



2012 REIP Draft Proposal for Changes to the REIP for Wind Systems

October 18, 2011

**Joanne Bachmann & David Damiani
Renewable Energy
Market Manager Staff**



New Jersey Board of Public Utilities, Office of Clean Energy



Actions/Activities Since last SWWG



- Discussed Field Listing requirements with DCA
- Contacted Nationally Recognized Testing Labs (NRTL) to learn which firms field test wind systems
- Met with one NRTL to discuss timelines, tests performed, process and costs for a field listing
- Researched insurance, bonding, certification, wind system standards
- Performed extensive financial analysis on wind systems using existing and multiple rebate structures
- Reviewed stakeholder comments and develop changes to the program straw proposal



New Jersey Board of Public Utilities, Office of Clean Energy



Recommendations to Revise the REIP Wind Program



Recommendation Categories:

- Certification/Safety/Turbine Eligibility
- Insurance and Bonding
- Warranty Information
- Program Inspection Process
- Calculating Estimated Production for rebate determination
- Rebate Payments and Rebate Structure
- Paperwork Changes



New Jersey Board of Public Utilities, Office of Clean Energy



Certification/Safety/ Turbine Eligibility



Turbines with a swept area of **200 m² or less** and within the scope of **IEC-61400-2** or the American Wind Energy Association, Small Wind Turbine Performance and Safety Standard (**AWEA 9.1 – 2009**), submission of:

- **Evidence of certification** to IEC 61400-2 or AWEA 9.1-2009 by the Small Wind Certification Council (SWCC) or other independent certification body
- **Evidence that a power performance** test conforming to AWEA 9.1-2009 or IEC 61400-12-1 has been certified by the SWCC or other Nationally Recognized Testing Lab (NRTL) or other independent certification body



New Jersey Board of Public Utilities, Office of Clean Energy



Certification/Safety/ Turbine Eligibility



Turbines with a swept area of **more than 200 m²** and therefore outside the scope of IEC 61400-2 or AWEA 9.1-2009, submission of:

- **Evidence of type certification** by a certification body that is accredited to provide product conformity certification to IEC Standard 61400-1 (*safety*), IEC Standard 61400-11 (*noise*) & 61400-12-1 (*performance*)
- **Evidence that a power performance test** conforming to IEC 61400-12-1 (*performance*) has been certified by a Nationally Recognized Testing Lab (NRTL) or independent certification body



New Jersey Board of Public Utilities, Office of Clean Energy



Certification / Safety / Turbine Eligibility



For turbines not certified:

- The New Jersey Department of Community Affairs (DCA) has authorized local municipal inspectors to require a “field listing” of the wind energy generating system.
- “Field listing” evaluations will be performed by a NRTL at the expense of the installer, manufacturer and or customer.
 - *Installation will not pass a local inspection without a passed report issued by an NRTL.*



New Jersey Board of Public Utilities, Office of Clean Energy



Certification Evidence



- **Evidence** of the safety and performance certification will be required with the **initial REIP Application**
- *Question for Stakeholders :*
 - What **documents** do turbine manufacturers receive upon certification being granted?



New Jersey Board of Public Utilities, Office of Clean Energy



Field Listing - DCA



DCA has verified to MM that the **Field Listing** requirement is effective immediately.

- Focus includes:
 - Review the installation's compliance with the NEC (National Electrical Code)
 - Ensure each of the major components installed are UL listed by a UL certified testing facility.



New Jersey Board of Public Utilities, Office of Clean Energy



Field Listing - NRTL



One NRTL's approach to field listing:

- **Wind Turbine Design Review and Component Evaluation:**
 - Design documentation, electrical components, schematics, control and safety function,
 - Identify any components required for field labeling or certification
- **Wind Turbine Project Review:**
 - Detailed review of all electrical standard requirements specific to wind turbine construction
- **Compliance Plan:**
 - Identify actions necessary to qualify for field labeling and eventual certification
- **Issuance of Project Inspection Report:**
 - Upon review of project a report will be issued detailing any component issues to be addressed for a successful field evaluation
- **Onsite Inspection:**
 - Utilize report issued to verify construction adherence to all previously mentioned standards
- **Issuance of Certification Report:**
 - Details the construction/components that have been evaluated and certified, including testing that was performed and any production line or site testing required for compliance



