



# CITY OF VANCOUVER BUSINESS ENERGY AND EMISSIONS PROFILE (BEEP)

PREPARED FOR CITY  
OF VANCOUVER AND  
VANCOUVER ECONOMIC  
COMMISSION

DECEMBER 19, 2014



climatesmart



# climatesmart

Empowering businesses to reduce carbon emissions and cut costs

**Climate Smart Businesses Inc.** is a social enterprise that provides a training and certification program for businesses to measure their carbon emissions, identify opportunities for cost, energy, and carbon savings, and communicate their efforts internally and externally.

We work not as consultants, but as teachers, using a capacity-building curriculum, top-rated software tool, and one-on-one client support. Businesses and organizations renew their Climate Smart certification by measuring their carbon emissions annually to track progress toward reducing emissions and add to their reduction plans. Individuals coming through our training learn to measure, analyze and reduce their company's impact: key skills in the emerging green economy.

Climate Smart also works with local governments, utilities, industry associations and other corporate partners to engage their business communities. We catalyze innovation, which strengthens businesses in the face of risks from volatile energy and fuel prices, the rising cost of waste disposal, and an increase in climate change impacts.

Climate Smart businesses cut unnecessary consumption of energy, fuel, and materials, as well as waste generation, tying climate action to smart business practice. Since 2008, we have helped more than 775 businesses and organizations of all sizes and sectors prepare for the future.

Using our growing set of data, Climate Smart develops reports, case studies and analysis for community emission modeling, utilized by both local governments and businesses to benchmark their progress against emission and cost-saving goals and amongst their peers.



Climate Smart business training session (photo credit: Climate Smart)

**775+** Climate Smart businesses to date (trained or in training)

**9.6%** average carbon reductions seen by Climate Smart businesses by year 2 following program

**1,231,000** total emissions measured by Climate Smart to date (tonnes CO<sub>2</sub>e)

**\$397** projected cost savings to a business, per tonne CO<sub>2</sub>e reduced

**30%+** GHG reduction achieved by year two by 20 top performing businesses

**2.7%** average increase in staff over three years among Climate Smart businesses

# EXECUTIVE SUMMARY

This City of Vancouver Business Energy and Emissions Profile (BEEP) provides a unique view of the business sector emissions by industry and highlights the areas with greatest potential for achieving reductions.

Focusing on key sectors in the Vancouver economy, the BEEP report helps local government and economic development commissions better understand and engage businesses in transitioning to a low-carbon economy. Municipal planners, sustainability staff and community energy managers can utilize BEEP analysis as a benchmarking tool and planning document to complement Community Energy and Emissions Plans and Inventories (CEEPs and CEEIs), and other relevant reports. The business profile approach offers an industry sector lens into the community-wide emissions data

which we hope will serve to inform the City's planning around emissions/energy reduction projects and business engagement programs: critical initiatives for Vancouver to reduce community-wide emissions.

City of Vancouver-based businesses included in this study represent thirteen NAICS (North American Industry Classification System) sectors, covering 71% of businesses in Vancouver. These businesses have an estimated 370,000+ employees and are projected to be responsible for 989,000 tonnes of CO<sub>2</sub>e emissions annually.

The following table highlights, in descending order, the largest sectors by the number of businesses, by total emissions, and by emissions per business:

Rank	By number of businesses	By emissions	By emissions-per-business
1	Office-Based Businesses (NAICS 51-55)	Accommodation and Food Services (NAICS 72)	Manufacturing (Food, Textiles) (NAICS 31)
2	Accommodation and Food Services (NAICS 72)	Construction (NAICS 23)	Construction (NAICS 23)
3	Retail Trade (NAICS 44-45)	Office-Based Businesses (NAICS 51-55)	Accommodation and Food Services (NAISC 72)

Natural Gas and Transportation are the highest emission sources across all business sectors. The top three highest emitting sectors in this study are Accommodation and Food Services (NAICS 72), Construction (NAICS 23), and Office-Based Businesses (NAICS 51-55). Combined, these three sectors account for 70% of emissions projected in the BEEP (692,000 tonnes of CO<sub>2</sub>e).

The highest natural gas emissions (225,000 tonnes of CO<sub>2</sub>e) are attributed to Accommodation and Food Services sector, followed by Office-Based Businesses. Transportation emissions are led by the Construction sector (174,000 tonnes of CO<sub>2</sub>e), followed by Office-Based Businesses. The largest amount of waste is generated by the Construction sector (65,000 tonnes of waste), and Accommodation and Food Services Sector (36,000 tonnes of waste). The largest electricity users are Office-Based Businesses (9,800 tonnes of CO<sub>2</sub>e), followed by the Accommodation and Food Services sector.

It is important to acknowledge that business emissions projections in this report measure company fleets, electricity, natural gas, and waste generated by businesses. These emission sources are large for many organizations, however the impact of business operations in the community goes beyond these four key sources. Significant emissions result from business travel in personal vehicles, staff commuting, refrigerant use, and other activities that are part of day-to-day business operations. Overall, scope 3 (indirect) business emissions account for 43% of total emissions measured by Climate Smart to date. Therefore, there is an even greater emission reduction potential for businesses in this report than the numbers projected.

In addition to emissions projections, this study highlights the motivations for businesses in each sector to take on carbon management as well as a summary of reduction strategies implemented by businesses after the first year of measurement. In recent years, Climate Smart is seeing more and more businesses cite “anticipating future requirements”, “existing requirements”, and “customer/investor/partner demand” in addition to the common motives of marketing and cost cutting. This trend is showing to be especially strong for the Construction sector, with 29% of businesses entering the Climate Smart program citing “anticipating future requirements” as a reason to participate. With more municipalities adjusting their procurement policies to favour businesses that manage their fuel use and emissions, more businesses will be motivated to take action on their emissions in order to stay competitive on RFPs. Climate Smart sees this as one of the most powerful ways local governments can drive emission reductions in their communities.

For each sector, a summary of reduction strategies implemented by Climate Smart businesses after the first year of measurement is presented. Most sectors include a case study highlighting success stories of Climate Smart businesses achieving notable emissions and cost reductions.

When considering business engagement approaches, it is helpful to know not only the total emissions generated by a given sector, but also average per business emissions. “A View of Emissions per Business” section of this report highlights the sectors with the highest average business emissions. Hotels, food manufacturing, and construction businesses show the highest average emissions per business in Vancouver.

We hope that this report will assist in the City of Vancouver in better understanding how to strategically engage businesses to close the gap on emissions targets— from its 2013 inventory total of 2,585,000 tonnes of CO<sub>2</sub>e to its 2020 goal of 1,846,000 (a gap of 739,000 tonnes).

On average, Climate Smart-certified businesses achieve an annual reduction of 5%, with 30% of top-performing businesses achieving a reduction of over 30% by year two. If 30% of businesses profiled in this report were to achieve this same pace of emission reductions, their 5% reduction over 7 years would translate into nearly 90,000 tonnes of CO<sub>2</sub>e reduced. In addition, this reduction represents annual cost savings of over \$35 billion to these businesses.

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# INTRODUCTION

## WHAT IS A BEEP?

A Business Energy and Emissions Profile (BEEP) is an analysis of emissions produced and energy used by the key sectors within the Vancouver business community. This BEEP estimates emissions generated by industry sectors within Vancouver's economy, highlighting the opportunities for business engagement and emissions reductions. Within each industry sector, emissions are broken down into the four key activities as measured in the City's inventory—electricity and natural gas use in buildings, on-road transportation, and waste.

This allows comparison between sectors and activity types, informing local government planning around emissions and energy reduction projects and business engagement programs—critical initiatives for BC municipalities working to reduce community-wide emissions. In addition, BEEP analysis can serve as a foundation for data-driven communication pieces to facilitate engagement of local business communities and stakeholders such as utilities.

## CONTEXT FOR BEEP

In BC, Community Energy and Emissions Inventory (CEEI) reports provide local governments with community-wide data on buildings energy use, transportation, waste, and associated emissions. CEEIs support policy direction and target setting around GHG reductions as mandated by the Local Government (Green Communities) Statutes Amendment Act (Bill 27, 2008). CEEI reports provide high-level information on community energy and emissions; however, they do not provide resolution into business sector emissions. The City of Vancouver produces its own community emissions report with the same level of granularity as the CEEI which does not provide business emissions data by industry sector.

The BEEP was first developed in partnership with the Climate Action Secretariat and the City of Victoria as a reporting framework to augment municipal emissions data provided by CEEI or the community's own reporting. This profile is generated from Climate Smart's growing business emissions database and local business demographic data to create a profile of emissions generated by the key sectors in the business community.

# METHODOLOGY

For this analysis, Climate Smart utilizes the data from its growing pool of 580 baseline inventories representing over 700,000 tonnes in CO<sub>2</sub>e emissions.

The Climate Smart database is parsed by two digit NAICS sectors. For each sector, average per-employee intensities for electricity, natural gas use, transportation, and waste are calculated and then applied to the total number of employees in this sector in Vancouver.

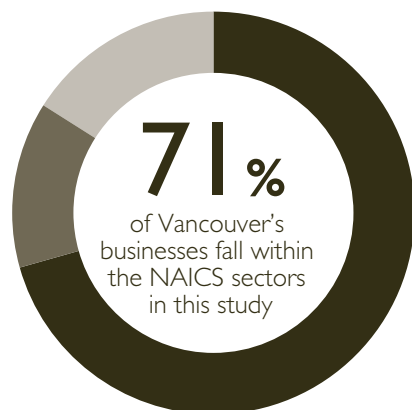
Sectors encompassing diverse operation types were further broken down into subsectors to improve accuracy. For example, for NAICS sector 72 (Accommodation and Food Services), per-employee averages were calculated separately for hotels, full-service restaurants, limited-service restaurants, and caterers.

The per-employee intensities derived from the Climate Smart data set were then applied to the total number of employees in each given sector in Vancouver. Stats Canada Business Register data as of June 2014 was used to calculate the total number of employees in each sector. Statistics Canada data was used in place of business license data, as the business license data had incomplete employee numbers information and did not classify businesses by NAICS. Stats Canada data presented establishment counts for the City of Vancouver by six-digit NAICS. Establishments were broken down into employee size ranges (1-4, 5-9, 10-19 employees etc.) A midpoint of each range was used to estimate the number of employees. The words “establishment” and “business” are used interchangeably in this report because in most cases they are equivalent. The self-employed category (establishments with zero employees) was not included in this report's projections.

The projections are made in units of energy as well as in tonnes of CO<sub>2</sub>e for electricity and natural gas. The City of Vancouver 2013 inventory emission factors are used to calculate emissions from electricity and natural gas. Transportation emissions include company vehicles and are projected in tonnes of CO<sub>2</sub>e only, as the sample sizes did not allow breaking down the usage into fuel types. Waste projections are made based on the weight of landfilled and incinerated waste reported by businesses, and are listed in tonnes of waste as well as tonnes of CO<sub>2</sub>e. Waste emissions are calculated using an emission factor derived from the 2010 Vancouver CEEI report by dividing the total emissions by the total waste generated as reported in the CEEI. Because the City uses a complex model to project waste emissions for its inventory, a single waste emission factor for the City's inventory is not available and the CEEI-derived factor is used to illustrate the emissions. Waste projections are made in base units (tonnes of waste), and allow for an application of any emission factor if needed.

Motivations for implementing carbon management and reduction strategies pursued after the first year of measurement are presented for each sector. These are based on the data collected from the Climate Smart businesses going through the program. The number of businesses in each sector's business sample is presented below each graph. The sample size for motivations is always larger than the sample size for reductions since motivations data is collected as the companies enter the program, and reduction strategies at the very end. Many businesses are currently working on compiling their reduction plans, which is why the numbers differ.

