

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



Document Prepared By First Environment, Inc.

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Prepared By	First Environment, Inc.
Contact	91 Fulton Street Boonton, New Jersey 07005 Tel: 973-334-0003 www.firstenvironment.com
Approved By	James Wintergreen
Work Carried Out By	Iris Caldwell Michael Carim Mary Pat Campbell Natali Ganfer Jeff Daley

Summary:

The Waste Heat Capture Project at Natural Gas Pipeline in Culbertson, Montana (the Project) consists of the recovery of excess heat from a natural gas compressor station located along the Northern Border natural gas pipeline near Culbertson, Montana. The excess heat is recovered and used to produce electricity in a 5.5 MW generator. This activity results in a net reduction of greenhouse gas (GHG) emissions.

The validation process consists of the independent third-party assessment of the project design and emission reduction assertion against the criteria stated in the Verified Carbon Standard (VCS) Standard, 15 July 2011, v3.1 and the approved Clean Development Mechanism (CDM) small-scale methodology AMS-III.Q. (Version 4).

During the validation process, First Environment, Inc. (First Environment) issued several clarification and corrective action requests – all of which were addressed sufficiently by Element Markets, LLC. In summary, First Environment is reasonably assured that the Project meets all relevant VCS Version 3 requirements and correctly applies the VCS-approved CDM methodology AMS-III.Q.

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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 validation process for the Waste Heat Capture Project at Natural Gas Pipeline in Culbertson, Montana (the Project). This report provides a description of the steps involved in conducting the validation and the findings of the validation performed on the basis of the VCS Standard, as well as criteria given to provide for consistent project operation, monitoring, and reporting of greenhouse gas (GHG) emission reductions. This validation report summarizes the findings of the validation.

As outlined in the VCS Project Description (VCS PD), the VCS-approved methodology applied to the project activity is the Clean Development Mechanism (CDM) small-scale methodology AMS-III.Q – *Waste energy recovery (gas/heat/pressure) projects*, Version 4 (AMS-III.Q). The Audit Team was provided the initial version of the VCS PD on July 13, 2011. Based on this documentation, a document review and desktop audit took place, which resulted in corrective action requests (discussed later in this report) and revisions to the VCS PD. The final version, dated November 21, 2011, serves as the basis of the final conclusions presented herewith.

During the validation process, Element Markets acted as the project advisor for the project proponents, Basin Electric Power Cooperative (BEPC) and Ormat Recovered Energy Generation II (OREG II). As such, the Audit Team communicated directly with Element Markets regarding most validation activities. The validation was performed concurrently with the validation of an identical project owned and operated by BEPC and OREG II near Garvin, Minnesota.

1.1 Objective

The purpose of validation is to have an independent third party assess the Project's design. In particular, the Project's baseline, monitoring plan, and the Project's compliance with VCS requirements are validated. This is to ensure that the VCS PD, as documented, is sound and reasonable and meets the identified criteria. Validation objectives also include an assessment of the likelihood that the Project will achieve the emission reductions estimated by Element Markets. Validation is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the Project and its intended generation of emission reductions.

1.2 Scope and Criteria

The validation scope is defined as an independent and objective review of the VCS PD. The VCS PD was reviewed against the following criteria:

- VCS Standard, 15 July 2011, v3.1 (VCS Standard), and
- CDM small-scale methodology AMS-III.Q, *Waste energy recovery (gas/heat/pressure) projects*, Version 4, including all methodological tools reference therein.

The Audit Team employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of emission reductions. The validation process was also informed by the requirements stated in the VCS Standard; the VCS Program Guide, 19 October 2011, v3.1; and the ISO 14064-3 standard.

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 carbon dioxide equivalent (CO₂e) emissions.

The VCS PD provides additional details regarding the project activity.

2 VALIDATION PROCESS

2.1 Method and Criteria

The following validation process was used:

- conflict of interest review;
- selection of validation team;
- initial interaction with Element Markets;
- development of the validation plan;
- desktop review of the project design and the baseline and monitoring methodology and other relevant project documentation;
- site visit;
- follow-up interaction with Element Markets and other project personnel for supplemental information and corrective action as necessary; and
- report development and issuance of final validation statement.

