CAPRICORN RIDGE 4 WIND FARM PROJECT

Document Prepared By NativeEnergy, Inc.

Project Title	Capricorn Ridge 4 Wind Farm Project
Version	01.5
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Monitoring Period	01-January-2014 to 31-December-2014
Prepared By	Brian KillKelley
Contact	NativeEnergy, Inc. 3 Main Street, Suite 212 Burlington, VT 05401 (802) 861-7707 brian.killkelley@nativeenergy.com www.nativeenergy.com

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The Capricorn Ridge 4 Wind Farm Project is the second phase of the Capricorn Ridge Wind Farm. The Project consists of 75 GE 1.5 MW wind turbines, with a total capacity of 112.5 MW, and is interconnected to a substation owned by the Lower Colorado River Authority (LCRA). Meters at that substation provide the source of revenue-quality energy production data. Energy data is provided to the Project Proponent where it is remotely monitored and stored in the Project Proponent's data storage system, and to the Electricity Reliability Council of Texas (ERCOT) where Renewable Energy Credits (RECs) are generated and tracked on the ERCOT registry. Station service load is provided by Concho Valley Electric Coop and metered separately.

During the monitoring period of this Monitoring Report (01-January-2014 to 31-December-2014) the Project operated continuously as expected with no deviations or other notable events to report.

The Project began operations on 20 May 2008.

The total GHG emission reductions generated in the monitoring period of this Monitoring Report which are available for voluntary sales are 168,308 tCO_2.

1.2 Sectoral Scope and Project Type

The Project falls under UNFCCC CDM sectoral scope 01, "Energy Industries (renewable- /non-renewable resources)".

The Project is not a grouped project.

1.3 Project Proponent

Organization name	NextEra Energy Power Marketing, LLC
Contact person	John Mantyh
Title	Environmental Trade Desk Head
Address	700 Universe Boulevard Juno Beach, FL 33408
Telephone	(561) 304-6150
Email	jmantyh@nee.com

1.4 Other Entities Involved in the Project

Organization name	NativeEnergy, Inc.
Role in the project	NativeEnergy, Inc. is involved in the Project as the developer of the Monitoring Report and manager of the Project's VCUs.
Contact person	Brian KillKelley
Title	Director, Project Origination
Address	3 Main Street, Suite 212 Burlington, VT 05401
Telephone	(802) 861-7707
Email	brian.killkelley@nativeenergy.com

1.5 Project Start Date

The Project Start Date is 20 May 2008.

1.6 Project Crediting Period

The Project Crediting Period is 10 years, staring on 01 January 2010 and ending on 31 December 2019.

1.7 Project Location

The Project Location is as follows (in NAD83 coordinates):

Project	Latitude	Longitude
Capricorn Ridge 4 Wind Farm	31.900878° N	-100.817413° W

1.8 Title and Reference of Methodology

The Project uses the following methodology and tools:

- UNFCCC CDM consolidated methodology ACM0002, "Consolidated methodology for grid connected electricity generation from renewable sources," Version 9.0.
- UNFCCC CDM methodological tool Tool07, "Tool to calculate the emission factor for an electricity system," Version 01.1.
- UNFCCC CDM methodological tool Tool03, "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion," Version 02.

1.9 Other Programs

The Project does not participate in any other GHG emissions trading program and has not registered credits under any other GHG emissions trading program.

The Project participates in the ERCOT Renewable Energy Credit (REC) Program and has registered its RECs in the ERCOT registry, as the Project is a qualified renewable generator. A specific number of RECs have been generated, registered, and claimed as RECs in 2014 (via transfer to other parties and/or retirement on behalf of other parties); these RECs are excluded from this Monitoring Report and are identified in documents provided to the VVB under separate cover.[1] As such, the parameter $EG_{facility,2014}$ does not include these previously issued RECs. Therefore, no GHG emissions reductions can be claimed relating to the electricity production associated with these previously issued RECs.