## BUSINESS SECTORS INCLUDED IN THE BEEP



excluded:

Health Care,  
Public Administration,  
and Education

**13%**

Other  
Sectors

**16%**

NAICS Sector (2-digit)	# of businesses	# of employees
23 Construction	1,877	26,645
31 Manufacturing (Food, Textiles, Leather)	296	7,342
33 Manufacturing (Machinery, Goods, Furniture, Misc)	318	3,426
41 Wholesale Trade	1,409	14,649
44 Retail (Cars, Electronics, Food, Gasoline, Clothing)	2,154	40,837
45 Retail (Goods, Misc)	758	9,077
51 Information and Cultural Industries	957	24,936
52 Finance and Insurance	1,614	45,330
53 Real Estate and Rental and Leasing	2,498	18,715
54 Professional, Scientific, and Technical Services	5,543	57,895
55 Management of Companies and Enterprises	726	23,382
56 Administrative, Support, Waste Management and Remediation Services	1,521	35,028
72 Accommodation and Food Services	2,486	68,394
<b>TOTAL</b>	<b>22,157</b>	<b>375,653</b>

This table summarizes establishment count data for the City of Vancouver provided by Statistics Canada and lists all the sectors included in the projections made in this study. Note that while the business counts are exact, the numbers of employees are estimated using midpoints of employee size ranges provided in the establishment counts (see Methodology section for more details). Businesses covered in this study represent 71% of all businesses in the city, and include over 22,000 establishments employing 375,000+ people.

The largest sectors by the number of businesses are Professional Services (5,500+ businesses), Real Estate and Rental and Leasing (nearly 2,500 businesses), and Accommodation and Food Services (2,400+ businesses).

By the number of employees, the largest sectors are Accommodation and Food Services, followed by Professional Services, and Finance and Insurance. The sectors excluded from the analysis are Health Care, Public Administration, and Education (13% of establishments), along with mining, utilities, entertainment, transportation, and other sectors (16% of establishments).



## BEEP PROJECTIONS AS PART OF TOTAL COMMUNITY EMISSIONS



**Total Emissions Breakdown** tonnes CO<sub>2</sub>e

The chart above shows what portions of the total community emissions are attributable to the businesses in this BEEP for each activity (natural gas, transportation, waste, and electricity). The total community emissions data is taken from the City's calendar 2013 emissions inventory, totaling 2,583,000 tonnes.

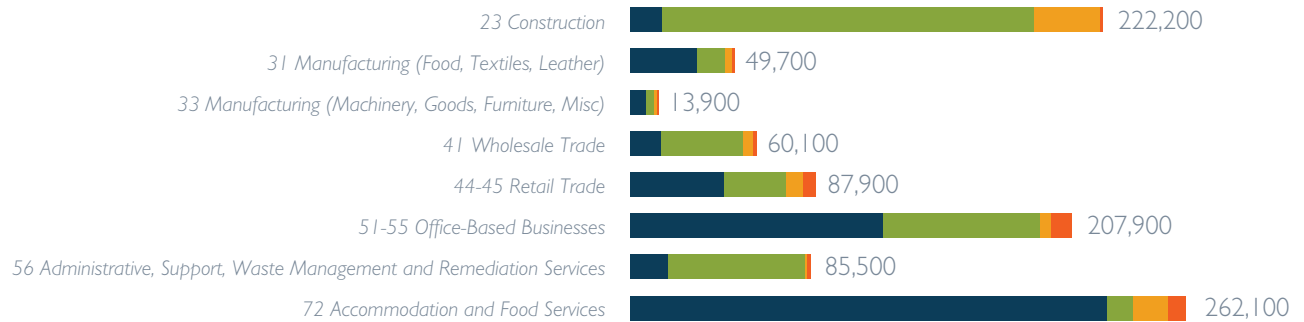
The largest projected emission source for businesses in this study is natural gas. It accounts for an estimated 479,000 tonnes of emissions. This includes natural gas used for space and water heating, as well as process heat (e.g., breweries, coffee roasters, cooking equipment in restaurants, etc.)

The second largest emission source is transportation, accounting for 407,000 tonnes of emissions. These emissions include only company vehicles, and do not account for other transportation emissions indirectly attributed to businesses, such as reimbursed business travel in personal vehicles, staff commuting, and third-party shipping.

Waste generated by businesses in this study accounts for 73,000 tonnes of CO<sub>2</sub>e. Note that the City's inventory uses a model to project waste emissions and a single emission factor for waste is not available to align the business waste projections with the community total. Instead, a CEEI-based emission factor for waste is applied in this report to illustrate waste emissions generated by businesses. Projections in base units (tonnes of waste) are also presented.

Electricity used by businesses is projected to account for 30,000 tonnes of emissions: about 40% of the community total.

# EMISSIONS SUMMARY BY INDUSTRY SECTOR



## Emissions by NAICS Sector

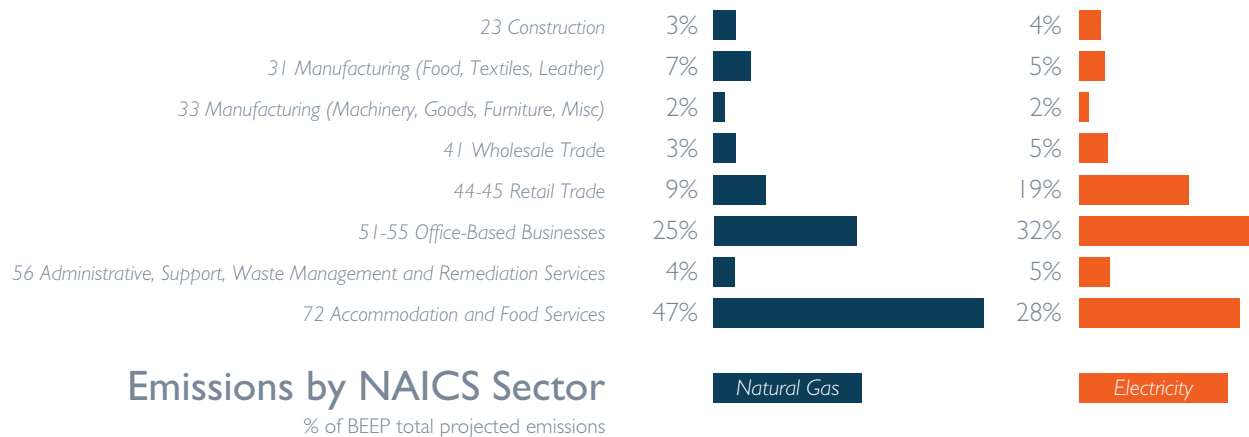
tonnes CO<sub>2</sub>e



This chart summarizes emissions projected for each sector by activity: natural gas, transportation, waste, and electricity. The top three emission generating sectors are Accommodation and Food Services (262,000 tonnes of CO<sub>2</sub>e), Construction (222,000 tonnes of CO<sub>2</sub>e), and Office-Based Businesses (208,000 tonnes of CO<sub>2</sub>e).

Combined, these three sectors account for 70% of emissions projected in the BEEP. For Construction businesses, the majority of the emissions comes from transportation (that includes equipment). For Accommodation and Food Services, it is natural gas. For Office-Based businesses, both natural gas and transportation are significant.

## // EMISSIONS SUMMARY BY INDUSTRY SECTOR



## NATURAL GAS

Natural gas emissions from businesses in this BEEP are projected to account for 479,000 tonnes of emissions. Nearly half of these emissions are attributed to the Accommodation and Food Services Sector, with the largest contribution (164,000 tonnes) coming from the Food Services subsector. Food Services has high per-employee natural gas usage intensity because of the gas used in cooking equipment.

The second largest contributor to natural gas emissions is the Office-Based Businesses. This group includes 5 NAICS sectors and while the natural gas emission intensity for offices is relatively low, the large number of employees in this group of businesses leads to a significant emission total.

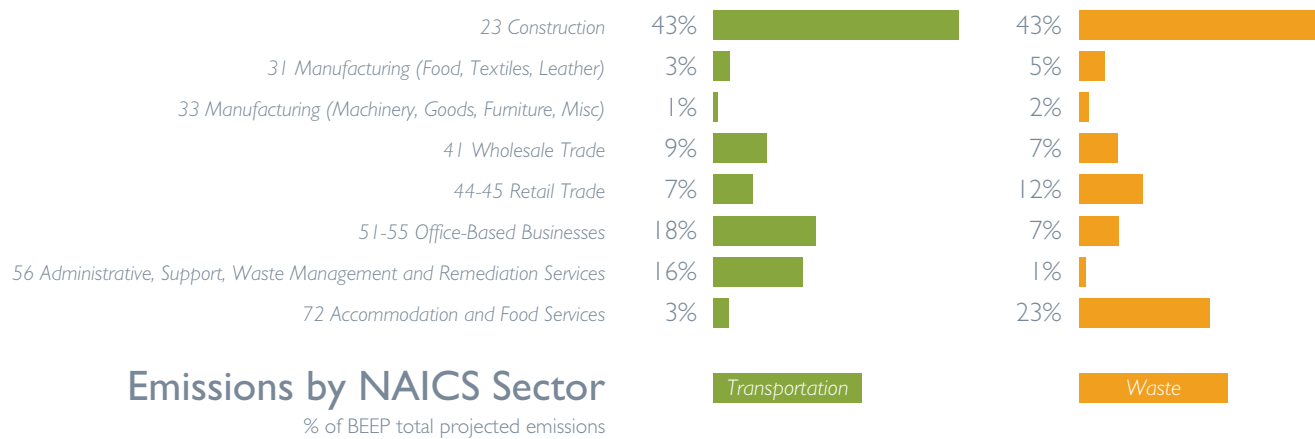
The third largest natural gas emitter is Retail Trade. With its large heated spaces this group accounts for 9% of the total natural gas emissions projected in the BEEP. Food, Beverage and Textile manufacturing sector (NAICS 31) has some of the highest per-employee natural gas use intensities across all sectors, and while the number of businesses in this sector is fairly small (under 300), the projected emissions amount to 32,000 tonnes of CO<sub>2</sub>e: 7% of the total projected.

## ELECTRICITY

Office-Based Businesses account for 32% of the electricity usage projected in this BEEP. This includes a wide range of businesses such as law firms, architects, financial institutions, and marketing firms. While the electricity use intensity for this sector is relatively low, the group includes many businesses, and their combined electricity use is significant.

The second largest consumer of electricity is the Accommodation and Food Services sector. This is a large sector with nearly 2,500 businesses, including hotels, restaurants, cafes, and caterers. The third largest electricity user is the Retail Trade sector with its 2,912 businesses and large lit spaces.

## // EMISSIONS SUMMARY BY INDUSTRY SECTOR



## TRANSPORTATION

The Construction sector accounts for 43% of total transportation emissions projected in the BEEP. Note that this includes heavy and civil engineering construction subsector emissions and accounts for the use of heavy equipment.

The second highest emitting sector is Office-Based Businesses—also the largest group by far by the number of employees (170,000+). While not all office-based businesses operate fleets (in the Climate Smart data set about 40% of office-based businesses had company vehicles), the sector is large and the collective emissions are significant.

The Administrative, Support, and Waste Management services sector is projected to be the third largest transportation emitter. These businesses deliver services such as janitorial, security, maintenance, and garbage removal and travel to multiple client locations.

## WASTE

The Construction sector generates 43% of waste projected in the BEEP, and has the highest per-employee waste generation across all sectors. Construction waste is estimated at 65,000 tonnes, with over 75% coming from the building construction subsector.

The Accommodation and Food Services sector is the second largest in terms of waste generation, and accounts for 23% of waste. A large portion of this waste is organic and can be diverted.

The third largest waste generator is Retail Trade, accounting for 12% of waste in the BEEP.