The validation process was utilized to evaluate whether the Project's approach, as outlined in the VCS PD, is consistent with the VCS Standard and the AMS-III.Q methodology. A validation conformance checklist was developed for the Project, which summarizes the criteria used to evaluate the Project, the Project's conformance with each criterion, and the Audit Team's validation findings.

Conflict of Interest Review

Prior to beginning any validation 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 validation experience, as well as familiarity with renewable energy operations:

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

Audit Kick-off

The validation process was initiated with a kick-off conference call on June 6, 2011 between First Environment and the primary Element Markets contacts, Gauri Potdar and Ken Nelson. The communication focused on confirming the validation scope, objectives, criteria, schedule, and the information required for the validation.

Development of the Validation Plan

The Audit Team formally documented its validation plan as well as determined the sampling plan. The validation plan was informed by the kick-off meeting where key elements of the plan for validation were discussed, including project team members, project level of assurance, materiality threshold, and standards of reporting and validation. The validation plan also provided an outline of the validation process and established project deliverables. A separate sampling plan was designed to review all project elements in areas of potentially high risk of inaccuracy or non-conformance.

Desktop Review

The Audit Team performed a desktop review of the VCS PD and supporting documentation, as further described in Section 2.2 below.

Site Visit

Iris Caldwell performed a site visit to compressor station No. 3 and BEPC's headquarters office on September 1, 2011. The focus of the site visit was to interview relevant site personnel and project stakeholders; review the Project's operations, data collection procedures, and information management systems; as well as assess the Project's controls for sources of potential errors and omissions.

Corrective Actions and Supplemental Information

The Audit Team requested clarification and supplemental information as well as corrective actions during the validation process. The corrective action and clarification requests and the responses provided by Element Markets are summarized in Section 2.5.

Validation Reporting

Validation reporting, represented by this report for Element Markets, documents the validation process and identifies its findings and results.

2.2 Document Review

The Audit Team conducted the validation using the VCS Standard and AMS-III.Q as the criteria. Additionality, eligibility requirements, baseline scenario(s), project emissions, monitoring plan, and other pertinent criteria were assessed to evaluate the Project's approach as outlined in the VCS PD against the validation criteria. Discrepancies between the VCS PD and the validation criteria were considered material and identified for corrective action. Any deviations from the validation criteria required appropriate justification.

2.3 Interviews

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

- Gauri Potdar, Senior Director, Renewable Energy – Element Markets,
- Ken Nelson, Senior Vice President, Trading – Element Markets,
- Ron Rebenitsch, Manager of Alternative Technologies – BEPC,

- Jeremy Woeste, Alternative Technologies Coordinator – BEPC,
- Kip Waddell, Project Developer – OREG II.

2.4 Site Inspections

As described above, Iris Caldwell performed the site visit on September 1, 2011.

2.5 Resolution of Any Material Discrepancy

The Audit Team identified several differences between the Project's approach, as outlined in the VCS PD, and the validation criteria that would constitute non-conformities or require approval as a methodology revision. Corrective action requests were issued accordingly. Additionally, First Environment requested several clarifications in order to inform the validation assessment.

Through communications with the Audit Team, Element Markets was able to resolve all corrective action and clarification requests made by the Audit Team during the validation process. The following tables summarize the corrective action and clarifications requested, as well as Element Markets' responses.

