

**zerofootprint™**

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# Cornerstone Architecture

**2008 Corporate Carbon Inventory**

## Table of Contents

<b>Introduction.....</b>	<b>1</b>
Methodology .....	1
Data Sources .....	2
<b>Cornerstone Architecture’s Corporate Inventory .....</b>	<b>3</b>
About Cornerstone Architecture .....	3
Organizational Boundaries .....	3
Operational Boundaries .....	3
<b>Results .....</b>	<b>6</b>
Emissions Overview .....	6
Emissions by Scope .....	8
Detailed Emissions Breakdowns .....	9
Emissions Comparisons .....	11
<b>Analysis.....</b>	<b>13</b>
Equivalencies.....	14
<b>Conclusion .....</b>	<b>15</b>
Appendix A: Carbon Offsetting .....	16
Appendix B: Frequently Asked Questions.....	17
Appendix C: Tips for Reducing Your Carbon Emissions .....	19

**List of Tables**

Table 1: Reporting Scope.....4

Table 2: CO2e Emissions by Source .....6

Table 3: CO2e Emissions by Source, including Electricity Emissions .....7

Table 4: Emissions By Scope .....8

Table 5: Emissions from Electricity .....9

Table 6: Emissions from Ground Travel.....10

Table 7: Emissions from Paper .....10

Table 8: Emissions from Waste and Recycling .....10

Table 9: Emissions from Shipping.....11

Table 10: Emissions from Food.....11

Table 11: CO2e Emissions by Source, 2007 .....11

Table 12: Equivalencies .....14

**List of Figures**

Figure 1: CO2e Emissions by Source .....7

Figure 2: CO2e Emissions by Source, including Electricity .....8

Figure 3: CO2e Emissions by Scope, excluding Electricity.....9

Figure 4: Comparison - CO2e Emissions from 2007 and 2008 .....12



## Introduction

Cornerstone Architecture has engaged Zerofootprint to calculate the corporate carbon emissions from their regular business operations for 2008. Through a process of data collection, calculation and analysis, Zerofootprint has determined the carbon footprint of their business operations.

## Methodology

This corporate greenhouse gas (GHG) inventory was undertaken in accordance with the World Resources Institute and World Business Council for Sustainable Developments' *Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard, Revised Edition, (WRI/WBCSD, 2004)*.

The *GHG Protocol* 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 such as The Climate Registry's Climate Registry Information System (CRIS), of which Ontario is a member, and the Canadian Standard's Associations CleanStart™ registry, which adheres to ISO 14064 standards.

### About WBCSD

The World Business Council for Sustainable Development (WBCSD) is a coalition of 170 international companies united by a shared commitment to sustainable development via the three pillars of economic growth, ecological balance and social progress. Members are drawn from more than 35 countries and 20 major industrial sectors.

### About WRI

World Resources Institute is an independent nonprofit organization with a staff of more than 100 scientists, economists, policy experts, business analysts, statistical analysts, mapmakers, and communicators working to protect the Earth and improve people's lives. WRI strives to harness the power of business to create profitable solutions to environment and development challenges.



A number of additional best practice documents were used where appropriate to calculate carbon emissions for this report. These include the *2006 IPCC Guidelines for National Greenhouse Gas Inventories, Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks, (USEPA, 2006)* and Statistics Canada data accessed from Environment Canada's Greenhouse Gas Inventory for 2006.

## Data Sources

Zerofootprint used information collected from Cornerstone Architecture to calculate emissions in carbon dioxide equivalents (CO<sub>2</sub>e). Under circumstances of limited disclosure or limited availability of data, Zerofootprint conservatively estimated Cornerstone Architecture's carbon emissions by applying industry, national, or regional averages for carbon emissions, energy use, or other metrics.

All greenhouse gas emissions were calculated using GHG emission factors sourced from Environment Canada, the United States Environmental Protection Agency, the Greenhouse Gas Protocol, and others. Where emissions factors differ, the local emission factor or calculation methodology took precedence. This report outlines the greenhouse gas emissions produced from all buildings and other assets owned or controlled by Cornerstone Architecture.



## Cornerstone Architecture's Corporate Inventory

### About Cornerstone Architecture

Cornerstone Architecture, established in 1991, has expertise in a variety of institutional, educational, administrative and assembly projects. Sustainable design is also a core principle of their firm as they produced the first LEED Gold Certified building in their area. These principles are also present in their business – Cornerstone Architecture has already performed a base year carbon inventory in 2007 and has made significant carbon emission reductions since.

