerable variation in the price. Class 1 REC prices have decreased from ~ $35/MWh in 2009 to a low of $5/MWh in July 2011. (LEI, Figure 12, page 32). In comparison, Massachusetts Class 1 REC prices have varied from $40/MWh in October 2009 to a low of ~$15/MWh in February 2011, rebounding to a $40+/MWh in December 2011 (LEI, Figure 13, page 33). Since REC prices represent a significant portion of wind generation revenue, the current price volatility in the market introduces financial uncertainty and influences investment decisions. REC prices would need to be at least $33/MWh for on-shore wind to achieve a break-even point on an all-in-levelized cost basis. At a $33/MWh requirement, REC revenue represents 33% of total revenue (LEI, page 13).

3. *Federal Tax Subsidy.* The federal Production Tax Credit (PTC) of $21/MWh is set to expire in December 2012. The PTC is a major incentive for wind development representing over 20% of total revenue for the first ten-year period of a project. Without

the federal PTC, either energy prices and/or REC prices would need to increase significantly to achieve the all-in-levelized break-even point. LEI estimated that REC prices would need to increase to $60.9/MWh to reach the breakeven point if the federal PTC is not available.

4. *Capacity Payments.* Due to the intermittent nature of wind generation, capacity payments are reduced to a normal range of ~$6.2/MWh which is significantly less than other generation sources.

LEI provided a typical on-shore wind generation revenue break-even balance sheet as:

Energy price	$48.9/MWh
REC price	$33.0/MWh
PTC	$21.0/MWh
Capacity	$ 6.2/MWh
Total	**$109.1/MWh**

As is being experienced in Maine and other locations, wind power investment appears to be waning due to the financial realities and uncertainties associated with decreased energy prices, REC price volatility and federal inaction on extensions of the PTC subsidy.

These market factors are understood and as a result, there may well be a greater emphasis on long term contracts to provide the revenue predictability. Maine has entered into one long term wind contract since 2008 (Rollins Wind Project). This contract is based on a discount off the hourly real time wholesale market prices with a $55/MWh floor price escalating to a $65/MWh floor price. The MPUC reported on February 13, 2012 that the first six months of the Rollins contract added $953,000 in above market costs to electric rates (~ $1.9 million per year).

Work recently completed by New England States Committee on Electricity (NESCOE) as reported in January 2012, indicates that long term contracts developed through a competitive procurement process for wind generation would be the likely mechanism to support the development of increased wind generation to meet New England Renewable demand (*Renewable Resource Supply Curve Report*). NESCOE supply curve analysis indicates that wind generation prices could be $125/MWh to $200/MWh in the 2016 time frame to achieve the required investment and capacity. NESCOE projects that Maine on-shore wind will be the majority source of on-shore wind by 2016 (up to 72 % of the total or 2054 MW) if transmission constraints do not exist.

While the theoretical potential for increasing the installed wind capacity in Maine exists, there are two obstacles that will need to be overcome to realize the investment.

1. An unpredictable revenue system that results in a significantly higher revenue level than the current market price and REC price structure affords. If the federal PTC is not extended in the immediate future, the decline in wind investment will be significant. The

NESCOE analysis indicates that long term contracts by the New England states that need to satisfy their respective renewable requirements are the most likely method to achieve the revenue predictability and level to encourage investment.

2. Transmission restraints will need to be eliminated so that Maine wind generation can reach the New England market. The Western Maine Renewable Integration Study (WMRIS) determined that integrating an additional 743 MW of wind in addition to the 362 MW of existing generation in the region would require a transmission investment of $553 million. While there is a total of 400 MW of potential wind development in the Maine Public Service (MPS) service area in northern Maine, there will need to be a transmission investment needed to "connect" to the ISO-NE system.

VII. Experiences from the Permitting Process

The OEIS, in conversations with both regulators and developers has found that overall the *Wind Power Development Act* is working as intended. However, with the increased numbers of operational and proposed wind energy developments, public controversy and opposition to wind energy continues, and appeals have lengthened the permitting process considerably.

LD 1680, "An Act to Assist in Reviewing Wind Energy Applications" enacted as Public Law 2010, Chapter 492, was intended to create consistency in the application and permitting process of wind energy developments before LURC and DEP. The law requires LURC to render a determination on an application in the expedited permitting area for projects 100 kW or greater within 185 days after the LURC determines that the application is complete, except the LURC can render a decision in 270 days if a public hearing is held. These timeframes are consistent with the DEP process.

LD 1504, "An Act to Provide Predictable Benefits to Maine Communities That Host Wind Energy Developments", enacted as Public Law 2010, Chapter 642, changed appeals of final actions of the LURC and DEP for expedited wind energy developments to the Supreme Judicial Court sitting as the Law Court. The Law Court now has exclusive jurisdiction over requests for judicial review of final actions of the LURC regarding expedited wind energy developments.

The LURC may, by rule, add specified places in the State's unorganized areas to the expedited permitting area if 1) the area involved a logical geographic extension of the currently designated expedited permitting area; 2) the area is important to meeting the state goals for wind energy development; and 3) the area would not compromise the principal values and the goals identified in the comprehensive land use plan adopted by the LURC. In April 2011, LURC revised guidance to interpret the statutory criteria for expanding the expedited area.

The LURC Reform Commission was formed through a resolution passed by the 125th Maine Legislature to make recommendations on how to carry out land use planning, zoning and permitting in the 10.4 million acres of unorganized towns and plantations of Maine. The LURC Reform Commission recommended the transfer of all permitting for wind power projects and other large projects that trigger the Site Location of Development Act in the unorganized

territory, except under existing or future Concept Plans, to the Maine Department of Environmental Protection. Under LD 1798 – *An Act to Reform Land Use Planning in the Unorganized Territory*, the DEP would exclusively administer and enforce wind energy development within the expedited permitting areas. The bill is being considered in the 125th Legislature.

Status of LURC and DEP wind project permitting is in the "Summary of Wind Energy Development Projects in Maine" above.

VIII. Visual Impacts

Based on analysis completed by CEI (*Maine Wind Assessment 20102, A Report*, Jan. 2012), the wind projects developed in Maine to date have resulted in 11.5 MW per mile of ridgeline. This varies proportional to the turbine size. With 3 MW turbines in use, the average was 18.8 MW per mile of ridgeline. With 1.5 MW turbines in use, the average was 9.4 MW per mile of ridgeline. To achieve the additional 1654.5 MW to realize the 2000 MW by 2015 goal, an additional 144 miles of ridgeline will need to be accessed (range of 88 miles with 3 MW turbines to 176 miles with 1.5 MW turbines). Based on the experience to date, 260 miles of Maine ridgeline would be needed to achieve the 3,000 MW of on-shore wind generation by 2030. The Appalachian Mountain Club has estimated that there may be insufficient ridgeline available to site all the wind projects that would be needed to achieve the goals (*Ridgeline Windpower Development in Maine: An Analysis of Potential Natural Resources Conflicts, AMC Technical Report 2011 -1*).

In addition to the required ridgeline, there is an associated need for land to support the wind generation development. The January 2012 LEI report on Maine's RPS identified that a typical wind project requires 25 to 50 acres per installed MW. If this is an accurate measure of land requirements, 75,000 acres to 150,000 acres could be required to support the 3,000 MW by 2030 goal.

This possibility, in conjunction with studies on cumulative visual impacts, indicates that there may well be the need to revisit on-shore wind generation goals and the appropriateness of the existing expedited permitting areas.

Per RESOLVE, Chapter 93, LD 1366, the OEIS asked the Land Use Regulation Commission (LURC) to develop a process for the assessment of cumulative visual impact from wind power development based on the experiences of the state's reviewing authorities in permitting grid-scale wind projects. This assessment process convened a study group and assembled resources for their consideration, defined and described the cumulative visual impact issues to be addressed by the assessment, developed and evaluated options for addressing cumulative visual impacts from wind energy development, and reported on the process and findings. Three experts in the fields of landscape architecture and visual resource assessment participated in the study group along with staff from OEIS, LURC and DEP.

The study group identified and described a fairly large and diverse set of potential solutions and strategies and then worked on evaluating the options in a systematic manner based on the feasibility and importance of the option. The LURC assessment identified twenty-two options for consideration. The options are grouped by the type of approach offered by the potential solution or strategy.

- **Threshold analysis** approaches generally look at providing a method and/ or criteria for indicating when the accumulation of visual impacts from wind power development has crossed some unacceptable threshold.
- **Cluster** approaches generally look to pre-determine (or proactively plan) where a certain amount of development could be accommodated and, conversely, where it could not.
- The **Other** approaches category includes options that do not fit either the threshold or cluster category but which may have some ability to reduce the impact on visual resources from cumulative wind power development (and in many instances from individual projects).

This study and report is part of the OEIS wind energy development assessment conducted pursuant to LD 1366 and is not separate or independent from this report. The full report is at http://www.maine.gov/oeis/alternativeenergy.html. See Appendix C for summary.

IX. Identified Successes, Including Tangible Benefits

While Maine has progressed forward in meeting its wind energy development goals with a total installed wind energy capacity of 345.5 MW, meeting the goals will be challenging if not impossible. Maine continues to be a leader in wind power development in New England and the nation and significant meaningful tangible benefits are being delivered to the economy, environment, and Maine people.

Progress is ongoing for the potential development of deep-water off-shore wind energy through the research, development and deployment efforts of the University of Maine, as well as the continued partnership between the State of Maine and the U.S. Bureau of Ocean Energy Management (BOEM). This technology will continue in an R & D phase for several more years.

Tangible Benefits and Community Benefits

Prior to July 12, 2010 grid-scale, commercial wind energy projects proposed in the State of Maine had to provide “significant tangible benefits”. In making findings, the primary siting authority (DEP/LURC) had to presume that an expedited wind energy development provided energy and emissions-related benefits and had to make additional findings regarding other tangible benefits provided by the development.

"Tangible benefits" was defined as environmental or economic improvements attributable to the construction, operation and maintenance of an expedited wind energy development, including but not limited to: construction-related employment; local purchase of materials; employment in

operations and maintenance; reduced property taxes; reduced electrical rates; natural resource conservation; performance of construction, operations and maintenance activities by trained, qualified and licensed workers in accordance with Title 32, chapter 17 and other applicable laws; or other comparable benefits, with particular attention to assurance of such benefits to the host community to the extent practicable and affected neighboring communities.

LD 1504, "An Act to Provide Predictable Benefits to Maine Communities That Host Wind Energy Developments", enacted as Public Law 2010, Chapter 642 changed the definition of "tangible benefits". Tangible benefits now also include property tax payments resulting from the development and other payments to a host community, including, but not limited to payments under a community benefit agreement. Tangible benefits also apply to host communities instead of just one community.