To prevent double counting, any and all Project VCUs pertaining to this Monitoring Report and issued under VCS will result in the immediate voluntary retirement of the corresponding quantity of Project RECs, where the quantity of RECs is determined by the quantity of the VCUs (in tCO_2) divided by the emission factor $EF_{grid,CM}$ (in tCO_2/MWh). The voluntary retirement of these RECs will render the RECs unusable for use in meeting an RPS requirement.[2] To avoid any doubt of possible double counting of the RECs and/or VCUs in the voluntary market, the following statement will be included in the ERCOT retirement memo field: "Retirement for affecting the conversion of RECs to issued VCUs under VCS Project 468, vintage year 2014." Evidence of this voluntary REC retirement --including the corresponding vintage, facility ID, serial numbers, quantity of RECs, its retirement status, and specific memo language as noted above-- shall be provided to the VCS registry under which the VCS issuance occurs in the form of a copy of the ERCOT REC Retirement Summary Detail report.

In accordance with VCS Standard v3.5, Section 3.11.3:

- The relevant REC program to which the RECs will be registered is the Electricity Reliability Council of Texas (ERCOT) State of Texas Renewable Energy Credit Trading Program. The address is:

  Electric Reliability Council of Texas, Inc.
  7620 Metro Center Drive
  Austin, Texas 78744-1654
  Telephone: (512) 225-7000

- The Project is listed in the ERCOT REC tracking system as "Capricorn Ridge Wind II, LLC", Facility ID 00114.

- The monitoring period for which the RECs will be registered is vintage year 2014.

- Final volumes and serial numbers will be made available to the VCS registry upon

[1] "ERCOT Screenshot - 2014 REC Creation Rev.1(Q4).docx" and "ERCOT Screenshot - 2013-14 REC Retirements Redacted.pdf" files are provided to the VVB under separate cover.

[2] ERCOT Nodal Protocols, Section 14.10 includes reference to ERCOT REC retirements.

issuance of the corresponding VCUs.

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

The Project operated as expected during the monitoring period of this Monitoring Report. There were no events that impacted the GHG emission reductions or monitoring. As discussed in Section 1.9 above, some of the Project's RECs have been issued, thereby precluding those MWh to be converted to GHG emission reductions. These MWh have not been included in the Project's total electricity generation, thereby precluding any claims of GHG reductions associated with those MWh under this Monitoring Report.

2.2 Deviations

2.2.1 Methodology Deviations

There are no methodology deviations for the monitoring period of this Monitoring Report.

2.2.2 Project Description Deviations

There are no Project Description deviations for the monitoring period of this Monitoring Report.

2.3 Grouped Project

The Project is not a grouped project.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data / Parameter	LE_{2014}
Data unit	tCO2e
Description	Leakage emissions
Source of data	In accordance with methodology ACM0002, no leakage emissions are considered.
Value applied:	0
Justification of choice of data or description of measurement methods and procedures applied	In accordance with methodology ACM0002, no leakage emissions are considered.
Purpose of the data	Calculation of leakage emissions
Comments	n/a

3.2 Data and Parameters Monitored

Data / Parameter	$EG_{facility,2014}$
Data unit	MWh
Description	Quantity of net electricity generation supplied by the project to the grid in year 2014
Source of data	Revenue-quality electricity meters located at the LCRA substation and confirmed by ERCOT. For data not yet confirmed by ERCOT, the latest MV90 data shall be used. "ERCOT Screenshot - 2014 REC Creation.docx" and "Cap Ridge 4 2014 MV90 Data (NEcalcs).xlsx" files are provided to the VVB under separate cover.
Description of measurement methods and procedures to be applied	Data is measured continuously with utility grade, revenue-quality kWh electricity meters operated by LCRA. Meters are tested and calibrated to ERCOT EPS and NIST standards.
Frequency of monitoring/recording	Data is reported in real time to the Project Proponent and to ERCOT via separate telemetry systems approximately every two seconds. The data is ultimately stored in 15-minute intervals consistent with both the Project Proponent's market data software and ERCOT's data requirements. An MV90 report is generated for billing purposes, which is consolidated into hourly data.
Value monitored:	279,495
Monitoring equipment	A primary revenue meter (PT-0702A256-01) and secondary revenue meter (PT-0702A255-01) are used. The Project Proponent's nMarket data package stores the data remotely at their Florida headquarters.
QA/QC procedures to be applied	The primary and secondary revenue meters located at the LCRA substation were inspected and certified on 15 July 2014 and 28 July 2014, respectively. The meters were inspected using the ERCOT EPA meter certification procedure. "Cap Ridge 4 Primary Meter Test.xlsm" and "Cap Ridge 4 Back-up Meter Test.xlsm" files are provided to the VVB under separate cover.
Purpose of the data	Calculation of Baseline Emissions
Calculation method	n/a
Comments	This value excludes all RECs previously generated and claimed by others. "ERCOT Screenshot - 2013-14 REC Retirements Redacted.pdf" file is provided to the VVB under separate cover.