# IMPORTANCE OF INDIRECT BUSINESS EMISSIONS

It is important to acknowledge that business emissions projections in this report measure only company fleets, electricity, natural gas, and waste generated by businesses. These are large emission sources for many organizations, however, the impact of business operations goes beyond these figures and includes emissions that result from the use of personal vehicles for business, staff commuting, refrigerants, third-party shipping, business travel, paper use, product use, and other activities that are part of day-to-day business operations. For many businesses in the Climate Smart dataset, these additional emissions are greater than company fleet, electricity, natural gas, and waste combined. Overall, scope 3 (indirect) business emissions compose 43% of total emissions measured by Climate Smart businesses to date.

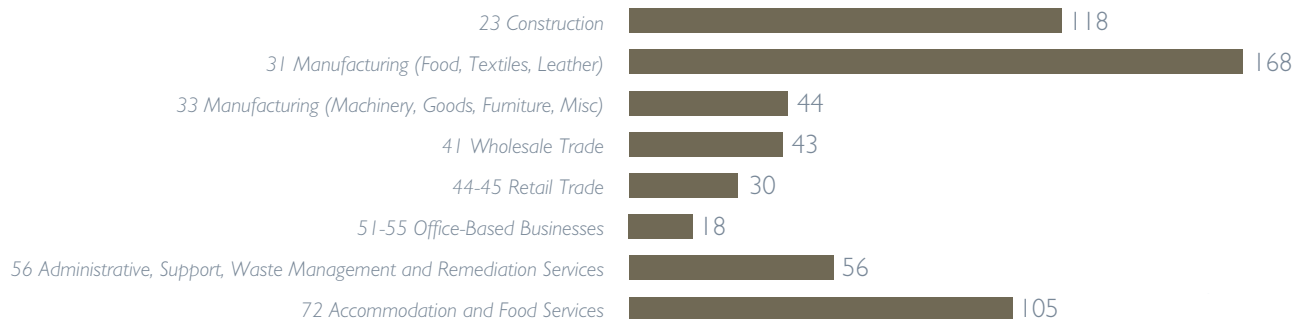
For example, if we take the median per-employee staff commuting emissions of 0.72 tonnes from the Climate Smart dataset and apply this figure to the 375,000 people employed by BEEP businesses in Vancouver, we will arrive at a projected 270,000 tonnes in staff commuting emissions: over 10% of the total Vancouver community footprint.

In addition, many businesses provide services or deliver goods that influence a community's emissions beyond business operations. Examples of this include construction companies, lighting and heating contractors and equipment distributors, car dealerships, and others. Climate Smart businesses implement strategies that will affect not just their direct business emissions, but community emissions overall. For example, Solus Décor—a Vancouver outdoor fire pit manufacturer—is replacing wooden crates with recycled cardboard to reduce the weight of their shipments and shipping emissions. Miles Industries, a North Vancouver fireplace manufacturer, developed a pilot light system with a timed shut-off that projected to reduce GHGs associated with the use of their product by 1,165 tonnes.

In summary, the impact of businesses in the community goes well beyond the fleets and buildings they operate. This highlights the importance of engaging businesses in the community's emissions reduction efforts as partners in building a more efficient, cleaner economy.

## // EMISSIONS SUMMARY BY INDUSTRY SECTOR

# A VIEW OF EMISSIONS PER BUSINESS



### Emissions Per Business tonnes CO<sub>2</sub>e

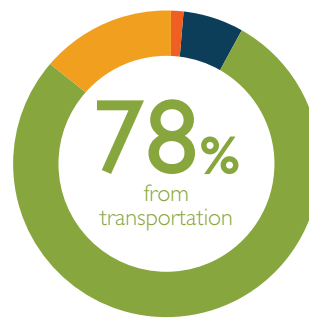
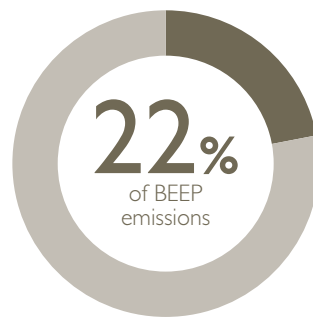
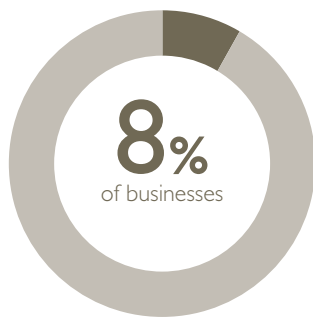
This chart presents the average emissions per business in each sector. The sector's projected emissions are divided by the number of establishments to arrive at the average. The Food, Beverage and Textile Manufacturing sector (NAICS 31) has the highest per business emissions. This is an emission intensive sector with the majority (65%) of emissions coming from natural gas used primarily in food processing, but also in space and water heating.

The Construction sector has the second highest emissions per business, with the majority (78%) coming from waste. Accommodation and Food Services has the third highest per business emissions, with an average of 105 tonnes. Within this sector, there are two distinct subsectors: Accommodation Services and Food Services.

In the Accommodation subsector, the average business size is 61 employees and the average emissions are 401 tonnes per business. In the Food Services subsector, the average business size is 25 employees and the average emissions are 83 tonnes per business.

# NAICS 23: CONSTRUCTION

## SECTOR PROFILE



### Sector Emissions Breakdown

Electricity	1%
Natural Gas	7%
Transportation	78%
Waste	14%

**26,600** Vancouver employment  
**1,877** number of businesses  
**14** average business size (employees)  
**222,200** sector emissions (tonnes CO<sub>2</sub>e)

**312,000** natural gas usage (GJ)  
**85,897,000** electricity usage (kWh)  
**174,100** transportation emissions (tonnes CO<sub>2</sub>e)  
**65,100** waste generated (tonnes)

The Construction sector in Vancouver consists primarily of specialty trade contractors (roofing, electrical, plumbing, etc.) and building construction (residential and commercial), with a smaller portion of businesses involved in civil engineering construction work such as land subdivision, sewer line, road, and power line construction.

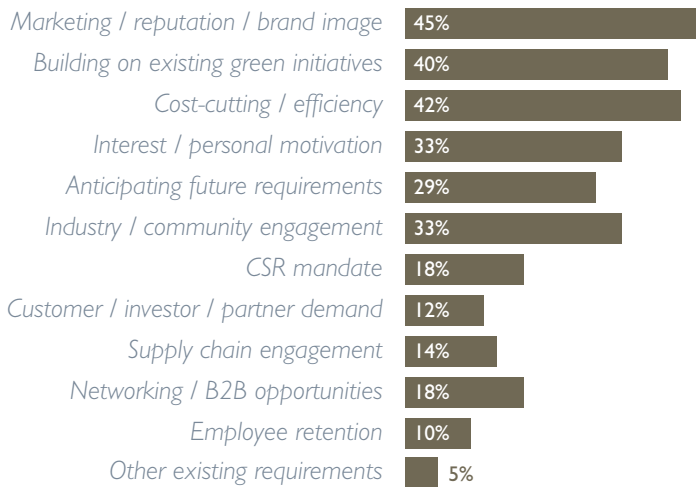
The Building Construction subsector (NAICS 236) in Vancouver is composed of 730+ businesses and employs nearly 12,000 people, with an average business size of 16 employees. This subsector generates over 75% of waste generated by the construction sector: nearly 50,000 tonnes.

The Heavy and Civil Engineering Construction subsector (NAICS 237) includes 240+ businesses and over 6,500 employees, with an average business

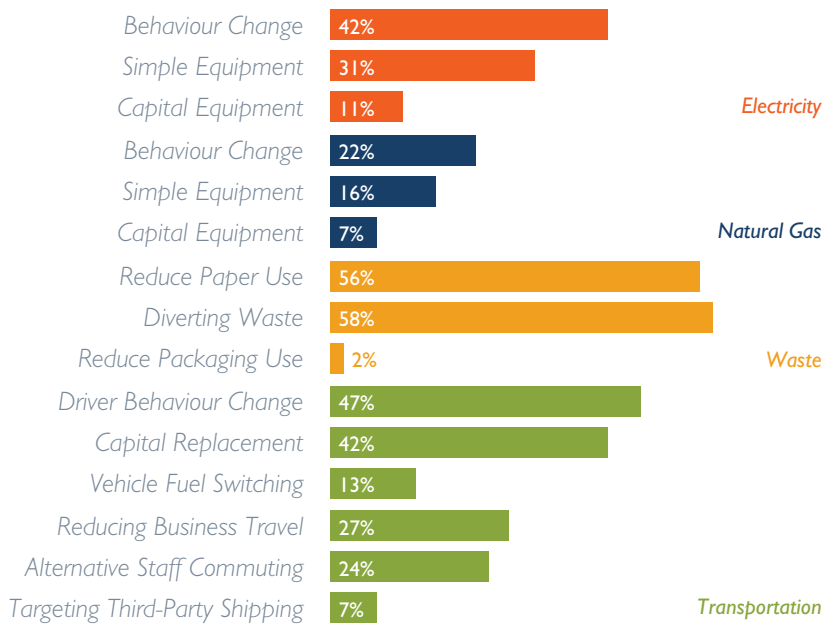
size of 27 employees. These businesses often operate heavy equipment, and have high fuel emission intensity, accounting for 70% of the fuel emissions in the construction sector.

Specialty Trade subsector (NAICS 238) consists of plumbing, electrical, painting, air conditioning, and other contractors, and includes 900+ businesses employing over 8,100 people, with the average business size of 9 employees. While the majority of businesses in this subsector generate less than a tenth of the waste generated by building construction businesses, roofing contractors stand out with the highest per employee waste generation in the construction sector: over four times that of building construction businesses. The total waste generated by roofing contractors is estimated at over 7,500 tonnes.

# MOTIVATION AND REDUCTION STRATEGIES IMPLEMENTED AFTER FIRST YEAR OF MEASUREMENT



## Motivations



## Reduction Strategies

Personal interest, marketing, and cost savings are the top three motives for carbon management cited by construction businesses entering the Climate Smart program. Anticipation of future requirements and responding to existing regulations are starting to appear as drivers, as construction businesses encounter more requirements such as fuel use tracking for their municipal contracts and waste diversion rates for LEED projects.

Waste diversion is an area tackled by nearly 60% of businesses in this sector after their first year of Climate Smart. This often includes providing separate bins for recyclable materials at the site and educating workers and contractors on proper waste separation.

**Electricity** To reduce their transportation emissions and costs nearly half of businesses are implementing low-hanging fruit strategies such as driver behavior change. This often includes company anti-idling policies and driver training. Over 40% of businesses are choosing to replace their fleet vehicles with more fuel-efficient models.

**Natural Gas**

**Waste**

**Transportation**

The Building Construction subsector is unique in that in addition to controlling their own operations, these businesses have influence over the operational footprint of buildings they create for years to come. By committing to sustainable building practices, they can have positive impact well beyond their operational boundaries.



# CASE STUDY

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## CONCERT PROPERTIES

Concert has been developing and managing real estate for almost 25 years: rental apartments, condominium homes, retirement communities and commercial properties. Concert is involved in development, construction, sales and leasing, property management and ultimately customer service. Over the past three years Concert has worked with Climate Smart to inventory their greenhouse gas emissions and work towards a 20% reduction by 2020.

As a showcase, they have implemented a number of changes at 1190 Hornby Street, the office building that serves as their headquarters. A film applied to all windows reduces solar heat gain, helping to improve occupant comfort and reduce the energy needed to cool the building in summertime. Additionally, the boilers and chillers in their HVAC system were changed over to high-efficiency models. Adding direct digital control technology to their HVAC system allows the building operator to monitor and adjust energy performance throughout the building in real time. This combination of initiatives has reduced their electricity use at 1190 Hornby by 25%; likewise, their natural gas consumption has decreased by 50%.

