



Enersol Solar Products | September 8, 2014

Greenhouse Gas (GHG) Reduction Project Verification Report

(Vintage Years 2012 – 2013)

Verification Body:



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INTRODUCTION

Enersol Solar Products Inc. (Enersol) is a manufacturer of roof-mounted solar panels used to heat water in above-ground or in-ground swimming pools. For heated pools, Enersol's solar panels result in reduced greenhouse gas (GHG) emissions compared to the common alternative which is a fossil-fuel heater (e.g. natural gas, propane). Enersol's former owner retains ownership of all GHG reductions from Enersol systems installed between 2002 and 2011. Enersol's former owner is pursuing a listing of the GHG reductions that occurred from January 1 2012 – December 31 2013 from the 2002-2011 installations on the CSA CleanProjects registry.

The services of Kuzuka Ltd. (Kuzuka) were retained to conduct a verification with a reasonable level of assurance of the GHG assertions associated with the Enersol GHG reduction project, to satisfy the third-party verification requirements of the CSA CleanProjects registry. The objective of the verification is to confirm the data, controls and processes supporting the emission reduction calculations as presented in the GHG Report and corresponding GHG Assertion according to the procedures set out in ISO 14064-3¹. Additional objectives include confirming that the GHG Report and corresponding GHG Assertion conform to the requirements and principles of ISO 14064-2² and are without material discrepancies.

This report is intended to provide the project proponents with details about the verification conducted by Kuzuka and is organized into the following subsections:

- Verification Objective and Details;
- Verification Criteria;
- Verification Plan;
- Verification Statement;
- Verification Body Profile, including review of qualifications and conflict of interest procedures.

¹ CAN/CSA-ISO 14064-3, *Greenhouse gases — Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions*

² CAN/CSA-ISO 14064-2, *Greenhouse gases — Part 2: Specification with guidance at the project level for quantification, monitoring, and reporting of greenhouse gas emission reductions or removal enhancements*

1. VERIFICATION OBJECTIVE AND DETAILS

1.1 Project Title

Enersol Greenhouse Gas Emission Reductions via Solar Pool Heating 2012-2013

1.2 Project Start Date

The start date of GHG reductions for this project has been verified as January 1, 2012. The GHG reductions in this project are a result of Enersol solar pool heaters installed between 2002 and 2011.

1.3 Verification Site Visit

No site visits at Enersol solar pool heater installations were deemed necessary for this verification. The verification was conducted through a detailed review of project GHG information provided by the proponent and an assessment of the solar water heater energy simulation model utilized in the project.

1.4 Expected Lifetime of the Project

The GHG emission reductions associated with this project have been verified as those occurring from January 1, 2012 to December 31, 2013.

1.5 Type of GHG Emission Reduction Project

The GHG emission reduction project is from solar water heating systems (renewable energy).

Lead Verifier Stephen Boles is an accredited Greenhouse Gas Verifier with the California Air Resources Board and is a contract GHG verifier with a ISO 14065-approved accreditation body. Stephen has completed the Canadian Standards Association course entitled Greenhouse Gas Verification using ISO 14064. Stephen has led dozens of GHG verification engagements for clients in a range of industry sectors. Stephen is a certified Environmental Professional recognized by the Canadian Environmental Certification Approvals Board.

1.6 Verification of Appropriateness of Methodology

The quantification methodology applied is the Clean Development Mechanism (CDM) methodology for small scale projects “*1.J. Solar water heating systems (SWH) Version 1.0³*”. The CDM methodology has been thoroughly reviewed and verified as appropriate, and it has been properly applied in the Enersol GHG Emission Reduction via Solar Pool Heating 2012-2013 project.

The GHG emission reductions generated in this project have been determined to be additional to the baseline (business-as-usual) scenario. The CDM methodology defines the baseline as heaters powered by fossil fuel or electricity (for retrofit projects) or heaters that are powered by a fuel source typical of new construction (for new pool projects). Approximately 95% of Enersol installations for this GHG reduction project are in Ontario and Canada’s western provinces, where natural gas is the primary fuel used for pool heaters⁴.

1.7 Legal Land Description of the Project

The solar heating systems are located on private residences or commercial swimming pool locations throughout Canada. The system location can be tracked if the homeowner completes and returns the warranty information. However, the majority of homeowners do not return the warranty cards. Each year, the number of systems, the size of the systems (in terms of collector area) and the province are tracked through shipping information. All of this information has been verified in this verification engagement.

1.8 Verification of Ownership of GHG Emission Reductions

The emission reductions generated by this project were originally property of Enersol Solar Products. Enersol was sold to Enerworks in 2012, however, all ownership of emission reductions are retained by the original owner, Colleen Simmons and her new company Crimson Lane. Crimson Lane has requested and paid for the preparation of all project documents, project validation and verification. The wording of the warranty card distributed to each

³ <http://cdm.unfccc.int/methodologies/DB/GX9DV8QFP9X8BNR5GI1UUJD55EJ03A>

⁴ http://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/canmetenergy/files/pubs/Residential_Pool_solarWaterHeating_ENG.pdf

customer (verified in this engagement) assigns ownership of emissions reductions associated to the implementation of their system to Enersol.