Data / Parameter	$EF_{grid,CM,2010}$
Data unit	tCO_2/MWh
Description	Combined margin CO_2 emission factor in year 2010
Source of data	Most recent published data for the electricity grid
Description of measurement methods and procedures to be applied	Most recent U.S. EPA eGRID data is year 2010 to represent the monitoring period of 2014. The applicable electricity grid is the ERCOT interconnection region. Components of the calculation for $EF_{grid,CM}$ (operating margin emission factor, $EF_{grid,OM}$, and build margin emission factor, $EF_{grid,BM}$) are determined in accordance with the UNFCCC CDM methodological tool Tool07, "Tool to calculate the emission factor for an electricity system," Version 01.1.
Frequency of monitoring/recording	eGRID data is published periodically and publicly available on the EPA website.
Value monitored:	0.605
Monitoring equipment	Data contained within the EIA databases (from which the U.S. EPA eGRID data is derived) are reported from individual utilities and other entities that are required to report their plant operating data. Data applied to calculate this parameter includes annual energy production, fuel consumption, fuel type, and fuel type CO_2 emission factor. This reported data is derived from revenue quality electricity meters, official fuel records, and other calculations or DOE factors applied in accordance with DOE reporting requirements.
QA/QC procedures to be applied	Data contained within the EIA databases are reported from individual utilities and other entities that are required to report their plant operating data. The DOE, as a third-party entity, implements a rigorous review the data each year for quality assurance and accuracy. Please see the EIA Quality Guidelines for a complete description of their quality assurance and quality control program: http://www.eia.gov/about/information_quality_guidelines.cfm
Purpose of the data	Calculation of Baseline Emissions
Calculation method	Calculations of this parameter are performed in accordance with the UNFCCC CDM methodological tool Tool07, "Tool to calculate the emission factor for an electricity system," Version 01.1, and are provided in Appendix B.
Comments	n/a

Data / Parameter	$EC_{PJ,2014}$
Data unit	MWh
Description	Quantity of electricity consumed by the project from the grid in year 2014
Source of data	Monthly utility invoices, where the data is measured with revenue-quality electricity meters located at various electricity consuming facilities of the Project. "2014 Concho Valley utility invoices - Cap Ridge.pdf" and "Concho Valley Utility Invoice Summary Matrix (NEcalcs) rev1.xlsx" files are provided to the VVB under separate cover.
Description of measurement methods and procedures to be applied	Data is measured continuously with utility grade, revenue-quality kWh electricity meters operated by Concho Valley Electric Cooperative.
Frequency of monitoring/recording	Data is measured continuously and reported to the Project Proponent via monthly invoices.
Value monitored:	1,421
Monitoring equipment	Multiple revenue-quality meters located at the Project site.
QA/QC procedures to be applied	Meters employed are standard revenue-quality meters standard for metering commercial or industrial customers
Purpose of the data	Calculation of Project Emissions
Calculation method	n/a
Comments	n/a

