

MAY 2012

Cornerstone Architecture:

2011 Greenhouse Gas Inventory Report

zerofootprint™

Cornerstone Architecture

2011 Greenhouse Gas Inventory

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1.0 INTRODUCTION

→ Comerstone Architecture Inc. (“Comerstone”) has engaged Zerofootprint Software Inc. (“Zerofootprint”) to calculate the greenhouse gas (GHG) emissions for its business operations for the 2011 calendar year. Comerstone, established in 1991, has expertise in a variety of institutional, educational, administrative, and assembly projects with sustainable design as a core focus of the business. Zerofootprint conducted Comerstone’s 2007 (base year), 2008, and 2009 GHG inventories. Choosing to continue tracking GHG emissions illustrates Comerstone’s commitment to responsible environmental management. Based in London, Ontario, Comerstone operates with 14 employees and occupies 3,187 square feet of office space in 2011.

Zerofootprint has determined the GHG emissions associated with Comerstone’s electricity consumption, employee ground travel, paper usage, waste, shipping, and food. This was done through data collection, calculation, and analysis. This report describes the methodology and results of the 2011 GHG inventory.

2.0 METHODOLOGY

→ This greenhouse gas inventory was undertaken in accordance with the World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD)’s “Greenhouse Gas Protocol – A corporate accounting and reporting standard (revised edition).” Launched a decade ago, the Greenhouse Gas Protocol provides organizations with the tools needed to assess organizational and operational boundaries, measure their carbon footprints, and report the results. It is recognized internationally as the preeminent methodology for quantifying and reporting corporate GHG emissions and forms the basis of national and international voluntary reporting frameworks.

2.1 BOUNDARIES

One of the first steps in establishing a GHG inventory is determining the boundaries upon which the inventory will be built. The scope of a corporate inventory is defined by both organizational and operational boundaries.

ORGANIZATIONAL BOUNDARIES

Under the GHG Protocol, organizations can use either the Equity Share or Control approach. The equity share approach uses an organization’s share of equity, or the financial ownership percentage, to account for its share of GHG emissions.

Similarly, the control approach accounts for the GHG emissions for all operations that the organization has control over (financial or operational).

An operational control approach has been taken to collect and report Cornerstone's 2011 GHG emissions.

OPERATIONAL BOUNDARIES

The GHG Protocol defines the operational boundary as the scope of direct and indirect emissions, broken down as scopes 1, 2 or 3. Scope 1 emissions are direct emissions that occur from sources owned or controlled by the organization. Scope 2 emissions are indirect emissions attributed to purchased electricity. Scope 3 emissions are optional and include all other indirect emissions. The following activities (sources) and scopes have been included in Cornerstone's 2011 inventory:

Scope 1 – There are no reported scope 1 emissions in Cornerstone's inventory. Natural gas consumption for heating is the most common Scope 1 emissions for offices in Canada. However, electricity is used to run a heat pump system at Cornerstone and hence, it is captured as part of Scope 2 emissions.

Scope 2 – Electricity consumption. Electricity consumption is considered as Scope 2 emissions, which occur off-premise and not directly at Cornerstone.

Scope 3 – Employee ground travel, paper usage, waste, shipping, and food. These are all Scope 3 indirect emissions included in the inventory over which Cornerstone has operational control.

2.2 DATA COLLECTION & CALCULATIONS

Cornerstone provided data for the following activity types for 2011: electricity consumption, renewable energy purchases, employee ground travel, paper usage, waste generation, shipping, and food consumption. In order to accurately and comprehensively calculate an organization's carbon footprint, Zerofootprint considered all significant and measurable elements that produce GHG emissions. Table 1 outlines the information provided for each activity type.

All greenhouse gas emissions were calculated using GHG emission factors sourced from government and international agencies including Environment Canada, the United States Environmental Protection Agency, and the Greenhouse Gas Protocol, among others. Where emission factors differed, the local emission factor or calculation methodology took precedence. Emission factors are specific to each activity type and convert activity data into a quantity of greenhouse gas emissions.

