

READING WIND ENERGY, LLC



Document Prepared By Southern Power Company

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1 PROJECT DETAILS

1.1 Summary Description of the Project

Reading Wind Energy, LLC (Project or Project Activity) consists of the installation of 62 new (greenfield) wind power turbines on approximately 20,000 acres of land leased by the Project Proponent near Reading in Lyon and Osage Counties, Kansas, USA. The wind turbines will consist of the following technologies, totalling a nameplate capacity of over 200 megawatts (MW):

- 14 x Siemens SWT-2.415-108 @ 80m HH turbines, 2.415 MW capacity each; and
- 48 x Gamesa G132 @ 101.5 HH turbines, 3.465 MW capacity each.

The Project Activity will generate greenhouse gas (GHG) emission reductions through the displacement of grid-connected fossil fuel-powered electricity generation by wind-powered electricity generation supplied by the turbines and delivered to the Southwest Power Pool (SPP) electricity grid system.

The Project is quantified and will be monitored according to the United Nations Framework Convention on Climate Change (UNFCCC) Clean Development Mechanism (CDM) methodology “Grid-connected electricity generation from renewable sources, Version 17.0” and falls under CDM/VCS Sectoral Scope 1, Energy industries (renewable/ non-renewable sources).

Consistent with the methodology, the baseline scenario prior to Project implementation is grid-connected electricity generated by fossil fuel power plants. The Project will generate an estimated annual average of 512,840 tonnes carbon dioxide equivalent (CO₂e) in GHG emission reductions, totalling 5,128,398 tonnes CO₂e over the 10-year crediting period.

1.2 Sectoral Scope and Project Type

The Project falls under the following CDM/VCS Sectoral Scope:

- 1. Energy industries (Renewable / non-renewable sources)

The Project has a nameplate capacity of greater than 15 megawatts (MW) and accordingly will use the following CDM large-scale quantification methodology:

- ACM0002 – Large-scale Consolidated Methodology: Grid-connected electricity generation from renewable sources, version 18.1, April 26, 2018 (CDM Methodology)

The Project is not grouped.

1.3 Project Proponent

Project Proponent details are as follows:

1.4 Other Entities Involved in the Project

1.5 Project Start Date

1.6 Project Crediting Period

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

The Project Activity is over the annual 300,000 tCO₂e threshold for large project scale, per the VCS Standard. **Table 1.1** which presents the estimated GHG emission reductions over the 10-year crediting period.

Project Scale	
Project	
Large project	X

Table 1.1 Estimated GHG Emission Reductions

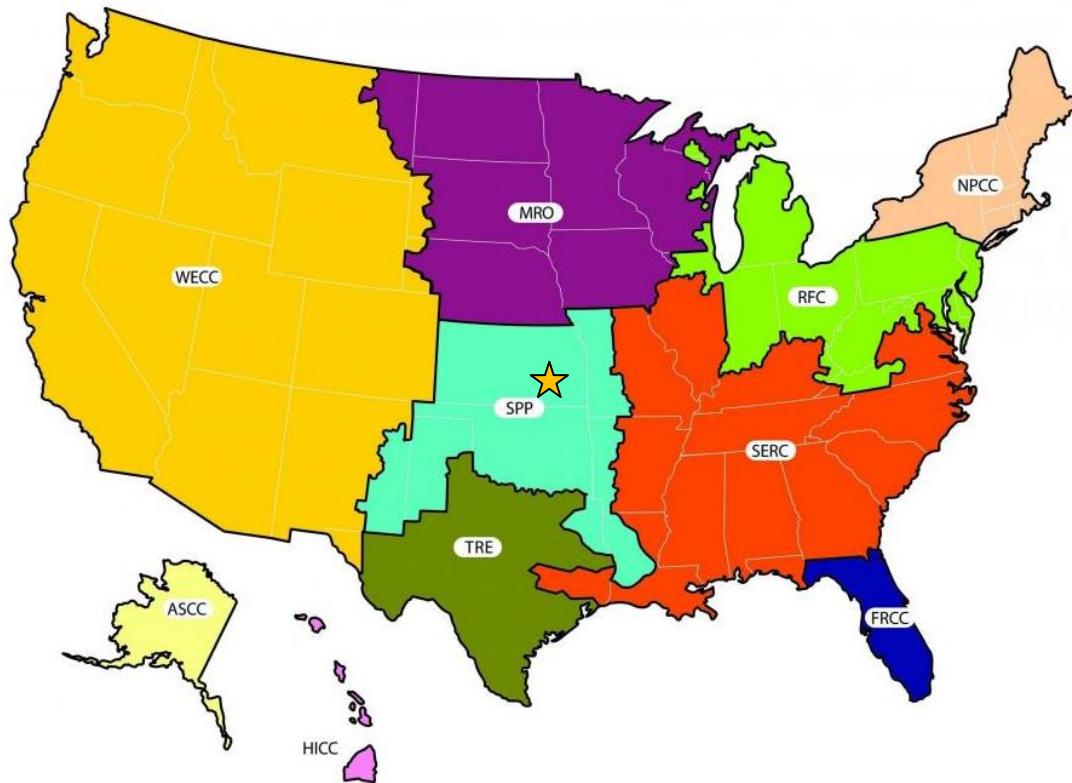
Year	Estimated GHG emission reductions or removals (tCO ₂ e)
2019 (Dec. 31)	1,405
2020	512,840
2021	512,840
2022	512,840
2023	512,840
2024	512,840
2025	512,840
2026	512,840
2027	512,840
2028	512,840
2029 (Jan. 1 – Dec. 30)	511,435
Total estimated ERs	5,128,398
Total number of crediting years	10
Average annual ERs	512,840

1.8 Description of the Project Activity

The Project Activity consists of the installation of 62 new (greenfield) wind power turbines on approximately 20,000 acres of land leased by the Project Proponent near Reading in Lyon and Osage Counties, Kansas, USA. The wind turbines will consist of the following technologies, totalling a nameplate capacity of 200.13 MW:

- 14 x Siemens SWT-2.415-108 @ 80m HH turbines, 2.415 MW, 30-year useful life; and
- 48 x Gamesa G132 @ 101.5m HH turbines, 3.465 MW, 30-year useful life.

The layout of the turbines on the Project site is provided in **Section 1.9**. The net capacity factor (NCF) is estimated to be 43.2%, with over 757,540 MWh per year in net power production forecast. A main substation meter and check meter at the point of interconnection to the SPP Grid, for all turbines will track net electricity delivered to grid, with centralized data storage and remote monitoring on the Project Proponents secure servers. The substation is located northeast of the City of Emporia, KS (Gaston, 2016). The Project supplies the SPP electricity grid, as shown in **Figure 1.1** below (EPA, 2015).



This is a representational map; many of the boundaries shown on this map are approximate because they are based on companies, not on strictly geographical boundaries.
September 2015

Figure 1.1 Project Location and Electricity Grid System

1.9 Project Location

The Project is located near Reading in Lyon and Osage Counties, Kansas, USA on parcels totalling approximately 20,000 acres. Approximately 25% of the planned turbine layout is in Osage County, with the remainder in Lyon County (Gaston, 2016). Coordinates of the individual turbines are presented in **Table 1.2** below.

Table 1.2 Project Activity Location Details

Turbine	UTM14 NAD27 Coordinates		Diameter (m)
	Easting	Northing	
S1	753650.00	4265198.00	80
S2	753918.00	4265465.00	80
S3	754288.00	4265521.00	80
S4	754925.00	4266749.00	80
S5	755286.00	4266635.00	80

Turbine	UTM14 NAD27 Coordinates		Diameter (m)
	Easting	Northing	
S6	755593.00	4266411.00	80
S7	753369.00	4264959.00	80
S8	754271.51	4266315.20	80
S9	756641.80	4265649.24	80
S10	755856.00	4266222.00	80
S11	755032.00	4264813.00	80
S12	755390.00	4264644.00	80
S13	757058.00	4265639.00	80
S14	757660.00	4265691.00	80
T11	756756.00	4268887.00	101.5
T12	757192.00	4268900.00	101.5
T13	758123.00	4269510.00	101.5
T15	758328.00	4266296.00	101.5
T16	758843.00	4266304.00	101.5
T17	758709.50	4264975.58	101.5
T18	759148.00	4264900.00	101.5
T19	759991.00	4267150.00	101.5
T20	760501.00	4267345.00	101.5
T21	761911.00	4265214.00	101.5
T22	762480.00	4265243.00	101.5
T23	763087.00	4265286.00	101.5
T24	763664.00	4265254.00	101.5
T25	760248.34	4264040.00	101.5
T26	760893.23	4263584.91	101.5
T27	761706.00	4263423.00	101.5
T28	762162.00	4263482.00	101.5
T29	763511.00	4263362.00	101.5
T30	763831.00	4263657.00	101.5
T31	764913.00	4264273.00	101.5
T32	759019.48	4262316.24	101.5
T33	759370.54	4262133.01	101.5
T34	760386.00	4261944.00	101.5
T35	761835.81	4261821.62	101.5
T36	762180.33	4262019.13	101.5

Turbine	UTM14 NAD27 Coordinates		Diameter (m)
	Easting	Northing	
T37	762607.52	4261932.00	101.5
T38	764785.73	4262084.49	101.5
T39	765247.00	4262477.00	101.5
T40	765750.00	4262482.00	101.5
T41	766658.31	4261819.91	101.5
T42	767028.00	4262019.00	101.5
T43	768045.00	4261984.00	101.5
T44	768458.00	4261846.00	101.5
T45	769061.00	4261900.00	101.5
T46	765674.00	4260268.00	101.5
T47	766627.03	4259465.64	101.5
T48	767075.93	4259538.36	101.5
T49	767442.00	4260167.00	101.5
T50	761562.74	4261532.82	101.5
T51	767421.98	4262222.69	101.5
T52	761913.20	4268259.23	101.5
T53	757211.93	4264064.35	101.5
T55	757611.69	4264068.91	101.5
T56	758288.00	4264691.00	101.5
T58	761475.35	4268301.80	101.5
T59	764885.00	4259455.00	101.5
T60	764257.72	4259382.76	101.5
T61	761646.00	4264774.00	101.5

1.10 Conditions Prior to Project Initiation

The conditions prior to Project initiation are consistent with the baseline scenario, as described in detail in **Section 2.4** and consist of fossil fuel power plants generating electricity in the SPP grid.

