

Opportunities to Reduce Air Travel and Greenhouse Gas Emissions At the University of Washington: An Education Initiative for the University of Washington Climate Partnership

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Executive Summary

Professional air travel releases a significant amount of the University of Washington's greenhouse gas emissions. In order to help the University of Washington (UW) Climate Partnership reduce our overall impact on climate change, we investigated alternatives to air travel and opportunities to offset the impacts of carbon emissions when air travel is necessary. We then developed information to distribute to the University of Washington community via email and through an article in *The Daily*, and a set of recommendations for the UW Climate Partnership.

Air travel is an important component of today's professional and personal lifestyle, and cannot easily be replaced. As a potential alternative to air travel for professional meetings, we researched the University's videoconferencing capabilities and learning spaces technologies. Facility highlights include a videoconferencing studio, a digital presentation lab, a host of web tools, and web-based teleconferencing.

We interviewed faculty on the value of attending conferences domestically and internationally, and the likelihood that they would substitute their travel by using virtual conferencing. Overwhelmingly, they responded that there are certain aspects of professional travel that are invaluable, and cannot be replaced with virtual conferencing. With this in mind, we investigated carbon offsets: activities that compensate all or part of the carbon dioxide emissions of a party, by reducing the emissions—or increasing the carbon dioxide absorption—of another party. Using pre-existing research on carbon offsetting from Tufts University and Clean Air Cool Planet, and email communication with select providers, we selected two providers to recommend to the University in our education campaign: Native Energy and Climate Trust.

We faced many challenges and barriers in this project. Primarily, our early research on virtual conferencing tools illustrated their limitations in replacing professional travel, and faculty interviews indicated that foregone air travel is not a likely option. Turning to carbon offsets, we ran into a myriad of concerns regarding the lack of a certification system or industry standards for these companies. We had to rely on second party research and email contacts to make our own recommendations of providers. Additionally, with no central accounting of miles traveled or destinations, the University

has no accurate method of quantifying the amount of professional air travel that currently takes place. Moreover, without a travel accounting method, we cannot quantitatively measure the impact of our educational campaign. An overarching challenge in conducting this assessment of professional travel habits was the sensitivity of the issue of professional air travel at a public university and the importance of travel to the University's reputation.

In spite of these challenges, we completed our education campaign with two deliverables: an electronic brochure for faculty and staff, outlining the impacts of air travel on the earth's climate, recommendations for virtual conferencing, traveling light, and offsetting; and an article to the greater UW community to be run in The Daily, which outlines the same information to a broader audience.

Our final recommendations for the University of Washington Climate Partnership are as follows:

- Develop a method to track professional air travel
- Expand virtual conferencing capabilities and tools
- Prompt carbon offsetting to current and prospective faculty, staff, and students
- Continue outreach and education about the impacts of and alternatives to air travel

Alternatives to Professional Air Travel

In developing an educational campaign to reduce the University's greenhouse gas emissions caused by air travel, we used the first half of the winter quarter to research alternatives to air travel, and the second half of the quarter gathering feedback from faculty members, identifying influential departments, and developing our educational information for distribution.

University-wide Virtual Conferencing Capabilities

The University provides alternatives to air travel in the form of virtual conferencing, specifically videoconferencing, file-sharing technology, and web-based conference tools. Ari Tencate with the University's Office of Learning Technologies, and his assistant, Jacob Morris showed us the following University facilities:

- **Odegaard Videoconferencing Studio:** This studio allows groups to meet face-to-face without traveling through the use of videoconferencing. Videoconferencing may be the most useful tool in the effort to decrease faculty air travel because participants can accommodate connectivity with most far-end locations, with capacities of 16 at the UW facilities and as many other locations as are viewable on the screen. The site charges faculty \$125 per hour, unless the conference is between the UW libraries (Seattle, Tacoma, and Bothell).
- **Digital Presentation Studio:** Faculty and students can practice and record presentations for review or for conferences or lectures where travel is required. The studio contains a presentation laptop, plasma display, mounted camera with microphone, and control station. Faculty can utilize this feature in lieu of a trip to prepare or practice with colleagues.
- **Campus Free Videoconferencing Capabilities:** The University provides free videoconferencing services to students in addition to the Catalyst services listed above. Developed and run by student volunteers, these studios make it possible for students to conduct interviews with subjects anywhere, provided they have the use of a web-cam and internet.
- **Catalyst Web Tools:** A large portion of collaboration with colleagues from other universities already takes place via phone and email. Additional university web tools include document posting, peer review, file and portfolio sharing, quick polls, websites, and file management forums.

Web-based Virtual Conferencing

These programs allow participants to connect via teleconference with other stakeholders, colleagues, department members, etc. from different locations. While videoconferencing is sometimes an option with these programs, the majority of the communication takes place over the telephone while participants look at a shared website that allows document posting and sharing, chatting, facilitation tools, and message boards. These services must be purchased by a web-based virtual conferencing company. The Information Technology Advisory Committee is most likely the University body that would address such a decision.

Lower Impact Travel

Recognizing that some travel is necessary, we looked into alternative forms of travel that emit less carbon dioxide than air travel. These findings suggest that direct itineraries release less carbon dioxide than connecting itineraries that use most fuel during take-off and landing; flying business class reduces the capacity of the plane, thus creating 1.5 times the greenhouse gas emissions per person than flying economy; and taking a train or bus emits 3-7 times less carbon dioxide than airplanes.

Faculty Interviews

We conducted informal discussions with professors to determine the various attitudes about professional air travel at the UW. The following questions guided our conversations:

- How much do you travel for work in one school year?
- What form of travel do you generally engage in?
- What is the main purpose of your work-related air travel?
- What is the most valuable aspect of attending such functions?
- About what percentage of these gatherings could be replaced by virtual conferencing?
- How do you think virtual conferencing would affect your productivity and/or success?
- What is the perception within your department on work-related travel?
- Would you ever pay extra out of your own pocket to reduce the impacts of air travel on greenhouse gas emissions?
- Would you prefer to travel less and use virtual conferencing or pay more for a ticket? Or neither?
- Are you and other faculty aware of the emissions that result from air travel?

The faculty members we spoke with generally made less than 5 domestic flights per year and far fewer international flights. The purpose of these flights was for boutique and large professional conferences, which are most valuable for the intellectual momentum, informal discussion opportunities, and the sheer volume of information and thought. The overwhelming response from professors is that presenting at or participating in academic disciplinary conferences is extremely important to the development and growth of an academic's career.

Some faculty members are required to travel for additional reasons, depending on the nature and location of their research. Most faculty members do not consider supplementing these personal experiences at conferences with virtual conferencing or other types of communication. Ironically, many climate scientists or climate policy analysts are in high demand to speak at international conferences, due to the global nature of the issue. Therefore, some of the most informed and environmentally-minded climate academics have had to increase the amount of their personal air travel for the purpose of educating others about climate change.

Virtual conferencing is a viable alternative, however, in place of traveling to ‘boutique’ conferences of 4-5 people, or between colleagues who are collaborating on research or a paper. In fact, most professors stated that collaboration with colleagues at other universities can take place completely over e-mail, even when preparing to present jointly at conferences.

While it is certain that the issue of climate change is gaining awareness, professors did not see the issue affecting their travel-related behavior. Nor did they express great interest in offsetting out of their own pocket due to many of the unknown or ‘unconvincing’ results of the process. Currently, no systems are in place to track professional miles traveled for the University, and the University has no oversight as to how many flights faculty take. In part, this lack of central planning or oversight is due to the complexity of grants and budgeting in a University setting. Perhaps for this reason, the University travel office seems hesitant to take on the task of monitoring professional air travel.

