

VERIFICATION REPORT FOR THE WASTE HEAT CAPTURE PROJECT AT NATURAL GAS PIPELINE 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*, 1 February 2012, v3.2; 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, Inc. (First Environment) issued several corrective action and clarification requests, all of which were addressed sufficiently by Element Markets, LLC. The project claims emission reductions of 23,265 metric tonnes CO₂e for Vintage 2010 and 31,541 metric tonnes CO₂e for Vintage 2011. First Environment 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

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) located near Culbertson, Montana. This report covers the verification of greenhouse gas (GHG) emission reductions from the displacement of fossil fuel generated electricity during the period January 1, 2010 through December 31, 2011. First Environment, Inc. (First Environment) conducted the verification from January to March 2012.

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.

1.1 Objective

The purpose of this verification was, through review of appropriate evidence, to establish that:

- the Project conforms to the requirements of the verification criteria discussed in Section 1.2; and
- the data reported are accurate, complete, consistent, transparent, and free of material error or omission.

1.2 Scope and Criteria

The Project creates emission reductions, expressed in metric tonnes of carbon dioxide equivalents (CO₂e), resulting from the displacement of electricity generated from fossil fuels. Emission reductions are submitted for verification as part of the VCS project registration process.

The Project's emission reductions have been quantified in accordance with the Clean Development Mechanism (CDM) small scale methodology AMS-III.Q, *Waste energy recovery (gas/heat/pressure) projects Version 4* (AMS-III.Q). First Environment used the VCS Standard, 1 February 2012, v3.2 (VCS Standard); the CDM Methodology AMS-III.Q; and the validated Project Description (PD) as the basis for this verification. The verification covers the time period from January 1, 2010 through December 31, 2011. Any misstatement greater than five percent of the Project's GHG assertion is considered material. Qualitative non-conformities with the VCS Standard, the CDM small-scale methodology AMS-III.Q, and the validated PD are also considered material during the verification process.

1.3 Level of assurance

First Environment, Inc. (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 produce an average of 5.5 MWs of electricity. 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 VALIDATION PROCESS, FINDINGS, AND CONCLUSION

2.1 Validation Process

Not Applicable

2.2 Validation Findings

2.2.1 Gap Validation

Not Applicable

2.2.2 Methodology Deviations

Not Applicable

2.2.3 New Project Activity Instances

Not Applicable

2.3 Validation Conclusion

Not Applicable

3 VERIFICATION PROCESS

3.1 Method and Criteria

To review the Project's GHG information, 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.

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.

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:

Iris Caldwell – Lead Verifier
 Jeff Daley - Verifier
 Mary Pat Campbell - Verifier
 Natali Ganfer – Verifier
 Michael Carim – Internal Reviewer

Audit Kick-off

The verification audit was initiated with a kick-off conference call on January 10, 2012 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 January 10, 2012.

Site Visit

First Environment performed a site visit in September 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 3.2 below.

Corrective Actions and Supplemental Information

The Audit Team issued requests for supplemental information, clarification, and corrective action during the verification process. The clarification and corrective action requests and the responses provided by Element Markets are summarized in Section 3.5.

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.

3.2 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.

3.3 Interviews

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

Gauri Potdar – Element Markets

Jason Doerr – BEPC

Aaron Ramsdell – BEPC

3.4 Site Inspections

No site inspections were performed during the current verification process.

3.5 Resolution of Any Material Discrepancy

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 and clarification requests and the responses provided are summarized in the tables below:

ID	Corrective Action Request	Participant Response	Verification Conclusion
CAR No. 1	The source of the electricity generation data used in the emission reduction calculations is inconsistent with the validated PD.	The calculations were updated to utilize MV90 data instead of the totals reported in the Midwest Renewable Energy Tracking System (MRETS).	Response is acceptable.
CAR No. 2	The crediting period stated in the Monitoring Report is inconsistent with that in the validated PD.	The crediting period stated in the Monitoring Report was revised to be consistent with the PD	Response is acceptable.
CAR No. 3	The reporting period is incorrectly stated on the title page of the Monitoring Report.	The Monitoring Report was revised to reflect the correct reporting period.	Response is acceptable.

