Bellevue College – Summary of Carbon Audit Report Fiscal Years 2009 & 2010

Bellevue College (BC) is a signatory to the American College and University Presidents Climate Commitment (ACUPCC) for the reduction of greenhouse gas emissions and carbon neutrality. The Carbon Audit Report is an internal audit and inventory of greenhouse gas emissions attributed to Bellevue College campuses. This is a summary of the results of the carbon audit for fiscal years (FY) 08/09 and FY09/10 and comparison to the data collected for first BC carbon audit for FY05/06-FY07/08. An updated calculator was used in this audit which tabulates lower total campus emissions compared to the previous calculator using the same data. Because of the numerous factors involved, campus carbon audits are useful primarily to show trends over time, rather as a tool for benchmarking against other colleges.

Summary of the Data

There has been a steady rise in the total emissions (MT eCO_2) from FY05/06 -FY09/10, which is depicted in Figure 1. The major contributor to this rise in emissions can be directly attributed to a yearly increase in the student population and miles traveled to campus and associated commuting emissions.

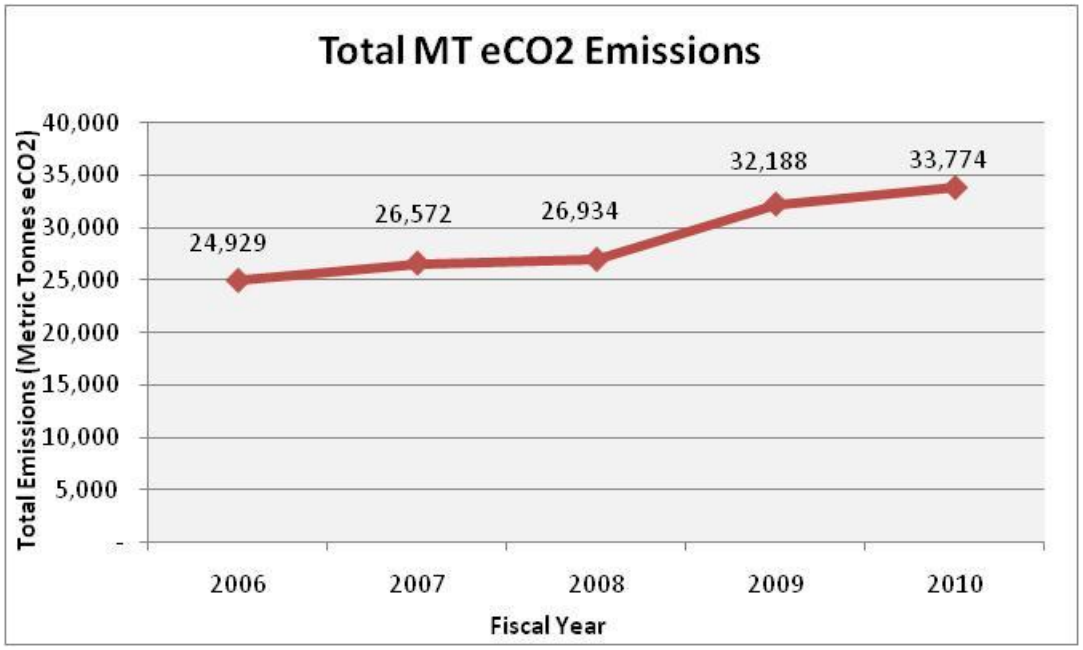

Figure 1 Bellevue College – Total Emissions (MT eCO_2) per Year

Contributing Emissions Factors by Scope

In order to better understand the meaning of the data, emissions are divided up into three major protocol scopes: Scopes 1, 2, and 3 (Table 1 and Figure 2). Individual scopes will be discussed in detail below, but it is important to note that over 75% of BC's carbon emissions fall under Scope 3.

Campus Carbon Emissions by Scope	
Scope 1	**Direct Campus Emissions** Scope 1 emissions are direct carbon emissions from the campus and include stationary energy sources (natural gas, oil burning, etc.), college fleet emissions (patrol cars, athletic vans, etc.), agricultural sources (emissions from fertilizer, animal waste, etc.) and refrigerants (CFCs, HCFCs, etc.).
Scope 2	**Indirect Emissions- Purchased Energy** Scope 2 emissions include purchased electricity and steam (where the carbon emissions are indirectly occurring at a distant power plant).
Scope 3	**Indirect Emissions - Transportation & Waste Disposal** Scope 3 emissions are related to the energy consumed by the people and materials that are transported to and from campus. For BC, this mainly includes emissions from the commuting of students and staff to and from the campus and air travel miles to and from conferences and events. In addition, it also includes emissions from solid waste that is transported to the landfill.

Table 1 Definition of Campus Carbon Emission by Scope

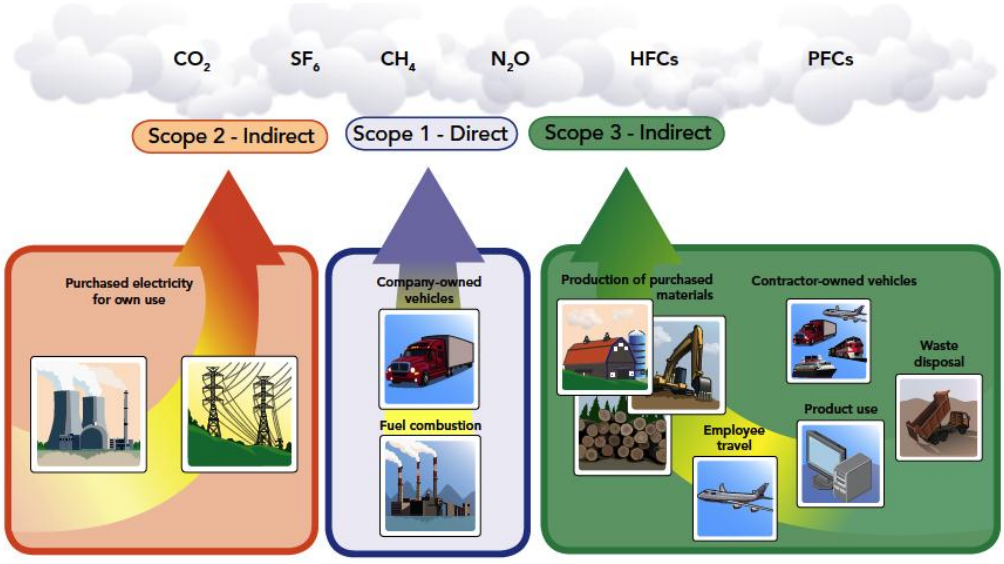

Figure 2 Greenhouse gas protocol scopes from Getting to Zero: Defining Corporate Carbon Neutrality (Clean Air-Cool Planet and Forum for the Future, 2008).

