

STATE OF NEW HAMPSHIRE
BEFORE THE SITE EVALUATION COMMITTEE
Docket No. SEC 2015-02

APPLICATION OF ANTRIM WIND ENERGY, LLC
FOR A CERTIFICATE OF SITE AND FACILITY

**PREFILED DIRECT TESTIMONY OF ARTHUR CAVANAGH AND DONALD
MARCUCCI ON BEHALF OF ANTRIM WIND ENERGY, LLC**

September 10, 2015

Testimony of Arthur Cavanagh

Q. Please state your name, title and business address.

A: My name is Arthur Cavanagh. I am employed as Director, Wind Energy/Senior Project Manager by Reed & Reed, Inc. My business address is 275 River Road, Woolwich, Maine.

Q. Please describe the services provided by Reed & Reed.

A: Reed & Reed is one of northern New England's largest and most versatile general contractors. Founded in 1928, Reed & Reed has almost nine decades of experience providing a wide range of heavy-civil construction services to public and private clients including bridge work, marine terminals, parking garages, hydropower facilities, and building construction. As the premiere wind energy project provider in the Northeast, Reed & Reed has broad experience in all aspects of wind power project development, including project design, scheduling, budgeting, constructability review, construction, and project management. It provides complete turnkey facilities and handles all aspects of wind turbine delivery and construction, including turbine receipt and transport from port to turbine pad, turbine storage and maintenance, turbine assembly and erection, and commissioning and energization. Reed & Reed has over 250 employees, including project managers, engineers, field technicians and quality control staff with experience in wind power projects, and a large fleet of heavy equipment including two Manitowoc 16000 lift cranes designed specifically for wind turbine erection.

Q. Has Reed & Reed been engaged as a contractor for other wind projects constructed in New England?

A: Yes. Reed & Reed's experience in managing the construction of wind energy projects is unmatched in the region, and it has installed more than 95% of the operating utility

1 scale wind projects in the Northeast. Reed & Reed has installed more than 280 wind turbines
2 capable of generating 556 MW in New England at elevations as high as 3,400 feet. It has
3 provided and / or managed critical associated services including: preconstruction project design
4 (civil, structural, and electrical), permitting, geotechnical exploration and analysis, turbine
5 selection, project budgeting, and scheduling; equipment staging; construction of access roads,
6 crane paths, turbine pads, foundations, electrical collection systems, grounding systems,
7 substations, and operations and maintenance buildings; turbine transportation and erection; and
8 tower electrical work. Reed & Reed has provided services to the following projects:

- 9 • Lempster Wind Project (NH): EPC contractor (civil, foundations and collector) for 24
10 MW project involving 12 Gamesa Turbines.
11
- 12 • Groton Wind Farm (NH): Performed turbine erection and tower electric work for 48
13 MW project involving 24 Gamesa Turbines.
14
- 15 • Kingdom Community Wind Project (VT): BOP contractor for 63 MW project
16 including the erection of 21 Vestas Turbines.
17
- 18 • Stetson I Wind Power (ME): Engineering, procurement and construction (“EPC”)
19 contractor for 57 MW project including erection of 38 GE Turbines.
20
- 21 • Stetson II Wind Power (ME): EPC contractor for 25.5 MW project including erection
22 of 17 GE Turbines.
23
- 24 • Kibby Mountain Wind Power (ME): BOP contractor for 132 MW project including
25 the erection of 44 Vestas Turbines.
26
- 27 • Bull Hill Wind (ME): EPC contractor for 34.2 MW project including the erection of
28 19 Vestas Turbines.
29
- 30 • Record Hill Wind (ME): EPC contractor for 50.6 MW project including erection of
31 22 Siemens Turbines.
32
- 33 • Rollins Mountain Wind (ME): EPC contractor for 60 MW project including erection
34 of 40 GE Turbines.
35

- 1 • Mars Hill Wind Power (ME): Constructed 42 MW project including erection of 28
- 2 GE Turbines.
- 3
- 4 • Berkshire Wind Power (MA): EPC contractor for 15 MW project including erection
- 5 of 10 GE Turbines.
- 6
- 7 • Beaver Ridge Wind Power (ME): Installed 3 GE Turbines for 4.5 MW project.
- 8

9 Reed & Reed also is currently constructing the Saddleback Wind Project in Maine (34.2
10 MW, 12 GE Turbines), the Oakfield Wind Project in Maine (148 MW, 48 Vestas Turbines), and
11 the Jericho Wind Project in Berlin, NH (14.25 MW, 5 GE Turbines). The company has an
12 exceptional safety record across these numerous projects and has in each instance delivered high
13 quality turnkey facilities on budget and on schedule.

