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Climate Action Strategy for Transportation



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List of Abbreviations

The following table describes the meaning of various abbreviations and acronyms used throughout the paper.

Abbreviation	Meaning
BtCM	Bike to Campus Month
CAST	Climate Action Strategy for Transportation
CBSM	Community Based Social Marketing
GIS	Geographic Information Systems
HFS	Housing & Food Services
HOV	High Occupancy Vehicle
HR	Human Resources
ICT	Individual Commuter Ticket
LTS	Levels of Traffic Stress
OCHA	Off Campus Housing Association
PPUP	Pay Per Use Parking
RitR	Ride in the Rain
SOV	Single Occupancy Vehicle
TS	Transportation Services
UTC	University Transportation Center
UW	University of Washington

Chapter 1 Introduction

The Climate Action Strategy for Transportation (the CAST) outlines actionable strategies to reduce carbon emissions produced from Transportation Services' operations and from Seattle campus commuting. The CAST responds to the UW Climate Action Plan, a plan that describes the university's intent to achieve climate-neutrality by 2050 and meet its obligations under the American College & University Presidents' Climate Commitment. The CAST seeks to answer the question: **What are the most effective strategies Transportation Services can employ to reduce emissions from its operations and from Seattle campus commuting?** In answering this question, the CAST sets out interim goals and strategies that will guide Transportation Services' staff to making the department's operations and campus-commuting climate neutral, as well as enable the department to engage with UW Climate Action Plan implementation as an informed partner and meaningful contributor. This is intended to be a working document, which will be revised as new technology is developed, contexts change, data is gathered, and opportunities are presented.

1.1 Why Transportation Services?

Carbon emissions from transportation represent nearly one-third of total greenhouse gas emissions at the University of Washington (27 percent for commuting, 2 percent for Fleet vehicles, and 0.7 percent for electricity) (see Figure 1-1). Because a significant portion of the university's emissions derive from transportation-related activities, it is

essential that Transportation Services take action in reducing these emissions. This is why in 2013 Transportation Services' leadership made it a strategic objective to champion environmental stewardship by developing this Climate Action Strategy.

Not only is reducing carbon emissions from Transportation Services a priority for department and university leadership, but it is of great interest to the campus population. The university's students and employees are increasingly interested in improving the sustainability of the UW, especially in the transportation sector. In the 2014 Climate Action Plan Sustainability on Campus Questionnaire, in ranking sustainability initiatives, students and employees placed decreasing drive alone rates and encouraging the use of U-PASS as their second and third highest priorities respectively.



Figure 1-1: Transportation Services is responsible for nearly one-third of Seattle campus emissions

1.2 Beyond carbon

Advancing lower-carbon transportation not only helps the university meet its climate commitments, but also helps the university pursue its other ambitions. The CAST builds on the university's pursuit of better ways to learn, live, and work. The university recognizes the importance of providing environments that support a safe and healthy place to work and learn. In addition to reducing emissions, encouraging the use of

lower-carbon transportation fosters active and healthy lives, increases sense of community, and helps ensure access to campus despite increasing fuel costs and traffic congestion. Transportation is a key element of commuters' daily lives and serves to set the tone for their time on campus. Likewise, easily navigable transportation options and a welcoming invitation to people arriving by all modes of transportation is a critical element to leaving exceptional first and last impressions for all people who come to campus, a charge set forth by President Young to Transportation Services.

At the same time, Transportation Services recognizes that reducing carbon is one of many departmental and university-wide goals, and that strategies aimed to decrease emissions will need to take into account these broader aims. The CAST often takes a purely-carbon lens on strategies, and thus it is important that those involved in implementing these strategies do so in a manner that respects and seeks to achieve other goals.

1.3 Funding

The CAST helps Transportation Services decide how to reallocate existing resources based on improved prioritization of strategies as well as proposes strategies for which additional resources will be sought.

Transportation Services recognizes its role within the larger university and plans to continue to be part of the institutional dialogue regarding where and how to most cost-effectively reduce carbon emissions. Furthermore, Transportation Services plans to explore the option to mitigate the carbon for which it is responsible for by funding other reductions at the university.

1.4 Transportation Services' financial investment

Carbon reduction strategies will often not have high financial returns on investment, therefore Transportation Services intends to allocate funding in its budget and/or pursue outside funding to achieve the ambitious goal of becoming carbon neutral by 2050. Transportation Services intends to allocate funding in relation to the progress being made in comparison to the reductions required based on a linear trend. In other words, Transportation Services aims to provide additional funding towards carbon reductions when actual emissions are greater than the target emissions. Target emissions are based on a linear regression using baseline emissions from 2005 (or 2013 in the case of electricity) and the 2050 goal of zero emissions. The amount of funding that Transportation Services intends to allocate will be the delta between the target emissions and actual emissions multiplied by the social cost of carbon determined by the EPA at a 5 percent discount rate. This will be considered on an annual basis when emissions data is collected. The funding will go towards carbon reduction strategies until such strategies have been reasonably exhausted at which point funding will go towards carbon offsets. Funding will be applied the following fiscal year. Emissions will

be tracked and considered individually for each sector (electricity, Fleet vehicles, and campus commuting) as well as collectively.

Though Transportation Services does not plan to purchase offsets in the coming years, and even if it is meeting targets, it may explore the option to facilitate customers to voluntarily purchase carbon offsets.

1.5 CAST updates

The CAST is intended to be a living document that will be regularly updated as knowledge is obtained and data is collected. Besides regular updating, Transportation Services intends to conduct a meaningful review of the CAST every five years.

1.6 Structure of the document and how it will be used

The CAST is divided into three main sections based on emissions sources. The first section discusses emissions from electricity used in Transportation Services' parking facilities and offices. The second section explains existing conditions and future

opportunities for emissions reductions of Fleet vehicles. Finally, the third section outlines how to reduce emissions from Seattle campus commuting. Each of these emissions sources is championed by a different manager at Transportation Services: the Facilities manager, the Fleet manager, and the Commute Options manger respectively.

Though it is up to each manager to decide how best to use the information provided in the CAST, the general process for strategy implementation involves developing a strategy selection process, determining potential strategies, evaluating and selecting strategies using the selection process, Strategy Implementation Process

- 1. Develop a strategy selection process
- 2. Determine potential strategies
- 3. Evaluate and select strategies using selection process
- 4. Secure funding
- 5. Pilot strategy and evaluate
- 6. Implement broadly
- 7. Monitor and evaluate

securing funding, piloting the strategies, implementing the strategies on a broad scale, and lastly monitoring and evaluating on an ongoing basis. The CAST suggests strategies as well as research questions whose answers can help develop additional strategies. These strategies form the foundation for how Transportation Services can reach its carbon reduction goals. Additionally, the CAST outlines specific carbon reduction goals for each sector based on extrapolated rates to reach carbon neutrality by 2050.

Note: An electronic version of this document as well as relevant documents (including a corresponding thesis that outlines the methodology and sources used) can be found in Transportation Service's files:

I:\groups\fac\trans\upass\A New File System\Climate Action Plan\FINAL DOCUMENTS

Chapter 2 Electricity

2.1 Background

TS uses electricity in its offices and in its parking facilities. Though most of the electricity is purchased from Seattle City Light, which generates its electricity from carbon-neutral sources (primarily hydro power), TS still aims to reduce electricity consumption. When TS reduces its demand for electricity, that carbon-neutral electricity is available for other consumers, thus potentially reducing the demand (or future growth in demand) for carbon-based electricity. Furthermore, TS may use some electricity generated from the campus' central utility plant, which combusts natural gas, a carbon-emitting form of electricity generation. Emissions from electricity can be seen in the following equation:

Emissions = (hours of electricity usage) x (kilowatts/hour) x (MgCO₂e/kilowatt)

Transportation Services can theoretically reduce emissions from electricity use by altering any three of these contributing factors:

- The **hours of electricity used** can be reduced by decreasing the amount of space requiring electricity, reducing the demand for electricity-drawing devices (e.g. use less lighting), and reducing the amount of time electricity-drawing devices operate.
- More energy-efficient devices can be used.
- The **source of electricity** can be changed from higher-emitting sources to campus-based low-emitting sources (this will be measured as reduction in electricity consumption).

Note: Though opportunities for reducing emissions are separated into these three contributing factors, measurements are given in kWh and MgCO₂e.

Strategies to reduce these three factors may reduce emissions for TS, but these strategies may have negative external effects, including:

- Decreased lighting could increase safety concerns.
- Some strategies may increase burden on staff or reduce staff satisfaction or productivity (e.g. decreased temperatures in offices).

