



Survey of Active Solar Thermal Collectors, Industry and Markets in Canada (2012)

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Executive Summary

This report is a summary of a survey of the Canadian solar thermal industry covering the 2012 calendar year, conducted between February and April 2013.

The Canadian 2012 solar thermal market was, in many ways, vastly different from the 2011 market. Total 2012 revenue was \$26.1 million, a decrease from the \$29.9 million reported in 2011 while collector sales increased slightly in 2012 to 186,043 m², a 3.4% increase from 179,971 m² in 2011. The discrepancy between revenue and collector area growth is primarily driven by differences in the domestic and export markets as well as market segment-specific dynamics. In particular, sales of exports and liquid unglazed collectors, which both tend to garner less revenue for each unit of collector area sold, were the least affected by the downturn in the domestic market.

An examination of the domestic market by collector type reveals further insights into the dynamics of the solar thermal market in Canada. The air unglazed market segment decreased by -50% (revenue) and -44% (collector area). The liquid evacuated and liquid glazed segments experienced similar declines both in revenue (-50% and -31%) and collector area sold (-18% and -17%). While the liquid unglazed market remained relatively stagnant with some decline in revenue and collector area sales (-5.5% and -4%), the air glazed market was the sole bright spot in an otherwise dismal year for solar thermal and grew by 168% and 72% (revenue and collector area sold).

On a national basis, Quebec replaced Ontario as the domestic market leader, increasing from 15% of the national market in 2011 to 46% in 2012. The Atlantic Provinces experienced some growth in national share comprising 12% of the market, compared to 9% in 2011. Similarly, the Prairie Provinces increased their market share accounting for 9% of domestic sales in 2012. British Columbia experienced the largest decrease in market share shrinking to 10% from 25% in 2011.

Industry optimism remained low in 2012 with 45% of respondents expecting little to no growth over the next two years. Thirty percent of respondents expected positive sales growth while 25% predicted a decrease in sales of the same time period.

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1. Introduction

This report provides the results of a survey of the solar thermal industry in Canada covering the calendar year of 2012. The survey was commissioned by Natural Resources Canada (NRCan), and was undertaken by ClearSky Advisors. This survey is a continuation of a series of annual surveys going back to 2002.

NRCan's Renewable Energy Deployment Initiative (REDI) was launched in April 1998 to stimulate the demand for cost-effective renewable energy heating and cooling systems, and to help create a sustainable market for those systems. The ecoENERGY for Renewable Heat program replaced the REDI program in 2006, and ended on March 31, 2011. Active solar thermal systems, including air and water heating, represent two of the types of renewable energy technologies previously supported by the ecoENERGY program.

In part, this survey was undertaken in support of Canadian contributions to the solar heating market survey of the Solar Heating and Cooling Program of the International Energy Agency (IEA).

The purpose of this study was to survey the Canadian active solar thermal collector industry to obtain data for the 2012 calendar year. The main objectives of the study were:

- To capture comprehensive and reliable information on market size and industry trends, including Canadian sales and revenues, import and export, and employment figures.
- To estimate delivered thermal energy and displaced CO₂ emissions of all active solar thermal systems operating in Canada.
- To analyze and report obtained data for publication and wider dissemination.

Survey respondents were asked a series of questions about employment, revenue, sales by collector area, and detailed breakdowns of sales by five collector types: unglazed air, glazed air, evacuated tube (liquid), unglazed liquid, and glazed liquid.

1.1. Comparison to Earlier Surveys

Comparisons to data from previous surveys are made throughout this report. Note that the identity of companies responding to the survey varies from year to year, and therefore may introduce some uncertainty in the comparisons. In order to ensure continuity, current respondents were asked to report both 2011 and 2012 revenue. This enabled a cross-check with the responses from previous years. Where appropriate, such responses were utilized to account for variance in the survey sample from year to year. All attempts were made to ensure that the underlying methodology for analysis of the 2012 survey data remained consistent with past surveys.

The reader should also be aware that the authors of this report are not aware of which companies responded to the survey in any particular year. To protect commercially sensitive information, access to individual responses was limited to only select members of the survey team. Outside staff members of ClearSky Advisors and all staff members of NRCan have no access to either the individual survey responses or the identity of companies who submit responses.

2. Survey Process

2.1. Survey Development and Distribution

In February 2013, a bilingual survey was sent by email to over one hundred and forty Canadian companies believed to be active in the solar thermal industry. The survey could be completed online, or returned by email, fax, or regular mail. The majority of the companies were then contacted by phone to confirm receipt of the survey, and to encourage them to respond. Most respondents completed the survey online.

A copy of the survey may be found in Appendix A.

2.2. Estimated Data Capture Rates and Comparison to 2011 Survey

This study involved three phases:

- 1) Data collection
- 2) Analysis
- 3) Verification and Validation

During data collection the goal was to capture as much of each market segment as possible. A comparison of revenue and sales data reported in the 2012 survey to the 2011 survey indicates a marked improvement in both response rates and sector coverage. The 2011 survey covered 42 respondents of which 31 provided revenue data for 2010 and 2011. The 2012 survey covered 47 respondents of which 46 provided both 2011 and 2012 revenues.

3. Survey Results

3.1. Industry Characterization

The following three figures categorize the business characteristics of the companies responding to the survey. Figures 1 and 2 provide a breakdown by industry role and collector type for the 47 respondents participating in the 2012 survey. Similar to 2011, the majority of participants, 77% (36 out of 47) were involved in direct retail sales and installations. Wholesalers and Other (e.g., design or consulting services) were the next largest segments of participants comprising 45% and 36% of respondents, respectively.¹ Of the surveyed respondents, the majority (54%) were active in the glazed liquid collector sector.

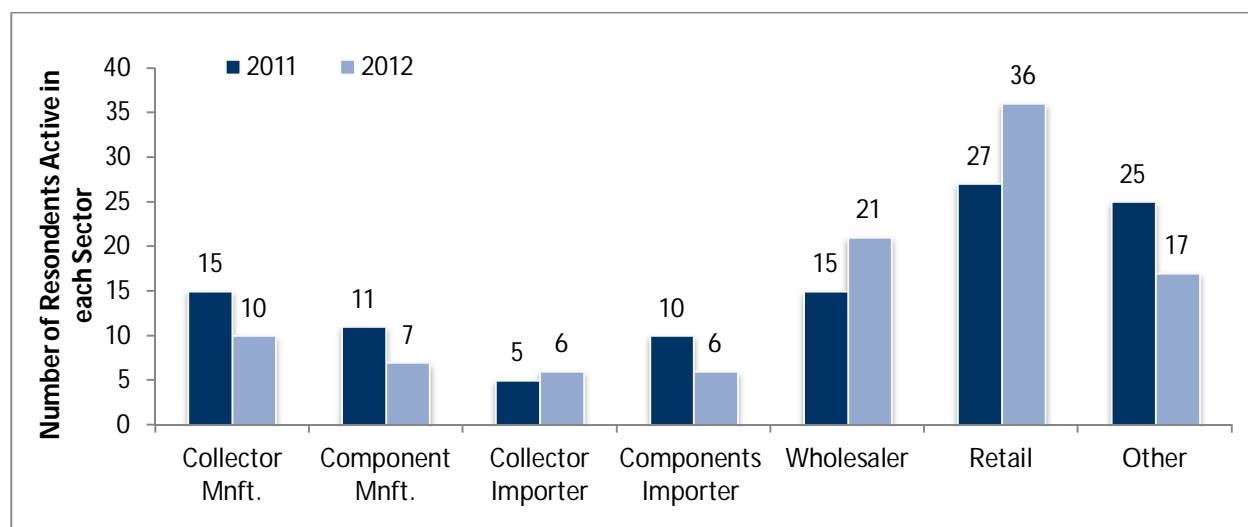


Figure 1: Sector involvement within the solar thermal industry.

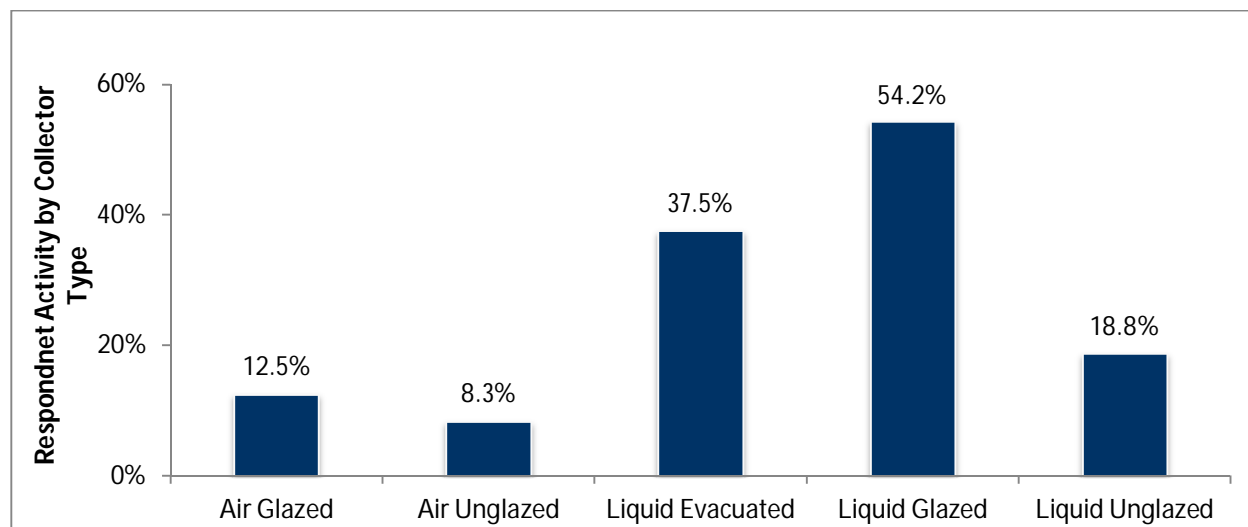


Figure 2: Respondent activity by collector type.