14 **Q. What are your responsibilities as Director, Wind Energy / Senior Project**
15 **Manager at Reed & Reed?**

16 A: I am responsible for all aspects of wind energy project development and
17 construction, including pre-construction activities such as scope development, design review,
18 budgeting, and scheduling, as well as project management responsibilities such as subcontractor
19 selection, contract review, purchasing and procurement, project administration, and project
20 close-out.

21 **Q. Briefly summarize your educational background and work experience.**

22 A: I have a Bachelor of Science Civil Engineering from Norwich University.
23 Professionally, I have more than thirty years of commercial and heavy civil construction
24 experience, and I have held senior management positions for the last 20 years. I began my career
25 at Pizzagalli Construction in Vermont, where I held several positions including Superintendent
26 and Assistant Project Manager. In 1988, I joined RCL General Contractors in Maine, where I
27 was a Project Manager and General Manager. From 1991 to 2001 I was a Senior Project

1 Manager and Vice President of Operations at Granger Northern, Inc. in Maine. I have been
2 employed by Reed & Reed since 2001.

3 My professional experience includes the development and successful implementation of
4 numerous wind energy projects in New England, as well as parking garages, design build
5 bridges, research facilities, marine terminals and piers, airport apron replacements, educational
6 facilities (including LEED certified facilities), office buildings, correctional facilities, medical
7 facilities, housing, resort, and retirement facilities, and large-scale historical renovations.

8 Additional detail regarding my education, background and experience is contained in my
9 curriculum vitae which is attached hereto as Attachment AC-1.

10 **Q. What is the purpose of your testimony?**

11 **A.** The purpose of our testimony is to address the technical and managerial
12 capabilities of Antrim Wind Energy, LLC (“AWE”) and Reed & Reed to assure the construction
13 and operation of the Antrim Wind Project (the “Project”) in continuing compliance with the
14 terms and conditions of a certificate of site and facility issued by the New Hampshire Site
15 Evaluation Committee (“SEC”). Specifically, the testimony of Mr. Cavanaugh focuses on the
16 relationship between AWE and Reed & Reed and Reed & Reed’s technical and managerial
17 capacity relative to the construction of the Project and post-construction restoration of the Project
18 site.

19 **Q. Please describe the nature of Reed & Reed’s relationship with AWE.**

20 **A.** AWE has entered into a Preconstruction Services Agreement (“PSA”) with Reed
21 & Reed pursuant to which Reed & Reed will provide certain pre-construction phase advisory
22 services at the direction of AWE, including (but not limited to) a constructability review of the
23 Project, a review and evaluation of the Project’s electrical design, project budgeting, construction

1 scheduling, and consultation regarding the selection and delivery of wind turbine generators.
2 The PSA also grants to Reed & Reed the exclusive right to negotiate a BOP contract for the
3 Project. Once a BOP contract has been negotiated and entered into between the parties, Reed &
4 Reed will perform post-permit electric design, foundation design and provide all technical and
5 construction services required to complete and turn over a fully commissioned and operational
6 Project, including the purchase of all materials, the placement of construction contracts, the
7 completion of a detailed scope of work, and the provision and management of all construction
8 labor and equipment.

