

SEI

STOCKHOLM
ENVIRONMENT
INSTITUTE

SEI US CENTER

ENVIRONMENTAL REPORT
2010

Table of Contents

1	INTRODUCTION	3
2	SEI-US OFFICES.....	3
3	TOTAL SEI-US CO ₂ E EMISSIONS	4
4	MONITORING ACTIVITIES	5
	AIR TRAVEL _____	6
	GROUND TRANSPORTATION _____	9
	STAFF COMMUTING _____	10
	UTILITIES _____	12
	PAPER CONSUMPTION _____	14
	GOODS & SERVICES _____	15
	COMMUNICATION/EDUCATION _____	16
5	OFFSETTING.....	16
6	CONCLUSIONS	17

1 INTRODUCTION

The Stockholm Environment Institute (SEI) is an international non-profit research organization working on issues related to sustainable development. SEI's goal is to bring about change for sustainable development by bridging science and policy. At SEI, it is believed that scientific insights should inform decision-making and public policy. SEI has centers in Tallinn (Estonia); Tanzania (Africa); Thailand (Asia); Oxford and York (UK); Somerville, MA, Davis, CA, and Seattle, WA (US) and Stockholm (Sweden), which hosts SEI's headquarters.

In 2008, SEI adopted an institute-wide environmental policy with an associated action plan that specifies the measures centers should take to minimize their environmental footprints. With this environmental policy, the Institute aims to 'walk our talk' and to undertake its activities as sustainably as possible to minimize negative environmental impacts.

In accordance with the institute-wide environmental policy and action plan, each SEI center develops an Annual Environmental Report with information on the following items:

1. Business travel and commuting
2. Electricity and heat consumption
3. Paper consumption
4. Goods and services
5. Waste management and recycling
6. Communication/education

This is the report of the SEI-US offices.

2 SEI-US OFFICES

2010 marks the fourth full year of operation of SEI's US Center after the transition in 2006 to Tufts University. The Stockholm Environment Institute US Center (SEI-US) is a non-profit research organization. Its main offices are on the Tufts University campus in Somerville, MA, with 2 additional offices in Davis, CA, and Seattle, WA. In June 2010, the Seattle office moved into its new home at the Joseph Vance Building in downtown Seattle. The US Center continues to grow, from a starting staff of eight in early 2006 to a staff of 27 in 2009; in 2010, it had an average of 25 employees.

More information about SEI's work can be found at www.sei-international.org and www.sei-us.org.



3 TOTAL SEI-US CO₂E EMISSIONS

The emissions of the SEI-US offices have remained roughly the same over the last 3 years. The main emissions source is air travel. Since much of our work is international, it is difficult to significantly reduce emissions from air travel. Yet we continue our efforts to build capacity in developing countries, consolidate travel, and use remote conferencing whenever possible.

ALL CO₂ EMISSIONS ARE GIVEN IN METRIC TONS, ROUNDED TO ONE SIGNIFICANT FIGURE

TABLE 1. SEI US CENTER TOTAL CO₂e EMISSIONS 2007 - 2010

Source	Total Emissions in CO ₂ e (Mt)				% change 2010- 2009
	2007	2008	2009	2010	
Air travel (including non-CO₂ effects multiplier of 2 for air travel)	248	280	260	206	-20.8
Ground travel (non-commuting)	No data	No data	0.7	1.0	42.9
Staff commuting	16	11.2	6.6	10.08	52.7
Utilities (heating, cooling, lighting, etc)	16	12	18	16.2	-10.0
Paper consumption	No data	No data	No data	.1	-
TOTAL	280	303.2	285.3	233.4	-18.2
Number of staff	27	25	27	25	-7.4
<i>Average CO₂e (Mt) per staff</i>	<i>10.4</i>	<i>12.1</i>	<i>10.6</i>	<i>9.3</i>	-11.6

As demonstrated by the table above, the total emissions in 2010 from the part of SEI US Center work monitored was **233.4 Mt of CO₂e**. This is a decrease of about 24% in total and with about 10% less per staff compared to 2009. Comparing three years of data, the emissions portfolio, or contribution from each emissions source, remains about the same—with air travel being the predominant contributor (see Figure 1).