2.5.1 Corrective Action Request	Summary of Participant Response	Validation Conclusion
Element Markets, LLC does not meet the VCS definition of project proponent.	The VCS PD was revised to identify BEPC and OREG II as co-project proponents. Element Markets is identified as another entity involved in the Project.	Response is acceptable.
Section 1.4 of the VCS PD does not include contact information for other key project participants besides BEPC.	The VCS PD was revised to include all project participants involved.	Response is acceptable.
Please identify the essential distinctions between the project activity and other waste heat recovery projects installed by BEPC and OREG II.	Additional detail was added to the common practice table in the VCS PD regarding essential distinctions between the project activity and other waste heat projects.	Response is acceptable.
Project emissions due to electricity consumption are not determined according to the <i>Tool to calculate baseline, project and/or leakage emissions from electricity consumption</i> .	The project emissions calculations in the VCS PD were revised to be consistent with the <i>Tool to calculate baseline, project and/or leakage emissions from electricity consumption</i> .	Response is acceptable.
"Power units" at "power plants" that operate both low-cost/must-run (LCMR) units and non-LCMR units are incorrectly assessed at the power plant level in the calculation of operating margin.	The electricity emission factor calculations were revised to be consistent with the <i>Tool to calculate the emission factor for an electricity system</i> .	Response is acceptable.
Provide justification for why coal-fired power units should not be considered LCMR generation resources.	LCMR resources were defined as nuclear, hydro, wind, solar, and any other resource with a capacity factor over 80%. This follows guidance that EPA used in developing the eGRID database, where baseload units were defined as those with a capacity factor over 80%. Where	Response is acceptable.

2.5.1 <i>Corrective Action Request</i>	Summary of Participant Response	Validation Conclusion
	coal units meet or exceed this capacity factor, they are considered baseload.	
The set of power units that “started to supply electricity to the grid most recently” was not correctly identified as per Step 5(b) of the <i>Tool to calculate the emission factor for an electricity system</i> .	The electricity emission factor calculations were revised to correctly identify the set of power units built most recently.	Response is acceptable.
The set of power units that “comprises the larger annual electricity generation” was not determined according to Step 5(c) of the <i>Tool to calculate the emission factor for an electricity system</i> .	The electricity emission factor calculations were revised to correctly identify the set of power units that comprise the larger annual electricity generation.	Response is acceptable.
Please further justify the selection of operating margin and build margin weighting given that the project activity is neither wind nor solar power generation.	The weighting factors reflect the intermittent nature of the availability of the waste heat from the Northern Border Pipeline. The availability of the waste heat is dependent entirely on the shippers along the Northern Border Pipeline. Neither OREG II nor Basin can impact or control this activity. Given the high degree of unpredictability in pipeline gas flows, the Project is similar to a wind or solar projects. Therefore, the use of the higher weight for the operating margin is appropriate.	Response is acceptable.
The VCS PD does not specify how long electronic data and records are retained.	The VCS PD was updated to identify that all records will be kept for two years after the end of the project crediting period.	Response is acceptable.
Please justify why the project activity would not have occurred anyway due to BEPC’s internal target for renewable energy generation.	BEPC’s internal target was developed to show support to renewable resources and respond to member and community interest in renewable generation. BEPC had no obligation to meet the target nor was there any internal requirement to do so. At the time the waste heat project was completed, Basin had exceeded its target; therefore, this resource was not necessary to meet the internal resolution.	Response is acceptable.
The VCS PD does not include relevant equations for the quantification of project emissions and total emission reductions.	The VCS PD was revised to include relevant equations for the quantification of project emissions and total emission reductions.	Response is acceptable.
Section 3.2 of the VCS PD does not clearly address paragraph 14 of the AMS-III.Q. methodology.	The VCS PD was revised to indicate that emissions in the exhaust are not exacerbated by the project activity and therefore are not accounted for as project emissions.	Response is acceptable.
Please further justify why it is not practicable to identify the baseline scenario and demonstrate additionality for each project activity separately.	This CAR is no longer applicable, since it was determined that the waste heat projects located in Garvin, MN and Culbertson, Montana were two separate projects. Therefore, a VCS PD was prepared for each project.	Response is acceptable.

2.5.1 Corrective Action Request	Summary of Participant Response	Validation Conclusion
Please clarify in the VCS PD whether Option II or Option III is applied in the investment analysis.	The VCS PD was revised to consistently identify Option III as the selected financial analysis method.	Response is acceptable.
In Sub-step 2b, the VCS PD incorrectly indicates that interconnection costs of waste heat generation are considered in the investment analysis.	The VCS PD was revised to indicate that interconnection costs are conservatively excluded, which is consistent with the benchmark analysis.	Response is acceptable.
Please further justify why additional information on the Neptune Gas Processing, Northern Border Pipeline Compressor Station No. 6, and Northern Border Pipeline Compressor Station No. 13 projects is not available for the common practice analysis.	Essential distinctions were identified in the VCS PD for these projects.	Response is acceptable.