Table 1: Data provided by Cornerstone

Activity	Scope	Information provided for 2011
Electricity	2	Total consumption in kWh
Purchase of green electricity from Bullfrog power	NA	Amount purchased in kWh
Ground travel	3	Total distance driven and car type by employee
Paper usage	3	Paper type, number of sheets used and % recycle content
Waste disposal	3	Total weight of each material type
Shipping	3	Shipping method, weight transported and total distance traveled
Food consumption	3	Number and type of meals

3.0 RESULTS → Zerofootprint assessed the emissions resulting from Cornerstone’s business operations for 2011. Greenhouse gas emissions are expressed in tonnes of carbon dioxide equivalents (CO₂e).

Table 2 provides emission results grouped by scope. Scope 2 (indirect) emissions represent the largest source of emissions at approximately 52%. There were no Scope 1 emissions since Cornerstone does not consume any fuel (or natural gas) on-site and does not own fleet vehicles. Emissions normalized by area and by employee are also shown in Table 2.

Figures 1 and 2 summarize Cornerstone’s 2011 GHG emissions for each activity type expressed in tonnes of CO₂e and by percentages, respectively. The largest contribution to total emissions came from electricity consumption at 6.4 tonnes of CO₂ in 2011, or 52% of total emissions. The second largest was the contribution from ground travel, at 4.5 tonnes of CO₂e or 37% of total emissions. Greenhouse gas emissions from paper and waste make up the bulk of the remainder at 3% and 7.5%, respectively.

Table 2: 2011 Emissions summary by scope

Scope	Tonnes CO ₂ e	% of total emissions	Tonnes CO ₂ e / m ²	Tonnes CO ₂ e / employee
Scope 1	0.000	0.0%	0.000	0.000
Scope 2	6.364	52.5%	0.021	0.455
Scope 3	5.822	47.8%	0.020	0.416
Total	12.185	100.0%	0.041	0.870

Figure 1: 2011 Emissions by activity type

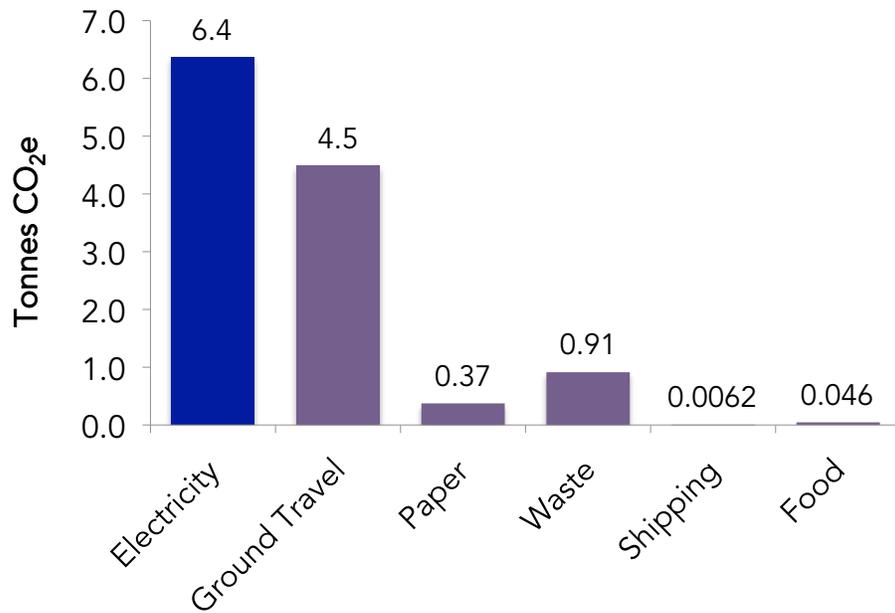
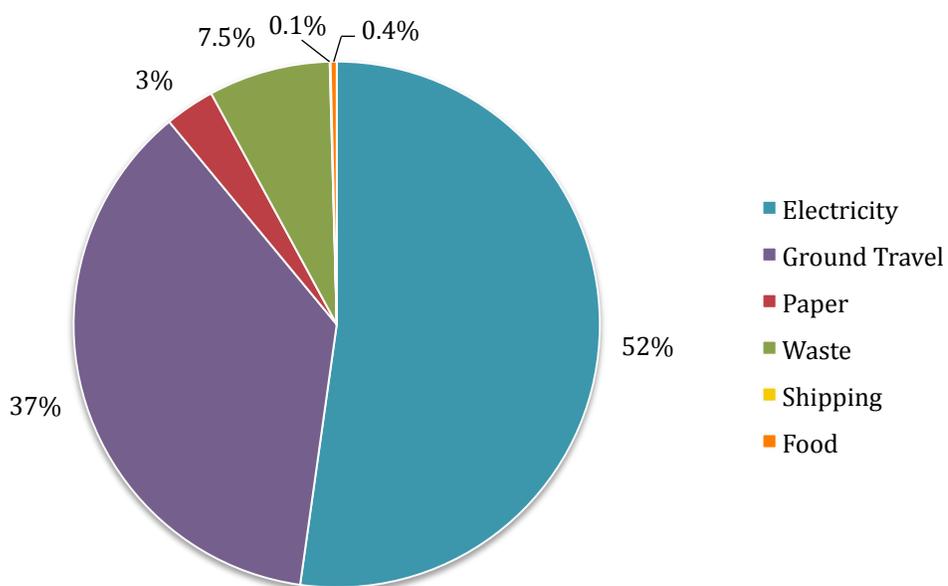


