CROW LAKE WIND EMISSIONS REDUCTION PROJECT

ELEMENT MARKETS

Document Prepared By

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The Crow Lake Wind project site is located east of Chamberlain, South Dakota. The site contains 100 GE 1.5-megawatt turbines owned by PrairieWinds SD 1, Inc. (PWSD1) - a wholly-owned subsidiary of Basin Electric Power Cooperative (BEPC) - 7 turbines owned by South Dakota Wind Partners (SDWP), a South Dakota limited liability company, and one turbine owned by Mitchell Technical Institute (MTI). The output of all of the turbines at the Crow Lake Project site is ultimately purchased by BEPC pursuant to Purchase Power Agreements (PPAs) by and between each of the turbine owners listed above. The 108 turbines described above have an aggregate generating capacity of 162 megawatts (MW). Construction of the project started September 29, 2010. The commercial operation date of this project is February 1, 2011; and it has been in continuous operation to date.

In addition to purchasing the output of the turbines located on the Crow Lake project site, BEPC operates and controls the turbines pursuant to an Operation and Management Agreement with PWSD1. The wind turbines at the Crow Lake project site are interconnected to the Western Area Power Administration (WAPA) – Upper Great Plains East (UGPE) bulk transmission system ("Integrated System" or "IS"), which is located within the Midwest Reliability Organization (MRO) region. The turbines on the Crow Lake project site generate emissions reductions by delivering onto the bulk transmission system electricity generated by use of a renewable fuel source (wind).

This project was developed on a voluntary basis, and it was not required to meet any state renewable portfolio requirements. In addition, the monetization of the green attributes from this project was part of the justification of the economics of the project to BEPC as they have more cost effective alternatives to obtain energy from grid connected resources, absent the value of the green attributes.

The project achieved total net GHG emission reductions of 574,396 tCO_2e in the period from January 1 – December 31, 2014.

1.2 Sectoral Scope and Project Type

As a grid-connected renewable energy project, the project activity may be principally categorized under Sectoral Scope Number 1: Energy (renewable/non-renewable sources). Crow Lake Wind is a stand-alone project, and is not a grouped project.

1.3 Project Proponent

Organization name	Basin Electric Power Cooperative (parent company of PrairieWinds SD 1, Inc.)
Contact person	Zane Zuther
Title	Planning Analyst
Address	1717 East Interstate Avenue Bismarck, North Dakota 58503-0564
Telephone	701-557-5638
Email	zzzuther@bepc.com

Organization name	Basin Electric Power Cooperative (parent company of PrairieWinds SD 1, Inc.)
Contact person	David Raatz
Title	Manager of Marketing and Power Supply
Address	1717 East Interstate Avenue Bismarck, North Dakota 58503-0564
Telephone	701-223-0441
Email	draatz@bepc.com

Organization name	South Dakota Wind Partners
Contact person	Nick Sershen
Title	Project Coordinator
Address	5555 Wexford, Sioux Falls, SD 57106
Telephone	605-271-0578
Email	nick@val-addservice.com

Organization name	Mitchell Technical Institute
Contact person	Greg Von Wald
Title	President
Address	1800 E. Spruce St. Mitchell, SD 57301
Telephone	605-995-3022
Email	Greg.Vonwald@mitchelltech.edu

1.4 Other Entities Involved in the Project

Organization name	Element Markets, LLC
Role in the project	Consultant and authorized representative for BEPC
Contact person	Ken Nelson
Title	Authorized Agent
Address	3555 Timmons Lane, Ste 900 Houston, TX 77027
Telephone	281-207-7208
Email	knelson@elementmarkets.com

1.5 Project Start Date

The commercial operation date of the project is February 1, 2011.

1.6 Project Crediting Period

The project crediting period for the projects started on February 1, 2011, and will conclude January 31, 2021, for a total of 10 years. This verification covers the periods from January 1, 2014 – December 31, 2014.

1.7 Project Location

The Crow Lake Wind project is located across the span of Aurora, Jerauld and Brule counties, east of Chamberlain, South Dakota on a 36,000-acre plot of land at grid coordinates:

Latitude: 43.8°N Longitude: -98.8°.