1.9 Reporting, Monitoring, and Verification Details

Because less than 10% of warranty cards are returned each year, this method of determining the size and number of systems installed each year would be incomplete and inaccurate. The alternative method chosen was to use data extracted annually from the Enersol financial database on the number and size of panels and number of system kits shipped to each customer. From this data, the calculation of the total emission reductions for each project year were performed using an Excel spreadsheet which incorporates the raw sales data above. The sales data was provided by Enersol Solar Products' Colleen Simmons. These data are collected by Enersol Solar Products with the accounting management system "Quickbooks", and were subject to annual financial reviews by Enersol's accountant.

Due to the lack of a site-specific monitoring plan to confirm the continued operation of installed Enersol water heaters, the project proponents have incorporated a 2% decay rate to the annual GHG emission reductions beginning in the fourth year after installation to account for system failures or removals.

This verification report (dated September 5, 2014) pertains to the Enersol solar water heater GHG reduction project and the related Enersol project report (dated August 20, 2014) and GHG assertion. This verification report will be publicly posted on the CSA CleanProjects website.

1.10 Verification Summary

Table 1 on the following page shows the GHG emission reductions for the period of 2012 and 2013, inclusive, by GHG type. The column "vintage year" represents the year of installation for the water heaters.

Vintage Year	Cumulative Emission Reductions [t CO ₂ e]	Emission Reductions CO ₂ [t CO ₂ e]	Emission Reductions CH ₄ [t CO ₂ e]	Emission Reductions N ₂ O [t CO ₂ e]
2002	1,035.2	1,034.1	0.080	0.960
2003	1,405.5	1,404.1	0.109	1.304
2004	1,683.4	1,681.8	0.131	1.561
2005	1,752.3	1,750.5	0.136	1.625
2006	1,876.3	1,874.4	0.146	1.740
2007	2,190.9	2,188.7	0.170	2.032
2008	2,888.3	2,885.4	0.224	2.679
2009	3,097.1	3,094.0	0.240	2.873
2010	2,459.5	2,457.0	0.191	2.281
2011	1,701.0	1,699.3	0.132	1.578
Total	20,089.4	20,069.2	1.559	18.634

Table 1 – GHG Emission Reductions by type [t CO₂e]

Based upon the defined scope of this verification, Kuzuka has concluded with a reasonable level of assurance that the Enersol GHG reduction project (2012 – 2013), including its GHG report and GHG assertion of 20,089.4 tonnes of CO₂e reduced, are materially correct and are a fair representation of GHG data and information. In addition, Kuzuka has concluded that the GHG reduction project has been prepared in accordance with the requirements of ISO 14064-2.

1.11 Roles and Responsibilities

VERIFICATION TEAM (KUZUKA LTD.)

Stephen Boles (Lead Verifier)

- Bachelor of Science (Geography)
- Master of Science (Natural Resources Management)
- CSA ISO 14064-3 training course
- Accredited GHG Verifier with California Air Resources Board
- Contract GHG Verifier with SAI Global (ISO 14064 accreditation body)
- Certified Environmental Professional (EP) with Canadian Environmental Certification Approvals Board

Contact info: sboles@kuzuka.com

PROJECT PROPONENTS

Below is a list of project participants and their roles and responsibilities.

Name and Contact Info	Role	Responsibility
Colleen Simmons, Enersol Solar Products, 3 Cedar Trail Cambridge, ON, Canada N3C 2V4 Phone: 905-719-0410	Project Proponent, past principal of Enersol, owner of emission reductions	<ul style="list-style-type: none"> - Providing technical details about components - Provide annual shipping data about number, size and location of systems
Emil Breza, P.Eng. BrezaWorks & Consulting Inc. 3723 Mountainview Rd. Beamsville, ON, Canada L0R 1B2	Project Representative	<ul style="list-style-type: none"> - Overall project management and technical services to the project
Evan Jones, P.Eng.,GHG-V 3P Analysis and Consulting, 78 Balmoral Drive, Guelph ON N1E 3N6 Phone: 519-763-6967 Email: evan.jones@eajonesgue.com	Consultant to Project Representative	<ul style="list-style-type: none"> - Development of Project Document - Completing application to CSA CleanProject Registry - Preparation of estimated and actual GHG emission reduction calculations - Co-ordinating the validation and verification of the project

2. VERIFICATION CRITERIA

Verification of the Enersol solar water heater GHG reduction project (2012 – 2013) and the related Enersol project report and GHG assertion has been conducted with the following criteria:

- conformance with the requirements and principles of ISO 14064-2;
- the data supporting the GHG calculations have sufficient controls to be considered fair and accurate and without material discrepancy;
- the calculations supporting the GHG assertion are sufficiently accurate to be considered fair and accurate and without material discrepancy;
- there are no competing claims to the ownership of the GHG Project and the resulting emission reductions or removals.