Conclusions about Air Travel Alternatives

A main conclusion we made based on interviews with professors about their professional air travel (and from exploring our own travel habits), is that behavior will not change without continued expansions of the UW’s virtual conferencing capabilities, pressure from the University and/or government to engage in more sustainable travel behaviors, and more concrete information on and evaluation of carbon offsetting. The University of Washington community sees a need for decreased greenhouse gas emissions and improved conservation, but air travel is so engrained in today’s lifestyle that behavior patterns are not likely to change without taking more direct measures.

In order to work past these barriers, we suggest the following:

- The University’s Information Advisory Technology Committee should investigate the feasibility of contracting with a web-based virtual conferencing company to supplement UW’s current suite of collaboration and videoconferencing tools.
- The information technology division should improve and continue outreach to faculty, staff, and students regarding current technological alternatives to air travel.
- The UW Travel Office should work with departments to track professional air travel and to educate the UW community on the impacts and alternatives to air travel.

Carbon Offsetting

There are times when air travel cannot be substituted with virtual conferencing. Therefore, we expanded the scope of our project to include carbon offsetting, and we investigated several carbon offset providers to recommend to the university.

A carbon offset is an activity that compensates all or part of the carbon dioxide emissions of a party, by reducing the emissions—or increasing the carbon dioxide absorption—of

another party. This results in less net greenhouse gas (GHG) emissions with the goal of fighting global climate change. The theory relies on the principle that since climate change is a global problem, an emission reduction made elsewhere will have the same positive effect as one made locally.

The most common form of offsets involves the planting of trees. This practice stems from the ability of trees to sequester carbon and for forests to become carbon sinks. Planting trees presents the most cost-effective offset option, especially in the tropics where trees have a high growth rate, and offer other tangible benefits to the surrounding environment such as decreasing soil erosion and increasing biodiversity. Despite these attributes, critics have risen to debate the logic of tree planting for offsets. For example, many scientists have questioned the use of trees for offsets due to tree planting in temperate latitudes not having a net-cooling effect, and many tree planting projects are monoculture tree plantations which actually have negative impacts on the local population and the forests themselves.

Another form of offsets involves funding renewable energy projects which will reduce future GHG emissions, and supporting energy conservation projects. In addition, projects have worked to eliminate the production of methane (a potent GHG) from animal manure at farms, or have worked to capture methane from coalmines and landfills.

There are some negative aspects to carbon offsets. Currently, no formal guidelines or regulations guide the voluntary offset market and no formal certification or monitoring program exists to ensure consumers that they actually receive the offset that a company has promised. In addition, offsets are an intangible and unobservable asset, so it is difficult to know for certain if any offsets are actually occurring. Furthermore, skeptics have pointed out that people can use offsets like buying indulgences, which means they avoid changing their underlying behavior which contributes to climate change. Finally, many problems exist with the projects themselves, such as negative impacts on the local population and determining if the project does in fact reduce GHG emissions.

Despite these criticisms, carbon offsets offer a tremendous opportunity to educate the public about the environmental impact of their everyday living which is the main reason we think it is important to make everyone at UW familiar with carbon offsets. Nathan Decker, EvoGear's senior manager of e-commerce explains, "The concept of offsetting one's carbon footprint is such an effective way to spread awareness and get people thinking about how they are making an environmental impact with their choices." Though they are not the ultimate solution to climate change, carbon offsets play an important role in educating the public about climate change and demonstrating to policy makers the importance of the issue.

Evaluation of Offset Providers

As part of our project we investigated and evaluated several carbon offset providers in order to make recommendations to both the UW admissions office and departments. We began this investigation by reviewing a report published by non-profit organization Clean Air-Cool Planet entitled "A Consumers Guide to Retail Carbon Offset Providers." This

report recommended eight carbon offset providers out of thirty which it evaluated. After finding out more about several of the eight recommended carbon offset providers through information on their websites, we chose two to send questionnaires to in order to answer questions we had related to how they determine the location of their projects, how their projects improve those environments beyond carbon offsetting, how much money donated is invested directly into the projects and how they are able to demonstrate that these projects would not occur without donations. After evaluating their responses, we felt confident in recommending these two providers—Native Energy and Climate Trust.