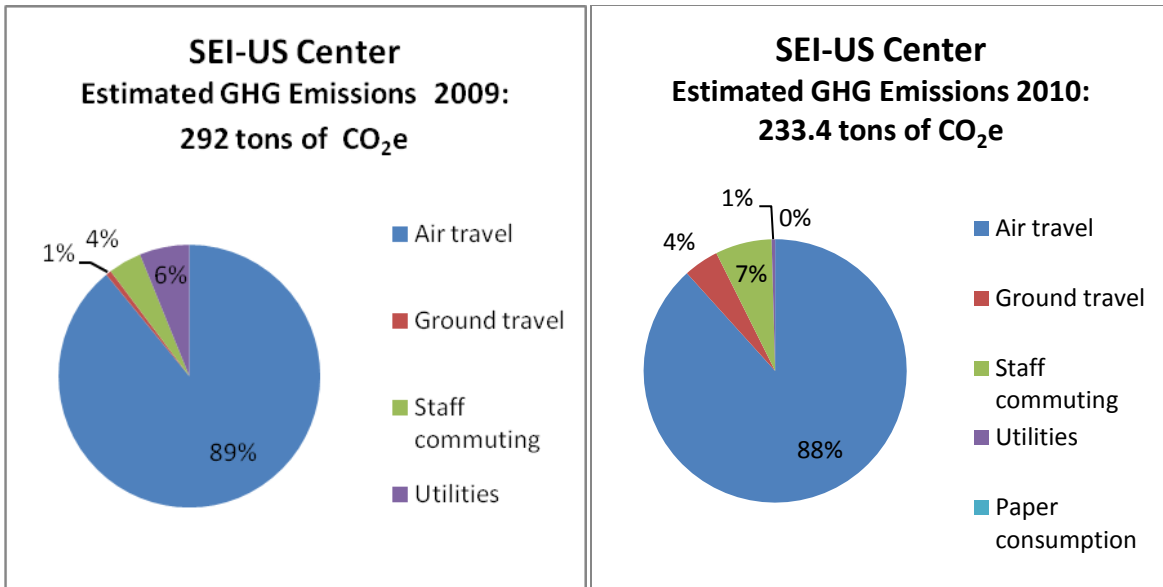


FIGURE 1. 2009 AND 2010 SEI-US CENTER TOTAL CO₂E EMISSIONS

4 MONITORING ACTIVITIES

In support of SEI's Environmental Policy Action Plan, SEI-US undertakes monitoring activities in the first four of the five major areas included in this report:

1. Business Travel (Air and ground)
2. Staff Commuting
3. Utilities
4. Paper Consumption
5. Goods and Services

The following sections will describe the activities responsible for these emissions in more detail, as well as the methodology used to calculate the emissions. Aspects such as water, paper consumption, procurement of goods and services, recycling and waste management and communication are also elaborated on.



AIR TRAVEL

EMISSIONS CALCULATION METHOD

To determine our flight emissions, we used the emissions calculator developed by the carbon offset provider *myclimate*. Myclimate was chosen because earlier research has shown its calculator to be reliable. Factors that impact a person's air travel emissions include:

Type of seat: Business and first class seats take up much more space and are therefore responsible for a larger share of a flight's emissions (since more passengers could fit in an airplane equipped with economy seats only). SEI environmental policy encourages all SEI staff to travel economy class. When possible, class is taken into account when calculating emissions from air travel.

Type of airplane: Not all airplanes are equally efficient. *Myclimate* uses different airplane types as references for kerosene calculations.

Distance: Short-distance flights produce more CO₂ per kilometer traveled than long-distance flights because, among other reasons, the energy-intensive landing and takeoff cycle represents a larger share of the total journey. The *myclimate* calculator takes this into account.

Occupancy: Not all flights are fully occupied. The *myclimate* calculator assumes occupancy rates of 70-75%.

Air travel also causes several non-CO₂ climate effects. To date there is no conclusive evidence available on how to best integrate these non-CO₂ effects of air travel. Because many of the effects are still not very well understood and because of the vastly different timescales of the impacts (from a few hours in the case of contrails to centuries in the case of CO₂) there is no simple way to account for all the impacts. Recent research has shown that policy factors such as the discount rate or the damage function applied to the model have a much larger effect on the resulting "radiative forcing factor". Following the precautionary principle, we apply a factor of 2 to account for all the non-CO₂ warming effects associated with air travel. *Myclimate* automatically multiplies emissions by 2 to account for non-CO₂ warming effects associated with air travel¹.