2.2 Baseline data and CO₂e emissions goals

Baseline data for TS electricity use was collected for the first time in fall 2013. Data from the fiscal year 2012-2013 was collected to establish a baseline for emissions from parking facilities and offices. In sum TS electricity use emitted approximately 894 MgCO₂e in FY2012. The specific facilities and respective emissions can be found in Table 2-1.

Building	kWh	MgCO₂e
Central Parking Garage	952, 567	354
Padelford Garage	116,494	43
Portage Bay Garage ¹	620,890	231
(including TS offices)		
S1 Parking Garage ²	73,961	28
Triangle Parking Garage	638,194	237
Total Building Electricity	2,402,106	894

 Table 2-1: Electricity use and carbon emissions from Transportation Services

 buildings

Note: The data collected represents most of the emissions produced, however it is not comprehensive given the inability to access data. The UW Tower parking garage is not separately metered and is tied into the Tower's electricity and the meter for Fleet Services' office was just recently identified and thus meter readings have only just begun to be collected. Despite these omissions from the baseline data, emissions from the same facilities will continually be measured to have comparable data. Each facility's emissions will be calculated separately so that changes over time per facility can be observed. It will be assumed that measures used to reduce emissions on facilities similar to the UW Tower parking garage and the Fleet Services office will produce similar levels of benefits if applied to these unmeasured facilities.

¹ Meter readings started in mid-September 2012

² No data for August 2012, several months of significantly different readings (likely bad readings)

Using a linear regression between this baseline figure and a 2050 carbon neutrality goal, the following are interim targets:

Year	Interim Targets (MgCO ₂ e)
2016	822
2018	773
2020	725
2035	362



Figure 2-1: Electricity emissions reductions goals based on linear regression between baseline data and 2050 carbon neutrality

2.3 Reducing hours of electricity usage

TS can decrease the number of hours of electricity usage in several ways.

- TS can reduce electricity consumption by reducing the space demanding electricity. Square footage of both offices and parking facilities relates to demand for electricity because offices need to be heated and lit while parking facilities can require ventilation and lighting. Though reducing office space is unlikely, there may be opportunities to reduce the square footage of parking facilities. A reduction in parking facilities may not only imply a reduction in commuter emissions, but also a reduction in TS operations emissions because energy would not be required to ventilate and light facilities. When considering what parking facilities to renovate, it would be advantageous for TS to consider the amount of energy required to operate different facilities.
- TS can reduce its demand for electricity by reducing the use of electricitydrawing devices, such as HVAC, lighting, and computing. This can mean reducing the amount of lighting used in offices and parking facilities, using less heating and air conditioning in offices, and using fewer electronic devices.
- TS can reduce the amount of time electricity-drawing devices are being used. This can mean not using devices when there is no one present. For example, TS can install motion sensors to trigger lights to turn on only when a person is present, reduce the hours that lighting in parking facilities is set to be on, turn electronics off or to an energy-saving setting when not being used, etc.

2.4 Improving energy efficiency

TS can reduce emissions by improving the energy efficiency of its electricity-drawing devices by either replacing the devices with more energy-efficient equivalents or by making current devices more efficient. For example, currently TS uses fluorescent lighting in parking facilities because it is the most cost efficient technology on the market. LEDs, which are more expensive but more energy efficient, could be installed to reduce emissions.

2.5 Reducing emissions from electricity production

As discussed before, TS receives electricity from Seattle City Light (which is a carbonneutral energy source) and the campus' central utility plant. There exist opportunities to either improve efficiency of the central utility plant or begin production of energy from other sources (e.g. solar photovoltaic, wind (off-site), landfill methane, emerging technologies). One opportunity that may be viable would be to use solar photovoltaics in association with electric vehicle charging stations. If vehicles can be charged during the times that energy is being produced through the photovoltaics (during peak solar hours) and used when energy is not being produced (at night, during commute hours), demand for electricity during peak hours could be reduced. Furthermore, emerging technology may allow stored energy in electric vehicles to be drawn out during peak demand times (early morning and evening), thus not requiring fossil fuel-produced energy to meet these high-demand times. While this is one potential strategy, by in large strategies to reduce emissions from electricity production largely lay outside of the scope of TS operations.

Small scale solar photovoltaics may be a favorable option for powering devices at the location of use. For example, lighting and pay stations can be powered off the grid using localized solar panels.

2.6 Current Electricity Usage

Reducing the hours of electricity usage and improving energy efficiency both require an evaluation of what electricity is currently being used for (e.g. lighting, heating and cooling, ventilation, etc.) and the nature of that usage (e.g. level of use, hours of use, efficiency of devices). The following list provides a general idea of what electricity is currently being used for; however, considerable amount of research needs to be invested to determine the nature of that usage as well as opportunities for improvements.

Electricity used in parking facilities primarily goes towards lighting, but some goes towards ventilation and operating access gates/doors. The following is a list provided by the former TS' Parking Facilities Manager, outlining the primary electricity uses in each campus parking facility.

- 1. Central Parking Garage A large vertical vent served by fans and carbon monoxide monitors (see the twin stacks in Red Square).
- 2. Triangle Garage Lighting and large fan turbines wired into carbon monoxide sensors.
- 3. UW Tower Garage—Primarily lighting access rollup doors are incidental power.
- 4. Padelford Garage Primarily lighting.
- 5. South Campus S1 Lighting and carbon monoxide monitors that operate exhaust fans to ventilate S1 Lower Level.
- 6. 4545 (N28) Primarily lighting.
- 7. W51 (Roosevelt Commons) Utilities are operated by the Building Property Management company.
- 8. Stevens Court complex W32, 33, & 29 Primarily lighting. W32 and 33 ventilation fans have not been necessary since emissions have improved.
- Mercer Court Lighting is the only electrical usage charged to Transportation Services.
- 10. Cedar Hall Garage W20, 21, 22, 23 Primarily lighting, access roll up doors can be a noticeable percentage of power use as the lot is in the closed position as default, doors must open on each use. Both employees and students park in the lot.
- 11. Surface lots are primarily lighting, however, E1 gate access system power use varies with use
- 12.X Lot Primarily lighting (soon to be rebuilt so the system may include carbon monoxide sensors and ventilation).

Electricity used in offices primarily goes towards HVAC. Additional electricity is used to power office functions such as lighting, electronic equipment, and incidental low-voltage draws such as desk phones and LAN modems.

2.7 Strategies

Separate strategies will be taken to reduce emissions from electricity used in offices versus electricity used in parking facilities. This is because electricity used in offices is common to other buildings across campus, whereas electricity used in parking facilities is unique to Transportation Services. TS plans to take a systematic approach to reducing emissions from electricity usage through strategies to conserve energy.

2.7.1 Offices

For electricity used in offices, TS intends to apply university-wide policies, which are currently being developed by the Environmental Stewardship Committee. TS will designate a leader to carry these policies out and allocate funding to these efforts, though funding can be combined with those used for strategies in parking facilities and used on whichever measures are most desirable.

2.7.2 Parking Facilities

The approach taken to reducing emissions from electricity used in parking facilities can be divided into two stages. The first stage requires establishing a structure for completing strategies while the second stage involves the operations of implementing strategies. The implementation of the strategies will likely occur within the context of recommissioning or retro-commissioning.

Stage 1—Establish Structure:

- 1. <u>Designate leaders</u> for this process (currently the Facilities manager for existing facilities and the assistant director for new facilities and redevelopment).
- <u>Create a policy for how to select strategies</u> (TS can use Facility Services' Conservation Program Outline (I:\groups\fac\trans\upass\A New File System\Climate Action Plan\FINAL DOCUMENTS\Additional Resources\Electricity) as a template and make alterations necessary to fit TS needs, goals, and values. Such a policy can take into account the return on investment, available rebates and incentives, and perhaps public image and marketing potential.).
- 3. Identify potential strategies
 - a. Audit parking facilities (Facilities Services' energy conservation manager can facilitate a meeting with Campus Engineering, Seattle City Light Lighting Design Lab's lighting designers, and Facilities Services' energy engineers).
 - b. Consider Green Garage Certificate's suggested measures.
 - c. Consider best practices currently being used in our facilities.
 - d. Consider best practices currently being used elsewhere.