Scope 1

Table 2 summarizes the amount of MT eCO_2 by the campus source, and total emissions for Scope 1 during FY05/06-09/10. Listed in Table 3, are the increases or decreases by campus source for Scope 1 for the fiscal year the change was evident, and any comments to why this change may have occurred. Note: significant square feet added to campus in FY08/09 – increasing Scope 1 and Scope 2 emissions.

Fiscal Year	Scope 1 Emissions (MT eCO_2)				
	On-Campus Energy	Fleet	Agriculture	Refrigerants	Total Scope 1
05/06	1,208	56	1	93	**1,358**
06/07	1,229	59	1	93	**1,382**
07/08	1,281	65	1	93	**1,441**
08/09	1,604	61	1	81	**1,746**
09/10	1,520	35	2	46	**1,603**

Table 2 Bellevue College - Annual Scope 1 Carbon Emissions

Scope 1 Direct Campus Emissions – Increase/Decrease Usage			
	Increase/Decrease	Year	Comment
On-Campus Stationary Sources	↑		
Natural Gas		FY08/09	New S Building completed and operational
Distillate Oil	↓	FY08/09	Heating oil no longer used.
Campus Fleet Vehicles	↓		Athletic Dept. began to rent vehicles, lowering amount of overall fleet gasoline usage recorded in this report, the number of gallons purchased by the Athletic Dept. is unknown. This will be calculated for future carbon audits.
Gasoline		FY09/10	
Diesel	↑	FY09/10	
Agriculture	↑		A supply of fertilizer was purchased for future use.
Fertilizer		FY09/10	
Refrigerants	↓	FY08/09 and FY09/10	The campus is phasing out use due to the Clean Air Act regulations.
HCFC-22			

Table 3 Bellevue College – Scope 1 Direct Campus Emissions – Increase/Decrease Usage

Scope 2

Table 4 lists the amount of electricity used (kWh) by the campus and the total emissions (MTeCO2) of Scope 2 from electricity the campus purchased. Summarized in Table 5 are any significant increases or decreases in BC's usage of electricity, including potential reasons for the change.

Fiscal Year		Scope 2 Emissions (MTeCO2)	
	Electricity Use (kWh)	Purchased Electricity	Total Scope 2
05/06	9,581,817	4,303	**4,303**
06/07	12,741,937	5,331	**5,331**
07/08	11,938,131	5,446	**5,446**
08/09	12,069,664	5,365	**5,365**
09/10	12,160,300	5,522	**5,522**

Table 4 Bellevue College – Annual Scope 2 Carbon Emissions

Scope 2 Indirect Emissions – Increase/Decrease Usage			
	Increase/Decrease	Year	Comment
Purchased Electricity	↓	FY07/08	As stated in the Carbon Audit Report for FY05/06-FY07/08, although our electricity usage went down from FY06/07 to FY07/08, our emissions went up. This is a direct result of an increase in coal usage in the PSE energy mix (from 34% to 37% of the total mix).
Electricity Use			
Electricity Use	↑	FY08/09	New S Building operational, effecting both Scope 1 and 2 emissions.

Table 5 Bellevue College – Indirect Emissions Source – Increase/Decrease Usage

Scope 3

Campus emission sources for Scope 3, amount of emissions, and total emissions by source for FY05/06-FY09/10 are summarized in Table 6. Tables 7 – 9 show campus commuting habits from the BC transportation survey taken by students, faculty, and staff to compare FY09/10 and FY07/08.

Fiscal Year	Scope 3 Emissions (MT eCO_2)					
	Student Commuting	**Faculty/Staff Commuting**	**Air Travel**	**Solid Waste**	**Wastewater**	**Total Scope 3**
05/06	15,201	2,539	970	71	62	**19,268**
06/07	15,449	2,638	1,111	73	61	**19,859**
07/08	15,811	2,618	948	77	56	**20,047**
08/09	20,328	3,249	831	75	63	**25,076**
09/10	21,759	3,545	664	74	59	**26,647**

Table 6 Bellevue College - Annual Scope 3 Carbon Emissions

A comparison of the two transportation survey's for FY08/09-FY09/1 shows an increase in the amount of emissions by students commuting. The increase in emissions is directly related a larger number of students attending, both full-time and part-time. In addition, these students are commuting from further away, increasing the number of miles they are traveling (14 miles compared to 11 miles in FY07/08), which adds to the increased total emissions for students as seen in Table 6.

The survey does show that the students driving alone have decreased their number of trips per week to school from 8.40 to 8.18. Students have increased their bus ridership to campus from 14% to 18%, also increasing their trips per week by bus to campus from 8.24 to 8.88.

Student Commuters - A BC transportation survey was completed by 2579 students in FY09/10; Table 7 shows the data from the survey that represents the student's main mode of transport in an average week, with comparison to FY07/08 transportation survey for changes in commuting patterns.

Student Commuters							
	2010				2008		
	Drive Alone	Carpool	Bus		Drive Alone	Carpool	Bus
Percentage Commute by Mode	57%	19%	18%		63%	16%	14%
Trips/Week	8.18	8.18	8.88		8.4	8.4	8.24
Weeks/Year	42	42	42		42	42	42
Miles/Trip	14	14	12		11	13	8

Table 7 Bellevue College – Student Commuters by Mode for FY09/10 and FY08/09

Fewer faculty are driving alone and more people are busing, although the number of carpoolers did decrease. It appears faculty are taking fewer trips per week to campus dropping from 9.20 to 8.06 trips/week and they are driving a further to get to campus. These changes may potentially be attributed to changes in survey methods.

Staff driving alone increased 10% to 75%, carpooling has decreased from 12% to 9%, and bus ridership has decreased from 21% to 15%. The number of trips/week by staff has increased for both personal vehicle and bus, as has the miles per trip. Again, some of these changes may be attributed to survey methods.

Faculty and Staff Commuters - A BC transportation survey was taken in FY09/10 by 188 faculty members and 303 staff members, the data listed in Table 8 and Table 9 are the average number of days in a week the faculty/staff member commutes by which mode of transportation, with comparison to FY07/08 transportation survey to observe commuting patterns.