Figure 1 Map of Project location

Figure 2 Image of Project

1.8 Title and Reference of Methodology

1.8.1 Title

ACM0002 - Consolidated baseline methodology for grid-connected electricity generation from renewable sources

1.8.2 Reference

http://cdm.unfccc.int/filestorage/V/A/1/VA17EM2PNDJWBTFY34KGRLZO68S9UQ/Consolidated%20baseline%20methodology%20for%20grid-connected%20electricity%20generation%20from%20renewable%20sources.pdf?t=NXV8bHVwdzh6fDAPldA2Htix3vUsiCteQTKR

1.8.3 Version

Version 12.1.0

1.8.4 Tools used

- Tool for the demonstration and assessment of additionality - version 5.2.1
- Tool to calculate the emission factor for an electricity system - version 2.2.0

1.9 Other Programs

The Crow Lake project site is currently listed in M-RETs (the Midwest Renewable Energy Tracking System), a third-party registry created to record the generation of renewable energy MWhs and renewable energy credits (RECs). A third party (WAPA) reports the number of MWhs generated each month to M-RETs, which assigns unique serial numbers for each MWh. For the creation of VCUs, the MWhs for which VCUs are being claimed will be retired in M-RETS and the reason for doing this (VCU creation) will be documented in M-RETS. The retirement of these credits and subsequent identification of the reason will ensure that those RECs will not be double sold, and that VCUs can be created with confidence.

No entity has applied for, or been denied acceptance under, any other GHG program with respect to the turbines located at the Crow Lakes project site.

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

Crow Lake Wind came online last year on February 1, 2011 and has experienced normal operations since then, until the period ending December 31st, 2014.

Western Area Power Administration occasionally requests facilities to derate or shutdown in order to check the over-supply of power into the grid. In order to comply with this request, the facility had to change the output capacities a few times which led to lower power generation. Additionally – in accordance with the information found in the Project Description – BEPC demonstrates continued efforts to minimize the project's avian impacts. Temporary shutdowns occurred in 2014 due to whooping cranes in the area. There was also one unscheduled outage due to an equipment issue. The underground cable failed in the feeder breaker cabinet where the connection to the underground cable and the buss bars connect, and generation from a portion of the project was curtailed for approximately twelve days. Other than these curtailments, no other unscheduled outages or events took place and the project operated normally.

The JemStar meter measures the amount of power generated on a continuous basis; data is aggregated hourly and is reported in a MV90 report with 8760 separate data points for the number of kWh generated each hour. The Western Area Power Administration (WAPA) reads this meter on a monthly basis and reports the number of megawatt hours (MWhs) generated to the Midwest Renewable Energy Tracking System (MRETS), which then issues Renewable Energy Credits (RECs) to the project's account. As noted in the project description, the project's registration in MRETS is being used for reporting purposes only – all certificates for which VCUs are being generated will be retired.

Per the project description, both the MV90 data and the corresponding MRETS generation records are being provided to corroborate the number of MWhs generated. Please note that at times, there can be a small difference between the value reported in the MV90 report and the value in MRETS. For the period January 1 thru December 31, 2014, the difference between the annual MRETS value and the MV90 value is extremely small 0.001%.

The small difference between the MV90 data and M-RETS occurs due to the way WAPA reads the meters for the projects. WAPA's standard procedure is to use the Stop meter reading and subtract the Start meter reading to come up with the monthly reading. This reading is then multiplied by the meter's multiplier to come up with monthly kWh. The Start and Stop times occur at midnight of the beginning of each month. The MV90 hourly data is a reading for each hour multiplied by the meter multiplier. Therefore when summing up the hourly meter reads and comparing to a start and stop time meter read a variance will occur to sampling.

As documented in the project description, the PWSD1 has a revenue grade meter installed at the Wessington Springs Interconnection point which measures the total amount of power delivered to the grid by the Crow Lake project. The JEMStar meter, Serial No. 10 21 13576, Model JS-09R6110-C3 was tested on 12/18/2014 and found to be operating in a satisfactory manner.

Deviations

2.1.1 Methodology Deviations

No methodology deviations were applied during this monitoring period.

No methodology deviations were applied during previous reporting periods.

2.1.2 Project Description Deviations

No project description deviations were applied during this monitoring period.

No project description deviations were applied during previous reporting periods.