¹ Note: respondents were able to select multiple categories

Forty-two percent of 2012 survey participants indicated that over 80% of their corporate revenue is derived from solar thermal activities (Figure 3). Overall, 48% of respondents generated at least half of their revenue from solar thermal activities in 2012, up slightly from 47% in 2011.

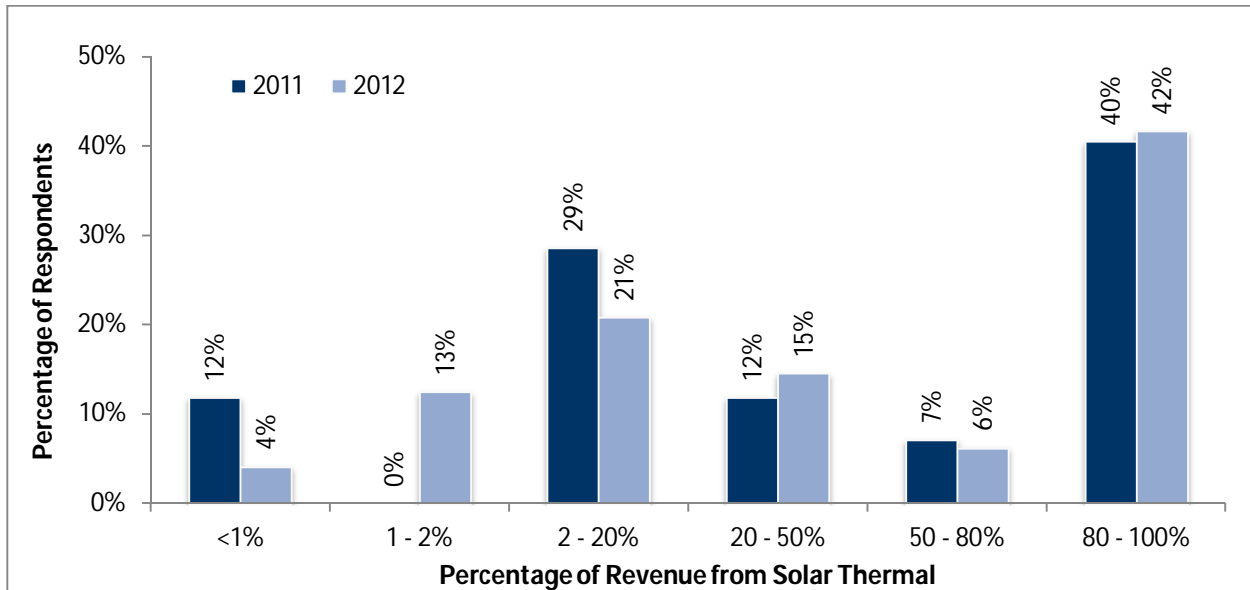


Figure 3: Solar thermal revenue as a percentage of total corporate revenue (2011 and 2012).

Seventy-four percent of respondents (35 out of 47) had between one to four full-time employees in 2012, a significant increase when compared to the 45% reported in 2011. Peak employment was reported as 25 employees. Total employment among respondents was reported to be 158 employees in 2012. Note that this survey was not designed to capture all employment at the manufacturing, distribution, retail and installer levels, and therefore total employment in the Canadian solar thermal industry is likely to be much higher than is presented in this report.

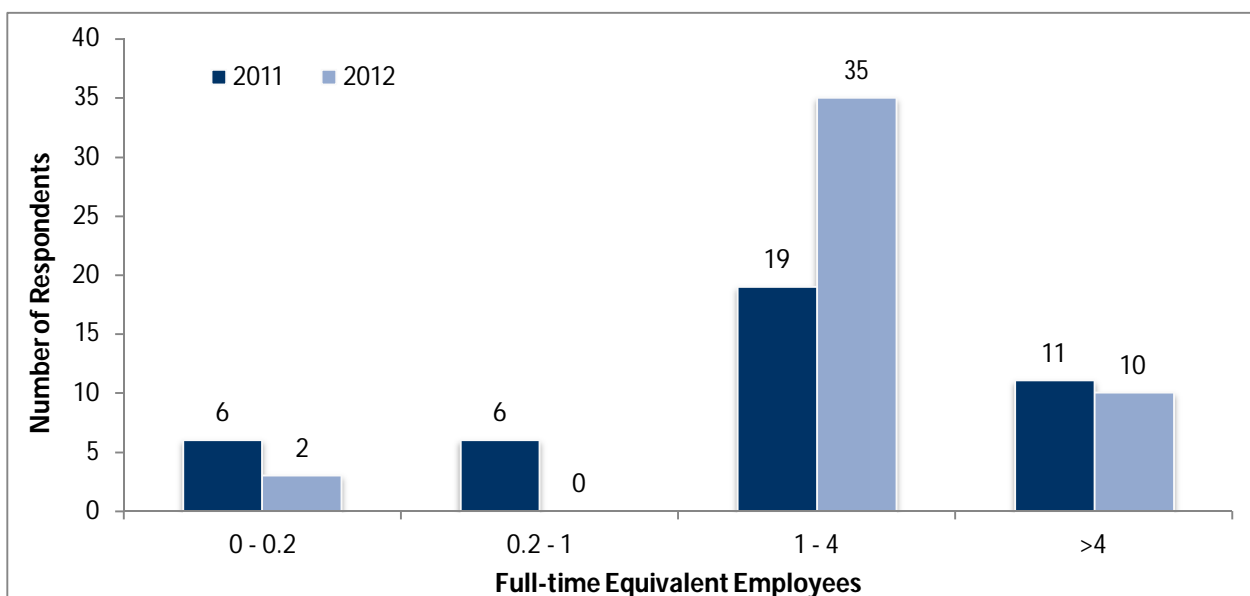


Figure 4: Number of employees per company engaged in solar thermal activities (2011 and 2012).

3.2. Industry Size and Growth

Overall, the Canadian solar thermal industry in 2012 experienced considerable declines when compared to 2011. A comparison of key metrics for 2011 and 2012 is provided below. Refer to Table 1 for detailed 2012 industry sales segmented by collector type.

- Total industry revenue decreased from \$29.9 million to \$26.0 million (-13%).
- Total area of collectors sold increased slightly from 179,971 m² to 186,043 m² (3.4%).
- Revenue from domestic sales decreased from \$26.6 million to \$20.1 million (-24.3%).
- Collector area from domestic sales decreased from 127,412 m² to 114,018 m² (-10.5%).
- Revenue from export sales increased significantly from \$3.3 million to \$5.9 million (78.8%).
- Collector area from export sales increased from 52,559 m² to 72,025 m² (37.0%).

Table 1: Solar collector sales by type, 2012.

Domestic Sales

Collector Type	Thermal Capacity (MW)	Collector Area (m ²)	Revenue (\$1,000's)
Air - Glazed	8.8	12,359	5,566
Air - Unglazed	11.1	15,824	2,764
Liquid - Evacuated	5.5	7,812	5,076
Liquid - Glazed	4.5	6,513	4,348
Liquid - Unglazed	50.1	71,510	2,361
Total	80.1	114,018	20,114

Export Sales

Collector Type	Thermal Capacity (MW)	Collector Area (m ²)	Revenue (\$1,000's)
Air - Glazed	7.5	11,075	1,400
Air - Unglazed	8.7	12,620	1,532
Liquid - Evacuated	0.3	479	662
Liquid - Glazed	1.1	1,566	895
Liquid - Unglazed	32.5	46,284	1,454
Total	50.3	72,025	5,944

Total Sales

Collector Type	Thermal Capacity (MW)	Collector Area (m ²)	Revenue (\$1,000's)
Air - Glazed	16.3	23,434	6,966
Air - Unglazed	19.8	28,444	4,296
Liquid - Evacuated	5.8	8,291	5,738
Liquid - Glazed	5.6	8,079	5,243
Liquid - Unglazed	82.6	117,795	3,815
Total	130.4	186,043	26,058

Note: thermal capacity is estimated using an IEA equation 0.7 kWth/m² of collector area.