9 **Q. Are you familiar with the Project proposed by AWE in this matter?**

10 A. Yes. Reed & Reed has conducted a constructability assessment of the Project,
11 including a review and evaluation of the Project design, as well as cost estimating, Project
12 scheduling, and other construction-related advisory services. Reed & Reed also provided
13 construction-related advisory services to AWE in connection with its previous application for the
14 Antrim Wind Project in Docket 2012-01. Services provided by Reed & Reed during this
15 previous engagement included a constructability analysis, development of cost estimates,
16 development of a Spill Prevention Control and Countermeasures (“SPCC”) plan, and the
17 preparation of a Project schedule. Reed & Reed conducted a site visit on June 16, 2011 to
18 determine site viability, access and suitability for the proposed Project.

19 **Q. Has Reed & Reed prepared a construction schedule for the Project that is the**
20 **subject of AWE’s current application for a certificate of site and facility?**

21 A. Yes. AWE anticipates a commercial operation date for the Project in July 2017,
22 and Reed & Reed has developed a commercially reasonable schedule supporting that date. A
23 copy of the Project schedule is attached to the Application as Appendix 7D.

1 **Q. Please summarize the different construction phases indicated in the Project**
2 **schedule, and describe Reed & Reed's role in managing or implementing the actions**
3 **required in each phase.**

4 A. Reed & Reed anticipates four general construction phases including
5 preconstruction activities, construction of the wind turbines, construction of the collector system
6 and substation, and project completion / turnover. Reed & Reed will manage all aspects of these
7 phases. Preconstruction activities are already underway and include a constructability analysis,
8 budgeting, and scheduling. The wind turbine construction phase will include clearing and
9 constructing the Project laydown area[s], clearing and developing access roads, clearing and
10 developing a crane path and pads, constructing foundations, transporting turbine components to
11 the Project site, erecting the wind turbines, and completing tower electrical work. Concurrently
12 with civil turbine foundation work, Reed & Reed will construct an overhead and underground
13 collector system, as well as a substation yard, foundation, and facility and an operations and
14 maintenance building. Finally, Reed & Reed will manage the testing, energization,
15 commissioning, and turnover of the Project to AWE.

16 **Q. What steps will be taken to ensure post-construction restoration of the**
17 **Project site?**

18 A. Approximately 55.3 acres will be disturbed during project construction, and
19 approximately 44.05 of those acres will be re-vegetated after construction of the wind turbines
20 and associated facilities is completed. Restored areas will include road edges, crane paths,
21 temporary roads, and staging areas. The restoration process will generally include spreading
22 organics and seeding with a native mix and mulching all rock work pads; spreading organics and
23 seed with native mix at the edges of access roads and crane paths to reduce widths to 16 feet; and

1 restoring all construction and laydown areas. Debris, unused material, gravel, and geotextile
2 fabric will be removed and replaced with organics stockpiled during the site preparation process.

3 **Q. Are you aware of any special local restrictions that will apply to the**
4 **construction of the Project?**

5 A. AWE has entered into an Agreement with the Town of Antrim that specifically
6 applies to the construction of the Project. In addition to reporting requirements and
7 specifications regarding the wind turbines, the Agreement sets forth requirements and restrictions
8 that must be adhered to during the construction period. These requirements apply to construction
9 activities such as debris disposal; blasting; storm water pollution control; design safety
10 certification; and use of construction vehicles. Reed & Reed is familiar with and will abide by
11 these requirements and restrictions during the course of Project construction.

12 **Q. Will Reed & Reed assist in the development of a blasting plan?**

13 A. Yes. Reed & Reed will engage and contract with a competent blasting company
14 who will develop a comprehensive blasting plan in conformity with all applicable state and
15 federal rules and regulations, as well as AWE's agreement with the Town of Antrim.

16 **Q. What steps has AWE taken to ensure the prevention of hazardous substances**
17 **during the construction of the Project?**

18 A. As noted above, Reed & Reed prepared a SPCC plan in connection with the
19 construction of the Project as it was proposed in Antrim's previous application to the SEC. Reed
20 & Reed has reviewed that SPCC plan in light of the reconfigured Project that is the subject of
21 AWE's current application for a certificate of site and facility. A copy of the SPCC plan is
22 attached to the Application as Appendix 4.

