Greenhouse Gas Emissions Inventory from Transportation University of Alaska Anchorage

prepared for:

Office of Sustainability
University of Alaska Anchorage

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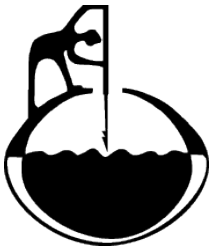

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1. Introduction

As a signatory of the American College and University Presidents' Climate Commitment (ACUPCC) and of the Talloires Declaration, the University of Alaska Anchorage (UAA) agreed to monitor its greenhouse gas (GHG) emissions by conducting biannual inventories. GHG emissions are the release of gases to the atmosphere that prevent radiant (infrared) energy from escaping the Earth's atmosphere, causing the Earth to maintain higher surface temperatures than would occur if the gases were absent. In this inventory, as in many like it, carbon dioxide (CO_2) is the only greenhouse gas measured. CO_2 is the most prevalent of the greenhouse gases generated from human activity. Therefore, it serves as a proxy to estimate GHG emissions.

The ACUPCC, signed by UAA Chancellor Elaine Maimon in 2007, supports the mission of implementing comprehensive plans in the pursuit of carbon neutrality for higher education institutions. The Talloires Declaration, signed in April 2004, is a statement of principles and practices for using higher education to promote sustainability. This second UAA GHG emissions inventory serves both as a continuation of the progress made with the first inventory, conducted in 2008, establishes an improved methodology for tracking GHG emissions, and provides preliminary baseline against which to compare future inventories to determine the effectiveness of GHG emissions reduction projects and initiatives.

To fulfill the ACUPCC, UAA agreed to conduct an inventory of its Scope One and Two emissions, as well as some Scope Three emissions. Scope One emissions are defined as direct GHG emissions occurring from sources that are owned or controlled by the institution. Scope Two emissions are indirect emissions generated in the production of energy purchased by the institution. Scope Three emissions are indirect emissions that are the consequence of the activities of the institution, but are from sources not owned or controlled by the institution.

Pursuant to the ACUPCC, this study estimates the levels of two types of Scope Three GHG emissions: University official air travel and commuting by students and employees. Scope One and Scope Two GHG emissions are estimated in a separate study prepared by the UAA Office of Sustainability using the Clean Air Cool Planet model. In the 2008 Scope Three study, two models were developed: a UAA air travel model and a UAA commuter model. This report calculated GHG estimates using the 2008 model, with refinements made to the methodology for data collection and calculations.

2. UAA Air Travel GHG Emissions Inventory

GHG emissions created by any air travel from funded and official UAA activities must be included in a GHG emissions inventory to meet the requirements of the ACUPCC. Air travel GHG emissions were estimated using data from Travel Expense Reports (TERs) obtained from UAA's Travel Office. TERs include information on each segment of a trip financed or approved by the University. TERs were separated into two categories: Athletics and Non-Athletics. A total sample size of 21% of all TERs during the fiscal year 2010 (July 1, 2009 to June 30, 2010) was used to estimate total emissions

attributed to air travel. The sample size used was 17% of Non-Athletics TERs and 100% of Athletics TERs.

Available models to calculate air travel GHG emissions include the Clean Air – Cool Planet (CA-CP) Campus Carbon Calculator, the California Climate Action Partnership (CARROT), Torrie Smith Associates emission GHG Strategy Software, methodology from the United Nations Environment Programme (UNEP), and numerous individually-derived models from higher education institutions, including UAA. The CA-CP Campus Carbon Calculator was considered for use because over 1,000 universities and colleges in North America employ this model. This model would therefore create a convenient comparison of GHG emissions across higher education institutes. However, UAA's model yields more precise results for calculating air travel emissions by categorizing flights into short, medium, and long hauls (discussed below). Furthermore, a methodology of data collection specifically for UAA was established in the baseline study in 2008. This methodology was further improved in this update and will allow reproduction of the study with greater ease, and comparisons to future years will be more accurate.

Though the overall methodology remains similar, this inventory expanded and improved upon the previous methodology using the lessons learned from the first attempt at charting UAA's carbon footprint. However, the methodology is sufficiently different that comparison between the two years should not be done. A detailed discussion of the progress made in UAA's carbon inventory model is provided in subsection three.

2.1 Air Travel Results

UAA air travel was responsible for generating 2,641 metric tons of carbon dioxide, CO_2, emissions in FY10. This is equivalent to an average of 0.63 metric tons of CO_2 per each UAA sanctioned trip, given 3,031 trips. It also equates to an average of 0.79 metric tons of CO_2 per UAA employee, given 3,347 faculty and staff members. The total CO_2 and CO_2 emissions per employee accounts for all air travel funded by UAA, including travel done by the Athletics Department. Results of the UAA's air travel inventory are summarized below in Table 1.