2.1 Scope of Verification

Project Boundary:

The project boundary is defined as the number of Enersol solar water heating systems sold to private residences or commercial swimming pool locations in Canada. The emission reductions generated by this project were originally property of Enersol Solar Products. Enersol was sold to Enerworks in 2012, however, all ownership of emission reductions are retained by the original owner, Colleen Simmons and her new company Crimson Lane. The wording of the warranty card distributed to each customer (verified in this engagement) assigns ownership of emissions reductions associated to the implementation of their system to Enersol.

Project Methodology and Baseline Selection:

The Clean Development Mechanism (CDM) proposes a series of methodologies for the quantification of emissions for GHG projects. The CDM methodology for small scale projects “*I.J. Solar water heating systems (SWH) Version 1.0⁵*” was adapted for this project. This category comprises the installation of residential solar water heater systems that displaces

⁵ <http://cdm.unfccc.int/methodologies/DB/GX9DV8QFP9X8BNR5GI1UUJD55EJ03A>

fossil fuel that would otherwise have been used to produce hot water which is very similar to the Enersol Solar Products' swimming pool heating project. Both retrofit and new construction projects are included in this category.

The baseline scenario is the alternative scenario that would most likely occur in the absence of the project. According to the selected methodology the baseline scenario for retrofit projects is the operating water heating system and fuel source or electricity that existed immediately prior to the start of the solar water heater project activity. For new construction projects, the baseline scenario is the system and fuel source (fossil fuel or electricity) assumed to be used for water heating and demonstrated to be typical of new construction in the region of the project activity at the time of the start of the project activity. Fossil fuel combustion (natural gas or propane) was identified as the baseline scenario for this project.

Description of the GHG Project:

The project technology uses rubber-based heating panels that heat water using solar thermal energy. The service being delivered by the system is to heat swimming pool water to a comfortable temperature during the summer pool season. According to Natural Resources Canada, there is sufficient solar energy for solar pool heaters to function without backup from May through September⁶. A reduced swimming pool season of 14 weeks was selected as a conservative assumption for this project.

Heating systems are sized based on the size of the pool being heated and the normal rule of thumb is that the panel size is one half of the surface area of the pool. The heating systems use the existing pool circulation pump for moving the water through the panels.

Each individual solar heater installation consists of the following major design components:

- Solar heat transfer panels and manifolds
- Pool pumping system
- Additional piping to connect the panels to the pool pumping system

⁶An introduction to solar pool heating systems.
<http://www.energyalternatives.ca/PDF/An%20Introduction%20to%20Solar%20Pool%20Heating%20Systems.pdf>

- Control system components (Control box, 3 port valve, actuator, sensors, wiring)

Water is circulated from the pool up onto the roof where it is heated in the solar panels. Each panel is constructed of a manifold (or header) made of PVC plastic and heat collector tubing made of extruded EPDM (ethylene propylene diene monomer) rubber.

GHG Sources, Sinks, Reservoirs:

The GHG sources, sinks, and reservoirs for the baseline and project scenarios are described in Table 2 and Table 3, respectively.

Types of GHG:

The types of GHG quantified in this project are carbon dioxide, methane, and nitrous oxide.

Time Period:

The GHG emission reductions associated with this project occurred from January 1, 2012 to December 31, 2013. The GHG reductions in this project are a result of Enersol solar pool heaters installed between 2002 and 2011.

2.2 Materiality

A materiality threshold of 5% was applied in this verification.

1. SSR	2. Description	3. Controlled, Related or Affected
Upstream SSRs Before Baseline Operation		
B1a Steel Manufacturing	Includes all emissions associated with the production of steel and copper used in the manufacture of components of the pool heating system. GHG emissions arise from the combustion of fossil fuels required for raw material acquisition and manufacture. GHG emissions are also generated during the transportation of the raw materials to the manufacturing plant or facility.	Related
B1b Copper Manufacturing		Related
B2 Manufacture of Pool Heating Equipment	Includes all activities involved in the manufacture of components needed for constructing and operating the solar pool heating system. GHG emissions arise from the combustion of fossil fuels required for manufacturing of each of these project components.	Controlled
B3 Circulation Pump Manufacturing	The pool circulating pump and associated control components will generate emissions during the manufacturing.	Related
B4 Transportation to Site	GHG emissions result from the combustion of fuels during transportation of baseline equipment to the site.	Controlled
B5 Construction on Site	The installation of the pool heating system will require the use of electricity and other energy.	Controlled
Upstream SSRs during Baseline Operation		
B6 Fossil Fuel Extraction / Processing and Delivery	Includes all emissions associated with the production, processing, transportation and distribution of natural gas and propane used to heat swimming pools.	Related
B7 Electricity Generation	Includes all fossil fuel combustion activities involved in the off site generation & distribution of grid electricity needed for operating the circulation pump and control system.	Related
Onsite SSRs during Baseline Operation		
B8 Circulation Pump Operation	GHG emissions related to the operation of the circulation pump (from grid supplied electricity).	Controlled
B9 Combustion of Fossil Fuel	GHG emissions related to the combustion of fossil fuel to heat the pool water.	Controlled
B10 Operation and Maintenance of Pool Heating System	Emissions from maintenance activities result from fossil fuel combustion in vehicles used for transporting maintenance personnel to and from project site.	Controlled
Downstream SSRs during Baseline Operation		
None		
Downstream SSRs after Baseline Operation		
B11 Transportation to Landfill or Recycling Centre	Emissions from disposal activities result from fossil fuel combustion in vehicles used for transporting decommissioned system to disposal site.	Related
B12 Recycling of Components	Emissions associated with the combustion of fossil fuels or electricity required to return materials to a usable raw state.	Related