¹ MyClimate reviews the factor regularly and change it in their calculators if necessary. During 2010, the radiative forcing factor was estimated to two. <http://www.myclimate.org/en/information-climate-tips/facts-about-climate-change/traffic-as-co2-producer/air-traffic.html>.

Air travel is responsible for the biggest share of SEI-US's GHG footprint. We are investigating possibilities for reducing our travel demands (e.g. through improved video conferencing and promoting more regional expertise, so as to reduce the need for global travel by SEI staff). These efforts are difficult to quantify. We also consolidate travel whenever possible.

EMISSIONS

SEI-US AIR TRAVEL IN 2010 TOTALED 588,767 PASSENGER-MI, RESULTING IN AN ESTIMATED 205.6 TONS OF CO₂e.

The SEI-US air travel in 2010 totaled 588,767 passenger-miles, resulting in **205.6 Mt of CO₂e** emissions (see Table 2 below). The total 2010 passenger-miles and CO₂e emission figures are slightly lower than the 2009 and 2008 figures due to less travel by SEI-US employees in 2010, compared to previous years. However, the CO₂e emissions per staff decreased from 9.6 in 2009 to 8.2 metric tons of CO₂e because staff flew less overall, and there were fewer total staff.

TABLE 2 . 2007-2010 AIR TRAVEL CO₂e (Mt) EMISSIONS SUMMARY

Year	CO ₂ e (Mt)	Total no. of staff	CO ₂ e (Mt)/staff
2007	248	27	9.2
2008	280	25	11.2
2009	260	27	9.6
2010	206	25	8.2
% change 2009 and 2010:	-20.8%		-14.4%

The average CO₂e Mt/staff varies between the three US offices: Seattle averages 4.0 Mt/staff, Davis 8.8/staff, Somerville 9.8/staff, and an overall US average of 8.2 tons/staff member (see Table 3). However, three senior researchers represent over 50% of total US air travel emissions (see Figure 2). To provide a sense of the typical air travel average emissions per SEI-US staff, we recalculated the average Mt/staff, excluding the emissions of these three individuals, Seattle averages 4.0 Mt/staff, Davis 4.5/staff and Somerville 4.6/staff.

TABLE 3. 2010 AIR TRAVEL CO₂e (Mt) EMISSIONS SUMMARY BY OFFICE

Office	no. of staff	Passenger Miles	CO ₂ e	% of US Total	CO ₂ e (Mt)/staff
Somerville	15	383,310.0	136.5	66	9.8
Davis	6	157,295.1	53.0	26	8.8
Seattle	4	48,162.5	16.1	8	4.0
Total	25	588,767.5	205.6^a		8.2

^a if we were to include air travel emissions that resulted from the 2010 SEI-US symposium, held at Tufts University in November 2010, we would add another 7.6 CO₂e tons.