Faculty Commuters							
	2010				2008		
	Drive Alone	Carpool	Bus		Drive Alone	Carpool	Bus
Percent Commute by Mode	80%	5%	13%		75%	8%	10%
Trips/Week	8.06	8.06	8.52		9.2	9.2	9.2
Weeks/Year	48	48	48		48	48	48
Miles/Trip	15	15	16		13	13	13

Table 8 Bellevue College – Faculty Commuters Comparison by Mode for FY09/10 and FY08/09

Staff Commuters							
	2010				2008		
	Drive Alone	Carpool	Bus		Drive Alone	Carpool	Bus
Percent Commute by Mode	75%	9%	15%		65%	12%	21%
Trips/Week	9.62	9.62	9.94		9.2	9.2	9.2
Weeks/Year	48	48	48		48	48	48
Miles/Trip	11	11	14		11	11	12

Table 9 Bellevue College – Staff Commuters Comparison by Mode for FY09/10 and FY08/09

Note:

- Miles per trip in the 07/08 survey were based on reported round-trip distance, while miles per trip in 09/10 were based on reported one-way trip distance. This may account for some of the increase in average mile/trip reported.
- Trips/Day calculation for FY05/06-FY07/08 CA-CP v5.0 calculator was standardized to Trips/Week for CA-CP v6.6 calculator
- Weeks/Year = 42, includes summer school quarter to balance our data as an academic year round commuter college.
- The response rate was more than five times greater for students in 2010 and about 70% greater for employees.

Carbon Offsets

Offsets that are included in this section of the report include the carbon sequestered by forest preservation, carbon "recycled" using compost generated on campus, and purchased energy credits. At this point, BC's offsets are minor. They include 31 $mTCO_2$ sequestered by the 7.64 acres of forest on the northwest side of campus (west of the athletic track) and purchased energy credits. In FY08, BC signed a 2-yr plan to purchase 408,681 kWh of wind energy credits a year from Renewable Choice Energy as part of the S-Building LEED certification. Half of this amount (204,340 kWh) was applied to the FY08, which includes the first half of 2008. Table 10 shows the offsets summary.

Fiscal Year	Emission Offsets (MT eCO_2)		
	Energy Credits	Forest Preservation	Total Offsets
05/06	(0)	(31)	**(31)**
06/07	(0)	(31)	**(31)**
07/08	(93)	(31)	**(124)**
08/09	(91)	(31)	**(122)**
09/10	(0)	(31)	**(31)**

Table 10 Bellevue College - Annual Carbon Offsets

Conclusion

The largest source emissions on the Bellevue College campus has continued to be from the Scope 3 source: Student/Faculty/Staff Commuting. Figure 3 shows the percentage of carbon emissions by source, and the largest contributor. For FY09/10 Student Commuting carbon emissions was at 66% and Faculty/Staff Commuting 10%, totaling 76% of the emission sources on campus. In FY07/08, Student Commuting totaled 60% of the carbon emissions, and Faculty/Staff Commuting was 10%, 70% of the total emissions on campus. This increase from 70% to 76% was mostly due to the influx of students over the FY08/09 and FY09/10 academic years.

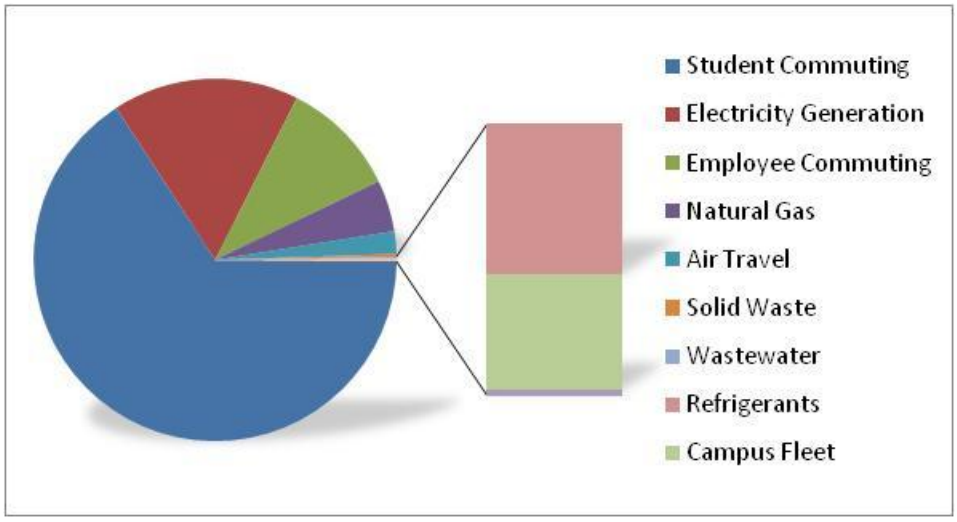

Figure 3 Bellevue College – Carbon Emissions by Emission Size and Campus Source FY09/10

Table 11 also shows the highest emissions contributor by source and compares FY07/08 and FY 09/10, Student Commuting is at the top of the emissions contributions. *Note: the data listed here in Table 11 under Emissions (MT eCO_2) FY09/10 shows in comparison to FY07/08 a decrease in use and FY09/10 is set to highest to lowest contribution, allowing us to see the decrease in these campus sources from two years ago.

Campus Source	Scope	Emissions (MT eCO_2) FY09/10	Percent Total FY09/10	Emissions (MT eCO_2) FY07/08	Percent Total FY07/08
Student Commuting	3	21,759	66%	15,811	60%
Electricity Generation	2	5,522	17%	5,446	21%
Faculty/Staff Commuting	3	3,454	10%	2,618	10%
Natural Gas	1	1,520	5%	1,281	5%
Air Travel	3	664	2%	948	4%
Solid Waste	3	*74**	<1%	*77**	<1%
Wastewater	3	59	<1%	56	<1%
Refrigerants	1	*46**	<1%	*93**	<1%
Campus Fleet	1	*35**	<1%	*65**	<1%
Agriculture	1	*2**	<1%	*1.5**	<1%

Table 11 Bellevue College – Emissions FY09/10 Compared to FY07/08

Figure 4 is show the steady climb Bellevue College is experiencing in the source Student/Faculty/Staff Commuting and air travel paid by the college as highest attributing sectors from 2006-2010. We can also see the relatively fixed usage of campus electricity and On-Campus Stationary Sources (natural gas/propane).