"Community benefit agreement" is defined as an agreement between the developer of an expedited wind energy development and a host community that involves payments by the developer to the host community to be utilized for public purposes including, but not limited to property tax reductions, economic development projects, land and natural resource conservation, tourism promotion or reduction of energy costs. The agreement must specify in writing the value of the payments to the community and any payment schedule and other terms and conditions made over time by the developer to the host community.

"Community benefits package" is defined as the aggregate collection of tangible benefits resulting from: payments, not including property tax payments, to the host community or communities including, but not limited to, payments under community benefit agreements, payments that reduce energy costs in the host communities and any donations for land or natural resource conservation. An applicant for a wind energy development is required to establish a community benefits package valued at no less than $4,000 per year per wind turbine, averaged over a 20-year period, unless a host community's legislative body votes to waive or reduce the community benefits package requirement. Projects under 20 MW in size, owned by a nonprofit entity or quasi-public entity, or are located on certain Indian territories are exempt from this requirement.

Wind energy permit applications must also include the following information regarding tangible benefits:

- Estimated jobs to be created statewide and in host communities as a result of construction, maintenance and operations;
- Estimated annual generation of wind energy;
- Projected property tax payments;
- Description of the community benefits package, including but not limited to community benefit agreement payments; and
- Any other tangible benefits to be provided by the project.

The law also expanded the reporting of tangible benefits by the OEIS by adding a summary of tangible benefits provided by expedited wind energy developments including but not limited to, documentation of community benefits packages, community benefit agreement payments

provided, as well as a review of the community benefits package and the actual amount of negotiated community benefits packages relative to the statutorily required minimum amount.

The OEIS consulted with DEP and LURC and the agencies provided the following information on several operating and proposed projects.

Tangible benefits, wind projects in LURC jurisdiction

1. Stetson I and II (Stetson Wind Project and Owl Mountain and Jimmey Mountain Wind Project, respectively)

The Stetson I project permit application was submitted to LURC prior to the effective date of the *Wind Energy Act* in April of 2008, and as such it did not include a tangible benefits proposal. However, the LURC permit required that First Wind report the energy and environmental benefits annually for Stetson I for the first two years of operation.

Stetson II was subject to the tangible benefits requirement of the *Wind Energy Act* in PL 2007 Ch. 661, but not to the amended tangible benefits requirement in PL 2009 Ch. 642.

Energy produced and pollution offset. Stetson I and Stetson II are connected by a 34.5 kV collector line, forming one continuous project that connects to the New England grid by one generator lead line. As such, the amount of energy produced and pollution offset by Stetson I and Stetson II are reported here as one project.

- Stetson I, consisting of 38 turbines with a total generating capacity of 57 MW, went into commercial operation on January 22, 2009. Stetson II, consisting of 17 turbines with a total generating capacity of 25.5 MW, went into commercial operation on March 15, 2010.
- *2009.* For Stetson I, First Wind reported to LURC that this project produced 138,969 MW hours in 2009.
- *2010.* In 2010, Stetson I and Stetson II combined produced 200,657 MW hours (Stetson I – 155,723 MW hours; and Stetson II - 44,934 MW hours). The pollution offset by the combined project in 2010 was reported by First Wind as 83,214 tons of carbon dioxide (CO_2), 86 tons of nitrogen oxides (NO_x), 237 tons of sulfur dioxide (SO_2), and 2.05 pounds of mercury.
- *2011.* For Stetson II only, First Wind reported that the amount of energy produced in 2011 was 60,353 MW hours. The pollution offset by Stetson II in 2011 was reported by First Wind as 24,985 tons of CO_2, 25.4 tons of NO_x, 85.8 tons of SO_2, and 0.06 pounds of mercury.
- The total amount of energy produced in 2009 is for Stetson I only. The total amount reported for 2010 is for Stetson I for 12 months and Stetson II for approximately 9.5 months of 2010. The total amount of power produced by Stetson I in 2010 was affected by a shut-down for repair of a transformer, and a second shut-down during construction of Stetson II. The total amount of energy reported for 2011 is for Stetson II only because the two-year reporting requirements for Stetson I were met when the 2010 report was submitted.

Stetson II - Other tangible benefits. The other tangible benefits reported for the Stetson II project included:

- 114 Maine-based companies were engaged as sub-contractors, suppliers, or consultants.
- A high proportion of the 200 individuals employed during construction were Maine or local residents.
- Currently, 6 individuals are employed for the operation and maintenance of Stetson I and II (with an additional 25 employees located in the Portland office to develop, construct, and operate all of First Wind's projects in Maine). The Stetson project continues to contract with Maine and local businesses.
- Over $10 million were spent directly with Maine-based companies and individuals during construction of Stetson II. This amount does not include land-owner payments, tax payments, or other "induced" payments.
- The tax liability for Stetson II in 2010 was $270,972.
- $468,465 in grants has been made available from the Stetson I and II tax incremental financing (TIF) funds for conservation and nature tourism, leveraging $2.86 million in matching grants for projects in Washington County. These funds have resulted in 72 full-time equivalent jobs created and/or retained, and 14.5 temporary or seasonal jobs created. Stetson II's share of this is roughly 40%.

2. Kibby I (Kibby Wind Power Project)

The Kibby I wind project was developed by TransCanada Maine Wind Development, Inc. The project permit was approved by the LURC Commission on July 9, 2008, and the project became fully operational on October 24, 2010.

The permit application for the Kibby I wind power project was submitted to LURC prior to effective date of the *Wind Energy Act* in April 2008, and as such it did not include provisions for tangible benefits. However, the LURC permit required that TransCanada report annually the energy and environmental benefits for the first two years of operation, including the amount of power produced and pollution offset.

In January, 2012, TransCanada reported to LURC that 278,435 MW hours of energy were produced by the Kibby I project in 2011. The amount of energy produced equates to an offset of 26.21 tons of NO_x, 35.47 tons of SO_2, and 136,297 tons of CO_2.

3. Kibby II (Kibby Expansion Project)

The Kibby II wind project is being developed by TransCanada Maine Wind Development, Inc. The permit was approved by the LURC Commission on January 5, 2011, and was appealed on January 28, 2011. The appeal is still pending, and as such no construction has started on this project. This project was subject to the tangible benefits requirements of PL 2007, Ch 661, but not to the provisions of the amended tangible benefits requirements in PL 2009 Ch. 642.

Highlights of Kibby II's tangible benefits include the following:

Total estimated project cost: $116.3 million

- *Estimated jobs to be created during engineering, design, permitting and construction*: Up to 315 jobs during peak construction.
- *Indirect benefits to local and Maine businesses due to purchases of supplies or services.* Noted, but not quantified.
- *Maintenance and operations jobs*: 1 additional permanent job, added to the nine individuals already employed to operate and maintain the Kibby I project.
- *Estimated annual generation of wind energy*: Up to 92,000 MW hours per year, and the associated offset of emissions generated by a comparable amount of generation using fossils fuels.
- *Projected property tax payments*: More than $400,000 per year, or $10 million over the 25-year life of the project.
- *Income taxes*: Estimated $13 million over the 25-year life of the project
- *Community benefits package*:
  - Payments to the Town of Eustis/Stratton of $33,000 per year (or $1,000 per MW per year) in additional to the $132,000 per year already paid to the town for the Kibby I project, resulting in a total of $177,000 per year paid for the Kibby I and Kibby II projects combined.
  - $110,000 to the Maine Department of Labor for green jobs education and training in Franklin County.
  - $110,000 to the High Peaks Alliance for land conservation and trail corridor acquisition.

4. Highland Wind Project

The Highland Wind Project is being developed by Highland Wind, LLC, an affiliate of Independence Wind. The permit application was being reviewed by LURC, but was withdrawn by the applicant in May 2011, with the intention of re-submitting a revised project in the near future. However, no re-submission date has been set at this time. The Community Benefits Package for this project was subject to the amended tangible benefits reporting requirements, in accordance with PL 2009 Ch. 642. If the application is re-submitted as a revised project, the proposed Community Benefits Package may be revised as well.

Highlights of the Highland Wind Project's tangible benefits proposal in the application that was withdrawn included the following:

Total estimated project costs: $247 million

- *Estimated jobs created during engineering, design, permitting and construction*: 330 jobs during the primary construction year, 36 jobs during non-peak years. Engineering, design, permitting and construction are expected to take a total of 6 years.
- *Maintenance and operations jobs*: 8 permanent jobs
- *Estimated annual generation of wind energy*: Approximately 306,000 to 350,000 MW hours per year, and the associated avoidance of emissions generated by a comparable amount of power generation using fossils fuels.
- *Projected property tax payments to Highland Plantation*: $118,000 to $119,000 per year.

- *Community benefits package*: Annual payments of $104,000 to Highland Plantation for energy conservation over the 20-year life of the project, for a total of $2,080,000, paid into a Highland Plantation Fund, including:
  - A one-time pre-permitting advance to Highland Plantation of up to $15,000 to help defray the costs of reviewing the permit application.
  - Annual payments directly to year-round and seasonal residences in Highland Plantation to help defray the cost of electrical power during the 20-year life of the project.
  - One-time payment of up to $6,000 directly to each year-round residence in Highland Plantation for the purpose of home energy efficiency projects.
  - Annual payments directly to each year-round residence in Highland Plantation who have installed an electro-thermal heat storage unit to help defray electricity costs.

  After payments are made to each individual landowner, as described above, the remainder of the $104,000 will go to Highland Plantation.
- *Benefits to the University of Maine.* Highland Wind proposed to provide the University of Maine with electro-thermal heat storage units to be used in the future expansion of the University's Offshore Wind Laboratory.

5. Bowers Wind Project

The Bowers Wind Project is proposed by Champlain Wind, LLC, a subsidiary of First Wind. The Bowers Wind Project has been reviewed by LURC, but the applicant has decided to withdraw the application and re-submit a revised proposal in the future. This project is subject to the amended tangible benefits reporting requirements, in accordance with PL 2009 Ch. 642. The tangible benefits initially proposed in the application are summarized here.

Total estimated project costs: $136 million

- *Direct and indirect jobs.* The number of direct and indirect jobs expected to be created, and the amount of money expected to be spent in Maine to construct and operate the Bowers Wind Project would be similar to those resulting from the Stetson I project.
  - Construction-related employment of the project will create approximately 150 jobs
  - Three (3) full-time operation and maintenance jobs and 5 technician jobs during the first three years of operation will be created.
  - Project-related wages would total $12.5 million.
  - An estimated $50 million would be spent in Maine during construction.
- *Property taxes.* The estimated annual property taxes to be paid are approximately $628,000, adjusted by any credit enhancement agreement, for a total of $125 million over the 20-year life of the project.
- *Energy to be produced.* Approximately 200,000 MW hours per year would be produced by the 69.1 MW project.
- *Community Benefits*
  - *Agreement with Carroll Plantation:* Payments of $92,000 annually over the 20-year life of the project, totaling $1,840,000.
  - *Payments to Washington County:* $10,000 annually over the 20-year life of the project, totaling $200,000.