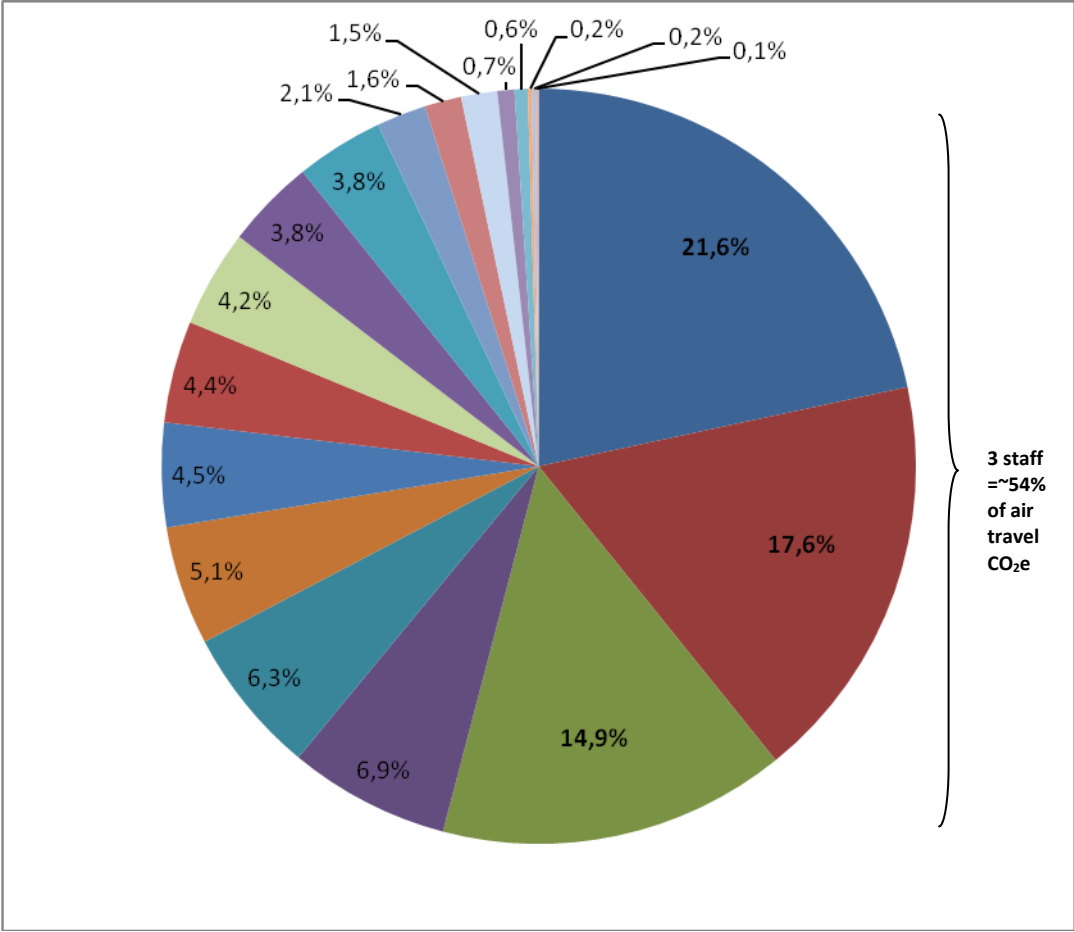


FIGURE 2. 2010 AIR TRAVEL EMISSIONS PER STAFF AS A PERCENT OF TOTAL CENTER AIR TRAVEL EMISSIONS
 (each wedge represents a staff member who flew this year)



GROUND TRANSPORTATION

EMISSIONS CALCULATION METHOD

Given the far distances between work site locations, SEI-US staff mostly travel by plane. SEI-US currently tracks its non-commuting ground transportation on a voluntary basis, i.e. business-related bus, taxi, and train travel. Additionally, we include an estimate of ground transportation to and from airports, making the following assumptions: Approximately 100 return flights in 2010; 20 miles car ride to airports per trip; 15 miles per gallon fuel efficiency.

TABLE 4. EMISSIONS FACTORS FOR GROUND TRAVEL

Type of Ground Travel	kg CO ₂ per passenger mi
Diesel Bus, long distance	0.08
Diesel Bus, urban	0.30
US Intercity Rail (i.e., Amtrak)	0.19
US Transit Rail (e.g., subway, tram)	0.16
US Commuter Rail	0.16
Personal Vehicle/Taxi	0.34

All calculations are based on the WRI Employee commuting spreadsheet², except for Personal Vehicle/Taxi, where, instead of using an average figure based on US EPA figures³ we are using SEI International’s universal conversion factor for cars⁴, which does not take into account the fuel efficiency of the vehicle; 2008 and 2009 years’ figures have been revised accordingly.

² WRI: Employee commuting spreadsheet: http://docs.wri.org/wri_co2comm_2002_commuting_protected.xls
³ 10.35 kg of CO₂ per gallon of motor fuel, an average figure based on US EPA figures:
<http://www.epa.gov/oms/climate/420f05001.htm>
⁴ 0.34 kg CO₂e per mile : <http://www.defra.gov.uk/environment/business/reporting/pdf/20090928-guidelines-ghg-conversion-factors.pdf>

EMISSIONS

SEI-US GROUND TRAVEL IN 2010 TOTALED 4,065 PASSENGER-MI, RESULTING IN AN ESTIMATED 1.0 TONS OF CO_{2e}.