Figure 2: 2011 Percentage of total emissions by activity type



3.1 DETAILED EMISSIONS BREAKDOWN

The following tables provide a more detailed breakdown of emissions for each activity type. (Please note: numbers in tables are rounded and may not sum.)

ELECTRICITY

Cornerstone continues to purchase EcoLogo-certified green electricity from Bullfrog Power. In 2011 Cornerstone purchased green electricity totaling 37,680 kWh to offset emissions from their electricity use. Table 3 displays the carbon emissions avoided as a result. Emissions from both electricity consumed and green electricity purchased were calculated using the average Ontario grid electricity emission factor from *Canada's National Inventory Report: 1990-2008*.

Table 3: 2011 Summary of emissions from electricity consumption and offsets from purchased green electricity

Electricity	kWh / year	Tonnes CO ₂ e / year
Electricity consumed	37,433.53	Emissions = 6.364
Purchase of green electricity from Bullfrog Power	37,680.00	Emissions offset = 6.406

GROUND TRAVEL

Table 4 provides a breakdown of emissions from employee travel for 2011. Emission factors for vehicle types, expressed in tonnes of carbon per distance traveled, were found in the GHG Protocol. To increase calculation accuracy, Zerofootprint recommends collecting data on direct fuel consumption.

**Table 4: 2011
Summary of emissions
from employee
business travel**

Employee	Primary vehicle	Total distance traveled (km / year)	Tonnes CO _{2e} / year
Brad Beharrell	Saturn SL4	548	0.13
Jason McIntyre	Mazda 5	6669	1.62
Mallory Blaine	Pontiac Bonneville	87	0.02
Richard Hammond	Honda Accord	9740	2.37
Robert Reed	Honda Accord	1360	0.33
Total		18404	4.48

PAPER USAGE

Using lifecycle analysis research from the United States Environmental Defense Fund, emissions from paper usage were calculated based on paper type, number of sheets, and basis weights. The majority of Cornerstone's paper use comes from Corporate Express Multi-purpose and Staples recycled paper, as summarized in Table 5.

**Table 5: 2011
Summary of emissions
from paper usage**

Paper type	Total # of sheets (per year)	Tonnes CO _{2e} / year
Corporate Express- Brochure, Glossy, Letter	150	0.003
Corporate Express- Paper, Rolland Environ 100, 11"	500	0.006
Corporate Express- Paper, 92 Bright, White, 500/pack	4000	0.099
Corporate Express- 92 Bright, White, 2500/ctn	5000	0.124
Corporate Express- 96 Bright, White, 500/pack	2500	0.031
Staples- Paper, 30% Recycled, 92 Bright, 5000/ctn	10,000	0.109
Total	19,650	0.373

WASTE

Greenhouse gas emissions from waste were calculated using the United States Environmental Protection Agency's report "Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks, 2006". The weight of each material disposed was provided by Cornerstone and used in the calculations. Table 6 provides a summary of waste-related emission results.