The cost per m² for both liquid evacuated and liquid glazed collectors varied considerably from respondent to respondent. This range was due to variability in reported costs, some respondents reported fully installed costs, while others reported only manufacturing prices. The tables below provide a breakdown for manufacturing, manufacturing and distribution as well as fully installed cost for two collector types (liquid glazed and liquid evacuated). The wide range in costs is likely a result of technology differences between companies and economies of scale, with per unit costs generally decreasing as system sizes become larger.

Due to the application of various weightings, average \$/m² costs calculated from Table 1 will not equal those reported in Table 2. In fact, figures provided in Table 2 represent individual prices for various steps of the solar thermal value chain, whereas the figures provided in Table 1 represent a weighted average of the numbers according to the proportion that each activity represents within each segment.

The bifurcated nature of the liquid evacuated market, which is comprised of both high and low-end products, necessitated a reassessment of the average prices for manufacturing, manufacturing and distribution, and total installed system reported in the 2011 report. While the high and low end values remain the same, average prices have been updated as follows: manufacturing - 427 \$/m², manufacturing and distribution - 546 \$/m², total installed system - 1,045 \$/m².

Table 2: Cost breakdown for select technologies (\$/m²)

Liquid Glazed Cost Breakdown (\$/m²)

	Manufacturing	Manufacturing and Distribution	Total Installed System
High end of range	964	1,300	3,052
Low end of range	330	444	1,043
Average	495	667	1,567

Liquid Evacuated Cost Breakdown (\$/m²)

	Manufacturing	Manufacturing and Distribution	Total Installed System
High end of range	1,158	1,566	3,000
Low end of range	141	190	365
Average	378	483	925

Figure 5 presents the rate of growth in the domestic market by collector type, for the five types of solar thermal collectors. With the exception of glazed air collectors (72% growth), all other collector types experienced a decline between 2011 and 2012. The year-over-year growth rates are derived from a limited sample of the solar thermal market, and may not be indicative of the entire domestic market as a whole.

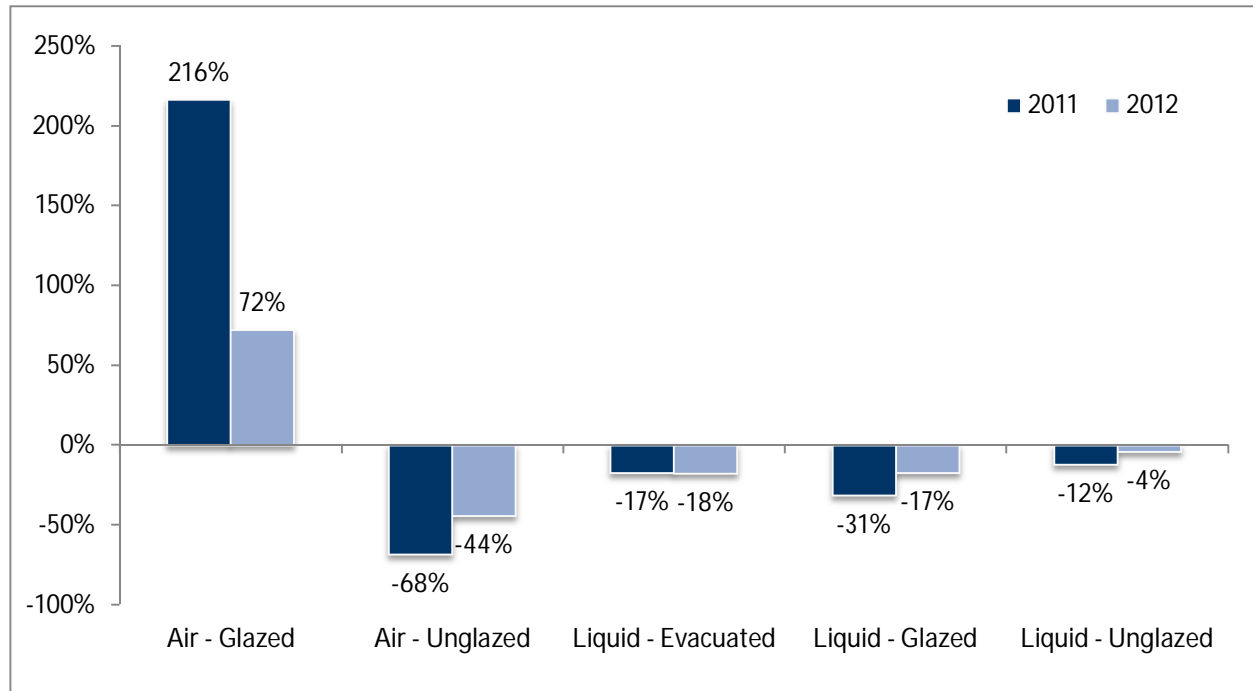


Figure 5: Collector area growth rates by collector type (2011 and 2012).

Figure 6 provides a historical overview of annual domestic collector sales from 2001 to 2012 for glazed liquid, air (glazed and unglazed), and unglazed liquid collector types. Figure 7 provides annual revenue data for domestic and total collector sales from 2003 to 2012. Contrary to 2011, export revenues increased by 78.8% in 2012 and accounted for 23 % of total industry revenue, compared to 11% in 2011.

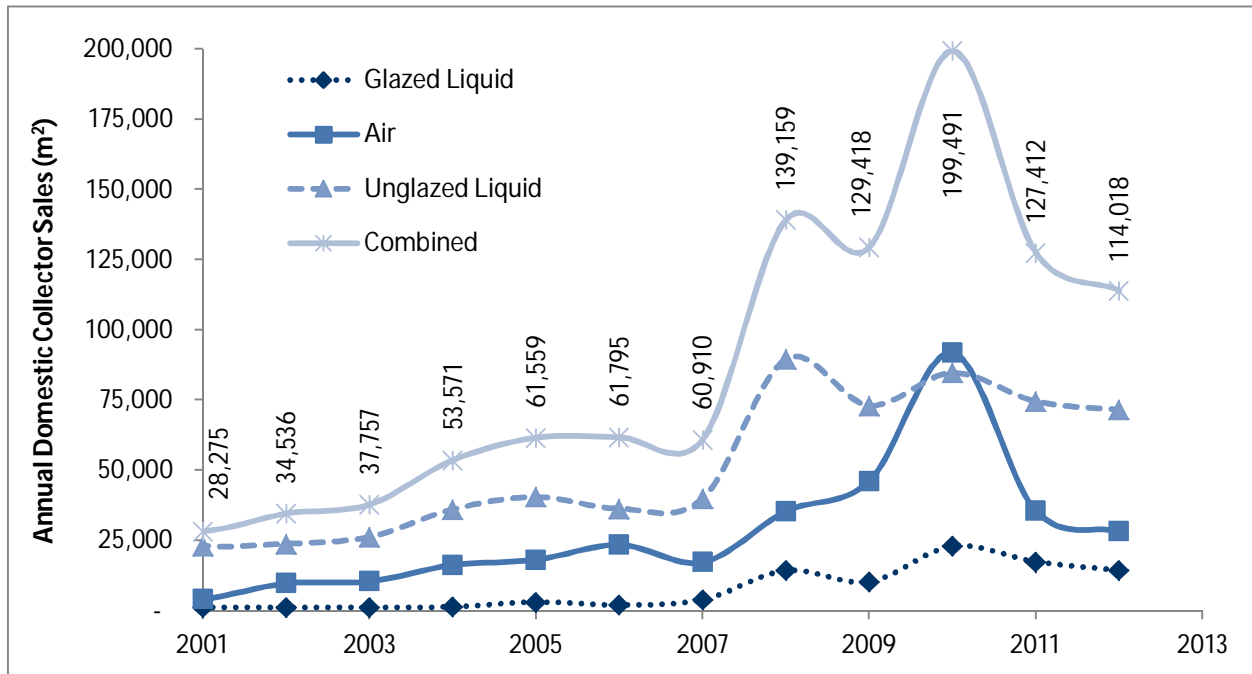


Figure 6: Historical annual domestic collector sales (m²).