- *Energy Fund:* Establish an Energy Fund to be held and administered by the Sunrise County Economic Council of Washington County to offset the cost of electricity for Kossuth residents and for energy related projects. There would be an initial payment of $20,000, thereafter $15,000 annually over the 20-year life of the project, totaling $305,000.
- *Conservation Fund:* Establish the Bowers Mountain Fund to be administered by the Forest Society of Maine to support and enhance natural resource conservation, public access, and recreational opportunities in Carroll Plt., Kossuth Twp., Lakeville Twp., and vicinity. The initial payment will be $120,000, with $20,000 paid annually over the subsequent 19 years, totaling $500,000.

6. Bull Hill Wind Project

The Bull Hill Wind Project is being developed by Blue Sky East, LLC, a subsidiary of First Wind. The permit was approved in October 2011, and construction started in February 2012. This project is subject to the amended tangible benefits reporting requirements, in accordance with PL 2009 Ch. 642.

Highlights of the Bull Hill Wind Project's tangible benefits include the following:

Total project costs: $78.5 million

- *Estimated jobs created during construction:* 225 individual jobs.
- *Maintenance and operations*: 3 to 8 permanent jobs.
- *Total wages generated*: $6.2 million over 20-year life of the project.
- *Indirect economic benefits:* Supplies and services purchased by contractors during construction.
- *Estimated annual generation of wind energy*: Approximately 94,000 MW hours per year.
- *Projected property tax payments:* $342,343 annually totaling $6.9 million over 20-year life of the project.
- *Annual lease payments:* To landowner Lakeville Shores, which hires locally for its forest operations business.
- *Community benefits package*:
    - $200,001 to Hancock County annually ($5,848 per MW per year) totaling $4 million over the 20-year life of the project.
    - $20,000 to the Town of Eastbrook annually, totaling $400,000 over the 20-year life of the project.
    - $20,000 annually to the Downeast Salmon Federation (DSF) for water quality improvement and public access projects.
    - $25,000 one-time contribution to DSF for conservation projects.

Tangible benefits, wind projects in DEP jurisdiction

1. Oakfield Wind

The applicants submitted a description of the tangible benefits to be provided by the project in Section 28 of the application. In that description the applicants described tangible benefits that the project will provide to the State of Maine and to the host community of Oakfield, including economic benefits and environmental benefits.

The applicants state that the proposed project will add significant new property tax value to the Town of Oakfield. In 2009, the Town of Oakfield designated a TIF (Tax Increment Financing) district and adopted a Development Program for the TIF district. The Town intends to amend the designation of a municipal TIF district to be known as "Amended Town of Oakfield Wind Project Municipal Development and Tax Increment Financing District," and adopt the first amendment to the Development Program for the District as presented to the Town.

The applicants state that their proposal will benefit the host communities and surrounding areas through construction-related employment opportunities. These will include tree clearing and excavation jobs, and jobs in businesses that support construction such as lodging, restaurant, fuel and concrete supply. The applicants anticipate hiring five to ten permanent employees to operate and maintain the facility.

The 59- mile generator lead line will also result in increased property values and property taxes paid to the property taxing jurisdictions.

Communities Benefits Agreement. The applicants propose to establish a community benefits package that will consist of an annual payment to the Town of Oakfield of $5,000/MW, which equals $15,000 per turbine. This payment will total $600,000 annually paid to the Town of Oakfield for the 20 year term of the agreement.

2. Saddleback Ridge

The applicant submitted a description of the tangible benefits to be provided by the Saddleback Ridge Wind Project as Section 28 of the application. In that description the applicant describes tangible benefits that the project will provide to the State of Maine and to the host community of Carthage, including economic benefits and environmental benefits. The applicant states that the project is expected to be assessed at approximately $66 million, providing tax revenue to the host community.

The applicant states that the host community will also benefit through employment opportunities, the local purchase of materials and supplies, taxes paid on the project, and a proposed annual Community Benefit Fund payment. The applicant describes the employment benefits in part as follows:

> *"On average, the Project would employ 60 to 70 construction workers for five to six months and up to 100 workers during peak construction times. Materials located close to*

the site will be used as much as possible, giving local stone quarries and construction material suppliers procurement opportunities. In addition, local businesses such as motels, restaurants, gas stations, and retail stores will see increases in activity during construction. After construction is complete, the Project will employ a maintenance staff of two to three full-time workers. There will also be a need for ongoing road maintenance, plowing, and landscaping services."

The applicant also states that the project will increase energy diversity, thereby helping to reduce electric price volatility in Maine. The applicant states that the project will help Maine meet its commitments under the Regional Greenhouse Gas Initiative, which establishes limits for emissions associated with the generation of electricity, and that it will have the capacity to provide enough emission-free energy to power more than 16,000 Maine households annually, with no air or water pollution and with no greenhouse gas emissions.

Community Benefits Fund. The applicant has agreed with the Town of Carthage to establish a Community Benefits Fund. This fund would be used at the Town's discretion to provide direct economic benefits to its citizens. The applicant's proposed contribution to the community benefit fund will be at least $4,000 per turbine per year for the life of the project and will be administered by the Town of Carthage. The applicant states that the size of this fund may increase subject to availability of project resources. The Town of Carthage submitted a letter to the DEP dated February 21, 2011, accepting the proposed community benefit fund.

Recreation Donation. The applicant initially proposed to donate $60,000 to the Maine Bureau of Parks and Lands for a new playground at the beach and campground near Webb Lake in Mount Blue State Park. In comments dated December 9, 2010, the BPL notes that this proposal is above and beyond the minimum requirements of the law. BPL further stated that since negotiating the agreement, other potential funds have been identified for the playground so the donation should be restructured as a more general contribution to BPL, or more specifically for land acquisition in the vicinity of Mount Blue State Park.

3. Canton Mountain

The applicant submitted a description of the tangible benefits to be provided by the Canton Mountain Wind Project as Section 28 of the application. In that description the applicant describes tangible benefits that the project will provide to the State of Maine and to the host community of Canton, Maine including economic benefits and environmental benefits. According to the application, the project is expected to be assessed at approximately $44 million. This significant investment in the local community will make CMW the largest taxpayer in Canton and will increase the assessment of the town by roughly 60 percent. Canton can elect to use the funds from the new tax revenue to lower taxes and/or fund public projects.

According to the applicant, the project will have a significant impact on employment in the State of Maine. During development of the Project, CMW hired many consultants, contractors, and field crews that are based in Maine. Specifically, CMW used Maine-based companies for wetland and vernal pool delineations, wildlife surveys, soil work, visual impact assessment, archaeological surveys, real estate surveying, electrical engineering, and legal counsel. During

construction, there will be job opportunities for activities such as tree clearing, excavation, road construction, concrete work, and electrical work. On average, the project would employ 40 to 50 construction workers for five to six months and up to 75 workers during peak construction times. Materials located close to the site will be used as much as possible and local businesses such as motels, restaurants, gas stations, and retail stores will see increases in activity during construction. After construction is complete, the project will employ a maintenance staff of two to three full-time workers. There will also be a need for ongoing road maintenance, plowing, electrical, and landscaping services.

Community Benefit Fund. According to the applicant, CMW will establish a Community Benefit Fund (CBF) that would provide the Town of Canton with an annual funding source that could be used by the community without restrictions. CMW would fund at least $4,000 per turbine per year for the first 15 years of the Project and at least $6,000 per turbine per year from year 16 to the end of the Project; the size of this fund may increase subject to availability of project resources. The CBF would be administered by the Town of Canton.

CMW is exploring various options for entering into a long-term, fixed-price power purchase agreement with a New England load-serving utility. According to the applicant, a 22-MW project on Canton Mountain would provide enough emission-free renewable energy for more than 10,900 Maine households each year.

4. Passadumkeag Project

The applicant submitted a description of the tangible benefits to be provided by the Canton Mountain Wind Project as Section 28 of the application. In that description the applicant describes tangible benefits that the project will provide to the State of Maine, Penobscot County and local communities, including economic and environmental benefits.

According to the applicants, the project:

> *Provides a direct economic benefit to the local landowner participating in the project through a land lease. This income stream will significantly supplement revenue from commercial forestry. This additional income stream will help maintain the property in traditional forestry and recreational uses, while creating a new source of clean energy.*
>
> *Development and construction of the proposed Passadumkeag Wind Project is estimated to require the direct labor of approximately 225 individuals. Following the construction phase, the Applicant estimates three to eight permanent employees will be required to operate and maintain the facility. The project would respond directly to area needs and to the people who live and work in the vicinity of Greenbush and southeastern Penobscot County. A significant portion of the estimated $79 million dollar project cost is expected to be spent on development, engineering, and construction-related activities, much of which is anticipated to stay within Maine. The surrounding areas can benefit through construction-related employment opportunities and the ancillary economic benefits of that construction activity. There will be the opportunity for direct jobs for activities like*

tree clearing and excavation, and ancillary jobs in businesses that support construction such as lodging, restaurant, fuel and concrete supply.

The Applicant expects that it will pay significant annual property taxes on the project. The Applicant is currently discussing the development with the Penobscot County Commissioners, and is proposing a tax increment financing (TIF) program for the project. The Applicant estimates that the Passadumkeag Wind Project will initially add approximately $68 million of new property tax value to the unorganized territory of Penobscot County, resulting in estimated average annual tax payment of approximately $496,000 dollars (averaged over a 20-year period), adjusted by any credit enhancement agreement.

The applicant states that the addition of new power generation facilities in Maine will tend to lead to lower and less volatile electricity prices.

Community Benefits Package. According to the applicant, they are negotiating a Community Benefit Agreement (CBA) with Penobscot County that will satisfy or exceed the $4,000 per turbine per year. An immediate community benefit to the residents living along Greenfield Road will be the rebuild of approximately eight miles of the existing Bangor Hydro Electric Company distribution system from the new substation location in Greenbush, through Greenfield, and into Summit Township. This rebuild will provide greater system reliability, and decrease the likelihood of power outages for those living along this section of Greenfield Road.

X. Technology Trends

The development of new wind power technology continues apace, driven by demand as installations continue to grow exponentially worldwide. The more important features of recent wind technology developments, and those most relevant to Maine, include new or improved technology for reduction of noise nuisance and bird and bat strikes, improved technology and technique for grid reliability, power production integration and backup, and related improvements in wind power forecasting. On the research side, there has been a recent and very large increase in the Department of Energy's estimate of total US wind power available based on new measurement with very tall anemometer towers, which would likely apply to Maine based wind development as well. Finally, great strides have been made in overall power production, both by improved equipment, particularly larger equipment, as well as by the improved anemometry from the DOE and individual companies' own efforts and better forecasting.