Table 1. Air Travel Results Summary

	UAA	Per Trip	Per Student	Per Employee
Total miles flown	10,726,00	3,500	715	3,200
Kg CO_2	2,641,000	600	176	800
Metric tons CO_2	2,641	0.6	0.2	0.8

Source: UAA Travel Office Records, ISER Calculations. August, 2010.

2.2 UAA Air Travel Model

The UAA air travel model estimates GHG emissions by summing the GHG emissions of individual flight segments. The data for the model were obtained from TERs, which provide a detail itinerary with all segments of a trip. A trip constitutes all flights incurred between the origin of travel and the final destination of travel, as attributed to one financial receipt delivered to the UAA Travel Office. This includes all connecting flights, even if intermediary destinations exist in the travel itinerary. Records exist for 3,031 air travel trips funded by the University in FY10, excluding reports concerning auto travel only. Of these, 2,883 were not travel by the Athletics Department; the 149 TERs attributable to athletics were accounted for using a slightly different methodology, as discussed in the next subsection.

The TERs are sorted alphabetically by the last name of the person traveling, or by the last name of the fiscally responsible traveler in the case of group travels, such as athletic or student research teams. TERs are currently available in hard copy only and are stored by the Travel Office on seven and one half shelves. Mileage reports for car travel are also stored among the TERs. Flight information from every seventh air travel report, not including athletics TERs, was manually entered into a database to estimate the GHG emissions of UAA air travel for a sample total of 492 recorded trips with a statistical mode of two travel segments per trip, approximately 17% of the TERs. This sample size gives the study a 95% confidence interval (with a 4% margin of error) for the accuracy of the results.

The model is structured so that its inputs are airport codes for each airport associated with a trip. For example, a roundtrip to Detroit from Anchorage with a connecting flight in Seattle would be entered:

ANC SEA DTW SEA ANC

The model then determines the geographic coordinates (latitude and longitude) for each airport listed in the TERs using a lookup table providing degree coordinates obtained from the Bureau of Transportation Statistics (BTS) under the Research and Innovative Technology Administration (RITA).

Next, the model converts each successive pair of airport codes into a distance in statute miles using the Haversine formula, shown below in Figure 1. This formula gives mathematically and computationally exact results for both short and long spherical distances, and therefore provides more accuracy than the conventional distance formula, which operates on a planar surface. Two versions of the formula are given and it was determined that they yielded identical results. The radius of the Earth is needed for this calculation and it was obtained from the National Aeronautics and Space Administration (NASA).

Figure 1. The Haversine Formula

Version 1:

$$\boldsymbol{R * 2 * \arcsin(\sqrt{a})}$$

where $a = \sin(\frac{\Delta lat}{2})^2 + \cos(lat1) * \cos(lat2) * \sin(\frac{\Delta long}{2})^2$

and R = 3440 nm

Version 2:

$$\frac{\boldsymbol{\arccos(b) * r}}{\boldsymbol{1.852}}$$

where $b = \sin(\text{lat1}) * \sin(lat2) + \cos(lat1) * \cos(lat2) * \cos(\Delta long)$

and r = 6371km

The number of statute miles for each segment of each trip is then multiplied by a GHG multiplier to determine the carbon emissions for that segment. Before this multiplication, each segment is categorized by its length: short (fewer than 281 statute miles flown), medium (fewer than 994 statute miles flown), or long (994 or more nautical miles flown). Due to the high energy cost of takeoff relative to additional miles at cruising altitude, different segment lengths are associated with different levels of average GHG emissions per mile traveled. Utilizing the information about the length of each segment of the journey creates a more accurate model than one that uses only the total distance between origin and final destination airports.

A carbon emission multiplier corresponds with each of these categories and is calculated to correct for the curvature of the Earth's surface. Thus, the multipliers operate with statute miles rather than nautical miles, which are used worldwide for air and sea navigation due to their accuracy over larger distances. Using nautical miles along with these multipliers corrects twice for the spherical nature of the Earth's surface, leading to inaccurate results. The categorization determinants and the corresponding emissions multipliers were obtained from Clean Air Conservancy, which based their figures on those calculated by the World Resources Institute. Table 2 shows the category parameters and emissions multipliers used in the model.

Table 2. Air Travel Emissions Factors

	Maximum Distance (statute miles)	Multiplier (kg of CO_2 per statute mile)
Short Haul	281	0.2897
Medium Haul	994	0.2028
Long Haul	*none*	*0.1770*

Source: Clean Air Conservancy, Air Travel CO2 Emissions. 2010.

