

VERIFICATION REPORT FOR THE WASTE HEAT CAPTURE PROJECT AT NATURAL GAS PIPELINE IN CULBERTSON, MONTANA



Document Prepared By First Environment, Inc.

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Summary:

The Waste Heat Capture Project at Natural Gas Pipeline in Culbertson, Montana consists of the recovery of excess heat from natural gas compressor station No. 3 along the Northern Border pipeline. The excess heat is recovered and used to produce electricity in a 7.5 MW generator. This activity results in a net reduction of greenhouse gas emissions.

The verification process consists of the independent third-party assessment of the implementation of the Project and emission reduction assertion against the criteria stated in the Verified Carbon Standard (VCS) Standard, 8 October 2013, v3.4; the approved Clean Development Mechanism (CDM) small-scale methodology AMS-III.Q (Version 4); and the validated Project Description (PD).

During the verification process, First Environment issued two corrective action requests and one clarification request which were all addressed sufficiently by Element Markets, LLC. No uncertainties were identified during the verification process. The Project claims emission reductions of 31,263 metric tonnes CO₂e for the period of January 1 through December 31, 2013. First Environment, Inc. is reasonably assured that the Project meets all relevant VCS program requirements and correctly applies the CDM small scale methodology AMS-III.Q (Version 4) and the validated PD.

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1 INTRODUCTION

1.1 Objective

This report is provided to Element Markets, LLC (Element Markets) as a deliverable of the Verified Carbon Standard (VCS) project verification process for the Waste Heat Capture Project at Natural Gas Pipeline in Culbertson, Montana (the Project). This report covers the verification of greenhouse gas (GHG) emission reductions from the displacement of fossil fuel generated electricity during the period January 1 through December 31, 2013. First Environment, Inc. (First Environment) conducted the verification from October 2013 to March 2014.

During the verification process, Element Markets acted as the Project advisor for the Project proponents, Basin Electric Power Cooperative (BEPC) and Ormat Recovered Energy Generation (OREG II). As such, First Environment communicated directly with Element Markets regarding all verification activities.

1.2 Scope and Criteria

The specific scope metrics for the verification are outlined in the table below:

Reporting Period	January 1 - December 31, 2013
Emission Sources Verified	Emissions reductions (expressed in units of carbon dioxide equivalents (CO₂e)) resulting from the displacement of electricity generated from fossil fuels; Project emissions of CO₂ from purchased electricity
Definition of Materiality	- Misstatements of greater than five percent of the Project's GHG assertion - Qualitative non-conformities with Standards of Verification described below

The following table outlines the guidance and protocols used to conduct this verification:

Standards of Verification	- VCS Standard: VCS Version 3, 8 October 2013, v3.4 (VCS Standard) - Approved Clean Development Mechanism (CDM) methodology AMS III.Q, Waste Energy Recovery (gas/heat/pressure) Projects, Version 04 (AMS III.Q) - Validated VCS Project Description (PD) dated November 21, 2011
Verification Process	- VCS Standard - VCS Program Guide, Version 3, 8 October 2013, v3.5 - ISO 14064-3: Specification with guidance for the validation and verification of greenhouse gas assertions, 2006

The Monitoring Report, dated March 25, 2014, Version 1.3 titled “*Emission Reductions From Capture of Waste Heat at The Culbertson Compressor Station*” was also reviewed to inform the verification assessment.

1.3 Level of Assurance

First Environment and Element Markets have agreed that a reasonable level of assurance be applied for the Project.

1.4 Summary Description of the Project

The Project uses waste heat from the exhaust at Northern Border's compressor station No. 3 near Culbertson, Montana to generate electricity. In the absence of the Project, the waste heat generated at this compressor station would dissipate into the atmosphere. With the implementation of the Project, a major portion of the waste heat is recovered and used to provide an average 5.5 MW of electricity generation capacity. The Project delivers electricity to the grid, displacing traditional fossil fuel sources and resulting in a net reduction in CO₂e emissions.

The VCS PD provides additional details regarding the Project activity.

2 VERIFICATION PROCESS

The verification process was utilized to gain an understanding of the Project's GHG emission sources and reductions and to evaluate and verify the collection and handling of data, the calculations that lead to the results, and the means for reporting the associated data and results.

The following verification process was used:

- conflict of interest review;
- selection of Audit Team;
- kick-off meeting with Element Markets;
- review of the validated PD;
- development of the verification plan and sampling plan;
- site visit;
- desktop review and evaluation of raw data, calculations, and supporting documentation for the period under review;
- follow-up interaction with Element Markets for corrective action or supplemental data as needed; and
- final statement and report development.