Stage 2—Select and Implement:

- 1. <u>Select strategies</u> to fund using the policy created in Stage 1.
- 2. <u>Design the strategy</u> to fit the needs and specs of the parking facility.
- 3. <u>Allocate funding</u> from either TS sources or identify outside funding opportunities.* *Funding for these capital projects needs to be established with the expectation that the return on investment may be low or negative.
- 4. If possible, pilot the strategy.
 - a. Select two or more similar facilities.
 - b. Collect baseline data of both the control and the affected facilities.
 - c. Implement the strategy.
 - d. Collect post-strategy data.
 - e. Evaluate effect.
 - f. Adjust as necessary.
 - g. Calculate return on investment (carbon saved per dollar).
- 5. Implement strategy on broad scale.
 - a. Collect baseline data.
 - b. Apply strategy.
- 6. Evaluate and monitor.
 - a. Evaluate effect.
 - b. Report to TS and public if appropriate.

Potential Strategies

The Green Parking Council has developed a beta version of a *Green Garage Certification Handbook 1.0.* This handbook outlines what defines sustainable parking facilities and is intended to be used for both assessing facilities and providing suggestions for improvements. The handbook covers dozens of opportunities for sustainability improvements, including the management of the facilities, the programs within the facilities, and the technology and structure design of the facilities. It is in this last section where strategies pertaining to electricity can be found. In particular, the handbook highlights four main areas in which emissions from electricity use can be reduced. These strategy areas are summarized below, but more detailed information can be found in the handbook at:

http://www.greenparkingcouncil.org/downloads/GPC_Certification_1.0_Public_Beta_We b.pdf.

Area 1: Mechanical Systems and Controls in Occupied Spaces

Mechanical systems and/or control devices can be implemented to reduce energy used for heating, air conditioning, and ventilation of parking structures with human occupied spaces.

Area 2: Lighting Controls

Systems can be installed to regulate the amount of lighting or timing of lighting such that lights are illuminated only when and where necessary.

Area 3: Energy-Efficient Lighting Systems

More energy-efficient lighting systems can reduce electricity use and operating expenses (though can have high initial capital expenses).

Area 4: Energy-Efficient Ventilation System

Energy-efficient demand controlled ventilation technology can reduce energy consumption required to meet standards for carbon monoxide and nitrogen dioxide.

Additional Resources:

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Chapter 3 Fleet Vehicles

3.1 Background

UW's Fleet Services manages nearly 700 university vehicles that are used for all types of university business, from dump trucks for Maintenance and Alterations to vans for field trips to sedans for professional meetings. These myriad vehicle uses can be divided into two groups: (1) assigned vehicles, which are used by the same people daily and include uses such as mailing services, police, carpenters, and grounds, and (2) short-term rentals, which are used by an individual or a group for a number of hours to a few months. Though Fleet's goal is to reduce its fleet size, it has been forced to grow as a result of the university's continued growth in population and square footage. Furthermore, due to safety concerns, Fleet replaced its 12 passenger vans with seven passenger vans (which inherently required more vehicles).

Despite the growing number of vehicles and the increase in miles driven, Fleet has successfully reduced fuel use and emissions. It has accomplished this through purchasing new vehicles with improved gas mileage, adding new technology to existing vehicles, and right sizing vehicles to ensure that appropriate vehicles are used for the trip needs. Fleet recognizes that reducing its emissions requires investments that are unlikely to pay off financially. Ron Kahler, the former Fleet manager, says that he makes decisions that are sustainable and cost-effective for the university. In addition to the advancements currently being made, there may be potential for Fleet to further reduce emissions and to make more strategic decisions using additional research and cost benefit analyses.

Emissions from the fleet vehicles derive from three different factors as depicted in the following equation:

Emissions = (Gallons of fuel used) x (BTUs/gallon) x (MgCO₂e/BTU)

Reducing any of these three factors will affect the emissions produced. This means Transportation Services can:

- Reduce vehicle miles traveled.
- Increase fuel efficiency.
- Increase the use of lower-emission fuels.

3.2 Baseline data and CO₂e emissions goals

Baseline data for Fleet vehicle emissions was collected in 2005 and emissions data has been collected annually since then. The data accounts for all the fuel used in Fleet vehicles and uses emissions factors from the 2005 GHG Inventory. The 2005 baseline data shows Fleet vehicles emitted approximately 2,689 MgCO₂e.

Using a linear regression between this baseline figure and a 2050 carbon neutrality goal, the following are interim targets:

Year	Interim Targets (MgCO ₂ e)
2016	2032
2018	1912
2020	1793
2035	896



Figure 3-1: Fleet emissions reductions goals based on linear regression between baseline data and 2050 carbon neutrality in comparison to actual emissions

3.3 Reduce vehicle miles traveled

The first factor, gallons of fuel used, can be influenced by changing the way trips are made, or whether the trips are made at all. **Replacing the vehicle trip with another mode** is one option (for example if transit or biking was used instead). Another option would be to **not make the trip at all**, such as if a meeting were held over teleconference. Alternatively, trips can be made in a way that reduces the number of miles required, such as by **changing routes, changing scheduling, or carpooling**. Currently, Fleet does not actively manage the usage of rental vehicles to reduce miles driven, but they are doing some work to reduce miles driven by assigned vehicles. For example, Shuttles is expanding its use of Trapeze trip-scheduling software, which will eventually help create operating and service efficiencies in the Dial-A-Ride system.

A strategy with great potential that TS plans to prioritize for implementation is telematics. Telematics could provide data to help Fleet better understand how vehicles are being used and thus aid Fleet with future strategy selection. A specific, known application for how telematics can potentially help reduce emissions is though helping mechanics locate vehicles in need of service. Currently, Fleet mechanics driving to locate vehicles in need of repair sometimes drive additional miles in search of the vehicle. Adding GPS technology to locate these vehicles will minimize extraneous miles driven while improving employee productivity.

3.4 Increase fuel efficiency

The second factor, energy required per mile can be changed in a variety of different ways. The first is through **vehicle design**. Fuel efficiency will inherently increase as federal fuel efficiency standards increase and as new technology emerges that increases fuel efficiencies of vehicles. As Fleet replaces vehicles, even of the same model or type, the fuel efficiency of its vehicles will increase.

Besides increased fuel efficiencies that will naturally occur over time, Fleet can and does make conscious efforts to increase fuel efficiencies. Different vehicles require different amounts of energy to move the same distance (e.g. a heavy duty truck requires more energy than a small sedan). Matching vehicle type to the trip requirements is essential and is called "**right sizing**." Right sizing takes into account many factors, including the number of people traveling, the cargo being carried, the trip distance, the terrain, the total distance driven per day, and how frequently and when the vehicle is back on campus (or where it can be charged if needed). Fleet has already done significant work to right size vehicles, particularly for assigned vehicles. Short term rental vehicles, on the other hand, may not be as well fit as possible, because Fleet does not know the trip details and thus vehicle requirements.

In addition to matching vehicle type to vehicle use, right sizing also includes matching fleet size to fleet use. Fleet needs to consider not just average demand, but also peak

demand. Currently Fleet Services plans for large rental days, but also uses the car rental agency, Enterprise, to help meet demand on extra-large rental days.

In addition to right sizing, **removing extraneous weight** from the vehicle can lead to greater efficiencies (according to Professor Don MacKenzie, a 10% increase in weight leads to a 7% decrease in efficiency). Therefore, if tools or other cargo are being carried, but are not required, they could be removed to gain efficiencies. There may be significant potential for reducing emissions in this way for assigned vehicles. For example, users of service vehicles drive fully loaded with thousands of pounds of equipment to ensure they have exactly what they need for each job. There may be opportunities to leave such equipment in buildings across campus or to only carry necessary tools for each job. Additionally, routing changes for delivery vehicles can help reduce the amount of fuel used by minimizing the distance traveled while carrying the most cargo.

Besides right sizing and removing weight, **ensuring vehicles are well-maintained** to optimize fuel efficiencies can create small improvements in efficiencies. These include making sure the tires are filled to an optimum level, filters are replaced as needed, etc. Former Fleet manager, Ron Kahler, says he believes Fleet is doing the best it can to maintain vehicles to optimize fuel efficiency, though he is open to further research and suggestions for improvements.

