PENDING

Customer On-Site Renewable Energy Program
Wind Expected Performance Based Buydown
Frequently Asked Questions

Q. What does Expected Performance Based Buydown ("EPBB") mean?

A. EPBB is a methodology for calculating a CORE rebate which is based on the expected kWh output of a specific wind turbine at a specific site.

Q. How does the EPBB work?

A. The EPBB estimates the kWh output for a specific wind turbine from our approved list at a given location based on the documented wind speed at that location. The associated power output of the turbine is determined using the turbines power curve at that wind speed. Incentive rates are designed to produce higher rebates for projects that maximize the power production at that wind speed.

Q. What is a wind turbine manufacturer's power curve?

The power curve of a wind turbine is a graph that indicates how large the electrical power output will be for the turbine at different wind speeds. Power curves are found by field measurements, where an anemometer is placed on a mast reasonably close to the wind turbine (not on the turbine itself or too close to it, since the turbine rotor may create turbulence, and make wind speed measurement unreliable). Power curves are based on measurements in areas with low turbulence intensity, and with the wind coming directly towards the front of the turbine. Local turbulence and complex terrain (e.g. turbines placed on a rugged slope) may mean that wind gusts hit the rotor from varying directions. It may therefore be difficult to reproduce the power curve exactly in any given location. For further information, please visit the AWEA website at http://www.awea.org/faq/basicpp.html which provides an explanation of the "Basic Principles of Wind Turbine Power Production".

Q. Why are we adopting the EPBB methodology?

A. The EPBB methodology is designed to provide greater incentives to systems that have a higher expected kWh output. This new approach calibrates the rebates more closely to the goals defined in the Renewable Portfolio Standard, and Energy Master Plan, which are based on energy output (KWH). This method is superior to the previous approach of basing rebates on system size (capacity) or installed cost methodology, neither of which incorporates the key drivers of wind system performance which are wind speed and turbine performance. This method will also be incorporated with other renewable energy technologies such as wind and biomass funded by the NJ Clean Energy Program.

Q. What are the EPBB incentive levels?

A. The table below defines the incentives provided:

Annual estimated production	Incentive level
1-16,000 kWh	$3.20/Annual kWh
16,000 - 750,000 kWh	$.50/Annual kWh

Annual estimated production is based on the location average annual wind speed and turbine power characteristics curves.

Q. How is the EPBB different than the way rebates were calculated before?

A. The amount of the incentive is based on annual kWh production versus the previous incentive that was based on the capacity (kW) of the system, or the installed cost, regardless of annual output.

Q. What factors are considered when determining the annual energy output?

A. The EPBB requires an estimation of the annual energy output of the proposed wind system. Estimating energy production for a small wind energy system can be achieved according to the following formula:

Annual Energy Output (kWh/year) = 0.01328 (D^2) (V^3)

Where D^2= the blade diameter in feet squared, and
V^3 =the wind velocity cubed in mph -- this is the year round average wind speed.
0.01328 = a conversion factor of blade diameter and mph to kWh per year

Q. Where can I get my location's average annual wind speed?

A. There are three locations that have the wind maps available at no charge. These locations are listed on the pre-application worksheet and below. In each case use the 50m hub height since this is the only common height for all three wind speed calculators. (Note: If your hub height is not 50m the EPBB calculator automatically adjusts for the hub height of your projects)

http://firstlook.3tiergroup.com/
http://www.awstruewind.com/maps/united-states.cfm/region/46688
http://eosweb.larc.nasa.gov/cgi-bin/sse/grid.cgi

Please note that wind speed used in the rebate calculation will be capped at 13.7mph. This cap avoids over-subsidization of projects beyond their installed cost.

Q. Is a wind resource site assessment also required?

A. No. The average wind speed from the three free wind maps is acceptable for rebate calculations. However, there are other, more accurate ways to determine your location's wind speed. The first way is to hire a certified site assessor to evaluate the site topography and specific site characteristics to provide a more accurate evaluation. The second way is to hire an engineering firm to do a detailed site assessment, including a local wind speed analysis based on an anemometer reading. If either of these methods is used, you should provide the study to the CORE program staff that will use this revised wind speed information instead of the online wind maps when calculating the CORE rebate.

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Q. What wind turbine equipment is accepted by the program?