Cornerstone Architecture employed between 12 and 13 employees during 2008. Cornerstone Architecture occupies an office space with an area of 3,187 square feet. This report covers their business activity in the 2008 calendar year.

### **Organizational Boundaries**

To collect and report on data, a control approach, as outlined in the GHG Protocol, is taken toward an organization's operations. It is assumed that the business accounts for 100 percent of the GHG emissions from operations over which it, or one of its subsidiaries, has operational control.

### **Operational Boundaries**

In accordance with the GHG Protocol, emissions are divided into three categories: scope 1, scope 2, and scope 3.

**Scope 1** emissions are direct emissions that occur from sources owned or controlled by the company, such as natural gas used to heat company buildings or emissions due to company owned fleet vehicles.

**Scope 2** accounts for GHG emissions from the generation of purchased electricity consumed by the company. Purchased electricity is defined as electricity that is purchased or otherwise brought into the organizational boundary of the company. Scope 2 emissions physically occur at the facility where electricity is generated.



**Scope 3** is an optional reporting category that allows for the treatment of all other indirect emissions. Scope 3 emissions are a consequence of the activities of the company, but occur from sources not owned or controlled by the company. Some examples of scope 3 activities are extraction and production of purchased materials; transportation of purchased fuels; and use of sold products and services (such as paper use or shipping services).

In order to accurately and completely calculate an organization’s carbon footprint, Zerofootprint looks at all significant and measurable elements that produce carbon emissions as shown in the table below.

**Table 1: Reporting Scope**

Category	Scope
Ground Travel	1
Electricity	2
Paper	3
Waste & Recycling	3
Shipping	3
Food	3

*Electricity*

Cornerstone uses 100% renewable energy sourced from small-scale hydro and wind projects. These energy sources do not produce emissions during the generation of energy, and therefore emissions for power consumption are assumed to be zero.

*Ground Travel*

Cornerstone Architecture’s employees use their own cars for both commuting and business travel. While emissions resulting from employee commutes are considered to be Scope 3, employee business travel is classified as Scope 1. For all vehicles emissions were calculated by estimating the amount gasoline consumed using the EPA published fuel economy factor (mpg) in combination with the reported distance travelled.

*Paper*



The majority of Cornerstone Architecture's paper use was *Corporate Express Multi-purpose Paper*. Emissions from the use of paper were calculated based on typical sheet sizes and basis weights for the reported paper types. Calculations for GHG emissions from paper are based on lifecycle analysis research done by the US Environmental Defense Fund on carbon emissions from paper use.

#### *Waste*

Cornerstone Architecture estimated they generated 520 tonnes of waste during 2008. Emissions from waste were calculated using Canadian averages from the US Environmental Protection Agency report on Solid Waste Management and Greenhouse Gases.

#### *Shipping*

It was assumed all shipping was within North America and packages traveled by road freight.

#### *Employees*

Cornerstone Architecture employs the equivalent of 12-13 fulltime employees. For per capita carbon intensity, Zerofootprint assumed 12.5 employees.

## Results

Zerofootprint has assessed the emissions of the office space over which Cornerstone Architecture has operational control. The following tables and supporting text describe Cornerstone Architecture’s emissions.

### Emissions Overview

Table 2 and figure 1 present a summary of Cornerstone Architecture’s emissions broken down by source. The largest sources of emissions for Cornerstone Architecture are emissions from ground travel (64% of total emissions) with paper and waste & recycling making up the bulk of the remainder (26.0% and 9.5% respectively).

**Table 2: CO<sub>2</sub>e Emissions by Source**

Source	CO <sub>2</sub> e Emissions (tonnes)	% Of Total Emissions	Intensity (tonnes CO <sub>2</sub> e/employee) <sup>[1]</sup>
Electricity <sup>[2][3]</sup>	0.00	0.00%	0.00
Ground travel	6.10	63.7%	0.49
Paper	2.49	26.0%	0.20
Waste & Recycling	0.91	9.5%	0.07
Shipping	0.03	0.3%	0.00
Food	0.04	0.4%	0.00
<b>Total</b>	<b>9.57</b>	<b>100%</b>	<b>0.77</b>

[1] Assumes 12.5 fulltime employee equivalents

[2] Electricity emissions are offset by the purchase of 100% renewable electricity