Additionally, **eco-driving**, or changing the way in which people drive, can lead to fuel savings of 5%-20%. Eco-driving can be achieved by forcing the vehicle to operate in a given way or through driver behavior change. SCT Fleet Solutions' vehicle programmers are a new technology that Fleet has already implemented in some vehicles and plans to continue to implement in vehicles because it has observed fuel savings in vehicles with the devices. SCTs are devices that change the calibration of the vehicle's computer. SCTs force the vehicle to drive in a more fuel-efficient manner. Another device, eco meters, can be added after-market to provide drivers with real-time feedback on their fuel efficiency. These meters are intended to influence drivers through information. Fleet intends to build on this by adding incentives to drivers who achieve improved fuel efficiency over other drivers making the same trip under similar conditions. While eco meters do not inform drivers of how to achieve better fuel efficiency, such educational information can be provided to drivers. Information about how to drive in a more fuel-efficient way can be provided to drivers in Fleet's online newsletter (*Fleet Safe*), in vehicles, or in drivers training.

Similar to eco-driving, people can change their behavior in regards to idling vehicles and cold starts. Idling vehicles consumes fuel without the vehicle moving, and thus can be seen as needlessly producing emissions. **Reducing idling** requires driver behavior change, which can be influenced by education, incentives, and disincentives. For

example, drivers can be informed of the reasons why idling is detrimental to the environment. Alternatively, technology can be added to vehicles to monitor idling and then Fleet can implement rewards based on the reports collected from the instrument. Another option is for Fleet to implement a policy that does not allow idling for longer than a given time; Fleet can then choose whether to enforce the policy or not. Another source of fuel use is **cold starts**, or starting a vehicle with a combustion engine when it has not been running recently, which results in higher emissions. Therefore, clustering short trips together in a way that minimizes cold starts will reduce the fuel used and emissions produced.

3.5 Increase use of lower-emission fuels

The third factor is dependent on the fuel used to operate the vehicle, such as gasoline, electricity, ethanol, natural gas etc. Changes in fuel use can be implemented in three ways: (1) by **changing the fuel in vehicles that can already accept new fuels** (e.g. replacing B20 biodiesel with a higher biodiesel blend for all diesel vehicles or using E85 ethanol fuel in vehicles that can use it), (2) by **using an entirely new vehicle that uses a different fuel** (e.g. replacing vehicles with combustion engines with electric vehicles), and (3) by **adding technologies to existing vehicles to allow them to use a new fuel type**. Regardless of which way a new fuel is introduced, it can potentially be an extremely expensive endeavor that may require not only costly changes to the vehicles, but also expensive infrastructural changes to provide the fuel (e.g. new electric charging stations).

Fleet is currently considering two new fuels that can be used in existing vehicles. First, Fleet is evaluating the potential for using E85 in the roughly 200 vehicles that can currently use the new fuel, but Fleet needs more information about the infrastructural requirements, emissions savings, and financial costs. Second, Fleet currently uses B20 in all diesel vehicles, but it is considering increasing the biodiesel ratio. This may require the use of a winter and a summer blend.

While Fleet is not prepared to purchase exceptionally expensive new vehicles with alternative fuels, it is considering more affordable plug-in hybrids, electric vehicles, and other technologies. As the price of alternative vehicles comes down, they will be more available to Fleet as it purchases new vehicles.

Fleet is piloting two new technologies added to existing vehicles to enable new fuel usage. One technology is ECHO Automotive, an electric assist device that can be added to vehicles with combustion engines that allows the vehicle to operate with the same amount of power while using less gas. ECHO Automotive gives vehicles an additional push using an electric battery to supplement the combustion engine. Fleet is also testing Via Motors, a device that converts vehicles with a conventional gasoline drive chains into a series hybrid.

3.6 Strategy development process

In order to evaluate the most effective changes to be made within these three factors, more in-depth research needs to be conducted. The process from research question to broad scale implementation of a strategy closely aligns with the Strategy Process developed for reducing commuter emissions (see Appendix 1). For those research questions for which it would be impractical to do on-site tests, analysis can be done from an academic and theoretical perspective (e.g. a literature review of best practices, analysis of systems requirements, etc.).

Some of this research can be conducted by Fleet staff alone, but collaboration with UW academics could provide some useful assistance. Professors Don MacKenzie and Anne Goodchild have offered to support this research. There are several options Fleet can pursue for obtaining student research help.

- 1. Hire a professional student as a consultant to do this research.
- 2. Work with a student who has research assistant funding and would like to assist in this research on the side.
- 3. Work with a student who does this research for his research assistant funding.
 - a. This may be difficult because the project would require a more stimulating topic than just a consulting-type project as this currently appears in order to fulfill the thesis requirements. Furthermore, professors would need to dedicate their limited funds for research assistants and this is likely not an option given the scope of this research.
- 4. Work with a self-funded (professional) student who uses this research as his final project.
- 5. Work with a student or students seeking project work as part of a class.
 - a. Research topic must be limited in scope given the 10-week time period.
- 6. Hire a professional (self-funded) student as an intern, likely over the summer, to do research and turn it into his final project. (This is likely the best option)

3.7 Research questions

Of the ways to reduce Fleet vehicle emissions, some are within the control of Fleet Services while others are controlled by drivers and other departments, but can be influenced by Fleet Services. The former Fleet manager, Ron Kahler, has identified which questions are of high priority for Fleet, though he is interested in all research questions.

3.7.1 Fleet control

- 1. How well are vehicles right sized to fit their use in rentals? How can Fleet better right size their rental vehicles?
 - a. Increase fuel efficiency
 - b. Ongoing, high priority for Fleet
- 2. What technologies exist to improve fuel efficiency in existing vehicles and how effective are such technologies?
 - a. Increase fuel efficiency
 - b. Ongoing, high priority for Fleet
 - c. Fleet is currently piloting SCTs. Additional research can be done as technologies emerge.
- 3. What fuel changes can be made to existing vehicles to reduce emissions (e.g. E85, increased biodiesel) and what are the infrastructural changes required?
 - a. Increase use of lower-emission fuels
 - b. Ongoing, high priority for Fleet
 - c. Fleet is currently piloting ECHO Automotive and Via Motors.
 - d. A cost-benefit analysis is required. This is lower hanging fruit than replacing vehicles (question 4).
- 4. What new vehicles with alternative fuel sources can be used in lieu of existing vehicles (or with the expansion of Fleet's number of vehicles) and what infrastructural changes would be required, if any?
 - a. Increase use of lower-emission fuels
 - b. Medium priority for Fleet
 - c. A cost-benefit analysis is required.
- 5. How can cold starts be reduced while also maintaining even usage between vehicles for assigned vehicles? For rental vehicles?
 - a. Reduce fuel consumption
 - b. Low/medium priority for Fleet
 - c. This requires checking with the vendor that manages the vehicle assignment technology.
 - d. If current technology does not allow for this, Fleet could request an addition to the technology to allow for this. Collaboration with other customers of the technology may be necessary.

3.7.2 Fleet influence

- 1. How can the schedules, routes, and operation of assigned vehicles be altered to reduce miles driven?
 - a. Reduce fuel consumption
 - b. Medium priority for Fleet
 - c. Currently aware of only 3 groups with routes
 - Mailing services—a study was done in 2010 (A Model for Emissions Reduction Evaluation in Urban Pickup Systems: A Heterogeneous Fleet Case Study). How was this study conducted? How was it used? Could the methods/results be applied elsewhere?
 - ii. Laboratory medicine—this group may be a bright spot since it may have carefully analyzed and optimized its routes/schedules
 - iii. Laundry services—this group may not be operating on a schedule
 - d. Are there other groups that operate on routes? Could groups that currently do not operate on routes maintain or improve their operations while reducing emissions if they did operate on routes?
- 2. How can students, staff, and faculty accomplish their business needs in a more carbon efficient way?
 - a. Reduce fuel consumption
 - b. Medium priority for Fleet
 - c. Tripwire: introduction of bike share
 - d. Education and outreach strategies
 - e. Need to know what types of trips U-CARs are currently being used for
- 3. What strategies can be implemented to reduce vehicle idling for assigned vehicles? For rental vehicles?
 - a. Reduce fuel consumption
 - b. High priority for Fleet
 - c. Behavior change tools can be used (feedback, prompts, rewards, policy change, enforcement)
- 4. What opportunities exist for removing extraneous weight from assigned vehicles?
 - a. Increase fuel efficiency
 - b. High priority for Fleet
 - c. Potentially easiest to achieve
- 5. What are the most effective ways of encouraging or enforcing eco-driving for assigned vehicles? For rental vehicles?
 - a. Increase fuel efficiency
 - b. Ongoing, high priority for Fleet
 - c. Fleet is currently piloting eco meters.
 - d. Behavior change tools can be used (communication, feedback, rewards)

Chapter 4 Commuters

4.1 Background

Campus commuting represents the second largest source of Seattle campus emissions, only behind emissions produced from the campus power plant. Campus commuting includes students, staff, and faculty traveling from their home to campus.