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

The Project Proponent received Conditional Use Permits from Lyon and Osage Counties for the Project on December 29, 2016 and December 16, 2016, respectively. The permits allow for construction activities to move forward. There are no statutes or regulations in the state of Kansas or at the federal level mandating the generation of electricity by wind power. Additional regulatory compliance considerations for the Project include:

- The Kansas Renewable Energy Standard (RES) is a voluntary program with a goal of 20% of peak utility demand in the state being generated from renewable sources by 2020, including from wind power;
- The Project location and turbine layout was developed in accordance with the federal Endangered Species and Migratory Bird Treaty Acts;
- The leased area for the Project is not on public lands under the management of the Bureau of Land Management or near US military operations;
- The Project has undergone third party environmental and wind studies to support compliance with Kansas Department of Wildlife, Parks and Tourism (KDWPT) requirements; and
- The Project has undergone third party interconnection and wind studies to confirm that the rated capacity can be generated and accommodated in the SPP grid.

1.12 Ownership and Other Programs

1.12.1 Project Ownership

The Project Proponent of the Project Activity, Southern Power Company, holds the Right of Use of the Project Activity consistent with Clause (3) of Section 3.11.1 of the VCS Standard, v3.7. Southern Power Company has full ownership of the wind power plant, equipment, and systems that generate the GHG emission reductions, and has not been divested of such ownership.

1.12.2 Emissions Trading Programs and Other Binding Limits

There are no local, state, or federal emissions trading programs or other regulatory binding requirements for the Project or wind power generation in the United States.

1.12.3 Other Forms of Environmental Credit

The Project has not sought or received any other form of GHG environmental credits. The Project Activity, as a result of supplying renewable energy to the SPP grid, would be eligible for Renewable Energy Certificate (REC) issuances. However, the Power Purchase Agreement (PPA) for the Project has a stated clear objective to generate verified emission reduction credits (VERs) instead of RECs, and The Project Proponent will not issue RECs while applying for issuance of VERs for the same instances of power generation, as this would result in double counting. Consistent with the VCS Standard, the Project Proponent will track all instances of power generation and only issue either VERs or RECs in accordance with the VCS Registration and Issuance Process. RECs in the state of Kansas are tracked by the North American Renewables Registry (NAR), consistent with the Kansas Renewable Energy Standard.

1.12.4 Participation under Other GHG Programs

The Project has not been registered, and is not seeking registration under any other GHG programs.

1.12.5 Projects Rejected by Other GHG Programs

The Project has not been rejected by any other GHG programs.

1.13 Additional Information Relevant to the Project

Eligibility Criteria

The Project is not a grouped project.

Leakage Management

There is no leakage for the Project.

Commercially Sensitive Information

Commercially sensitive information provided under separate cover is identified in **Appendix A**.

Sustainable Development

The Project does not contribute to achieving any specific sustainable development priorities at the national level.

Further Information

No further information.

2 APPLICATION OF METHODOLOGY

2.1 Title and Reference of Methodology

The following methodology and methodological tools are applied to the Project:

- UNFCCC CDM large-scale consolidated methodology ACM0002: Grid-connected electricity generation from renewable sources, Version 18.1, April 26, 2018 (CDM Methodology);
- UNFCCC CDM methodological tool: Tool to calculate the emission factor for an electricity system, Version 06.0 (CDM EF Tool);

- UNFCCC CDM methodological tool: Tool for the demonstration and assessment of additionality, Version 07.0 (CDM Additionality Tool); and
- UNFCCC CDM Guidelines on the assessment of investment analysis, Version 05 (CDM Investment Analysis Guidelines).

2.2 Applicability of Methodology

The Project Activity meets the applicability conditions of the CDM Methodology as follows:

- The Project Activity consists of grid-connected renewable energy power generation from a greenfield wind power plant supplying electricity to a regional grid;
- The Project Activity is located on a site where there was no previous renewable power plant prior to the implementation of the Project;
- The Project Activity is not a capacity addition, retrofit, rehabilitation, or replacement to an existing grid-connected power plant;
- The Project Activity does not involve fuel switching at the site of the Project Activity or biomass-fired power plants; and
- The Project Activity electricity system does not include off-grid power plants.

2.3 Project Boundary

The relevant GHG sources, sinks and reservoirs for the baseline scenario are presented in **Table 2.1** below. Consistent with the CDM Methodology, there are no project emissions for the project type. There is no leakage (**Section 3.3**).

Table 2.1 Project Activity GHG Sources, Sinks, Reservoirs

Source		Gas	Included?	Justification/Explanation
Baseline	CO ₂ emissions from electricity generation in fossil fuel-fired power plants that are displaced due to the Project Activity	CO ₂	Yes	Main emission source
		CH ₄	No	Minor emission source
		N ₂ O	No	Minor emission source
		Other	No	No other associated emissions

The Project boundary consists of the 62 wind turbines on-site, as identified in **Section 1.8** above. Coordinates of the individual turbines and electricity meter(s) were identified in **Section 1.9** above. **Figure 1.1** presents the location of the Project within the SPP electricity grid and the state of Kansas. **Figure 2.1** presents the project boundary in relation to the town of Reading, Kansas, while **Figure D.1** presents the detailed layout of turbines, electrical connections and other system

components. Equipment specifications of the wind turbines and meters have been presented in **Section 1.8** above.