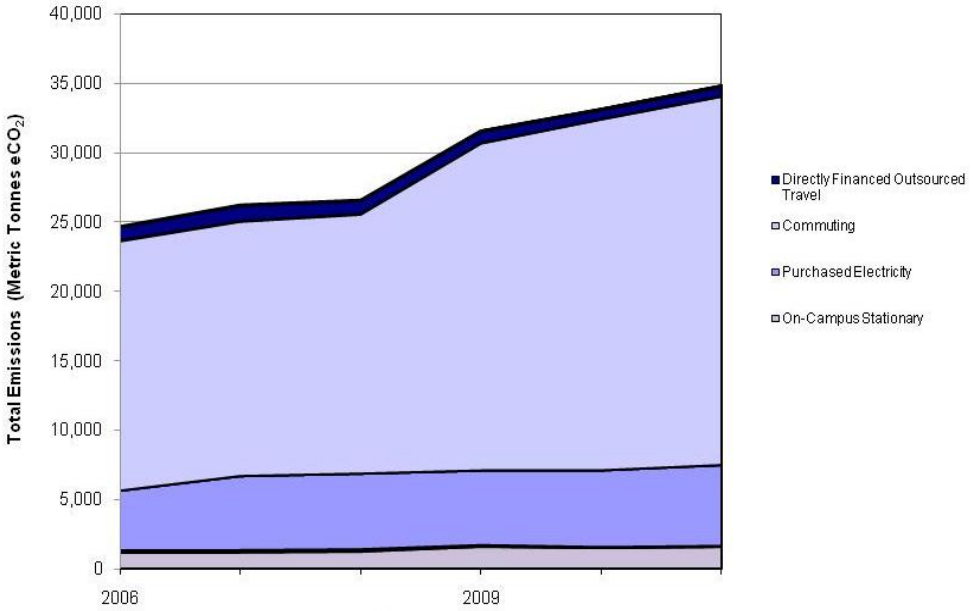

Figure 4 Bellevue College – Total Emissions (MT eCO_2) by Highest Attributing Sectors

In conclusion, the distribution between the sources of emission has stayed steady between FY07/08-FY09/10. Commuting is the largest contributor to the emissions, and if we do change our commuting habits to campus the carbon emissions will likely continue to increase our footprint over the next few years. Electricity consumption did decrease in the percent of total emissions from FY07/08 to FY09/10, but the amount of emissions linked to fueling electricity did increase.

Data Notes

For the data calculations in FY08/09-FY09/10, we used the Clean Air – Cool Planet (CA-CP) Campus Carbon Calculator v6.6, the Carbon Audit Report for FY05/06-FY07/08 used CA-CP Calculator v5. Transferring the data from calculator v5 to v6.6, we observed a few differences compiling the new data. One difference was the Summer School Student population data being used as a reference instead of as a part of the commuting population. As BC is a full academic year commuter college, keeping track of the number students arriving and leaving campus is a major part of our carbon emissions. To counter this deficit, we reflected the summer students in the Input Commuter spreadsheet by increasing the number of Weeks/Year students commute to include the summer quarter.

We also noticed our Net Emissions decreased for FY05/06-FY07/08 through a decrease in Scope 2 and Scope 3 Emissions when entered into the new CA-CP v6.6 calculator. Part of this change was in the upgrade of CA-CP Calculator v5, as noted from the CA-CP v6.5 User's Guide, CA-CP made improvements to their methods and approach of calculating emissions. The other difference we discovered was in the calculation of the Input Commuter data, and using different methodologies in the first BC carbon audit which we have standardized for future audits.

Due to the CA-CP calculator upgrade to v6.6, this report will include the FY05/06-FY07/08 data, for comparison with the FY08/09-FY09/10 data under both standardized to our current methodologies.

Appendix A

How the Data was Collected/Calculated

Carbon emissions were calculated using the Clean Air – Cool Planet Campus Carbon Calculator v6.6[1]. Their website, along with resources from the Association for the Advancement of Sustainability in Higher Education (AASHE)[2] and the President's Climate Commitment website[3] were extremely helpful in working out the details of the audit. We chose to define each year as a fiscal year, running from July 1 – June 30 (this is more in line with the way our data is tabulated on campus). In order to help determine the source of the data required to conduct the audit and to provide a guideline for those who continue to amass this data in the future, this appendix describes how and from whom the data was obtained and how carbon equivalents were calculated.

General Information

BC policy asks any college data/data analysis requests to be submitted to the BC Request Center. To obtain this information, the request must be submitted by a BC employee and batch similar data requests together.

To access the request form, log in to My BC[4], click on the Requests & Forms tab, select Request Center, on the Request Center webpage – select College Data/Data Analysis (Data requests for work-related purposes), finally choose the category to best fit your data request. The request must include: date due, requesting department, purpose, information needed, how often information is needed and report format, also include an example of data from a previous year to help the Request Center search for the correct data. Once the request form is submitted, allow two weeks for data remittance.

Other data, as noted, is archived in the Campus Operations. Contact Laurel LaFever (Executive Director, Campus Operations) and Cindy Boekhoff (Administrative Assistant 3, Campus Operations), or Deric Gruen (Program Manager, Capital Projects) for further assistance.

Note: On the CA-CP, under the Direct Transportation Sources – University Fleet is called Campus Fleet at BC.

Institutional Data

Budget

Operating Budget

The BC Operating Budget value is calculated by adding the: General Fund, Local Dedicated, and Grant & Contracts. This information is disbursed from the Request Center, and in the request form must include the fiscal year, General Fund, Local Dedicated, and Grant & Contracts.

Research Budget

BC does not have a Research Budget.

Energy Budget

The Energy Budget calculation is the total dollar amount purchased from Puget Sound Energy (PSE) including electricity and natural gas plus any propane and generator fuel (diesel) purchased by the campus (not already included in the University (Campus) Fleet. To calculate the Energy Budget by fiscal year with data from the PSE Energy spreadsheet archived in Campus Operations, add: Total ($) from PSE-GAS, Total ($) from PSE-ELECT Houses, Total ($) PSE-ELECT-3000, Total ($) Genesee Invoice (diesel). The PSE spreadsheet is archived in the Campus Operations (LaFever & Boekhoff, 2010).

See the discussion under "Scope 2 Emissions: Purchased Electricity" for a discussion of the source of the electricity budget data and "Scope 1 Emissions: On Campus Stationary Sources" for a discussion of the source of natural gas, propane and diesel budget data.

Population

Campus population data is difficult to calculate for a commuter college that has varying enrollment and flexibility in the number of adjunct teaching faculty and staff each quarter. Therefore, the numbers used for the students were averaged for the year based on quarterly data, and the FT/PT faculty or staff was added together to become an equivalent comparison to four year colleges using the CA-CP. We decided that the location the students were taking classes was not relevant at this point, as the survey that determines commuter emissions is based on travel distance regardless of where their classes are (and students have the option of entering 0 if they are taking online classes only).