Finally, the total CO_2 emissions from each segment of each trip were added and divided by 17 to obtain the estimated carbon emissions for air travel, not including athletics travel, funded by the University. Per trip calculations were completed by dividing the total CO_2 emissions by the number of trips, which was determined via a manual count of the TER records in UAA's Travel Office. Per employee calculations were derived in a similar manner, with number of employees obtained from the University's

Office of Institutional Research by adding the number of full time and part time employees to obtain 3,347 total UAA employees.

2.3 Athletic Department Air Travel

Athletic travel was modeled separately from other University travel due to sampling concerns related to the fact that a single TER from the Athletic Department often covers a number travelers rather than a single traveler, as is the case for most other University travel. The Athletic Department provided a list of employees who traveled in the fiscal year 2011 and the TERs categorized as 'Athletics Department' and associated with these names were recorded separately from other University travel with added emphasis on recording the number of travelers participating in each trip; 149 TERs for the Athletics Department recorded the trips of 1,028 passengers. The methodology for calculations proceeded as described in the previous subsection, with only slight adjustments. After the carbon emissions for each segment were determined by multiplying the statute miles of the distance between airports by the carbon emissions multiplier, this number was multiplied by the number of travelers. Thus, the carbon emissions for each traveler for each segment of each trip are accounted for. Table 3 shows the total CO_2 emissions, the CO_2 emissions attributable only to other University travel, and the CO_2 emissions attributable to athletics travel.

Table 3. CO_2 Emissions (Total, Other, Athletics)

	UAA Total	Other Travel Only	Athletics Travel Only
Total miles flown	10,725,800	9,941,300	784,500
Kg CO_2	2,641,500	1,806,700	834,700
Metric tons CO_2	2,641	1,806	834

Source: UAA Travel Office Records, ISER Calculations. January, 2011.

As can been seen from the table, sampling University travel without separating the Athletics Department activities would likely lead to inaccurate results.

2.4 Comparison with Previous Inventory

As mentioned in the introduction to this section, comparison between the 2010 inventory and the 2008 inventory is not feasible due to the changes in data collection and calculation methodology. Many lessons were learned from the first effort to estimate UAA's scope three carbon footprint and the 2010 methodology was modified in the following ways:

1. The sample of TERs was taken from every seventh record rather than from one shelf. TERs are stored alphabetically and even though taking one shelve gives a random sample, taking every seventh significantly decreases the cluster problem associated with this type of data improving the accuracy of the study while decreasing the sampling error and variance. In addition, a larger sample of 17% was recorded.

2. In the previous report, the distance emission multipliers were applied to the total traveled distance. In this update the categorized emissions multipliers were

applied based on the distance per segment traveled. Each segment was accounted for individually, improving accuracy of the estimates.

3. For this update the total number of TERs were manually counted as oppose to estimating it based on the one shelf sample. In addition, Mileage Reports were separated from the TERs.

All else remains the same for the air travel model.

We believe that most of the difference between the previous study and this refinement of the baseline is due to improved methodology for drawing the sample which significantly reduces the sampling error and provides more accurate calculations. Hence, this report focused on improving the model to provide more accurate results and allow for consistent reproduction in the future. The carbon footprint difference between 2008 and 2010 results should not be directly compared.

2.5 Recommendations

Future GHG inventories would benefit from TER electronic data records. Preferably, each trip paid for by the University would be added to a spreadsheet identifying each airport visited and the number of travelers. This would increase the accuracy of calculations and allow the model to calculate figures for the entire population, rather than a sample.

Future GHG inventories should account for air travel by UAA employees for university business that is not funded by UAA. For example, records from the International Student Office may help estimate the emissions attributable to UAA due to students participating in study abroad programs. Also, if a UAA employee's travel is paid for out of pocket or by another institution it is not accounted for in the TER data. Emissions from this type of travel may still be attributable to UAA.

3. UAA Commuter GHG Emissions Inventory

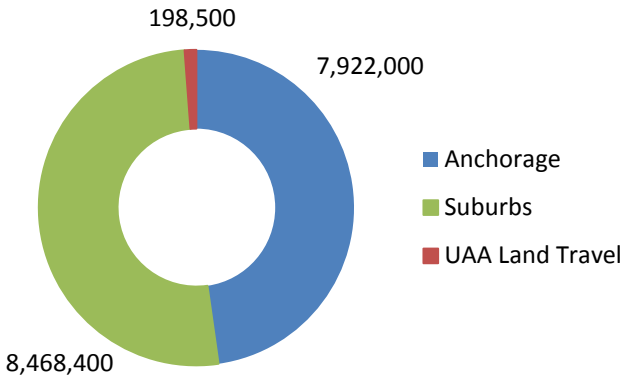
In order to meet the requirements of the ACUPCC, greenhouse gases created by students and employees commuting to and from UAA must be included in the GHG Emissions Inventory.