Data / Parameter	$EF_{EL,2010}$
Data unit	tCO_2/MWh
Description	CO_2 emission factor relating to retail electricity supplied to the project in year 2014
Source of data	Most recent published data for the electricity grid
Description of measurement methods and procedures to be applied	Most recent U.S. EPA eGRID data is used (year 2010) to represent the monitoring period of 2014. The applicable electricity grid is the ERCOT interconnection region.
Frequency of monitoring/recording	eGRID data is published periodically and publicly available on the EPA website.
Value monitored:	0.553
Monitoring equipment	Data contained within the EIA databases (from which the U.S. EPA eGRID data is derived) are reported from individual utilities and other entities that are required to report their plant operating data. Data applied to calculate this parameter includes annual energy production, fuel consumption, fuel type,

	and fuel type CO_2 emission factor. This reported data is derived from revenue quality electricity meters, official fuel records, and other calculations or DOE factors applied in accordance with DOE reporting requirements.
QA/QC procedures to be applied	Data contained within the EIA databases are reported from individual utilities and other entities that are required to report their plant operating data. The DOE, as a third-party entity, implements a rigorous review the data each year for quality assurance and accuracy. Please see the EIA Quality Guidelines for a complete description of their quality assurance and quality control program: http://www.eia.gov/about/information_quality_guidelines.cfm
Purpose of the data	Calculation of Project Emissions
Calculation method	"eGRID2010 ERCOT (NEcalcs).xlsx" file is provided to the VVB under separate cover
Comments	n/a

3.3 Monitoring Plan

During this monitoring period, the process and schedule have been followed for monitoring the data and parameters in Section 3.2 above.

- The Project Proponent (NextEra) received continuous electric data via telemetry from the LCRA revenue-quality meters (both primary and backup). The meters are industry standard, revenue-grade electronic meters capable of continuous monitoring of kWh to industry recognized standards, and capable of delivering such data via telemetry. The meters are physically located at the Project site at the collection point where the energy is recognized as being delivered to the electricity grid.

- Data was captured and stored in 15-minute intervals with the Project Proponent's market data software package managed at its corporate headquarters by its Power Marketing department. The electric data was also delivered from the LCRA meters to ERCOT and in the same 15-minute interval basis. ERCOT ultimately reports the data in calendar quarters.

- The Project Proponent's data was consolidated to one-hourly increments and provided to NativeEnergy via electronic files. In addition, the Project Proponent provided ERCOT's quarterly reporting summary to NativeEnergy.

- The Project Proponent (NextEra) is capable of managing the monitoring, storage, and reporting of data. NextEra is one of the largest owner/producers of renewable energy with over 12,000 MW of electrical capacity. Furthermore, NextEra's Power Marketing is leading energy marketing in North America and provides daily management of its

company's electricity and fuel resources.

- The entire reporting year's data is available (8,760 hourly data points, with no missing intervals). Data provided by the Project Proponent is cross checked against final ERCOT reported data. ERCOT, for purposes of this Monitoring Report, functions as an independent third-party review of the Project's data. The difference between data supplied by the Project Proponent and ERCOT reported data was less than 1%. The LCRA primary and backup meters were demonstrated to have less than ±0.2% error. As such, the Methodology's requirements for monitoring frequency have been met, target precision and confidence levels have been met, and QA/QC procedures were appropriate for this project type.

- In accordance with Section 3.17.1 of the VCS Standard, Version 3.5, all documents and records are kept for at least two years after the end of the project crediting period.

- The Project incorporates a backup meter to its primary electricity revenue meter as a cross check in the event of any observed non-conformities. Furthermore, the Project Proponent can make use of each wind turbine's SCADA system to cross check against the primary meter. In 2014 there were no non-conformities of the Project's electrical generation data; therefore, a comparison is not provided in this Monitoring Report.

- The Project Proponent provided Project electrical consumption data in the form of monthly invoices from its retail energy service provider, Concho Valley Electric Cooperative. Concho Valley Electric Cooperative, for purposes of this Monitoring Report, functions as an independent third-party review of the Project's electrical consumption data.