A. The following turbines are part of the list of approved equipment.

ARE	Bergey	Endurance	Entegrity	Jake
PGE	Proven	Scirocco	SWWP	Ventera
Vestas	Whisper			

Q. What do I do if I have a turbine that is not on the list?

A. If you are requesting to use a turbine that is not listed on our website you will need to provide the following:

- An engineering certification from the wind turbine manufacturer that is based on the manufacturer's power curve information for estimating energy production.
- The manufacturer's power curve shall be based on at least one year of actual energy production data.

If you are interested in a turbine that you think should be on the list, please direct the manufacturer to contact the CORE staff for specific requirements.

Q. How do I go about applying for a rebate?

A. The application process is done in two steps. First the Pre-Application is completed and submitted with all the required documentation specified on the Pre-Application. The Pre-Application process is a designed to ensure the applicant has guidance on their rebate before they undertake the effort to submit a complete application.

The Pre-Application includes the following key input data:

- Site location latitude and longitude
- Wind speed estimates from 3 wind map sources or through a site assessment
- Turbine manufacturer, make and model and DC output
- Tower height
- Site map showing potential obstacles

The CORE program staff will review the Pre-Application technical worksheet and provide the rebate calculation based on our calculation of the expected output of the system. At the time we provide the rebate calculation, we will provide a copy of the worksheet we have used to derive the system performance. The CORE team will be happy to consult with applicants to explain the results.

Once you have the rebate amount supplied by the CORE program staff, if you decide to proceed with the Rebate Application, you will need to provide the following information including:

- The wind Technical Worksheet
- Annual electrical consumption as shown by 12 months of electric bills
- A signed and fully executed contract between the installer and customer.
- A 10 year certification, which attests if the wind turbine equipment is moved out of the state of New Jersey within the 10 year period, a pro rated portion of the rebate, will be returned to the NJOCE.

This complete package must be submitted at the time of application or the complete package will be held and the installer contacted to provide any missing information. Missing information will hold up the application process.

Q. How does the CORE program staff calculate the rebate from the Pre-Application information?

A. Once the average wind speed at a specific hub height is obtained, the CORE program uses a simple Excel based calculation tool loaded with the power curve of each turbine on the list of approved turbines to calculate estimated annual energy production. This calculation tool was originally developed by NREL and is available online at:
http://www.bergey.com/Technical/ExcelS.xls

The screen below details the information inputs to the calculator:

SITE INPUTS	**PROJECT NAME**				
Annual Energy Use (kWh/yr) =	3,800		Wind Shear Exp. =	0.15	per site assessment
Site Wind Speed from Map (mph) =	12.3	from wind map	Weibull K =	2.00	assume k = 2
Map Wind Speed Height (m) =	50	from wind map	Turbulence Intensity =	15%	per site assessment
Recommended Tower Height (ft) =	100	per site assessment	System Derate =	2%	per site assessment
Site Altitude (ft) =	20	from topographical map	Total Derate =	17%	(sum of turbulence and system derate)

The column on the left is the data supplied to the Program Manager during the Pre-application process. The derate factors on the right are default factors that are generic for New Jersey. These values will only be changed based on inputs from a certified wind assessor or engineering firm. All these inputs combine to provide an expected production for the listed turbines, which is directly related to the EPBB rebate calculation.

Q. What information is given as an output to the applicant by the CORE program staff?

A. The following example is from an Entegrity Model EW 15 using the inputs from the table above. The areas highlighted in yellow are the estimated energy output, which is used as the basis for the rebate calculation.

SPECIFICATIONS	
Manufacturer	Entegrity
Model	EW 15
Rated Capacity (kW)	50.0
Output Voltage (V)	480-600
Phase	3
Rotor Diameter (ft)	49.0
Rotor Diameter (m)	14.9
Tower Height (ft)	100
Tower Height (m)	30

Total Structure Height AGL (ft)	125
Total Structure Height AGL (m)	38
PERFORMANCE	
Wind Speed at Hub Height (mph)	11.4
Annual Energy Output (kWh)	62,580
Monthly Energy Output (kWh)	5,215
Wind Percent of Facility Energy Use	1646.8%
Excess Energy Production (kWh/yr)	58,780

CORE program staff will be available to consult with you to interpret the results of the calculator.

Q. What should I be looking for when deciding if wind is right for me?

A. The following article from www.homepower.com "Site It Right!: An Interview with Wind Energy Consultant & Installer David Blecker" is a good place to start.