Table 2 – Sources, Sinks, and Reservoirs (SSR) for Baseline Scenario

1. SSR	2. Description	3. Controlled, Related or Affected
Upstream SSRs Before Project Operation		
P1 Steel Manufacturing	Includes all emissions associated with the production of materials that are used in the manufacture of components of the solar heating system – steel for mounting structure, plastic for piping and manifolds, EPDM rubber for solar collector surface. GHG emissions arise from the combustion of fossil fuels required for raw material acquisition and manufacture. GHG emissions are also generated during the transportation of the raw materials to the manufacturing plant or facility.	Related
P2 PVC Plastic Manufacturing		Related
P3 EPDM Rubber Manufacturing		Related
P4 Solar Panel Manufacturing	Includes all activities involved in the manufacture of components needed for constructing and operating the solar pool heating system. GHG emissions arise from the combustion of fossil fuels required for manufacturing of each of these project components. □	Controlled
P5 Circulation Pump Manufacturing	The pool circulating pump and associated control components will generate emissions during the manufacturing.	Related
P6 Transportation to Site	The solar panels and mounting system needs to be transported to the site. This involves a two step process of transportation to the dealer location and then to the homeowner's site. The emissions associated with transportation (truck and/or van) will be captured in this SSR.	Controlled
P7 Construction on Site	The installation of the solar heating panels, mounting system and piping will require the use of electricity for tools.	Controlled
Upstream SSRs during Project Operation		
P8 Electricity Generation	Includes all fossil fuel combustion activities involved in the off site generation & distribution of grid electricity needed for operating the circulation pump and control system.	Related
Onsite SSRs during Project Operation		
P9 Circulation Pump Operation	GHG emissions related to the operation of the circulation pump (from grid supplied electricity).	Controlled
P10 Control System	GHG emissions related to the operation the control system and electronics (from grid supplied electricity).	Controlled
P11 Maintenance of Solar System	Emissions from maintenance activities result from fossil fuel combustion in vehicles used for transporting maintenance personnel to and from project site.	Controlled
Downstream SSRs during Project Operation		
None		
Downstream SSRs after Project Operation		
P12 Transportation to Landfill or Recycling Centre	Emissions from disposal activities result from fossil fuel combustion in vehicles used for transporting decommissioned system to disposal site.	Related
P13 Recycling of Components	Emissions associated with the combustion of fossil fuels or electricity required to return materials to a usable raw state.	Related

Table 3 – Sources, Sinks, and Reservoirs (SSR) for Project Scenario

3. VERIFICATION PROCESS AND VERIFICATION PLAN

Kuzuka followed a 3-phase approach to perform the risk-based verification of the Enersol GHG reduction project (2012-2013) in accordance with ISO 14064-3 with a reasonable level of assurance. All records are maintained in the verifier's project management system for a period of seven years.

➤ **Phase 1: Verification Planning** - The following steps were conducted in the Verification Planning phase of the project:

1. Kuzuka issued a request for information to obtain the relevant datasets, documentation, and information needed for the verification engagement. Information that was requested is listed below:
 - Project design document (PDD);
 - Validation report;
 - Spreadsheets with the calculations used in the baseline and project scenarios;
 - Original source data that justifies assumptions made for the baseline and/or project scenarios;
 - Technical information pertaining to the solar water heaters (not included in the PDD) that is relevant to the assumptions and/or calculations used;
 - Database of Enersol solar water heater sales from 2002-2011;
 - Documentation pertaining to data quality control procedures and project monitoring procedures utilized by Enersol;
2. Kuzuka conducted a preliminary review all data and documentation provided.
3. A Verification Plan was developed based on the information reviewed and potential risks identified in Phase 1/Step 2. The Verification Plan (including the sampling plan) is provided as Appendix B.

➤ **Phase 2: Verification Execution** - The following steps were conducted in the Verification Execution stage of the project:

1. Kuzuka conducted a review of Enersol's GHG management system and controls. This included an assessment of the procedures for collecting, processing, and

consolidating GHG data. This also included an assessment of data management systems in place to ensure accuracy and quality of data used. This step was accomplished through a review of documentation provided and interviews with individuals responsible for the management of the project GHG data.