1 **Q. In your opinion, does Reed & Reed possess the technical and managerial**
2 **capabilities to construct the proposed Project?**

3 A. Yes. Reed & Reed's extensive knowledge of and experience in wind energy
4 project construction as the premier wind energy contractor in New England make us uniquely
5 qualified to manage and implement construction of the Project.

6 **Q. Does this conclude your pre-filed testimony?**

7 A. Yes.

8 **Testimony of Donald Marcucci**

9 **Q. Please state your name, title and business address.**

10 A: My name is Donald Marcucci. I am employed as Director, Project Acquisitions
11 for Siemens Energy, Inc. ("Siemens"), Wind Power Americas. I also served as Deputy /
12 Commercial Project Director of the Cape Wind Project. My business address is 4400 Alafaya
13 Trail, Orlando, Florida 32826 – Mail Code Q14 SW.

14 **Q. Please describe the services and products provided by Siemens.**

15 A. Siemens, a corporation organized and in good standing under the laws of the State
16 of Delaware, is a global supplier of a complete spectrum of utility scale energy products, services
17 and solutions for power generation in thermal and renewable facilities, for power transmission
18 and for the extraction of oil and gas. Of relevance here is Siemens' provision of wind turbine
19 generators and related technical services, including wind turbine generator delivery, technical
20 field assistance for installation and mechanical completion, commissioning, and maintenance
21 services. A major driver of innovation in the wind power industry since 1980, Siemens has
22 significant experience in the manufacture, installation, commissioning and operation of wind
23 turbine generators globally and in the United States, including New England. The Company's

1 installed fleet of wind turbine generators includes over 14,300 facilities in more than 40
2 countries across North and South America, Europe, Asia, Africa, Australia and New Zealand for
3 a total installed capacity of approximately 25,400 MW.

4 Siemens is a U.S. subsidiary of Siemens Corporation, which in turn is a U.S. subsidiary
5 of Siemens AG, a global conglomerate founded in 1847 and headquartered in Munich, Germany.
6 Its businesses include, among other divisions, wind power and renewables, power and gas,
7 power generation services, and energy management. Siemens AG has approximately 343,000
8 employees in more than 200 countries, and was ranked 58 on the 2014 Fortune Global 500.

9 **Q. What are your responsibilities as Director, Project Acquisitions for Siemens**
10 **Energy, Inc.?**

11 A. I am currently responsible for various commercial, warranty, performance
12 guaranties and contractual aspects for all of Siemens' multi-billion dollar wind turbine generator
13 business in North and South America, as well the negotiation of the Turbine Supply Agreements
14 and Service and Maintenance Agreements with select customers and for complex projects and
15 EPC consortium arrangements.

16 **Q. Briefly summarize your educational background and work experience.**

17 A. I have a Bachelor of Science degree in Mechanical Engineering, as well as a JD
18 and MBA, from the University of Pittsburgh. I joined the Westinghouse Electric Corporation
19 after receiving my undergraduate degree and served in positions of increasing responsibility
20 within the Westinghouse organization, including the Bettis Atomic Power Laboratory, Nuclear
21 Energy Systems, Transportation Systems, and the Westinghouse legal department. After
22 Westinghouse sold its Transportation Systems business unit to AEG Transportation Systems,
23 Inc., I served as the Executive Vice President of Commercial Operations. In that role, I had

1 responsibility for all of the customer activities of a billion dollar per year U.S. transportation
2 systems equipment and services supplier. In 1998, I rejoined Westinghouse in its Power
3 Generation Business Unit, which was subsequently purchased by Siemens. Since then, and prior
4 to my present position, I served as Regional Contracts Director for Siemens Energy, Inc., Fossil
5 Power Generation and the Director of Commercial Sales and Contracts Management for Siemens
6 Energy Inc., Wind Power Americas. Please see Attachment DM-1.

7 **Q. What is the purpose of your testimony?**

8 A. My testimony provides an overview of the Siemens SWT-3.2-113 direct drive
9 wind turbine generator that AWE proposes to utilize in the Antrim Wind Project, including its
10 key features and design. I also provide an overview of the wind power technical and managerial
11 capabilities of Siemens, which will manufacture and deliver the wind turbine generators pursuant
12 to a Turbine Supply Agreement (“TSA”) and will service and maintain the wind turbine
13 generators pursuant to a separate Service and Maintenance Agreement (“SMA”) subsequent to
14 their commissioning under the TSA.