Table 6: 2011
Summary of emissions
from waste

Material	Total weight disposed (kg / year)	Tonnes CO ₂ e / year
Food	104	0.164
Glass	208	0.146
Plastic	52	0.120
Paper and cardboard	52	0.280
Aluminum	104	0.203
Total	520	0.913

SHIPPING

Emissions from shipping by road freight were calculated using emission factors from the Greenhouse Gas Protocol. Cornerstone provided the product weights and distances traveled for all shipments made in 2011. Table 7 summarizes the shipping-related GHG emissions.

Table 7: 2011
Summary of emissions
from shipping

Shipping mode	Total weight (kg / year)	Total distance traveled (km / year)	Tonnes CO ₂ e / year
Road freight	83.00	10320.69	0.006
		Total	0.006

FOOD

Cornerstone provided information on the number and type of company-catered meals in order to calculate emissions associated with food consumption in 2011. Table 8 summarizes this information. Emissions from food were calculated using assumed meal sizes and aggregated data on the average national diet according to

the United Nations Food and Agriculture Organization Statistical database (FAOSTAT).

**Table 8: 2011
Summary of emissions
from food**

Type of meal	Total # of meals (per year)	Tonnes CO ₂ e / year
Lunch – non-vegetarian	10	0.0217
Breakfast – coffee/muffins	16	0.0240
Total	26	0.0457

3.2 EMISSIONS COMPARISONS

In order to monitor progress and assess Cornerstone’s performance, emissions have been tracked over time. Zerofootprint conducted Cornerstone’s greenhouse gas emissions inventories for 2007 (baseline), 2008 and 2009. Figure 3 displays these results by activity types for 2007, 2008, 2009 and 2011. The floor area of office space remained constant at 3,187 square feet while the number of employees ranged from 12 and 14 over the reporting years. The activity types included in the inventories remained the same, with the exception of shipping, which was not included in the 2007 report. Emissions from all activities showed a decreasing trend or remained constant, with the exception of emissions from ground travel.

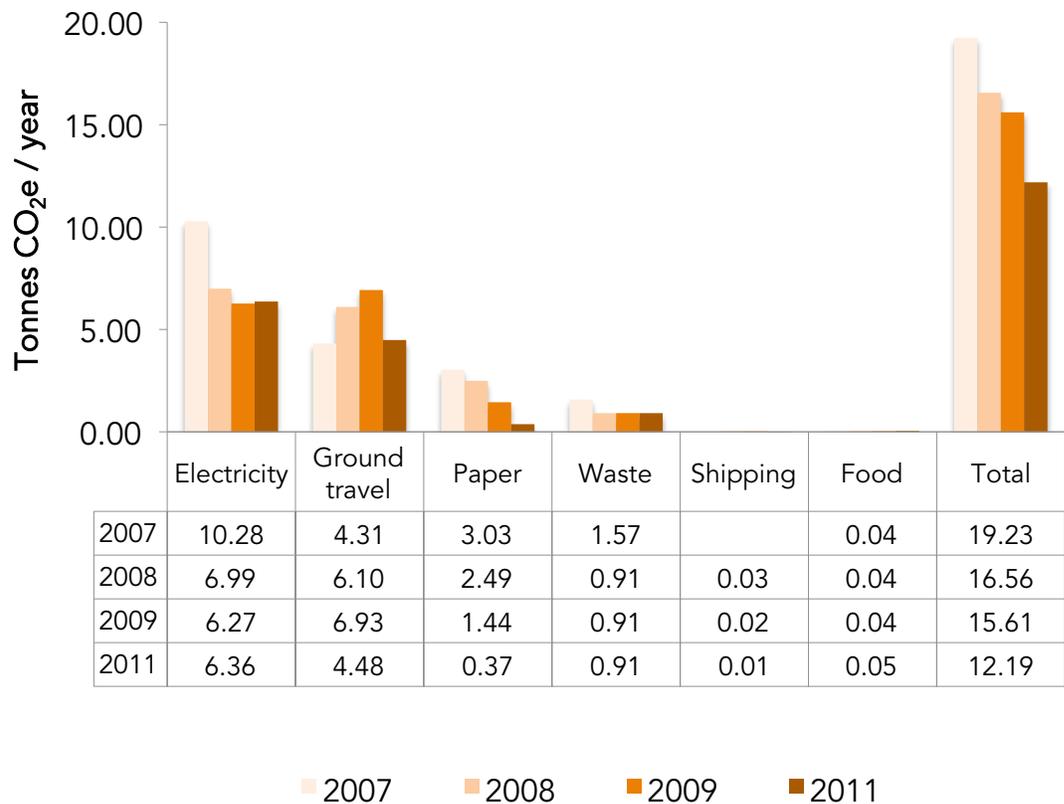
Comparing results from 2007 to 2008, Cornerstone significantly reduced its total emissions from 19.23 to 16.56 tonnes of CO₂e, a total of 2.67 tonnes, or nearly 14%. The largest absolute reduction was in electricity consumption, at 3.29 tonnes of CO₂e per year. The largest percentage reduction was in waste, with a 42% reduction from 2007 to 2008. In order to make a more accurate comparison, emissions from shipping were omitted. With this omission, a reduction amount of 2.70 tonnes of CO₂e was observed from 2007 to 2008.