All new Concert rental developments target LEED Gold or equivalent environmental construction standards. An example is their new Axis rental development currently underway at the University of British Columbia: Concert is aiming for a Gold rating under the UBC-specific Residential Environmental Assessment Program (REAP). One of the requirements of these programs is the diversion and recycling of construction waste,

which includes wood, metal, cardboard, plastics, and drywall. Concert has set a goal of 75% waste diverted from landfill at Axis. They have engaged their trade subcontractors to ensure everyone involved in the project understands how their actions affect Concert's sustainability goals. By placing the responsibility of diversion on their subtrades, and monitoring waste diversion throughout the project, Concert has achieved 82% diversion from landfill on the Axis construction site.

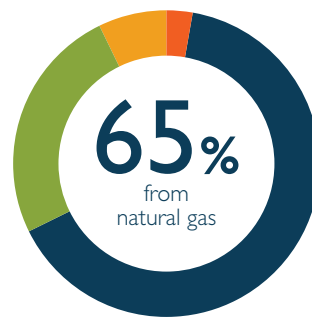
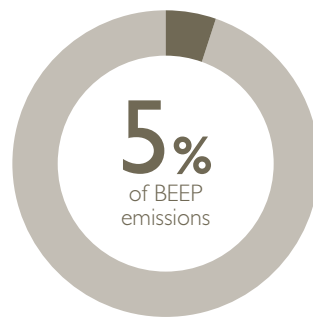
With many different properties and many facets of their business where change could be achieved, it was important to engage staff from across the organization. The creation of a dedicated Sustainability Manager position, to act as a resource for different projects and departments across the organization, highlights the degree to which sustainability is embedded at Concert.

Working with Climate Smart has helped draw the link between operational expenses and carbon/energy performance, and has catalyzed the development of internal systems for data management. For instance, gathering building energy data from across their portfolio, Concert now monitors energy use per square metre, and can identify particular properties on which to focus their efficiency efforts. Concert sees an additional benefit in the collaborative Climate Smart network of like-minded businesses, of which they are now a member. Knowledge-sharing with other companies yields strategies that they can implement within Concert's own operations.

*View Concert's case study video: [http://bit.ly/ConcertProperties\\_CS\\_Video](http://bit.ly/ConcertProperties_CS_Video)*

# NAICS 31: MANUFACTURING (FOOD, BEVERAGE, TEXTILE, CLOTHING)

## SECTOR PROFILE



### Sector Emissions Breakdown

Electricity	3%
Natural Gas	65%
Transportation	25%
Waste	7%

**7,300** Vancouver employment  
**296** number of businesses  
**25** average business size (employees)  
**49,700** sector emissions (tonnes CO<sub>2</sub>e)

**626,000** natural gas usage (GJ)  
**100,610,000** electricity usage (kWh)  
**12,700** transportation emissions (tonnes CO<sub>2</sub>e)  
**7,300** waste generated (tonnes)

This manufacturing sector includes 3 subsectors: food, beverage, and clothing and textiles manufacturing. Food Manufacturing is the largest subsector of the three and includes bakeries, seafood, meat and poultry processors, coffee roasters, and other food producers. The sector overall is fairly small in Vancouver (under 300 businesses), and emission intensive, accounting for 5% of emissions projected in this BEEP.

The Food Manufacturing (NAICS 311) subsector employs 5,000 people and consists of 150+ businesses, with an average business size of 32 employees. Nearly 40% of these businesses are bakeries. Bakeries, as well as other businesses in this sector, use large amounts of natural gas. The Food Manufacturing subsector is projected to be responsible for 23,000+ tonnes of

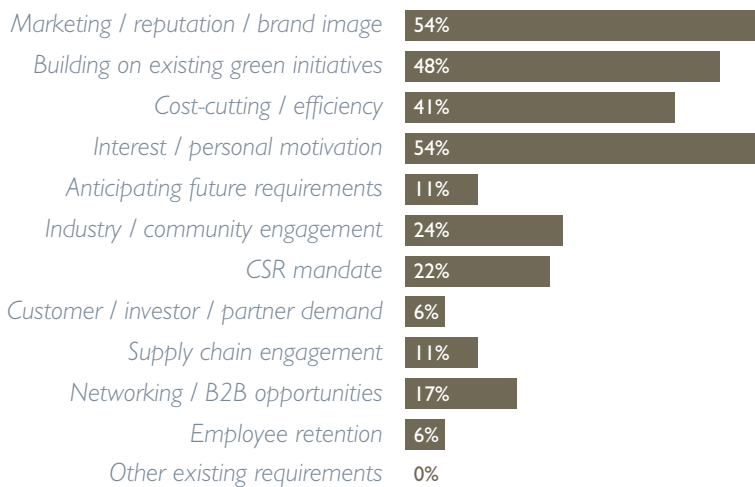
natural gas emissions (over 70% of the natural gas emissions for this entire manufacturing sector).

The Beverage and Tobacco Product Manufacturing (NAICS 312) subsector consists of 20+ establishments and employs over 500 people, with an average business size of 23 employees. This subsector is composed primarily of breweries, wineries, and soft drink manufacturers. Over 80% of emissions in this subsector come from natural gas use.

Clothing and Textile Manufacturing (NAICS 313-316) consists primarily of clothing manufacturers, includes 115+ businesses and employs 1,800+ people, with the average business size of 16 employees. Emissions from this subsector are estimated at 7,600 tonnes of CO<sub>2</sub>e.

// NAICS 31: MANUFACTURING (FOOD, BEVERAGE, TEXTILE, CLOTHING)

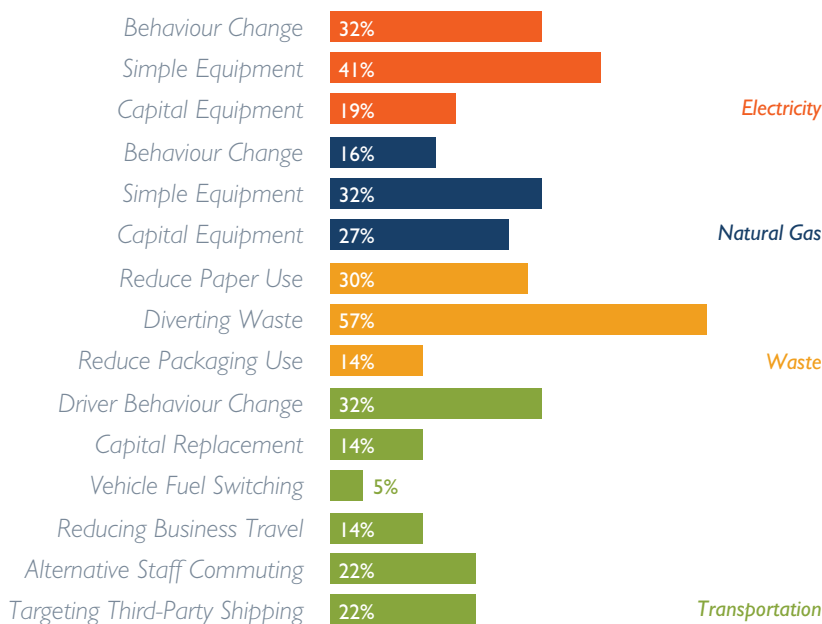
# MOTIVATION AND REDUCTION STRATEGIES IMPLEMENTED AFTER FIRST YEAR OF MEASUREMENT



## Motivations

Marketing alongside personal interest are the primary drivers for carbon management in this sector. With the growing demand for environmentally responsible products and services, companies are looking to improve their brand images. Building on existing green initiatives is another common motive, with many manufacturers already moving down the road of sustainability.

Strategies aimed at reducing waste going to landfill are widely adopted by this sector after going through Climate Smart program—nearly 60% of businesses targeted waste in their reduction plan.



Over 40% of businesses chose to purchase simple equipment such as motion sensors to cut their electricity usage and costs, with nearly a fifth of businesses opting for capital electric upgrades such as lighting retrofits.

Nearly a third of businesses chose to tackle their natural gas use through capital equipment upgrades.

## Reduction Strategies

## // NAICS 31: MANUFACTURING (FOOD, BEVERAGE, TEXTILE, CLOTHING)

# CASE STUDIES

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## PURDYS CHOCOLATIER

**47.2%** waste emissions reduction achieved

Purdy's Chocolates, the iconic Canadian chocolatier, was able to reduce their largest single source of emissions, solid waste, by nearly half in just one year through their work with Climate Smart. By the end of 2011, Purdy's had reduced emissions from this source by 47.2% compared to their 2010 baseline measurement year. This waste diversion effort cut Purdy's' emissions in this area by 112.3 tonnes of carbon dioxide, from 2010 to 2011.

Purdy's is also rigorously evaluating their emissions from areas such as electricity, transport and natural gas.

In terms of waste, however, Jim Pritchard, Director of Chocolate Operations at Purdy's, had encouraging words to say about the straightforward nature of their initiatives.

"There really [wasn't] much to it. I had asked [an employee] to try to find a company that would take items we were sending to landfill. He found one company that would take everything and we just had to separate it and store for them to pick up." The absolute number of waste and recycling-hauling trips made to the Purdy's facility have also been decreased.

Not only has Purdy's addressed their waste diversion and sorting, however, initiatives such as the installation of energy-efficient hand dryers has reduced the production of wastepaper at their facilities. In addition, by discouraging the use of disposable plastic bags at the retail end of their operations, Purdy's has managed to reduce this waste stream by 10%.

**112.3** emissions reduction (tonnes CO<sub>2</sub>e)

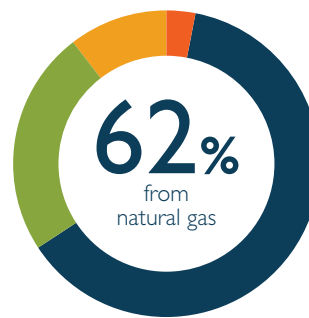
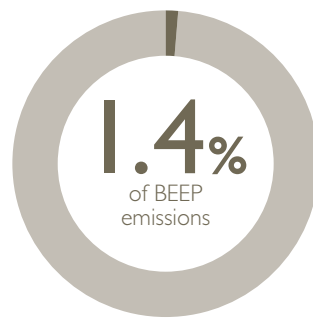
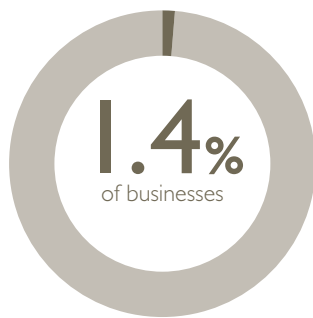
Duncan Johnston, Chief Financial Officer at Purdy's, and a participant in the Climate Smart program, was also able to provide some insight into the implementation of these waste reductions strategies, estimating that it required "30% education, 60% follow up and 10% inspiration."

Purdy's continues to work towards reducing their emissions further by improving the recycling program at the factory, implementing a lower emission delivery program, performing a natural gas audit at the factory, and investigating alternative packaging. Through this process, Purdy's has retrofitted lighting, windows, heating systems and roofing materials in various areas of the Purdy's business. Says Johnston, "new opportunities are always coming up", and Purdy's is projecting a wide array of efficiency gains that have potential to reflect an even lighter organizational footprint in future years.

Paramount in the process has been the education of employees on electricity, paper and waste reduction strategies using staff, department manager and supervisor meetings in tandem with newsletters. Though it may seem impossible, it is initiatives like these that make Purdy's Chocolates that much more enjoyable.