15 **Q. Please describe the Siemens wind turbine generator that will be used in the**
16 **Project.**

17 A. AWE has selected the Siemens SWT-3.2-113 direct drive wind turbine generator,
18 which is part of the Siemens D3 wind turbine generator platform and is designed to optimize
19 energy output at sites with moderate wind conditions. The SWT-3.2-113 is one of latest
20 additions to the Siemens D3 platform, and builds upon Siemens’ successful design and
21 operational experience with its SWT-2.3-113, SWT-3.0-101, SWT-3.0-108 and SWT-3.0-113
22 direct drive wind turbine generators. Siemens has installed over 530 wind turbine generators of
23 the D3 platform, which is designed for sites with moderate to high wind speeds and turbulence,

1 for a total installed capacity of approximately 1,540 MW. The Siemens SWT-3.2-113 wind
2 turbine generator is certified to be in conformity with International Electrotechnical Commission
3 standard IEC 61400-1, 2005 edition 3.

4 The SWT-3.2-113 wind turbine generator is, like any typical wind turbine generator, a
5 horizontal axis machine comprised of a tower, a nacelle, and a rotor with three blades. The
6 nacelle includes a 3.2 MW generator that is mounted on a sliding ring, allowing it to rotate into
7 the wind to maximize energy production. Also included in the nacelle are the primary electrical
8 components of the wind turbine generator, as well as a cooling unit, control panel, yaw gears and
9 a hydraulic power unit. The nacelle is enclosed within an insulated, glass fiber reinforced
10 polymer skin that covers a nodular cast iron frame holding all of the wind turbine generator's
11 internal components.

12 The blades are made of fiberglass-reinforced epoxy and cast in one piece to eliminate
13 glue joints which are weaker areas in other blades. The individual blades are 55 meters in
14 length, resulting in a rotor diameter of 113 meters, and are designed to optimize the power from
15 the wind. The blades are mounted on pitch bearings and can be feathered 80 degrees for
16 shutdown purposes. Each blade has its own independent pitching mechanism capable of
17 feathering the blade under any operating condition, allowing for optimization of power output
18 throughout the operating range. The blades are feathered during standstill to minimize wind
19 loads. The blades are bolted to a nodular cast iron rotor hub. The nacelle is mounted on a
20 tubular tower made of structural steel that is bolted to a concrete and steel reinforced foundation.

1 **Q. Please describe the role that Siemens will play in the wind turbine generator**
2 **procurement process.**

3 A. Siemens and AWE have entered into a binding Memorandum of Understanding
4 (“MOU”), pursuant to which Siemens has the exclusive right to negotiate a TSA with AWE to
5 provide Siemens wind turbine generators for the Project. The TSA will set forth and govern
6 Siemens’ responsibilities to manufacture the wind turbine generator components and deliver
7 them to the Project site for installation by AWE’s construction contractor. Siemens will be
8 responsible for procuring, manufacturing/assembling and delivering all of the specified wind
9 turbine generator components, including towers, nacelles, blades, hubs, and an agreed list of
10 necessary spare parts, as well as selecting a trucking contractor(s) to deliver the wind turbine
11 generator components to the Project site. Siemens will also provide technical assistance to the
12 AWE EPC during the unloading, construction and installation phase of the wind turbine
13 generators. The TSA will also detail the defects warranties and performance guaranties
14 applicable to the Siemens wind turbine generators installed at the Project.

15 Siemens currently manufactures various components for the SWT-3.2-113 wind turbine
16 generator in several locations globally, including a nacelle and hub manufacturing facility in
17 Hutchinson, Kansas and a blade manufacturing facility in Tillsonburg, Ontario, Canada.
18 Siemens also has several European manufacturing locations for such components. The final
19 selection of the applicable manufacturing facility, which will be based upon the most economic
20 delivery to the Project site, will be determined when the final TSA is executed, taking into
21 account such pertinent factors as the then current currency exchange rates and transportation
22 costs.