- Other third-party data identified in Section 3.2 above and relied upon to determine total Emission Reductions are sourced from independent governmental sources. In particular, the U.S. DOE EIA data (from which the U.S. EPA eGRID data is derived) is widely recognized as the most accurate source of U.S. electricity data available. The U.S. DOE EIA implements a quality assurance program which is publicly available on their website.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

In accordance with Equations (8) and (9) of the Methodology, Baseline Emissions, BE_{2014}, is calculated as follows:

$$BE_{2014} = EG_{facility,2014} \times EF_{grid,CM,2010}$$

where:

BE_{2014} = Baseline emissions in year 2014 (tCO_2)

$EG_{facility,2014}$ = Quantity of net electricity generation supplied by the Project to the grid in year 2014 (MWh)

$EF_{grid,CM,2010}$ = Combined margin CO_2 emission factor for grid connected power generation in year 2010 (which is the most recent year of available data to apply to 2014) (tCO_2/MWh)

$EG_{facility,2014}$ is the Project's net MWh (after previously issued REC sales are excluded). This value is 279,760 MWh.

$EF_{grid,CM,2010}$ is calculated at 0.605 in accordance with the UNFCCC CDM methodological tool Tool07, "Tool to calculate the emission factor for an electricity system," Version 01.1, and detailed in Appendix B.

The resulting calculation of Baseline Emissions, BE_{2014}, is:

$$BE_{2014} = 279{,}495\ MWh \times 0.605\ tCO2/MWh$$

$$= \mathbf{169{,}094\ tCO_2}$$

4.2 Project Emissions

In accordance with Equation (1) of the Methodology, Project Emissions, PE_{2014}, is calculated as follows (excluding parameters associated with geothermal and hydro power plants):

$$PE_{2014} = PE_{FF,2014}$$

where:

PE_{2014} = Project emissions in year 2014 (tCO_2)

$PE_{FF,2014}$ = Project emissions from fossil fuel consumption in year 2014 (tCO_2)

As related to the Project, Project Emissions are solely due to grid electricity supplying power to the project. The Methodology references UNFCCC CDM methodological tool, "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion," Version 02; this tool is intended for direct combustion of fossil fuels. Referring to Equation (1) of this tool, and recognizing the fuel type *i* is electric consumption of the project (FC = EC_{PJ}) and the fuel CO_2 coefficient is the electric grid CO_2 emission factor ($COEF=EF_{EL}$):

$$PE_{EC,2014} = \sum_j EC_{PJ,j,2014} \times EF_{EL,j,2010}$$

where:

$PE_{EC,2014}$ =	Project emissions from electricity consumption in year 2014 (tCO_2)
$EC_{PJ,j,2014}$ =	Quantity of electricity consumed by the project electricity consumption source *j* in year 2014 (MWh)
$EF_{EL,j,2010}$ =	Emission factor for electricity generation for source j in year 2010 (the most current year of data available for 2014) (tCO_2/MWh)
j =	Sources of electricity consumption

$EC_{PJ,j,2014}$ is the annual MWh of electricity consumed by the project in 2014. Adjustments are made to account for some electricity consumption sources being shared with other phases of the wind farm (see below), and to exclude the amount of energy associated with previously issued RECs. This calculation is provided to the VVB under separate cover. The final calculated value of $EC_{PJ,j,2014}$ is 1,421 MWh.

$EF_{EL,j,2010}$ is determined from the U.S. EPA eGRID2010 database which reports both power plant MWh and power plant fuel types.[3] All power plants in ERCOT were used and totals of MWh and CO_2 emissions were weight-averaged to determine this parameter. All electricity consumption sources are served by the same set of plants in the same ERCOT region. A summary is provided in the table below:

Year	Tonnes CO_2 from all power units in ERCOT (tCO_2)	Generation from all power units in ERCOT (MWh)	$EF_{EL,2012}$ (tCO_2/MWh)[4]
2010	190,841,639	345,382,526	0.553

j denotes the source of electricity consumption. For the Project there are several sources of electrical consumption, some of which are directly used by Capricorn Ridge 4 and others are shared across all phases of the project. Regarding the latter, the portion attributed to Capricorn Ridge 4 is determined by applying a capacity share factor to the total kWh metered, where the capacity share is (Capricorn Ridge 4 MW capacity)/(Total Capricorn Ridge wind farm MW capacity). All electricity consumption sources are served by the same local energy service provider, Concho Valley Electric Cooperative.