# NAICS 33: MANUFACTURING (FABRICATED METAL, MACHINERY, FURNITURE)

## SECTOR PROFILE



### Sector Emissions Breakdown

Electricity	3%
Natural Gas	62%
Transportation	24%
Waste	11%

**3,400** Vancouver employment

**318** number of businesses

**11** average business size (employees)

**13,900** sector emissions (tonnes CO<sub>2</sub>e)

**168,000** natural gas usage (GJ)

**33,561,000** electricity usage (kWh)

**3,300** transportation emissions (tonnes CO<sub>2</sub>e)

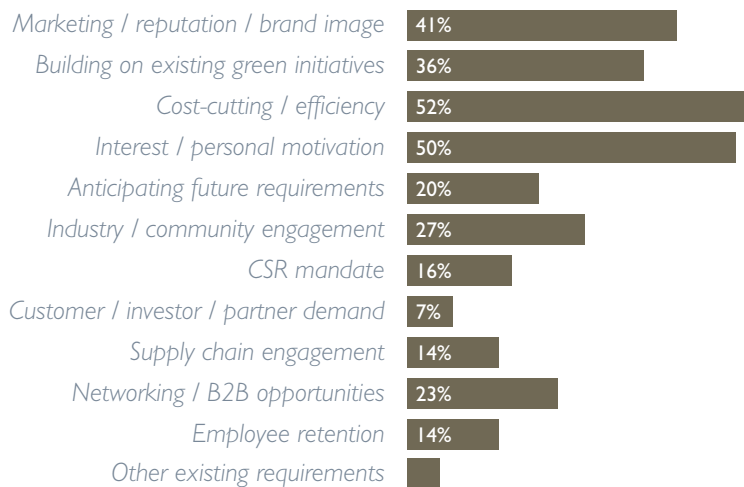
**3,100** waste generated (tonnes)

This sector encompasses a diverse range of manufacturing businesses, including medical equipment, jewelry, sporting goods, lighting fixture, furniture, sign, counter top, and other manufacturers. In Vancouver, this sector is relatively small: it consists of 318 businesses employing 3,400 people.

Due to the small size of the sector in Vancouver, it represents a small portion of emissions compared to other sectors: just 1.4% of total emissions projected in this BEEP.

// NAICS 31: MANUFACTURING (FABRICATED METAL PRODUCTS, MACHINERY, FURNITURE)

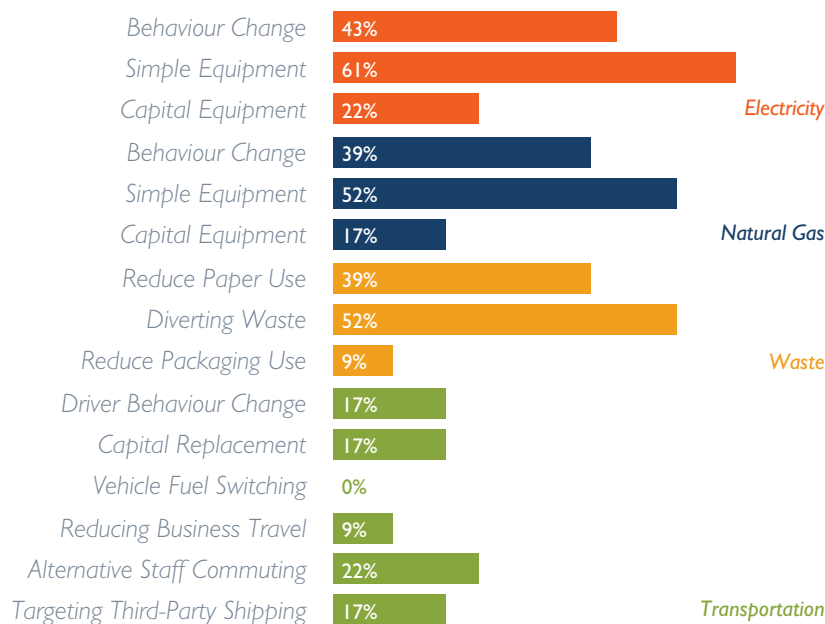
# MOTIVATION AND REDUCTION STRATEGIES IMPLEMENTED AFTER FIRST YEAR OF MEASUREMENT



## Motivations

Cutting costs appeared as the primary driver for businesses in this sector to take on carbon management. This is expected given the pressure on manufacturers to keep the production costs low with a lot of manufacturing now being done overseas. Networking and business-to-business opportunities also appeared as a strong driver for this sector.

Following the Climate Smart program over a half of manufacturing businesses in this sector have implemented initiatives to improve their waste diversion rates.



## Reduction Strategies

Over 50% of businesses tackled their natural gas use by installing simple, non-capital intensive equipment at their facilities such as insulation and motion sensors for lighting. Over a fifth of businesses invested in capital heating and lighting upgrades.

Behavioral change strategies aimed at reducing electricity and natural gas use are widely adopted by businesses as low-cost ways to reduce emissions. A typical example would be changing the thermostat settings and implementing a “turn it off” policy for unused equipment and lights.

# // NAICS 31: MANUFACTURING (FABRICATED METAL PRODUCTS, MACHINERY, FURNITURE)

## CASE STUDIES

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### AGGRESSIVE TUBE BENDING

**compressor retrofit** initiative  
**\$27,800** project cost  
**\$15,300** incentive (BC Hydro Power Smart)  
**\$12,500** total investment

**\$7,700** annual savings (23% electricity use)  
**1.6** payback period (years)  
**62.5%** rate of return  
**2.7** emissions reduction (tonnes CO<sub>2</sub>e)

Aggressive Tube Bending is a manufacturer in Vancouver, BC, employing 45 people between two industrial facilities. It offers a wide spectrum of products and services, including pipe, tube, and structural steel forming. It also carries out custom fabricating and manufacturing. The company measured its baseline inventory for the 2010/2011 fiscal year at a time when it was undergoing extensive renovations. This experience gave the firm an additional lens—energy efficiency—through which to evaluate renovation options.

Aggressive Tube Bending is working to reduce its emissions by improving insulation in its new facilities, introducing anti-idling practices for vehicles and heavy equipment, retrofitting lighting for maximum efficiency, increasing recycling efforts and eliminating unnecessary paper use.

This case study focuses on the company's most impactful project: the replacement of two aging air compressors

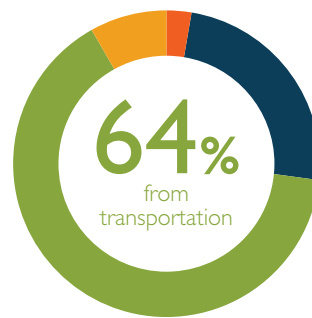
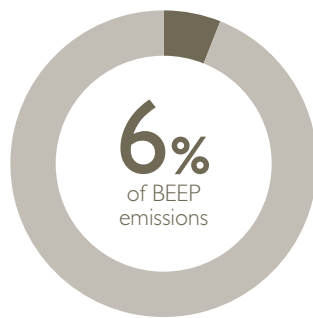
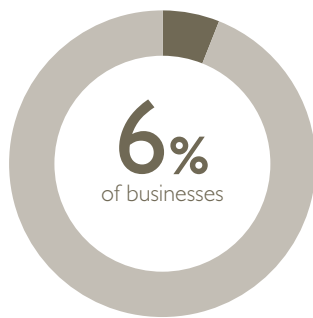
integral to its operations with a newer, considerably more efficient model in late 2012. The move followed a seven-day evaluation of the two-piston compressors' usage and efficiency, which indicated they were significantly oversized for the output that was required.

The higher upfront cost of moving to a right-sized, higher-efficiency variable frequency drive compressor, compared to a standard model, was manageable due to the energy savings and BC Hydro Power Smart incentives.

By replacing their two aging compressors with the high-efficiency model, and lowering the pressure of the compressor by 20 pounds-per-square-inch (psi)—which provides approximately 1% electricity savings per 1 psi lowered—Aggressive Tube is projected to save \$7,700 annually and 109,500 kWh. After BC Hydro provided an incentive of \$15,300, the projected payback on this \$27,800 investment was lowered to 1.6 years.

# NAICS 41: WHOLESALE TRADE

## SECTOR PROFILE



### Sector Emissions Breakdown

Electricity	3%
Natural Gas	25%
Transportation	64%
Waste	8%

**14,600** Vancouver employment

**1,409** number of businesses

**10** average business size (employees)

**60,100** sector emissions (tonnes CO<sub>2</sub>e)

**291,000** natural gas usage (GJ)

**112,849,000** electricity usage (kWh)

**38,400** transportation emissions (tonnes CO<sub>2</sub>e)

**10,900** waste generated (tonnes)

The Wholesale Trade sector is diverse and includes food and beverage, personal and household goods, motor vehicle parts, and building material wholesalers.

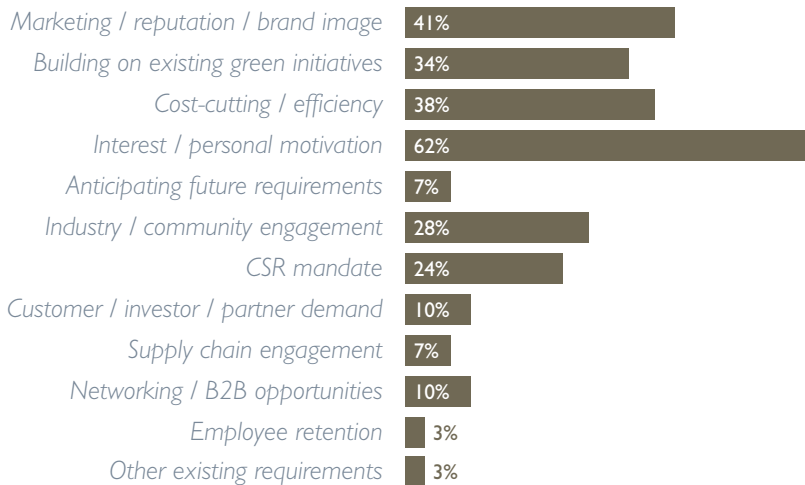
Overall, the wholesale sector accounts for 6% of emissions measured in this BEEP. The majority (64%) of these emissions are from transportation: wholesalers often operate heavy delivery vehicles that contribute significantly to the footprint of their operations.

Food and Beverage Wholesalers subsector (NAICS 413) stands out as one of the largest subsectors within this sector. It includes 225 businesses, and is characterized by high electricity usage, because food wholesalers often maintain refrigerated storage spaces.

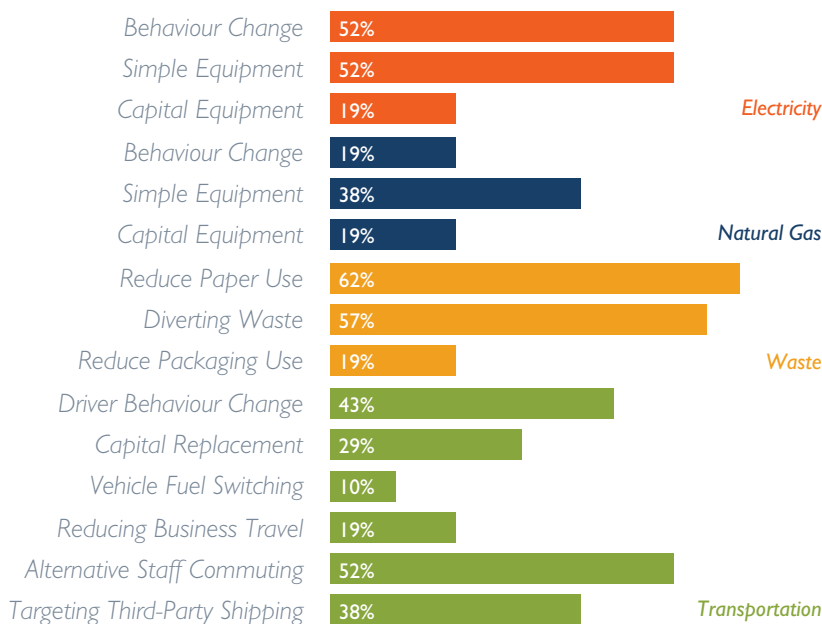
Another significant emission source for these businesses is refrigerants. Refrigerant emissions are higher than fleet emissions for some wholesalers in the Climate Smart dataset. Refrigeration leakages often go unnoticed as the cost of topping up refrigerants is negligible compared to other operating costs for a business. For example, a meat distributor that has gone through Climate Smart program recorded 88 tonnes of CO<sub>2</sub>e in refrigeration emissions, 4 tonnes more than emissions from their fleet. The cost of the topped up refrigerants was only \$1,300 compared to the company's \$70,000 Hydro bill and \$42,000 in fuel costs. In addition, a leaking cooling system is less efficient and leads to a higher electric bill.