1 **Q. What services will Siemens provide following installation of the turbines?**

2 A. Under the terms of the MOU, Siemens and AWE will also enter into an SMA
3 pursuant to which Siemens will be responsible for wind turbine generator service and
4 maintenance requirements, both planned and unplanned, during the term of the agreement.
5 Though the full scope of services to be provided under the SMA will be subject to negotiation,
6 Siemens anticipates that such services will include a dedicated Siemens maintenance team
7 consisting of 2 individuals employed full-time on site. Services will also include, at a minimum,
8 regularly scheduled maintenance of the Siemens wind turbine generators; the provision, care and
9 calibration of tools and safety equipment required for the service and maintenance; 24 hour
10 remote monitoring of the Project's Supervisory Control and Data Acquisition ("SCADA")
11 system, which provides remote control and reporting from a standard web browser, as well as
12 alerting of any identified issues; retrieval and backup of SCADA data; monitoring and analysis
13 of Turbine Condition Monitoring ("TCM") data, which predicts potential malfunctions by
14 monitoring the vibration level of the main components and comparing the actual vibration
15 spectra against established reference spectra; implementation of changes and updates to the TCM
16 and SCADA software as necessary; initiating appropriate responses to any monitored events,
17 alerts, and warnings; notifying AWE of all unusual events and malfunctions; maintaining wind
18 turbine generator-specific logs detailing work and repairs performed; and maintaining the
19 guaranteed wind turbine generator availability for the duration of the SMA. The SMA will also
20 contain additional terms designed to incorporate standard industry practices and ensure that the
21 wind turbine generators are serviced, maintained and operated safely and that the wind turbine
22 generators are maintained in accordance with the manufacturer's specifications.

1 **Q. What will be the term of the SMA?**

2 A. Siemens and AWE anticipate that the term of the SMA will be between two and
3 five years, subject to an extension. Alternatively, AWE may elect to contract with a qualified
4 independent third party service provider to service the wind turbine generators following
5 expiration of the initial SMA term.

6 **Q. Does Siemens have the technical and managerial experience and capability to**
7 **carry out its responsibilities under the SMA in compliance with the applicable terms and**
8 **conditions of any certificate of site and facility that is issued by the SEC for the Antrim**
9 **Wind Project?**

10 A. Yes. Over the past three decades, Siemens has accumulated thousands of hours of
11 experience servicing and maintaining its wind turbine generators, and is recognized as a world-
12 class service provider as a result of the high quality of its services, its preventative approach to
13 maintenance, and its dedication to safety. Siemens services and maintains its wind turbine
14 generators with its latest technology to optimize turbine availability, and its state-of-the-art
15 SCADA and TCM systems enable Siemens to identify anomalies early on to respond to such
16 problems in real time. The TCM system delivers vibration measurements for critical wind
17 turbine generator components, enabling Siemens' diagnostics experts to analyze vibration
18 patterns, compare them with values from a database that compiles records from more than 8,000
19 Siemens wind turbine generators, and identify any anomalies requiring a response. Siemens'
20 web-based SCADA systems is a maintenance tool that collects electrical and mechanical data,
21 operating and fault messages, meteorological information, and myriad other data on a 24/7 basis.

22 Siemens maintains more than 4,000 wind turbines (>10GW) in the United States under
23 service contracts. Siemens' fleet wide availability in the United States exceeds 97%. The

1 Siemens wind service TRIR (Total Recordable Incident Rate), a safety metric, is currently below
2 3.5 throughout North America.