Student Population

The Request Center provides the student campus population for the Main Campus, North Campus, and Other, listing students by quarter and the number of credits: as part-time (fewer than 10 credits) or full-time (more than 10 credits). To calculate the total number of part-time and full-time students for a fiscal year (not including summer quarter students), we added the total number of PT students on the Main Campus, North Campus and Other, attending during each of the Fall/Winter/Spring Quarters,

then found the average number of PT students per quarter by dividing the total PT students by three. The same calculation was performed for FT students. Summer quarter students are calculated by totaling only summer student attendees on the Main Campus, North Campus, and Other, then combining both FT and PT students. In the CA-CP v.6.6, the summer quarter students are used as a reference, not as part of the calculation of commuter traffic.

Faculty and Staff Population

The Request Center will provide the data for Faculty and Staff for both Full-Time and Part-Time employees. Calculate Faculty or Staff by adding FT Faculty to PT Faculty and FT Staff to PT Staff.

Physical Size

Total Building Space

The campus Total Building Space is data based on gross square footage obtained from the BC - 2009 Accreditation Report. The totals include total square footage of all campus building and the houses owned by the campus (including hallways, service areas, etc. along with classroom and office space). In FY09-10, this included 14 main campus buildings (A, B, C, D, E, F, G, K, L, M, N, Q, R, and S), 12 houses, and the North Campus building (W). It does not include the parking garage structure.

--Scope 1 Emissions Sources--

On-Campus Stationary Sources

On-Campus Cogeneration Plant

The campus does not have an on-campus cogeneration plant. It does generate some heat through a geothermal heat pump in the R-Building. The impact of this unit is reflected in a reduced need for natural gas to heat the building.

Other On-Campus Stationary Sources

The stationary energy sources to run the campus come chiefly from off-campus; these include natural gas and propane. Distillate oil, previously reported for FY07/08 & FY08/09 is no longer used for heating the campus houses.

Natural Gas

The natural gas usage was calculated by adding up the total purchased gas (in Btu) from the PSE monthly bills and archived in Campus Operations (LaFever & Boekhoff, 2010).

Propane

To calculate the propane usage in gallons, it was necessary to look back through invoices at Campus Operations (LaFever & Boekhoff, 2010) for the Voyager Card (July 2009 – October 2009 and July 2008 – June 2009) and Comdata (October 2009 – June 2010 to present) account summaries, by month and fiscal year to tabulate the number of gallons of propane used by the Mail Room Department. The Voyager and Comdata invoices also contain gasoline and diesel fuel data for the College Fleet purchases by department (Athletics, Public Safety, Campus Ops, Mail Room, Grounds, and Food Service).

Note: The Art Dept uses propane to fuel the kiln for firing ceramics, on hand are 3 – 3# propane tanks. Usage is 2-3 – 3# tanks summer quarter, 1-3# fall and winter quarters. Lars Husby (Teaching Faculty - Art) supplied the propane data for FY08/09 and FY09/10. This data was added into the Other On-Campus Stationary Source, this source of propane is not used as a method to heat the campus – the best place to list it on the CA-CP.

Diesel
The campus uses diesel heat for two generators, and these gallons are added to the University Fleet – Diesel. Gallons of diesel purchased for these two generators, was taken from the Genesee invoice for 11/20/09 (not listed as a part of the Comdata or Voyager invoices), archived in Campus Operations (LaFever & Boekhoff, 2010).

For future audits, on the Comdata spreadsheet, arranging the number of gallons used per department by month will be helpful for ease in updating the carbon report. Additionally, listing the diesel purchase for the generators on the Comdata spreadsheet will also be easier to track.

Direct Transportation Sources

College Fleet

Total college fleet gallons of gasoline and diesel fuel were obtained Voyager Card (July 2009 – October 2009 and July 2008 – June 2009) and Comdata (October 2009 – June 2010 to present) invoices from Campus Operations (LaFever & Boekhoff, 2010).

Gasoline Fleet
Gasoline usage was totaled from the Voyager and Comdata invoices by tabulating the number of gallons used each month in FY08/09 and FY09/10, for each department: Public Safety/Campus Ops/Mail Room/Grounds Equip/Food Service (the Athletics Dept was included until 6/09).

Note: as of June 2009, the Athletics Department is no longer driving a BC vehicle to athletic events, or charging gasoline to the campus Voyager Card, and current transportation mode to athletic events are by rental vehicles. The fuel expenditure for

the rental vehicles is not being tracked and offsets what our true fuel usage value is for the total College Fleet; this will be something to change for future audit reports.

Diesel Fleet
Diesel usage was totaled from the Voyager and Comdata invoices by tabulating the number of gallons used each month in FY08/09 and FY09/10, for the departments Campus Ops and Parking. The diesel for the two campus generators listed under the Other On-Campus Stationary Sources, is added the Campus Fleet total gallons.

Note: that the college does own electric vehicles; however any electricity used for these vehicles is included in the total campus electricity bill and is therefore included in the Scope 2 emissions.

Refrigerants & Chemicals

Refrigerants

HCFC-22
The amount of refrigerants lost to evaporation, etc. was determined by how much we purchase each year, and this information was found on the BC invoices from Johnston Supply and RSD- Refrigeration Supplies Distributor – invoices obtained from Campus Operations (John Buckingham in 2010). The pounds of R-22 purchased were totaled by fiscal year. The amount of R-22 (HCFC-22) purchased in FY08/09 (105lbs) and FY09/10 (60lbs) is on the decline from the previous carbon audit in FY07/08 which was estimated at 120lbs purchased by BC, and as R-22 is being phased out due to the Clean Air Act[5], a continued decrease in campus use and purchase will be noted in future years.

Agriculture Sources

Fertilizer Application

Synthetic / % Nitrogen
BC's only contribution to agricultural emissions is the use of nitrogen based fertilizers. The total weight of fertilizer purchased each year (in pounds), as well as the percent nitrogen in the fertilizer, was obtained from the Grounds Manager (Eidson, T., 2010).

--Scope 2 Emissions Sources--

Purchased Electricity, Steam, and Chilled Water

Electricity

The BC campus purchases only electricity as their source for Scope 2 emissions.

The total electricity use was obtained by adding the kilowatt hours (kWh) by fiscal year from the PSE Energy spreadsheet - a compilation of the campus monthly bills for gas, electricity, and water archived in Campus Operations. The bills pertaining to electricity are called PSE – ELECT Houses and PSE – ELECT – 3000.