# MOTIVATION AND REDUCTION STRATEGIES IMPLEMENTED AFTER FIRST YEAR OF MEASUREMENT



## Motivations



## Reduction Strategies

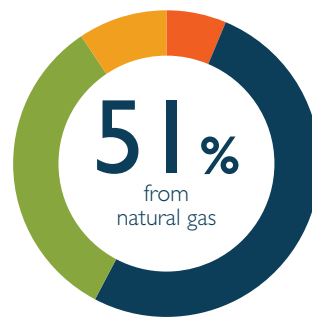
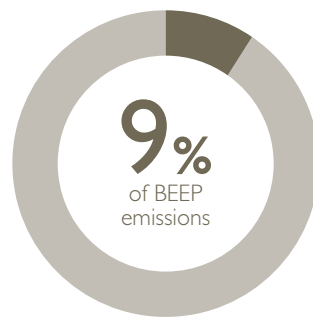
Marketing, personal interest, cost reduction, and building upon existing green initiatives top the list of drivers for carbon management in this sector. Responding to existing requirements and anticipating future requirements do not appear as strongly for this sector as they do for, for example, construction; where companies often compete on bids and tenders for municipal governments.

Following the Climate Smart program, nearly 60% implement initiatives aimed at increasing their waste diversion rate, such as starting to recycle their Styrofoam and soft plastics. Paper use is an area addressed by over 60% of businesses, as wholesalers often have good opportunities to reduce paper used for packaging slips and invoices. While paper use is a relatively small source of emissions for these businesses, reducing paper is a low-cost strategy that touches everyone in the organization and helps promote a culture of conservation.

Reducing natural gas use through installing simple equipment such as strip curtains is another widely adopted tactic, with one out of five businesses going a step further and choosing to implement capital lighting or heating upgrades.

# NAICS 44-45: RETAIL TRADE

## SECTOR PROFILE



### Sector Emissions Breakdown

Electricity	7%
Natural Gas	51%
Transportation	33%
Waste	9%

**49,900** Vancouver employment

**2,912** number of businesses

**17** average business size (employees)

**87,900** sector emissions (tonnes CO<sub>2</sub>e)

**873,000** natural gas usage (GJ)

**417,232,000** electricity usage (kWh)

**28,800** transportation emissions (tonnes CO<sub>2</sub>e)

**17,700** waste generated (tonnes)

The Retail Trade sector is one of the largest sectors in this BEEP by the number of businesses, second only to the Office-Based Businesses sector. It includes 2,912 establishments and accounts for 9% of emissions covered in the report.

The majority of retail sector emissions (51%) are attributed to natural gas, followed by transportation (33%), and waste (9%).

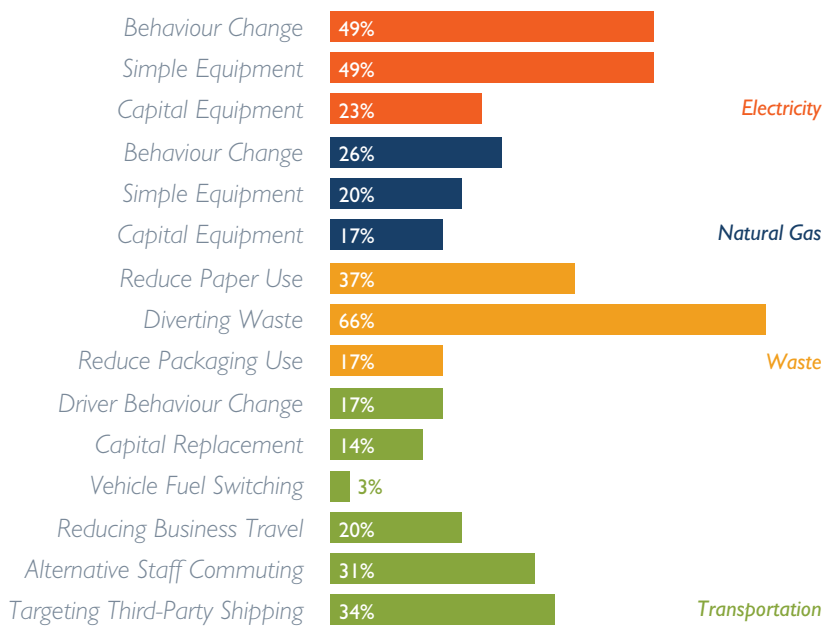
The retail sector is composed of 12 subsectors, including Food and Beverage Stores (583 businesses), Clothing and Accessories Stores (556 businesses), and Health and Personal Care Stores (369 businesses).

Food and Beverage Stores, the largest subsector, account for 34% of retail sector emissions. They have the highest electricity usage intensity because of high waste generation, as well as some of the highest refrigeration emissions recorded by Climate Smart to date across all sectors. Refrigeration emission intensities vary greatly among different stores depending on the age and condition of the store's refrigeration system. Climate Smart has recorded refrigeration emission intensities of up to 24 tonnes of CO<sub>2</sub>e per employee, which, if applied to all Vancouver grocery stores, would translate into 36,000 tonnes of CO<sub>2</sub>e emissions from refrigerants.

# MOTIVATION AND REDUCTION STRATEGIES IMPLEMENTED AFTER FIRST YEAR OF MEASUREMENT



## Motivations



## Reduction Strategies

Personal interest and education, marketing, cost reduction and community engagement appear as the top drivers for retail businesses to manage their carbon emissions.

Following the Climate Smart program, over 60% of businesses in this sector choose to implement strategies aimed at reducing their landfilled waste.

Reducing electricity use through installing simple equipment such as light timers and dimmers as well as behavior change campaigns (e.g., implementing a turn-it-off policy) are often-cited strategies for retail business.

Over 30% of participating businesses choose to tackle their third-party shipping. While this activity is outside of their direct emissions, retail businesses recognize its significant environmental impact and implement strategies such as bulk ordering and avoiding rush shipments.

Staff commuting is another emissions source commonly addressed by retailers. Aligning staff shifts with transit schedules, promoting carpooling, and providing secure bike parking are some of the initiatives tackling staff commuting emissions.

## CASE STUDIES

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### THE OTTER FARM AND HOME CO-OP

**\$7,700** annual cost savings

**5** emissions reduction  
(tonnes CO<sub>2</sub>e)

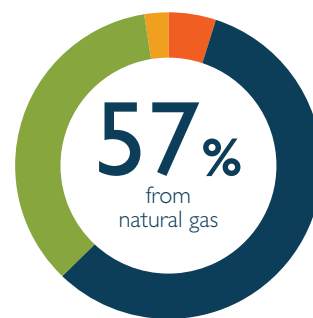
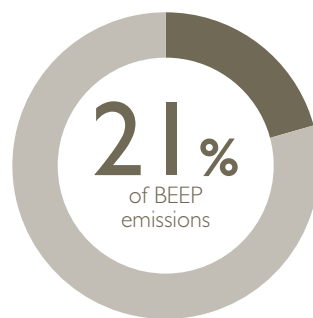
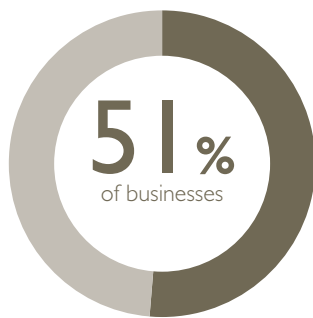
The Otter Farm and Home Co-operative is an agricultural and home product co-op located in the Township of Langley. They operate a retail centre, a bulk plant, feed plant, and several gas bars and convenience stores.

Otter Co-op has retrofitted their retail location with energy-efficient lighting. With an investment of \$5,800 and a \$1,200 rebate from BC Hydro, they project a savings of \$750 a year, with an ROI of approximately 6 years. Switching off lights in their retail centre for 4 hours a day when the space is not in use will additionally reduce their electricity costs by nearly \$17,500.

In their newly renovated deli, a modest investment of \$100 in reusable glasses means a savings of nearly \$600 a year in paper cups. Nearly 600 pounds of magazines arrive at the store every week, many of which go unsold. By reducing their order, Otter Co-op will save 1,560 pounds of paper annually, as well as the 5 hours of labour a week required to process the unsold copies.

# NAICS 51-55: OFFICE-BASED BUSINESSES

## SECTOR PROFILE



### Sector Emissions Breakdown

Electricity	5%
Natural Gas	57%
Transportation	35%
Waste	3%

**170,300** Vancouver employment

**11,388** number of businesses

**15** average business size (employees)

**207,900** sector emissions (tonnes CO<sub>2</sub>e)

**2,315,000** natural gas usage (GJ)

**698,379,000** electricity usage (kWh)

**73,700** transportation emissions (tonnes CO<sub>2</sub>e)

**11,200** waste generated (tonnes)

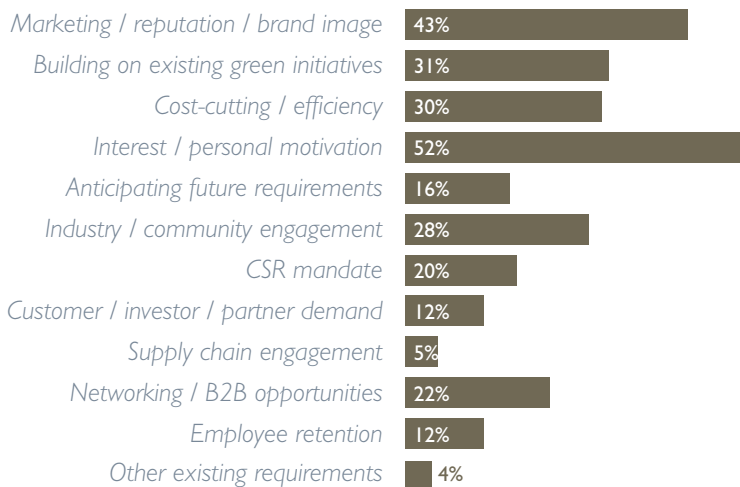
The office-based group of businesses encompasses NAICS sectors 51-55 and includes a diverse range of businesses including software firms, insurance companies, financial institutions, real estate agents, architects, law firms, and marketing firms. This is the largest group in this BEEP that includes over 11,000 businesses employing 170,000 people and it is projected to account for 207,900 tonnes of CO<sub>2</sub>e in emissions.

Natural gas used for space and water heating is the primary emission source, accounting for 57% of emissions.