3 **Q. What are the key safety features of the Siemens SWT-3.2-113?**

4 A. Wind turbine generators in the Siemens D3 platform, including the SWT- 3.2-
5 113, are designed for with a focus on safety. Each Siemens SWT-3.2-113 wind turbine generator
6 is designed in accordance with international engineering standards, and each has a state-of-the-
7 art braking system, pitch controls, sensors and speed controls that operate to reduce the risk of
8 blade and / or tower failure as a result of excessive speed. Moreover, the TCM system in each
9 wind turbine generator monitors vibrations during operation and will terminate operation if
10 significant deviations are sensed. As noted above, Siemens employs its proprietary
11 IntegralBlade® manufacturing process in which the blades are cast in one piece, providing
12 superior strength and resilience and eliminating potentially weak glue joints that increase the risk
13 of water ingress, cracking or damage due to lightning. In the extremely rare and unlikely event of
14 a tower collapse or blade failure, operations will immediately cease. Similarly, if the SCADA
15 system senses an imbalance due to ice build-up on the blades, the wind turbine generator will be
16 shut down automatically until the icing subsides.

17 Siemens SWT-3.2-113 wind turbine generators are also designed to minimize the risk of
18 damage from lightning strikes to, or fire in, the wind turbine generator. Each wind turbine
19 generator has heat sensors and smoke detectors that are connected to the main control unit and to
20 the SCADA. The smoke detectors are located at critical points within the wind turbine
21 generator, including the generator, nacelle, tower top, and power unit, and connected to
22 individual digital inputs on the wind turbine generator control system. The control system
23 monitors the smoke detectors located inside the wind turbine generator, which are failsafe, and

1 activates all alarm systems if smoke is detected in the wind turbine generator, including sending
2 a signal to the SCADA system indicating the location of the event. When an alarm is triggered
3 due to the detection of smoke or the failure of a smoke detector, operation of that wind turbine
4 generator ceases and the cooling fans in all cubicles are switched off in order to reduce the
5 admission of air to a possible fire. The SCADA system is remotely monitored around the clock.
6 The on-site Siemens operations staff is available to assist with emergencies. Each wind turbine
7 generator will be equipped with manually operated fire extinguishers.

8 The lightning protection system in the Siemens SWT-3.2-113 is designed to protect
9 against the effects of direct and nearby lightning strikes at a specified level, and each wind
10 turbine generator is designed and tested for lightning protection level (“LPL”) 1 of 200 kA.
11 Each blade features a lightning receptor system that is integrated into the nacelle bedplate and
12 connected to the tower through a series of brushes and cabling. All main components are
13 efficiently grounded and metal oxide arrestors in the controller are designed to provide transient
14 protection from the effects of nearby strikes. Both the nacelle and the tower also act as a faraday
15 cage. Should a lightning strike occur, these systems conduct the lightning from the blade to the
16 tower and then to the ground via a grounding system.

17 **Q. In your opinion, does AWE possess the technical and managerial capabilities**
18 **to operate and maintain the Project?**

19 A. Yes. Based upon the information that we have received about AWE’s managerial
20 team and their collective experience in the renewable energy industry, as well as the TSA and
21 SMA contractual arrangements with Siemens, I am confident that AWE possesses the technical
22 and managerial capabilities required to operate and maintain the Antrim Wind Project. Siemens
23 unquestionably has the experience and ability to manufacture, deliver, and commission and

1 service and maintain the SWT-3.2-113 wind turbine generators that AWE intends to install and
2 operate at the Project site pursuant to the TSA and SMA. Moreover, Siemens is a leader in the
3 wind power industry, having installed and serviced over eight thousand wind turbine generators
4 over the course of the past three decades, and is optimally qualified to operate and maintain the
5 wind turbine generators in accordance with the SMA. AWE's managerial capability in
6 combination with Siemens' experience in the manufacture, service, and maintenance of wind
7 turbine generators will ensure that this is a very well managed project.

8 **Q. Does this conclude your pre-filed testimony?**

9 A. Yes.

10



Arthur J. Cavanagh

Senior Project Manager

Director, Wind Energy

Responsibilities

- Marketing, Pre-construction, Scope Development, Design Review, Contract Development, Subcontractor selection, Oversight and Management of all contract requirements including Estimating, Purchasing, Scheduling, Procurement, Project Administration, and Project Closeout.

Experience

- Thirty - One years of commercial and heavy civil construction experience. The last twenty years have been senior positions for projects in the Maine, New Hampshire, Vermont, Massachusetts and USVI markets.