2.1 Method and Criteria

The following verification method was applied when conducting the verification:

Conflict of Interest Review

Prior to beginning any verification project, First Environment conducts an evaluation to identify any potential conflicts of interest associated with the project. No potential conflicts were found for this Project.

Audit Team

First Environment's Audit Team consisted of the following individuals who were selected based on their verification experience, as well as familiarity with renewable energy operations:

Jeff Daley – Lead Verifier
 Luca Nencetti – Verifier
 James Wintergreen – Internal Reviewer

Audit Kick-off

The verification audit was initiated with a kick-off conference call on November 7, 2013 between First Environment and Element Markets. The communication focused on confirming the verification scope, objectives, criteria, schedule, and the data required for the verification.

Project Description Review

The Audit Team reviewed the PD as a basis for developing the verification plan.

Development of the Verification Plan

The Audit Team formally documented its verification plan as well as determined the data-sampling plan. The verification plan was developed based on discussion of key elements of the verification process during the kick-off meeting. Element Markets was afforded the opportunity to comment on key elements of the plan for verification. Based on items discussed and agreed upon with Element Markets, the plan identified the First Environment team members, project level of assurance, materiality threshold, and standards of evaluation and reporting for the verification. It also provided an outline of the verification process and established project deliverables. A separate sampling plan was designed to review all project elements in areas of high risk of inaccuracy or non-conformance. The initial verification and sampling plans were provided to Element Markets on November 7, 2013.

Site Visit

First Environment performed a site visit on September 1, 2011 as part of the validation process for the Project. The site visit included interviews with relevant site personnel and Project stakeholders; review of the Project's operations, data collection procedures, and information management systems; as well as assessments of the Project's controls for sources of potential errors and omissions. During the kick-off meeting, Element Markets confirmed that no significant operational or monitoring changes had occurred since the previous site visit; therefore, a repeat site visit for this verification period was deemed unnecessary.

Desktop Review

The Audit Team performed a desktop review of the Monitoring Report, GHG emission reduction assertion, and supporting documentation, as further described in Section 2.2 below.

Corrective Actions and Supplemental Information

The Audit Team issued requests for supplemental information and corrective action during the verification process. The corrective action requests and the responses provided by Element Markets are summarized in Section 2.5.

Verification Reporting

Verification reporting documents the verification process and identifies its findings and results. Verification reporting consists of this report and a separate Deed of Representation to be submitted to the VCS Association.

2.2 Document Review

During the verification process, First Environment reviewed the Project's Monitoring Report, GHG emission reduction assertion, and supporting documentation for the current verification period to ensure consistency with the validated PD and AMS-III.Q. Discrepancies between Project documentation and the verification criteria were considered material and identified for corrective action. Monitoring deviations required appropriate justification from Element Markets. Additionally, First Environment assessed the GHG emission reduction assertion and underlying monitoring data to determine if either contained material or immaterial misstatements. The results of these reviews are discussed in greater detail below.

2.3 Interviews

Through the course of verification activities, First Environment interviewed the following Project personnel to inform the verification process:

Mihaly Wekler – Element Markets
Ken Nelson – Element Markets

2.4 Site Inspections

No site inspections were performed during the current verification process.

2.5 Resolution of Findings

The Audit Team issued requests for corrective action and clarification during the verification process. Element Markets' responses were sufficient to resolve all requests. The corrective action, clarification requests, and the responses provided are summarized in the tables below:

ID	Clarification Request	Participant Response	Verification Conclusion
1	Please clarify why the last group of test conditions ("Varhours Received") were not performed for either meter (s/n: 055006054, and s/n 055006045).	The last group of test conditions, meter pulse output 4, is normally used for varhours received, but at this location it is programmed and wired for meter trouble alarm to SCADA system. Therefore, the test conditions are not applicable to meter output 4 since it is simply an output for an alarm condition.	Response is acceptable

ID	Corrective Action Request	Participant Response	Verification Conclusion
1	The meter test reports for both electricity meters (s/n: 055006054, and s/n 055006045) were not tested within the three year testing frequency stipulated per the Western Area Power Administration (WAPA) metering policies. Please provide justification that the meters were tested per the WAPA metering policies.	Per confirmation with WAPA, the meter test schedule is performed on a calendar year basis, not with an exact 36 month interval. The testing will take place any time within the third calendar year after the previous test.	Response is acceptable
2	The following discrepancies were identified with the Monitoring Report: a. summary description Section 1.1 does not include all the relevant implementation dates; b. summary description Section 1.1 does not include the total GHG emission reduction/removals in the current monitoring period; c. Section 2.2 does not identify if there were any deviations during previous reporting periods.	The Monitoring Report has been revised to address the following: a. All relevant Project implementation dates have been added. b. The total GHG emission reduction achieved by the Project activity in the current monitoring period has been added. c. A description indicating that no monitoring deviations were applied during previous reporting periods have been included.	Response is acceptable

2.5.1 Forward Action Requests

There were no Forward Action Requests issued during the current verification.