2.5.2 Clarification Request	Summary of Participant Response	Verification Conclusion
Please further clarify the mechanism for demonstrating that renewable energy certificates are “retired” and therefore neither double-counted with carbon credits nor used to satisfy Renewable Portfolio Standard obligations or Renewable Energy Objectives.	The VCS PD was updated to include additional detail regarding the mechanism for demonstrating that renewable energy certificates have been cancelled, including sample screenshots from the tracking registry.	Response is acceptable.
Please confirm that the waste heat recovery equipment was installed new and provide supporting documentation as appropriate.	OREG II confirmed in writing that only new equipment was installed at the project location.	Response is acceptable.
Please further explain why the Antelope Valley Station is an appropriate proxy for determining the electricity generation displaced by the project activity.	BEPC applies the Component/Peaker Method for determining the avoided cost rate, which assumes that the facility displaces the marginal, or most expensive, generation source in the utility’s system at any given time. In the case of BEPC’s eastern system, the marginal unit is represented by Leland Olds (not Antelope Valley as identified in the Rural Utilities Service (RUS) filing). This is a typo identified by BEPC. The marginal unit costs include fuel costs, transmission and distribution losses, and other variable costs, such as incremental scrubber costs, taxes, etc. Hence, the marginal unit is chosen as the proxy measure to determine the costs of the energy displaced by the project activity.	Response is acceptable.
Please further clarify the frequency of monitoring, recording, and data acquisition of the following parameters: $Q_{WCM,y}$ and $EG_{i,j,y}$.	The VCS PD was revised to more clearly indicate that data monitoring is continuous, while data recording and acquisition are monthly.	Response is acceptable.

2.5.2 Clarification Request	Summary of Participant Response	Verification Conclusion
Please clearly identify in the VCS PD the project electricity system and connected electricity system and specify how they are related, consistent with Step 1 of the <i>Tool to calculate the emission factor for an electricity system</i> .	The VCS PD was revised to clearly identify the project electricity system and connected electricity system.	Response is acceptable.

3 VALIDATION FINDINGS

3.1 Project Design

The Project applies the AMS-III.Q methodology, which is applicable to the project activity because it falls within the scope of the approved methodology. Specifically, the project activity involves the utilization of waste heat from an existing facility as an energy source for the generation of electricity. The recovery of waste heat is a new initiative at Northern Border's compressor station No. 3. The resulting emission reductions will be less than 60,000 metric tonnes of CO₂e annually, as confirmed through review of historic operational data and the ex ante emission reduction estimates.

Compressor station No. 3 is located approximately six miles northeast of Culbertson, Montana in Roosevelt County (latitude and longitude are 48.144° and -104.516°, respectively). The compressor station is driven by a natural gas-fuelled turbine, which exhausts hot combustion gases between 800° to 900°F. OREG II's recovered energy generation unit utilizes the hot exhaust gases to generate electricity through a specially adapted geothermal technology.

The project start date is December 17, 2009, which is the first date on which electricity began being exported to the grid. The Audit Team reviewed operational records and the Interconnection Agreement in order to confirm the project start date. The first crediting period is January 1, 2010 to December 31, 2019. The forecasted emission reductions during the first crediting period are 232,477 metric tonnes CO₂e.

The Project complies with relevant laws and regulations. The Audit Team reviewed email communications with local regulatory agencies and interviewed project personnel during the site visit in order to confirm that necessary regulatory requirements were met.

There are two project proponents associated with the Project: OREG II and BEPC. The Audit Team reviewed the power purchase agreement (PPA) between OREG II and BEPC in order to confirm the ownership and operational arrangement. First Environment also confirmed during the site visit that OREG II maintains operational control over the waste heat recovery and electricity generation equipment, while BEPC maintains operational control over the interconnection infrastructure and net electricity metering.