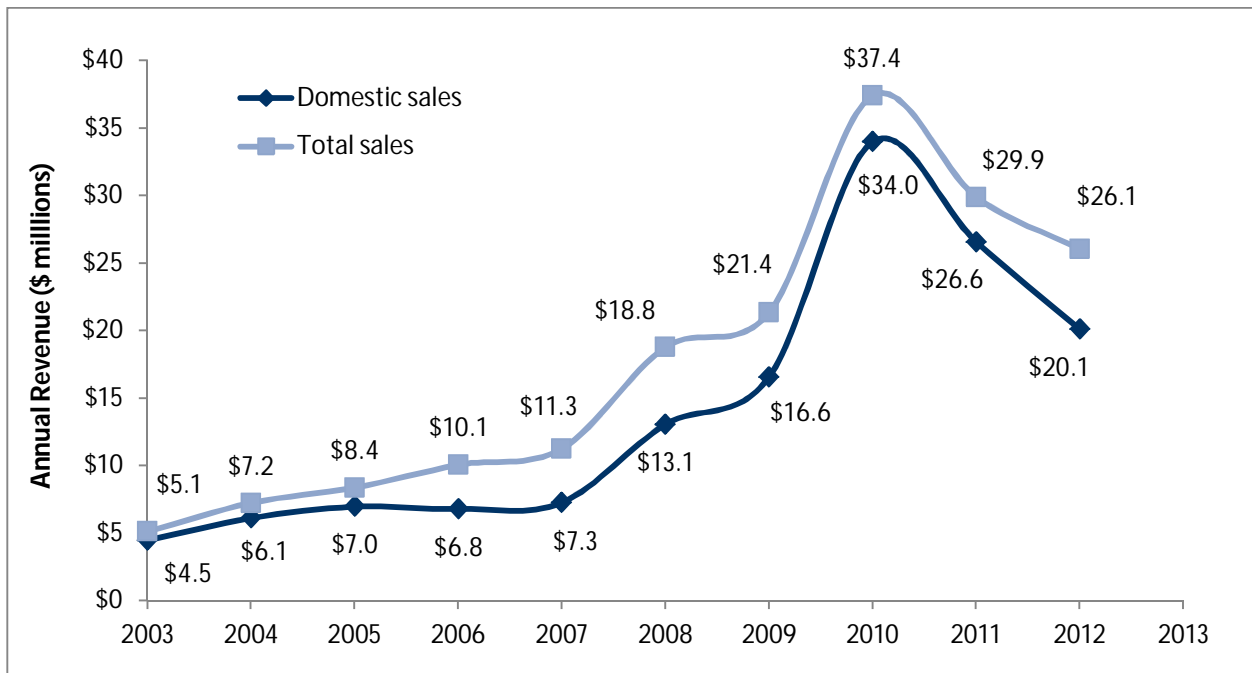


Figure 7: Canadian solar thermal industry revenue growth.

3.3. Applications of Solar Thermal Technology

Tables 3 and 4 provide a breakdown of revenue by collector type and end-use application. There are some changes when compared to the distribution found in 2011 but overall trends remain similar. Variations may be attributed to having a slightly different respondent pool than previous years. Unglazed liquid collectors are used primarily for residential pool heating (93.3%). Conversely, the other liquid collectors (evacuated and glazed) have a more even distribution across both residential and industrial/commercial/institutional (ICI) sectors. When compared to 2011, a greater proportion of liquid evacuated collector end users are ICI (59.4% compared to 28%). The opposite has occurred for liquid glazed collectors with 38.5% of end users in the residential sector, compared to 30% in 2011.

Glazed air collectors are used in both the residential and ICI sectors, but that market segment has significantly shifted more towards ICI sectors (97.7% compared to 73% in 2011). Unglazed air collectors continue to be exclusively used for ICI space heating.

Table 3: Solar heating collector type by sector (2012).

Revenue by Sector	Liquid			Air	
	Evacuated	Glazed	Unglazed	Glazed	Unglazed
Residential	38.3%	38.5%	93.3%	2.3%	0.0%
Industrial/Commercial/Institutional (ICI)	59.4%	61.5%	6.7%	97.7%	100.0%
Unknown	2.3%	0.0%	0.0%	0.0%	0.0%

Table 4: Solar heating collector type by application (2012).

Revenue by Sector	Liquid			Air	
	Evacuated	Glazed	Unglazed	Glazed	Unglazed
Residential - Pool	10%	0%	93%	0%	0%
Residential - Domestic Hot Water	19%	37%	0%	0%	0%
Residential - Space	0%	1%	0%	2%	0%
Residential - Combined/Other	10%	1%	0%	0%	0%
ICI - Pool	0%	17%	7%	0%	0%
ICI - Domestic Hot Water	35%	42%	0%	1%	0%
ICI - Process Heat	24%	0%	0%	13%	0%
ICI - Space Heat	0%	2%	0%	83%	95%
ICI - Combined/Other	0%	0%	0%	0%	5%
Unknown/Wholesale	2%	0%	0%	0%	0%

3.4. Geographical Distribution

3.4.1. Domestic Sales

Solar thermal collectors were sold throughout Canada in 2012, including in the Canadian Territories. Although 46% of domestic revenue was generated from sales in Quebec, the revenue per capita was almost equivalent for both Quebec and the Atlantic Provinces (\$1.15 and \$1.06 per capita), which is almost double that of the industry Canada-wide (\$0.57 per capita).

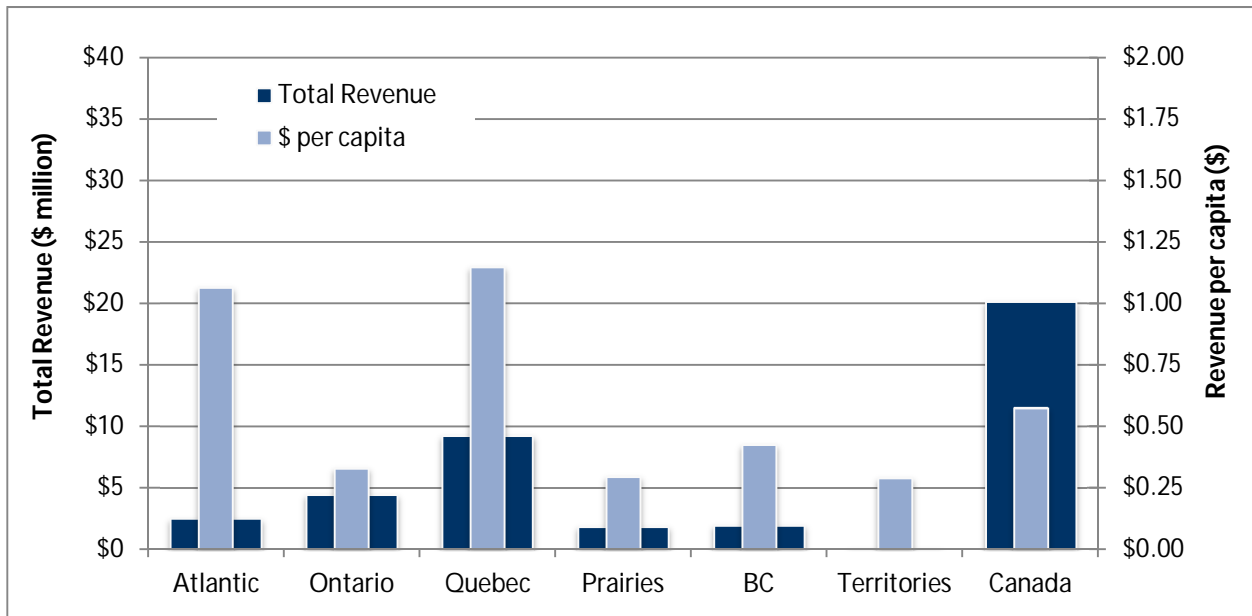


Figure 8: 2012 regional solar collector sales.

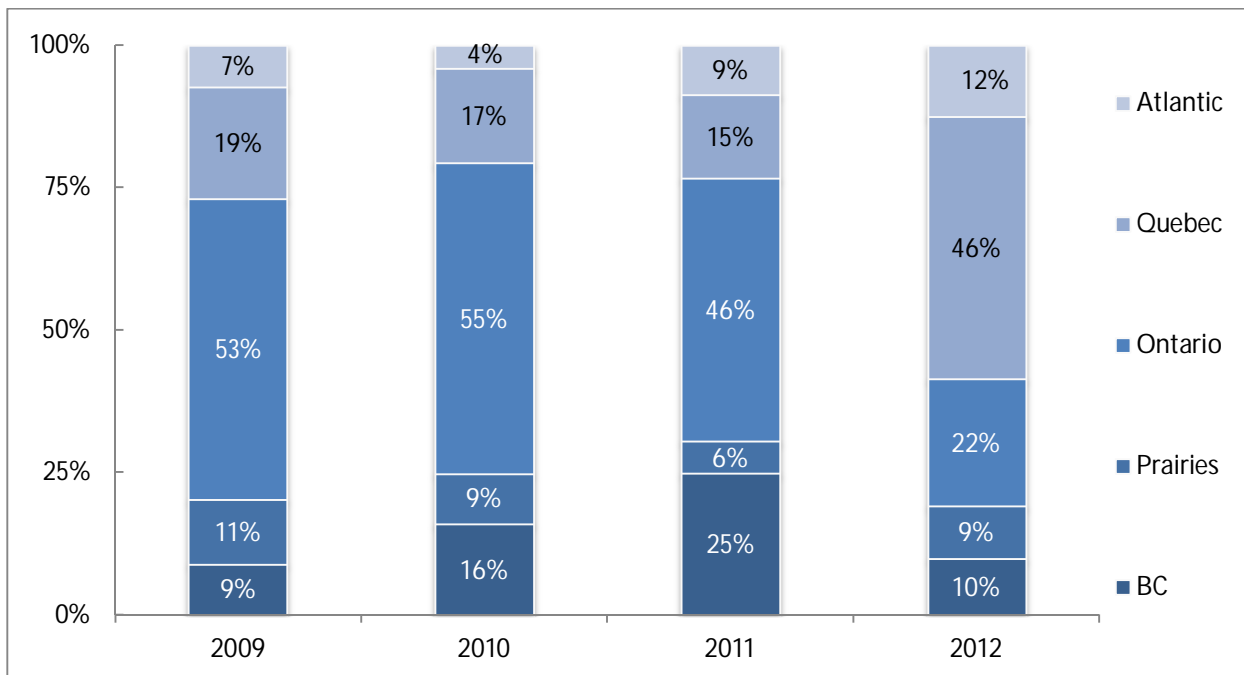


Figure 9: Regional distribution of domestic revenue.