[3] Cornerstone Architecture heats their office with a heat pump system. The energy required to run this system is captured in the electricity category

Figure 1: CO2e Emissions by Source

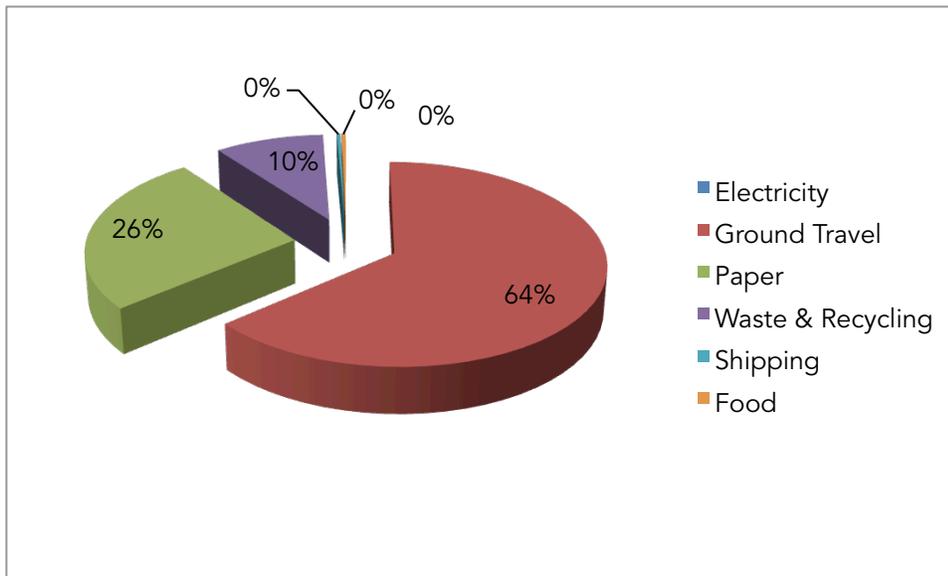


Table 3 and figure 2 below presents the Cornerstone Architecture emissions summary, but includes the avoided emissions from purchasing electricity from renewable electricity providers based on the kilowatt hours consumed at Cornerstone Architecture. The table and figure illustrate the relative contribution of emissions from electricity consumption if this electricity had been generated conventionally. As is shown, electricity would have been the largest single emissions source, contributing 42% of total emissions, slightly higher than ground travel’s 37%.

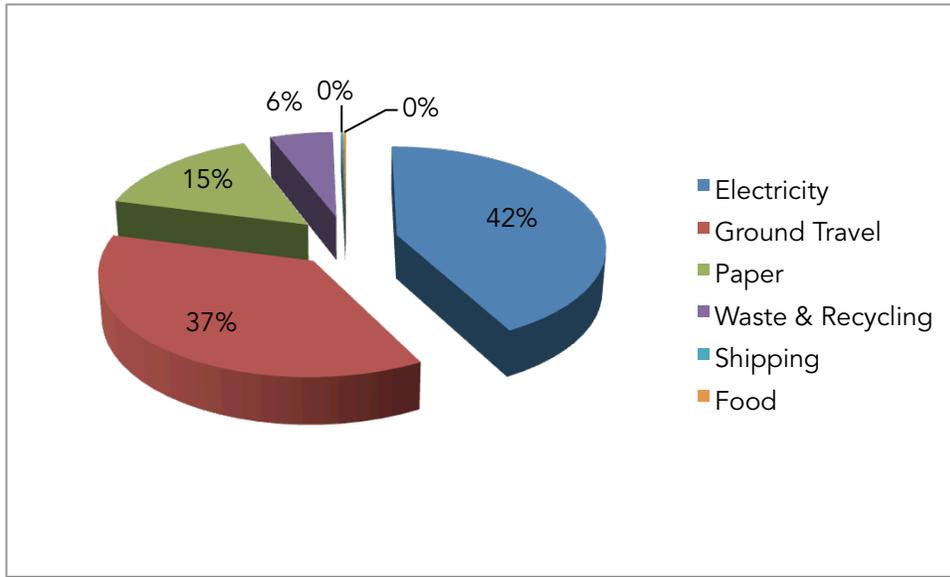
Table 3: CO2e Emissions by Source, including Electricity Emissions