Compared to the air travel emissions, the total CO_{2e} emissions from ground transportation are low, in part because we do not monitor all forms of travel. SEI-US’s ground transport in 2010 totaled approximately 4,065 passenger-miles resulting in approximately **1.0 Mt of CO_{2e}** emitted (see Table 5 below). The total passenger miles for 2010 is higher than our 2009 figures, because we started monitoring additional modes of transit (buses and train travel); subsequently emissions from ground travel also increased. SEI US did not monitor ground transportation prior to 2009.

TABLE 5. 2010 GROUND TRANSPORTATION CO_{2e} (Mt) EMISSIONS SUMMARY

Year	Train (mile)	Train CO _{2e}	Bus/ coach (mile)	Bus/coach CO _{2e}	Taxi (mile)	Taxi CO _{2e}	Total (mile)	Total CO _{2e}	CO _{2e} per staff
2009	No data	No data	No data	No data	2400	0.8	2,400	0.8	<0.1
2010	815.9	0.2	1,250.2	0.1	1,999.6	0.7	4,065.6	1.0	<0.1
<i>% change btw 2009 and 2010:</i>								25%	-



STAFF COMMUTING

EMISSIONS CALCULATION METHOD

The US Center undertook a staff survey to calculate commuting emissions. All staff were asked what modes of transport they used to commute to and from the office during 2010. The ground transportation conversion factors used to estimate the emissions from staff commuting include the same as those used in the previous section, (summarized in *Table 4. Emissions factors for ground travel*).

The SEI-US had **25** staff in 2010. Of these:

- **33%** commuted by car most of the time.
- **63%** commuted by bicycle/foot most of the time.
- **4%** worked from home most of the time.

EMISSIONS

The total emissions for commuting were approximately **10.1 Mt CO₂e** in 2010 (See Table 7) which is higher than the 2009 figure (6.6 Mt CO₂e). This is due to fewer staff over all, changing commuting habits of a few staff, from driving to biking, as well as the departure and hiring of staff with different commuting methods. SEI-US had 25 employed staff (on average) during 2010; Table 7 summarizes staff commuting habits. SEI-US staff commute to work three main ways, 1) by car, 2) by bicycle or foot, 3) tele-commuting

TABLE 6. 2007-2010 COMMUTING CO₂e (Mt) EMISSIONS SUMMARY

US Center	Car/Taxi CO ₂ e	Bus/Coach CO ₂ e	Total CO ₂ e	CO ₂ e per staff
2007	12.4	3.6	16.0	0.59
2008	7.8	3.4	11.2	0.45
2009	6.2	0.4	6.6	0.24
2010	8.4	1.7	10.1	0.40
<i>% change btw 2009 and 2010:</i>			53.0%	66%

TABLE 7. 2010 STAFF COMMUTING CO₂e (Mt) EMISSIONS SUMMARY

Office	no. of staff	Car/Taxi		Bus/Coach		Bike		Total		CO ₂ e per staff
		Mile	CO ₂ e	Mile	CO ₂ e	Mile	CO ₂ e	Mile	CO ₂ e	
Somerville	15	22,499.96	7.7	4,105.02	1.2	5,711.77	0	30,996.96	8.9	0.6
Davis	6	1,934.02	0.7	0.00	0	2,600.00	0	4,534.02	0.8	0.1
Seattle	4	23.98	0	1,394.98	0.4	6,584.98	0	8,004.00	0.4	0.1
Total	25	24,458	8.4	5,500	1.7	14,897	0	44,855	10.1	0.4

**SEI-US Total distance traveled by car:
31,000 miles resulting in 8.4 tons of CO₂ e**

**SEI-US Total distance traveled by bus, train, subway:
4,500 miles, resulting in 1.7 tons of CO₂e**

STAFF COMMUTING WAS ESTIMATED TO RESULT IN 10.1 TONS OF CO₂e



UTILITIES

This Center has staff using four different office buildings: in Davis, CA, in Seattle, WA, and in two different spaces on the Tufts University campus in Somerville, MA, where it has one independent office and shares office and office facilities with the Global Development and Environment Institute (GDAE). Being at Tufts University means that SEI cannot choose the energy supplier for those two buildings.