Emissions from campus commuting are the product of several contributing factors as represented in the following equation:

Emissions = (miles commuted) x (CO₂e/mile) x (days/week) x (weeks/year) x (number of commuters)

TS can theoretically reduce emissions from campus commuting by reducing any five of these contributing factors.

- The **miles commuted** can be reduced by encouraging more commuters to live closer to campus.
- The **carbon emitted per mile** can be reduced by encouraging greater use of lower-carbon modes and lower-carbon vehicles.
- The **number of days per week** commuted can be reduced by encouraging telecommute, distance education, and compressed work weeks.
- The **number of weeks per year** commuted can be reduced, though this is not within the scope of Transportation Services.
- The **number of commuters** can be reduced, though this is also not within the scope of Transportation Services. If trends continue, the number of commuters is likely to increase, meaning reduction of other factors becomes even more important.

4.2 Baseline data and CO₂e emissions goals

In 2005, 53,227 MgCO₂e were emitted as a result of Seattle campus commuting. This serves as the baseline.

Using a linear regression between this baseline figure and a 2050 carbon neutrality goal, the following are interim targets:

Year	Interim Targets (MgCO ₂ e)
2016	40,216
2018	37,850
2020	35,485
2035	17,742



Figure 4-1: Commute emissions reductions goals based on linear regression between baseline data and 2050 carbon neutrality in comparison to actual emissions

4.3 Mode emissions & mode hierarchy

Different modes emit varying amounts of carbon per mile traveled. These differences can be seen in Table 4-1. Note: national emissions rates were utilized in developing these figures, however Transportation Services intends to try to use more local data in the future to better capture real world reductions.

Mode	Average emissions (gCO ₂ e/person/mile)
Drive Alone	373
Transit	225
Carpool	172
Lower-carbon vehicles	160
Vanpool	62
Bike	0
Walk	0
Telecommute	0

Table 4-1: Per person per mile carbon emissions for each mode

The Mode Hierarchy (Figure 4-2) uses the average modal emissions to depict zerocarbon modes, moderate-carbon modes, and high-carbon modes. It does not include lower-carbon vehicles since they are seen as having many of the same negative repercussions as driving alone (including land use for parking, traffic congestion, etc.) and significant efforts to encourage them will be used secondarily to modal shifts. This reveals the mode shifts that Transportation Services desires—from higher-carbon to lower-carbon. The goal of the strategies for mode choice is to move people up the Mode Hierarchy, and neither down the hierarchy nor within the same level.

Mode Hierarchy



Figure 4-2: Mode Hierarchy based on carbon emissions per person per mile

4.4 Target groups and modes

With nearly 70,000 commuters, Transportation Services can better focus its efforts by targeting specific types of people and modes that will likely result in the greatest carbon impact. Calculations were completed to reveal which mode shifts and which populations (students, staff, or faculty) would result in the greatest carbon impact. The results showed that all modes except walking are most promising for carbon reductions. Additionally, staff showed greater potential to reduce carbon emissions than students and faculty. In addition to these calculations, research on the power of habits on likelihood to change behavior as well as individuals interested in changing resulted in the identification of several more key target groups. Table 4-2 depicts the target groups and the reason for their selection.

Target group	Reason for selection
New employees	 New employees have a significant context change at the destination end and in many cases at the home end as well. New employees will likely have new: Commute routes Transportation options (e.g. bus service, bike route) Financial and structural context at the destination (e.g. parking prices, bike parking) Financial and structural context at home (e.g. a new home/neighborhood, salary change) Coworkers/social norms Schedule change
New students	New students are facing the same context changes as new employees, but in some cases they may be facing even more significant life changes. New students are often entering a new phase of life. For many it is their first time living away from their parents and they have greater independence. College is when many people develop new habits as their context has altered in so many respects.
Individuals seeking a new home	Persons who are looking to move are considering what their new lifestyle will be in a new location. Some, however, may not adequately consider the relationship between their housing location and transportation. Helping people realize the effect that location will have on their transportation choices, commute time, and transportation expenses may cause some to select more location-efficient housing.
Individuals who are about to move or who recently moved homes	Individuals who move homes will not be triggered by the same stimuli that once prompted their transportation habits. Furthermore, a new home may mean a new commute route and different transportation options.
Individuals whose existing mode has been made worse	Commuters whose routine has been disrupted by changes to their context are likely to more deliberately make decisions about their mode. While likely angry that their habits have been disturbed, commuters whose commute has worsened may require assistance in finding a new way to get to campus, be more open to other options, and be more appeased when worsened conditions are combined with increased support.
Individuals whose transportation options have improved	When new or better options become available, people may choose to change their behavior. Of the target groups this group may be least likely to change their habits because their existing habits and triggering stimuli are not disrupted as is the case for all the other target groups identified here. On the other hand, it is important to make affected commuters aware of the improvements so that they can choose to take advantage of the enhanced context.

Staff	In a quantitative analysis of likelihood to change and carbon impact, staff had the highest combined weighted numbers, nearly three times that of faculty. This shows that staff members' likelihood to change in conjunction with the resulting carbon impact is the most significant of
	the three populations.
All modes except walking	All modes proved important in terms of carbon reductions with the exception of walking.
Individuals in the contemplation- action stages of change	It is unlikely that any strategy will move an individual through multiple stages of change, therefore, it is most important to assist commuters whose change in stage advances them towards taking action. Commuters who are considering, preparing, and taking initial steps to change their commute behavior are at points in which intervention will advance them towards further action (rather than just towards contemplation or continued action). People in the contemplation, preparation, and action stages are interested in changing but have not yet achieved adoption of a new habit. These individuals are interested in adopting new habits and will thus be more receptive to strategies.

Table 4-2: Target groups based on likelihood to change and carbon impact

In addition to the barriers identified for each mode, ambivalence is an overarching barrier for many people. Ambivalence refers to a state of experiencing conflicting values. In addition to habits, ambivalence is responsible for why many commuters choose modes that in some ways conflict with their beliefs. For example, while people may greatly value the environment and strive to live a low carbon lifestyle, they may also enjoy the comfort and convenience of driving. Ambivalence about changing modes reveals the fact that for many people there is no perfect mode that requires no tradeoffs. People will not change as long as they perceive the cons of changing as outweighing the benefits of changing.

4.5 Barriers and benefits to change

In order to encourage greater use of lower-carbon modes, it is important to understand why commuters currently do not use these modes and what benefits they see in lowercarbon modes. Table 4-3 presents the primary barriers and benefits for walking, biking, transit, and rideshare as reported by customers through surveys and focus groups. Transportation Services' efforts will be to reduce the barriers as well as promote the benefits.

Mode	Primary Barriers	Primary Benefits
Walking	-Travel time -Safety	-Health and fitness -Convenience
Biking	-Safety from cars -Lack of knowledge -Cost of equipment -Lack of showers -Weather -Distance -Hills -Travel time -Social norms -Bike parking security	-Exercise -Enjoyment -Inexpensive -Travel time
Transit	-Travel time -Frequency of service -Transferring -Hours of operation -Lack of knowledge -Lack of control	-Inexpensive
Rideshare	-Finding a partner -Irregular schedule	-Inexpensive (relative to driving) -Travel time (relative to transit)

 Table 4-3: Primary barriers and benefits for walking, biking, transit, and rideshare

4.6 Behavior change strategy objectives and tools

In addition to knowing what commuters view as barriers and benefits to lower-carbon modes, it is important to know what tools can be used to change people's behavior.

4.6.1 Strategy objectives

There are known factors that must be true for individuals to change their behavior. Based on these known factors, it is understood that collectively strategies must achieve the following seven objectives (with extra priority given to the first three objectives)

- 1. Remove structural barriers to using lower-carbon modes and increase structural barriers to using higher-carbon modes.
- 2. Motivate people to want to change, and provide opportunities for people to commit to using lower-carbon modes.
- 3. Equip commuters with the skills necessary to use lower-carbon modes.
- 4. Ensure commuters realize the benefits of lower-carbon modes and the costs of higher-carbon modes for both utilitarian and affective factors.
- 5. Establish strong social norms around the use of lower-carbon modes.
- 6. Help people identify as someone who would use lower-carbon modes.
- 7. Raise individuals' self-confidence that they can use lower-carbon modes in many different conditions.