Source	CO <sub>2</sub> e Emissions (tonnes)	% Of Total Emissions	Intensity (tonnes CO <sub>2</sub> e/employee) <sup>[1]</sup>
Electricity <sup>[2]</sup>	6.99	42.2%	0.56
Ground travel	6.10	36.8%	0.49
Paper	2.49	15.0%	0.20
Waste & Recycling	0.91	5.5%	0.07
Shipping	0.03	0.2%	0.00
Food	0.04	0.2%	0.00
<b>Total</b>	<b>16.56</b>	<b>100%</b>	<b>1.32</b>

[1] Assumes 12.5 fulltime employee equivalents

[2] Electricity emissions are offset by the purchase of clean electricity, shown here to demonstrate the savings

Figure 2: CO2e Emissions by Source, including Electricity



### Emissions by Scope

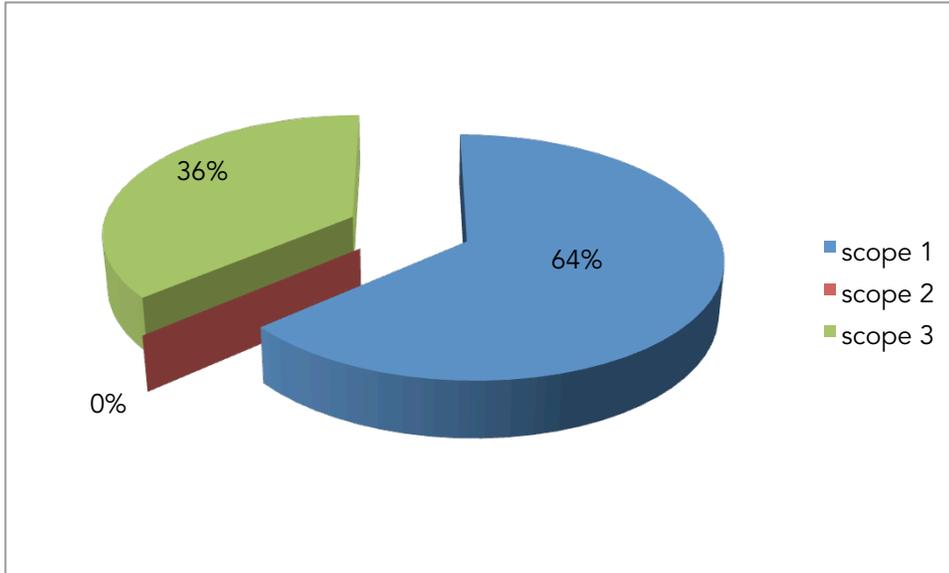
Table 3 summarizes Cornerstone Architecture’s Scope 1, 2 and 3 emissions and the emissions intensity per employee for each scope. Figure 2 is graphical representation of the Scope 1, 2 and 3 emissions breakdown.

Table 4: Emissions By Scope

Scope	CO <sub>2</sub> e Emissions (tonnes)	% Of Total Emissions	Intensity (tonnes CO <sub>2</sub> e/employee) <sup>[1]</sup>
Scope 1	6.10	63.7%	0.49
Scope 2	0.00	0.00%	0.00
Scope 3	3.47	36.3%	0.28
<b>Total</b>	<b>9.57</b>	<b>100%</b>	<b>0.77</b>

[1] Assumes 12.5 fulltime employee equivalents

Figure 3: CO2e Emissions by Scope, excluding Electricity



Cornerstone Architecture’s Scope 1 emissions (Business Ground Travel) make up 64% of the total emissions (table 3) while Scope 3 emissions (shipping, paper, and waste) account for the remaining 36% of the total. Cornerstone Architecture has zero scope 2 emissions as electricity emissions are offset through the purchase of clean electricity.

### Detailed Emissions Breakdowns

The emissions from specific emission sources follow:

Table 5: Emissions from Electricity

Location	Kilowatt-hours used	CO <sub>2</sub> e Emissions (tonnes)	CO <sub>2</sub> e Emissions (tonnes) Saved <sup>[1]</sup>
London, Ontario	38,823.43	0.00	6.99
<b>Total</b>		<b>0.00</b>	<b>6.99</b>