ID	Clarification Request	Participant Response	Verification Conclusion
CR No. 1	Please clarify in the Monitoring Report the records retention policy for records generated during the verification period.	The Monitoring Report has been revised to specify the required records retention policy for the Project (2 years beyond the 10 year crediting period)	Response is acceptable.
CR No. 2	Please clarify why the meter test reports from 2009 are dated prior to the meter starting notices.	Element Markets clarified that there are two power projects at the Culbertson site. One of them is waste heat and the other is natural gas generation. The meter test report from October 2009 is from the natural gas generation project, so is not applicable to the waste heat project.	Response is acceptable.
CR No. 3	Please clarify how the test reports demonstrate conformance with the accuracy requirements at the loads stipulated by the Western Area Power Administration (WAPA) policy.	Element Markets clearly explained the WAPA requirements and how the meter test reports meet these requirements. Specifically, supporting documentation was provided from WAPA to clarify that the fourth test condition at the PF=1, Load =50% is only tested if one of the other test conditions is found to be outside the required accuracy threshold. Because the remaining three test conditions were within the required accuracy threshold, the fourth test condition was not performed.	Response is acceptable.
CR No. 4	Please clarify if percent registration >0.3% from 100 is acceptable for the May 2010 test reports. Provide supporting documentation as appropriate.	Element Markets clearly explained that the tests with results >0.3% are due to Transmission Loss Compensation (TLC) to account for difference between the load point and the meter point. Without accounting for TLC, the meters are within the required accuracy thresholds. This is consistent with the WAPA metering policy.	Response is acceptable.

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. 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. BEPC provided an attestation dated January 26, 2012 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 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 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 witnessed the retirement of the RECs in the MRETS system over the verification period during a webinar on February 28, 2012. Element Markets also provided a report from MRETS 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. The MV90 data report 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 and the WAPA Regional Metering Policy. First Environment reviewed a meter test report from May 4, 2010 and other supporting documentation demonstrating that the meter was operating accurately and maintained consistent with WAPA requirements.

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

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. The Audit Team approved this monitoring deviation during validation because it does not negatively impact the conservativeness of the quantification of emission reductions. During the reporting period, no 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.

4.2 Accuracy of GHG Emission Reduction or 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 MV90 report were checked for quality control against monthly data in the MRET's database and aggregated annually. The total electricity generated during the verification period was multiplied by the CO₂ emissions factor for the grid electricity displaced due to project activity ($EF_{grid,CM,y}$), which had been previously calculated ex-ante and approved during validation. Total baseline emissions were determined by multiplying this quantity by the f_{cap} factor, which was calculated for the verification period in accordance with the validated PD.

The Project consumes a small quantity of grid-connected electricity for station services. Monthly invoices were reviewed to confirm the quantity of electricity consumed ($EC_{PJ,j,y}$) 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 determine 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, such as meter readings and utility invoices, were compared with the quantities used in the final calculations and tested for transcription and mathematical errors. The calculations for the entire period were also reviewed to confirm that they were free of material misstatement. All calculation methods and emission factors used to quantify emission reductions were consistent with those outlined in the validated PD. No material misstatements were observed.

4.3 Quality of Evidence to Determine GHG Emission Reductions or 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 power generation, and electricity consumption. 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 Management and Operational System

Element Markets has adequate management and operational systems in place with respect to monitoring and reporting, as determined through observation during the validation site visit and the current desktop review of project documentation.

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:* CO₂ emission reductions expressed as carbon dioxide-equivalents; and
 - o *The time period for the assertion:* January 1, 2010 through December 31, 2011.

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, 2010 through December 31, 2011 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); and
- without material discrepancy; and meeting the minimum level of accuracy of at least 95 percent.

Verified GHG emission reductions or removals from January 1, 2010 through December 31, 2010:

GHG Emission Reductions or Removals	tCO ₂ e
Baseline Emissions	23,274
Project Emissions	9
Leakage	0
Net GHG emission reductions or removals	23,265

Verified GHG emission reductions or removals from January 1, 2011 through December 31, 2011:

GHG Emission Reductions or Removals	tCO ₂ e
Baseline Emissions	31,568
Project Emissions	27
Leakage	0
Net GHG emission reductions or removals	31,541

6 LEAD AUDITOR SIGNATURE



Iris Caldwell
Senior Engineer

7 INTERNAL REVIEWER SIGNATURE



Michael Carim
Associate