3.4.2. Exports

In 2012, Canada exported 72,025 m² of solar thermal collectors, with a value of \$5.9 million (up 78.8% from 2011). This increase in exports may be due in part to the significant decrease in domestic demand (resulting from a loss of incentives) which has driven the industry to look to other markets for sales. The vast majority of exports, similar to 2011, were to the United States. Exports to Latin America have increased to 11% while exports to Europe have dropped to 2%. Little to no exports to Asia, Africa, or Oceania were reported. By collector type, unglazed air collectors were the single largest category of exports followed by glazed air and glazed liquid collectors.

Table 5: Regional distribution of solar thermal exports, by revenue (2011 and 2012).

Distribution of Solar Thermal Exports	2011	2012
United States	70%	86%
Latin America	7%	11%
Europe	23%	2%
Asia and Middle East	0%	2%
Africa	0%	0%
Oceania	0%	0%
Total	100%	100%

Table 6: Solar thermal collector exports, by revenue (2011 and 2012).

Distribution of Solar Thermal Exports	2011	2012
Air - Glazed	29%	30%
Air - Unglazed	26%	33%
Liquid - Evacuated	0%	7%
Liquid - Glazed	13%	19%
Liquid - Unglazed	33%	10%
Total	100%	100%

3.5. Anticipated Sales Growth

Figure 10 provides a compilation of participant's outlook for future sales growth, relating to their 2012 solar thermal revenue. Respondents in the 2012 survey were markedly less pessimistic than in the previous survey. Thirty percent of respondents expected positive sales growth (37% in 2011) while only 25.5% predicted a decrease in sales over the same time period (40% in 2011). Comments provided by respondents suggest that the reason that 45% of participants anticipate no growth in 2013 is due to the fact that the contraction experienced in previous years is expected to have bottomed out. At the same time, no further growth is expected due to a lack of provincial and federal incentives for the industry.

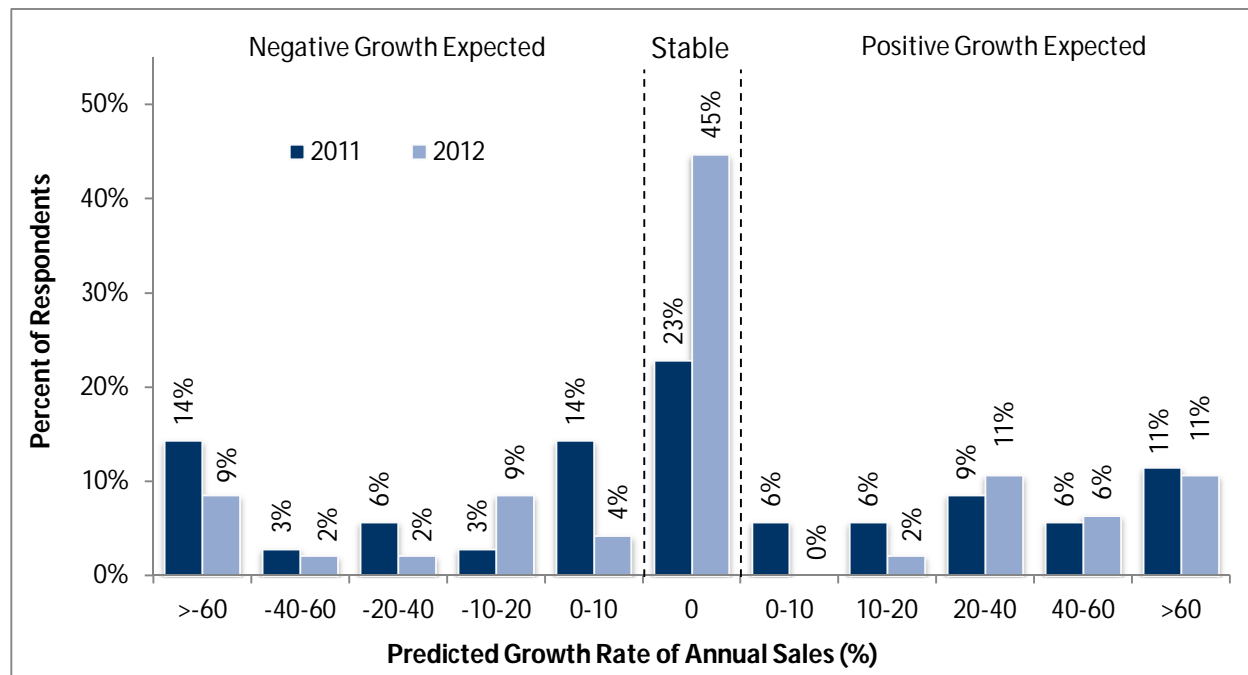


Figure 10: Estimate of future sales growth.

3.6. Sales of Packaged Systems

Respondents were asked if they sold packaged residential systems, either for domestic hot water or pool heating. Based on our results, approximately 19% of all liquid evacuated and glazed collectors (by revenue) were sold as packaged residential DHW systems (13% in 2011). While the increase in the reported number, total collector area, and total revenue for packaged systems was unexpected due to the relative absence of incentives in 2012, an expanded definition of a packaged system in the 2012 survey may have played a role in improving capture rates.

Due to low response in our sample from the pool heating sector, data for packaged pool heating systems were not reported. It is probable that many more such systems were sold, just not reported in our survey. Note that the pricing below does not reflect the fully installed price, but rather the packaged system equipment price.

Table 7: Domestic sales of packaged residential systems (2012).

	Packaged Residential DHW Systems
Systems Sold	605
Average Collector Area per System	4.0 m ²
Total Collector Area (m²)	2,449 m ²
Total Revenue from Packaged Systems	\$2,118,665
Average Revenue per System	\$3,503

4. Estimate of Avoided Greenhouse Gas Emissions

4.1. Background

The estimation of avoided GHG emissions from solar thermal installations in Canada involves numerous variables such as displaced fuel mix, system sizes, system efficiency, and operating conditions, many of which are difficult to accurately estimate. The methodology for estimating GHG emission avoidance in a current year involved the following major steps:

- Researching historical sales data, and interpolating as necessary to provide estimates for missing data.
- Estimating the useful operational life of various solar thermal collectors or systems, to estimate the total solar collector area operational in a specific year.
- Developing typical or reference systems and applications, from which to estimate annual energy production per square meter of collector surface.
- Analyzing the fuel being displaced by solar, for each of the reference systems.
- Calculating the quantity of displaced fuel, and thus the GHG emissions avoided.

To maintain consistency in reporting, this document continues to use the method that was used for previous reports for estimating avoided GHG emissions, developed by Weiss et al with the support of the International Energy Agency (IEA). Section 4.2 provides a summary of the reference systems used.

Figure 11 shows historical solar thermal collector area that is installed and operating in Canada. By the end of 2012, 1,249,162 m² of solar thermal collectors were operating in Canada.