The Scope three emissions from commuting to campus were calculated with a refined model based on the 2008 model, explained in section 3.2. Increased data availability allowed us to modify the original model to improve the accuracy of the estimates.

3.1 UAA Commuter Model Results

GHG emissions from commuting to campus attributable to UAA were estimated using a Commuter Model and UAA mileage reports. Our model shows that about 16,390,400 miles were drven by UAA commuters in a year, and 198,500 miles were driven in road trips by UAA travelers. On average, UAA commuters drove vehicles that have a fuel efficiency of 17 miles per gallon. Commuting and land travel resulted in a combined total of 9,500 metric tons of carbon dioxide emitted into the environment during fiscal year 2010.

Figure 2. Total Miles Traveled



Source: UAA Travel Office Records, ISER calculations. January, 2011.

Table 4. Commuter CO2 Emissions per year

City	Metric Tons CO2	Miles per Commuter	CO2 per commuter
Anchorage	4,200	1,200	0.6
Suburbs	3,600	5,800	2.5
Commuting Total	**7,800**	**2,000**	**1.0**
UAA Land Travel	1,700	300	2.7
Total	**9,500**	**1,900**	**1.0**

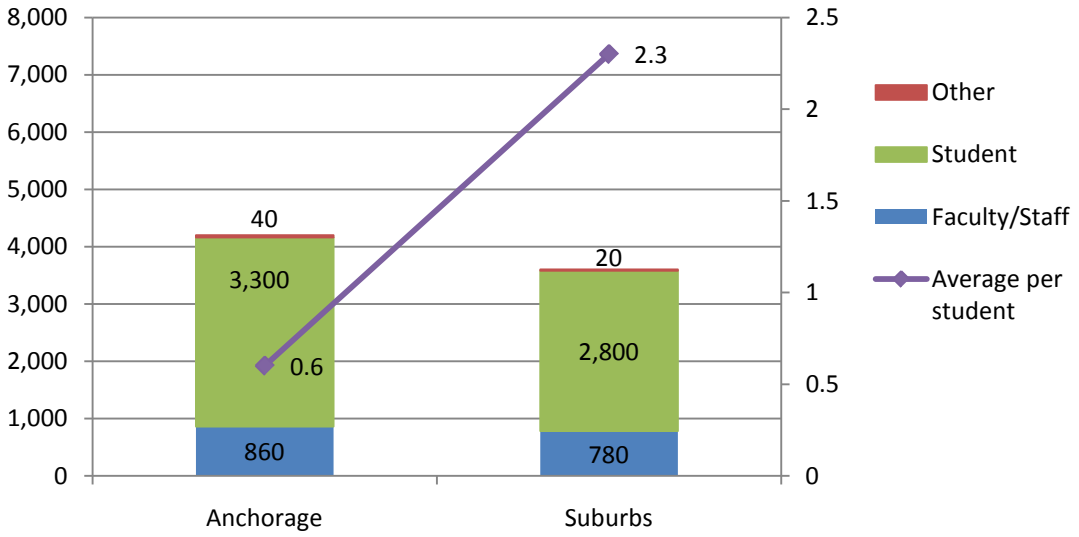
Source: UAA Travel Records, Mileage Reports, Campus Parking Permit Data; ISER Calculations. December 2010.

Of the UAA commuters who purchased a semester or an annual campus parking permit, 18% were from communities near Anchorage (referred to as "suburbs" in this report) and the remainder, 82%, from the city of Anchorage. Nonetheless, the total miles driven by drivers from the suburbs were about 3% more than the total miles driven by Anchorage resident commuters. Commuters from within the boundaries of the city drove an average of about nine miles per round trip to campus while commuters from the suburbs drove an average of 44 miles per round trip.

Students and faculty and staff commuted to the UAA campus about the same number of days per week, an average of 3.7 days per week. As expected, adjunct faculty and other UAA visitors traveled to campus with less frequency, about 2.8 and 1.8 days per week, respectively.

As a result of their higher numbers, commuting by students was the major contributor to CO2 emissions. Commuters from Anchorage have a carbon footprint of about 4,200 metric tons of CO2 per year while commuters from nearby communities have a carbon footprint of 3,600 metric tons of CO2 per year as shown in figure 2.