From 2008 to 2009, Cornerstone’s total greenhouse gas emissions continued to decrease. Emissions decreased from 16.56 to 15.61 tonnes of CO₂e, a total of 0.95 tonnes, or nearly 6%. The largest emissions reduction and percentage reduction was in paper usage at 1.05 tonnes of CO₂e or 42%. Ground travel was the only activity in which emissions increased (by 0.83 tonnes of CO₂e or 14%).

Finally, total greenhouse gas emissions in 2011 were lower than 2009 emissions by 3.42 tonnes of CO₂e, or nearly 22%. This reduction can mainly be attributed to reduced emissions from ground travel and paper usage. In fact, Cornerstone has managed to reduce its total emissions by 7.04 tonnes of CO₂e or nearly 37% from

2007 to 2011. The largest footprint reduction in relative terms was achieved between the years 2009 and 2011.

Figure 3: 2007, 2008, 2009 and 2011 Emissions breakdown

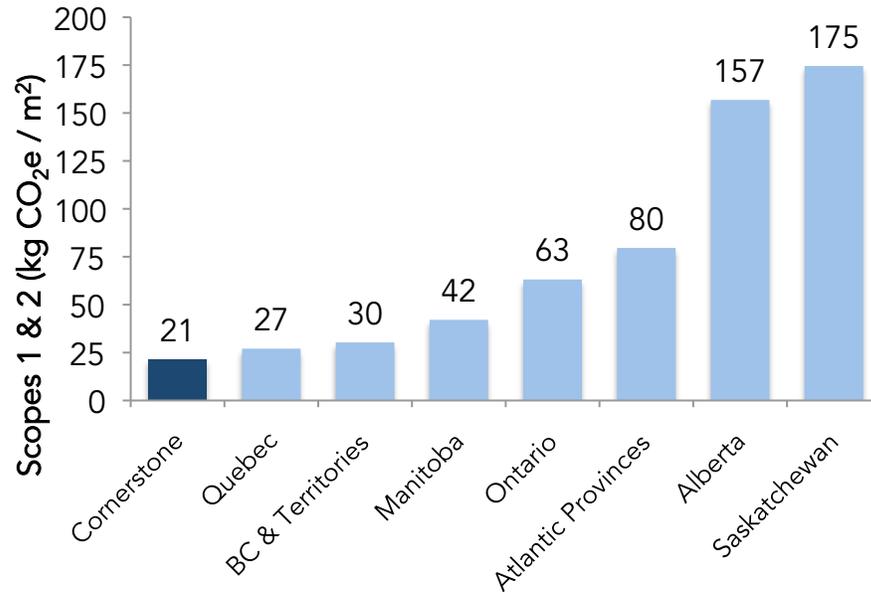


4.0 BENCHMARKING COMPARISONS WITH OFFICES IN CANADIAN PROVINCES

→ Greenhouse gas emissions from Cornerstone were benchmarked against the “office” sector across Canadian provinces. The office sector consists of insurance, real estate, rental and leasing, professional, scientific and technical services, and public administration. Data was obtained from Natural Resources Canada – Office of Energy Efficiency for the most recent year available (2009). Zerofootprint performed additional calculations using the data obtained to derive the metrics for comparisons. Figure 4 compares the sum of Scope 1 and 2 emissions between Cornerstone and the office sector average in Canadian provinces. The results are arranged from lowest to highest emitters and are displayed in kg of CO₂e per square meter. It is important to note the difference in reporting years between Cornerstone and the provincial averages. Different reporting years have different weather patterns that influence the demand for energy, and thus the GHG