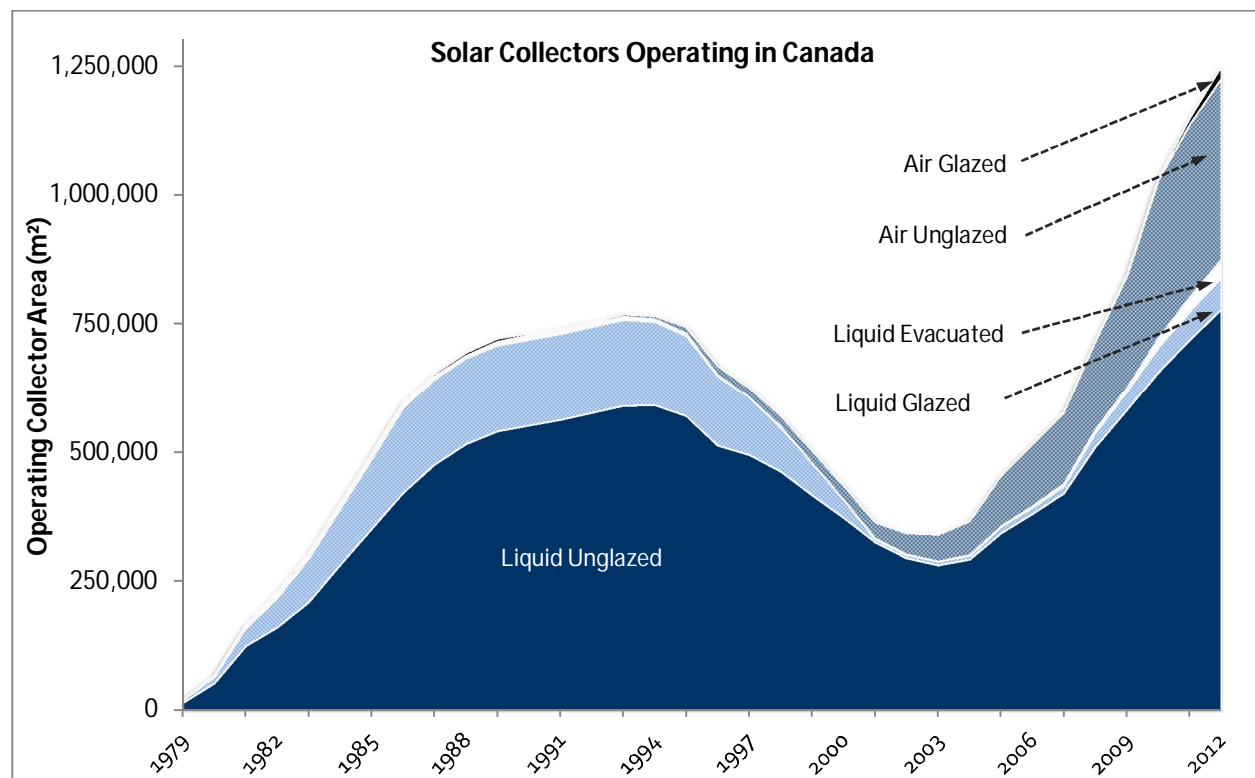


Figure 11: History of operating solar thermal collectors in Canada.

4.2. Reference System Definitions

Three of the four reference systems developed by Weiss et al are applicable for solar thermal systems in Canada, which were selected for estimating GHG savings. Adjustments were made to reflect the Canadian market, and a commercial air category was added to capture a segment of the market not present in Weiss' methodology.

Residential DHW – This system is identical to Weiss' solar domestic hot water systems for single family houses in Canada. It represents a typical solar DHW preheat system consisting of two 4' x 8' (6 m²) glazed solar collectors, 150 L/d hot water usage, with a 300 L hot water storage tank.² Commercial marketing material indicates that each system will produce about 50% of the energy required for hot water in a home, on an annual basis.

Commercial Water – This system is essentially a new name for Weiss' solar domestic hot water systems for multi-family houses and district heating, retaining many of its features. This incorporates all larger scale systems with glazed, liquid collectors, covering applications from institutional or multi-residential DHW, to municipal indoor pool heating, to process water at car washes, laundries or other facilities. As with Weiss, the reference system consists of 50 m² of collectors, 2,000 L/d hot water draw and a 2,500 L storage tank.

Residential Pool – This system is identical to Weiss, except that the collector area has been reduced from 200 m² to 25 m², to more closely reflect the Canadian market (5-6 nominal 4' x 12' collectors per system). This reduction in size has little impact on the GHG analysis, but it does affect the calculation of the number of systems. Note that this reference system covers all unglazed, liquid-type collectors, and thus does include seasonal municipal or resort pools, which may have collector areas of 50 – 300 m². However, these commercial pools constitute well below 5% of the Canadian market, and they do perform similarly to the more common residential pools.

Commercial Air – This is a new reference system, based on the successful use of unglazed air collectors for preheating ventilation and makeup air in industrial, commercial and agricultural (livestock barns) applications. Within Canada, this is a strong market sector, and cannot be ignored. System sizes vary widely from below 50 m² to 10,000 m². 200 m² was selected as the reference system size, because it is within the size range for both agricultural and industrial/commercial/institutional sectors, and should provide a reasonable estimate of the mean size of all systems.

² The 150 L/d hot water usage used by Weiss is probably low for Canadian practice, but we chose to keep this value for consistency with international reports. Using a larger hot water draw (~225 L/d is more typical of actual hot water usage in Canada) would have increased the estimate of GHG avoided, but since DHW heating systems are a small segment of the Canadian market, the overall effect would be negligible. Moreover, because the relevant assumptions made for annual and specific yields per system were not far from those of a 225 L system, the actual effect of using Weiss' figures are reduced even further.

4.3. GHG Emissions Avoidance Calculations

Table 8 details the calculations used to estimate avoided GHG emissions in 2012 based on the total operating solar thermal collectors in Canada. The avoidance is equivalent to 95,255 tonnes of CO₂, an increase of 9.1% when compared to the 2011 calculated value.

Table 8: Analysis of avoided GHG emissions, 2012.

Parameter	Residential DHW	Commercial Water	Residential Pool	Commercial Air
Collector type	glazed	glazed	unglazed	unglazed air
Collector area (m ²)	6	50	25	200
Annual yield per system (GJ/a)	9.9	82.1	19.4	422
Specific annual yield (GJ/a-m ²)	1.6	1.64	0.78	2.11
<u>Displaced fuel mix (%)</u>				
· Oil (73 kg of CO ₂ /GJ)	4%	15%	1%	5%
· Natural gas (50 kg of CO ₂ /GJ)	50%	75%	63%	50%
· Propane (60 kg of CO ₂ /GJ)	--	5%	--	40%
· Electricity (151 kg of CO ₂ /GJ)	46%	5%	12%	5%
· Heat pump (38 kg of CO ₂ /GJ)	--	--	24%	--
· No fuel	--	--	--	--
Blended CO ₂ avoided (kg of CO ₂ /GJ)	97.6	59	59	60
Annual CO ₂ avoided (t/a-system)	0.96	4.84	1.14	25.3
Annual specific CO ₂ avoided (kg/a-m ²)	160	97	46	127
Estimated system life (years)	15/20	15/20	15/20	30
Total operating collector area (m ²)	48,585	48,585	778,102	373,890
Calculated number of systems	8,097	972	31,124	1,869
Total annual CO ₂ avoided (t/a)	7,774	4,703	35,481	47,297
Total annual CO ₂ avoided, all types (t/a)	95,255			

The 95,255 tonnes of avoided GHG emissions from solar thermal installations in Canada is equivalent to removing more than 19,000 mid-sized cars from Canadian roads, or the total GHG emissions of over 4,000 Canadians.³

³ "Human Activity and the Environment: Annual Statistics – 2007 and 2008" Statistics Canada, March 2009. This report indicates that the per capita GHG emissions from a typical Canadian are 23 tonnes per annum, and that a typical mid-size car driven 25,000 km each year emits 5 tonnes of GHG's.

4.4. Forecast GHG Emission Avoidance from Collectors sold in 2012

A similar calculation to that above was performed to estimate the total avoided GHG emissions over the lifetime of solar thermal collectors installed in Canada in 2012. Based on the 114,018 m² that was installed, the equivalent of 206,942 tonnes of CO₂ will be avoided over the lifetime of these systems (assuming a 20 year expected life for all water systems and a 30 year life for commercial air systems). This is a decrease of 16.5% compared to the 247,736 tonnes of CO₂ that will be avoided due to systems installed in 2011.

The Canadian solar industry earned \$20.1 million in revenue from domestic sales in 2012, this amounts to a displacement of one tonne of CO₂ for every \$97 of revenue (neglecting any service and repair revenue that may be earned over the life of the systems). Depending upon climatic conditions and displaced fuel data in the country of use, it is likely that the solar collectors exported from Canada during 2012 will be responsible for avoiding approximately 137,098 tonnes of CO₂ equivalent, during their operating life.

5. Conclusions

In 2012, the Canadian solar thermal industry experienced a substantial decrease in revenue (-13%) but a slight increase in collector area (3.4%) when compared to 2011.

Figure 12 summarizes the 2012 solar thermal industry domestic market share by collector type. Unglazed liquid collectors accounted for the largest market share by collector area (63%), accounted for only 12% of market share by revenue. Conversely, glazed liquid collectors made up only 12% of market share by collector area but 47% of market share by revenue. The GHG savings reflect projected savings over total lifetime for collectors installed in 2012.

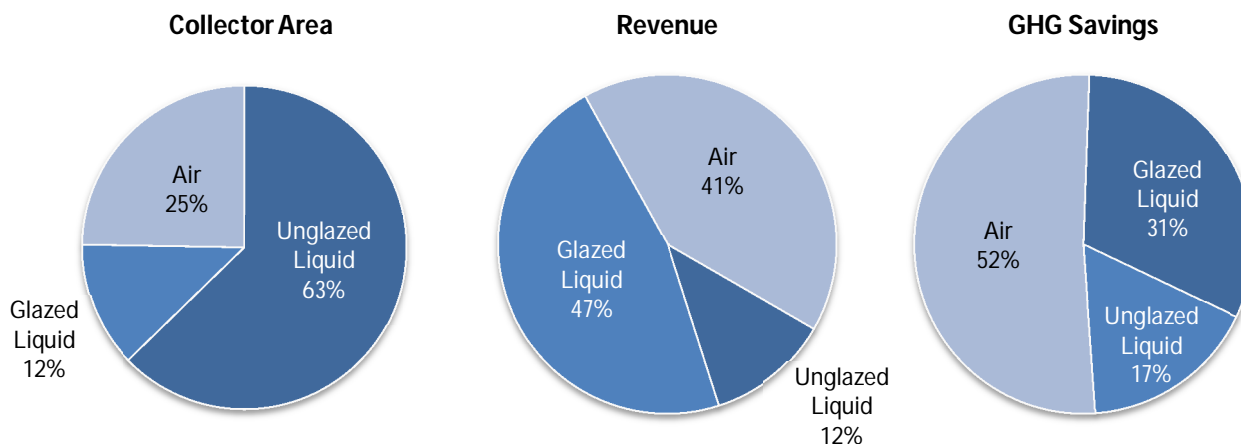


Figure 12: 2012 market share by collector area, revenue, and projected GHG savings.