New Jersey Board of Public Utilities, Office of Clean Energy



Examples of NRTL that Field List turbines



- **National Technical Systems**

36 Gilbert Street South

Tinton Falls, NJ 07724

T: 732.936.0800

E-mail: Dean Mathew dean.mathew@nts.com

- **Intertek Commercial & Electrical**

3933 US Route 11

Cortland NY, 13045 USA

T: 607.758.6636

www.intertek.com/wind

- **SGS U.S. Testing Company, Inc.**

291 Fairfield Avenue

Fairfield, New Jersey 07004

T: 281.484.7475

Email: antonio.montes@sgs.com



New Jersey Board of Public Utilities, Office of Clean Energy



Examples of NRTL that Field List turbines



- **UL**

2600 N.W. Lake Rd.

Camas, WA 98607-8542

T: 877.UL.HELPS (877.854.3577)

E-mail: cec.us@us.ul.c

- **TUV Rheinland of North America, Inc.**

2100 Golf Rd, Suite 300

Rolling Meadows, IL 60008

T: 847.640.5700 x6058

Email: Jonathan T. Kotrba jkotrba@us.tuv.com



New Jersey Board of Public Utilities, Office of Clean Energy



Insurance & Bonding Requirements



Insurance:

- Installer, Manufacturer & Distributer must have: General Commercial Liability Insurance including:
 - Completed Operations Insurance
 - Product Liability
 - BPU and Customer listed as additional insured
 - Certificate of Insurance(s) are required for each REIP project

Bonding: None required for the REIP in 2012



New Jersey Board of Public Utilities, Office of Clean Energy



Warranty Requirements



- Minimum Five (5) Year Warranty is Required for Turbines, Inverters and the system installation
- Initial Application will Require:
 - Copy of the customer's equipment warranties (turbine and inverter) showing minimum five years. Provisions that would void the warranty, must be included in the warranty documents or customer contract.
 - Copy of installation contract describing the five year installation warranty. Provisions that would void the warranty, must be included in the customer contract.



New Jersey Board of Public Utilities, Office of Clean Energy



Program Inspection Process



- 100% of REIP wind projects will continue to receive a program inspection
- Program inspection will not change but new parameters to the process will be added:
 - Program inspection occurs **after** Final As-Built paperwork is received including UCC and EDC authorization to energize
 - MM will use an optical range finder for more accurate review of program requirements (tower height, tree height, wind swept area)
 - Installer must be present during program inspection
 - MM will request a copy of turbine manufacturer installation manual to keep on file



New Jersey Board of Public Utilities, Office of Clean Energy



Wind Program Inspection



Program Inspection Includes:

- Match equipment approved for rebate with equipment installed on site
- Verify data listed on REIP paperwork and compliance with program rules and manufacturer specifications.
 - Tower height, voltage, name plate rating, model numbers
 - Confirm siting: wind swept area and obstruction requirements
 - Confirm manufacturers specifications were adhered to for warranty
 - *Any discrepancies could impact the rebate amount, new calculations would be based upon the NJCEP program inspector's findings*
- Verify that the system is operational
 - Document instantaneous kW production and cumulative kWh production
- Confirm installation of ANSI C12 meter and anemometer
 - Verify height and orientation of anemometer



New Jersey Board of Public Utilities, Office of Clean Energy



Calculating Estimated Production



Ways to Improve Estimated Production Calculation

- Accurate Power Curves
- A realistic long-term average wind speed measured at the top of the customer's tower
- Estimated performance calculator using appropriate inputs specific to NJ terrain



New Jersey Board of Public Utilities, Office of Clean Energy



Accurate Power Curves



- Independent 3rd party verified power curves to AWEA or IEC standards are required for all REIP wind projects
- If turbine has met certification criteria previously discussed, that will satisfy this requirement



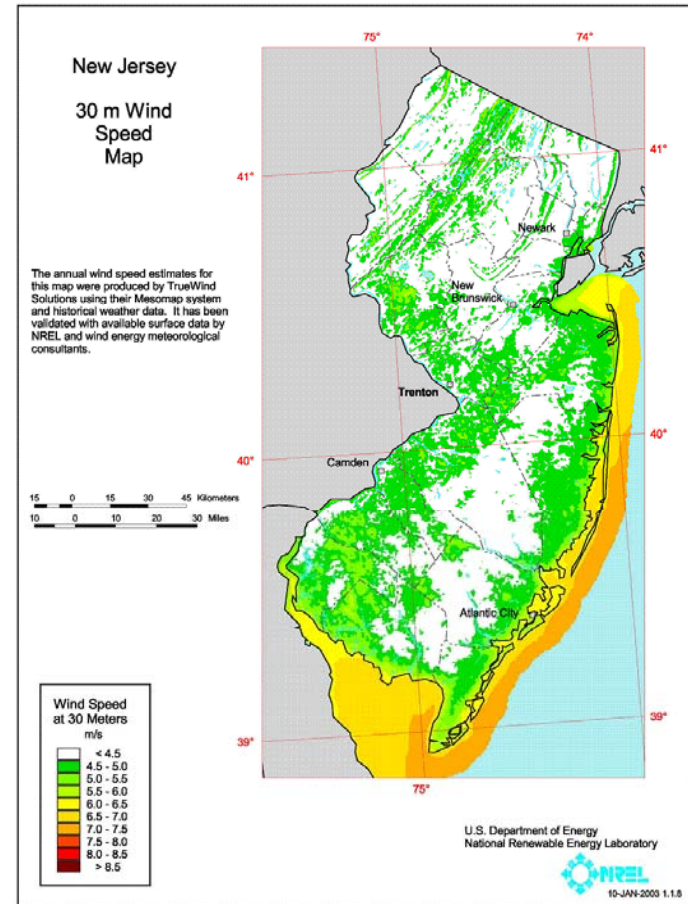
New Jersey Board of Public Utilities, Office of Clean Energy