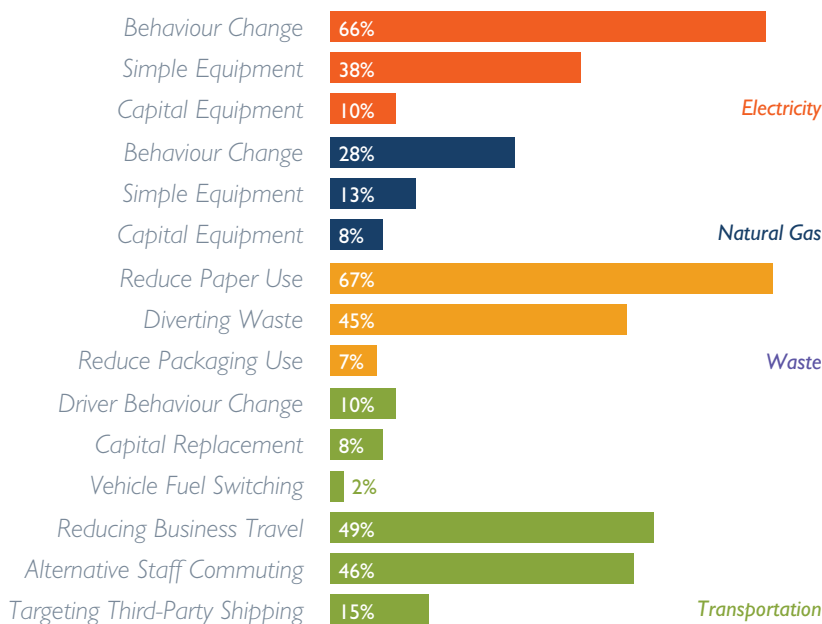
Transportation is the second largest emission source responsible for an estimated 35% of emissions. Note that this only includes emissions from company vehicles, and does not account for reimbursed business travel and staff commuting, which are commonly found to be significant emission sources for these businesses.

Office-based businesses generate a relatively small amount of waste—the total projected waste for this sector is 11,200 tonnes.

# MOTIVATION AND REDUCTION STRATEGIES IMPLEMENTED AFTER FIRST YEAR OF MEASUREMENT



## Motivations



## Reduction Strategies

Personal interest and education is the top driver for office-based businesses to take up carbon management, followed closely by marketing and brand image. Building upon existing sustainable initiatives and cutting costs also appear as strong drivers cited by nearly a third of businesses entering the Climate Smart program. Anticipation of future requirements is starting to appear as a strong driver: 16% of businesses cited it as a reason to enter the Climate Smart program.

Office-based businesses often operate out of shared leased spaces where they do not have direct control over their heating and lighting, which is why capital heating and lighting upgrades are not as common for these businesses. Most widely chosen reduction strategies include tackling paper use, business travel, electricity through behavior change, and staff commuting. Staff commuting is often the largest emission source for office-based businesses after air travel. While staff commuting is not included in the projections made in this report, it does contribute significantly to emissions at the community level. Ample opportunities exist for influencing commuting habits through initiatives implemented by the businesses, such as providing discounted passes, bike facilities, and shifting the company culture towards sustainable commuting and business travel.

## CASE STUDIES

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### STARFISH MEDICAL

**\$7,000** annual cost savings

**7.7** emissions reduction  
(tonnes CO<sub>2</sub>e)

Starfish Medical works with clients all over North America and around the world to design, develop and manufacture medical devices. The company employs 51 people in Saanich, operating out of one facility. Starfish first measured its emissions inventory over fiscal 2011-2012, leading to emissions reduction strategies that included conducting waste and energy assessments, supporting sustainable commuting with incentives and improved facilities, purchasing Forest Stewardship Council certified paper, and teleconferencing with clients when possible.

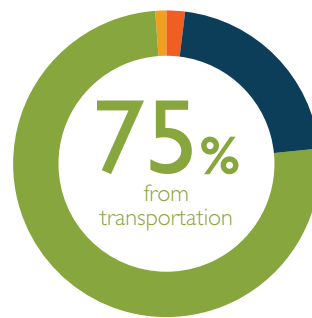
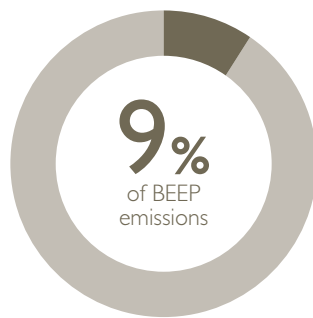
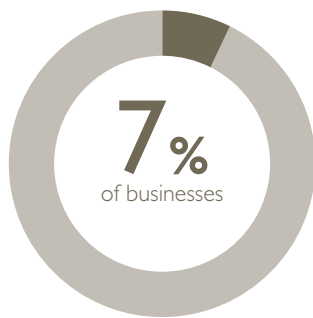
Starfish Medical's most innovative emissions reduction strategy is also likely the most impactful the company could pursue: encouraging project managers and clients to reduce their business air travel. On average, for office-based professional services firms, business air travel represents the largest source of emissions, at 37%<sup>9</sup>. Starfish encouraged this behaviour by proactively supplying and encouraging the use of videoconferencing and webcam technology to both employees and clients. This initiative has worked well for the bottom line, with a nearly immediate payoff thanks to savings achieved from reduced air travel.

Since launching this strategy in 2009, Starfish has outfitted all project managers, senior management and numerous clients with top-of-the-line webcams and headsets, using either Skype or GoToMeeting as the software component. Each unit costs \$106 per set-up (not including shipping to clients). Starfish has invested \$2,755 to date, purchasing 26 of the webcams and headsets. Important to note is that the barrier to this type of initiative is much less likely to be technological than it is to be cultural. Perhaps the most important aspect of this "investment" has been the encouragement by senior management that project managers utilize teleconferencing whenever feasible.

While Starfish has found it difficult to provide exact figures for the value of air travel not expensed, and kilometres not flown, over the past three years encouraging this style of work has proven to be a positive investment, with a nearly immediate payback. Anecdotally, the company knows that numerous, otherwise necessary flights to clients (e.g., Charlottesville, West Virginia and San Mateo, California) have been avoided.

# NAICS 56: ADMINISTRATIVE SUPPORT, WASTE MANAGEMENT, REMEDIATION

## SECTOR PROFILE



### Sector Emissions Breakdown

Electricity	2%
Natural Gas	22%
Transportation	75%
Waste	1%

**35,000** Vancouver employment

**1,521** number of businesses

**23** average business size (employees)

**85,500** sector emissions (tonnes CO<sub>2</sub>e)

**362,000** natural gas usage (GJ)

**115,830,000** electricity usage (kWh)

**64,400** transportation emissions (tonnes CO<sub>2</sub>e)

**1,900** waste generated (tonnes)

The Administrative Support, Waste Management and Remediation Services sector includes two subsectors: Administrative and Support Services (NAICS 561) and Waste Management and Remediation (NAICS 562).

98% of businesses in this sector are part of the Administrative and Support Services subsector, which includes businesses that support operations of other businesses: janitorial services, maintenance, security, employment agencies, etc. These businesses are characterized by high transportation emissions, as they often operate a fleet of vehicles and deliver their services at multiple client locations. Transportation is estimated to account for 75% of emissions in this sector.

Overall, the sector accounts for 9% of business emissions projected in this report: over 85,000 tonnes

of CO<sub>2</sub>e. Waste emissions for this sector are small, with the per-employee emission intensity smaller than that for offices. The waste generated by these businesses is often disposed at clients' sites, and becomes part of other businesses' waste stream.

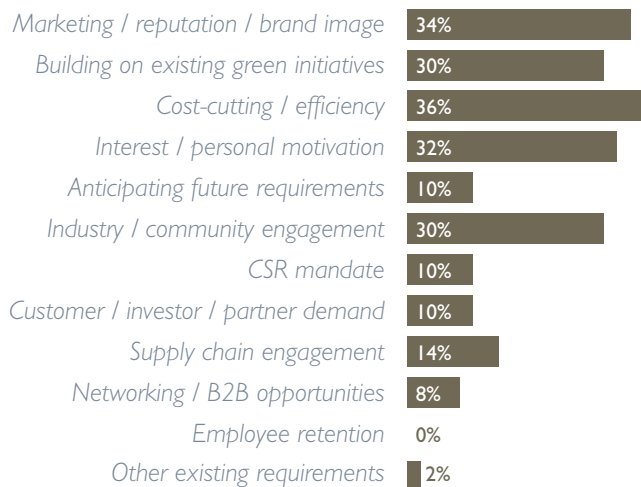
Waste Management and Remediation Services subsector includes waste haulers, recycling depots, and other waste management businesses. This subsector includes 34 businesses and employs 600+ people in Vancouver.

These businesses have high transportation emission intensity and account for an estimated 4,500 tonnes in CO<sub>2</sub>e emissions. Note that the waste disposed at the landfill or incinerator by these businesses is not counted as part of their emissions, as it is generated by other businesses or is residential.

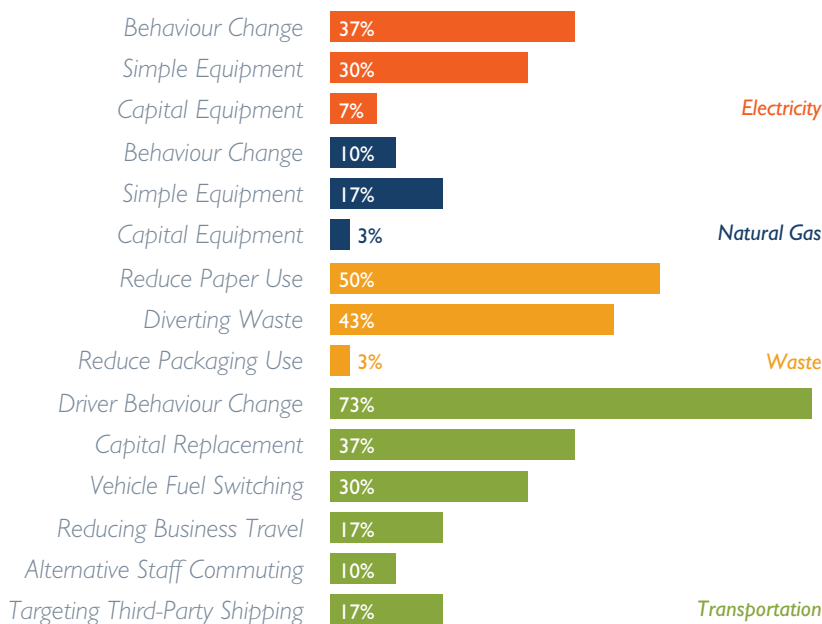


## // NAICS 56: ADMINISTRATIVE AND SUPPORT, WASTE MANAGEMENT AND REMEDIATION SERVICES

# MOTIVATION AND REDUCTION STRATEGIES IMPLEMENTED AFTER FIRST YEAR OF MEASUREMENT



### Motivations



### Reduction Strategies

Cutting costs appeared as the strongest motivating factor for businesses in this sector to take on carbon management. Marketing and brand image, education, and expanding existing sustainability initiatives are other strong factors cited by businesses. Responding to existing and anticipating future requirements also appeared as drivers for this sector, as some of the businesses are starting to see requests from their municipal and private clients for measurable sustainability action.

With transportation emissions forming a large part of emissions for this sector, the most oft-cited reduction strategy is reducing transportation emissions through behavior change. This includes low-cost strategies such as eliminating idling, speeding, and abrupt braking, as well as purchasing equipment and software for vehicle tracking to optimize routes and monitor idling and speed. Nearly 40% of businesses coming through the program choose to replace some of their fleet vehicles with more fuel efficient models.

# // NAICS 56: ADMINISTRATIVE AND SUPPORT, WASTE MANAGEMENT AND REMEDIATION SERVICES

## CASE STUDIES

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### SECURIGUARD

**\$80,000+** annual cost savings

**97+** emissions reduction (tonnes CO<sub>2</sub>e)

Securiguard is a full-service integrated security solutions company offering customized corporate security services, security guards and security consulting. Through participating in the Climate Smart program, the company measured their baseline inventory for their North American operations for the 2010 fiscal year, and is currently measuring their footprint for 2011 and 2012.

Presently, the Securiguard fleet includes 17 hybrid vehicles and one diesel vehicle in their 47-vehicle fleet. In addition to replacing conventional vehicles with the 17 efficient hybrids vehicles, Securiguard was actually able to reduce the total number of vehicles in their fleet over the past two years by better optimizing their route planning. Securiguard is working to replace an additional 12 vehicles with leased hybrids in the next year.