Research and Technology Trends

The Department of Energy (DOE) and the National Renewable Energy Laboratory (NREL) continue to be active in making technological and planning knowledge accessible to New England and to Maine users. Of particular note is the New England Wind Power Education Project, under the auspices of the Wind Powering America initiative (http://www.windpoweringamerica.gov/newengland/neweep/). Considerable improvements have been made to the average cost and overall availability of technology to do bird and bat

studies using avian radar. Companies with bases or representation in Maine have made this technology increasingly and more easily available to wind power developers. The US Fish and Wildlife Service has issued guidelines for wind power development and wildlife planning, available at http://www.fws.gov/habitatconservation/windpower/wind_turbine_advisory_committee.html.

A major finding by a NREL study released in 2011 resulted in the DOE and NREL issuing a new 80-meter above ground level wind map for the entire United States. The new map and base data show an increase in the available wind power projection, from 11 trillion KWh to 37 trillion KWh (http://www.windpoweringamerica.gov/filter_detail.asp?itemid=2542). These data were the result of new tall tower anemometrical studies (up to 120 meters) around the country, but particularly the Midwest and Texas, as well as continued development of wind map models by the company AWS Truewind. According to the Department of Energy, the new data apply to Maine, and indicate a much larger amount of available wind power in Maine at these higher turbine hub heights (of 80 meters and 100 meters). The larger turbine equipment is now widely available, and has already been used on many if not most sites in Maine, leading the state's various public-interest wind power analysts to consider whether or not Maine wind power facilities are already more productive than currently expected. Maine has two anemometrists who serve the general public, one at the University of Maine School of Engineering Technology, the other at Unity College, who have together measured the wind, or are doing so, at sixteen sites around the state. The new DOE data is consistent with their findings, but there has not been the ability to perform the tall tower studies that would be needed to fully confirm the availability of this larger wind resource.

The information in this section has been provided in part by Dr. Michael W. "Mick" Womersley, Lead Faculty of the Sustainability Energy Program at Unity College. According to Dr. Womersley, new research has addressed the question of grid reliability and back-up, sometimes known as integration. Further work has confirmed these findings and expanded the knowledge base for wind power integration. Dr. Womersley states that this research demonstrates that previous apprehensions of grid power integration difficulties and possible disruption because of intermittent wind power production were overstated. Relatively large amounts of power, especially from larger wind farms with forecasting technology employed, can be, and are being, absorbed by the grid in some grid balancing areas. The overall increase in combined cycle natural gas power generation, at the expense of coal generation, facilitates this transition because of the more immediate dispatch of modern natural gas plants. Improved technique in wind power forecasting applied to grid integration has been first demonstrated and then mainstreamed at commercial wind power sites in the Midwest and Texas, and as Maine's wind power capacity grows, these techniques can be expected to be extended to Maine.

Dr. Womersley maintains that forecasting is of particular value to Maine if feasible, off-peak and excess wind power is in the future shunted to building heat in our windy winter season, facilitated by Smart Grid technology that is at present being installed by Central Maine Power and Bangor Hydro. With the high price of heating oil expected to continue unabated, state planners and decision makers would wish to be aware of these possibilities as wind power expands. A very small-scale experiment is underway at the Fox Islands Wind installation, using electric storage heaters and cell-phone based switching. The current effective comparable cost of

2 home heating oil at the average Maine price of $3.86/gallon (as of March 12, 2012) is 9.5 ¢/KWh, assuming 100% efficiency and no transmission losses. There may be room for mutually beneficial arbitrage between wind power generators, smart grid operators, and residential and other consumers of home heat.

Wind Technology in Maine

The evolution of wind power equipment choice in Maine supports the likelihood that Maine wind power companies are already well aware of the larger wind power resource at higher turbine hub heights. Until recently, most operational wind energy development projects in Maine use General Electric (GE) 1.5 MW turbines with the exception of the Kibby project which operates 3 MW Vestas turbines and the Spruce Mountain Wind Project which operates 10 Gamesa G90 2 MW turbines. However, GE has increased the size of the available towers for the 1.5 MW turbine, from 60 and 67 meters to 80 and 100 meters, and has produced larger blade configurations for certain types of sites, and many of these taller and broader units have been deployed in Maine already. Capacity factors for the taller units would be higher by several percentage points, although, it would be difficult for state government and the public to know whether or not these machines were more efficient than expected. Developers are also looking to new turbine designs from General Electric and other companies that are now coming to market.

Stetson Wind I and II consist of GE 1.5 MW turbines, the most installed brand of turbine in the industry. The towers are 80 meters (262 feet) tall and blade diameters are 77 meters (253 feet). According to GE the 1.5 MW turbine "is active yaw and pitch regulated with power/torque control capability and an asynchronous generator. It uses a bedplate drive train design where all nacelle components are joined on a common structure, providing exceptional durability. The generator and gearbox are supported by elastomeric elements to minimize noise emissions." There are over 16,500 units of these turbines in operation worldwide and it continues to be one of the world's most widely used wind turbines in its class. Beaver Ridge Wind, Mars Hill Wind, Rollins Mountain Wind and Fox Islands also operate the GE 1.5 MW turbines, although with different tower height and blade configurations.

The Kibby wind project utilizes Vestas V90 3 MW turbines. According to Cleantech, "the V90 wind turbine consists of a rotor in a total diameter of 90 meters. The rotor has a swept area of 6,362 square meters with a total of three blades. It operates at a speed of 16.1 rotations per minute. The turbine can be installed on towers with varying hub heights such as 80 meters and 105 meters. The V90 wind turbine generates 3 megawatts of power at a nominal wind speed of 15 meters per second. The cut-in and cut-out wind speeds of the turbine are 4 meters per second and 25 meters per second, respectively".

The Spruce Mountain project uses 10 Gamesa 2 MW turbines. According to RenewableEnergyfocus.com this model is designed for sites with low wind resources, is produced with lighter blades using fiberglass and has an aerodynamic design NRS control system to minimize noise emissions.

Some wind developers are investigating the use of GE 2.5 MW, Siemens 2.3 MW and 3 MW turbines. According to GE, their 2.5 MW turbines "can be deployed on over 85% of the sites

being developed today. The turbine generates a leading amount of annual energy production and its 100m rotor also makes it an excellent solution for low wind sites. The patented rotor blade technology provides the turbine with very competitive acoustic performance. With the optional noise-reduced operation modes, the turbine can be deployed at sites with the most stringent noise restraints, while simultaneously maintaining a high energy yield. The turbine can also be equipped with various towers resulting in hub heights of 100m, 85m and 75m, meeting potential tip height constraints and maximizing energy yield."

The Siemens 2.3 MW turbine unit is among the largest land-based turbines deployed in the United States. According to WindPower Engineering it was "turbine of the month" in March, 2010 and was tested at the National Renewable Energy Lab's Technology Center to examine "structural and performance characteristics, aerodynamic and performance improvements, along with model, acoustics, and power-quality studies. The turbine is fitted with a 101-m diameter rotor (331 ft) and mounted atop an 80-m tower (262 ft)". According to Siemens, their 3 MW turbine "offers innovation through a completely new Direct Drive concept introducing a permanent magnet generator. With half the parts of a conventional geared wind turbine, and much less than half the number of moving parts, the new wind turbine will require less maintenance and increase profitability for customers. The new Direct Drive wind turbine features a rotor diameter of 101 meters and is now available for sale for onshore and offshore projects around the world. The main advantage of permanent magnet generators is their simple and robust design that requires no excitation power, slip rings or excitation control systems. This leads to high efficiency even at low loads. A major advantage of the new machine is its compact design. With a length of 6.8 meters and a diameter of only 4.2 meters, the nacelle can be transported using standard vehicles commonly available in most major markets."

The Saddleback Ridge project is proposing to use a GE 2.75 MW turbine. According to Windpower Engineering, GE's 2.75-100 turbine "is an upgrade of the existing 2.5-100 wind turbine without mechanical component changes and only minor changes to the electrical system. GE's 2.75-103, a combination of the 2.75 uprate and the 103-m rotor which uses GE's 50.2 m proprietary blade design offers the latest enhancements in aerodynamics, reduced acoustics, and robust performance".

Off-shore wind energy turbine development technologies are just emerging and it remains to be seen which technologies will prove to be commercially viable. For example, the University of Maine is developing a Floating Turbine Design of coupled aeroeleastic/hydrodynamic models developed by NREL with optimized platform designs that integrate more durable, lighter, hybrid composite materials. Their tasks include developing a complete design of one or more scale floating turbine platforms, capable of supporting a wind turbine in the 10 kW to 250 kW range for deployment at the University of Maine Deepwater Offshore Wind Test Site.

Further improvements to power production from wind turbine technology can be expected, as yet larger turbine configurations come into production. A 7.5 MW machine has been commissioned for an offshore site in the North Sea and both Enercon and Clipper wind power are involved in the design and production of 7.5 MWh wind machines. Other efficiencies might be gained from better site planning technology, particularly the use of 3D airflow modeling. The development of high voltage DC transmission line technology has facilitated reduced transmission losses, adding

value to power production at the demand source. Large scale DC transmission line initiatives have been proposed for the east coast, particularly by Google, an important consumer and driver of renewable energy technology development. Other developers are considering new models as they become available in the marketplace and are proposed for a number of projects in Maine.

XI. Maine and New England States' Progress Toward Reducing Greenhouse Gas Emissions

In January 2012, the Maine Department of Environmental Protection (DEP) released its Fourth Biennial Report on Progress toward Greenhouse Gas Reduction Goals. The DEP's analysis of energy consumption, industrial processes, agriculture and waste management found that Maine met the goal of reducing greenhouse gas (GHG) emissions to 1990 levels by 2010. The Department's analysis indicates:

- 89% of GHG emissions in Maine are the result of energy consumption, largely produced by combustion of petroleum products.
- From 1990 to 2009, total energy consumption in Maine declined 7% while total GHG emissions only declined 2.5%.
- The Transportation sector produces almost half of all CO_2 emissions in Maine.
- CO_2 emissions from petroleum combustion in the Industrial sector dropped 50% and in the Electric Power sector 85% since 1990.

According to the DEP, "additional GHG emission reductions can be achieved by encouraging energy efficiency strategies and replacement of petroleum products with renewable energy sources. New federal standards for vehicle fuel efficiency, electric generating facilities, and boilers are expected to reduce GHG emissions in the coming years. The Department recommends that future GHG emission reduction programs in Maine should focus on reducing petroleum consumption in the residential, commercial and transportation sectors."

According to the accompanying CEI Report, *Maine Wind Assessment 2012, A Report*, natural gas is the "marginal rule" for dispatch in the New England power system at most times so that wind energy coming on line is generally associated with decreases in natural gas generation (and small amounts of other fossil fuels, such as coal). As a result, wind generation in Maine that displaces natural gas-fired generation produces GHG reductions in proportion to natural gas-fired generation's GHG emissions.