Accurate Wind Speeds



- Wind Speeds vary – there is no completely accurate wind speed map.
- The program will require all projects to calculate wind speed using the same wind speed map – NREL 2003 validated wind map



New Jersey Board of Public Utilities, Office of Clean Energy



Estimating Performance



- NJ Terrain includes many trees and buildings – adjustments are needed for Turbulence Intensity and Wind Shear values:

Turbulence Intensity Values:

<u>Terrain</u>	<u>Factor</u>	<u>Site Quality</u>
Well Exposed	15%	Good
Some Ground Clutter, Scattered Trees, buildings	20%	Average
Many Trees or Buildings, lower elevation than surroundings	25%	Poor
For extremely compromised sites add 5 - 10% more	30% - 35%	Very Poor

Wind Shear Values:

<u>Surface Description:</u>	<u>Wind Shear (α):</u>
Smooth, hard ground, lake or ocean	.14
Short Grass on untilled ground	.17
Level country w/ high grass, occasional tree	.21
Tall row crops, hedges, a few trees	.23
Many trees and occasional buildings	.25 - .27
Wooded country, small towns and suburbs	.35
Urban areas with tall buildings	.5



New Jersey Board of Public Utilities, Office of Clean Energy



Distributed Wind Site Analysis Tool (DSAT)



- The Cadmus Group: developed with DOE funding
- Cadmus Group is releasing this new DSAT tool:
 - Expands upon The Cadmus Group's CWEST tool
 - Makes use NREL 2003 validated wind maps
 - Specific site observations options are integrated in DSAT
- Use of DSAT will be required for all REIP projects
 - Submit a copy of DSAT report with Initial Application
 - *Public Release: end of October 2011 (anticipated during the Community Small Wind Across America conference in Albany)*



New Jersey Board of Public Utilities, Office of Clean Energy



Rebate Payment Schedule



Rebate Payment Recommendation:

- 50% of the rebate paid upon project completion
- Up to the remaining 50% of the rebate paid upon demonstration of actual first year system production via an ANSI C12 meter.
- New rebate payment structure eliminates need for Innovative Wind Technology Incentive (IWTI)



New Jersey Board of Public Utilities, Office of Clean Energy



Financial Justification and Rebates



- Developing energy production estimates using more observation and tools that account more for siting issue will reduce estimated production for projects in NJ
- Given current rebate structure, lower estimated production reduces rebate amount
- Project financial justification must include accurate estimated production as energy savings over time has the most impact on the return of the investment
- Receiving a large rebate should not be the reason to install a wind turbine
- It is estimated that some REIP projects installed in NJ will not receive a payback during the life of the system



New Jersey Board of Public Utilities, Office of Clean Energy



Rebate Structure



Current Rebate		Proposed New Rebate Structure	
Production	Rebate Amount	Production	Rebate Amount
1-16,000 kWh	\$3.20/ kWh	1-15,000 kWh	\$2.50/ kWh
16,001- 1,000,000 kWh	\$0.50/ kWh	15,001-1,000,000 kWh	\$0.50/ kWh
		Project with greater than or equal to 13.4 mph or 6.0 m/s and project production is less than or equal to 500,000 kWh	Additional \$0.50/kWh
Max rebate for residential is \$51,200 & non-residential is \$543,200		Max rebate for residential is \$45,000 & non-residential is \$530,000	



New Jersey Board of Public Utilities, Office of Clean Energy



Financial Analysis

- Assumptions



- Residential projects have no depreciation benefits
- Commercial projects will follow a 5 year MACRS, 50% depreciation bonus and 30% tax credits
- Public projects use PPA, so same assumptions as commercial projects
- For projects > 100kW there is no MACRS or 30% tax credit; used 20 year depreciation
- Projects are not financed
- Residential electricity rate is 16.39 cents per kWh and Commercial rate is 13.36 cents per kWh
- Discount Rate is 6%
- Analysis was completed for 25 years, the expected life of a turbine
- Projects did receive the full rebate amount
- Estimated energy production assumes 25% for turbulence intensity and .30 for wind shear for projects with wind speeds < 13.4 mph or 6.0 m/s. Assumes 20% for turbulence intensity and .25 for wind shear for projects with wind speeds => 13.4 mph or 6.0 m/s.