[1] Renewable electricity purchased from Bullfrog Power

**Table 6: Emissions from Ground Travel**

Employee	Primary Vehicle	Yearly Km Traveled	CO <sub>2</sub> e Emissions (tonnes)
Thomas Trimbee	Honda Accord	545	0.13
Brad Beharrell	Chevy Cavalier	1792	0.45
Jason McIntyre	Mazda Five	301	0.06
Mallory Blaine	Pontiac Bonneville	172	0.05
Ryan Ollson	Mazda Six	220	0.03
Robert Reed	Honda Accord	3,945	0.92
Allison Hanny	Saturn Vue V6	2,268	0.55
Office Car	Honda Accord	16,022	3.90
<b>Total</b>		<b>25,265</b>	<b>6.10</b>

**Table 7: Emissions from Paper**

Type	# of Sheets	Tonnes of CO <sub>2</sub> e
Paper 1: Corporate Express Multi-Purpose (copy paper)	104,500	2.091
Paper 2: Corporate Express Multi-Purpose	7,500	0.300
Paper 3: Corporate Express – Laser Paper, 96 Bright	3000	0.91
Paper 4: Corporate Express – Quad Pad Paper	4992	0.01
<b>Total</b>		<b>2.49</b>

**Table 8: Emissions from Waste and Recycling**

Type	Disposed (kg disposed per year)	CO <sub>2</sub> e Emissions (tonnes)
Paper and Cardboard	52	0.280
Plastics	52	0.120
Organics	104	0.164
Glass	208	0.146
Metal	104	0.202
<b>Total</b>		<b>0.912</b>



**Table 9: Emissions from Shipping**

Mode	Weight (lbs/year)	CO <sub>2</sub> e Emissions (tonnes)
Road freight	596	0.0294
<b>Total</b>		<b>0.03</b>

**Table 10: Emissions from Food**

Type of Meal	Number of Meals	CO <sub>2</sub> e Emissions (tonnes)
Lunch – non-vegetarian	7	0.018
Breakfast- coffee/muffins	12	0.018
<b>Total</b>		<b>0.036</b>

## Emissions Comparisons

Cornerstone Architecture engaged Zerofootprint Software, Inc. to complete a Greenhouse Gas Inventory for 2007, the results of which are displayed below in table 11. Figure 4 shows a comparison of Cornerstone Architecture’s 2007 and 2008 total CO<sub>2</sub>e emissions.

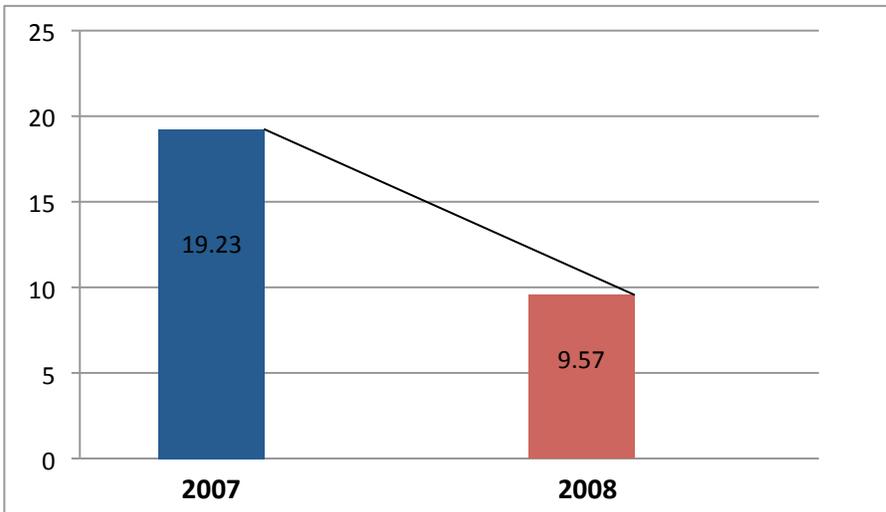
**Table 11: CO<sub>2</sub>e Emissions by Source, 2007**

Source	CO <sub>2</sub> e Emissions (tonnes)	% Of Total Emissions	Intensity (tonnes CO <sub>2</sub> e/employee) <sup>[1]</sup>
Electricity <sup>[2]</sup>	10.28	53.5%	0.86
Ground travel	4.31	22.4%	0.36
Paper	3.03	15.8%	0.25
Waste & Recycling	1.57	8.1%	0.13
Shipping	NA	NA	NA
Food	0.04	0.2%	0.00
<b>Total</b>	<b>19.23</b>	<b>100%</b>	<b>1.60</b>

[1] Assumes 12 fulltime employee equivalents

[2] Electricity emissions include heating

Figure 4: Comparison - CO<sub>2</sub>e Emissions from 2007 and 2008



Cornerstone Architecture has significantly reduced its operating emissions in 2008 from the emissions in 2007. This overall decrease (9.66 tonnes CO<sub>2</sub>e) is largely due to Cornerstone Architecture decision to purchase 100% renewable electricity, thus eliminating electricity emissions for 2008. Although ground travel emissions increased in 2008, Cornerstone Architecture also achieved emission reductions through reduced paper use and waste generation.