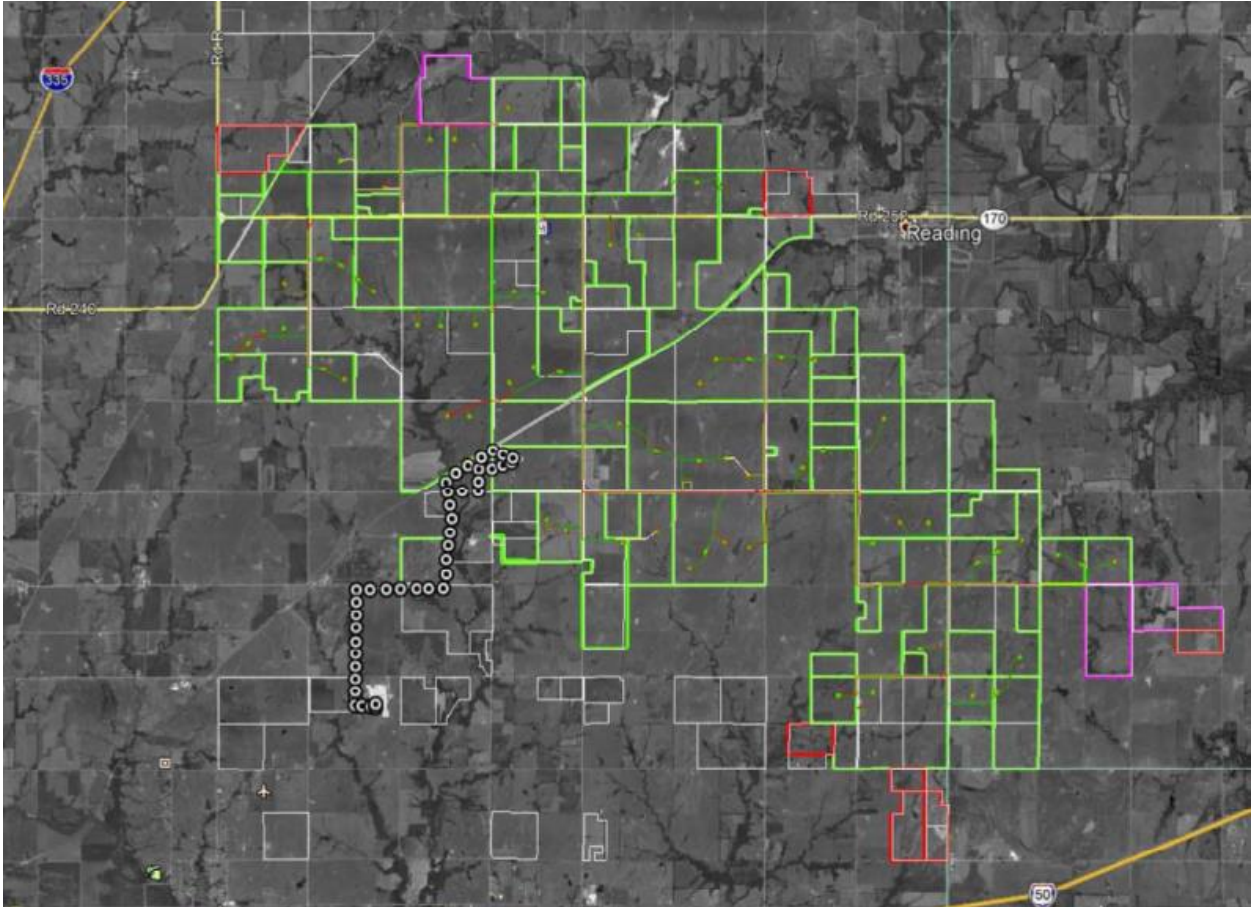


Figure 2.1 Project Boundary and Turbine Location Map

The applicable geographical area, consistent with the CDM Additionality Tool, is defined as the SPP electricity system for additionality assessment and emission factor calculation. Environmental and regulatory compliance were evaluated at the federal, state, and local jurisdictional level, extending the review beyond the SPP grid for conservativeness.

2.4 Baseline Scenario

The Project Activity is the installation of a greenfield wind power plant, and the baseline scenario is electricity delivered to the grid by the Project Activity that would have otherwise been generated by the operation of grid-connected fossil fuel-fired power plants and by the addition of new generation sources. This generation mix in the baseline is reflected in the combined margin (CM) calculations for the project emission factor, based on the EF Tool.

2.5 Additionality

Additionality of the Project Activity is demonstrated and assessed using Steps one through four of the CDM Additionality Tool, as detailed in **Appendix B**.

2.6 Methodology Deviations

There are no deviations proposed for the CDM Methodology selected.

3 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

3.1 Baseline Emissions

Baseline emissions include only CO₂ emissions from electricity generation in fossil fuel-fired power plants that are displaced due to the Project Activity. The CDM Methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

$$BE_y = EG_{PJ,y} \cdot EF_{grid,CM,y}$$

Where:

BE_y	Baseline emissions in year y (tCO ₂ / y)
$EG_{PJ,y}$	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh / y)
$EF_{grid,CM,y}$	Ex ante combined margin CO ₂ emission factor for grid connected power generation in year y calculated using the CDM EF Tool (MWh / y)

Calculation of $EG_{PJ,y}$

The Project is a greenfield wind power plant, and the quantity of net electricity generation, $EG_{PJ,y}$, is calculated as follows:

$$EG_{PJ,y} = EG_{facility,y}$$

Where:

$EG_{PJ,y}$	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh / y)
-------------	--

$$EG_{\text{facility},y} = \text{Quantity of net electricity generation supplied by the project plant/unit to the grid in year } y \text{ (MWh / y)}$$

Calculation of $EF_{\text{grid,CM},y}$

The grid emission factor ($EF_{\text{grid,CM},y}$) is calculated through a step-wise approach, according to the CDM EF Tool, Version 06.0, as further detailed in **Appendix C**.

Calculation of Baseline Emissions

The baseline emissions in year y are thus calculated as follows:

$$BE_y = EG_{PJ,y} \cdot EF_{\text{grid,CM},y}$$

$$BE_y = 757,540 \text{ MWh} \cdot 0.677 \text{ tCO}_2/\text{MWh} = 512,840 \text{ tCO}_2\text{e}$$

3.2 Project Emissions

For the wind energy power generation Project Activity:

$$PE_y = 0$$

3.3 Leakage

Leakage emissions are not considered per the CDM Methodology. Emissions associated with power plant construction and upstream emissions from fossil fuel use (such as extraction, processing and transport) are not considered. The Project is a greenfield facility and all equipment is new.

3.4 Net GHG Emission Reductions and Removals

Net emission reductions are calculated as follows:

$$ER_y = BE_y$$

Table 3.1 below presents the ex-ante calculation of baseline emissions/removals and net GHG emission reductions for the crediting period.

Table 3.1 Net GHG Emission Reductions

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
------	---	--	--	--

2019 (Dec. 31)	1,405	---	---	1,405
2020	512,840	---	---	512,840
2021	512,840	---	---	512,840
2022	512,840	---	---	512,840
2023	512,840	---	---	512,840
2024	512,840	---	---	512,840
2025	512,840	---	---	512,840
2026	512,840	---	---	512,840
2027	512,840	---	---	512,840
2028	512,840	---	---	512,840
2029 (Jan. 1 – Dec. 30)	511,435	---	---	511,435
Total	5,128,398	---	---	5,128,398

4 MONITORING

4.1 Data and Parameters Available at Validation

The tables below detail the data and parameters determined or available at validation and remain fixed throughout the Project crediting period.

Data / parameter	$FC_{i,m,y}$
Data unit	MMBtu
Description	Quantity of fuel type <i>i</i> consumed by power plant <i>m</i> in year <i>y</i> .
Source of data	United States Energy Information Administration (EIA) 860 and 923 datasets, 2012-2016 (EIA, 2017) (EIA, 2018).
Value applied	Varies by power plant.
Justification of choice of data or description of measurement methods and procedures applied	Published values from the EIA dataset.
Purpose of data	Calculation of the emission factor for all plants in the Project electricity system.
Comments	---

Data / parameter	$EF_{i,m,y}$
Data unit	kg CO ₂ / MMBtu
Description	CO ₂ emission factor for fuel type <i>i</i> consumed by power plant <i>m</i> in year <i>y</i> .

Source of data	EIA and United States Environmental Protection Agency (EPA) published emission factors as detailed in Appendix C (EIA, 2016) (EPA, 2014) (EPA, 2009).
Value applied	Varies by fuel type.
Justification of choice of data or description of measurement methods and procedures applied	Published values from the EIA and EPA datasets, by fuel type.
Purpose of data	Calculation of the emission factor for all plants in the Project electricity system.
Comments	---

Data / parameter	EG _{m,y}
Data unit	MWh
Description	Net quantity of electricity generated by power plant m in year y.
Source of data	EIA 860 and 923 datasets, 2012-2016 (EIA, 2017) (EIA, 2018).
Value applied	Varies by power plant.
Justification of choice of data or description of measurement methods and procedures applied	Calculated according to the CDM EF Tool, as demonstrated in Appendix C .
Purpose of data	Calculation of the operating and build margin emission factors for project electricity system.
Comments	---

Data / parameter	EF _{grid,OM}
Data unit	tCO ₂ / MWh
Description	Simple operating margin CO ₂ emission factor, calculated ex ante for the Project crediting period.
Source of data	EIA 860 and 923 datasets, 2012-2016 (EIA, 2017) (EIA, 2018).
Value applied	0.852
Justification of choice of data or description of measurement methods and procedures applied	Calculated according to the CDM EF Tool, as demonstrated in Section 3.1 and Appendix C .
Purpose of data	Calculation of the combined margin emission factor for the Project electricity system.
Comments	---

Data / parameter	EF _{grid,BM}
Data unit	tCO ₂ / MWh
Description	Build margin CO ₂ emission factor, calculated ex ante for

	the Project crediting period.
Source of data	EIA 860 and 923 datasets, 2012-2016 (EIA, 2017) (EIA, 2018).
Value applied	0.151
Justification of choice of data or description of measurement methods and procedures applied	Calculated according to the CDM EF Tool, as demonstrated in Section 3.1 and Appendix C .
Purpose of data	Calculation of the combined margin emission factor for the Project electricity system.
Comments	---

Data / parameter	W_{OM}
Data unit	%
Description	Weighting of build margin CO ₂ emission factor.
Source of data	CDM EF Tool.
Value applied	0.75
Justification of choice of data or description of measurement methods and procedures applied	Default value for wind power projects in the CDM EF Tool.
Purpose of data	Calculation of the combined margin emission factor for the Project electricity system.
Comments	---

Data / parameter	W_{BM}
Data unit	%
Description	Weighting of build margin CO ₂ emission factor.
Source of data	CDM EF Tool.
Value applied	0.25
Justification of choice of data or description of measurement methods and procedures applied	Default value for wind power projects in the CDM EF Tool.
Purpose of data	Calculation of the combined margin emission factor for the Project electricity system.
Comments	---

Data / parameter	$EF_{grid,CM,y}$
Data unit	tCO ₂ / MWh
Description	Combined margin CO ₂ emission factor in year y, calculated ex ante for the Project crediting period.
Source of data	EIA 860 and 923 datasets, 2012-2016 (EIA, 2017) (EIA, 2018).

Value applied	0.677
Justification of choice of data or description of measurement methods and procedures applied	Calculated according to the CDM EF Tool, as demonstrated in Section 3.1 and Appendix C .
Purpose of data	Calculation of the baseline GHG emission reductions representing the Project Activity emission reductions.
Comments	---

4.2 Data and Parameters Monitored

The tables below detail the data and parameters monitored during the Project crediting period.