2. Kuzuka performed a desktop review of the information and data utilized in the GHG assertion, including:
 - comparison of original GHG activity data (e.g. sales records) against values utilized in GHG reduction calculations;
 - confirmation of the accuracy of GHG calculations utilized;
 - utilization of appropriate emission factors and conversion equations;
 - review of the function and output of the Enerpool solar water heater energy requirement simulation model;
 - appropriateness of assumptions made in the baseline and/or project scenarios.

A copy of the verification notes is provided as Appendix C to this report.

3. Kuzuka assessed Enersol's GHG assertion against the principles of ISO 14064-2 and the CSA CleanProjects program. A summary of the verification activities for each ISO 14064-2 principle are provided in Table 4 on the following page.

➤ **Phase 3: Verification Completion** - The following steps were conducted in the Verification Completion stage of the project:

1. Kuzuka prepared a final report that describes the scope and findings of the verification. A draft report was submitted to Enersol for review and comment prior to issuance of the final report.
2. Kuzuka issued a public verification statement in accordance with the requirements of the CSA CleanProjects program.

ISO 14064-2 Principle	Verification Process
Accuracy	Verifier reviewed the accuracy of calculations and data sources (as per the sampling strategy)
Completeness	Verifier confirmed that all relevant SSRs have been considered and that exclusions have been justified
Conservativeness	<p>Verifier confirmed that conservativeness was applied throughout the project design through the following methods:</p> <ul style="list-style-type: none"> • Exclusion of certain SSRs from the baseline scenario (e.g. manufacturing of natural gas heaters), justified based on the principle of conservativeness; • incorporating a decay factor beginning in 4th year after heater installation; • applying a reduction to the first year of the baseline GHG emissions to account for partial-season installations; • moderate 14-week swimming pool season assumed; • lower minimum pool temperature of 25°C assumed.
Consistency	<p>Verifier confirmed that baseline and project scenarios can be considered an equivalent level of product/service.</p> <p>Verifier confirmed that the calculation methodology has been consistently applied in all project years.</p>
Relevance	<p>Verifier confirmed that an appropriate GHG calculation methodology was selected and applied.</p> <p>Verifier confirmed the reasonableness of assumptions made.</p>
Transparency	All data sources and calculation methodology have been verified as accurately described.

Table 4 – Verification Activities to Address ISO 14064-2 Principles

4. VERIFICATION STATEMENT

The services of Kuzuka Ltd. were engaged to conduct a verification of the greenhouse gas (GHG) emission reductions associated with the Enersol solar pool water heating project calculated in accordance with the requirements of ISO 14064-2 for the time period from January 1, 2012 to December 31, 2013.

The verification was conducted with the following criteria:

- conformance with the requirements and principles of ISO 14064-2;
- the data supporting the GHG calculations have sufficient controls to be considered fair and accurate and without material discrepancy;
- the calculations supporting the GHG assertion are sufficiently accurate to be considered fair and accurate and without material discrepancy;
- there are no competing claims to the ownership of the GHG Project and the resulting emission reductions or removals.

Scope and Parameters of Verification

The scope of the GHG verification was established prior to the verification engagement as:

Geographic Boundary: Locations of Enersol solar pool water heater installations in Canada for both residential and commercial pools.

Time Period: January 1, 2012 – December 31, 2013

Intended Users: CSA GHG CleanProjects Registry

Verification Standard: ISO 14064-3

The parameters of the GHG inventory verification were defined as:

Assertion Document: Enersol GHG Reduction Project Report 2012-2013 (dated August 20, 2014)

Objective: For the purposes of posting on the CSA GHG CleanProject Registry, establish:

- Stated GHG reductions are true and correct over the period of time covered by the GHG report
- GHG assertion has been prepared in accordance with ISO 14064-2

Level of Assurance: Reasonable

Materiality Threshold: 5%

Verification Process

Kuzuka conducted the verification in accordance with the requirements of ISO 14064-3: *Greenhouse gases – Specification with guidance for the validation and verification of greenhouse gas assertions*. Kuzuka reviewed the project GHG Report and associated GHG management database and evaluated them for conformity with the requirements of ISO 14064-2 with reported emissions considered free of material misstatement if found to be less than 5% on a carbon dioxide–equivalent basis. Enersol’s assertion was tested according to a risk-based approach and the review of controls to manage these risks, including:

- management system and procedural review for accuracy, reliability and reproducibility;
- verification of representative sources, sinks, reservoirs, and processes;
- verification of reported GHG reductions, including the accuracy and relevancy of emission factors and conversion equations used, and the accuracy of tools used by Enersol to calculate GHG reductions; and
- Review of original source activity data and GHG calculations for both project years.