Figure 3. Metric Tons of CO2 by Commuter Type



Source: UAA Parking Permit Data; ISER Calculations. December, 2010.

3.2 UAA Commuter Model

The commuter model was based on the 2008 UAA GHG Emissions Inventory model. However, better and more detailed data allowed us to modify the model to provide better insight into UAA's Scope Three emissions and to increase the level of accuracy compared to previous estimates. There were two major data inputs to our commuting inventory, Land Travel Records and the Parking Permit records.

The land travel records, that identify miles driven for UAA business, were manually collected and inputted into a database. Included in the database were TER records where the main mode of transportation was driving a university or personal vehicle, or a rental car. TER records have origin and destination information and in many cases they report miles driven. For the cases in which miles driven were not recorded, the origin and destination were entered into Mapquest.com to estimated miles driven; miles for round trips were recorded.

Most of the land travel information was from the Mileage Reports stored with the TERs. These reports always include the number of miles driven; information from these records were entered in the database for every report during fiscal year 2010. In total 659 reports, both TER and Mileage, were entered in the database. Based on these records, an estimated total of 198,500 miles were driven for UAA business. A report does not constitute a trip; in many cases the mileage report included many trips and unfortunately due to time constraints we were unable to record that level of detail in the database. However, we were able to determine the number of miles driven per year which allowed us to estimate the CO2 emissions by multiplying the number of miles by the emissions factor of 8.8 kilograms of CO2 per gallon of fuel. This calculation assumes that all miles were driven in vehicles that run only on motor fuels.

The data used in the Commuting Model was provided by the UAA Parking Services Director and included parking permit data from July 1st to December 7, 2010. For every permit sold we were able to obtain the following information:

- Permit ID
- Permit Type
- Permit Status (e.g. Active, Refunded, Cancelled, etc.)
- Vehicle Make, Model and Year
- Permit buyer's Address

In addition per the researchers' request the Parking Services Office included a few additional questions in the parking permit application.

- How many times per week do you drive to campus?
- Do you drive to campus with someone else (carpool)?
- If yes, how many times a week do you carpool?
- How many people do you carpool with?
- How many times per week do you use non-motorized transportation (Walk, bike, ski) to get to campus?
- How many times a week do you ride the People Mover bus to campus?

Also, the Office of Sustainability conducted a randomized campus wide student survey focused on determining what portion of the campus population purchases a semester/annual parking permit and other behavioral aspects and attitudes towards sustainability on campus. Some data generated by this survey were used as background.

Distance of commute

Distance of the commute is a key factor in the model was calculated differently than the 2008methodology. The previous inventory was only able to use zip code data and estimated driving distance from one zip code to another using Mapquest.

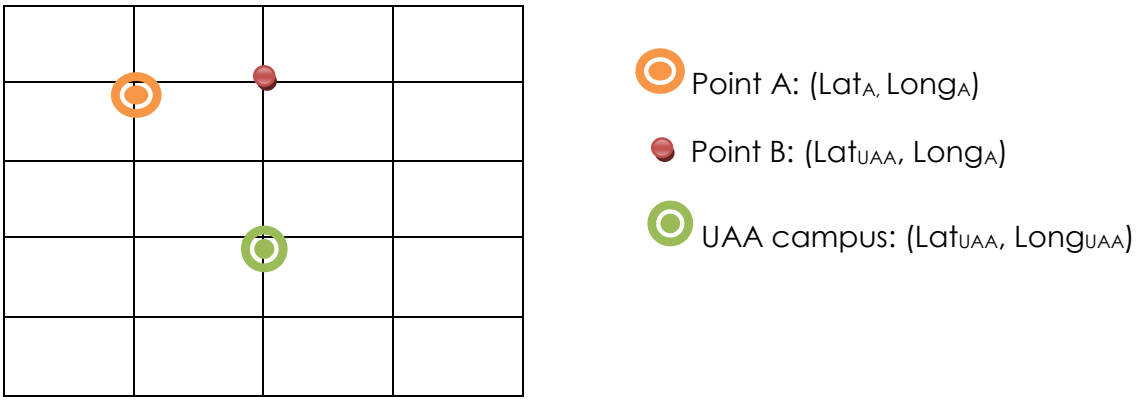
For this inventory we were able to use full addresses, including number, street, city and zip code. The address and Permit ID fields were extracted from the database and were sent to be geo-coded by Geocoder.us, which provided latitude and longitude data for each address. Some addresses were P.O. Boxes and not physical addresses; for these, the centroid latitude and longitude of the zip code was used. The addresses were categorized in three major groups: address in Anchorage, address within commuting range and address outside of the commuting range. The commuting range was defined to the north as far as Palmer and Wasilla and to the south as far as Girdwood.