These seven strategy objectives can be divided into two primary strategy types: context strategies and perceptual strategies. Context strategies change the actual context in which people make decisions. Context strategies address objective factors such as the presence of facilities, access and connections, and economic structures. Context strategies include both push and pull strategies. Push strategies "push" people away from doing a particular behavior and should be used to make higher-carbon modes less attractive. For example, higher parking fees "push" car drivers away from their habit to drive. On the other side, pull strategies "pull" people towards a particular behavior. For example, providing showers and lockers "pull" people to walk and bike. While push strategies are less popular with the public, they are more effective at changing transportation behavior than pull strategies alone.

The second way to influence people's behavior is through perceptual strategies, or changing the way that people perceive their options. This means influencing how individuals evaluate the costs and benefits of changing modes. Perceptual strategies address subjective factors such as individuals' perceptions of distance, safety, cost, convenience, importance of time, importance of exercise, physical capabilities, flexibility, enjoyment, values, and social norms. People perceive these factors differently and how they perceive them influences their choice of commute mode. Some researchers propose that perceptual strategies may be far more important than has been previously assumed. They cite the fact that people with similar demographics

in similar situations choose different commute modes, showing that people with the same objective situations are being influenced by subjective factors.

Of the seven strategy objectives, the first is achieved through context strategies whereas the following six are achieved through perceptual strategies.

To help better understand and better use these strategy objectives, researchers have identified a number of key tools known to change behavior. These tools can be used to obtain a number of the strategy objectives, but have been organized based on what the researcher found to be most relevant. In developing strategies to change commuter's mode choice, tools should be utilized that correspond to the barrier being addressed. Figure 4-3 depicts the breakdown of strategy types and objectives and relevant behavior change tools.




4.6.2 Context strategy tools

Remove structural barriers to using lower-carbon modes.

These tools can be used to remove structural barriers to using lower-carbon modes, increase structural barriers to using higher-carbon modes, and generally make different modes more or less attractive through tangible changes to the physical, financial, and regulatory environment.

Convenience

Using lower-carbon modes should be easier than using higher-carbon modes. Making lower-carbon modes the rational choice is necessary to encouraging use of those modes.

How to alter convenience:

- Make using higher-carbon modes less convenient (e.g. move parking for SOV farther away).
- Alter the context to address barriers to lower-carbon modes (e.g. provide more frequent transit service, build separated bike facilities, increase lighting on walking paths, etc.).

Minor Contextual Changes

Small contextual changes can make a big difference in making it easier to change a behavior. Because the decision to bring a car to campus is made on the home end, most minor tweaks will need to happen on the home end.

How to make minor contextual changes:

• Ask people how they can make it easier to use lower-carbon modes (e.g. do they store their bike at the back of their garage so it's hard to get out? Would downloading the One Bus Away app help them get to the bus stop in time? What if they packed their pannier the night before?).

(Dis)Incentives

Incentives can encourage greater use of a desired behavior or adoption of a new behavior. Incentives, however, are often used to reward people who already partake in the behavior and whose behavior does not change because of the incentive. Therefore, it is important to primarily target incentives to audiences that will respond by initiating or advancing their use of lower-carbon transportation rather than audiences that will simply maintain their behavior.

Incentives, though they can be a contributing factor to changing behavior, are not as effective as intrinsic motivation, and the behavior change may only last as long as extrinsic motivators are present. That said, because repeated behaviors create deeper neural pathways, which make the behavior easier, incentives in place for a temporary

period may be effective at encouraging behavior for a long enough time to create new habits.

In addition to using incentives to encourage a behavior, incentives can be effective at encouraging people to seek more information and consider their options. For many, accessing information is not difficult (a simple Google search often reveals a wealth of useful information), but rallying the motivation to make that effort can be difficult. A small incentive to encourage people to make that effort can be the difference between taking steps to change and not.

Disincentives discourage people from doing an undesirable behavior (e.g. use highercarbon modes). Though disincentives are politically more difficult to implement, they are twice as effective as incentives of an equal amount. People strongly dislike losing things more than they like gaining them (e.g. a \$1 increase in the cost of parking may be twice as effective as paying people \$1 not to drive).

How to use (dis)incentives:

- Determine if an incentive is necessary to change behavior.
- Incentives need to be large enough to warrant behavior change, however beyond that point there are diminishing returns with increased size.
- Deliver (dis)incentives in a timely manner (e.g. charge parking at the time a person parks, provide preferential parking to carpools and vanpools).
- Make people aware of (dis)incentives so that they will have an impact.
- Be clear about setting expectations regarding how long the incentive will be in place since removing incentives unexpectedly can be difficult.
- Plan for how people will respond to the (dis)incentive (e.g. will people cheat the system to gain an incentive or avoid a disincentive?).
- Offer incentives for a temporary period to give external motivation during the most difficult time of adopting a behavior—the beginning.
- Non-monetary incentives that are rewards that people would not normally treat themselves to (e.g. gift certificates, electronics, massages, etc.) can be more effective that their equivalent in cash.
- Rather than incentivizing the behavior change (e.g. changed modes), incentivize getting information, thinking about the behavior, or taking initial steps.

Trials

When a new behavior can be adopted on a trial basis, people are more likely to adopt the behavior. Additionally, taking the step to trying a new mode is important because it opens up an opportunity for people to have a first-hand experience. These first-hand experiences can be powerful and persuasive, and thus efforts should be made to make these initial experiences as positive as possible. Often the most credible information is information gained on one's own, so allowing people to "try before you buy" will increase the credibility of the behavior. How to use trials:

- Provide opportunities for people to try a new mode at little cost to them in terms of time and energy (e.g. have a mentor take people on their first walk/ride to show them how to make the trip).
- Offer incentives for a temporary period for people to try a new mode (see (Dis)Incentives section).
- Allow people to use something free of charge or at reduced cost for a period of time (e.g. offer a free U-PASS for a limited time, offer people interested in biking an opportunity to inexpensively rent a fully-equipped bike before they invest in a bike and accessories, promote the ability to ride in a vanpool for a few times before committing to it).

4.6.3 <u>Perceptual strategy tools</u>

Motivate people to want to change and provide opportunities for people to commit to using lower-carbon modes.

These tools will inspire people to change their behavior and commit to doing so.

Emotion

People can be motivated to change when both their brains and their hearts believe in the change. Behavior change experts advise people wanting to encourage others to make a change to appeal to two parts of a person's decision-making scheme—their rational side and their emotional side. Their rational side analyzes and plans future behavior; it has good intentions based on analysis. Many commuting campaigns are based solely on appealing to the rational side. These campaigns advertise the benefits of saving money, saving time, burning calories, etc. in the hopes that commuters will rationally reconsider their commute options and then select a new commute mode based on analysis of this information. People's rational sides, however, are often thwarted by their emotional sides. People do not follow an analyze-think-change sequence, but instead see-feel-change. People are inspired to change not just because it logically makes sense, but because their emotional side is jolted into action. This emotional catalyst can be a disconcerting realization of the problem caused by their current behavior or an encouraging peek into what the future could be.

How to evoke emotion:

- Things that are seen evoke emotion more so than things that are read—make your message visual (e.g. videos, photos, etc.).
- People care about people, not abstractions. Personal stories are more impactful than generalizations (e.g. a story of one person who was hit by a car is more meaningful than statistics about the many number of traffic fatalities).
- Use stories.
- Write self-interest into the headline (e.g. "Give us 10 minutes and we'll give you the keys to a happier, healthier life—let us prove it—free!" or "The secret to a stress-free life").
- Have people imagine themselves in a situation (e.g. rather than saying "Vanpooling to campus makes people happier and healthier," say, "Take a moment to imagine how vanpooling to campus will give you time to relax and start your day refreshed. Imagine how instead of fighting traffic and the hassle of parking, you get to spend your morning sleeping, reading, or chatting with friends."
- Negative emotions will inspire people to take on short, clear actions (e.g. disgust with current commute behavior can encourage someone to obtain information about other modes). Positive emotions will inspire people to be flexible and creative and can last longer (e.g. hope that they can change can encourage someone to figure out how to makeover their commute routine).

- Market the emotional appeal of lower-carbon modes rather than the practical aspects of these modes since people often make decisions based on how they feel rather than what they analytically think. Follow the way the auto industry markets a lifestyle rather than measurable features (e.g. images of friends laughing on the bus to conjure up emotions of fun should be used rather than a picture of a bus).
- Use motivational interviewing techniques to help people find their own reasons for changing based on their personal values and concerns. Help individuals resolve ambivalence by helping them identify the benefits of changing and reducing the cons of making the change.