The following table shows the GHG emission reductions for the period of 2012 and 2013, inclusive, by GHG type:

Vintage Year	Cumulative Emission Reductions [t CO2e]	Emission Reductions CO2 [t CO2e]	Emission Reductions CH4 [t CO2e]	Emission Reductions N2O [t CO2e]
2002	1,035.2	1,034.1	0.080	0.960
2003	1,405.5	1,404.1	0.109	1.304
2004	1,683.4	1,681.8	0.131	1.561
2005	1,752.3	1,750.5	0.136	1.625
2006	1,876.3	1,874.4	0.146	1.740
2007	2,190.9	2,188.7	0.170	2.032
2008	2,888.3	2,885.4	0.224	2.679
2009	3,097.1	3,094.0	0.240	2.873
2010	2,459.5	2,457.0	0.191	2.281
2011	1,701.0	1,699.3	0.132	1.578
Total	20,089.4	20,069.2	1.559	18.634

Conclusion

Based upon the above, Kuzuka has concluded with a reasonable level of assurance that the reported GHG reductions of 20,089.4 metric tonnes of carbon dioxide equivalent, for the time period from January 1, 2012 to December 31, 2013 are materially correct and is a fair representation of GHG data and information. In addition, Kuzuka has concluded that the GHG reduction project has been prepared in accordance with the requirements of ISO 14064-2.

Statement of Independence, Impartiality and Competence

Kuzuka Ltd. is an independent environmental services company that provides solutions to the private and public sector across North America. Kuzuka's staff of certified environmental professionals, GHG verifiers, and professional engineers have decades of combined experience providing environmental consulting and data assurance services to a range of clients in various industry sectors.

This verification has been conducted independently and to our knowledge there has been no conflict of interest.

Attestation

Kuzuka Ltd.



Stephen Boles, B.Sc., M.Sc., EP (Sustainability)
Accredited GHG Verifier (California Air Resources Board)
Lead Verifier
Kuzuka, Ltd.
Exeter, Ontario

APPENDIX A – Conflict of Interest Review

	Yes	No	Details
<p>Independence</p> <p>Remain independent of the activity being verified, and free from bias and conflict of interest.</p> <p>Maintain objectivity throughout the verification to ensure that the findings and conclusions will be based on objective evidence generated during the verification.</p>	√	<input type="checkbox"/>	The verification team is independent of the activity being verified and has no prior consulting or financial relationship with the client.
<p>Ethical conduct</p> <p>Demonstrate ethical conduct through trust, integrity, confidentiality and discretion throughout the verification process.</p>	√	<input type="checkbox"/>	The verification team has extensive experience and training in the ethical conduct demanded in verification engagements. In addition, the verification team adheres to the Kuzuka code of conduct for verification engagements.
<p>Fair presentation</p> <p>Reflect truthfully and accurately verification activities, findings, conclusions and reports. Report significant obstacles encountered during the verification process, as well as unresolved, diverging opinions among verifiers, the responsible party and the client.</p>	√	<input type="checkbox"/>	All activities and findings resulting from the verification assessment are presented in Appendix C of the verification report.
<p>Due professional care</p> <p>Exercise due professional care and judgment in accordance with the importance of the task performed and the confidence placed by clients and intended users. Have the necessary skills and competences to undertake the verification.</p>	√	<input type="checkbox"/>	Skills and competencies of the verification team are described in Section 1.11 of the verification report.

APPENDIX B – Verification Plan

VERIFICATION PLAN

Enersol Solar Pool Water Heater GHG Reduction Project (2012 – 2013)

Table 1: Verification Parameters

Project Proponent:	Enersol
Project Representative:	Evan Jones
Assertion Document:	Enersol GHG Project Report (dated August 20, 2014)
Objective:	<p>For the purposes of posting on the CSA GHG CleanProject Registry, establish that:</p> <ol style="list-style-type: none"> 1. Stated GHG reductions are true and correct over the period of time covered by the project report. 2. GHG assertion has been prepared in accordance with ISO 14064-2.
Verifier:	Stephen Boles, Kuzuka Ltd.
Scope:	<p>What: GHG reductions associated with the installation of Enersol solar pool water heaters.</p> <p>Where: Locations of Enersol solar pool water heater installations in Canada.</p> <p>When: January 1, 2012 – December 31, 2013</p> <p>Who: Intended users: CSA GHG CleanProjects Registry</p> <p>How: ISO 14064-3</p>
Criteria:	<ul style="list-style-type: none"> • conformance with the requirements and principles of ISO 14064-2; • data supporting the GHG calculations have sufficient controls to be considered fair and accurate and without material discrepancy; • calculations supporting the GHG assertion are sufficiently accurate to be considered fair and accurate without material discrepancy; • there are no competing claims to the ownership of the GHG Project and the resulting emission reductions or removals.
Level of Assurance:	Reasonable
Materiality Threshold:	5 %

CONFIDENTIAL

Table 2: Verification Schedule

TASK	COMPLETION DATE
<i>Verification Planning</i>	
Preliminary review of GHG activity data and documentation	September 2, 2014
Preparation of Verification and Sampling Plan	September 3, 2014
<i>Verification Execution</i>	
Kuzuka will perform a desktop review of the following: <ul style="list-style-type: none">• according to the sampling plan, compare original GHG activity data (e.g. solar water heater sales records) against values recorded in GHG reduction calculation spreadsheets;• according to the sampling plan, confirm the accuracy of GHG calculations;• review of management system and controls utilized by project proponents to ensure data accuracy and quality;• utilization of appropriate emission factors and conversion equations in GHG calculations.	September 5, 2014
Enersol GHG reduction project will be assessed against the requirements and principles of ISO 14064-2 and the CSA GHG CleanProjects Registry.	September 5, 2014
<i>Verification Completion</i>	
Submission of draft verification report and statement to project proponents	September 8, 2014
Submission of final verification report and statement to project proponents	September 12, 2014