2.2 Grouped Project

Crow Lake Wind is a stand-alone project, and is not a grouped project.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,CM,y}$
Data unit	Metric tons / MWhr
Description	The CO_2 emissions factor for the grid displaced due to the project activity, during the year y in metric tons CO_2/MWh, as calculated by the combined operating margin (CM), which is a weighted average of the Simple Operating Margin and Build Margin.
Source of data	Calculated based on Tool for calculating emissions intensity of the grid; Sources include EIA 923/860 databases, EIA fuel emissions factors
Value applied:	0.8422
Justification of choice of data or description of measurement methods and procedures applied	w1 * Simple OM + w2 * Build Margin, where w1 = 0.75, w2 = 0.25, Simple OM = 0.98542 and Build Margin = 0.4126. For detailed calculations see Section 3 of the Project Description.
Purpose of the data	Calculation of baseline emissions
Comments	The ex-ante option is chosen

Data Unit / Parameter:	$EF_{grid,OMsimple,y}$
Data unit:	Metric tons / MWh
Description:	Simple Operating Margin CO2 emissions factor in year y
Source of data:	Calculated based on Tool for calculating emissions intensity of the grid; Sources include EIA 923/860 databases, EIA fuel emissions factors
Value applied:	0.98542
Justification of choice of data or description of measurement methods and procedures applied	Calculated based in tool for calculating emissions intensity of the grid. For detailed calculations see Section 3 of the Project Description.
Purpose of Data	Calculation of baseline emissions
Any comment:	The ex-ante option is chosen

Data Unit / Parameter:	$EG_{m,y}$
Data unit:	MWh
Description:	Net quantity of electricity generated by power unit m in year y (m includes all power units except low cost must run power units)
Source of data:	EIA 923/860 databases
Value applied:	Varies by unit
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of Data:	Calculation of baseline emissions
Any comment:	N/A

Data Unit / Parameter:	For simple operating margin - $EF_{EL,m,y}$
Data unit:	Metric tons / MWh
Description:	CO2 emissions factor of power unit m in year y (tCO2 / MWh)
Source of data:	EIA 923/860 databases
Value applied:	Varies by unit
Justification of choice of data or description of measurement methods and procedures applied	Calculated using EIA 923 / EIA 860 databases and EIA Fuel emissions factors
Purpose of Data	Calculation of baseline emissions
Any comment:	N/A

Data Unit / Parameter:	$FC_{i,m,y}$ and $NCV_{i,y}$
Data unit:	MMBtus
Description:	Amount of fossil fuel type i consumed by power unit m in year y (mass or unit volume) and the Net Calorific Value (energy content) of fossil fuel type i in year y
Source of data:	EIA 923/860 databases and EIA Fuel Emissions Factors
Value applied:	Varies by unit
Justification of choice of data or description of measurement methods and procedures applied	The EIA 923 database provides the product of these two factors and provides the MMBtus consumed for electricity generation for each plant in the grid.
Purpose of Data	Calculation of baseline emissions
Any comment:	N/A

Data Unit / Parameter:	$EF_{CO2,i,y}$
Data unit:	Kg CO2e/MMBtu
Description:	CO2 emissions factor of fossil fuel type i in year y
Source of data:	EIA 923/860 databases and EIA Fuel Emissions Factors
Value applied:	Varies by fuel type
Justification of choice of data or description of measurement methods and procedures applied	EIA fuel emissions factors are default values that have been used to prepare GHG inventories.
Purpose of Data	Calculation of baseline emissions
Any comment:	N/A

Data Unit / Parameter:	$EF_{grid,BM,y}$
Data unit:	Metric Tons / MWh
Description:	CO2 emissions factor of fossil fuel type i in year y
Source of data:	Calculated using Option A2 for simple OM, but including all units as defined in the methodology. EIA 923/860 databases and EIA Fuel Emissions Factors
Value applied:	0.4126
Justification of choice of data or description of	For detailed calculations see Section 3 of the Project Description

measurement methods and procedures applied	
Purpose of Data	Calculation of baseline emissions
Any comment:	N/A

Data Unit / Parameter:	For Build Margin - $EF_{EL,m,y}$
Data unit:	Metric tons / MWh
Description:	CO2 emissions factor of power unit m in year y (tCO2 / MWh)
Source of data:	EIA 923/860 databases
Value applied:	Varies by unit
Justification of choice of data or description of measurement methods and procedures applied	Calculated using EIA 923 / EIA 860 databases and EIA Fuel emissions factors, based on Option A2 as described under the Simple OM found in Section 3 of the Project Description.
Purpose of Data	Calculation of baseline emissions
Any comment:	This factor uses the power generation efficiency factor and the CO2 emissions factor of fossil fuel type I in year y.