The first carbon offset provider, Native Energy, is a for-profit organization based out of Vermont. Aside from quickly responding to our questionnaire, we were impressed by them for several reasons. First, they focus their energy on building new renewable energy projects such as wind turbine, methane gas and solar energy projects. Their projects work directly with family farmers and Native American organizations that have significant benefits on the environment and it is majority owned by the Intertribal Counsel on Utility Policy (ICOUP). Although we were initially skeptical at recommending a for-profit company, they pointed out that most non-profits selling offsets are purchasing them through middlemen that are for-profit. The benefit of a for-profit provider is the more profit gained, the more money to be invested into renewable energy projects.

The second carbon offset provider we recommend is Climate Trust, a non-profit organization. They had a wider scope of projects compared to Native Energy including, not just renewable energy, but energy efficiency, sequestration, transportation efficiency, and material substitution. Based out of Portland, naturally many of their projects are conducted in the northwest which means they are not only offsetting carbon, but improving the environment in our region. Both providers' websites include carbon calculators which calculate the carbon emissions from your travels, and determine what it will take to offset these impacts. They also provide sufficient information on their websites to educate people about climate change and what to do about it as an individual.

Feasibility and Costs

Offering prospective students the opportunity to offset their travels to the UW would not be difficult. It could be as simple as including an extra question related to this on the application they fill-out before they come to visit campus. It would also be feasible to add a splash page on the admissions page that would link to Native Energy at no charge. This would make it easier for those who are interested in carbon offsets to find out exactly what type of projects are being done, and also their website has lots of information in general on climate change to help educate and raise awareness.

Convincing departments to include carbon offsets into their budget will probably be more difficult. Aside from science departments, it seems that most departments are usually struggling to stretch existing funds. Tracking air travel within departments, however, seems feasible since this would merely entail a little extra effort to record this information. Similarly, it should not be difficult for the travel office to implement a system where they

record air travel miles. The main challenge lies in convincing departments and the travel office that it is worth their time to make the extra effort to track and record air travel.

As mentioned, there are certainly negative sides to carbon offsets, and while it may not be the ultimate solution to reducing carbon emissions it is one option that exists. Most importantly, it is an effective way to raise awareness about one's individual carbon footprint and impact on climate change. If the admissions and department offices can take the extra effort to encourage carbon offsetting, this could significantly reduce the UW's overall greenhouse gas emissions.

Carbon Offset Recommendations

Based on our research we have come up with several recommendations for the university in order to support the reduction of UW air travel. First, the admissions office should prompt prospective students to off-set the carbon gas emitted from their air travel by donating to a carbon offset provider, either Native Energy or Climate Trust. We think there are several positive aspects that may result from prompting prospective students to off-set their carbon gas emissions. First, offsetting is an opportunity for a person to invest in a project that will reduce overall global warming gases. Second, even if a prospective student chooses not to off-set their carbon emissions, it will help raise individual awareness of one's carbon footprint which is especially important for air travel because many people do not realize how heavily air travel adds to global house gas emissions. Third, it demonstrates to prospective students the university's commitment to both raising awareness and participating in ways to fight global warming. Fourth, if there are a large number of students who do choose to enroll at the UW in part because of its image as an environmentally aware university, there will be an increase in the number of students on campus who are aware of environmental problems and most likely interested to get involved in environmentally related projects. In other words, attracting environmentally conscious students will be good for the university.