2.6 Eligibility for Validation Activities

Not Applicable.

3 VALIDATION FINDINGS

Not Applicable – No validation activities took place during the current verification.

3.1 Participation under Other GHG Programs

Not Applicable – The Project is not seeking registration with any other GHG programs.

3.2 Methodology Deviations

The following methodology deviation was previously validated for the Project:

The Project does not monitor the gross amount of electrical energy produced, the amount of waste energy contained in the waste heat, or the temperature and pressure of the waste heat because these parameters are not relevant in the emission reduction calculations. Rather, emission reductions are calculated based on the net electricity delivered to the grid, as required by AMS-III.Q. Steps taken during validation included a review of the impact this deviation has on the conservativeness of the quantification of emission reductions. Additionally, this deviation meets the criteria for permitted methodology deviations, namely that it represents a deviation to the procedures for monitoring or measurement set out in the methodology. The Audit Team approved this monitoring deviation during the validation of the Project because it does not negatively impact the conservativeness of the quantification of emission reductions.

During the current reporting period, no additional deviations from the approved Monitoring Plan or the methodology were identified. Furthermore, there were no remaining issues or material discrepancies from the previous validation process.

3.3 Project Description Deviations

Not Applicable – The Project has not applied any project description deviations.

3.4 Grouped Project

Not Applicable – the Project is not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The Project is implemented according to the description provided in the validated PD. The Project became operational on December 17, 2009. The 10-year project crediting period began on January 1, 2010 and ends on December 31, 2019. First Environment previously confirmed the Project's start date and crediting period during validation. Emission reductions from the current verification period were claimed for the displacement of fossil generated electricity. No data and/or variables presented in the Monitoring Report differ from those stated in the validated PD.

First Environment confirmed during the validation process that GHG emission reduction credits had not been registered under another GHG program. Additionally, BEPC provided an attestation dated January 6, 2014 indicating that GHG emission reduction credits for the current verification period will only be registered with the VCS program.

The Project is eligible to receive renewable energy certificates (RECs); however, the attestation from January 6, 2014 provided by BEPC states that RECs will not be claimed for environmental attributes that are claimed as Verified Carbon Units (VCU's). The Project is listed in Midwest Renewable Energy Tracking System (MRETS). A third party, WAPA, reports the number of megawatt-hours (MWh) generated by the Project to the MRETS system. To avoid double counting, the RECs generated during the verification period – each representing one MWh of production - were retired in the MRETS system. The retirement is permanent and cannot be reversed once such a designation is made. First Environment reviewed a report from the MRETS tracking system confirming that the applicable number of RECs had been placed into a retirement account.

First Environment confirmed through interviews with Project personnel that no operational or management changes had occurred since the previous site visit. The following topics were discussed with Project personnel during the previous validation site visit and re-confirmed during the current verification process:

- the data collection process used to generate reports, and
- internal documents and protocols that set guidelines for the data collection process.

The information gathered during these discussions and review was used to assess the Project's data management systems and its controls for sources of potential errors and omissions. The primary aspects of the Project's monitoring plan are described below.

The primary parameter that is monitored and reported is the quantity of electricity generated and exported to the grid. The quantity of electricity generated by the Project and supplied to the grid is monitored continuously by a revenue grade meter (JemStar JS-09R6120-43) at the point of interconnection with the grid. The revenue meter is owned by Ormat and maintained by BEPC. The meter continuously measures power generated by the Project. Production data recorded by the meter is aggregated hourly and reported in an MV90 report which identifies kilowatt hours (kWh) generation. WAPA also performs independent meter readings on a monthly basis and reports the total number of megawatt hours (MWh) generated by the Project to the MRETS tracking system. The data reported to MRETS is what is used for the purpose of quantifying emission reductions.

The metering equipment at the point of interconnection is required to be maintained and calibrated in accordance with the interconnection agreement, the WAPA Regional Metering Policy, and the relevant American National Standards Institute (ANSI) Standard, ANSI C57.13. First Environment reviewed a meter test report from June 27, 2013 and other supporting documentation demonstrating that the meter was operating accurately and maintained consistent with interconnection agreement, WAPA requirements which stipulates the meter shall be tested every three years, and ANSI C57.13.

The data collection and recordkeeping procedures were found to be consistent with those outlined in the monitoring plan described by the PD and meet the requirements of AMS-III.Q.

Previously validated methodology deviations are listed and described above in Section 3.2.