## Analysis

Cornerstone Architecture's 2008 emissions result primarily from the operation of vehicles used for business travel (64%). While this is clearly the largest source of emissions for Cornerstone Architecture, it may be challenging for Cornerstone Architecture to lower its emissions if business operations require a large amount of travel. Still, ground travel is the only area where Cornerstone Architecture increased its emissions from 2007 so concentrating reduction efforts in this area may be appropriate. The best opportunities for reductions lie in investigating alternative modes of transportation and proper vehicle maintenance, particularly for the office car. Alternative transportation can include taking public transit more often or carpooling when possible. Where driving is necessary Cornerstone Architecture can assure vehicles run as efficiently as possible by performing regular maintenance checks as outlined in Tip #1 in Appendix C.

The next largest source of emissions for Cornerstone Architecture is from paper. Cornerstone Architecture made small reductions compared with 2007, which can be attributed to a minor reduction in total paper used. This is commendable and any office reduction strategies should be continued. Cornerstone Architecture could also investigate switching to recycled paper to further reduce paper emissions and conserve natural resources, which are not captured by a carbon inventory.

Cornerstone Architecture's electricity emissions were offset through purchasing clean electricity. The overall emissions that would have been emitted based on electricity consumption were also reduced compared with 2007. There are two reasons for this reduction. First, Cornerstone Architecture reduced its electrical demand by roughly 2,500 kWh. Second, the Ontario electrical grid is less carbon intensive now than in previous years. This is due to an increase in clean electricity production, partially due to organizations such as Cornerstone Architecture who choose to purchase renewable energy. These efforts are to be congratulated. Cornerstone Architecture should continue to pursue energy reduction strategies. Lower overall electricity demand helps to further reduce the carbon intensity of the Ontario electricity grid by enabling more energy to be produced from clean sources. And of course, reduced energy consumption also saves money.

## Equivalencies

The emissions resulting from the regular business operations of Cornerstone Architecture can be expressed in series of equivalencies. These can help the final numbers relate a little more easily to everyday occurrences.

**Table 12: Equivalencies**

<b>Offsetting Cornerstone Architecture's operational emissions (9.57 tonnes of CO<sub>2</sub>e) would be equivalent to...</b>
---

- |  |
|--|
| <ul style="list-style-type: none"><li>➤ Taking 2 averaged sized cars off the road in Canada.</li><li>➤ Not burning 22 barrels of oil</li><li>➤ The carbon sequestered by growing 245 seedling to 10 years of maturity</li><li>➤ Avoiding 8 one-way flights between Toronto and Los Angeles</li><li>➤ The avoided use of 399 propane cylinders used for barbeques</li></ul> |
|--|



## Conclusion

Cornerstone Architecture has taken steps towards becoming a sustainable, carbon conscious company. Cornerstone Architecture reduced its carbon emissions in 2008 by nearly 10 tonnes CO<sub>2</sub>e compared with 2007. This reduction was achieved largely through purchasing renewable electricity, as well as reductions in energy consumption, paper use, and the amount of waste & recycling generated. Efforts toward greenhouse gas reductions could be further strengthened by reducing ground travel emissions, switching to recycled paper, and continued energy reduction strategies. Through the actions already taken Cornerstone Architecture is contributing to meaningful greenhouse gas reductions and is well positioned to become a true leader in sustainable, carbon conscious companies.

All of which is respectfully submitted,

**Zerofootprint Software Inc.**

### **Limitations and Use of this Report**

The statements in this report are the professional opinions of the writers. Zerofootprint does not guarantee the accuracy of information provided by other persons or agencies, or reliability of conclusions drawn from information provided by other persons or agencies.

This report was prepared for the exclusive use of Cornerstone Architecture. Any use of, reliance on or decisions based on this report by a third party are the responsibility of such third parties.



## Appendix A: Carbon Offsetting

Offsets are carbon credits that have been purchased from projects that are taking meaningful steps to decrease the carbon dioxide (CO<sub>2</sub>) in our atmosphere, with the goal of mitigating climate change and accelerating our transition to a more sustainable society.