emissions. Scope 1 and 2 emissions from the office sector across Canadian provinces averaged 82 kg of CO₂e per square meter and ranged from 27 to 175 kg CO₂e per m². Cornerstone was the lowest emitter among the group, emitting only 21 kg CO₂e per m². Cornerstone's GHG emissions were 3 times less than the office sector in Ontario.

Figure 4: Comparison of emissions between Cornerstone and the Canadian office sector



COMPARISONS WITH OTHER ORGANIZATIONS

Data used for benchmarking other organizations in the banking and accounting industries is publicly available on websites, responses to the Carbon Disclosure Project, and published sustainability reports. The data ranged from 2007 to 2011. Zerofootprint performed additional calculations using the data to derive the comparison metrics. To normalize emissions across organizations, comparisons were made on a per area and per employee basis.

Figure 5 compares Cornerstone with other financial institutions in Canada. The data is displayed in kg of CO₂e per square meter for the sum of Scope 1 and 2 emissions. The emissions from these organizations, including Cornerstone, ranged from 21 to 104 kg CO₂e per m², with an average of 74 kg CO₂e per m². Cornerstone was the lowest emitter among the group.

Figure 5: Comparison of emissions by area between Cornerstone and other organizations

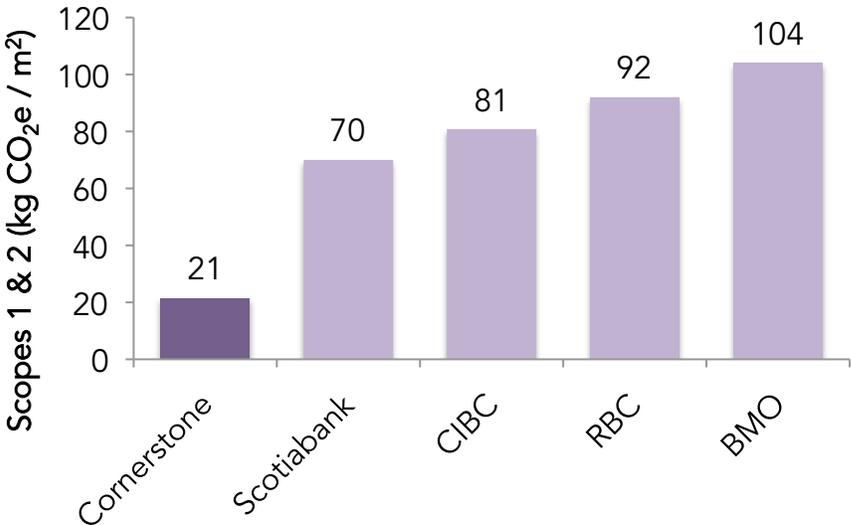
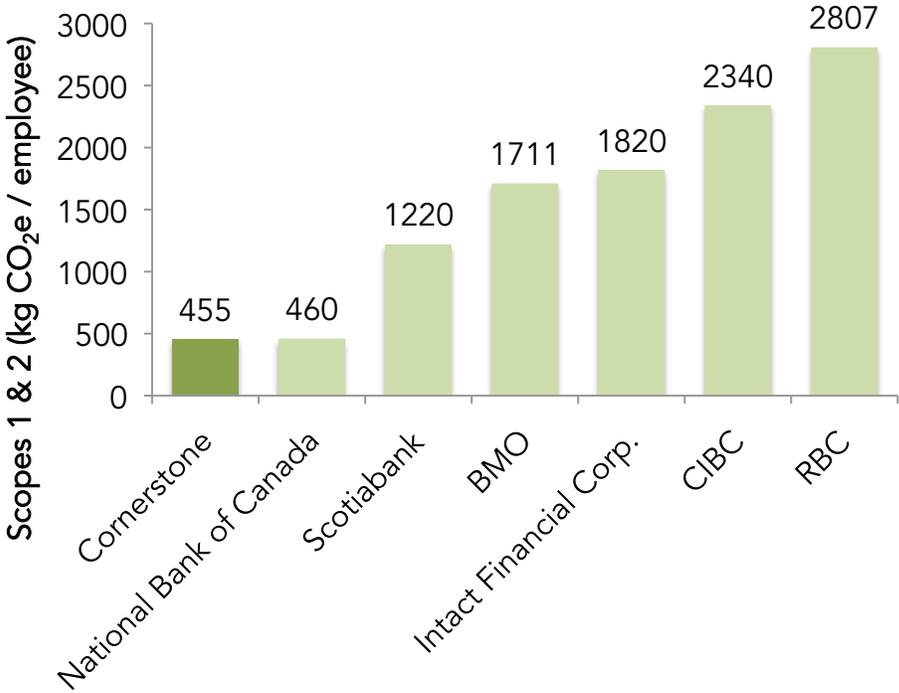