Data / parameter	$EG_{\text{facility},y}$
Data unit	MWh / y
Description	Total electricity produced by the Project Activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y.
Source of data	Project Activity site
Description of measurement methods and procedures to be applied	The revenue quality and check meters and the turbine SCADA system will continuously monitor net electricity generation and log data on a frequency of every 15 minutes. Periodic data downloads by the Project Proponent will be securely stored on their servers. Metering shall be in accordance with the executed Generation Interconnection Agreement and SPP Integrated Marketplace protocols guidelines for accuracy. Under the GIA Transmission Owner shall install, calibrate, and test revenue quality Metering Equipment in accordance with applicable ANSI standards.
Frequency of monitoring/recording	Continuous measurement and recording every 15 minutes.
Value applied	For calculated ex-ante GHG emission reductions, the annual net electricity generation is 757,540 MWh / y.
Monitoring equipment	The Project Description (PD) and Monitoring Plan will be revised with detailed meter equipment specifications during procurement. The main revenue metering for all turbines will conform to the SPP interconnection standards outlined above.
QA/QC procedures to be applied	The Project Proponent will store the factory calibration certificate of the revenue meter in a secure location. Calibrations will be conducted in accordance with the schedule stipulated in the PPA and the manufacturer recommended schedule, whichever occurs more frequently. The revenue quality and check meters will be field inspected for accuracy drift at a frequency consistent with the PPA. Any accuracy drift observed during routine operations and maintenance or field checks will be managed according to the PPA. Qualified personnel, either from the Project Proponent or through third party organization, will perform all routine

	meter maintenance checks and calibrations on the Project site.
Purpose of data	Calculation of the baseline GHG emission reductions representing the Project Activity emission reductions.
Calculation method	Not applicable; direct measurement.
Comments	---

4.3 Monitoring Plan

The following Monitoring Plan (**Table 4.1**) details the process and schedule for obtaining, recording, compiling, and analysing the monitored data and parameters set out in **Sections 4.1** and **Section 4.2** above.

Table 4.1 Monitoring Plan

Component	Details
Methods for measuring, recording, storing, aggregating, collating and reporting data and parameters.	Monitoring methods for the main revenue meter is detailed in Section 4.2. All data will be stored on the Project Proponent's secured and backed-up servers for a minimum of two years following the end of the first crediting period (12 years from the start date). The Project Proponent will invoice SPP for the generation from the check meter and SPP will provide payment records to the Project Proponent, indicating data reconciliation and acceptance. Monitored data and GHG emission reduction calculations will be compiled at least annually to support third party verification.
Calibration of monitoring equipment	Calibration of the main revenue meter is detailed in Section 4.2 .
Organizational structure, responsibilities, and competencies of personnel carrying out monitoring activities.	The Project Proponent is responsible for the ongoing operation of the turbine systems, while the turbine supplier is responsible for ongoing maintenance and regular servicing of the turbine components per the Turbine Supply Agreement (TSA) with the Project Proponent. The Project Proponent is responsible for the operation, maintenance, and regular calibration of the electricity revenue meter. A qualified person within the Project Proponent's organization, or certified third party service, will be used to perform all required calibrations in accordance with the manufacturer recommendations. All data will be received, stored, and monitored by the Project Proponent. The person(s) identified in this document will act on behalf of the Project Proponent to carry out the duties described herein.
Policies for oversight and accountability of monitoring activities.	The Project Proponent's contact identified in this document is accountable for monitoring activities and project oversight.
Procedures for internal auditing, quality assurance and quality control (QA/QC) and handling non-conformances with the validated monitoring plan.	The GHG emission reductions will undergo third party verification on an annual basis. Internally, the Project Proponent will conduct quarterly or annual reviews of monitoring data and GHG emission reduction calculations to ensure compliance with the validated project plan. Periods of non-conformance with the validated monitoring plan will be removed from emission reduction calculations in accordance with the VCS Program Guide.
Sampling approaches, sizes, locations, frequencies, and QA/QC procedures.	All monitored data will be collected and stored by the Project Proponent in their offices consistent with the VCS requirements for data storage and retention. Data monitoring frequencies and QA/QC procedures are detailed in Section 4.2 and Section 4.3 above.

5 SAFEGUARDS

5.1 No Net Harm

The Project Proponent did not identify any negative environmental or socio-economic impacts in the development of the Project. The Project area is mostly privately owned and sparsely populated agricultural and ranch lands, which are well-suited to wind power development. Tree cover is sparse through the Project areas.

A Phase I and II Cultural Resources Survey was completed for the area in March 2018 by Chambers Group, Inc. to inventory cultural resources found in the land of the Project site. The Project is located exclusively on private land, and as such, the requirements of the National Historic Preservation Act (NHPA) were not triggered. The consultants identified a historic bridge from 1925 but no other historical cultural resources on-site during physical surveys. The bridge was not considered a historic resource under the NHPA and will not be impacted during the Project.

5.2 Environmental Impact

The Project Proponents commissioned a third-party Biological Site Characterization Study in November 2009 and a Grassland Habitat Assessment in November 2015, both conducted by West, Inc. Beyond the Conditional Use Permits approved by Lyon and Osage Counties, no other regulatory studies were required, and the outcomes of the studies were communicated to the KDWPT. The main findings of the environmental studies include (West, Inc., 2009):

- The Project is outside of the 100 mile whooping crane migration corridor;
- Stopover habitat for migrating birds is limited in the Project area;
- Trees and transmission lines in Project area to provide nesting habitat for raptors;
- The land area within the site is not unique in feature and will likely not attract or concentrate bird or bat species in greater abundance than surrounding areas; and
- Additional follow up with KDWPT recommended, which is ongoing.

5.3 Local Stakeholder Consultation

In applying for Conditional Use Permits from Lyon and Osage Counties, the Project Proponent notified the public of the proposed Project and provided opportunity for public comment and engagement. County authorities heard from the Project Proponent through action sessions dated June 2, 2016 (Robinson, 2016) and October 26, 2017 (Brooks, 2017), and Conditional Use Permits were granted on December 29, 2016 for Lyon County and December 19, 2016 for Osage County. **Table 5.1** summarizes the procedures for and results of local stakeholder consultation.

Table 5.1 Local Stakeholder Consultation Results

Procedure	Action
Procedures and methods used for engaging local stakeholders.	The Project Proponent engaged county authorities in staff and commission meetings, which were open to the public. Additionally, local stakeholders are engaged through the public comment period of the validation process.
Procedures and methods for documenting outcomes of local stakeholder consultation.	The Project Proponent documented all meetings with county officials and the public and maintains these records in secure storage.
Mechanism for on-going communication with local stakeholders.	Public comment period and posting of documents on VCS portal throughout the Project.
Response received during consultation.	Any concerns or issues raised during consultation with the counties and public regarding the overall nature of the Project were considered and addressed (Brooks, 2017).
Updates to project design and layout made.	There were no concerns regarding the Project design and layout.

5.4 Public Comments

Refer to **Section 5.3** above. No additional feedback was received during the VCS public comment period. Any future comments with public posting of the PD will be incorporated.

6 REFERENCES

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APPENDIX A: ADDITIONAL DOCUMENTATION PROVIDED**Table A.1 Additional Documentation Provided**

File Name	Description	Date	Reference / Author	Confidential
Reading Wind 200.1MW- 10 xSWT108 2.415MW....xls	Electricity generation survey results 2016-2017	Mar. 2018	RES Group, Inc.	Yes
SGRE Proposal – Reading.pdf	Turbine supply pricing	Sep. 22, 2017	Southern Power Company	Yes
PUSAwof212_UTM14 -NAD27 Meters.csv	Turbine location coordinates	Mar. 2018	Southern Power Company	Yes
SPC-Siemens-Form of TSA (FINAL).docx	Form of Wind Turbine Generator and Tower Supply and Commissioning Agreement	Mar. 2018	Siemens Wind Power, Inc.	Yes
SPC-Siemens – Template SMA (Final).docx	Form of Service and Maintenance Agreement	Mar. 2018	Siemens Wind Power, Inc.	Yes
161229 Reading CUP Lyon County – Executed.pdf	Conditional Use Permit from Lyon County	Dec. 29, 2016	Lyon County	No
161229 Reading CUP Osage County – Executed.pdf	Conditional Use Permit from Osage County	Dec. 19, 2016	Osage County	No
KDWP Re_Reading project reports and presentation from 8_16_16 meeting.pdf	Correspondence with Kansas Department of Wildlife, Parks, and Tourism	Oct. 7, 2016	KDWPT	No
Final_Reading_SCS_ 11609.pdf	Biological Site Characterization Study for the Reading Wind Resources for Lyon and Osage Counties, Kansas	Nov. 16, 2009	Western EcoSystems Technology, Inc.	Yes
Update on Raptor Nest Surveys at Reading email 160311 w map.pdf	Correspondence with Kansas Department of Wildlife, Parks, and Tourism	Mar. 11, 2016	WEST, Inc.	No
21056 Reading Wind Energy Cultural Report clean.pdf	Phase I and II Cultural Resources Survey of Reading Wind Energy, LLC project	Mar. 2018	Chambers Group, Inc.	No
Reading_Grassland_ Assessment_Memo_1 2Nov2015.pdf	Summary of 2015 Grassland Habitat Assessment of the Proposed Reading Wind Farm	Nov. 12, 2015	WEST, Inc.	No