All departments should be expected to include offsetting in its budget, encourage students, colleagues and visiting professors to offset flights for travel, and finally, track yearly air travel and offset out of pocket at the end of the year. Encouraging students, colleagues, faculty and visiting professors to offset their emissions is not only important to actually reducing carbon emissions, but perhaps more importantly to make people aware about their impact on global warming. It is also vital that a system is designed to track yearly air travel miles because otherwise there is no way to measure whether or not UW is reducing its emissions caused by air travel. This system should be created in all the departments as well as the travel office.

Deliverables

E-Brochure

For our primary deliverable, we created an E-Brochure which discusses the impacts of air travel, and ways to mitigate these impacts. Owing to the fact that many in the UW community use different web browsers, we placed the introduction to the E-Brochure in

the body of the email, and created a PDF document for attachment. The introduction reads as follows:

Air travel by UW faculty, staff and students contributes a significant amount of the total UW greenhouse gas emissions.

The average American is responsible for 20 tons of carbon dioxide emissions annually. One round trip flight from the United States to Europe emits 3-4 tons of carbon dioxide into the atmosphere. Frequent air-travel disproportionately increases your carbon footprint and your impact on global warming.

The Facts about Air Travel and Greenhouse Gases

- Air travel is responsible for 9% of the total human impact on global warming.
- When you fly, the fuel used produces carbon dioxide, a greenhouse gas. In addition, there are other effects beyond fuel-based carbon dioxide that add to global warming. These effects include nitrous oxides which convert to ozone at high altitude and the creation of contrails which trap heat that would otherwise escape from the earth.
- These effects are so significant that estimates of the global warming impact from air travel are 2 – 4 times greater than that from the fuel burned alone.
- It takes 10 gallons of crude oil to make 1 gallon of jet fuel. It takes 77 gallons of jet fuel to fly one person from New York to LA on a commercial flight. This means that it takes 770 gallons of oil for one person to fly across the country!

Recognizing the significant impact of air travel on the University's greenhouse gas emissions while considering the often essential-nature of professional air travel, please consider a strategy of reducing and rethinking unnecessary air travel, and offsetting air travel when it is necessary. Please see the attached document for ideas and strategies for accomplishing this goal.

We chose to emphasize the impacts from air travel in the introduction in order to gain the readers' interest. As an educational campaign, we want to focus the readers' attention to the impacts of air travel, impacts which many may not understand or consider. Since we could not use the exact numbers from the still not yet released UW GHG inventory, we begin the introduction by simply stating that air travel by members of the UW community contributes a significant amount of the total UW GHG emissions, a fact which we believe many do not currently know. After stating this fact, we explain the impacts of air travel on climate change, again providing information that many readers might not currently be aware, and then invite the readers to consider the impacts of their actions and look to the rest of the E-Brochure for strategies to reduce their impact.

The attachment section of our E-Brochure begins with an easy to read outline of the technological replacements for air travel available at the University. By providing alternatives such as virtual conferencing at the start, we hoped readers might find a way to eliminate some of their unnecessary travel through the realization that technological replacements do exist. We do understand that in most cases the readers will still wish to travel, so we move on to asking the readers' to consider their impact on climate change and providing suggestions on how to travel light. While unquantifiable, we believe that if readers' simply consider the impact of their travels, it will raise their awareness and may serve to reduce overall professional travel. Finally, we call on readers to acknowledge their personal impact through the purchase of carbon offsets. We present a brief explanation of carbon offsets and present our two recommended providers. As explained

earlier, carbon offsets are not the ultimate solution to climate change, but can play an important educational role by forcing individuals to recognize their personal impact on climate change.

Daily Article

For our other deliverable, we composed an article for the Daily which mirrors many of the themes from our E-Brochure, only written in a more journalistic manner. The article introduces readers' to the impacts of air travel on climate change, explains the technologies available which can eliminate unnecessary travel, describes methods to travel light, and explains carbon offsets and our two recommended providers. Similar to the E-Brochure, we wrote this article as a method of raising awareness, especially regarding the impacts of air travel and how one personally contributes to climate change through air travel. We close the article by stating: "Along with making individual conscious decisions, we must educate those around us on how choices that we make in our daily lives effect the global environment and how we can change our lifestyles to reduce this impact." With the main goal of reducing professional travel in mind, we hope that this article will stimulate conversation and discussion initiated by the readers on this issue.