The resulting calculation of Project Emissions, $PE_{EC,2014}$, is:

$$PE_{EC,2014} = 1{,}421\ MWh \times 0.553\ tCO_2/MWh$$

$$= 786\ tCO_2$$

4.3 Leakage

[3] Source: http://www.epa.gov/cleanenergy/energy-resources/egrid

[4] Tonnes CO_2 from all power units in ERCOT/Generation from all power units in ERCOT

In accordance with Section 5.6 of the Methodology, there are no leakage emissions.

4.4 Net GHG Emission Reductions and Removals

Total Emissions Reductions are calculated in accordance with the Methodology, Equation (13):

$$ER_{2014} = BE_{2014} - PE_{2014}$$

Year	Baseline emissions or removals, *BE* (tCO_2)	Project emissions or removals, *PE* (tCO_2)	Leakage emissions, *LE* (tCO_2)	Net GHG emission reductions or removals, *ER* (tCO_2)
2014	169,094	786	0	168,308

APPENDIX A: LIST OF DOCUMENTS PROVIDED UNDER SEPARATE COVER

Document Description	Source	Filename
ERCOT Nodal Protocols; Section 14: State of Texas Renewable Energy Credit Trading Program	ERCOT web site; http://www.ercot.com/content/mktrules/nprotocols/current/14-070114_Nodal.doc	14-070114_Nodal.doc
Calculation of build margin using EPA eGRID data	NativeEnergy, Inc.	eGRID2010 ERCOT (NEcalcs).xlsx
Project energy consumption; invoices summary	NativeEnergy, Inc.	Concho Valley Utility Invoice Summary Matrix (NEcalcs) rev1.xlsx
Project hourly MWh from MV90 data; summary	NativeEnergy, Inc.	Cap Ridge 4 2014 MV90 Data (NEcalcs rev1 2015-03-06).xlsx
Calculation of emissions reductions	NativeEnergy, Inc.	CapRidge 4 ER (NEcalcs rev2 2015-04-02).xlsx
ERCOT Metering Design Proposal for Project	NextEra Energy Power Marketing, LLC	Cap Ridge 4 meter design specs.pdf
ERCOT report showing REC creations	NextEra Energy Power Marketing, LLC	ERCOT Screenshot - 2014 REC Creation Rev.1(Q4).docx
ERCOT report showing REC retirements	NextEra Energy Power Marketing, LLC	ERCOT Screenshot - 2013-14 REC Retirements Redacted.pdf
Meter calibration test; backup meter	NextEra Energy Power Marketing, LLC	Cap Ridge 4 Back-up Meter Test.xlsm
Meter calibration test; primary meter	NextEra Energy Power Marketing, LLC	Cap Ridge 4 Primary Meter Test.xlsm
Project energy consumption; invoices	NextEra Energy Power Marketing, LLC	2014 Concho Valley utility invoices - Cap Ridge.pdf
Project hourly MWh from MV90 data	NextEra Energy Power Marketing, LLC	Cap Ridge 4 2014 MV90 Data.xlsx
Site map	NextEra Energy Power Marketing, LLC	Site Map WCR 4.pdf
EIA Information Quality Guidelines	U.S. DOE EIA website; http://www.eia.gov/about/information_quality_guidelines.cfm	About EIA - Policies - U.S. Energy Information Administration (EIA).htm
ERCOT generation data	U.S. EPA eGRID data: http://www.epa.gov/cleanenergy/energy-resources/egrid	See website link: 2010 data files (XLS)

APPENDIX B: DETERMINATION OF PROJECT EMISSION FACTOR EF

The following assessment is in accordance with UNFCCC CDM methodological tool Tool07, "Tool to calculate the emission factor for an electricity system," Version 01.1 (the "Tool").