Commitments

People like to act in a consistent manner. This means that if people are asked to make a small gesture towards something (e.g. sign a petition, consider volunteering, vote in an upcoming election, commit to attending an event, etc.) they are more likely to comply with a larger request and are more likely to follow through with the commitment they made earlier (e.g. donate money, actually volunteer, actually vote, actually attend the event, etc.). This is because after complying with a small request, the person sees themselves as believing in that cause and wants to act in a consistent manner in alignment with that cause. Furthermore, when a person's actions match their statements, they are viewed as being honest and having integrity.

How to use commitments:

- Written commitments are more effective than verbal commitments.
- Public commitments are more effective than private commitments (because it strengthens the desire to act consistently).
- Commitments can be made in groups if there is good group cohesion and when individuals care how their peers perceive them. A group commitment is when the group sets a goal or commitment together to achieve cumulatively (e.g. miles biked in an office).
- Commitments can be requested by an institution, by volunteers, or by peers.
- Commitments should only be pursued for behaviors that people are interested in doing (e.g. people not interested in walking should not be asked to make a commitment to walk).
- Commitments are only effective if they are voluntary; people should not feel pressured to commit.
- People who encourage others to adopt a new behavior are more likely to do/increase their use of the behavior (e.g. people seeking commitments from others to bike are more likely to bike or increase their biking themselves).

Communication

In order to get people's attention and have them remember the content, as much as possible, messaging should be simple, surprising, concrete, credible, emotional, and

personalized. Knowing your target audience is important, because what will resonate with some will bypass others.

How to communicate:

- Use a source that is deemed credible by the target audience or use several sources, each which will be seen as credible by different people. Credible sources can be authorities (e.g. the Dean or President), people who are similar (e.g. a person with similar barriers), or themselves (e.g. "try it before you buy it" or "ask yourself if you are better off today than you were four years ago").
- Put things in human scale (e.g. no one can imagine the distance from the earth to the moon, but people do know what it is like to go from LA to NYC, or more so Seattle to Portland).
- Get people's attention by violating people's expectations—surprise them!
- Generate interest and curiosity by creating information gaps and then fill the gaps (e.g. How can you get free parking on campus? Answer: vanpool).
- When possible, use personal contact to deliver the message.
- Emphasize loss associated with undesired behaviors rather than gains accrued from desirable behaviors (e.g. lost money with driving alone is more effective than money saved when vanpooling).
- Do not create a perception of scarcity for higher-carbon modes, since things that are scarce are perceived as valuable (e.g. do not say there is limited parking).
- If using impending threat messaging (e.g. global warming), ensure your audience believes they have control over the threat and combine the threat with actionable items.
- Model the desired behavior, either in person or through marketing.
- Acknowledge that there will be obstacles and a learning curve, but that with patience and practice will come success. People are building "muscles" that will pay off later. Remember that habits allow people to operate on autopilot, but creating habits is the result of repeated actions that reinforce the behavior.
- Reduce complexity. Behaviors that are perceived to be low-complexity are more likely to be adopted.
- Maximize exposure to the message—frequency matters.

Equip commuters with the skills necessary to using lower-carbon modes.

These tools will help commuters know how to use lower-carbon modes, what to expect, and remind them to do so.

Prompts

In cases where people have the motivation and desire to engage in the behavior but simply forget to act, prompts reminding people to do the behavior can be effective.

How to use prompts:

- The prompt should be simple (e.g. don't idle when waiting, before crossing the street, look for turning vehicles).
- The prompt should be conspicuous and shown close in time and space to the decision to do the behavior (e.g. no idling signs at delivery locations, pedestrian safety campaign signage at conflict areas).
- Prompt people to engage in desirable behavior, not avoid undesirable behavior.

Social diffusion

People are highly influenced by their peers for many of their behaviors, including commuting. This can be because of social norms and because these people become a source of information by modeling the behavior and by being available to answer questions and distribute information. People are particularly influenced by those they respect and/or perceive as similar to themselves.

How to foster social diffusion:

- Encourage people to talk to their peers. Alternatively, use testimonials of respected people and/or people who are relatable (e.g. had similar barriers that they overcame).
- Employ strategies that start peer-to-peer conversations (e.g. innovative, edgy, catchy strategies).

Goal Setting

Setting individual goals is important because these goals establish an internal standard to which individuals can self-evaluate their progress. Goals inspire self-motivation to achieve a level of self-satisfaction associated with accomplishing a goal. Though a large, distant goal can be set, smaller, more proximate goals should be used. Accomplishment of sub-goals represents a step towards mastery, thus increasing self-efficacy and invoking a sense of satisfaction. Additionally, attaining these sub-goals develops intrinsic interest in the subject, further inspiring pursuit in achieving the larger goal. Without these sub-goals, individual's self-assessment in relation to a large, distant goal may be disparaging and create a negative feeling towards the subject.

How to use goals:

- Goals should be explicit to avoid people trying to get around achieving their goal.
- Goals should be set at an appropriate balance between difficulty and achievability in order to be effective so that individuals can properly evaluate their level of success.
- Goals should be proximate in time, because the closer the evaluation to the current behavior, the greater the likelihood individuals will be triggered to change.
- A larger more distant goal can be an umbrella for several more proximate subgoals (e.g. a large goal may be to vanpool three days per week by the end of the year, while smaller goals could include signing up for a rideshare matching website by the end of the week).
- Small, frequent rewards can be provided for achieving sub-goals; they are more effective at motivating behavior change than larger, infrequent rewards.

Ensure commuters realize the benefits of lower-carbon modes and the costs of higher-carbon modes, for both utilitarian and affective factors.

See the Emotion sub-section to learn why people need to feel the difference between different modes. See the Communication sub-section to learn how to communicate the costs and benefits of different modes.

Create social pressure to use lower-carbon modes.

These tools will help to create a social context that encourages use of lower-carbon modes. Also see the Social Diffusion sub-section to learn how people's behavior is influenced by the interactions they have with their peers.

Social norms

There are two types of social norms: injunctive norms and descriptive norms. Injunctive norms are in regards to what is appropriate and inappropriate behavior whereas descriptive norms are in regards to what is normal behavior. For example, injunctive norms may show that littering in the park is inappropriate behavior (perhaps because there is a sign saying so), however if the park is scattered with litter, the descriptive norm would be that it is normal to litter. It is important that descriptive norms do not counteract the strategy's purpose. For example, when households were told that they were using less energy than their neighbors, they increased their amount of energy, but when commended for their lower energy use with a small smiley face next to their energy use, they continued to use less energy.

How to create social norms:

- Make the norm noticeable (e.g. if most people take the bus to campus but all people can see if a parking lot full of cars, it may appear that everyone is driving because it is not obvious that people are taking the bus, therefore actions need to be made to advance the noticeability of transit and reduce the visual presence of cars).
- Be wary of descriptive norms when the undesirable behavior is common.
- Present the norm when people are making the decision about how to behave (e.g. inform incoming freshmen living in residence halls that the vast majority of students do not drive to campus and most students who live on campus do not bring a vehicle).
- Praise people doing desirable behavior.

Help people identify as someone who would use lower-carbon modes.

These tools help people see that using lower-carbon modes is consistent with their selfidentity.

Identity

People like to be consistent with their identity, thus people who view themselves as healthy are likely to act according to this identity by eating healthily and exercising or those who view themselves as environmentalists will act in a way they think is environmentally-friendly. The identities that people adopt shape the decisions that they make. Speaking to this identity can encourage change. Though, as noted before, habits and ambivalence can overcome identity. Recognizing the ambivalence, however, helps people move towards change.

How to cultivate identity:

- Appeal to an identity that people already have and build on that (e.g. to be a UW Husky means to commute sustainably).
- Highlight a competitor (e.g. Washington State University has more commuters biking to campus than UW does).
- Foster identity through public actions (e.g. have people put a bumper sticker on their car saying they stop for pedestrians so that they begin to see themselves as cautious drivers).
- Instill an identity that people will own to encourage them to maintain it (e.g. if you thank someone for being a vanpooler, they'll begin to see themselves as a vanpooler and want to maintain that identity).
- People who hear their behavior is admirable and associated with a commendable type of person will work to continue to align themselves with that type of person. For example, after a group of individuals volunteered to donate money, those who were thanked and told, "You are a generous person. I wish more of the people I met were as charitable as you." were far more likely to donate and donate larger amounts than people who were just thanked. Therefore, help people see themselves as a lower-carbon transportation user.

Raise individuals' self-confidence that they can use lower-carbon modes in many different conditions.