New Jersey Board of Public Utilities, Office of Clean Energy



Inputs



Site	Est. Mean Wind Speed (mph)	Cap. (kW)	Type	Annual Output (kWh)		Installed Cost (\$)	Cost per Watt
				Old method	New method		
Englishtown	11.6	10	Res	15,496	12,862	\$90,000	\$9
Cape May	14.0	10	Res	22,493	20,445	\$90,000	\$9
Old Bridge	12.6	20	Com	21,086	17,334	\$110,000	\$5.50
Waretown	13.9	50	Com	142,716	135,956	\$333,500	\$6.70
Glassboro	11.9	100	Com	126,759	103,661	\$565,000	\$5.70
Atlantic City	14.4	100	Com	210,642	191,889	\$590,000	\$6.00
Vernon	12.4	1500	Muni/P.P.A.	3,521,612	3,399,300	\$4,000,000	\$2.70
Bayonne	15.0	1500	Muni/P.P.A.	4,235,718	4,131,535	\$3,200,000	\$2.10



New Jersey Board of Public Utilities, Office of Clean Energy



Results



Site	Est. Mean Wind Speed (mph)	Current REIP rebate	Existing Incentive, new method output				Proposed Rebate change, new method output			
			Rebate (\$)	Rebate % of project cost	Simple Payback (years)	HPV	Rebate (\$)	Rebate % of project cost	Simple Payback (years)	HPV
Englishtown	11.6	\$51,200	\$41,158	46%	22	(\$25,255)	\$32,155	36%	> than 25 yrs	(\$34,437)
Cape May	14.0	\$51,200	\$51,200	57%	8	\$1,266	\$50,445	50%	9	\$38,233
Old Bridge	12.6	\$53,743	\$51,867	47%	> than 25 yrs.	\$3,761	\$38,667	35%	> than 25 yrs	(\$1,643)
Waretown	13.9	\$114,858	\$111,178	33%	7	\$75,648	\$165,956	50%	6	\$114,931
Glassboro	11.9	\$106,579	\$95,031	17%	> than 25 yrs.	(\$228,278)	\$81,831	15%	> than 25 yrs	(\$237,739)
Atlantic City	14.4	\$148,521	\$139,145	24%	11	(\$37,437)	\$221,889	38%	9	\$21,889
Vernon	12.4	\$543,200	\$543,200	14%	8	\$2,996,834	\$530,000	13%	8	\$2,982,834
Bayonne	15.0	\$543,200	\$543,200	17%	5	\$5,443,447	\$530,000	17%	5	\$5,430,244



New Jersey Board of Public Utilities, Office of Clean Energy



Paperwork Changes- Initial Application



- All existing 2011 program paperwork requirements will still be in effect. New 2011 sign-off on estimated annual production by manufacturer will still be required.
- New paperwork includes:
 - Warranty documents
 - Certificate of Insurance
 - Documentation to support the certification requirements
 - New Form requiring customer and installer signature would include:
 - Payment structure
 - Language including:
 - Estimates in production are used for determining maximum rebates and that the rebate payment is an estimate.
 - Final payment based on actual production
 - BPU does not guarantee the performance of any renewable energy systems.



New Jersey Board of Public Utilities, Office of Clean Energy



Paperwork Changes- Final As-Built



- The Final Application Form signed by the applicant and installer.
- Revised REIP Wind Equipment Technical Worksheet with the correct rebate if the system size, installation costs, or any other data has changed since the initial application.
- Copy of a New Jersey Tax Certification Certificate (only for commercial, non-profit, or farm projects),
- A one-page final site map (if the site map has changed from initial application submittal).
- Representative digital photographs of the system. The photos shall be a minimum of 5" x 7" at 300 DPI and must include 1) the turbine 2) inverter(s), 3) site changes if any from original application or registration and 4) the ANSI C12 meter and 5) the anemometer
- Copy the UCC from the local municipality inspection
- EDC Notification - Interconnection completion documentation from the utility
- ANSI C12 Certified Meter Worksheet



New Jersey Board of Public Utilities, Office of Clean Energy



Implementation of Program Changes Recommendation



- No extensions be granted for projects under the previous CORE & REIP rebate programs
- Projects that expire and want to proceed, should submit a new application under the improved rebate design to ensure program participants enjoy the protections of the proposed program design.



New Jersey Board of Public Utilities, Office of Clean Energy