STEP 1: Identify the relevant electric power system

The CDM definition of the "project electricity system" as stated in the Tool is:

> *"…the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity (e.g. the renewable power plant location or the consumers where electricity is being saved) and that can be dispatched without significant transmission* constraints."[5]

The Project is interconnected to Lower Colorado River Authority (LCRA) grid which operates within the Electric Reliability Council of Texas (ERCOT) region. The Project sells its electricity into the ERCOT market; for purposes of this Project, the relevant electricity system is identified as the ERCOT region. ERCOT is one of three electric interconnections in the U.S. and operates independently but for a few interties with the other interconnections. ERCOT's role is to manage the flow of electricity monitors and assess the transmission performance within its bulk power system, and provide for financial settlements. The result is the dispatching of power plants and delivery of electricity throughout its bulk power system without significant transmission constraints.

Other connected electricity systems import and/or export electricity to the ERCOT region. In accordance with the Tool, these connected electricity systems are located in Annex I countries (the United States) and, therefore, their emission factors are considered zero.

All grid power plants/units that are connected to the ERCOT region are publicly reported and listed in the U.S. EPAeGRID database. The most current year of final data is 2010 according to the U.S. EPA eGRID web page.[6]

STEP 2: Select an operation margin (OM) method

The calculation of the operating margin emission factor ($EF_{grid,OM}$) is based on the simple OM method using the *ex post* option. To use the simple OM method, low-cost/must run resources must constitute let than 50% of the total grid generation. Low-cost/must run resources in the ERCOT region consist of biomass, hydro, nuclear, solar, and wind generating plants, while fossil fired plants using coal, natural gas, and oil are typically dispatched against load and are not considered low-cost/must run units. For the ERCOT region in 2010, low-cost/must-run units were 19.3% of the total grid generation as summarized in the table below:[7]

[5] Source: https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v1.1.pdf
[6] Source: http://www.epa.gov/cleanenergy/energy-resources/egrid/
[7] Source: U.S. EPA eGRID2010 data. See "eGRID2010 ERCOT (NEcalcs).xlsx" provided to VVB under separate cover.

Year	Total generation from all resources in ERCOT region (MWh)	Generation from low-cost/must-run resources in ERCOT region *only* (MWh)	Percent of low-cost/must-run vs. total generation [8]
2010	345,382,526	66,515,009	19.3%

For the *ex post* option, the most recent data is used. The most current year of final eGRID data is 2010 according to the U.S. EPA eGRID web page.[9]

STEP 3: Calculate the operating margin emission factor according to the selected method

The simple OM emission factor is calculated using Option B – based on the net electricity generation and a CO_2 emission factor of each power unit. Low-cost/must-run units are not included. In accordance with the Tool, the equation to apply is:[10]

$$EF_{grid,OMsimple,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}}$$

where:

$EF_{grid,OMsimple,y}$	Simple operating margin CO_2 emission factor in year *y* (tCO_2/MWh)
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y*
$EF_{EL,m,y}$	CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)
y	The relative year as per the data vintage chosen. For this Monitoring Period *y* = 2012.
m	All power units serving the grid in year y except low-cost/must-run power units

$EF_{EL,m,y}$ can be determined using Option A of the Tool and applying the following equation:[11]

$$EF_{EL,m,y} = \frac{\sum_i FC_{i,m,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_{m,y}}$$

where:

$EF_{EL,m,y}$ =	CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)

[8] Generation from low-cost/must-run resources only / Total Generation from all resources
[9] Source: http://www.epa.gov/cleanenergy/energy-resources/egrid
[10] Equation (2) of the Tool.
[11] Equation (1) of the Tool.