The table below summarizes GHG (CO_2) emission rate reductions for different Maine wind penetration rates, assuming the 2009 marginal emission rate for CO_2 in New England, and making assumptions about the capacity factor of Maine wind resources:

New England GHG Reduction Due to Maine Wind

Time-frame	On-shore MW	Est'd Capacity Factor Onshore	Onshore Energy GWh/yr	Off-shore MW	Est'd Capacity Factor Offshore	Offshore Energy GWh/yr	Total Energy GWh/yr	Est'd GHG Reduction Factor (lbs/MWh)	Est'd GHG Reduction (Tons)
2011	346	32.6%	988	0			988	930	459,465
2015 Target	2,000	33.0%	5,782	0			5,782	930	2,688,444
2020 Target	2,700	33.0%	7,805	300	40%	1,051	8,856	930	4,118,207
2030 Target	3,000	33.0%	8,672	5,000	40%	17,520	26,192	930	12,179,466

Source: *Synapse Energy Economics, tabulation based on current Maine wind plants, ISO-NE data on marginal emissions, capacity factor estimates for wind, and Maine wind targets.*

New England's 2009 total greenhouse gas emissions was ~ 49,380,000 tons. According to CEI, "if Maine were to achieve the wind energy goal for 2015 of 2,000 MW and if those turbines actually operated with a capacity factor of 33%, we estimate that these wind turbines would cause an annual Greenhouse Gas reduction of 2,688,444 tons that otherwise would have been emitted in New England, primarily by natural gas-fired generators" depending on assumptions used in displaced energy models. The more than 2.6 million ton reduction corresponds to 5.4% of all New England's CO_2 reductions (2009) and the ~ 4.1 million ton and ~ 12.1 million ton reductions for 2020 and 2030 respectively account for 8.3% and 24.7% of New England's total CO_2 in 2009.

Notwithstanding additional wind power development, Maine's GHG reductions are likely to continue to decline in the coming years as residents and businesses respond to higher petroleum prices through fuel switching and /or energy efficiency improvements. Similarly, consumers will likely purchase more fuel efficient vehicles and/or drive less miles to offset higher fuel costs. Efficiency Maine Trust has estimated that its incentive and grant programs saved Maine residents and businesses approximately 1.67 billion kWh of electricity in 2011, reducing GHG emissions by 693,613 tons over the lifetime of the projects. Moreover, Federal stimulus grant programs awarded by Efficiency Maine Trust to residential and industrial customers in Maine, resulted in GHG emission reductions totaling approximately 247,000 tons/year (*2011 Annual Report of the Efficiency Maine Trust*, December 1, 2011). In addition, Maine State Housing Authority estimates that more than 5,000 low-income Maine homes were weatherized with federal stimulus grant funds over the past 3 years, savings those homeowners approximately $1.9 million, and reducing GHG emissions by 9,500 tons/year.

Lastly, with the potential expansion of new natural gas pipelines in key regions of the state, more energy supply options would be available for Maine consumers. OEIS has estimated that converting several of Maine's large industrial plants from oil to natural gas would reduce GHG emissions by approximately 400,000 tons per year.

XII. Offshore Wind Energy Development

Maine's statutory goals for wind power development include the following:

- At least 2,000 Megawatts (MW) of installed capacity by 2015;
- At least 3,000 MW of installed capacity by 2020, with potential to produce 300 MW or more of offshore wind power;
- At least 8,000 MW by 2030 including 5,000 MW located in coastal waters.

There has been much interest in developing both land- and ocean-based wind and tidal energy development projects in Maine due to the excellent wind resources, potential development of transmission, many operational wind energy projects and interest in renewable energy generation and reduction of greenhouse gas emissions. There are numerous wind energy projects currently in development and others in the discussion phase.

Two significant pieces of legislation laid the foundation for Maine's renewable ocean energy industry.

Public Law 2009, chapter 270 contains several provisions to facilitate research and development and testing of renewable ocean energy technologies. The law streamlines state permitting of offshore wind energy demonstration projects by creating a general permit administered by the Department of Environmental Protection for qualified offshore wind energy demonstration projects located in specific identified offshore areas. As directed by law, the Department of Conservation, in cooperation with the State Planning Office, designated three offshore wind energy test areas based on consideration of potential effects on natural resources and existing uses, community support and other factors, and following public outreach and consideration of public comments. One of these areas (off Monhegan Island) is the Maine Offshore Wind Energy Research Center, established to facilitate offshore wind energy-related research and development conducted by or in cooperation with the University of Maine.

Public Law 2009, chapter 615 sets ambitious state goals for installation of offshore wind energy capacity - 5,000 megawatts of offshore wind by 2030 – and streamlines and further clarifies state permitting and leasing laws. The law also directed the Maine Public Utilities Commission (MPUC) to issue a request for proposals for price-capped, long-term contracts for up to 25 MW of deep-water offshore wind power and 5 MW of tidal power. The MPUC issued this RFP on September 1, 2010 seeking proposals for "long-term contracts to supply installed capacity and associated renewable energy and renewable energy credits from one or more deep-water offshore wind energy pilot projects or tidal energy demonstration projects." Bidders selected will enter into long-term contractual arrangements with one or more of Maine's investor-owned transmission and distribution utilities: Central Maine Power (CMP), Bangor Hydro Electric Company (BHE) and Maine Public Service Company (MPS). Initial proposals have been submitted and updated in 2011. All information can be found at http://www.maine.gov/mpuc/electricity/rfps/standard_offer/deepwater2010/.

Maine's primary interest has been on deep-water ocean wind energy projects with turbines that will be placed in deep water off the Outer Continental Shelf (OCS). This geographic focus was driven by a number of factors, including the availability of a vast and renewable energy source; a need to move home heating and transportation costs away from volatile price fluctuations; a desire to move wind turbines offshore; the creation of unique industrial, technical, and specialized jobs; and the possibility of energy exportation. Maine's coastal waters feature heavily-used fishing grounds and widely acknowledged scenic qualities. Well-sited development in federal waters ten miles or more off the coast may have less of a potential for adverse effects on fishing activity as well as scenic and other natural resources. In addition, increased energy security, stabilized energy prices and reduced electricity costs for Maine ratepayers and businesses are significant goals for off-shore wind development.

The OEIS, State Planning Office, Department of Environmental Protection, Maine Department of Marine Resources and other state agencies are currently working with Federal agencies and other Atlantic states to further the development of offshore wind energy development off the coast of Maine. Maine is a participant in the Atlantic Offshore Wind Energy Consortium (AOWEC), formalized by a Memorandum of Understanding with the Department of Interior and ten member states, to facilitate the expeditious development of the wind resources of the OCS in a safe, responsible, and environmentally sound manner and to improve the working relationships and facilitate coordination among the participants on regional issues of mutual interest relating to wind development on the Atlantic OCS.

Maine is also participating in a U.S. Bureau of Ocean Energy Management (BOEM) Task Force to coordinate on proposed leasing of federal OCS areas off Maine for wind energy development. This BOEM-State task force, which met twice in 2011, is a consultative, inter-governmental group of public officials comprised of Federal, state, local, and tribal representatives. The purpose of the task force is to assist government decision-making regarding renewable energy leasing and development on the OCS off the coast of Maine.

BOEM has received an unsolicited request for a commercial lease from Statoil North America Inc. (Statoil NA). Statoil proposed a pilot project in response to a RFP issued by the MPUC. The Hywind Maine pilot project contemplates the deployment of a multi-turbine floating wind park in the Gulf of Maine at a location that is approximately 460 – 520 feet in depth and approximately 12 nautical miles from any land area of the State. The proposed legal description of the area for the renewable energy lease is within the Bath Area, OCS Official Protraction Diagram NK19-02. The gross size of the area is 22.2 square miles, which is expected to be reduced in size when detailed assessments of environmental impact, sea bed conditions and wind resources have been undertaken. The final park size is assumed to be approximately 2.32 – 3.86 square miles.

BOEM has finished a completeness review of the unsolicited lease application and has deemed Statoil NA to be legally qualified. The technical and financial qualifications review is currently underway. The area identified in the application is subject to task force deliberation and is subject to change. A second Maine task force meeting was held on December 8, 2011. The purpose of this meeting was to discuss the unsolicited lease application received from Statoil North America. A link to the task force site, and all files, will be at

http://www.maine.gov/oeis/Ocean%20Energy.html. OEIS Director Ken Fletcher is the point of contact for the state agencies.

The DeepCwind Consortium's mission is to establish the State of Maine as a national leader in deepwater offshore wind technology through a research initiative funded by the U.S. Department of Energy, the National Science Foundation, and others. The University of Maine-led consortium includes universities, nonprofits, and utilities; a wide range of industry leaders in offshore design, offshore construction, and marine structures manufacturing; firms with expertise in wind project siting, environmental analysis, environmental law, composites materials to assist in corrosion-resistant material design and selection, and energy investment; and industry organizations to assist with education and tech transfer activities.

XIII. Projections of Wind Energy Developers' Plans and Their State Policy Implications

There has been much interest in developing wind energy development projects in Maine due to the excellent wind resources, potential development of transmission, many operational wind energy projects and interest in renewable energy generation and reduction of greenhouse gas emissions. There are numerous wind energy projects currently in development and others in the discussion phase. However, continuing economic conditions, escalating citizen opposition to new wind projects, the resulting lengthy and contentious permitting process and the potential expiration of the federal renewable energy production tax credit have some developers examining their financing options and potentially re-thinking plans for new projects and/or looking to states where existing transmission lines or lower project costs may exist.

According to *Recent Developments in the Levelized Cost of Energy from U.S. Wind Power Projects* (Lawrence Berkeley National Laboratory and National Renewable Energy Laboratory, Feb. 2012), the economic attractiveness of wind projects has somewhat decreased due to increased capital costs, a move toward lower wind speed sites and lower electricity prices. However, the report suggests that lower capital costs and continued increases in wind turbine productivity may drive down the levelized cost of energy for U.S. wind projects in the future. The Global Wind Energy Council (GWEC), in an annual market statistics report published on February 7, 2012 stated that the wind industry installed just over 41,000 MW of new wind power generation capacity in 2011, an increase of 21 percent over 2010. Despite the state of the global economy, wind power continues to grow with China as the global market leader. The United States wind industry had a difficult 2010, but installed more than 6,800 MW in 2011. More than 1/3 of all new U.S. electricity generation capacity in the last few years has been wind powered. Projects continue to come online in Maine, while others are in various levels of construction, review and development.