As of June 17, 2010, the Seattle office was located in the Vance building. The Vance Building, built in 1929 and newly renovated, is on track to earn LEED-EB [Existing Building] Gold certification, and earned an Energy Star score of 97 (putting it in the top 4% of its peers). It monitors electricity consumption by floor, and heating use by the entire building. Because Seattle rent includes utilities, we rely on data available online for building energy data at the new building⁵. The annual consumption data for electricity and heating is received on a monthly basis from the different landlords for each office. Conversion factors are outlined in the box below⁶.

ELECTRICITY

Electricity data is available for Somerville offices and partially for the Seattle office. Since all utilities are included in the new Seattle office space lease, we based Seattle office consumption on (9th floor electricity consumption)/(floor occupancy) * (number of occupants in the Seattle office), relying on the Vance Building's online data. Electricity consumption for Davis was estimated based on 2007 consumption data.

UTILITY CONVERSION FACTORS	
Electricity ¹ :	
Massachusetts:	0.59 kg of CO ₂ per kWh
Washington:	0.11 kg of CO ₂ per kWh
California:	0.28 kg of CO ₂ per kWh
Fuel Oil ² :	10.35 kg /1000 = tonnes of CO ₂ per gallon
Natural Gas ³ :	
	5.5 kg /1000 = tonnes of CO ₂ per therm
	54.7 kg /1000= tonnes of CO ₂ per MMBtu
Biomass:	0 tonnes of CO ₂ per MMBtu

⁵ Vance Building data is monitored, and available online: <http://www.buildingdashboard.com/clients/vance/>

⁶ [1] Based on: Energy Information Administration, Updated State-and Regional-level Greenhouse Gas Emission Factors for Electricity (March 2002). <http://www.eia.doe.gov/pub/oiaf/1605/cdrom/pdf/e-supdoc.pdf>; [2] Based on: US Energy Information Administration. Voluntary Reporting of Greenhouse Gases Program; [3] Based on: US EPA. Clean Energy. Calculations and References. <http://www.eia.doe.gov/oiaf/1605/coefficients.html#tbl1>

HEATING & HOT WATER

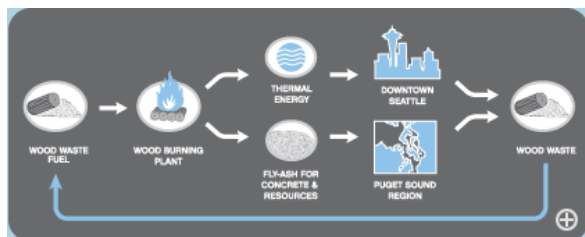


FIGURE 3. SEATTLE STEAM'S WOOD BURNING PROCESS (Source: www.seattlesteam.com)

The Somerville office and the first half of 2010 for the Seattle office are heated with fuel oil, the Davis office is heated with natural gas. Utility data is collected for the Davis and the Somerville office. The Seattle office switched locations to a more efficient building mid-June 2010 where the thermal energy is from District Steam Heating that runs on 50% biomass and 50% natural gas. The biomass for

Seattle Steam comes from waste wood from Cedar Grove Composting. Since all utilities are included in the new office space lease, our calculation was (total building heat consumption)/(building occupancy) * (number of occupants in the Seattle office), again, relying on the Vance Building's online data.

EMISSIONS FROM ELECTRICITY AND ENERGY CONSUMPTION

The CO₂ emissions from electricity and energy consumption in 2010 are slightly lower than that of 2009 (See Table 8 below). The total emissions from electricity and energy consumption in 2010 were approximately **16.2 Mt CO₂e**, as summarized in Table 8. The difference between 2009 and 2010 is due to the Seattle office move mid-year. The move reduced fuel-oil consumption, and even though it increased electricity consumption, because Seattle's electricity generation produces less CO₂e per unit consumed than the other offices, our utility emissions overall are less.