Zerofootprint secures carbon credits from a number of different sources that demonstrate effective and responsible means of reducing the CO<sub>2</sub> emissions that lead to climate change. This allows us to maintain a diversified bank of credits from several different projects, and have an ongoing program of developing innovative and high quality offset projects.

All Zerofootprint projects meet our 'blue-chip' selection criteria to ensure that:

1. The project is additional: The project creates a measurable decrease in carbon emissions that would not otherwise have taken place had it not been for offsetting funds.
2. The project has been certified by the International Organization for Standardization (ISO) and has been fully audited by an independent body.
3. The project sits in a credible registry.
4. Proper risk management and high standards of project management are employed at all times at the project sites.
5. "Carbon leakage" has been accounted for in the project's carbon accounting, ensuring there is no possibility of unanticipated CO<sub>2</sub> emissions;
6. The project will make a meaningful contribution to the long-term sustainability of the communities in which they exist.

This project is displayed on a Canadian Standards Association GHG Registry, and has been certified based on the principles of the ISO 14064 - 2 standard.

## Appendix B: Frequently Asked Questions

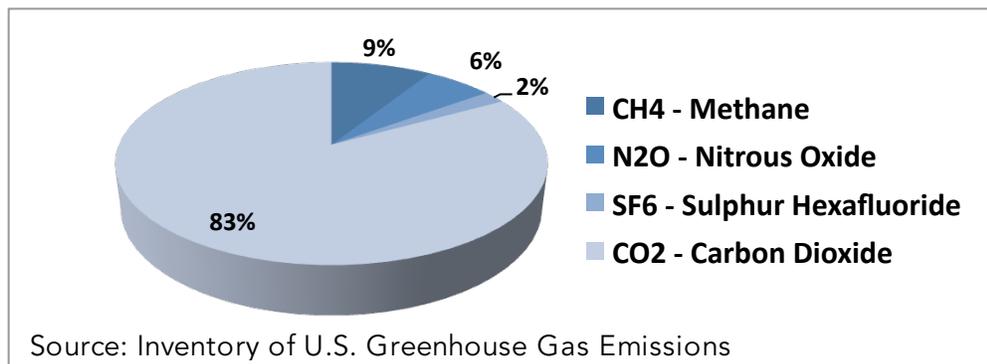
### *What is Offsetting?*

To “offset” carbon emissions means to first calculate how much we release into the atmosphere, and then to displace or soak up an equal amount through greenhouse gas offset projects, that wouldn’t otherwise have happened.

When the carbon you displace or take out of the atmosphere is equal to the amount you put in, you can be considered ‘carbon-neutral’.

### *Why CO<sub>2</sub>?*

CO<sub>2</sub> is the most prevalent of the Greenhouse gases, accounting for approximately 83 percent of U.S. greenhouse gas emissions.



*Is offsetting just a way of making people feel better about their carbon footprint, rather than a way of doing something about it?*

Absolutely not. We encourage people to do everything feasible to cut their emissions as much as possible by means of lifestyle changes. Yet, it also means putting a price on carbon. If no one takes the trouble of calculating his or her CO<sub>2</sub> emissions, no one will know have any idea either how to diminish it, or what it will cost to do so. Once we all start pricing the environment into our purchases, we’ll have taken the first step toward decisive change.



Additionally, offsetting results in tangible benefits: robust forests, renewable energy projects, and efficiency measures that go beyond business as usual.

### *How Do You Calculate the CO2 Emissions?*

Zerofootprint calculations are based on transparent industry standards and Environment Canada data. Our offsets are calculated very carefully, and in conformity with the Greenhouse Gas Protocol ([www.ghgprotocol.org](http://www.ghgprotocol.org)). In this way our clients can be certain that our figures are in keeping with internationally endorsed standards of reporting and accounting that are backed by both the World Business Council for Sustainable Development and the World Resources Institute, two of the most prestigious non-governmental organizations in the world. Many companies concerned with their carbon costs, including Ford Motor Company, IKEA International, and Sony Electronics, use this protocol internally.