File Name	Description	Date	Reference / Author	Confidential
Reading_AvianUseStations_20160105_location_map.pdf	Avian Use Stations Location Map	May 1, 2016	WEST, Inc.	No
Reading Prairie Chicken Leaks and Raptor Nests 20160518 WEST w map.pdf	Prairie Chicken Status Map	May 18, 2016	WEST, Inc.	No
Reading – Preliminary Wind Energy Output – 03272018.pdf	Wind Energy Assessment Summary (Draft)	Mar. 27, 2018	RES Group, Inc.	Yes
GEN-2015-073-IFS-2015-002-20_IFS-Summary_R0-DRAFT.pdf	Interconnection Facilities Study Report (Draft)	Mar. 2017	SPP, Inc.	Yes
Reading-DISIS-2015-002_2-12-16.pdf	Definitive Interconnection System Impact Study for Generation Interconnection Requests	Feb. 2016	SPP, Inc.	Yes
aUSAwof029.xls	Final Turbine Selection Specifications	Apr. 12, 2018	RES Group, Inc.	Yes
PUSAwof220.csv	Revised turbine location coordinates	Apr. 12, 2018	Southern Power Company	Yes
Reading Wind Project Lol 5 11 18.pdf	Letter of Intent for turbine purchase	May 11, 2018	Southern Power Company	Yes
SPP Kansas Que-Reading.xls	Kansas Wind Turbines Interconnected into SPP	May 2018	Southern Power Company	Yes
aUSAwof029-rev 180411.xls	Final Turbine Selection Specifications	May 2018	RES Group, Inc.	Yes
RE: Reading VCS Backup.msg	Backup data and information for Investment Analysis Inputs	July 2018	Southern Power Company	Yes
Reading Basis to SPP-N.pdf	Analysis of SPP basis rate	July 2018	Southern Power Company	Yes
ABB-Ventyx – SPP MCP Forecast – 2017 Fall Reference Case_VCS.xlsx	Ventyx price curve data for merchant revenue rate	July 2018	Southern Power Company	Yes
RCL statement for VCS – 7-9-18.pdf	Power purchaser letter	July 2018	Southern Power Company	Yes
Reading CongestionAssess_052518.pdf	Reading Wind, Kansas Congestion Assessment	May 2018	Leidos	Yes

APPENDIX B: DEMONSTRATION OF ADDITIONALITY

The CDM Baseline tool uses a step-wise approach to determining the baseline scenario for the Project and demonstrating additionality.

Step 0 – Demonstration that the proposed Project Activity is first-of-its-kind (optional)

The Project Activity, wind power electricity generation, is not first-of-its-kind.

Step 1 – Identification of alternatives to the Project Activity consistent with current laws and regulations

Step 1 has two sub-steps:

- Under Sub-step 1a, alternative scenarios to the Project Activity are defined, as shown in **Table B.1** and consistent with the CDM Additionality Tool. Per the CDM Methodology, ACM0002, the baseline scenario is Alternative Scenario 2, where other power plants supply the proposed electricity output of the Project.
- Under sub-step 1b, the consistency of the Alternative Scenarios with mandatory regulations are evaluated. For the proposed Project Activity to be additional, at least one of the Alternative Scenarios must be consistent with mandatory regulations. This is demonstrated in **Table B.1**.

Table B.1 Alternative Scenarios to the Project Activity

Scenario		Applicable to Project	Justification	Consistent with Mandatory Regulations
1	The proposed Project Activity undertaken without being registered as a VCS project.	Yes	The Project may be undertaken without being registered as a VCS project. Revenue would be generated from the sale of electricity via a PPA.	Yes. No mandatory regulations affecting Alternative Scenario.
2	Baseline Scenario: No investment is undertaken by Project Proponents, and the power output is generated in existing and/or new power plants in the electricity grid.	Yes	This is the Baseline Scenario as defined in the CDM Methodology.	Yes. Status Quo Alternative Scenario.

Scenario		Applicable to Project	Justification	Consistent with Mandatory Regulations
3	The continuation of the current situation, not requiring any investment or expenses to maintain the current situation.	No	The proposed project is a greenfield power plant, and as such there is no current situation.	Not applicable.
4	The continuation of the current situation, requiring an investment or expenses to maintain the current situation.	No	The proposed project is a greenfield power plant, and as such there is no current situation.	Not applicable.
5	Other plausible and credible alternative scenarios to the Project Activity scenario, including common practices in the relevant sector, which deliver the same output (i.e., fossil fuels, other renewable energy).	Yes	Alternative energy forms must be evaluated for barriers against the Project Activity to determine their plausibility and credibility.	Yes. No mandatory regulations affecting Alternative Scenario.
6	The proposed Project Activity without being registered as a VCS project activity, to be implemented at a later point in time (i.e., due to existing regulations, end-of-life of existing equipment, financing aspects).	No	There are no existing regulations, equipment constraints, or financing aspects that would benefit the Project being implemented at a later point in time.	Not applicable.

Step 2 – Investment analysis

Consistent with the CDM Additionality Tool, the purpose of the investment analysis is to determine whether the proposed Project Activity is not: the most financially or economically attractive alternative, or economically or financially feasible, without the revenue from the sale of VERs. There are four steps detailed below:

- Sub-step 2a: Determination of analysis method. Consistent with Section V of the CDM Investment Analysis Guidelines, a benchmark approach (Option III) is used. The Project Proponent only has the choices to invest or not invest in the Project, given the baseline is supplying the same level of electricity generation to the grid;
- Sub-step 2b and 2c: Application of benchmark analysis and calculation and comparison of financial indicators are shown under a separate cover in the Investment Analysis

- Sub-step 2d: Sensitivity analysis is shown under a separate cover in the Investment Analysis Spreadsheet, which is fully referenced. Further details and summary results are provided in the subsections below.

The Internal Rate of Return (IRR) was used as financial indicator for comparison of scenarios. The benchmark rate was taken as an average of numerous hurdle rates identified in wind energy market studies, as shown in **Table B.2** below.

Source	Reference Page	Rate	Justification
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED] [REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

- Turbine, balance of plant (BOP), and financing capital costs;
- Annual operations & maintenance (O&M) costs, consisting of: land leases, insurance, financial security, state taxes, turbine and BOP O&M, and property taxes;
- Annual revenues from the PPA, and following the term of the PPA, merchant revenues: based on projected net electricity generation;

- Federal production tax credits (PTC) and taxes, including MACRS depreciation
- Decommissioning costs at the end of the operational life

The PPA is provided under a separate cover, and curtailment is considered, in line with rates observed for the SPP and wind power generation in the US (NREL, 2014) (SPP, n.d.) (NREL, 2014). The project life is [REDACTED], consistent with the CDM Investment Analysis Guidelines and turbine supplier specifications. While the PPA term is shorter than the full operational life of the turbines, merchant revenues at the SPP interconnection are accounted for. A basis reduction is applied to both PPA and merchant revenue rates, representing a price discount for delivering the electricity to the SPP North hub.

We note that this approach is consistent with previously validated and registered US based VCS wind power projects. Benchmark returns identified range from [REDACTED], with an average rate of [REDACTED] referenced for sensitivity analysis.

Financial Indicator and Benchmark

The following scenarios were assessed and compared against the benchmark IRR:

- Baseline Scenario (Alternative Scenario 2): no investment in the Project Activity, continued supply by grid connected sources. **This is the do-nothing alternative and is taken to be the benchmark IRR for the Project Proponent, as further detailed in the IRR analysis calculation tool.**
- Alternative Scenario 1: the Project Activity undertaken without being registered as a VCS project, with revenue generated by the PPA and RECs; and
- Project Activity: the Project undertaken with registration as a VCS project, and revenue generated by VERs.

Outcome of Substep 2c: The results, as detailed under a separate cover, confirm that the Project Activity, with or without (Alternative Scenario 1) do not pass the benchmark post-tax IRR threshold (Baseline Scenario), and as such, the Project Activity is additional from an investment standpoint.

Sensitivity Analysis

The purpose of the sensitivity analysis is to show whether the conclusion regarding the financial attractiveness of the Project is robust to reasonable variations in the inputs and assumptions. As such, variables that constitute more than 20% of total project costs or revenues were varied by a $\pm 10\%$ range, consistent with the CDM Investment Analysis Guidelines. For the project, the parameters that constituted more than 20% of total project costs/revenues were the following:

- Capital cost

- Annual operations & maintenance (O&M) costs
- Annual PPA revenues
- Annual merchant revenues, following PPA period

Outcome of Substep 2d: The results, as detailed under a separate cover, confirm that the financial unattractiveness of the Project is robust to reasonable variations in the critical assumptions and inputs. All potential variations are below the average the benchmark IRR of [REDACTED] compared against. Variation in PPA pricing for the first 12 years of the operational life of the turbines is not expected to occur, given that the PPA is an existing executed contract and contains fixed pricing mechanisms for this time period. Additionally, the SPP basis rate, representing the price discount on the PPA price for settling at the SPP North electricity grid hub, was conservatively modelled by the Project Proponent and backed up by an independent analysis performed by Leidos. A sensitivity analysis of the PPA revenues shows that the Project continues to meet the IRR threshold.