Project experience includes broad diversity and expertise, along with Designer and Subcontractor knowledge base. Have successfully completed numerous projects with varied delivery methods including EPC Design Build, Construction Management, Construction Management at Risk and Lump Sum Bid from completed drawings.

Wind Power Projects: Responsible for development and successful execution of Wind Energy projects. Company Wind Energy program is the leader in the Northeast with completing 95% of the MW's installed exceeding 325 Million in projects completed in Maine, New Hampshire, Massachusetts and Vermont.

Parking Garages: 5 projects totaling 38 million dollars, for Maine Medical Center Portland ME, State of Vermont, City of Augusta and Penn National Gaming.

Housing, Resort, Retirement Facilities: 7 projects totaling 83 million dollars, for IBM, Canyon Ranch Health Resorts, USCG, BNAS, Maine Health Care, University of Maine and Schooner Ridge Development.

Design Build Bridges: Design Build Manager for 63 million dollar segmental precast balanced cantilever Veterans Memorial Bridge project in Portland, ME.

Research Facilities: 7 projects totaling 95 million dollars, for IBM, University of Vermont, State of Maine, National Semi-Conductor and Maine Medical Center.

Cruise Ship Terminal & Piers: 2 projects 18 million dollars, Ocean Gateway Project for the City of Portland Maine and Water Island Ferry Pier USVI.

LEED Certified Facilities: Colby College Alumni Center, Waterville, ME

Airport Apron Replacements: 4 projects totaling 9 million dollars for the USN, ANG, USVI Port Authority.

Educational Facilities: 10 projects totaling 56 million dollars for, Biddeford, Windham, Scarborough, Benton, Farmington, Kittery, Brunswick, Kennebunk and Gardiner.

Office Buildings: 6 projects totaling 62 million dollars, for IBM, UNUM, State of Maine and Maine Medical Center.

Historical Renovations: 5 projects totaling 50 million dollars, for The City of Westbrook, State of Maine and GSA.

Correctional Facilities: 4 projects totaling 89 million dollars, for State of Vermont, State of Maine and York County.

Medical Projects: 4 projects totaling 21 million dollars, for Miles Memorial Hospital, Togus V.A. and Maine Medical Center.

Education

- Norwich University Northfield, Vermont
- Bachelor of Science Degree in Civil Engineering 1981

Donald R. Marcucci

Director, Project Acquisitions and
Deputy/Commercial Project Director
Cape Wind Project
Siemens Energy, Inc.
Wind Power Americas

Biography



Donald R. Marcucci is the Director, Project Acquisitions and Deputy/ Commercial Project Director Cape Wind Project for Siemens Energy, Inc., Wind Power Americas, responsible for various commercial, warranty and contractual aspects of Siemens' multi-billion dollar wind turbine generator business in North and South America and all commercial aspects of the Cape Wind Offshore Wind Project for Siemens.

Mr. Marcucci, a Pittsburgh native, joined the Westinghouse Electric Corporation following his graduation with a BSME from the University of Pittsburgh. Mr. Marcucci, who also earned an MBA and JD from the University of Pittsburgh, served in various positions of increasing responsibility within the Westinghouse Electric Bettis Atomic Power Laboratory, Nuclear Energy Systems, Law Department and Transportation Systems groups.

After Westinghouse sold its Transportation Systems Business Unit to AEG Transportation Systems, Inc., Mr. Marcucci served as the Executive Vice President of commercial operations, responsible for all customer activities for a billion dollar per year U.S transportation systems equipment and services supplier. In 1998, he rejoined Westinghouse at its' Power Generation Business Unit in Orlando, Florida, for which he had been the chief legal counsel during his service in the Westinghouse Law Department.

Following his return to the Westinghouse Power Generation Business and its purchase by Siemens, Mr. Marcucci served as the Regional Contracts Director for Siemens Energy, Inc., Fossil Power Generation and the Director of Commercial Sales and Contracts Management for Siemens Energy, Inc., Wind Power Americas prior to his present position.

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