### *Do offsets actually make a difference?*

Yes. In fact, making a difference is part of the definition of an offset. This criterion is called “additionality,” which means that the money that comes from offsetting has to make something happen that otherwise wouldn’t. Since it is not always easy to say what would or wouldn’t happen, the Kyoto Protocol sets out a checklist to determine whether a project is “additional.” Simply put, if a project is not required by current regulation; if it uses technologies that are not common practice; or if it faces economic, technological or investment barriers and therefore needs money to start up, it can be considered additional.



## Appendix C: Tips for Reducing Your Carbon Emissions

There are a number of simple steps you can take as an office to reduce your environmental impact. Follow the tips below to minimize your footprint. Doing your part for the planet has never been easier and will help you save money through conservation.

### 1. Drive Green

Ground travel is the largest emission source at Cornerstone Architecture, which presents opportunities to save fuel and prevent CO<sub>2</sub> emissions. Driving habits can significantly impact a vehicle's fuel efficiency and CO<sub>2</sub> emissions. Aggressively starts and stops, driving at higher speeds, excessive idling and carrying excess weight can all significantly impact fuel efficiency. Save gas by moderating your driving, keeping the speed down and using cruise control when possible.

Furthermore proper maintenance of your vehicles can increase your fuel efficiency up to another 5%. Make sure your tires are properly inflated and your air filter is clean. For business travel, consider renting fuel-efficient vehicles or using public transit. If possible, upgrade to more fuel-efficient vehicles for personal travel.

### 2. Recycle

Make it easy for staff to recycle by having recycling bins throughout your office. You can even try to reduce the number of trash bins in your workplace. Employees are more likely to recycle when it's easier than throwing out their trash! You should also fill photocopiers and printers with 100% recycled, chlorine-free paper.

### 3. Power down your computers

Did you know that it takes the equivalent of 200 coal-fired plants to run the world's screensavers? Despite popular belief, screensavers don't generally help you save energy. To minimize your footprint, activate the energy-saving settings on your office computers and make sure they are turned off when not in use. Remember, computers will continue to draw power in standby mode.

## 4. Save energy by unplugging your gadgets and appliances.

Cell phones, coffee machines, microwaves, computers, and printers all draw energy when they are idle. If everyone working in Canada made sure to unplug their cell phone chargers, more than 1.5 billion kilowatt-hours worth of electricity would be saved, equating to over \$152 million and 337,944 tonnes of CO<sub>2</sub>.

You can reduce your footprint by plugging these products into a power bar that can be switched off at the end of the workday. Leave nonessential items like scanners unplugged until they are needed.

## 5. Bike, carpool, and take public transit to work.

You can easily promote these options by offering on-site parking for bikes, subsidizing transit passes, or setting up a carpool board.

## 6. Shop for the right equipment

Install water-saving devices, such as faucet aerators. It's shocking, but every day we flush away around 19 gallons of water per person. Reduce your footprint by investing in dual flush low-flow toilets.

Don't focus exclusively on the price tag of new equipment. You should also consider the energy and water the equipment will require over the course of its lifetime. Purchase Energy Star products, as they are more efficient and use 10 – 50% less energy and water than traditional models. The savings on your utility bill will often more than make up for the cost of the investment.

## 7. Pack light

The lunch you bring to work can leave a large footprint, particularly if you eat out regularly. Avoid unnecessary packaging by inviting employees to bring meals to work in reusable containers. You should also ensure your office has a kitchen stocked with reusable mugs, plates, and cutlery. This can go a long way in terms of eliminating your meal-related impacts.

## 8. Investigate green lighting options

Choose compact fluorescents. These bulbs last 10 times longer and require one-fourth the energy of traditional incandescent. In particular, try LED desk lamps, which run on very little energy. You can also install sensors so that the lights in your office only turn on when workers are present.

## 9. Be cool, not too cool

Heating and air conditioning can be a big part of your office footprint. Minimize what you can by setting the temperature to a more moderate level. A difference of one degree Celsius can add around 10% to your heating or cooling costs and will generate considerably more CO<sub>2</sub>. If you can't control your heating and cooling, talk to your landlord or property manager.

## 10. Cut-down on paper

Encourage employees not to print or photocopy unnecessary emails or documents. In cases where a hard copy is required, only reproduce what is needed and print double-sided. If your office ships packages, try shredding wasted paper so it can be used as packing material. Finally, set aside scraps and reuse the blank side as notepaper.

If every person in Canada used just 5 fewer sheets of paper each week, we would save over 1 million trees and more than 111,000 tonnes of climate-changing CO<sub>2</sub>. That's a goal we all can attain.