The Project is implemented according to the description provided in the validated PD and the monitoring system implemented was found appropriate to the task of obtaining, recording, compiling and analyzing the monitored data and parameters.

4.2 Accuracy of GHG Emission Reduction and Removal Calculations

Emission reductions are calculated ex post using the approach indicated in AMS-III.Q and the validated PD. Emission reduction calculations for the verification period were reviewed to ensure accuracy in the formulas used and the raw data used as inputs. The formulas were tested and found to be consistent with the calculations described in AMS-III.Q and the validated PD.

Monthly project monitoring data for net quantity of electricity generated ($EG_{i,j,y}$) from the MRET's database was checked for quality control against hourly data from the revenue meter (MV90 reports) and aggregated annually. The total electricity generated during the verification period was multiplied by the CO₂ emissions factor for the grid displaced electricity due to project activity ($EF_{elec,i,j,y}$). The grid displaced electricity emission factor was previously calculated and approved during validation and is fixed for the length of the crediting period.

Consistent with the validated PD, the Project does not combust any fuels to operate since it is not a hydro or geothermal project. The Project does, however, consume a small quantity of grid-connected electricity for station services. Monthly invoices were reviewed to confirm the quantity of electricity consumed ($EF_{elec,i,j,y}$) by the Project. The total electricity consumed during the verification period was multiplied by the CO₂ emissions intensity factor for the grid ($EF_{EL,j,y}$), which had been previously calculated ex-ante and approved during validation, to calculate the quantity of Project emissions. Total emission reductions were calculated by subtracting these Project emissions from total baseline emissions.

The verification process focused on the evaluation of quantification spreadsheets to ensure that they were consistent with the formulas and equations described in AMS-III.Q and the validated PD. The raw data used in the calculations were compared with the values used in the final calculations and tested for transcription or mathematical errors. The calculations for the entire period were reviewed as well to determine whether they were free of material misstatement. All calculation methods and emission factors used to determine emission reductions were consistent with those outlined in the validated PD.

The GHG emission reductions were quantified correctly in accordance with the validated PD and methodology AMS-III.Q, and no material misstatements were observed.

4.3 Quality of Evidence to Determine GHG Emission Reductions and Removals

Element Markets provided adequate documentation for the emission reduction calculations as well as its management systems around the data collection process. Specifically, First Environment was provided a Monitoring Report prepared in accordance with the VCS program template, transparent calculation spreadsheets, calibration records, and electronic data associated with electricity generated, and operating hours. Monthly monitoring data for net quantity of electricity generated from the MRET's database was cross checked against hourly data from the revenue meter to assess reliability of the evidence and verify the accuracy of the information flow.

The evidence provided was consistent with the requirements of AMS-III.Q and the validated PD and meets generally accepted evidentiary standards for best practice in GHG accounting.

4.4 Non-Permanence Risk Analysis

Not relevant since the project is not AFOLU activity.

5 VERIFICATION CONCLUSION

First Environment was retained to provide verification services for the Project's GHG emission reductions assertion based on the following fundamentals:

- *Level of assurance:* Reasonable assurance.
- *Objectives of verification:* To assure project conformance with the VCS Standard, the CDM small-scale methodology AMS-III.Q, and the validated PD.
- *Verification criteria:* VCS Standard, the CDM small-scale methodology AMS-III.Q, and the validated PD.
- *Definition of materiality:* Misstatements of more than five percent of the GHG assertion and qualitative non-conformities with the verification criteria are considered material.

- *Scope, including:*
 - o *Boundaries of the assertion:* Compressor station No. 3 (Culbertson, MT) plant area; for the purpose of calculating the combined margin emission factor, the project boundary also includes the grid-connected power plants in the Midwest Reliability Organization regional grid;
 - o *The physical infrastructure, facilities, and activities within the assertion:* waste heat capture operations;
 - o *GHG sources, sinks, and reservoirs included within the assertion:* Emission reductions (expressed in units of carbon dioxide equivalents (CO₂e)) resulting from the displacement of electricity generated from fossil fuels, Project emissions of CO₂ from purchased electricity; and
 - o *The time period for the assertion:* January 1 through December 31, 2013.

Based on the assessments performed and the historical evidence collected, First Environment concludes with a reasonable level of assurance that the emissions reductions of the Project resulting from the displacement of electricity generated with fossil fuels for the period of January 1 through December 31, 2013 are:

- consistent with the validated PD of November 21, 2011;
- in conformance with the VCS Standard and the CDM small-scale methodology AMS-III.Q (Version 4);
- without material discrepancy; and meeting the minimum level of accuracy of at least 95 percent.

GHG emission reductions or removals from January 1 through December 31, 2013:

Verified Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2013	31,305	42	0	31,263
Total	31,305	42	0	31,263