Custom Fuel Mix: Clean Air-Cool Planet Calculator - Worksheet
Fuel Mix data comes from data reported by PSE to the State of Washington Department of Commerce, Trade and Economic Development. Each year (in June) they publish an Electric Utility Fuel Mix Report[6]; this is where the custom fuel mix data for the CA-CP is located. Find the correct fiscal year, and scroll down the report to find the PSE fuel percentages. Since we are reporting our carbon emission on an academic calendar (and since the report is released midyear), we chose to use the data for the first half of the academic year. For example, for the FY07/08 academic year we used the June 2008 report, which summarizes the fuel mix for 2007. PSE also reports a percentage of Cogeneration as Fuel Mix for this part of the state, the CA-CP does not have a column for this data on the worksheet, and therefore we have added the % Cogeneration in with the % Natural Gas.

As the BC North Campus is a rental, we are unable to capture the electricity use and cost, and our total electricity use is an underestimate. It is expected that we will be buying out the lease on this building in the near future. Therefore, although we are not counting it for the past 3 years, emissions from the building will not be an ongoing concern in the very near future. If the college decides to move Continuing Education to a new rental space, we will need to set in place a way of capturing these data.

--Scope 3 Emissions Sources--

Commuting

Student / Faculty / Staff

Accurate data from daily commuting to campus was one of the most difficult values to obtain, yet is clearly the most important area for reducing our emissions. We chose to get a handle on the total emissions from commuting by conducting two transportation surveys – student and faculty/staff. The surveys are listed in detail, see Appendix B.

For this Carbon Audit Report 2009/2010, we changed the methodology for our determination of commuter traffic and applied this to the commuter traffic results for: FY05/06, FY06/07, and FY07/08.

Automobile Fuel Efficiency

The Student Transportation Survey did ask the students and faculty/staff to find the miles per gallon (MPG) value for their personal vehicles, and we decided to use the CA-CP MPG value already in the calculator as the survey MPG data seemed above average.

Students - % Personal Vehicle/ Carpool & % Bus

For greater accuracy in student commuting modes, we chose to use responses to the transportation survey question, "On average, how many days per week do you use the following modes as part of your commute to campus?" as opposed to only calculating the primary method of transportation mode per student respondent.

The calculation began by tallying each mode (car alone/ carpool/ bus/ motorcycle/ bicycle/ walk – except ferry) individually by respondents replies to commuting in that mode 1-7 days per week, and excluded respondents that selected "0" days a week from the total of that mode. Next, totaling each mode (car alone/ carpool/ bus/ motorcycle/ bicycle/ walk) traveled by 1-7 days per week, equaling the grand total of respondents (less "0" days of commuting and ferry riders). To calculate the percentage of commuters contributing to the output of emissions; % Personal Vehicles: add the Car Alone + Motorcycle commuters, and divide by the grand total respondents.
% Personal Vehicle: (1663 car alone + 60 motorcycles / 3032 = 57%).
% Carpool: (562 / 3032 = 19%)
% Bus: (554 / 3032 = 18%)
Note: The student data for FY05/06, FY06/07, and FY07/08 were updated to by parallel methodology

Students Trips / Week & Passenger Trips / Week

To calculate the average number of one-way trips each student commuter makes in a week we used the question, "on average, how many days per week do you travel to campus." We took the mean average of all responses for each category, car/carpool

and bus and multiplied by two. The student data for FY05/06, FY06/07, and FY07/08 were updated to by parallel methodology.

Students Personal Vehicle / Carpool & Passenger (Bus) Weeks / Year: 42 weeks
Fall/winter/spring quarters typically are 11 - 12 weeks of instruction, and summer quarter is 7 weeks. As BC is a full academic year commuter college, keeping track of the number students arriving and leaving campus is a major part of our carbon emissions. To counter this deficit, we reflected the summer students in the Input Commuter spreadsheet by increasing the number of Weeks/Year students commute to include the summer quarter.

Note: The data for FY05/06, FY06/07, and FY07/08 were updated to 42 Weeks / Year from Days / Year in previous CA-CP v5.

Students Miles / Trip & Passenger (Bus) Miles / Trip
To calculate the students average one-way commute distance, we took the data from the student transportation survey asking: "Using your primary transportation method, approximately how many miles do you travel one-way to arrive at BC?" We manipulated the spreadsheet for each cell that was selected by a respondent to equal the primary method of transportation they chose to commute to campus: car alone, carpool, and motorcycle. Then took the average miles commuted to the campus. The same calculation was created for the bus. Note: The student data for FY05/06, FY06/07, and FY07/08 were updated to by parallel methodology.

Faculty & Staff - % Personal Vehicle/ Carpool & % Bus
For greater accuracy in faculty/staff commuting modes, we chose to use responses to the transportation survey question, "Last week, what type of transportation did you use each day to commute TO your usual work location? (drove alone, carpooled (2 or more people), van pooled, motorcycle/moped, took the bus, rode the train/light rail/streetcar, rode a bicycle, walked, teleworked, compressed workweek/day off, overnight business trip, did not work (day off, sick, etc.), boarded ferry with car/van/bus, used ferry as walk-on passenger) and Mon-Sun)."

The calculation began by tallying each mode (car alone/ carpool/ bus/ motorcycle/ bicycle/ walk – except ferry) individually by respondents replies to commuting in that mode 1-7 days per week, and excluded respondents that selected "0" days a week from the total of that mode. Next, totaling each mode (car alone/ carpool/ bus/ motorcycle/ bicycle/ walk) traveled by 1-7 days per week, equaling the grand total of respondents (exceptions: van pooled, train etc, teleworked, did not work-day off, and ferry riders). To calculate the percentage of faculty (and separately staff) commuters contributing to the output of emissions; % Personal Vehicles: add the Car Alone + Motorcycle commuters, and divide by the grand total respondents.
Faculty
% Personal Vehicle: (car alone + motorcycles / = 80%).

% Carpool: (/ = 5%)
% Bus: (/ = 13%)
Staff
% Personal Vehicle: (car alone + motorcycles / = 75%).
% Carpool: (/ = 9%)
% Bus: (/ = 15%)

Faculty & Staff - Trips / Week & Passenger Trips / Week
To calculate the average number of one-way trips each employee commuter makes in a week

Note: The faculty & staff data for FY05/06, FY06/07, and FY07/08 were updated to by parallel methodology.

Faculty / Staff - Personal Vehicle / Carpool & Passenger (Bus) Weeks / Year: 48 weeks
Fall/winter/spring quarters typically are 11 - 12 weeks of instruction, and summer quarter is 7 weeks. As BC is a full academic year commuter college, faculty will be on campus more weeks than the students. The staff will be similar in the amount of weeks worked per year, as even if there are no students on campus, the campus is in operation. Note: The data for FY05/06, FY06/07, and FY07/08 were updated to 48 Weeks / Year from Days / Year in previous CA-CP v5.