Data Unit / Parameter:	For Build Margin - $n_{m,y}$
Data unit:	MMBtus / MWh
Description:	Average net energy conversion efficiency of power unit m in year y
Source of data:	Default table, Annex 1
Value applied:	Varies by unit
Justification of choice of data or description of measurement methods and procedures applied	This is required by the Tool for the option chosen.
Purpose of Data	Calculation of baseline emissions
Any comment:	N/A

3.2 Data and Parameters Monitored

Data / Parameter	$EG_{facility,2014}$
Data unit	MWhs/yr
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWhs/yr)
Source of data	Project activity revenue meter at the site (JemStar Meter)
Description of measurement methods and procedures to be applied	Revenue grade meters record power generated on a continuous basis. Production is then aggregated at an hourly interval so that an 8760 hourly production shape is available for each year. Data monitoring takes place on a monthly basis, when WAPA reads the meters and submits data to the Midwest Renewable Energy Tracking System (MRETS). This monthly data from MRETS is what will be used to calculate the emissions reductions.
Frequency of monitoring/recording	Data Recording: Continuous Data Aggregation: Hourly Data Monitoring: Monthly
Value monitored:	$EG_{facility,2014}$ = 682,019 MWh
Monitoring equipment	The project operator has installed a JemStar revenue grade meter (Serial No. 10 21 13576, Model JS-09R6110-C3) metering device.
QA/QC procedures to be applied	Per the interconnection agreement and WAPA Metering Guidelines. This meter was tested on 12/18/2014
Purpose of the data	Calculation of baseline emissions
Calculation method	Meter readings
Comments	N/A