BEPC has not attempted to register the Project with another GHG program other than VCS and the Project is not a part of any emissions trading programs or other binding limits. The Audit Team reviewed an attestation signed by BEPC in order to confirm such. The Project is eligible to receive renewable energy certificates (RECs); however, BEPC attested that it does not intend to receive RECs for emission reductions that are registered under the VCS program. Additionally, the VCS PD identifies an acceptable procedure for retiring RECs within the tracking registry in order to avoid double-counting.

Commercially sensitive information related to the project design and finances has been redacted from the public version of the VCS PD. The Audit Team reviewed all business confidential information and determined that the classification as “commercially sensitive” is appropriate.

3.2 Application of Methodology

3.2.1 Title and Reference

The VCS-approved methodology applied to the project activity is the CDM small-scale methodology AMS-III.Q. – *Waste energy recovery (gas/heat/pressure) projects*, Version 4.

3.2.2 Applicability

The project activity complies with the applicability requirements of AMS-III.Q. The table below lists the relevant applicability requirements and identifies how the Project meets them.

AMS-III.Q Requirement	Project Conformance	Comments/Findings
The energy produced with the recovered waste gas/heat/pressure should be measurable.	Yes	The quantity of electricity supplied to the grid is measured continuously with a revenue quality meter device. This was confirmed during the site visit.
Energy generated in the project activity may be used within the industrial facility or exported to other industrial facilities (included in the project boundary).	Yes	The Project only exports electricity to the grid, apart from some minor parasitic load that is consumed when the Project is operating. This was confirmed during the site visit.
Electricity generated in the project activity may be exported to the grid, or used for captive purposes.	Yes	The Project exports electricity to the grid. This was confirmed during the site visit.
The emission reductions are claimed by the generator of energy using waste energy.	Yes	The emission reductions associated with the project activity were transferred from OREG II (the operator of the electricity generation equipment) to BEPC per the PPA. The Audit Team reviewed the PPA in order to confirm.
The waste gas/heat/pressure utilized in the project activity would have been flared or released into the atmosphere in the absence of the project activity.	Yes	The waste heat would have been released in the atmosphere in the absence of the Project. The Audit Team reviewed an energy balance, electrical design specifications, and planning documentation in order to confirm.

3.2.3 Project Boundary

The project boundary is defined by the geographical extent of compressor station No. 3 where the waste heat is generated, the OREG II operations which transform the waste heat into electricity, and the grid to which the electricity is exported. 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.

3.2.4 Baseline Scenario

The baseline scenario of the Project is defined in accordance with the requirements of the AMS-III.Q methodology. Specifically, electricity would have been generated by the operation of grid-connected power plants and the addition of new generation sources.

3.2.5 Additionality

The additionality of the Project is demonstrated by applying the CDM large-scale tool, *Tool for the demonstration and assessment of additionality*, consistent with guidance from the VCS Association. The VCS PD follows the stepwise procedure as further described below:

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations.

The VCS PD identifies several alternatives to the project activity, including:

- the Project undertaken without being registered as a VCS project activity;
- generation of electricity from the operation of grid-connected power plants and the addition of new generation resources, as reflected by the combined margin emission factor; and
- procurement of other renewable energy generation sources, such as wind, solar, or biogas.

The procurement of other renewable energy generation sources is eliminated as a realistic and credible alternative, because the other renewable energy technologies do not provide a comparable level of service to the Project. The Audit Team reviewed evidence of the average capacity factors of wind and solar installations as well as BEPC's current biogas installations.

None of the alternatives identified are mandated by any enforced law, statute, or other regulatory framework, nor is the project activity mandated by any applicable law, statute, or other regulatory framework. The Audit Team reviewed evidence of BEPC's current renewable energy generation in order to confirm that BEPC had already met any obligations under mandatory state Renewable Portfolio Standards through the end of the crediting period prior to the construction of the Project.

Step 2: Investment Analysis

An investment analysis is applied consistent with the requirements of the *Tool for the demonstration and assessment of additionality*.