Overall Challenges, Barriers, and Recommendations

Challenges and Barriers

We faced many challenges and barriers in this project. First, our early research into virtual conferencing illustrated the limitations in replacing professional travel. As mentioned earlier, while virtual conferencing can replace some unnecessary travel, it does not provide a sufficient alternative in many instances. Turning to carbon offsets, we ran into the myriad of concerns regarding this issue, again mentioned earlier in this paper. Without a system of certification or industry standards for these companies, we had to rely on second party research and e-mail contacts to make our carbon offset provider recommendations. In our investigation to find ways to travel light, we ran into the obvious challenge of alternatives to air travel, that in many cases do not exist. As long as we have cheap, (relatively) easy and available air travel, it will be difficult to convince people to use alternatives. These issues along with information we gathered through our informal faculty interviews, which concluded that there are elements of traveling to conferences and research sites which are invaluable, demonstrate some of the main challenges we ran into.

The biggest barrier involved trying to find a way to track professional travel at the UW. The soon-to-be-released inventory relied on an estimate based on financial records of overall UW air travel. With no central accounting of miles traveled or destinations, the inventory used purchasing records from the financial office and extracted airfare from travel costs. Then, using the average per mile airfare cost provided by the University of Texas travel office, deduced the miles traveled from this data. This provides an inaccurate approximation and does not give us a useable metric in any way. Contacts with the UW Financial and Travel office did not provide any insight into this matter, and

the staff seemed generally annoyed at our inquiries. Contact with the University of Texas Travel office seemed hopeful at first since the head of the department responded that although they too did not have a method for tracking, they would think over the issue and get back to us. In the end, they quit responding to our emails.

Similar to lacking a system that tracks professional travel, we do not have any way to quantitatively measure the impact of our educational campaign after its release. While we would like to believe that our efforts will induce an impact, we have no way of knowing, especially since we do not have a reliable metric to measure professional travel.

Final Recommendations

Track Professional Air Travel

Our primary recommendation involves the UW Travel office creating a usable, uniform air travel tracking system for professional travel. The UW can not manage that which it can not measure. Some suggestions include working with the Financial office to establish a database for travel purchases and centralizing the purchase of tickets and arrangement of travel through the Travel office since much currently happens in an ad hoc manner through departmental and personal administrative staff. If the UW wants to get serious about reducing GHG emissions from professional travel, they must find a way to measure this travel in order to implement effective policies.

Expand Virtual Conferencing Tools

The University's Information Advisory Technology Committee should investigate the feasibility of contracting with a web-based virtual conferencing company to supplement UW's current suite of collaboration and videoconferencing tools. Additionally, the Office of Learning Technologies should evaluate the use and effectiveness of current virtual conferencing facilities.

Prompt Offsetting

Possibly outside the scope of our project, our group came up with the idea of working with the Admissions office to offer carbon offsets to visiting students. Through a free splash page on the Native Energy Website, the Admissions office could offer visiting students the opportunity to offset their visit, with the hope of raising awareness among potential students, highlighting the UW's commitment to combating climate change, and potentially attracting more environmentally aware students to the University, with the direct affect of increasing the environmental awareness of the student body. While this would not reduce UW GHG emissions directly, by raising awareness of applicants it could lead to more students wishing to undertake independent studies such as this one.

Continue Outreach and Education

Our final recommendation involves a continued educational campaign to highlight the issues raised in our E-Brochure and article for the Daily. Increased awareness about the impacts of air travel, technological alternatives to air travel, how to travel light, and the importance of recognizing one's personal contribution to climate change through carbon offsets can work in combination to reduce overall UW GHG emissions.