Recognizing that some Maine citizens are opposed to grid-scale development and have legitimate issues, the Maine State Legislature passed and the Governor signed legislation in 2011 – Resolve, Chapter 93, LD 1366 (*Resolve, To Clarify the Expectation for the 2012 Assessment of Progress on Meeting Wind Energy Development Goals*) – to further refine the OEIS assessment

and require updates of wind generation goals with an examination of various factors. LD 1366 was a compilation of ideas from bills introduced in the 1st Session of the 125th Legislature, amended to specify that certain information concerning wind power development in Maine be included in the OEIS's next annual report on wind energy progress. The proposed bills generally opposed wind power development and covered the following topics:

Noise and visual standards

- L.D. 711 *An Act To Regulate Noise from Wind Turbines in Residential Developments*
- L.D. 865 *An Act To Require the Department of Environmental Protection To Enforce Standards for Smaller-scale Wind Energy Development in Organized Areas*
- L.D. 1234 *An Act To Restore the Uniform Visual Permitting Standard for Wind Power Projects*
- L.D. 1443 *An Act To Improve the Permitting Process for Wind Energy Developments and To Protect Maine's Quality of Place*
- L.D. 1479 *An Act To Minimize Conflicts between Property Owners and Grid-scale Wind Energy Developments*

Wind energy benefits

- L.D. 1366 *An Act To Update the Maine Wind Energy Act To Include Low-emission Energy*
- L.D. 1236 *An Act To Amend the Legislative Findings in the Maine Wind Energy Act*
- L.D. 1411 *An Act To Facilitate Transparency and Accountability while Reducing Electricity Costs*

Health impacts

- L.D. 502 *An Act To Place a Moratorium on Expedited Permitting of Grid-scale Wind Energy Development*
- L.D. 1035 *Resolve, To Establish Baseline Information on Health Impacts from Grid-scale Wind Energy Development*

Property Values, Tangible Benefits, Community Benefit Packages

- L. D. 1042 *An Act To Preserve and Protect Citizens' Property Rights and Values*
- L.D. 1362 *An Act To Ensure Accurate Valuation of a Community Benefits Package for Communities That Host Wind Energy Developments*

Other wind issues

- L.D. 1170 *An Act To Establish a Code of Ethics for Individuals Involved in Grid-scale Wind Energy Development*
- L.D. 1291 *Resolve, To Promote Community Wind Energy Development*

Federal Energy Subsidies

The *American Recovery and Reinvestment Act of 2009* (ARRA) allowed taxpayers eligible for the federal renewable electricity production tax credit (PTC) to take the federal business energy investment tax credit (ITC) or to receive a grant from the U.S. Treasury Department instead of taking the PTC for new installations. The grant was only available to systems where construction began prior to December 31, 2011. The federal renewable electricity production tax credit (PTC) is a per-kilowatt-hour tax credit for electricity generated by qualified energy resources. Originally enacted in 1992, the PTC has been renewed and expanded numerous times. The tax credit amount for wind is 2.2¢/kWh. Despite bipartisan support in Congress, an extension of the federal wind energy PTC is not assured and is being vigorously pursued by wind developers and supporters. Expiration of the PTC, or continued intermittent extensions of the PTC, could limit private and public investment in wind projects and raise the cost to developers and ratepayers.

On a broader scale, federal subsidies for energy resources and development have varied significantly over the past several years. Historically, federal subsidies (*e.g.*, tax expenditures, R&D, loans/loan guarantees, federal electricity programs, regulations) have benefited oil and gas development, while more recently renewable energy technologies, and in particular wind resources, have been the predominant beneficiary of federal incentives.

According to the U.S. Energy Information Administration (EIA), direct federal financial interventions and subsidies in energy markets doubled between 2007 and 2010, primarily as a result of ARRA and the *Energy Improvement and Extension Act*. Spending increased from $7.7 billion in 2007 to $11.9 billion in 2010. As noted above, ARRA allowed developers in new qualifying projects (primarily wind) to choose an upfront grant in lieu of the existing 10-year production tax credit. While the grant and tax credit programs have similar value to developers and cost to the federal treasury over the life of the project, the grant awards front-load the federal cost and increase the 2010 expenditure versus what would have been reported if subsidies were taken as a production tax credit.

Total Federal Subsidies (Direct, Tax, R/D, Loans/Loan Guarantees)
(millions, 2010 dollars)

FUEL	2007	2010
Coal	3,981	1,358
Nat Gas/Liquid Petroleum	2,010	2,820
Nuclear	1,714	2,499
Biomass	61	1,117
Geothermal	14	273
Hydro	170	216
Solar	179	1,134
Wind	476	4,986
Biofuels*	3,999	6,644

** primarily for ethanol in transportation fuels*

Total Federal 2010 Subsidies per Unit of Production ($/MWh)

FUEL	
Coal	0.73
Nat Gas/Liquid Petroleum	0.63
Nuclear	3.10
Biomass	2.00
Geothermal	12.50
Hydro	0.84
Solar	968
Wind	52.48

Source: Analysis and Projection: Direct Federal Financial Interventions and Subsidies in Energy in Fiscal Year 2010, EIA, August 2011 http://www.eia.gov/analysis/requests/subsidy/

XIV. Conclusions and Recommendations

The Maine Comprehensive Energy Action Plan outlines the necessary action steps the State of Maine should consider implementing in order to achieve energy security over the next 50 years. The Plan's goals, objectives and implementation measures are built on six overarching and interconnected strategies:

1. Strengthening energy efficiency, conservation and weatherization;
2. *Fostering renewable energy;*
3. Improving transportation and fuel efficiencies;
4. *Upgrading electricity and natural gas services and transmission infrastructure;*
5. State of Maine Leading by Example; and
6. Energy Emergency preparedness and response.

The following three objectives have defined the purposes of fostering wind as a renewable resource in the Maine Energy Plan:

- To make Maine a leader in wind power development;
- To protect Maine's quality of place and natural resources; and
- To maximize the tangible benefits Maine people receive from wind power development.

Maine is a leader in wind power development. While the State's short-term wind goals may need to be revised, the OEIS does not believe the long-term goals should be abandoned without further analysis in the face of their potential to help us deliver economic, energy and environmental benefits on behalf of Maine's residents and businesses. Achieving these goals, or enacting legislation revising the goals to reflect new information and data, will require thoughtful

planning and balanced decision-making in order to tap into the State's significant wind resources, protect Maine's quality of place and deliver clean, affordable power.

We recognize that achieving these goals is not entirely within our control and will depend on factors such as technology developments, future energy costs, federal policies and other factors. However, some components are within our control, including but not limited to:

- Expediting wind permits under carefully considered and controlled circumstances.
- Providing significant tangible benefits to host and neighboring communities and residents, including construction-related employment; local purchase of materials; employment in operations and maintenance; reduced property taxes; reduced electrical rates; natural resource conservation.
- Requirements that an applicant for a wind energy development is required to establish a community benefits package.
- Opportunity for public participation.

Through extensive research and discussions with experts, the OEIS has found that the topics of noise standards, visual impacts, setback requirements, and regulation of wind turbine noise in particular, to be highly technical, complex and complicated subjects. During consideration of these issues in the 1st Session, 125th Legislature Committee hearings and work sessions, the OEIS did not assert it had all the answers at the beginning of the process, nor do we believe we are experts on the subject at this time. However, the OEIS completed a thorough examination of the issues and came to some conclusions and provided recommendations that may be helpful in guiding policymakers in Maine to improve the process relating to the permitting of wind energy development.

Maine is not in a unique situation compared to other U.S. states and countries around the world that have wind energy projects in operation or under development. It is clear that the DEP and LURC have learned from past experiences and have begun to adopt 'best practices" that have been developed over the last several years. This experience has proven valuable and should help guide the permitting process in the future.

Pursuant to Resolve 2011, Chapter 93, CEI prepared *Maine Wind Assessment 2012, A Report*, which was submitted to the OEIS on January 31, 2012. That report serves as the basis for many of the OEIS recommendations below. The purpose of these recommendations are to assist the Maine Legislature in examining ways to reduce the price of electricity to Maine people in a way that is environmentally responsible, optimizes economic growth and preserves Maine's quality of place and life.

To that end, the OEIS recommends exploring opportunities for the development of wind energy production in the State in a manner that is consistent with state and federal environmental standards and community expectations and that achieves reliable, cost-effective, sustainable energy production. The OEIS partnered with various public and private organizations to assess the status of wind energy development in Maine with a focus on helping the OEIS formulate recommendations to the Maine State Legislature, Joint Standing Committee on Energy, Utilities and Technology.

Wind Goals and Criteria for Wind Permitting

1. *Eliminate the statutory goal of 2,000 MW of installed wind capacity by 2015.*

   The change would permit a more realistic pace for wind development, rather than the near-doubling which the current 2015 goal requires – to 294 MW per year to 2020 rather than 552 MW per year to 2015.

   Maine has more than five years of experience with on-shore wind development. Over 430 MW of installed or under construction capacity and another 216 MW permitted sites are based in Maine. The experience that has been gained should provide an appropriate experiential base to assess the aspects of wind generation which was not available when the 2008 *Wind Energy Act* was passed. In that regard, it is recommended that:

   The 2015 on-shore wind capacity goals need to be re-considered in light of the actual build-out rates and the current economic factors as well as the implications of the transformation of Maine's mountain environments. If in fact a natural "slump" in future wind projects occurs as a result of the uncertainty of the federal PTC, low energy prices, variable REC prices, and the need for long term contracts to provide the financial support that on-shore wind development will need, an objective review and re-alignment of expectations would be appropriate.

2. *Retain the statutory goals of 3,000 MW of installed wind capacity by 2020 and 8,000 MW of installed capacity by 2030.*

   This recommendation would ensure that energy policy would still be guided by a major commitment to the development of wind resources. This change would retain the same amount of wind resources in the same timeframe, but allow more time to permit a thoughtful consideration of the role that both on-shore and off-shore wind may play in achieving wind power goals.

3. *The Governor, the Legislature, the Governor's Energy Office, the Department of Environmental Protection and/or others should convene a panel to identify where in Maine expedited permitting would be allowed in a way that provides maximum energy, economic and environmental benefits and minimum harm to local residents and the environment.*

   The 2008 Governor's Wind Energy Task Force has been accused of meeting in a non-transparent manner to develop the original goals and criteria for expedited permitting and the listing of scenic features. A transparent, public process with a diverse set of stakeholders to review the goals and criteria will confer legitimacy to the process and initiate a review that may be needed five years later.

   A public review process conducted by a broad cross section of individuals should be instituted to re-visit the topics covered by the 2008 Wind Energy Task Force that identified the expedited permitting areas and the process. This review would be

worthwhile based on the five years of experience. This could be a Legislative action or could be initiated by the Executive branch.

4. *The Legislature should clarify the significance of a quantitative "statutory goal" with respect to the action required if the goal is not achieved and/or exceeded.*

Wind Permitting Process

5. *Require independent analysis to evaluate the "financial capability" of a wind developer and expected output and capacity rating of a project's turbines.*

   LURC and DEP often lack in-house expertise to assess the financial robustness of a project and expected output and capacity.

6. *Revise "one-size-fits-all" permitting process to allow regulators to distinguish among varying levels of project impact – with diminished or expanded oversight as the circumstances warrant.*

7. *Treat all "robo-communications" as a single comment in permitting process.*

   Current administrative law requires that each communications be retained in the record of the proceeding and receive an individual written response. Treating "robo-communications" that are identical, or nearly identical, generated as a result of advocacy strategies as a single comment will reduce considerable investment of staff time.