Sub-step 2a: Determine Appropriate Analysis Method

The project activity and alternatives identified in Step 1 generate revenues from the sale of electricity; therefore, the Simple Cost Analysis (Option I) cannot be applied. Instead, the VCS PD identifies Benchmark Analysis (Option III) as the appropriate analysis method.

Sub-step 2b: Apply benchmark analysis (Option III)

The VCS PD identifies the annual avoided cost rate as the appropriate benchmark indicator. The annual avoided cost rate is reported to the RUS under the Public Utilities Regulatory Policy Act and represents the fuel displacement value of the marginal generation unit that would operate in absence of the Project. This indicator meets option (e) as given in Sub-step 2b of the *Tool for the demonstration and assessment of additionality*. The VCS PD provides appropriate justification regarding the appropriateness of this indicator and also why the other benchmark options are not applicable.

Sub-step 2c: Calculation and Comparison of Financial Indicators

The Audit Team reviewed annual RUS reports from 2005 through 2011 as well as BEPC's internal coal price forecasts in order to confirm the calculation of the avoided cost rate over the term of the PPA. The Audit Team was also provided a copy of the PPA in order to confirm the contract prices. The annual avoided cost rate is compared to the PPA price. Interconnection and integration costs associated with the Project are conservatively excluded. Nonetheless, the PPA price over the entire contract term exceeds the avoided cost rate, which demonstrates that the Project cannot be considered financially attractive. The VCS PD further argues that revenue from carbon credits was an important consideration for the project proponents when evaluating the investment decision. The Audit Team reviewed BEPC's 2007 Power Supply Analysis and internal company communications in order to confirm BEPC's interest in carbon credits.

Sub-step 2d: Sensitivity Analysis

A sensitivity analysis is presented in the VCS PD to demonstrate that the financial analysis is robust to reasonable variations in critical assumptions. Specifically, the escalator used to forecast the avoided cost rate through the end of the PPA contract term is varied by ± 10 percent. The results show that this variation does not affect the conclusion that the Project is not financially attractive.

Step 3: Barriers Analysis

A barriers analysis is also applied consistent with the requirements of the *Tool for the demonstration and assessment of additionality*. Specifically, the VCS PD identifies unstable pipeline flow and compressor station reliability as a technological barrier faced by the Project. This variability increases the economic and reliability risk to the project proponents. The Audit Team reviewed evidence of this barrier, including a study prepared by the Gas Technology Institute.

Step 4: Common Practice Analysis

The VCS PD includes an assessment of common practice among several similar waste heat projects located in the United States. In accordance with Sub-step 4b of the *Tool for the demonstration and assessment of additionality*, the VCS PD identifies essential distinctions between the Project and the other waste heat projects, including different ownership structures, use of other waste heat projects to comply with Renewable Portfolio Standard obligations, and other waste heat projects being ineligible to participate in the VCS program. The Audit Team reviewed adequate evidence for each of these distinctions and concluded that the common practice analysis appropriately complements the investment and barriers analyses described above. Based on this, the Audit Team confirmed that the Project is additional.

3.2.6 Quantification of GHG Emission Reductions and Removals

The VCS PD presents a procedure for quantifying emission reductions that is consistent with the procedures described in the AMS-III.Q methodology and relevant CDM tools. The equations are correctly identified and the calculation of GHG emission reductions is presented in a transparent manner, incorporating all relevant GHG sources, sinks, and reservoirs. Total emission reductions are calculated by subtracting project and leakage emissions from baseline emissions.

Baseline emissions are estimated ex-ante based on the quantity of electricity generated by the Project during calendar year 2010. The Audit Team confirmed through review of calculation spreadsheets and underlying raw data that the combined margin emission factor is calculated in accordance with the *Tool to calculate the emission factor for an electricity system*, Version 2.2.1. The operating margin is calculated as 0.9854 tCO₂/MWh and the build margin is calculated as 0.4126 tCO₂/MWh. The weighted combined margin is calculated as 0.8422 tCO₂/MWh.