Table 9 below, provides a breakdown of domestic end-use for glazed liquid and evacuated tube collectors based on collector area. The majority of glazed liquid and evacuated tube collectors installed in Canada were used for domestic hot water systems (89%). Forty-six percent of total installed collectors (6,572 m²) were for DHW systems in single family houses while 27% (3,872 m²) were for DHW applications in the public sector. (Note: DHW systems for single family houses include packaged and non-packaged system sales).

Table 9: Domestic sales of evacuated and glazed liquid collectors, by application (2012)

Application	Gross Collector Area (m ²)
DHW system for single family houses	6,572
DHW system for multiple family houses	2,203
DHW system for the tourism sector	46
DHW system for the public sector	3,872
Solar combi systems for single family houses	1,240
Solar combi systems for multiple family houses	-
Solar district heating systems	-
Solar process heat applications	391
Solar air conditioning and cooling	-

Figure 13 summarizes market share of each of the five collector types by total revenue in 2012. The market shares are relatively similar to those reported in 2011. Glazed air collectors experienced the largest increase in 2012 (10.0% in 2011 to 26.7% in 2012). Market shares for liquid evacuated collectors experienced the largest decrease (34.1% in 2011 to 22.0% in 2012).

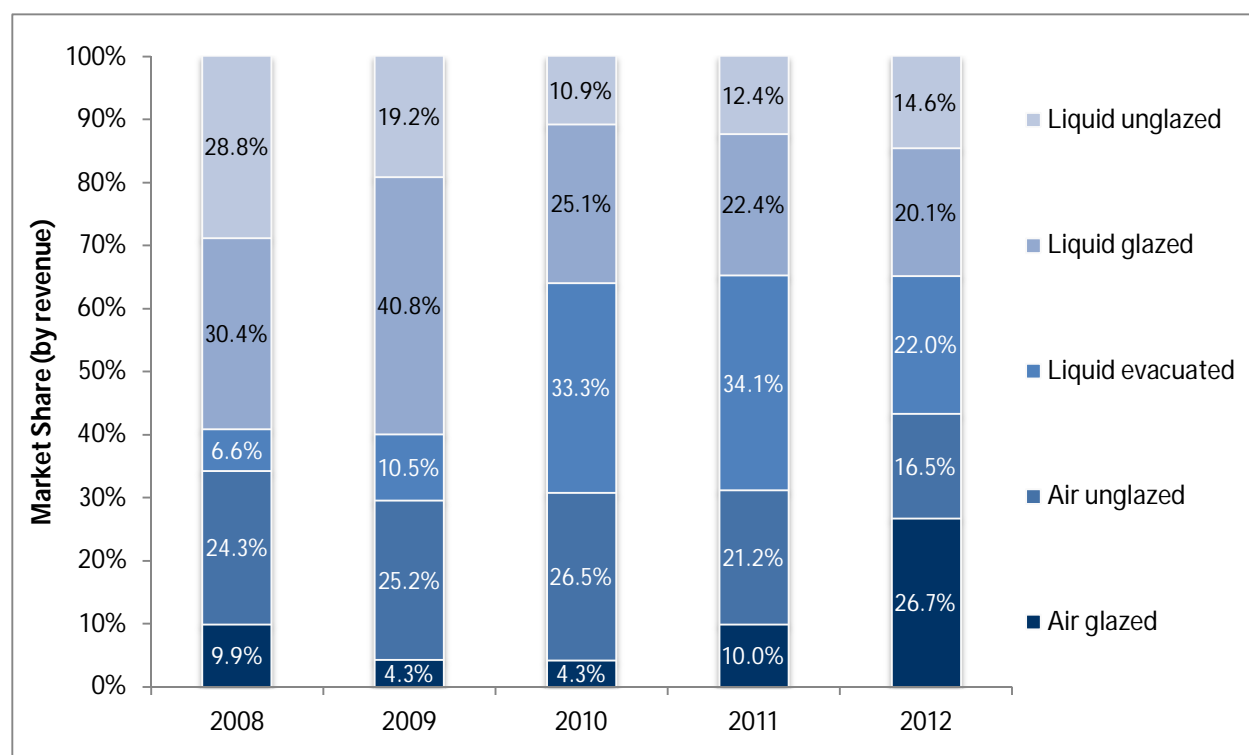


Figure 13: Market share of five collector types by total revenue in 2012.

6. References

1. **Survey of Active Solar Thermal Collectors, Industry and Markets in Canada (2011)**, August 2012, ClearSky Advisors.
2. **Final Report Survey of Active Solar Thermal Collectors, Industry and Markets in Canada (2002 – 2004)**, August 2005, SAIC Canada report no. CM001743.
3. **Final Report Survey of Active Solar Thermal Collectors, Industry and Markets in Canada (2005)**, October 2006, SAIC Canada report no. CM002056.
4. **Final Report Survey of Active Solar Thermal Collectors, Industry and Markets in Canada (2006 & 2007)**, March 2008, SAIC Canada report no. CM002208.
5. **Final Report Survey of Active Solar Thermal Collectors, Industry and Markets in Canada (2008)**, September 2009, SAIC Canada report no. CM002285
6. **Final Report Survey of Active Solar Thermal Collectors, Industry and Markets in Canada (2009)**, August 2010, SAIC Canada report no. CM002285
7. Omboli, Eugène and McClenahan, Doug, 2002, **NRCan In-house Survey of Solar Collectors for 1995 – 2001**, Natural Resources Canada.
8. Weiss, Werner; Bergmann, Irene and Faninger, Gerhard, February 2004. **Solar Heating Worldwide: Markets and Contribution to the Energy Supply 2001**. IEA Solar Heating & Cooling Program.

Appendix A - Survey Questionnaire (English)

Introduction

You have been invited to participate in a study of the Canadian Solar Thermal industry, commissioned by Natural Resources Canada (NRCan) and undertaken by ClearSky Advisors. The study results will help to provide comprehensive and reliable information on market size and industry trends, including sales and revenue, import and export, as well as employment figures.

Before you begin this questionnaire, it would be helpful for you to have the following information for your company on hand: 1) employment figures for 2011 and 2012; 2) 2012 sales and revenue (\$ and gross collector area) by region, collector type, and end use; and 3) information on your equipment supplier and sources.

Please note that your responses will be kept anonymous and your privacy protected. Collected data will only be presented in aggregate. You may choose not to answer any of the descriptive questions by writing "N/A" in the comment text. A copy of the 2011 Solar Thermal industry survey report may be found at the following CanSIA's web site: www.cansia.ca/market-intelligence/solar-thermal

ClearSky Advisors (www.clearskyadvisors.com) is an independent research and advisory firm focused on renewable energy offering fact-based advice to the industry. We offer our clients the value of up-to-date research and thought leadership from a fast changing industry. ClearSky Advisors serves a range of different stakeholders in the solar industry and regularly publishes reports on timely issues.

[Start Questionnaire]

Please enter company contact information:

1. Company Name: _____
2. Company Address: _____
3. Contact Name: _____
4. Title: _____
5. Phone: _____
6. Email: _____
7. If necessary, may ClearSky Advisors contact you to supplement the information gathered through the survey process? (Y/N)
8. Please select the primary business that your company carried out in 2012 (select only one).
 - Solar Thermal
 - Other Renewable Energy (e.g. solar PV, wind, etc.)
 - Swimming Pool Sales and Installation
 - Plumbing Contractor
 - HVAC Contractor
 - HVAC Equipment Manufacturer or Distributor
 - Building Contractor
 - Other Building Trades
 - Other (please specify): _____

9. In addition to your primary business as indicated in Q7, please indicate if your business was involved in any of the following business segments in 2012. Check all that apply.

- Solar Thermal
 Other Renewable Energy (e.g. solar PV, wind, etc.)
 Swimming Pool Sales and Installation
 Plumbing Contractor
 HVAC Contractor
 HVAC Equipment Manufacturer or Distributor
 Building Contractor
 Other Building Trades
 Other (please specify): _____

10. Please provide some profile information pertaining to your Solar Thermal business. Which of the following business segments were/are applicable to your organization for the calendar years 2011 and 2012? Check all that apply.