8. *Support the LURC December 20, 2011 proposal to add a second public meeting to the permit application process to improve efficiency and provide additional opportunity for comment and information exchange.*

9. *Adopt a consistent regulatory scheme for wind projects to eliminate major discontinuities between LURC and DEP implementation of their wind permitting responsibilities.*

10. *Amend the wind law to identify "those regions and view sheds that are most critical to the state's recreational and tourism economy and would be unacceptably degraded by any significant level of wind power development" and "remove any area within fifteen miles of them from the Expedited Permitting Area (EPA)" unless the wind project is not visible from them.*

11. *Revise the existing permitting process to allow for areas to be removed from the EPA.*

    The existing wind law provides for capability of adding areas to the expedited process but does not include a provision for areas to be removed from the designated expedited permitted areas. It is recommended that the provisions of the wind law be modified to allow areas to be removed from the EPA. Included in this work would be an assessment of the criteria used by the 2008 Wind Energy Task Force that resulted in the designation of the EPAs.

12. *Make no changes to the 270-day statutory period for processing a permit application.*

    The expedited permitting process may well have decreased the permitting timeline but experience has shown that the preparation and data gathering requirements can take up to four years prior to actual submission of an application. Once the application is received, the DEP process has 185 days to reach a decision if there is not an evidentiary hearing. The LURC process decision process can be up to 270 days. Once a permit is issued, it is not uncommon that there will be an appeal which extends the permitting timeline. For example, the Oakfield project was issued a DEP permit on January 17, 2012 and was appealed to the Board of Environmental Protection (BEP) on February 16, 2012. The Saddleback Ridge Wind Project was issued a DEP permit on October 6, 2011 and was appealed to the BEP which denied the appeal on February 16, 2012. Additional permitting complexities and processing timelines arise when an application is being reviewed and the applicant withdraws the application for re-submission at a later date. Two projects are currently at this stage. (Bowers Wind Project and Highland Wind Power Project). The permitting process is time consuming but the OEIS is not making specific recommendations at this time to change the procedure.

Noise and Best Available Technology

13. *Provide post-construction noise monitoring of an approved wind project.*

    Since noise has been a primary issue with wind development, both the DEP and LURC permitting processes should include a post-construction noise monitoring provision funded by the specific project.

14. *Require use of "best available control technology" to limit impacts from wind development.*
    a. Example: Radar-controlled night lighting systems to decrease visual impacts in night landscape.
    b. Example: Modify turbines for higher cut-in speeds to reduce bird and bat mortality.

Visual and Cumulative Visual Impact

15. *Update the surveys of resources designated as having state or national significance.*

    a. Example: Review whether sporting camps should be specifically listed as a "scenic resource of state or national significance" for LURC/DEP consideration in wind project application process.
    b. Example: Review whether scenic highways should be listed as a "scenic resource of state or national significance" for LURC/DEP consideration.
    c. Example: Review whether remote ponds should be listed as a "scenic resource of state or national significance" for LURC/DEP consideration.

16. *Institute a standard methodology or a more formal guidance document for visual impact assessment.*

    Consideration of a standard methodology should evaluate what constitutes a "legal right of access" to a historic site and what constitutes "use of a scenic resource."

17. *Require "intercept surveys" to help gauge scenic impact – pre- and post-construction visual impact surveys.*

    While there is limited information that suggests wind development could have negative impacts on scenic and tourism values at a local level, permitting should include provisions to include post-construction visual impact surveys as part of the applicant's responsibility. Post-construction visual impact surveys could provide critical information for the future expansion of wind development in Maine to provide a better understanding of the local visual and related tourism impact. The information that has been gained from LURC's outreach to seek public comment on cumulative visual impact combined with findings from tourists' perceptions in the Gaspe region of Quebec suggests that there is a preference for clustered wind development rather than fewer turbines spread over a larger area (*i.e.*, turbine sprawl).

18. *Amend the wind law to require scenic impact evaluations to eight miles, with a fifteen mile standard option and provisions made for review to greater distances.*

    The scenic evaluation zones incorporated into the wind siting law requires visual impact analysis to a distance of three miles, with analysis to a distance of eight miles being optional.

19. *Support a clear statutory authority for permitting agencies to consider cumulative visual impacts.*

    The LURC has considered CVI issues on multiple occasions and has sought public comment on CVI issues. The OEIS requested that LURC recommend a process for the assessment of CVI and convene a study group to consider options for CVI assessment. The study group examined several different scenarios, including a concentration of turbines that dominate a particular landscape and the dispersal of turbines throughout a landscape over a considerable distance. The options considered were grouped by the type of approach to the potential solution or strategy:

    d. Threshold analysis – Provide a method and/or criteria for indicating when the accumulation of development has crossed some unacceptable threshold.
    e. Cluster analysis – Pre-determine or plan where a certain amount of development could be accommodated or where it could not be accommodated.
    f. Other analysis – Implement plans that may reduce the impact on visual resources from cumulative and individual wind power development.

    The OEIS recommends further analysis of these options by policymakers and potential study to better understand policies to address CVI. The result should be a clear statutory

authority for permitting agencies to consider CVI and the criteria to follow in wind development project permitting. The LURC review should be the basis for this additional analysis. The CVI study group options are at http://www.maine.gov/oeis/alternativeenergy.html.

Offshore Wind

20. *Continue partnerships with MPUC, BOEM, state, federal, private, university, non-profit and other stakeholders in offshore wind development and corresponding energy, economic and environmental analysis.*

Decommissioning

21. *Incorporate into statute the LURC "Applications Guidance and Checklist" for wind projects pertaining to decommissioning planning:*

    a. Demonstrate that the applicant's present and future finances are adequate to fully fund necessary decommissioning costs, with consideration of:
        i. The size of the fund;
        ii. The date by which the decommissioning reserve will be fully funded;
        iii. The mechanism for ensuring that funds are not diverted for unrelated purposes; and
        iv. Criteria that trigger the start-up of decommissioning or allow its deferral.
    b. Identify all physical structures on the site to be removed and restored, consistent with a final detailed plan; and
    c. Explain under what conditions decommissioning would commence and notification of the regulating agency.

22. *Incorporate into statute the periodic updating of decommissioning plans with a regulatory check-in of decommissioning cost assumptions on a pre-determined schedule (e.g., every three to six years).*

23. *Require that standard permit conditions for wind projects include requirements that decommissioning payments be made in the form of a performance bond, surety bond, letter of credit, parental guaranty or other acceptable form of financial assurance.*

    While there has been relatively limited experience in the actual decommissioning of wind projects, both LURC and DEP have experienced an evolution in decommissioning requirements in the general direction of full funding within the first years of a project's life cycle. In the early years of a project, the federal production tax credit, low finance costs, and TIF's are significant subsidies which should permit the full funding of the decommissioning reserves during the first 10 years of operation. The current DEP and LURC practices of requiring that the first year's amount must be paid into the decommissioning reserve account beginning prior to the first year of commercial operation should be required as a standard condition. The DEP's recent direction of requiring that the DEP become an obligee of any performance bond with the right to call

the bond in the event of non-performance should also be considered as a standard practice for both DEP and LURC. While there could be extenuating circumstances that may need to be considered, it is reasonable to establish a rebuttable presumption that 12 consecutive months of "no-power production" indicates that the project is no longer operationally viable and decommissioning should be activated.

24. *The practice of including a future estimate of the salvage values as part of the decommissioning funds needs to be carefully considered.*

    It has been reported that as much as 97% of the total projected decommissioning costs have been comprised of estimates of surplus value in the future. This practice seems to be highly speculative and it is recommended that there be a standard formula developed that recognizes the surplus value but at more conservative level such as no more than 50% of the total decommissioning requirements.

Long-Term Contracting

25. *Adjust language in 35-A MRSA §3210-C (capacity resource adequacy) providing for long-term contracts for capacity and energy in a manner that prioritizes and promotes lower costs of electricity to ratepayers over the life of such contracts.*

    LD 1863 (125th Legislature, 2nd Session – *An Act to Lower the Price of Electricity for Maine Consumers*) clarifies that while the State is committed to systemically increasing the share of the generation that is derived from renewable sources, this must be accomplished in a way that places a high priority on reducing electric prices and price volatility. It is possible to achieve the other priorities such as greenhouse gas emissions reduction and mitigation of regional and federal capacity resource mandates, but there needs to be a clear balance until Maine's electricity prices are more competitive.

    Long-term contracts are one of the only means available to the State to promote investment in new generation while having some control over costs. Evaluation of long-term contracts necessarily entails a certain amount of analysis and forecasting of future energy prices, an approach that carries an inherent risk despite the potential benefit. The OEIS certainly supports pursuing all cost-effective energy efficiency opportunities and encouraging renewable, indigenous energy sources. But, in order to invest in cost effective renewable generation and increase the generation of renewable power into the State of Maine's electricity portfolio, we must closely examine directives that attempt to achieve these public policies, such as long-term contracts. To that end, the long term contracting provisions should be modified to clarify that the primary consideration of a long term contract decision would be the determination that the contract would be expected to lower the price of electricity to ratepayers over the life of the contract in addition to consideration of the State's greenhouse gas goals. The proposed changes to long term contract decision criteria would also place a priority on capacity resources located in the State.

Appendix A – *Maine Wind Assessment 2012, A Report*

(Accompanying Report Available at http://www.maine.gov/oeis/alternativeenergy.html)

Prepared for the Governor's Office of Energy Independence and Security

MAINE WIND ASSESSMENT 2012, A REPORT

Pursuant to Resolve 2011, Chapter 93

"To Clarify the Expectation for the 2012 Assessment of Progress On Meeting Wind Energy Development Goals"

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Maine Wind Assessment 2012: A Report

Prepared for the Governor's Office of Energy Independence and Security
Pursuant to Resolve 2011, Chapter 93:
"To Clarify the Expectation for the 2012 Assessment of Progress On Meeting Wind Energy Development Goals"

Executive Summary

This report was prepared for the Governor's Office of Energy Independence and Security, pursuant to Resolve 2011, Chapter 93 ("To clarify the Expectation for the 2012 Assessment of Progress on Meeting Wind Energy Development Goals"). After interviewing some forty spokespersons on all sides of debates over wind power development; the Report's authors offer a series of observations about utility-scale wind permitting and development in Maine. A summary of these observations follows.

1. Meeting Maine's Statutory Goals for Wind Development: In order to meet the 2015 goal, at least 552 new turbines will have to be permitted and become operational by 2012, and – depending on the size of the turbines – potentially as many as 1,103 turbines will be needed. Compared with the pace of siting that was actually achieved over the past three years – about 75 megawatts (MW) per year – meeting the 2015 goal will require a much faster pace, 184 MW per year on average. The pace of permitting over the next three years will nearly have to double. Maine will likely fall short of the 2015 goal by 513 MW even if all onshore projects proposed and in development actually come on line – an unlikely prospect. Maine is making progress, though, in meeting the off-shore wind goals for 2020 and 2030.