Project IRR Results

Table B.3 presents the results of the Investment Analysis.

Table B.3 Project IRR Results

Sensitivity Analysis	Alternative Scenario 1 (not registered as a VCS project)	Alternative Scenario 2 (registered as a VCS project)
Baseline Project IRR Result	[REDACTED]	[REDACTED]
10% Increase in Parameter		
Capital cost	[REDACTED]	[REDACTED]
Annual O&M cost	[REDACTED]	[REDACTED]
PPA revenues	[REDACTED]	[REDACTED]
Merchant revenues	[REDACTED]	[REDACTED]
10% Decrease in Parameter		
Capital cost	[REDACTED]	[REDACTED]
Annual O&M cost	[REDACTED]	[REDACTED]
PPA revenues	[REDACTED]	[REDACTED]
Merchant revenues	[REDACTED]	[REDACTED]

Step 3 – Barrier analysis

Given that the Project was shown to be additional in Step 2 (Investment Analysis), Barrier Analysis is not required but has been shown for completeness and reinforcement of the case for

the Project. Step 3 involves a review of technological, social, and economic barriers associated with the Project and Alternative Scenarios, as shown in **Table B.4**. The steps to Barrier Analysis include:

- Sub-step 3a: identify barriers that would prevent the implementation of the Project Activity
- Sub-step 3b: show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the Project Activity).

Table B.4 Barrier Analysis for Project and Alternative Scenarios

Scenario		Technological Barriers	Social Barriers	Economic Barriers
1	The proposed Project Activity undertaken without being registered as a VCS project. The Project would generate revenues through the PPA and RECs but not verified emission reduction (VER) credits.	None	None	Yes. Does not meet the investment benchmark required by the Project Proponent, as discussed in Step 2.
2	Baseline Scenario: No investment is undertaken by Project Proponents, and the power output is generated in existing and/or new power plants in the electricity grid.	None	None	None
3a	Addition of new fossil fuel generation capacity to match the Project generation output.	None. Well established technologies.	Yes. Continues the use of fossil fuels in the region, and the associated social health and environmental impacts.	None. Well established economics for conventional fossil fuel power plants.
3b	Addition of new renewable generation capacity to match the Project generation output.	Yes. Wind power potential far exceeds that of other renewables in the region, including solar (NREL, 2012).	None	None. VER prices for solar generation have been higher than other forms of renewable energy (Forest Trends, 2016).

Outcome of Step 3: the results of the barrier analysis demonstrate that the Baseline (Alternative Scenario 2) does not have any barriers preventing it from being implemented. As the Project (Alternative Scenario 1) has an economic barrier confirmed in Step 2, it is additional.

Step 4 – Common practice analysis

To assess whether the Project must use Sub-step 4a or 4b, the measure of the Project Activity must be compared against the four classes of GHG emission reduction activities possessing common features, as defined in the CDM Additionality Tool as follows:

- Fuel and feedstock switching;
- Switching of technology with or without change of energy source including energy efficiency improvement as well as use of renewable energy;
- Methane destruction; and
- Methane formation avoidance.

The Project Activity does not fall under any of the measure classes defined above and as such, Sub-step 4b is used. Under Sub-step 4b of the Common Practice Analysis, **a credibility check** is done to confirm that the Project has essential distinctions to projects of similar size and scope, for which it is not common practice.

SPP Grid Composition

The SPP grid comprises seven states in the Midwest, and as of winter 2018, had a generation makeup shown in **Figure B.1** below (SPP, 2018). Wind power represented between 20-30% of generation capacity through the past year, and eGRID data suggests that there are 140 active wind power projects supplying electricity to the SPP grid, as of 2016. Of these, only two are registered as VCS projects: Dempsey Ridge and Red Hills.

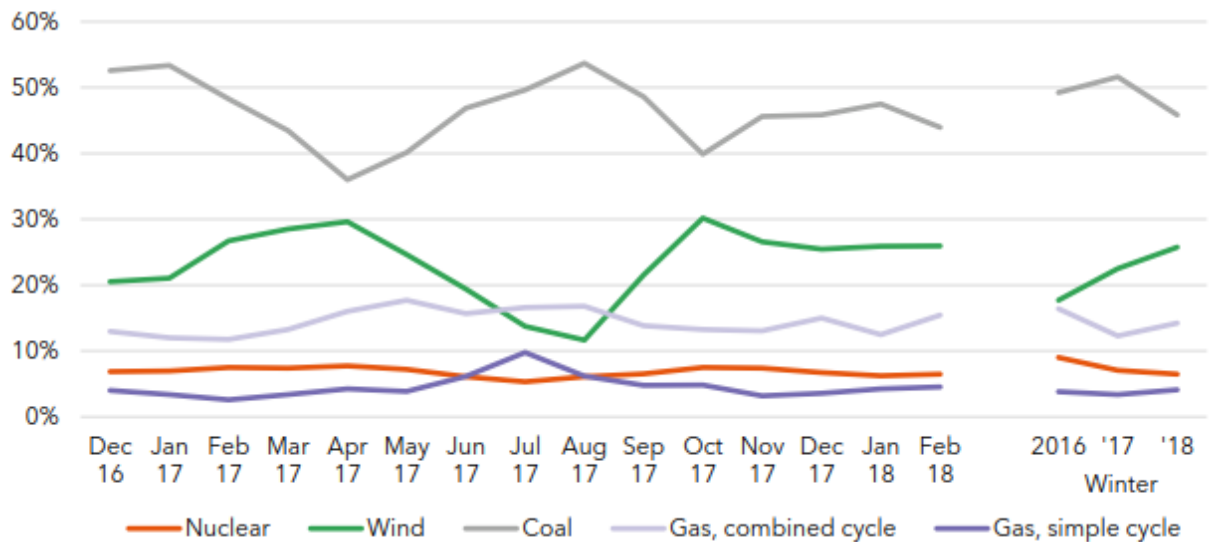


Figure B.1 SPP Generation by Technology Type (%)

Essential Distinction for Project – SPP wind projects are not viable without REC or VER credits

Within the SPP network, there are sixty-seven (67) currently installed wind power projects of over 100 MW in capacity. Of these, there exist eight (8) projects that were installed prior to 2013, which is earlier than the price collapse for RECs observed over the past three (3) years. Accounting for an additional two to three (2-3) years of planning and construction, these projects would have made their investment decisions prior to 2010-2011, when REC prices were double what they are currently (**Figure B.2**). Of the projects installed after 2013, there exists only one (1) that is not identified as being registered for RECs or VERs. As previously identified, there are two (2) VCS projects generating VERs, and a search through the NARR and ERCOT databases identifies fifty-six (56) projects generating RECs. The one project not listed in either database is Frontier Wind in Oklahoma, which is owned by Duke Energy. However, this project has a 22-year agreement with City Utilities of Springfield for the purchase of electricity (Duke Energy, 2017), which represents an exceptionally long contract period for a PPA. It is reasonable to expect that the guaranteed long term contract price under this agreement would offset the risk and lost revenues by not generating REC or VER credits. The data evaluated; specifically the fact that nearly all projects located in the SPP and installed within the past five (5) years are generating RECs, confirms the essential distinction for the project, in which it would not be viable without the inclusion of VERs in the electricity price.

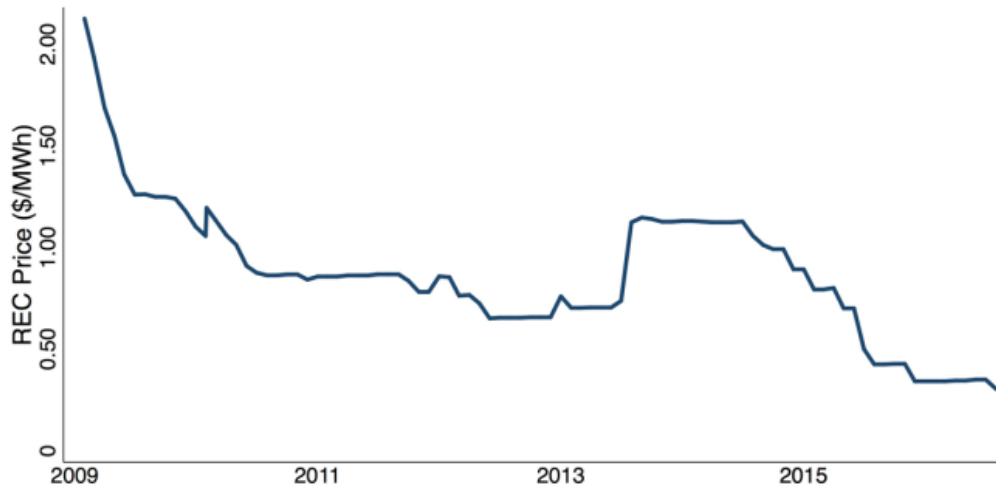


Figure 19. Voluntary national REC prices

Source: Marex Spectron (2016)

Figure B.2 Voluntary REC Pricing History (NREL, 2016)

Based on the above, we can conclude that:

- **Wind power projects in the SPP grid are not currently viable without VER or REC credits, when examined over the past 5-years, which corresponds to significant REC pricing changes.**

Essential Distinction for Project – The Project has an essential distinction to REC projects

The CDM Additionality Tool, Paragraph 62 states:

Essential distinctions may include a serious change in circumstances under which the proposed CDM project activity will be implemented when compared to circumstances under which similar projects were carried out. For example, new barriers may have arisen, or promotional policies may have ended, leading to a situation in which the proposed CDM project activity would not be implemented without the incentive provided by the CDM. The change must be fundamental and verifiable.