The VCS PD identifies an alternate method for determining the capping factor as allowed by the approved CDM methodology ACM0012 – *Consolidated baseline methodology for GHG emission reductions from waste energy recovery projects*, Version 4.0.0. The project-specific capping factor is based on historic and project capacity factors. The Audit Team reviewed historic operational data in order to confirm the appropriateness of the procedure for determining the capping factor. The fraction of electricity generated by the Project using waste heat is considered one, which is consistent with First Environment's observations during the site visit.

The Project does not combust any auxiliary fuels. Therefore, project emissions only result from power consumed for station services when the facility is not operating. The quantity of electricity consumed by the Project is determined from monthly utility invoices.

Leakage emissions are not considered because the energy generating equipment was not transferred from other project activities.

3.2.7 Methodology Deviations

The Project does not monitor the 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 concluded that this is an acceptable monitoring deviation, because it does not negatively impact the conservativeness of the quantification of emission reductions. No other deviations were identified between the VCS PD and the validation criteria.

3.2.8 Monitoring Plan

The Project applies the approved monitoring methodology described in AMS-III.Q. The primary variables monitored in order to determine and account for emission reductions are shown below.

Parameter	Method of Estimation	Frequency	Unit of Measurement
Electricity supplied to the grid ($EG_{i,j,y}$)	Revenue meter	Hourly	MWh
Grid electricity consumed by the Projects ($EC_{PJ,j,y}$)	Invoices	Monthly	MWh
Capacity factor (CF)	Calculated	Annual	%

The monitoring plan specified within the VCS PD includes all relevant data and parameters required to obtain a reliable result of generated emission reductions and meets the requirements of AMS-III.Q. The VCS PD includes a complete description of the frequency, responsibility, and procedures for recording, monitoring, measurement, and reporting activities. The monitoring plan ensures the adequate measurement of emissions occurring from GHG sources through the installation of appropriate metering equipment. The monitoring plan also identifies appropriate procedures for quality assurance and quality control of project data and includes procedures for responding to extraordinary events.

3.3 Environmental Impact

No formal environmental impact studies were performed for the Project.

3.4 Comments by Stakeholders

The Project has received positive publicity and recognition, but no formal stakeholder consultation was performed.

4 VALIDATION CONCLUSION

First Environment has performed a validation of the Project's approach, as outlined in the VCS PD, as part of the VCS validation process. The validation was performed on the basis of the VCS Standard, the ISO 14064-3 standard, and the approved CDM methodology AMS-III.Q, *Waste energy recovery (gas/heat/pressure) project*, Version 4.

The review of the VCS PD and the satisfaction of corrective action and clarification requests have provided First Environment with sufficient evidence to determine the fulfilment of stated criteria.

The Project correctly applies the approved CDM baseline and monitoring methodology, AMS-III.Q, as well as relevant CDM tools referenced therein. By producing renewable energy and displacing electricity that would otherwise have been generated through the combustion of fossil fuels, the project activity results in reductions of GHG emissions that are real, measurable, and give long-term benefits to the mitigation of climate change. An analysis of the additionality test demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the Project are hence additional to any that would occur in the absence of the Project.

The total emission reductions from the Project are estimated to be 232,477 metric tonnes of CO₂e over the selected 10-year crediting period. The emission reduction forecast has been checked, and it is deemed likely that the stated amount will be realized given that the underlying assumptions do not change.

In summary, it is First Environment's opinion that the Waste Heat Capture Project at Natural Gas Pipeline in Culbertson, Montana, as described in the VCS PD of November 21, 2011, meets all relevant VCS requirements and correctly applies the CDM methodology AMS-III.Q.

The validation of the Project is based on the information made available to us and the engagement conditions detailed in this report. First Environment cannot guarantee the accuracy or correctness of this information. Hence, First Environment cannot be held liable by any party for decisions made or not made based on this report or opinion.

5 LEAD VALIDATOR SIGNATURE



Iris Caldwell, P.E.
Senior Engineer

6 INDEPENDENT REVIEWER SIGNATURE



James Wintergreen
Senior Associate