Once geo-coded, data for Permits that were 'Active', 'Assigned', 'Approved', or 'Pending Approval' were kept resulting in 6,823 records with Anchorage addresses and 1,453 within the commuting range. Distance between each address and the UAA campus was calculated using the Harvesine formula (explained in the Air Model section). However, in order to estimate driving distance we based our calculation using the assumption that streets approximate a grid system and calculated distance using

three coordinates. To illustrate, distance from Point A (may represent a student's address) to UAA would be:

Figure 4. Calculating distance to UAA

[Distance *Point A* to *Point B*] + [Distance *Point B* to *UAA*]



Fuel efficiency

Fuel efficiency data from 1985 to 2011 was obtained from the U.S. Department of Energy, which records city and highway miles per gallon for each make and model of vehicles sold in the U.S. Fuel efficiency may vary from year to year for most vehicle models. Therefore, we used specific year data for each permitted vehicle.

Parking permit applicants reported their own vehicle make, model and year. Some of the vehicle information in the permit did not match precisely with the official name in the fuel efficiency database. In these cases, this was corrected by standardizing the naming conversions in the fuel efficiency data and the parking data. In cases in which a model year was missing, the closest year of the fuel efficiency for the same model was used. Finally, records for which no vehicle or fuel efficiency was available the weighted average of the fuel efficiency of all other vehicles was assigned to those without vehicle information.

Commuters from outside Anchorage

Fuel efficiency changes depending on the driving conditions; miles per gallon in the city are usually different from those when highway driving. In order to take this change into consideration for all commuters driving from outside of Anchorage two entry points to the city were identified: the intersection of Muldoon and Highway 1 to the north and New Seward Highway and Rabbit Creek to the south. The emissions between the commuter address and these points, were calculated using highway fuel efficiency and city miles per gallon were used for the distance portion in Anchorage.

Number of commutes

The additional questions in the parking permit application provided data regarding the average number of days per week driven to campus. Not every applicant answered all questions, but most did—6,595 respondents or 80%. This information was used to calculate the average number of days per week each commuter type drove to campus and to estimate the total number of commutes by commuter type. Also, students only commute to campus while classes are in session,

generally during spring and fall semesters with some also attending summer classes. Generally, employees come to the campus throughout the year net a few weeks of vacation time. Hence our model calculations assumed the following:

Table 5. Days per year commuting to UAA campus

Permit Type	Days/Week	Weeks/Year	Days/Year
Student	3.8	32	122
Faculty/Staff	3.7	50	184
Adjunct/Emeritus/Retired Faculty	2.8	50	138
VIP/Vendor/Visitor	1.8	50	88

Source: UAA Parking Permit data; ISER Calculations. December, 2010.

Alaska fuel efficiency decrease

It was assumed in the 2008 model that fuel efficiency estimates should be adjusted for Alaska's cold climate and a ten percent decrease was applied. This parameter was used to decrease the fuel efficiency of vehicles being driven to campus. Winter cold conditions in Anchorage cause vehicles to have lower fuel efficiencies than those used by the EPA. The original fuel efficiency values associated with each parking permit may over estimate fuel efficiency by not accounting for miles being driven in four wheel drive or for time spent warming a car before driving. This parameter attempts to correct for that problem. While we believe this parameter is reasonable, the model could benefit from better data on this regional issue.[1]

Portion of commutes with multiple purposes

A portion of trips to UAA were also used to travel to other destinations such as child care facilities or grocery store. In these cases in which UAA was not the only commute destination, it should not be responsible for all of the GHG emissions associated with these trips. However, we had insufficient data regarding the driver's motivation for driving, rather than taking a bus or using another mode of transportation, to campus. Would the driver use alternative modes of transportation if the only destination was UAA? The transportation survey done by the Office of Sustainability shows that about 60% of students drive to campus in combination with other destinations. Table 5 shows how the UAA Carbon Footprint is affected if the multi-purpose portion of the commutes were adjusted to attribute all or a portion of the emissions to the university.

[1] Connor, Billy, P.E, director, Alaska University Transportation Center, University of Alaska Fairbanks, personal communication, January 13, 2011.

Table 6. Sensitivity Analysis of Multi-Purpose Emissions

	Metric Tons of CO2		
Emissions Source	**100%**	**75%**	**50%**
Commuting Multi-Purpose	4,700	3,525	2,350
Commuting to UAA only	3,100	3,100	3,100
UAA Land Travel	1,700	1,700	1,700
Air Model	2,641	2,641	2,641
UAA Total CO2	**12,141**	**10,966**	**9,791**

Source: UAA Parking Data, UAA Travel Records; ISER Calculations. December, 2010.