Development of new wind-power generation projects registered with the VCS has dramatically decreased over the past several years largely due in part to decrease in valuation of credits associated with the VCS in comparison to REC's. As reported by [REDACTED], REC pricing has dramatically decreased over the past 3 years, from [REDACTED] [REDACTED]. Examining **Figure B.2** above suggests that this trend has been occurring for nearly a decade. As evidenced in wind project listings detailed above, the majority of the projects were installed several years ago and have chosen to generate RECs as the primary environmental credit over VERs. With REC prices historically

higher than they are currently, they have enjoyed greater revenue potentials, less scrutiny related to validation and verification, and reduced project risks, which has allowed them to proceed without seeking VERs. With the REC price collapse in the past three years, the economics for environmental credits in wind power represent a significant change in circumstance. Without registration as a VCS project, the potential revenues from the historically low REC pricing would not be sufficient to make the Project feasible, and given the trend of decreasing REC prices, would represent unwarranted risk to proceed.

Similar to RECs, VER prices have steadily decreased over the past decade as well, as shown in **Figure B.3** below. While the Project's PPA has a fixed price for electricity and environmental attributes bundled together, this demonstrates that previous project developers for VCS projects have enjoyed more exposure to VER market prices than is currently available, offering a better choice between environmental credits sought.

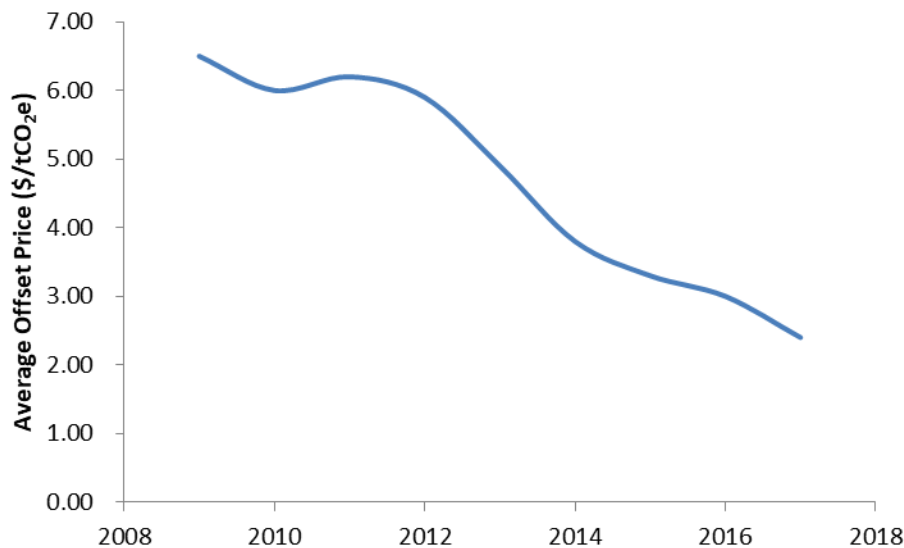


Figure B.3 Voluntary Emission Offsets Pricing History (Forest Trends, 2017)



Essentially, the project is below market as evidenced in our investment analysis. The Reading Project will not be built without offtake and that obtaining carbon offset verification makes our project more marketable by opening a whole new market of buyers.

Based on the above, we can conclude that:

- ***The project faces a significant change in circumstances in environmental credit pricing that previous VCS projects, and other projects receiving RECs, have not faced. This represents an essential distinction to other recently developed wind power projects.***

APPENDIX C: ELECTRICITY SYSTEM EMISSION FACTOR CALCULATION

Step 1 – Identify the relevant electricity systems

The relevant project electricity system is the Southwest Power Pool (SPP), which is one of the major electricity grids in the North American Electric Reliability Corporation (NERC) (EPA, 2015). As demonstrated in **Appendix B**, the NERC region grids provide essential distinction between each other, and thus SPP represents the most appropriate geographical area for the Project.

Step 2 – Choose whether to include off-grid power plants in the Project electricity system (optional)

This Step is optional and does not apply for the SPP grid, and is thus skipped for the Project.

Step 3 – Select method to determine the operating margin (OM)

The Simple OM method has been selected for the Project, based on a demonstration that the low-cost/must-run (LCMR) share of power plant production in the SPP system (including imported electricity) is less than 50% in the most recent 5 years of available data. As defined in the CDM EF Tool, LCMR plants are those with low marginal generation costs or dispatched independently of the daily or seasonal load of the grid, and include hydro, geothermal, wind, low-cost biomass, nuclear, and solar generation. Fossil fuel plants are not considered LCMR resources. Imported electricity is treated as one combined LCMR plant.

EIA data on power plant production, fuel type, and imported electricity was reviewed over the period of 2012-2016 to determine the share of LCMR resources in the SPP system, accounting for imports (EIA, 2018) (EIA, 2017), as presented in **Table C.1**.

Table C.1 LCMR and Total Power Generation by Year

Power Generation (MWh)	2012	2013	2014	2015	2016
LCMR Plants	27,249,998	36,209,779	40,009,607	47,454,428	56,689,284
Imported (LCMR)	29,003,589	39,187,900	34,072,550	20,800,579	20,861,812
Total LCMR	56,253,587	75,397,679	74,082,157	68,255,007	77,551,096
Total SPP	234,982,554	231,009,584	226,740,826	229,212,212	231,175,255
Ratio (%)	24%	33%	33%	30%	34%
Result	Simple OM method used.				

Step 4 – Select method to determine the operating margin (OM) and calculate OM

The OM is calculated ex ante using a three-year generation-weighted average, based on the most recent data available at the time of PD submission. Based on the EIA data, this is the years

of 2014 through 2016, where the OM emission factor is calculated for each year then averaged as follows:

$$EF_{grid,OM,y} = \frac{\sum_m EG_{m,y} \cdot EF_{m,y}}{\sum_m EG_{m,y}}$$

Where:

$EF_{grid,OM,y}$ = Ex ante operating margin CO₂ emission factor for grid connected power generation in year y (MWh).

$EG_{m,y}$ = Quantity of net electricity generation by plant m that is produced and fed into the grid in year y (MWh / y).

$EF_{m,y}$ = Emission factor for plant m in year y (tCO₂ / MWh).

Imported emissions are assigned a factor of 0 tCO₂ / MWh, effectively removing them from the overall plant emission factor calculation.

Calculation of $EF_{m,y}$ – Option 1A

The emission factor for each plant m is calculated based on a power generation weighted average of the fuel consumption multiplied by the fuel type emission factor for each power unit i for a power plant m, as determined from EIA and EPA guidance, as follows (EPA, 2014) (EIA, 2016):

$$EF_{m,y} = \frac{\sum_i FC_{i,m,y} \cdot EF_{i,m,y} \cdot EG_{i,m,y}}{EG_{m,y}}$$

Where:

$FC_{i,m,y}$ = Fuel consumption of power unit i in power plant m in year y (MMBtu).

$EF_{i,m,y}$ = Fuel type emission factor for power unit i in power plant m in year y (kg CO₂ / MMBtu)

$EG_{i,m,y}$ = Power generation for power unit i in power plant m in year y (MWh)

Emission factors by fuel type are presented in the calculation workbooks provided under a separate cover.

Step 5 – Calculate the build margin (BM)

Calculation of BM – Option 1

The BM EF is calculated ex-ante for the first 10-year crediting period, based on the most recent year of data of built power plants from a sample group m . The sample group is taken to be the power units with the larger power generation of:

- The five power units, excluding those registered as VCS projects, that started to supply electricity to the grid most recently ($EG_{set\ 5,i,y}$); and
- The power units, excluding those registered as VCS projects, that started to supply electricity to the grid most recently and comprise 20% of the total electricity system generation ($EG_{set\ 20\%,i,y}$).

There are additional steps in the case that one or more of the power units in the sample group started to supply electricity to the grid more than 10 years ago, as detailed in the CDM EF Tool. This is determined to not apply for the SPP. The power units in the selected sample group (SET_{sample}) are taken as the units m in the following equation to calculate the BM EF:

$$EF_{grid,BM,y} = \frac{\sum_{set\ i} EG_{set\ i,y} \cdot EF_{set\ i,y}}{\sum_{set\ i} EG_{set\ i,y}}$$

The emission factor for each power unit i in SET_{sample} is calculated as per Option 1A of Step 4 in calculating the OM.