Figure 6 compares Cornerstone with other financial institutions in Canada for the sum of Scope 1 and 2 emissions per employee. Emissions ranged from 455 to 2,807 kg of CO₂e per employee, with an average of 1,545 kg CO₂e per employee. Cornerstone was the lowest emitter among the group, 5 kg CO₂e per employee lower than the National Bank of Canada.

Figure 6: Comparison of emissions by employee between Cornerstone and other organizations



5.0 ANALYSIS & CONCLUSIONS

→ Cornerstone Architecture has made progress towards becoming a sustainable, carbon conscious company. Between the 2007 baseline year and the current 2011 inventory, Cornerstone has reduced its total greenhouse gas emissions by 7.04 tonnes of CO₂e, and has purchased green electricity equivalent to offsetting over 6.40 tonnes of CO₂e emissions.

In 2011, Cornerstone's GHG emissions from business operations were primarily from electricity consumption and ground travel. Total emissions from ground travel were 2.45 tonnes of CO₂e or 35% lower in 2011 than 2009. The significant reduction in ground travel emissions is the result of both a decrease in total distance travelled and number of vehicles driven. This might have been as a result of a change in business practices that required less ground travel. Zerofootprint has concluded that the implementation of previous recommendations, such as the use of public transportation for longer distances or enrollment in a car-share program, had a significant effect on the overall ground travel emissions. Further reductions in ground travel emissions could likely be achieved but possibly not at the same high rate.

Cornerstone has seen a slight increase in emissions from electricity consumption over the past year. Electricity consumption increased by approximately 1.6% from 2009 to 2011. The small percentage increase does not necessary imply changes in overall electricity consumption patterns, but might be the result of changes in weather or an increased number of employees.

Also, with the purchase of green electricity, Cornerstone was able to 'offset' its electricity carbon footprint. These efforts are to be applauded. A continued interest in pursuing energy reduction strategies will help enhance Cornerstone's sustainability initiatives.

It was mentioned in Cornerstone's 2008 GHG inventory that emissions from paper made up a significant percentage of its total footprint. Since then, it is evident that efforts have been made to reduce Cornerstone's paper footprint. Overall, emissions from paper use have decreased by 2.66 tonnes of CO₂e or 88% from 2007 to 2011. A significant reduction has been achieved from 2009 to 2011 with 1.07 tonnes of CO₂e avoided. Conclusively, Cornerstone has significantly minimized its paper usage.