3.3 Other Important Factors

There are factors that indirectly affect the results of this inventory which are not accounted for in this report. Limited parking space availability and parking permit prices affect the commuters' decisions on whether to drive to campus or not. Increases in parking availability or decreases in parking permit prices would likely increase Scope Three CO2 emissions attributable to UAA. On the other hand, the U-Pass program provides incentive for commuters to use public transportation and serves as measure to control and minimize Scope Three CO2 emissions.

3.4 Recommendations

Significant improvements were made to increase the accuracy of the estimates of UAA Carbon Footprint from Scope Three emissions. The commuter model could still benefit from additional improvements.

- Vehicle data would be more accurate if dropdown menus, rather than fill in the blank, were used in the parking permit application. This would avoid misspelling or incorrect make-model relationships.
- Tracking land travel would benefit from entering TER and Mileage Report data into a database.
- Pay N Park data may help estimate the number of commuters who drive to campus but do not purchase a semester or annual campus parking permit.
- Additional survey data could help estimate parameters to adjust the estimates for behavioral factors that could be accounted for.
- Estimates of emissions attributable to commuters traveling on public transportation through the U-Pass program should be added to UAA's Carbon Footprint.

4. Comparison with other Universities

It is important to draw comparisons of UAA's Carbon Footprint with other universities. This, however, is not a simple task. UAA is unique in many ways and the inventory of emissions is a relatively new endeavor. Universities rarely used the same methods or account for emissions from the same type of activities. Without detailed information on findings from other campus with similar characteristics of those of UAA and in depth understanding on how those institutions calculated their emissions, direct comparisons may be misleading.

Appendix A: Forms

1. Travel Expense Records
2. Mileage Report Forms
3. Parking Permit Application

TRAVELER Address is required

NAME	
ADDRESS	

UNIVERSITY OF ALASKA

TRAVEL EXPENSE REPORT

EXPENSE REPORT MUST BE FILED WITHIN
15 DAYS OF COMPLETION OF TRAVEL

TA#	
ID#	

Phone	
Email	
Code Dept	

Prepared By: **Phone:** **Department:**

	Date (year) **2010**	(mo/day)	(mo/day)	(mo/day)	(mo/day)	(mo/day)	(mo/day)	(mo/day	(mo/day	(mo/day)	(mo/day)	(mo/day)	TOTAL	**ACCTG USE**
TRAVEL TIMES	Depart from													
	Depart time													
	Arrive At													
	Arrival Time													
PER DIEM	Lodging													
	M&IE													
	deduct meals furnished													
Transport	AirFare													
	Own Vehicle													
	Taxi													
	Shuttle													
	Parking													
	Car Rental													
MISC.	Registration													
	Phone/Fax													
	Gasoline													
	Misc.													
	Totals												0.00	***Total Daily***

EXPLANATIONS:

a.
b.
c.
d.
e.
f.

Traveler's Signature *Date*

Dean's/Supervisor's Signature *Date*

TOTAL	0.00	***Total Itemized***
Adv / Partial Pre-PAID		
ProCard PAID		
TR / Travel Card PAID		
DUE TRAVELER / <UAA>	**0.00**	
REMIT BY:		
U.S. MAIL	**NO**	
INTRA-CAMPUS MAIL	**YES**	

	0
Submitted	
TOTAL	
DONE	
TA amnt	
Database	

Org	Acct	Fund	*Amount*
			0.00

Payment requested must comply with current UofA travel regulations.
If air fare is utilized, passenger coupon must accompany expense report.
Odometer readings must accompany expense report if applicable.
Receipts are required for all expenses in excess of $25.00 for which reimbursement is claimed.

XXX ◊«»

University of Alaska Anchorage

Mileage Report

Name _____ **Employee** ☐ *Yes* ☐ *No* **SS#** _____

Mailing Address _____ **Department** _____

_____ **Phone** _____

Date	*Travel From*	*Travel To*	*Odometer Readings*		*Actual Mileage*	*Purpose*
			Beginning	*Ending*		

Remit By: ***U.S. Mail*** ☐
Intercampus Mail ☐

_____ *Total Miles* **x** _____ *Rate* **= $** _____ *Amount Claimed*

Traveler's Signature _____ **Date** _____

Approved By _____ **Date** _____

Budget Approval _____ **Date** _____

Audited By _____ **Date** _____

Account Number

ORG	OBJ	FUND	AMOUNT

Note: All signatures are required before processing.

Revised 2/99

ONLINE PERMIT APPLICATION

step 1: personal information

Please enter your information below:

First Name: M.I.