Step 6 – Calculate the combined margin (CM)

The CM emission factor ($EF_{grid,CM,y}$) is calculated ex ante for the Project crediting period, according to the CDM EF Tool, weighted average CM option. It is calculated as a weighted average of the two emission factors pertaining to the SPP electricity grid as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \cdot W_{OM} + EF_{grid,BM,y} \cdot W_{BM}$$

Where:

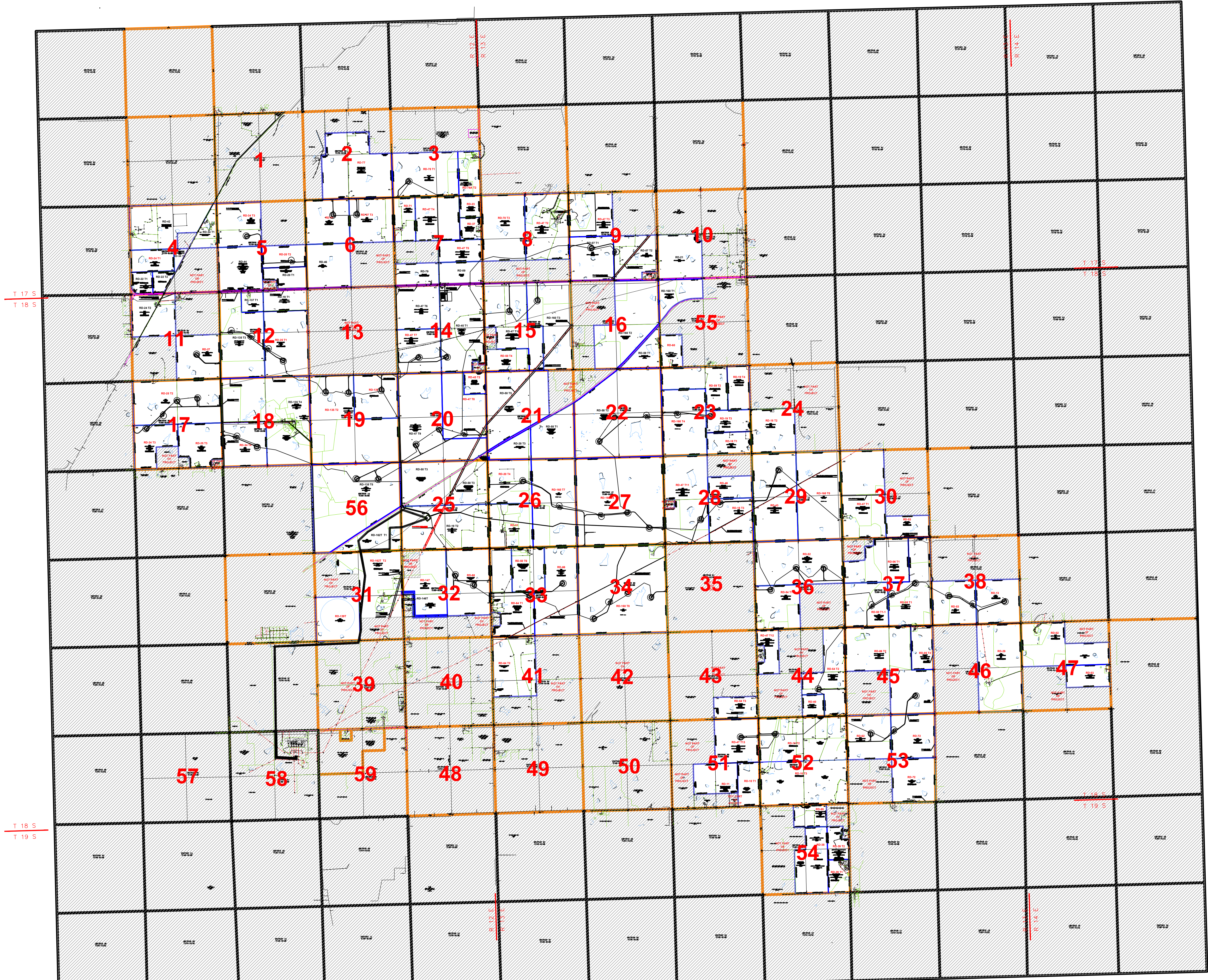
$OM =$ Operating Margin, representing the group of existing power plants whose current electricity generation is displaced by the Project Activity.

$BM =$ Build Margin, representing the group of prospective power plants whose construction and future operation will be displaced by the Project Activity.

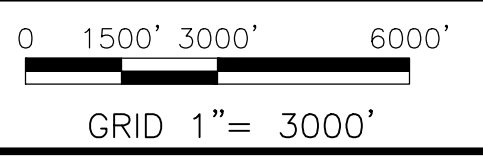
Figure D.1 Project Boundary and Turbine Location Map

- ELEC. PEDESTAL
- GUY WIRE
- LIGHT POLE
- POWER POLE
- ELEC. MARKER
- ELEC. PULL BOX
- ELEC. VAULT
- PARKING METER
- ELEC. METER
- TRAFFIC LIGHT
- TRAFFIC PULL BOX
- GAS METER
- MONITORING WELL
- GAS LID
- GAS MARKER
- GAS RISER
- GAS VALVE
- GAS WELL
- OIL VALVE
- VENT PIPE
- BENCHMARK
- R/W MARKER
- STORM SEW. MANHOLE
- CABLE PEDESTAL
- TELEPHONE POLE
- FIBER OPTIC PEDESTAL
- FIBER OPTIC MARKER
- TELE. VAULT
- TELE. MARKER
- TV ANT.
- WATER VALVE
- WATER METER
- FIRE HYDRANT
- WATER WELL
- STAND PIPE
- WATER MANHOLE
- WATER SPIGOT
- SPRINKLER VALVE
- SPRINKLER HEAD
- SAN. SEW. CLEAN OUT
- SAN. SEW. MARKER
- SAN. SEW. MANHOLE
- MONUMENT FOUND
- MONUMENT SET
- CONTROL POINT
- WIND TURBINE
- SIGN
- BOLLARD/COLUMN
- TELEPHONE PEDESTAL

SHEET INDEX



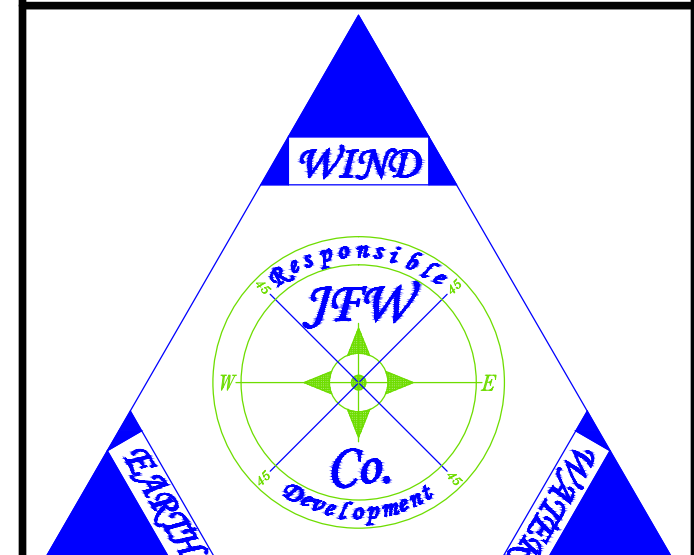
READING WIND
ENERGY, LLC
LYON COUNTY
STATE OF KANSAS



- SECTION LINES
- QUARTER SECTION LINES
- PROPERTY LINES
- BUILDINGS
- FENCES
- RIGHT-OF-WAY LINES
- CITY LIMITS
- EXISTING ROADS
- EXISTING RAILROADS
- EXISTING FLOWLINE
- DRAINAGE STRUCTURES
- TOP OF BANK
- TOE OF SLOPE
- EXISTING GRADE
- LANDSCAPE
- SS SANITARY SEWER LINES
- W WATER LINES
- FO FIBER OPTIC LINES
- CAB CABLE LINES
- TUG COMMUNICATION LINES
- OIL OIL LINE
- G GAS LINE
- AW OVERHEAD POWER LINES
- EUG ELECTRIC UNDERGROUND

TITLE CO.	
TITLE FILE #	L20154086
EFFECTIVE DATE	06/11/2015
VERSION	PROFORMA
SCHEDULE A	SEE PAGE F-H
SCHEDULE B	SEE PAGE I-Q
ALTA NOTES	SEE PAGE A

DRAFT



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www.windearthwater.com

CA #:	KS LS #1587
PROJECT NO.:	16-0040
DATE:	07/25/18
FIELD BK.:	SERVER
DRAWN BY:	JMM
PARTY CHIEF:	JM
CHECKED BY:	EHM
REVISIONS:	12/21/17 01/12/18 07/25/18

ALTA SURVEY

LAST SITE VISIT 07/09/18

SHEET # D