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Table 3: Document Review List for Verification

Document	Relevant Information for Verification Project
Enersol project report (Version dated Aug. 20, 2014)	Project description, Project methodology, Sources/Sinks/Reservoirs, Baseline and Project scenario descriptions
Validation report (Version dated March 2012)	Results of project validation conducted by Conestoga Rovers
CDM Methodology <i>I.J. Solar Water Heating Systems</i>	Reference methodology that was used in the Enersol solar pool water heating project
EnerPool model documentation (available within the EnerPool model software download)	Guidance pertaining to the design, functionality, and usage of the EnerPool solar water heating energy simulation model
CleanProjects GHG Report template	Description of project requirements and GHG report content to ensure compliance with CSA CleanProjects program
CleanProjects Verification Report template	Description of the verification requirements of the CSA CleanProjects program
Enersol GHG Calculator spreadsheets	GHG calculations are performed in a summary calculation spreadsheet. Calculations in the summary spreadsheet will be compared to the separate calculation spreadsheets prepared for each installation year of the project (2002 – 2011).
“An Introduction to Solar Pool Heating Systems” (published by NRCan)	Source of assumptions used for length of swimming pool season and minimum desired water temperature
Life Cycle GHG Emissions of Natural Gas	Source of upstream GHG emission factors associated with natural gas extraction and distribution (Baseline scenario)
LCA Methodology Report (published by World Steel Association)	Source of steel emission factors (Baseline and Project scenario)
Cradle-to-gate LCI of 9 plastic resins and 4 polyurethane precursors (prepared by Franklin & Associates)	Source of ABS and PVC emission factors (Project scenario)

Table 4: Verification Sampling Plan

DATA COMPONENT	PROPOSED SAMPLING STRATEGY
<p>Annual GHG Calculation spreadsheets</p>	<p>A template GHG calculation spreadsheet format is applied to each installation year from 2002 - 2011. The following sampling strategy will be used to review the accuracy of the calculation spreadsheets:</p> <ol style="list-style-type: none"> 1. Two installation years of the template GHG calculation spreadsheets (2002, 2010) will be thoroughly verified by reviewing: <ul style="list-style-type: none"> • The source activity data (water heater sales) matches the original sales records; • Emission factors and conversion equations match the source documentation from which they were obtained; • Calculations of water pool heater installation area were properly applied; • Calculations of transportation distance in the baseline and project scenario were properly applied; • Calculations of GHG emissions in the baseline and project scenario were properly applied within the Detail worksheet and correctly summarized in the Summary worksheet. 2. For the remaining project years, annual totals of water heater sales will be compared to the original sales records, emission factors will be reviewed for correctness, and annual GHG reduction calculations will be verified as being correctly reported in the Summary worksheet.
<p>Summary GHG Reduction spreadsheet (one file for all years of project)</p>	<p>The following calculations will be verified as accurate for each year (2012, 2013) of GHG reductions in this project:</p> <ul style="list-style-type: none"> • Application of decay factor beginning in year 4 after installation • On-going emissions in the baseline scenario from year to year • GHGs from the annual calculation spreadsheets match the main summary spreadsheet

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Table 5: Preliminary Risk Assessment and Planned Verification Approach

Level of Verification Assurance	Reasonable	Materiality Threshold:	5 %	Planned Verification Approach	
Observed Potential Risk	Potential for Material Discrepancy (H, M, L)	ISO 14064-2 Principle	Assessment Process	Potential Resolution	
Proper Application of EnerPool Model – The EnerPool model simulation results are used to determine the energy requirements for maintaining a minimum desired water temperature in various locations across Canada. The proper use of the EnerPool model (input parameters, assumptions) has a major impact on the Baseline scenario GHG emissions	M	Accuracy	Verifier will confirm that the EnerPool model’s simulation results have been applied in the same way as in the original project for GHG reductions from 2002-2011.	If discrepancies are observed, EnerPool model simulation results may have to be corrected to match the 2002-2011 project.	
Validity of Assumptions – the project is dependent on numerous assumptions (decay factor, desired pool temperature, use of pool covers, swim season length) that impact the net GHG reductions	M	Relevance	Review of the justification of assumptions made by project proponents, including source reference data that support the assumptions	To be determined following assessment of the validity of assumptions.	
Data Accuracy – Consistency and accuracy of GHG calculation spreadsheets	M	Accuracy	As per the sampling plan, thoroughly review the consistency and accuracy of GHG calculation spreadsheets	GHG calculation spreadsheets may have to be corrected.	
Data Quality - Consistency and accuracy of emission factors used	M	Accuracy	Review the source of emission factors used in the baseline and project scenarios	Emission factors may have to be updated.	