Last Name:

E-mail address:

Home Phone:

Cell Phone:

Work Phone: Ext.

Fax:

From what Zip Code do you commute to UAA?

How many times per week do you drive to campus? [SELECT]

Do you drive to campus with someone else (carpool)? [SELECT]

If yes, how many times a week do you carpool? [SELECT]

How many people do you carpool with? [SELECT]

How many times a week do you ride the People Mover bus to campus? [SELECT]

How many times per week do you use non-motorized transportation (Walk, bike, ski,) to get to campus [SELECT]

Mailing Address:

(Permits will be sent to this address.)

City:

State / Region: Alaska

Zip/Postal Code: -

Country: USA

Purchasing As: [SELECT]

This institution offers preapproved permits.
Please complete the following:

Last Name:

Eight-digit UAA ID Number (Drop the First Zero):

Continue Quit Order

Glossary

American College and University Presidents' Climate Commitment (ACUPCC): A group of 676 Presidents of higher education institutes that support the high-visibility mission of implementing comprehensive plans in the pursuit of carbon neutrality and sustainability through empowering the higher education sector to educate students, create solutions, and provide leadership-by-example for the rest of society.

Carbon dioxide (CO_2): A colorless, odorless, non-poisonous gas that is a normal part of Earth's atmosphere. Carbon dioxide is a product of fossil-fuel combustion as well as other processes. It is considered a greenhouse gas as it traps heat (infrared energy) radiated by the Earth into the atmosphere and thereby contributes to the potential for global warming. The global warming potential (GWP) of other greenhouse gases is measured in relation to that of carbon dioxide, which by international scientific convention is assigned a value of one (1).

Climate Action Toolkit Model: A resource available for educational institutions that consists of short bits of guidance for every aspect of campus climate action, including a Campus Carbon Calculator that can be used to measure campus emissions and formulate a climate action plan.

Conversion factor: A factor for converting data between one unit of measurement and another (such as between short tons and British thermal units, or between barrels and gallons).

Emissions: Anthropogenic releases of gases to the atmosphere. In the context of global climate change, they consist of radiatively important greenhouse gases (e.g., the release of carbon dioxide during fuel combustion).

Fiscal year: The University of Alaska Anchorage uses the State of Alaska fiscal year which runs from July 1 through June 30. The fiscal year is designated by the calendar year in which it ends; e.g., fiscal year 2010 begins on July 1, 2009 and ends on Jun 30, 2010.

Greenhouse effect: The result of water vapor, carbon dioxide, and other atmospheric gases trapping radiant (infrared) energy, thereby keeping the earth's surface warmer than it would otherwise be. Greenhouse gases within the lower levels of the atmosphere trap this radiation, which would otherwise escape into space, and subsequent re-radiation of some of this energy back to the Earth maintains higher surface temperatures than would occur if the gases were absent.

Greenhouse Gases (GHG): Those gases, such as water vapor, carbon dioxide, nitrous oxide, methane, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride, that are transparent to solar (short-wave) radiation but opaque to long-wave (infrared) radiation, thus preventing long-wave radiant energy from leaving Earth's atmosphere. The net effect is a trapping of absorbed radiation and a tendency to warm the planet's surface.

Haversine formula: This formula calculates great-circle distances between two points on a sphere from their longitudes and latitudes and gives mathematically and computationally exact results for both short and long spherical distances. See Figure 1.

Kilogram (Kg): One thousand grams.

Metric ton: A unit of weight equal to 2,204.6 pounds.

Radiatively: Send out in rays or waves (e.g. heat); spread out from a central point).To spread into new habitats.

Scope One emissions: Scope One emissions are defined as direct GHG emissions occurring from sources that are owned or controlled by an institution.

Scope Three emissions: Scope Three emissions are defined as indirect emissions that are the consequence of the activities of an institution, but occur from sources not owned or controlled by the institution.

Scope Two emissions: Scope Two emissions are defined as indirect emissions generated in the production of energy purchased by an institution.

Talloires Declaration: A statement of principles and practices for using higher education to promote sustainability through incorporating sustainability and environmental literacy in teaching, research, operations, and outreach at colleges and universities. It has been signed by over 350 university presidents and chancellors in over 40 countries.

Travel Expense Report (TER): TERs, administrated and stored by UAA's Travel Office, include information on each segment of a trip financed by the University.

Trip: A trip constitutes all flights incurred between the origin of travel and the final destination of travel, as attributed to one financial receipt delivered to the UAA Travel Office. This includes all connecting flights, even if intermediary destinations exist in the travel itinerary.

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