$FC_{i,m,y}$ = Amount of fuel type *i* consumed by power plant *m* in year *y* (mass or volume unit)

$NCV_{i,y}$ = Net calorific value (energy content) of fuel type *i* in year *y* (GJ/mass or volume unit)

$EF_{CO2,i,y}$ = CO2 emission factor of fuel type *i* in year *y* (tCO_2/GJ)

$EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y*

m = All power units serving the grid in year *y* except low-cost/must-run power units

i = All fuel types combusted in power unit *m* in year *y*

y = The relative year as per the data vintage chosen. For this Monitoring Period *y* = 2012.

While the eGRID database provides all the necessary data to determine the above parameters either directly or indirectly by back-calculating, it also conveniently makes use of the data to calculate the resulting quantity of CO_2 emissions produced from each plant. This quantity is equivalent to the product $\sum_m EG_{m,y} \times EF_{EL,m,y}$ shown in the above equation and can be substituted as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_m E_{CO2,m,y}}{\sum_m EG_{m,y}}$$

where:

$E_{CO2,m,y}$ = Quantity of CO_2 emissions produced from each plant *m* in year *y* (tCO_2)

In accordance with the Tool electricity imports are treated as a single power plant where, in the case of U.S. as an Annex I country, is assigned an emission value of 0 tCO_2/MWh. Electricity imports are obtained from the eGRID database.[12]

The simple OM emission factor, $EF_{grid,OMsimple}$ for the ERCOT region is calculated as 0.679 tCO_2/MWh, as summarized in the following table:

[12] Source: http://www.epa.gov/cleanenergy/energy-resources/egrid . See "GGL10" tab.

Year	Power units other than low-cost/must run resources		Net imports		Simple OM emission factor, $EF_{grid,OMsimple}$ (tCO_2/MWh)[13]
	Total tonnes CO_2 emissions, $\sum EG_{m,y} \times EF_{EL,m,y}$ (tCO_2)	Total generation, $EG_{m,y}$ (MWh)	Total tonnes CO_2 emissions (tCO_2)	Total generation (MWh)	
2010	190,841,638	278,867,516	0	2,231,071	0.679

STEP 4: Identify the cohort of power units to be included in the build margin

The build margin, *BM*, is calculated using Option 1 of the Tool, where for the first crediting period, the build margin is calculated on an *ex ante* basis using the most currently available information which will include those units built up to the year of Project registration.

STEP 5: Calculate the build margin (*BM*) emissions factor

The build margin, *BM*, is calculated using Option 1 of the Tool, where for the first crediting period, the build margin is calculated on an *ex ante* basis using the most currently available information which will include those units built up to the year of Project registration. The Project was registered with VCS in 2010 and the calculated the build margin is 0.384.

$$EF_{grid,BM} = 0.384 \ tCO_2/MWh$$

STEP 6: Calculate the combined margin emissions factor

The calculation of the combined margin emissions factor, $EF_{grid,CM}$, is based on the weighted average of the operating margin and the build margin, using the following formula:[14]

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$$

where:

$EF_{grid,OMsimple}$ = Operating margin CO_2 emission factor in year *y* (tCO_2/MWh)

w_{OM} = Weighting of operating margin emissions factor (per cent)

$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year *y* (tCO_2/MWh)

[13] (Total tCO_2 from power units other than low-cost/must-run + Total tCO_2 from imports) / (Total generation from power units other than low-cost/must-run + Total generation from imports)

[14] Equation (13) of the Tool.

w_{BM} = Weighting of build margin emissions factor (per cent)

In accordance with the Tool, the default weighting values used for a wind project are:

$$w_{OM} = 0.75$$

$$w_{BM} = 0.25$$

Substituting all values from above: the *ex post* combined margin emissions factor, $EF_{grid,CM}$, has a value of 0.603 tCO_2/MWh:

$$EF_{grid,CM,ex-post} = EF_{grid,OM,ex-post} \times w_{OM} + EF_{grid,BM,ex-post} \times w_{BM}$$

$$= (0.679\ tCO2_2/MWh \times 0.75) + (0.384\ tCO2_2/MWh \times 0.25)$$

$$= 0.605\ tCO2_2/MWh$$