APPENDIX C – Verification Notes

ENERSOL SOLAR POOL HEATING GHG REDUCTION PROJECT

2012/2013 Verification Working Notes

Red font are comments made by verifier that indicate potential issues that require resolution.

Green font are comments made by verifier that indicate a potential issue has been resolved.

Blue font are comments made by project proponents in response to verifier comments.

REVIEW OF PROJECT DESIGN DOCUMENT (PDD)

OBSERVATIONS	RECOMMENDED REMEDIAL ACTIONS	Proponent comments
<p>Section 2.9 (page 8): The CSA CleanProject guidelines state “The assertion should disaggregate each of the individual GHG types (CO₂, CH₄, N₂O, SF₆, HFCs, and PFCs) where reductions or removals are achieved.” Currently only total emissions of CO₂e are provided</p>	<p>Section 2.9 of the PDD should be revised to include the breakdown of reductions by GHG type</p>	<p>Table 1 are estimated emission reductions, which do not need to be specified by GHG</p> <p>Verifier accepts proponent’s response. No further action necessary.</p>
<p>Section 2.9 (page 8): The PDD document currently reads as follows: “... the cumulative emissions are expected to be about 49,800 t CO₂e. Table 1 shows the estimated GHG emission reductions for the 10 year period.”</p>	<p>Section 2.9 of the PDD document should be revised as follows: “... the cumulative emissions are expected to be about 17,920 t CO₂e. Table 1 shows the estimated GHG emission reductions from the 10 years of solar water heater installations for the 2 year project period.”</p>	<p>Text revised in Section 2.9 and Table 1 updated with totals for each year</p> <p>Issue resolved. No further actions necessary.</p>
<p>Section 2.10 (page 9): The PDD document currently reads as follows: “... there has never been a warranty claim for any system over the 10 year period covering the emission reduction period being calculated.”</p>	<p>For this project the time period since the first set of installations is now 12 years (2002 – 2013). Please confirm that the statement “never been a warranty claim” is still valid for the 12 years, and if so revise the PDD as appropriate.</p>	<p>Statement is still valid.</p> <p>Verifier accepts proponent’s response. No further action necessary.</p>

OBSERVATIONS	RECOMMENDED REMEDIAL ACTIONS	VERIFIER INITIALS
<p>Section 3 (page 12): The PDD document currently states that "... the geographic area considered will be all of Canada and the United States".</p>	<p>This is in contradiction to the geographic area specified in Section 2.5 (Canadian installations only). Please revise the PDD as appropriate.</p>	<p>Text revised Issue resolved. No further actions necessary.</p>
<p>Section 5 (page 32): The PDD document currently states that "... the Enerpool software tends to slightly underestimate the energy consumption with no pool cover and has a larger underestimation with a pool cover."</p>	<p>According to the figures in Table 9, the Enerpool software slightly <i>overestimates</i> the energy consumption with no pool cover. Please revise the PDD as appropriate.</p>	<p>Text revised Issue resolved. No further actions necessary.</p>
<p>Section 7.1 (page 35): In Table 10, the individual values of CO2/CH4/N2O emissions appear to be from the previous 2002 – 2011 project.</p>	<p>Correct Table 10 in the PDD.</p>	<p>Table 10 has been corrected Issue resolved. No further actions necessary.</p>
<p>Section 7.1 (page 37): Values in Table 12 are for the original project GHG reductions (2002 – 2011).</p>	<p>Table 12 should be updated with values for the 2012 – 2013 GHG reductions only. This may require a re-design of Table 12, as the first year reductions/emissions are no longer relevant for the 2012-2013 project.</p>	<p>Table 12 updated Issue resolved. No further actions necessary.</p>
<p>Section 7.1 (page 38): Text is partially missing from the page as it is offset to the right.</p>	<p>Correct placement of text in the PDD.</p>	<p>Issue resolved. No further actions necessary.</p>

REVIEW OF CALCULATION SPREADSHEETS AND EMISSION FACTORS

OBSERVATIONS	RECOMMENDED REMEDIAL ACTIONS	Proponent Comments
<p>All “on-going GHG reductions” for each installation year used in the project calculations were reviewed to confirm consistency with the values used in the previously verified 2002 – 2011 GHG reduction project.</p>	<p>The verifier accepts the “on-going GHG reduction” values for each installation year used in the project.</p>	
<p>Calculations in ‘Summary’ worksheet were reviewed. The worksheet was verified as accurate with the following exceptions:</p> <ol style="list-style-type: none"> 1. The number of installations in 2009 and 2010 (cells C17 and C18) do not match the values used in the annual calculation spreadsheets and Appendix D of the PDD. 2. The table on the right side of the worksheet that breaks down the emissions into the GHG types has incorrect values for CO₂, CH₄, and N₂O. 	<ol style="list-style-type: none"> 1. Update the ‘Summary’ worksheet with correct installation values. 2. Update the table in the “Summary” worksheet with correct values of CO₂, CH₄, and N₂O 	<p>Corrections made and updated tables inserted into PDD</p> <p>Issues resolved. No further actions necessary.</p>