TABLE 8. 2007-2010 UTILITY CONSUMPTION AND TOTAL CO₂e (Mt) EMISSIONS SUMMARY

Center	Electricity		Natural Gas (Heating)		Fuel Oil (Heating)		Total CO ₂ e	CO ₂ e (Mt) per staff
	KWh	CO ₂ e	MMBTU	CO ₂ e	Gallons	CO ₂ e		
2008							12	0.5
2009	19,394	7.2	21.0	1.1	975	9.7	18.0	0.7
2010	21,387	7.8	21.4	1.1	709	7.3	16.2	0.6
<i>% change btw 2009 and 2010:</i>							-10.0	

TABLE 9. 2010 OFFICE UTILITY USE AND CO₂e (Mt) EMISSIONS SUMMARY

Office	Electricity		Heating and hot water		Heating and hot water		Total CO ₂ e	CO ₂ e (Mt) per staff
	KWh	CO ₂ e	MMBtu	CO ₂ e	Fuel oil (gal.)	CO ₂ e		
Somerville	7,979	4.7	8.4	0.4	626	6.5	11.6	0.8
Seattle	4,108	0.5	1.9	.1	83	0.9	1.5	0.3
Davis	9,300	2.6	11.1	0.6	-	-	3.2	0.8
Total Energy	21,387	7.8	21.4	1.1	709	7.3	16.2	0.7

2010 UTILITIES EMISSIONS RESULTED IN AN ESTIMATED 16.2 TONS OF CO₂.

UTILITY MITIGATION MEASURES

The US offices are taking actions to reduce their energy consumption. For example, we had our main Somerville office insulated and required our landlord to install energy-efficient windows before we moved in. We have also insisted on purchasing only the most energy-efficient equipment currently available. Unfortunately, because all our offices are rented, the possibility of taking steps that are more aggressive in this area is currently rather limited.



PAPER CONSUMPTION

As of 2010, all SEI centers estimate the emissions generated from our paper consumption. The emission factor used is 700 kg of CO₂ per ton of paper⁷. The monitoring of SEI's paper consumption does not include paper consumed through the production of SEI books, papers, reports, etc. printed and distributed with the help of external printing companies. This is because it is difficult to monitor the amount of paper used for these activities.

PAPER CONSUMPTION AND EMISSIONS PRODUCED

Table 10 below shows the consumption and type of paper used by the three US offices.

TABLE 10. 2010 PAPER CONSUMPTION AND TOTAL CO₂e (Mt) EMISSIONS SUMMARY

Office	Sheets	Weight kg ^a	Type of paper (Recycled content - post and pre consumer content)	Average Sheets per staff	Total CO ₂ e (Mt) ^b
Davis	10,000	45	100% recycled content	1666	0.03
Somerville	15,000	67.5	100% recycled content	1071	0.05
Seattle	5,0000	22.5	100% recycled content	1250	0.02
Total	30,000	135	100% recycled content	1250	0.1

Note: ^a. Kg consumed based on average of 5lbs per ream of 500 sheets; ^b. 80g/m² paper at 700 kg of CO₂ per ton

⁷ Greenhouse Gas Protocol, June 2006, World Resources Institute



GOODS & SERVICES

THESE ARE NOT INCLUDED IN OUR 2010 GHG INVENTORY.

COFFEE, TEA AND FOOD



Coffee, hot chocolate and tea purchased for the US offices is organic and fair trade certified from Equal Exchange (www.equalexchange.coop). Catering services for the SEI-US 2010 Symposium included a vegetarian lunch that sourced local and organic produce as available.

RECYCLING & WASTE

The Somerville office is located on Tufts University’s Medford campus. The Medford campus recycling rate in 2009-2010 was 44%⁸.

Medford Campus Recycling Rates (as a percent of total waste)	2010	2009	2008	2007	2006
Paper, Cardboard, Mixed Bottles Recycling Rate	43.7	36.67	33.6	30.12	34.12

All SEI-US offices recycle office paper, cardboard, glass, metal and plastic. The main Somerville office also recycles fluorescent bulbs, batteries and electronics. Recycling rates at all SEI-US offices are very high, an estimated 80-90% for paper and cardboard and well over 50% for all other materials.

CLEANERS



The Somerville offices are cleaned by the Tufts University custodial contractor, OneSource (now ABM), which has been using [Green Seal](#) certified cleaning products and green cleaning methods throughout Tufts University since first piloting it in 2006. No data is available for the other offices.