3.3 Monitoring Plan

3.3.1 Relationship of the parties involved

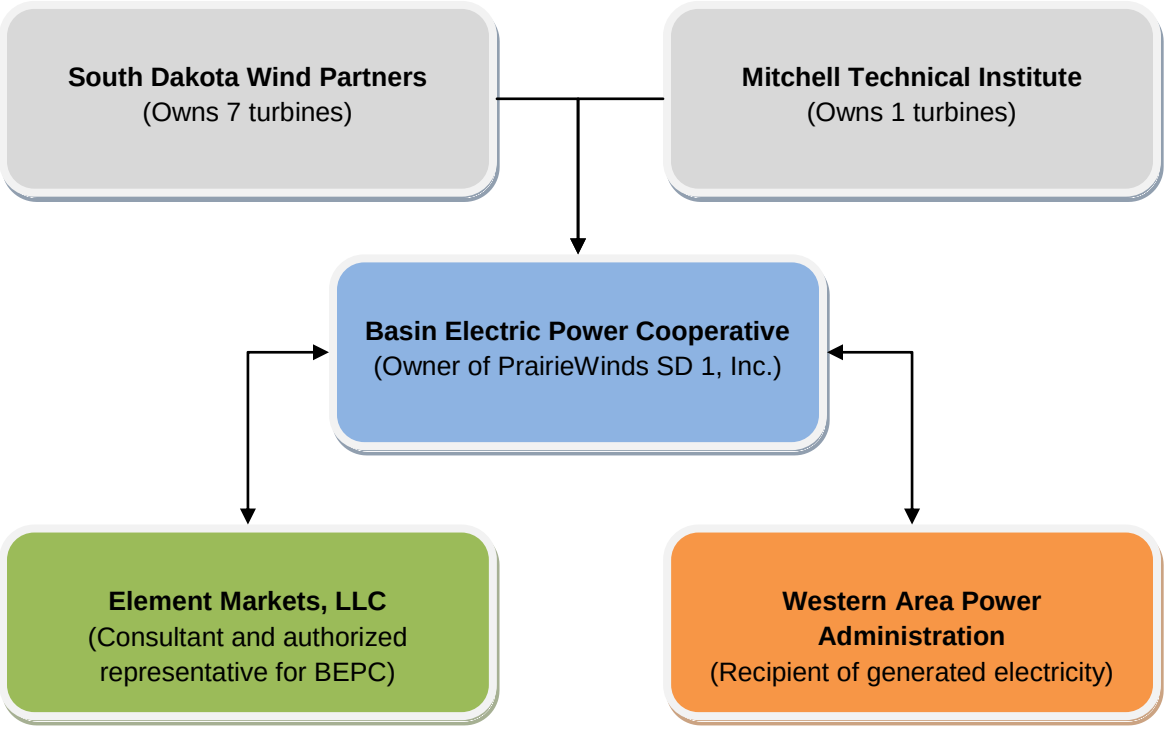

Figure 3 Relationship of parties involved in the project

Basin Electric Power Cooperative: Owner and operator of the project through its wholly owned subsidiary - PrairieWinds SD 1, Inc. The output of all of the turbines at the Crow Lake Project site is ultimately purchased by BEPC pursuant to Purchase Power Agreements (PPAs) by and between each of the turbine owners. In addition to purchasing the output of the turbines located on the Crow Lake project site, BEPC operates and controls the turbines pursuant to an Operation and Management Agreement with PWSD1.

South Dakota Wind Partners: A South Dakota limited liability company, owner of 7 turbines at the project site. The output of SDWP's turbines is purchased by BEPC.

Mitchell Technical Institute: MTI is the owner of 1 turbine at the project site. The output of MTI's turbine is purchased by BEPC.

Western Area Power Administration: Recipient of all electricity generated by the project. WAPA is taking monthly readings and reporting electricity generation in MRETS.

Element Markets, LLC: a renewable energy development and environmental credit marketing company based in Houston, Texas. Element Markets, LLC (Element Markets or EM) is the consultant and authorized representative for BEPC and is undertaking the verification and validation of the VCS project on behalf of BEPC.

For contact information of the parties involved in the project, see section 1.4 Other Entities Involved in the Project.

3.3.2 Data Monitoring

- A JEMStar Revenue grade meters record power generated on a continuous basis.
- Production is then aggregated at an hourly interval so that an 8,760 hourly production shape is available for each year.
- Data monitoring takes place on a monthly basis when WAPA reads the meters and submits data to the Midwest Renewable Energy Tracking System (M-RETS).
- This monthly data from M-RETS is what will be used to calculate the emissions reductions.
- Monitoring records will be retained for 12 years (two years past the project's crediting period of 10 years).

3.3.3 Metering Devices

- A JemStar revenue grade meter (Serial No. 10 21 13576, Model JS-09R6110-C3) generates the MV90 data; the meter is read by WAPA.
- Based on the Interconnection Agreement between PWSD1 and WAPA, and the WAPA Metering Guidelines, the meter was due to be tested in 2014. This meter test took place on 12/18/2014.

3.3.4 Extraordinary Events:

No extraordinary events or unscheduled major maintenance took place other than those cited in Section 2.1.

3.3.5 Retirement of RECs:

- As stated in the project description, since this project is registered in MRETS, renewable energy credits are being created for each MWhr generated. These credits have been retired.
- In addition, Basin has provided an attestation that these credits are not being used in any other GHG program.

3.3.6 Internal audit and handling of non-conformities

- All data used for establishing and verifying GHG emission reductions and removals is collected and processed by Element Markets with the help of other project proponents.
- Data collection and processing is based on EM's internal QA/QC procedures which include preapproved data and documentation checklists as well as emission reduction calculation methodology.
- All verification data submittal is performed under the supervision of EM's senior management. Any errors or non-conformities discovered during internal audits or by third party verifiers are addressed in cooperation with the project proponents by EM's operations team.

- The final step of non-conformance resolution is review and (if needed) update of the appropriate sections of the QA/QC procedures.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

The total MWhs generated (as reported in MRETS) for the period January 1, 2014 thru December 31, 2014 are: 682,019 MWhs.

The Baseline Emissions are calculated by multiplying the MWhs utilized, by the combined margin (EFgrid,CM,y), which is 0.8422 metric tons CO2e / MWh.

Hence the Baseline Emissions are:

682,019 MWhs * 0.8422 metric tons / MWh = 574,396 metric tons.

4.2 Project Emissions

Per the methodology ACM0002, project emissions from this project are zero. Per the methodology, we do not consider project emissions because this is not a geothermal, solar thermal, or hydro project.

4.3 Leakage

Per ACM0002, no leakage is considered.

4.4 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2014	574,396	-	-	574,396
Total	**574,396**	**-**	**-**	**574,396**