Faculty & Staff - Miles / Trip & Passenger (Bus) Miles / Trip
To calculate the faculty average one-way commute distance, we took the data from the faculty (and staff) transportation survey asking: "Using your primary transportation method, approximately how many miles do you travel one-way to arrive at BC? " We manipulated the spreadsheet for each cell that was selected by the faculty (staff separately) respondent to equal the primary method of transportation they chose to commute to campus: car alone, carpool, and motorcycle. Then took the average miles commuted to the campus. The same calculation was created for the bus. Note: The faculty & staff data for FY05/06, FY06/07, and FY07/08 were updated to by parallel methodology.

Directly Financed Outsourced Travel

Air Travel

The college does not keep a record of air miles traveled; however, it does record the total amount of money spent on air travel each year (including all travel from employees or official student trips), although there is no clear calculation for the conversion. Total air travel expenses were obtained from the Accounting Office (Roselle Hay in 2010).

How the calculation to convert dollars spent on air travel to air miles flown was decided upon. Information from the previous BC Carbon Audit Report – 2008 as listed by the AASHE blog post in 2008[7], suggested the calculable number was listed without taxes and is an average cost of each passenger mile. Another clue on the 2008 report, an inactive

website link to the Air Transport Association (ATA), this link referenced a page called Pax Prices Yield. Researching Pax Prices Yield on the ATA site resulted in a link to the Cost Index Tables spreadsheet[8] (and a suggestion "did you mean: Pox Prices yield?"). Opening the suggested Cost Index Tables spreadsheet to search for Pax, I located on the Composite tab reporting the Historical Summary table, and under the heading Pax Rev. (All Svcs.) listed two options that referenced passengers: ¢/RPM = Revenue per Passenger Mile (RPM) – "a paying passenger flying one mile creates an RPM"[9] and ¢/ASM = Available Seat Mile (ASM) – "one seat (empty or filled) flying one mile is an ASM" [10]. An additional note that leads to the use of the ¢/RPM for this calculation was from American Airlines (AA): Yield = passenger revenue / Total RPMs[11], and the definition of Yield from ATA is: "'Yield' as the average price (excluding taxes, which often constitute a substantial portion of an airline ticket) paid to fly one mile (an "RPM")"[12]. Testing the ¢/RPM from the Cost Index Tables spreadsheet for the calendar year of 2005, 2006, 2007, seemed to be the closest figures to those previously reported in the BC Carbon Audit Report - 2008 (2006 and 2007 = 13.0 cents per mile; 2005 = 12.3 cents per mile). Note: the ¢/RPM on the Cost Index Tables spreadsheet is the average RPM of six airlines.

Actual calculation of Faculty/Staff/Student miles for FY08/09 CA-CP: (Total BC air expenditure) * 20% (add 20% above the cost of each passenger accounting for taxes – recommended by the AASHE blog) / 13.49 ¢/RPM (averaged ¢/RPM for Q3 FY08-Q2 FY09). The same calculation was applied to FY09/10, using 13.03 ¢/RPM (Q3 FY09-Q2 FY10). This did result in a lower amount of mileage for both years, and fits with the college cutting back on spending.

It is likely that we are missing some student travel and personal travel to conferences, but it appears that is the only real record that we can monitor. Additionally, for future reporting, keeping track of the actual mileage would make this an easier way to account for air travel.

Solid Waste

Landfilled Waste

CH_4 Recover and Flaring

This is solid waste that is picked up and billed to campus; the data necessary to tabulate solid waste is archived in Campus Operations (LaFever, 2010) in a spreadsheet named: Refuse Vs Recycle.

To locate solid waste in the Refuse Vs Recycle spreadsheet, under the on the Refuse tab, locate Type: Compactor C135 Allied. Total the Tons of Compactor C135 Allied by fiscal year.

Based on the information provided on the website for the local Cedar Hills Regional Landfill[13], our waste is transported to a landfill with CH_4 recovery and flaring. This status

may change in the future as King County Solid Waste Management is considering a project to convert recovered methane to electricity.

Wastewater

Septic System

Wastewater is a new category added to the CA-CP since the last audit in 2008. This data was back calculated for FY06/07 – FY09/10 from data listed on the PSE Energy spreadsheet archived at Campus Operations (LaFever, 2010).

To tabulate the water flowing into the septic system, the PSE Energy spreadsheet has a column called "Water 748 gal = 1ccf used" listed on pages: BLVU-WATER-Q-bldg-IRR, BLVU-WATER-MAIN, BLVU Water SMALL, and Gilaham H99. Total the Water 748 gal = 1ccf Used column by fiscal year, add the total used water (ccf) from each page, multiply the grand total used water by 748 to convert cubic feet (ccf) to gallons.

---Offsets---

Offsets with Additionality

Forest Preservation

There are no long term plans to develop the 7.64 acre (3.09 ha) plot of forest located on the northwest side of campus (west of the track fields). Therefore, it was determined that this forest was eligible for some offset credits. Using the Intergovernmental Panel on Climate Change's (IPCC) average from the GRID Arendal website[14] for how much carbon is sequestered by temperate forests (2.7 metric tons C / ha / yr, which converts to 9.9 metric tons CO_2 / ha / yr) we calculated the annual offset of the forest as: 3.09 ha forest x 9.9 metric tons CO_2 / ha / yr = 30.6 $mtCO_2$/yr. This value should remain the same every year.

On-campus Composting

At this time BC does not have a significant composting program.

Non-Additional Renewable Energy Certificates (RECs)

Green Power Certificates

Starting in 2008, BC purchased 2 years of wind energy credits at 408,681 kWh a year (this was part of the S-Building LEED Certification). Since the FY07/08 included half of the first year of these credits, 204,340 kWh were credited to the FY07/08 offsets. Credit for this wind power was also credited in FY08/09.

BC has not purchased any additional wind credits in the last 3 years. (The "wind power credit" listed on the PSE energy bill is a refund based on the amount of wind power PSE

is producing. This is already included on the "energy mix" data and cannot be counted as a credit.)

Appendix B

Transportation Survey

In order to get a general idea of the commuting habits of the BC community, the Sustainability Coordinator conducted 2 surveys (one for faculty and staff and one for students). The surveys were conducted in the fall quarter over a period of about two weeks, and we provided several incentives for completing the survey. These surveys were our attempt to get a handle on the Scope 3 carbon emissions that can be attributed to students and employee commuting practices.