The per-vehicle savings that Securiguard has realized from these changes are \$100 per month, taking the additional leasing costs into account. The overall yearly savings amount to \$21,000 in fuel costs (assuming a gas price of \$1.30 per litre). These savings translate into a projected greenhouse gas (GHG) emissions reduction of 97 tonnes CO<sub>2</sub>e, or a 13% reduction in emissions from Securiguard's 2010 baseline measurement, with further reductions to come from increased fleet efficiency.

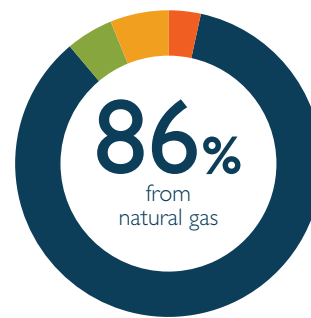
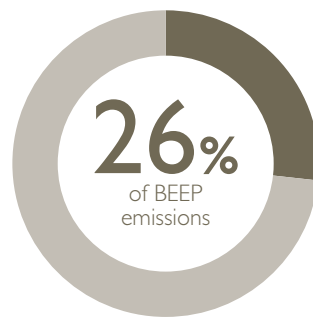
Securiguard is further reducing emissions significantly through the route optimization software implemented in their vehicles. Financial returns due to the implementation of this on-board software, and the subsequent fuel savings and reduced size of the Securiguard fleet have been substantial. Securiguard is realizing savings of \$5,000 on a monthly basis.

In total, Securiguard's fleet efficiency initiatives have achieved the company annual fuel savings of more than \$80,000, and reduced their carbon footprint extremely effectively.

Cutting down on vehicle idling, implementing electronic invoicing, improving their recycling infrastructure and reducing energy consumption by implementing 'turn-it-off' programs and reducing vampire power complete the Securiguard effort to thoroughly and thoughtfully green their operations.

# NAICS 72: ACCOMMODATION AND FOOD SERVICES

## SECTOR PROFILE



### Sector Emissions Breakdown

Electricity	3%
Natural Gas	86%
Transportation	5%
Waste	6%

**68,400** Vancouver employment

**2,486** number of businesses

**28** average business size (employees)

**262,100** sector emissions (tonnes CO<sub>2</sub>e)

**4,363,000** natural gas usage (GJ)

**612,645,000** electricity usage (kWh)

**11,900** transportation emissions (tonnes CO<sub>2</sub>e)

**35,900** waste generated (tonnes)

The Accommodation and Food Services sector is the third largest sector covered in this BEEP by the number of businesses, and the largest by generated emissions. It includes nearly 2,500 businesses and employs over 68,000 people in Vancouver.

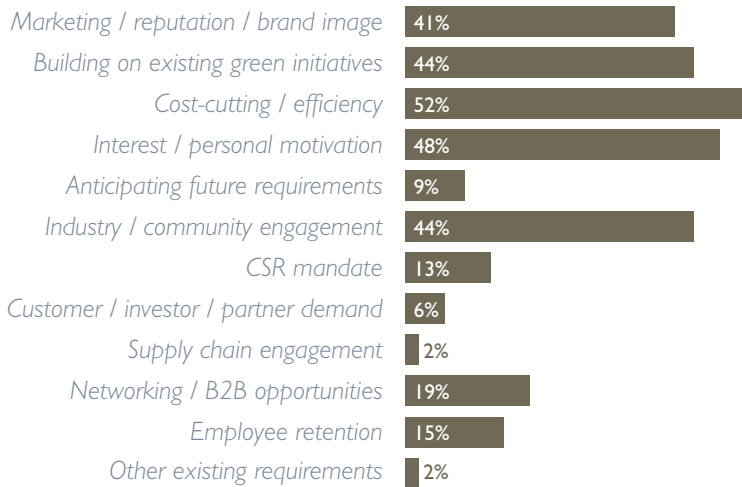
It is an emission intensive sector, accounting for an estimated 262,000 tonnes of CO<sub>2</sub>e emissions: more than 10% of the total City of Vancouver footprint and 26% of emissions projected in this BEEP.

Accommodation and Food Services sector is composed of two large subsectors: Accommodation Services (NAICS 721) and Food Services and Drinking Places (NAICS 722).

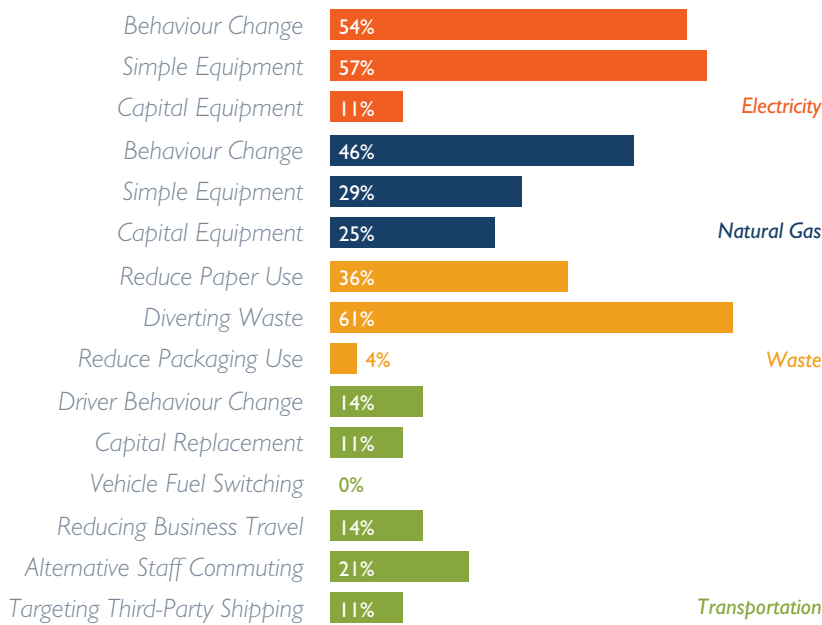
The Accommodation Services subsector includes hotels, motels, and resorts, and accounts for 177 businesses in Vancouver, employing 10,700 people. This subsector is characterized by high natural gas emissions intensity, and is estimated to account for 71,000 tonnes of CO<sub>2</sub>e in total emissions.

Food Services subsector includes restaurants, cafes, coffee shops, caterers, etc. This subsector accounts for 2,309 businesses in Vancouver, employing nearly 58,000 people. This subsector has high natural gas intensity because of natural gas used in food preparation. The total emissions from this subsector are estimated at 191,000 tonnes of CO<sub>2</sub>e.

# MOTIVATION AND REDUCTION STRATEGIES IMPLEMENTED AFTER FIRST YEAR OF MEASUREMENT



## Motivations



## Reduction Strategies

Cutting costs appeared as the strongest driver for businesses in this sector to manage their carbon — over a half of businesses mentioned it as a reason for entering the Climate Smart program. Industry and community engagement, education, and expanding existing green initiatives are other strong drivers for businesses in this sector. Networking and business-to-business opportunities also appeared as a common motive as many hotels are looking for ways to attract business travelers from organizations with strong sustainability commitments.

Improving waste diversion rate is the most widely-adopted strategy for businesses in this sector. While waste is not the largest emission source for this sector, its impact is significant and businesses often find easy ways to reduce their waste emissions—e.g., composting organics.

Over a half of businesses implement behavioral strategies and purchase simple equipment such as motion sensor or dimmers to reduce their electricity use and cut associated costs.

Natural gas, the largest emission source for the sector, is targeted by many businesses through simple equipment (low flow spray nozzles and programmable thermostats) and behavioral change initiatives such as “turn it off” campaigns for kitchen equipment.

## CASE STUDIES

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### LISTEL HOTEL

**heating retrofit** initiative  
**\$250,000** total investment  
**\$55,000** annual savings

**5.5** payback period (years)  
**18.1%** rate of return  
**150** emissions reduction (tonnes CO<sub>2</sub>e)

The Listel Hotel has been dubbed “Vancouver’s most art-full hotel” and is committed to art, elegance and comfort. It is also highly committed to reducing its energy consumption and greenhouse gas emissions. In 2008 the hotel installed a solar hot water system and a highly efficient heat recovery system in the 129-room hotel to minimize natural gas used to heat water for showers, laundry, dishwashing, and the like.

The heat recovery system uses waste heat from the cooling system to pre-heat water and as a support for heating the building. Solar panels also pre-heat water and with the two systems in place, natural gas is used only to heat water 10–20 degrees Celsius rather than approximately 60 degrees Celsius without the pre-heating systems.

Together the two systems helped reduce GHG emissions from heating by approximately 150 tonnes and costs by over 27% annually. With a grant from NRCan contributing to the purchase of the solar panels, the payback period on the hotel’s investment is anticipated to be 5.5 years.

The last fiscal year versus baseline fiscal year saw savings of \$43,183 after factoring out commodity-price variation (actual savings were over \$55,000). Total cost for the system (after NRCan grant) was roughly \$250,000.

# CONCLUSION

This report provides a high-level view of business sector emissions within the City of Vancouver. It highlights the sectors with the highest emissions (Accommodation and Food Services, Construction, and Office-Based businesses) and identifies specific activities within those sectors that generate them. It allows comparison between sectors and activities, which we hope will serve to inform the City's planning around emissions/energy reduction projects and business engagement programs: critical initiatives for Vancouver to reduce community-wide emissions.

This study can serve as a foundation for future in-depth sector-specific analysis by Climate Smart and development of business communication pieces and programs.

# APPENDIX

## SECTOR EMISSIONS DATA TABLE

NAICS Industry Sector	% of Emissions	Total Emissions (tonnes CO <sub>2</sub> e)	Natural Gas Use (GJ)	Natural Gas Emissions (tonnes CO <sub>2</sub> e)	Electricity Use (GJ / kWh)	Electricity Emissions (tonnes CO <sub>2</sub> e)	Transport Emissions (tonnes CO <sub>2</sub> e)	Waste Produced (tonnes)	Waste Emissions (tonnes CO <sub>2</sub> e)
23 Construction	22%	222,200	312,000	16,000	309,000 / 85,897,000	1,200	174,100	65,100	30,900
31 Manufacturing (Food, Textiles, Leather)	5%	49,700	626,000	32,200	362,000 / 100,610,000	1,410	12,700	7,300	3,400
33 Manufacturing (Fabricated Metal Products, Machinery, Furniture)	1%	13,900	168,000	8,700	121,000 / 33,561,000	470	3,300	3,100	1,500
41 Wholesale Trade	6%	60,100	291,000	15,000	406,000 / 112,849,000	1,580	38,400	10,900	5,200
44-45 Retail Trade	9%	87,900	873,000	44,900	1,502,000 / 417,232,000	5,840	28,800	17,700	8,400
51-55 Office-Based Businesses	21%	207,900	2,315,000	119,100	2,514,000 / 698,379,000	9,780	73,700	11,200	5,300
56 Administrative and Support, Waste Mgmt and Remediation Services	9%	85,500	362,000	18,600	417,000 / 115,830,000	1,620	64,400	1,900	900
72 Accommodation and Food Services	26%	262,100	4,363,000	224,500	2,205,000 / 612,645,000	8,580	11,900	35,900	17,000
<b>TOTAL:</b>	<b>100%</b>	<b>989,300</b>	<b>9,309,000</b>	<b>479,100</b>	<b>7,836,000 / 2.177B</b>	<b>30,480</b>	<b>407,200</b>	<b>153,000</b>	<b>72,600</b>

Note: Projections have been rounded; therefore totals may not exactly match the sum of row values.

# CITY OF VANCOUVER BUSINESS ENERGY AND EMISSIONS PROFILE

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