⁸ Recycling Coordinator, Tufts University School of Arts and Sciences

COMMUNICATION/EDUCATION

SEI conducts research on the design and implications of market mechanisms to address regional, national, and international greenhouse gas emissions, from the distribution of emissions allowances in emissions trading systems to the administration of emission offset programs. For over a decade, we have provided innovative and influential analyses of market instruments. Our establishment of the Carbon Offset Research and Education ([CORE](#)) website provides an up-to-date analysis and synthesis of the world's most influential offset programs and activities for policy analysis and consumers.

As part of the 2010 Staff Handbook update and creation of a new staff orientation checklist, they now both include a section on office recycling, and instructions to speak with the office communications node about the SEI environmental office policy and how to track travel and a carbon footprint.

5 OFFSETTING

The U.S. Center currently does not purchase offsets, nor does it have a policy on purchasing offsets.

6 CONCLUSIONS

The mission and work of SEI requires many of the staff to travel to undertake both short and long distance travel on a regular basis. Due to the decreased air travel by staff in 2010, our overall emissions subsequently are less than prior years but air travel still represent nearly 90% of annual emissions (consistent with prior years, see data labels on chart below). Since much of our work is international, it is difficult to significantly reduce emissions from air travel. In any given year, some people fly more than average and others fly below average. The emissions of the SEI-US offices from utilities (4-7% of total) and commuting 3-6% of total), the next largest contributors, have remained roughly the same over the since we first started monitoring in 2007 (see Figure 4).

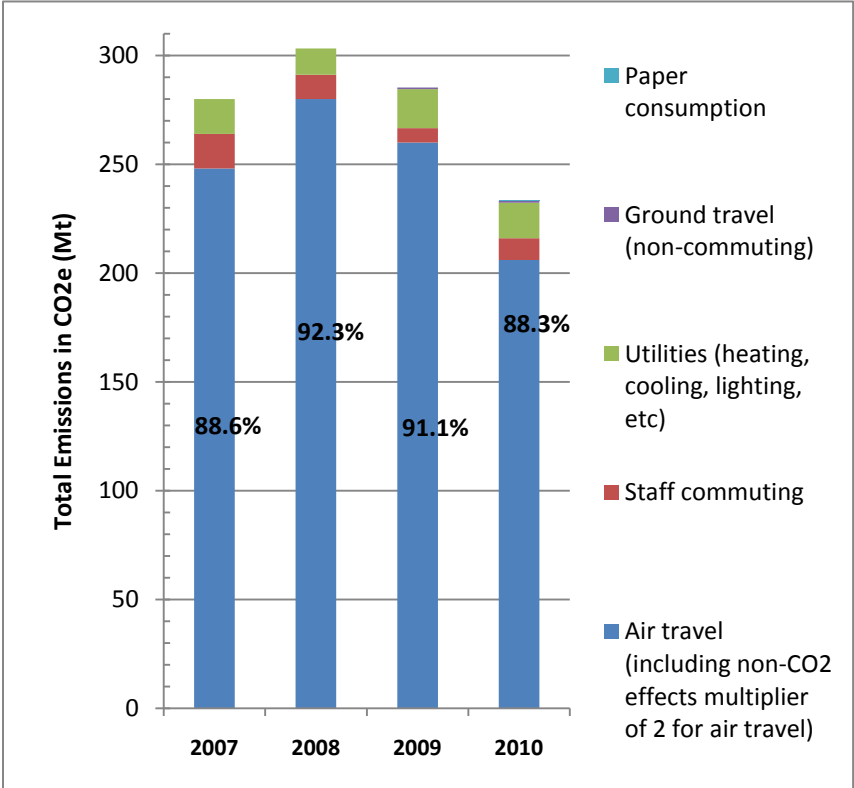


FIGURE 4. SEI US CENTER TOTAL CO2E EMISSIONS 2007 - 2010

The US Center grew from a starting staff of eight in early 2006 to a staff of 27 in 2009. Although in 2010 it had 25 employees, the center’s Strategic Plan calls for increased growth, aiming for 30 full time staff, we expect our emissions to grow as our number of staff does.

We will continue our efforts to build capacity in developing countries to reduce SEI travel, consolidate travel wherever possible, and increase our use remote conferencing.