Student Transportation Survey

This is the Transportation Survey for all BC students. The survey results for student commuters, Table 7 (above) compares student transportation modes for FY09/10 and FY08/09.

Bellevue College Student Transportation Survey (2010)

1. Please enter your name, e-mail and telephone number if you wish to be entered into a prize drawing for completing the survey.

2. Please keep me informed about Bellevue College transportation planning:
   Select: (yes or no)

3. This year I will commute to campus:
   Select all that apply: (never or online only, Fall quarter, Winter Quarter, Spring Quarter, or Summer Quarter)

4. My primary method of transportation to commute to campus is, select:
   (car (alone), carpool/rideshare (with other passengers), bus, bicycle, walk, or motorcycle)
5. On average, how many minutes is your typical daily one-way commute to BC?

6. Using your primary transportation method, approximately how many miles do you travel one-way to arrive at BC?

7. During the average day on campus, how many times do you leave campus and return?
   Select: (0, 1, 2, or 3)

8. On average, how many buses must you take to get to campus?
   Select: (0, 1, 2, 3, or N/A)

9. Which bus routes do you use to get to and from campus during an average week?

10. If you commute by bus, how do you get to the bus?
    Select: (walk to bus, drive to bus, bicycle to bus, or other - please specify)

11. If you drive to a Park and Ride to commute by bus, approximately how many miles do you drive one-way from your place of residence?

12. On average, how many days per week do you travel to campus?
    Select: (0, 1, 2, 3, 4, 5, 6, or 7)

13. On average, how many days per week do you use the following modes as part of your commute to campus?
    Select: number of days per week (0, 1, 2, 3, 4, 5, 6, or 7) commuted by (car (alone), carpool/rideshare (with other passengers), motorcycle, bus, bicycle, walk, or ride ferry)

14. --use last week as a guide--

15. Are you primarily a full-time (12 credits+) or a part-time student (less than 12 credits)?
    Select: (Full-Time Student (12+ credits) or Part-Time Student (less than 12 credits))
16. Please enter the five-digit zip code that you commute from.

17. Please enter the city you commute from.

18. If you own a vehicle, what is your car's fuel efficiency (within about ± 5mpg) in miles per gallon? To determine your vehicle's approximate fuel efficiency visit www.fueleconomy.gov, look for the **Your MPG** box; click **View Estimates from Driver's Like You** to find your vehicle make.

19. What would help you expand your transportation options beyond your current mode?

20. What suggestions do you have to improve transportation to, from and within Bellevue College?

21. How did you find out about this survey?

Employee Transportation Survey

This is the Transportation Survey for the BC faculty and staff. The results for the faculty and staff survey, Table 8 (above) shows the faculty commuters, and Table 9 (above) the staff commuters. Both the faculty and staff tables compare transportation modes for FY09/10 and FY08/09.

Bellevue College - Employee Transportation / CTR Survey 2010

1. Please enter your name and e-mail number if you wish to be one of the first invited to track your non drive-alone trips and earn an $81 voucher for gifts from King County Metro.

2. Keep me updated about the Bellevue College Transportation Plan

3. My primary method of transportation to commute to campus is, select:
   (car (alone), carpool/rideshare (with other passengers), bus, bicycle, walk, or motorcycle/moped)

4. On average, how many days per week do you travel to campus?
   Select: (0, 1, 2, 3, 4, 5, 6, or 7)

5. On average, how many minutes is your typical daily one-way commute to BC?

6. Using your primary transportation method, approximately how many miles do you travel one-way to arrive at BC?

7. During the average day on campus, how many times do you leave campus and return?
   Select: (0, 1, 2, or 3)

8. On average, how many buses must you take to get to campus?
   Select: (0, 1, 2, 3, or N/A)

9. Which bus routes do you use most often to get to and from campus?

10. If you commute by bus, how do you get to the bus?
    Select: (walk to bus, drive to bus, bicycle to bus, or other - please specify)

11. If you drive to a Park and Ride to commute by bus, approximately how many miles do you drive one-way from your place of residence?

12. Last week, what type of transportation did you use each day to commute TO your usual work location?

Select each day you commuted to campus: (M, T, W, Th, F, Sa, Su) and
Select the method by which you arrived to campus on each day:
(drove alone, carpooled (2 or more people), van pooled, motorcycle/moped, took the bus, rode the train/light rail/streetcar, rode a bicycle, walked, teleworked, compressed workweek/day off, overnight business trip, did not work (day off, sick, etc.), boarded ferry with car/van/bus, used ferry as walk-on passenger)

13. Last week, what type of transportation did you use each day to LEAVE your usual work location?

Select each day you left to campus: (M, T, W, Th, F, Sa, Su) and
Select the method by which you left campus on each day:
(drove alone (or with children under 16), carpooled (2 or more people), van pooled, motorcycle/moped, took the bus, rode the train/light rail/streetcar, rode a bicycle, walked, teleworked, compressed workweek /day off, overnight business trip, did not work (day off, sick, etc.), boarded ferry with car/van/bus, used ferry as walk-on passenger)

14. Was last week a typical week for commuting?

Select: (yes or no)

15. --use last week as a guide--

16. Which of the following most fits your normal work schedule?

Select: (5 days a week, 4 days a week (4/10s), 3 days a week, 7 days in 2 weeks 9 days in 2 weeks, or other - please specify)

17. On average, which days do you arrive on campus between 6 a.m. and 9 a.m.?

Select: (never, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, and Sunday)

18. How many days did you telecommute in the last two weeks?

Select: (N/A, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10)

19. In which campus constituency would you consider yourself?

Select: (Administration, Classified Staff, Faculty, or Hourly)

20. How many hours a week do you work?

Select: (Full Time (35 hours or more each week), Part Time (20 to 34 hours per week), or Part-Time (0 to 20 hours per week))

21. I commute to campus:

Select: (all year, never, 1 quarter, 2 quarters, or 3 quarters)

22. Is your position intended to last 12 months or more?
Select: (yes or no)

23. Please enter the five-digit zip code that you commute from.

24. Please enter the city you commute from.

25. If you own a vehicle, what is your car's fuel efficiency (within about ± 5mpg) in miles per gallon? To determine your vehicle's approximate fuel efficiency visit www.fueleconomy.gov, look for the **Your MPG** box, click **View Estimates from Driver's Like You** to find your vehicle make.

26. What would help you expand your transportation options beyond your current mode?

27. What suggestions do you have to improve transportation to, from and within Bellevue College?

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