	2011	2012
Solar Thermal Collector Manufacturer	<input type="checkbox"/>	<input type="checkbox"/>
Solar Thermal System Component Manufacturer	<input type="checkbox"/>	<input type="checkbox"/>
Solar Thermal Collector Importer	<input type="checkbox"/>	<input type="checkbox"/>
Solar Thermal System Components Importer	<input type="checkbox"/>	<input type="checkbox"/>
Wholesale Distributor	<input type="checkbox"/>	<input type="checkbox"/>
Retailer/Installer	<input type="checkbox"/>	<input type="checkbox"/>
Design/Consulting Services	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify): _____	<input type="checkbox"/>	<input type="checkbox"/>

11. Please estimate the time spent on Solar Thermal activities by all employees (full and part-time), and contractors, to provide the number of full-time employee equivalents. A full-time employee is defined as an employee who works 40 hours a week, 52 weeks a year (e.g., If two employees each spend approximately 20 hours per week over the course of a year on your Solar Thermal business, this would be counted as one full-time Solar Thermal employee).

2011: _____

2012: _____

12. Including full-time, part-time and seasonal staff, but excluding contractors, what was the peak number of persons employed at any single time?

2011: _____

2012: _____

13. What percentage of your organization's total revenue was from active Solar Thermal business?

2011: _____

2012: _____

14. Please report your total revenue earned from solar thermal activities in 2011 and 2012, and provide the percentage of this revenue that was earned from various types of sales. Please include all types of revenue related to Solar Thermal activities (e.g., product sales, service contracts, installation fees, consulting revenues). The percentages provided should sum to 100%. (Please note that two years of revenue information is being requested to ensure accuracy and continuity of data.)

	2011	2012
Total Sales Revenue from Solar Thermal Activities	\$	\$
Revenue of All Export Sales	%	%
Revenue from Sales to Canadian Resellers	%	%
Revenue from Sales Direct to Canadian End Users	%	%
Revenue from Other Canadian Sales	%	%

15. Please provide total Solar Thermal collector sales in 2012, by collector gross area, and provide the percentage of Solar Thermal collector sales, export and Canadian, by gross collector area. The percentages provided should sum to 100%.

Total Solar Thermal Collector Sales (square meters) _____m²
 Percent of Collectors Exported _____%
 Percent of Collectors Sold Within Canada _____%

16. Compared to 2012, does your organization expect more, less or about the same revenues in the Solar Thermal collector and components sales and services area over the next 2 years?

- About the same
 Increase by ____% average per year
 Decrease by ____% average per year

17. Please report collector sales in 2012 by collector type in both collector gross area (m²) and revenue (\$). If your business involved the sale of complete systems, and/or related services and components along with solar collectors, please report the total revenue earned for the sale in the most appropriate column.

	Air - Glazed ⁴	Air - Unglazed	Liquid - Evacuated	Liquid - Glazed	Liquid - Unglazed
Revenue from manufacturing ⁵	\$	\$	\$	\$	\$
Revenue from distribution	\$	\$	\$	\$	\$
Revenue from installations	\$	\$	\$	\$	\$
Revenue from other sources	\$	\$	\$	\$	\$
Total Solar Thermal Revenue	\$	\$	\$	\$	\$
Collector Gross Area	m ²	m ²	m ²	m ²	m ²

If **Other Sources** selected, please specify the nature of the revenue: _____

⁴ Includes transpired glazed

⁵ Includes sales of all associated equipment (e.g., thermal fluid) and shipping costs

18. Please provide a percentage distribution, by collector type for dollar sales by application in 2012. The total for each column should sum up to 100%. If a collector type is not applicable, please leave the column blank. If you were wholesaling the product to re-sellers, and are unaware of the final application, please report these shipments in the "unknown" category. (ICI: Industrial/Commercial/Institutional)

	Air - Glazed⁶	Air - Unglazed	Liquid - Evacuated	Liquid - Glazed	Liquid - Unglazed
Residential – Pool	%	%	%	%	%
Residential – DHW	%	%	%	%	%
Residential – Space	%	%	%	%	%
Residential – Combined/Other (includes hot tubs)	%	%	%	%	%
ICI – Pool	%	%	%	%	%
ICI – DHW	%	%	%	%	%
ICI – Process Heat	%	%	%	%	%
ICI – Space Heat	%	%	%	%	%
ICI – Combined/Other	%	%	%	%	%
Unknown/Wholesale	%	%	%	%	%

⁶ Includes transpired glazed

19. Within each region, please report the 2012 sales by revenue and collector gross area for each collector type. If your business did not conduct sales in a particular region in 2012, please leave the applicable section blank.

		Air - Glazed⁷	Air - Unglazed	Liquid - Evacuated	Liquid - Glazed	Liquid - Unglazed
Atlantic Provinces	Revenue	\$	\$	\$	\$	\$
	Collector Gross Area	m ²	m ²	m ²	m ²	m ²
Ontario	Revenue	\$	\$	\$	\$	\$
	Collector Gross Area	m ²	m ²	m ²	m ²	m ²
Quebec	Revenue	\$	\$	\$	\$	\$
	Collector Gross Area	m ²	m ²	m ²	m ²	m ²
Prairie Provinces	Revenue	\$	\$	\$	\$	\$
	Collector Gross Area	m ²	m ²	m ²	m ²	m ²
British Columbia	Revenue	\$	\$	\$	\$	\$
	Collector Gross Area	m ²	m ²	m ²	m ²	m ²
Canadian Territories	Revenue	\$	\$	\$	\$	\$
	Collector Gross Area	m ²	m ²	m ²	m ²	m ²
United States	Revenue	\$	\$	\$	\$	\$
	Collector Gross Area	m ²	m ²	m ²	m ²	m ²
Latin America	Revenue	\$	\$	\$	\$	\$
	Collector Gross Area	m ²	m ²	m ²	m ²	m ²
Europe	Revenue	\$	\$	\$	\$	\$
	Collector Gross Area	m ²	m ²	m ²	m ²	m ²
Asia, Middle East	Revenue	\$	\$	\$	\$	\$
	Collector Gross Area	m ²	m ²	m ²	m ²	m ²
Africa	Revenue	\$	\$	\$	\$	\$
	Collector Gross Area	m ²	m ²	m ²	m ²	m ²
Australia, New Zealand, Oceania	Revenue	\$	\$	\$	\$	\$
	Collector Gross Area	m ²	m ²	m ²	m ²	m ²

⁷ Includes transpired glazed

20. a) Do you manufacture any Solar Thermal collectors in house?

Yes

No

b) If yes, please select the collector types that you manufacture and indicate the cumulative dollar value of all Solar Thermal collectors manufactured in the year 2012.

Air - Glazed

Air - Unglazed

Liquid - Evacuated

Liquid - Glazed

Liquid - Unglazed

Revenue Earned from of Solar Thermal Collector Sales (\$): _____

21. Please list your sources of Solar Thermal collectors, including: the collector type, the name of the supplier, the location of the supplier (using the regions listed in Q18), and the total dollar value (Revenue Earned) for each collector source for the year 2012.

	Collector Type	Supplier Name	Supplier Location	Dollar Value (Revenue) of Supply
Purchased Within Canada				\$
				\$
				\$
				\$
				\$
Purchased Outside of Canada				\$
				\$
				\$
				\$
				\$

22. Please briefly describe any changes to your business during 2012 (e.g., merger, acquisitions, etc.) that have had a significant impact on solar thermal sales from previous years. If none, please enter "N/A".

--

23. Does your business sell packaged residential solar systems in Canada?

- Yes
 No

If yes, please provide information on the number and type of systems sold in 2012. Please provide data only on Canadian sales, excluding exported systems.

	Solar DHW Systems	Solar Pool Heating Systems
Total Revenue from Packaged Residential Sales (including all packaged equipment revenue but excluding any related labour and/or services revenue)	\$	\$
Number of Packaged Systems Sold		
Total Solar Thermal Collector Area in Packaged Residential Sales (gross)	m ²	m ²

24. This question is relevant to domestic sales (not exports) of liquid glazed flat plate and evacuated tube collectors only. Please estimate in collector gross area, the breakdown by end user for total sales of these two types of collectors in 2012.

Application	Gross Collector Area (m ²)
DHW System for single family houses	m ²
DHW System for multiple family houses	m ²
DHW System for the tourism sector	m ²
DHW System for the public sector	m ²
Solar combi systems for single family houses	m ²
Solar combi systems for multiple family houses	m ²
Solar district heating systems	m ²
Solar process heat applications	m ²
Solar air conditioning and cooling	m ²
Total (m ² of all 2012 sales of liquid flat plate and evacuated tube collectors)	m ²

25. For any 2012 Solar Thermal business conducted in Canada, did you or the system end user take advantage of any federal, provincial, or municipal initiatives? If applicable, indicate the initiative and approximate collector gross area per initiative (if known).

Incentive, Program or Procurement Initiative	Gross Collector Area (m ²)
	m ²
	m ²
	m ²
	m ²
	m ²
	m ²
	m ²
	m ²