Zerofootprint also compared Cornerstone's greenhouse gas emissions normalized by area and by employee with other offices across Canada and within the banking

and accounting industries. These comparisons showed that Cornerstone was amongst the lowest emitters in all categories.

5.1 EQUIVALENCIES The emissions resulting from Cornerstone’s business operations can be expressed in equivalences using activities or metrics that are more relatable. Table 8 provides a summary of these metrics.

Table 8: Equivalencies

Cornerstone’s 2011 emissions of 15.605 tonnes of CO ₂ e are equivalent to...
→ Taking 11 one-way flights between Toronto and Los Angeles
→ Going through 508 barbeque propane cylinders
→ Burning 28 barrels of oil
→ The carbon sequestered by growing 313 seedlings to 10 years of maturity
→ Emissions saved by taking 3 average-sized cars off the road in Canada

6.0 REDUCTIONS → This section outlines simple reduction measures that Cornerstone could use to reduce its environmental impact.

ELECTRICITY

Over the past 5 years, Cornerstone has managed to minimize its electricity consumption and the resulting CO₂ emissions. Additionally, in 2011 Cornerstone offset all electricity emissions, as they have done in prior years.

Although Cornerstone has lower energy consumption than its peers, Zerofootprint has identified certain measures that could help Cornerstone achieve further reduction in electricity consumption.

Properly setting your office air conditioner in the summer could significantly reduce electricity consumption and CO₂ emissions. For every degree you raise it, electricity consumption from air conditioning is reduced by approximately 4%. Cornerstone could relax its summer dress code, for example by not requiring suit jackets and ties, enabling them to increase the thermostat and save on air conditioning.

Many electronic devices draw power even when not being used. Devices such as printers, servers, scanners and monitors could be plugged to power bars and switched off at the end of the workday. This would allow Cornerstone to reduce its standby electricity usage by up to 76%. One way to implement this is to place one power bar per workstation, allowing each employee switch off his/her power bar at the end of their workday.

GROUND TRAVEL

Ground travel is the second largest emission source from Cornerstone's 2011 greenhouse gas inventory. While emissions from ground travel have been significantly reduced since 2009, further reductions could be achieved by continuing to implement prior recommendations of using web-conferencing, biking, walking, public transportation, and car-share programs. Car choice can also be very significant. Switching to hybrid cars could have saved up to 51% of ground travel emissions in 2011.

PAPER

Emissions from paper have decreased significantly over the past 5 years, with the largest reduction between 2009 and 2011. Overall paper usage has decreased 85%, demonstrating how Cornerstone has incorporated previous advice on going paperless. While they still use paper with recycled content for approximately half their needs, the recycled paper used in 2009 contained 100% recycled material, while the recycled paper used in 2011 contained only 30% recycled material. Cornerstone could continue to make great strides in reducing their paper emissions by using paper with higher recycled content.

WASTE

Waste production habits have remained constant since 2008. Waste emissions could be reduced by reducing waste, reusing materials, composting organic waste, and increasing recycling. Make it easy for employees by placing well-labeled compost and recycling bins throughout the office. Have a designated tray for paper only printed on one side to be reused.

SHIPPING

Shipping emissions can be reduced by decreasing the number, weights, and distances of packages, and by switching to less carbon-intensive methods such as

bike couriers. Condensing shipments into less frequent but larger packages can make each trip more efficient. Recycling plastic bags and shredded paper as packing materials can also decrease the weight.

FOOD

Consider serving vegetarian or vegan meals, as animal products have the highest carbon intensity of all foods. Also, consider local and organic meals for business events. Buying locally and from farmers' markets saves emissions from the transportation of food.

OFFSETTING

Zerofootprint encourages an approach to carbon footprint reduction that begins with accurate measurement, followed by actions for reduction, and finally, the acquisition of carbon offsets to balance the remaining carbon emissions. Offsetting your carbon emissions provides a responsible option to neutralizing the climate change impacts of the emissions that are not easily reducible, or that are not within your organization's control. Zerofootprint maintains a diversified offset portfolio with projects that are registered on the Canadian Standards Association (CSA) Reductions Registry and have been verified by a third-party registry or the GHG Clean Projects.