2. Efforts to Expedite the Review Process: Even with a streamlining of the process that took effect in 2008, the permitting process at the Land Use Regulation Commission (LURC) still requires 270 days (185 days at Department of Environmental Protection (DEP) with no evidentiary

hearing) and is preceded by up to four years of data gathering in compliance with permitting requirements. The permitting process remains arduous and costly.

3. Developer Criticisms of Maine's Permitting Process for Wind: Delays in the permitting process are "commonplace". Because Maine has a "one-size-fits-all" permitting process, there is no possibility of avoiding major costs in the case of permits for smaller projects in less sensitive settings. After initial high hopes in 2008 for wind development, developers now say they are "bearish" about the regulatory climate. Generally, developers prefer DEP's non-hearing process to LURC's adjudicatory process. In both settings, outside State agencies that provide consultative comment during permitting are seen often as over-reaching in making extreme demands. There still is not enough certainty and predictability in Maine's permitting process.

4. Criticisms of Wind Opponents: Both DEP and LURC lack in-house capacity to evaluate the financial capability of individual project developers. Both agencies accept developer claims about the projected output of wind turbines without sufficient scrutiny. Opponents have a consistent preference for LURC's formal process over DEP's informal, consultative process. Unlike LURC, DEP operates without any specific "process guidance" for how wind project applications are to be handled; the process is at the discretion of the DEP Commissioner.

5. Specific Aspects of Siting: The 2007 decisions creating the areas eligible for Expedited Permitting have left three species exposed to significant potential harm, in the eyes of some opponents – Bicknell's thrush, the Northern bog lemming and the Fir-Heartleaved birch forest. There also is interest in diminishing nighttime visual impacts from wind turbines by installing radar-activated lighting systems.

6. Visual Impacts: Sporting camps and scenic highways were left off the list for scenic features of state or national significance and deserve reconsideration, some believe. Lists of other scenic resources – Great Ponds and rivers – could be updated and expanded to include remote ponds. There is concern about the cumulative visual impact of wind development among some observers and regulators and some research underway.

Some observers suggest post-construction user surveys as an important means to assess visual impact. There is some interest in considering visual impacts that are beyond the current mandated and optional zones around a wind project.

7. Other Siting Concerns:
Municipalities that are confronted with very large wind proposals would benefit from assistance in evaluating TIF requests and community benefit proposals. Such assistance could be derived from sharing some portion of the developer's application fee at LURC or DEP. Regarding projects eventually being decommissioned with developer funds reserved for that purpose, both DEP and LURC permit major portions of the projected requirement to be "paid for" with proceeds from the expected sale or salvage of the turbines and related equipment. Both LURC and DEP recently have required full funding of the decommissioning reserve at an earlier point – year 12 for DEP and year 7 for LURC.

8. Technical Aspects of Wind Generation: The fact that wind turbines only generate output when the wind blows (intermittency) is not likely to impose costs on the ISO-New England grid and its ratepayers until wind's share eventually comes to more than 20% of total electric output in the region. A recent CMP study indicates that a major strengthening of the transmission system to accommodate more wind projects in Western Maine could raise rates by as little as 0.3% (with ISO-New England subsidies) or as much as 8% (without ISO-New England subsidies). Any reduction in Greenhouse Gases resulting from increased wind output in New England can best be estimated based on reductions in natural-gas output and its associated Greenhouse Gases.

9. Reconsidering the Statutory Goals:
There are considerable viewshed impacts in Western Maine if the 2030 goal is to be achieved. Maine could designate the habitat of the Bicknell thrush as ineligible for wind sites. Maine could eliminate the 2015 goal as excessive in light of harm to sensitive mountainous settings, while retaining the 2020 and 2030 onshore and off-shore goals. Maine could convene a new panel – in an open process that is available to the press and public – for reconsidering the designations that created the Expedited Permitting Area for wind development in 2007.

Appendix B – Other Primary Resources

London Economics International (LEI), *MPUC RPS Report 2011 – Review of RPS Requirements and Compliance in Maine* – Full Report at http://www.maine.gov/mpuc/legislative/reports.shtml and http://www.maine.gov/oeis/alternativeenergy.html.

During its 2011 session, the Legislature enacted *An Act To Reduce Energy Prices for Maine Consumers*, P.L. 2011, ch. 413 (Act). Section 6 of the Act directed the Maine Public Utilities Commission (MPUC) to study the portfolio requirement established in 35-A M.R.S.A. § 3210 (3-A).

The Act specified that the study must include an analysis of:

1. The source and cost of renewable energy credits used to satisfy the portfolio requirements;
2. The impact of renewable energy credits generated in this State on the regional renewable energy credit market;
3. The impact of the portfolio requirements on the viability of electricity generating facilities in this State that are eligible to meet the portfolio requirements;
4. The impact of the portfolio requirements on electricity costs;
5. If the portfolio requirements result in an increase in electricity costs, to the extent possible, the impact of that increase on economic development in this State;
6. The cost of the use of the alternative compliance payment mechanism under Title 35-A, section 3210, subsection 9 for electricity consumers in this State and, to the extent information is available, the reasons competitive electricity providers use the alternative compliance payment mechanism;
7. The best practices for setting the alternative compliance payment rate; and
8. To the extent possible, the benefits resulting from the portfolio requirements, including, but not limited to, tangible benefits and community benefits pursuant to Title 35-A, section 3454, economic benefits due to the creation of jobs or investments in this State including multiplier effects, research and development investment in this State, the impact on electricity rates and benefits due to diversifying this State's energy generation portfolio.

New England States Committee on Electricity (NESCOE), *Renewable Resource Supply Curve Report*, 2011 – Full Report at http://www.nescoe.com/ and http://www.maine.gov/oeis/alternativeenergy.html.

Executive Summary:

In the summer of 2011, the New England Governors expressed interest in continuing to explore the potential for coordinated competitive renewable power procurement. To provide policy-makers additional information about New England's renewable resources, the New England States Committee on Electricity ("NESCOE") completed directionally indicative analysis of the availability of, and potential cost for, new wind resources that could be developed in New England or New York to meet New England's renewable energy goals.

The analysis demonstrates that the regional potential for additional wind energy greatly exceeds the forecasted regional need through 2020. Over 50% of the total wind energy developable by 2016 would come from on-shore projects in Maine, while very large off-shore wind resources could be available by 2020. The costs for off-shore wind energy are higher than the costs of wind energy from many of the on-shore projects, and thus, the actual development of off-shore wind will likely be constrained by cost considerations. When considering generation only, on-shore wind generation located in Maine would provide the majority of wind energy with the lowest costs. In 2016, 72% of the lowest-cost energy required to meet regional renewable energy goals would come from onshore generation in Maine. When transmission is considered, a larger percentage of regional needs might be supplied from off-shore wind & imports. For instance, in 2016, imports & off-shore wind would provide 44% of total regional needs. Such resources would provide 45% of regional needs in 2020.

However, the numerous wind resources - both on-shore and off-shore - that could be developed have a wide range of potential costs in both absolute and relative terms. In particular, the specific mix of wind resources that could meet regional renewable energy goals at the lowest *total* cost to consumers depends on the relative costs of new wind resources. In turn, those relative costs are driven by several key parameters, including:

- The region's preferred standard for integrating new wind resources into the regional power supply mix, since that standard would determine, for each specific wind resource, the amount and cost of additional transmission required to achieve the integration standard;
- The allocation of the costs for such additional transmission; and,
- The relative changes in technology and costs for different wind resources (*e.g.*, the cost reductions from forecasted decreases in the capital cost of off-shore wind generation may, or may not, be matched by cost reductions achieved from higher capacity factors that may be accomplished with taller towers for onshore generation).

A key implication for a regional coordinated renewables procurement process is that such a process requires a defined standard for integrating the output of new renewable energy resources. A "REC Only" standard – in which the energy output of new renewable generators only needs to displace non-renewable generation and thus increase the supply of Renewable Energy Credits ("RECs") within the region – would tend to reduce the amount of new transmission required to achieve that integration standard. However, such a standard may not maximize the market benefits (*e.g.*, displacement of the highest cost regional generation) that could be provided by new wind resources, given enough additional transmission. A more stringent "REC Plus" integration standard could capture more of those market benefits, but at the cost of requiring additional transmission investment.

An important near-term consideration is the appropriate "energy integration" standard that would be applicable in any joint or separate but coordinated competitive power procurement process. While the current process used by the Independent System Operator-NE ("ISO-NE") to interconnect new generators may be able to support an efficient coordinated procurement process if a "REC Only" standard is used, an efficient coordinated procurement process using a "REC Plus" standard may only be possible with modifications to ISO-NE's interconnection process.

Appendix C – *Report of OEIS Assessment of Cumulative Visual Impacts from Wind Energy Development*

(Accompanying Report Available at http://www.maine.gov/oeis/alternativeenergy.html)

Report of OEIS Assessment of Cumulative Visual Impacts from Wind Energy Development

(CVI Assessment)

March, 2012

Executive Summary

The 125th Maine Legislature's Resolve 93 (LD 1366) directs the Office of Energy Independence and Security (OEIS) to conduct an assessment of the Wind Energy Act including the method by which permitting authorities should consider the cumulative impact on scenic resources of state or national significance. OEIS worked with the Land Use Regulation Commission (LURC) to develop a process for the assessment of cumulative visual impact from wind power development based on the experiences of the state's reviewing authorities in permitting grid-scale wind projects.

This assessment process convened a study group and assembled resources for their consideration, defined and described the cumulative visual impact issues to be addressed by the assessment, developed and evaluated options for addressing cumulative visual impacts from wind energy development, and reported on the process and findings. Three experts in the fields of landscape architecture and visual resource assessment participated in the study group along with staff from OEIS, LURC and Maine Department of Environmental Protection (MDEP).

The study group identified and described a fairly large and diverse set of potential solutions and strategies and then worked on evaluating the options in a systematic manner based on the feasibility and importance of the option. The report sets out the twenty-two options the group felt merit consideration.

The options are grouped by the type of approach offered by the potential solution or strategy.

- **Threshold analysis** approaches generally look at providing a method and/ or criteria for indicating when the accumulation of visual impacts from wind power development has crossed some unacceptable threshold.
- **Cluster** approaches generally look to pre-determine (or proactively plan) where a certain amount of development could be accommodated and, conversely, where it could not.
- The **Other** approaches category includes options that do not fit either the threshold or cluster category but which may have some ability to reduce the impact on visual resources from cumulative wind power development (and in many instances from individual projects).

This study and report is understood by the study group to be part of the OEIS report conducted pursuant to LD 1366 and is not separate or independent from that report. **The study group has not made specific recommendations and this report leaves any policy choices or preferences to others.**