These tools help increase individuals' self-efficacy to use lower-carbon modes. Selfefficacy, which is the level of confidence a person has to complete a task or goal, is seen by some theorists as the most important factor to enabling behavior change. Selfefficacy is developed over time and requires the accumulation and operation of different skills; it is not merely a switch from inability to mastery. People who lack selfefficacy in a task may incur high levels of stress when faced with the need to do the task or even the hypothetical thought of carrying out the task. Self-efficacy will influence which activities (e.g. commute mode) people choose, how much effort they will expend to try a new activity, and their persistence when facing barriers. Therefore, strategies to improve people's self-efficacy are essential to fostering behavior change. Also see Goal Setting sub-section as goals can help break change into manageable pieces; celebrating the completion of these goals also helps to raise self-confidence.

Smaller Change

Change, especially complex change such as how to get to campus, can be overwhelming and feel impossible. Making the change feel smaller will help people overcome this feeling of insurmountable difficulty.

How to reduce the change:

- Show how the person has already made progress. Taking the first step towards what seems like a long journey, can be difficult, but helping people feel like they have already taken steps, will make them feel some investment in the change and make the distance from start to finish feel smaller (e.g. check off to-dos that a person has already done, such as if the goal is to start biking and they already have a bike—check it off).
- Think in terms of incremental steps and set goals that can be achieved in hours or days (see Goal Setting).
- Celebrate small wins (see Goal Setting).

Feedback

Feedback allows people to learn from their actions, reflect, and change their actions. It helps them see the difference they are making, and thus helps build motivation. Feedback at the community level promotes social norms that others are participating.

How to provide feedback:

- Provide feedback at both the community and individual campaign (e.g. the outcomes of a campaign, the savings an individual had because they biked rather than drove).
- Group feedback should be provided when it is adequately inspiring.
- Group feedback can be disseminated through the media.

4.7 Strategies

Building from the target groups and modes, barriers and benefits to lower-carbon modes, strategy objectives, and behavior change tools, strategies were developed to encourage behavior change. Strategies are divided into two levels of thoroughness; strategies that were determined to be of high influence level, of high carbon impact, and with interest from the Commute Options manager were given greater attention and detail and were deemed Level 1 Strategies, while the remaining strategies were deemed Level 2 Strategies and were given only cursory attention. Level 1 Strategies are highly detailed in order to provide the most guidance possible to TS; however it is understood that the actual process of implementation will diverge significantly. Level 1 Strategies that begin with "Improve" refer to changing existing strategies that are currently being conducted by Transportation Services, while all others refer to new strategies that do not currently exist. Strategies are listed in alphabetical order.

A list of all the strategies along with each strategy's corresponding carbon impact, cost (Level 1 strategies only), and influence level these can be found in I:\groups\fac\trans\upass\A New File System\Climate Action Plan\FINAL DOCUMENTS\Appendices—CAP Calculations as well as in Appendix 2. Budgets were only formulated for Level 1 strategies and can be found in I:\groups\fac\trans\upass\A New File System\Climate Action Plan\FINAL DOCUMENTS\Appendices—CAP Calculations as well as in Appendices—CAP Calculations as well as in Appendices—CAP Calculations as well as in Appendix 3. The cost figures found in the text and in Figure 4-5 represent the annual costs to operate each strategy, not the initial start-up costs. Initial start-up costs can be found in the budgets. The carbon scores are between zero and 19 and roughly correlate to hundreds of megagrams while the influence level figures range from one to five.

The carbon, influence levels, and cost numbers were charted to best determine which strategies to employ (see and Figure 4-5). Resources can be most effectively be spent on strategies with high carbon impact, low cost, and high level of influence (i.e. the

strategies found in quadrant 1 of



Strategy Carbon and Influence Levels

Figure **4-4** and the strategies found in quadrant 2 of Figure 4-5). However, Transportation Services intends to take advantage of opportunities that allow them to pursue lower-ranking strategies. The following list outlines all the strategies proposed for reducing emissions from campus commuting:

Level 1:

- Commute Ambassadors
- Commute Assistance
- Commute Calendar
- Improved Transportation Options
- Improve Commute Campaigns
- Improve Outreach through Partners
- Improve Presentations
- Improve Written and Graphic Communication
- Personalized Commute Plans
- Prospective Mover
- SmartTrips New Home
- SmartTrips New Employee
- SmartTrips New Students
- SmartTrips Commute Options
- SmartTrips Departments

Level 2:

- Better regulate on-street parking near campus.
- Better understand barriers to finding a rideshare partner.
- Develop a means for on-going relationship with customers.
- Enable carpool parking permit fees to be split by more than three people.
- Identify and improve off-campus bike infrastructure.
- Identify housing locations with high SOV rates.
- Identify why people don't drive lower-carbon vehicles to campus then develop strategies to address these barriers.
- Identify why people don't telecommute then develop strategies to address these barriers.
- Improve access to showers and lockers.
- Improve accommodation of bicyclists and pedestrians in construction detours.
- Improve on-campus walk, bike, and transit infrastructure.
- Improve transit service.
- Increase access to real-time transit information.
- Increase flexible work hours.
- Increase housing on and near campus.
- Increase parking pricing variability based on frequency of use.
- Increase the price of parking.
- Instill better bicyclist behavior.
- Make it easier for customers to cancel their parking permits and purchase a U-PASS.
- Make it easier to sign up for a carpool permit.
- Make social norms more visible in TS facilities.
- Provide more secure bike parking.
- Provide preferential parking to carpool and vanpools.
- Remove ability for carpool permits to be used as an SOV permit up to two times per week.

Climate Action Strategy for Transportation

Strategy Carbon and Influence Levels



Figure 4-4: Strategy carbon and influence levels graph



Climate Action Strategy for Transportation

Figure 4-5: Strategy carbon and cost graph

4.7.1 Commute Ambassadors

Carbon impact: 13		
Influence level: 4		
Cost: \$60,200		

What: The commute ambassador program is a peer-to-peer commute assistance program. It is comprised of volunteers from across campus. These ambassadors raise awareness of Commute Options news and campaigns, support their peers who are interested in changing their commute behavior, participate in Commute Options events and campaigns, and provide feedback to Commute Options.

Ambassadors promote Commute Options events, news (e.g. detours, light rail station openings), campaigns, and programs. They help adapt Commute Options materials and information to best fit their community's resources, culture, and space.

Ambassadors support their peers who are interested in changing or who are facing a context change. Though ambassadors are available to their peers at any point, ambassadors are encouraged to actively engage individuals who have expressed interest in changing or those who have recently faced a context change.

Ambassadors participate in Commute Options events and campaigns. They also attend quarterly meetings to learn about upcoming news, events, and programs, learn about behavior change tools and techniques, and celebrate their accomplishments.

Ambassadors provide feedback to the Commute Options team. In addition to helping Commute Options extend its outreach and support, commute ambassadors can be the eyes and ears of the Commute Options team, helping the team learn about the questions, concerns, ideas, and interests of their customers. This feedback will help Commute Options respond to better meet the needs of their customers.

Why: People are influenced significantly by their peers, both by the behaviors they passively observe and by direct communication. Ambassadors model lower-carbon commuting behavior, promote TS events, educate their peers, and are a resource for their peers. Ambassadors will be perceived by their peers as more similar and perhaps with greater respect than TS staff. Furthermore, they interact regularly and on more familiar terms than TS staff do with customers. Thus, they may be able to address the needs and questions of their peers more immediately and with greater ease than if customers needed to go directly to TS resources.

Ambassadors better know their community and thus can help Commute Options better promote programs, events, campaigns, and news. Ambassadors know where to best locate written materials and posters, how to promote events and articles in newsletters, departmental meetings, social media outlets, and websites. Ambassadors may be the best way to distribute information, with similar ambassador programs (e.g. The Whole U) raising awareness in 65 percent to 75 percent of a population versus traditional outlets reaching 10 percent to 15 percent.

Ambassadors may be more visible and easily found than TS and thus can provide easy access to transportation information. They are also more aware of their peers who are facing a context change (e.g. new employees) and can offer support to these individuals.

Who: All students and employees

- Target group of ambassadors: persons experienced in using lower-carbon transportation, desire to help others, well-known in their community
- Target group for ambassadors: persons interested in changing

Strategy details:

- 1. <u>Obtain support from university leaders</u> (This is only required if a robust commute ambassador program is desired with outreach to all campus groups. For a less formal, less comprehensive program, support from leadership is not required and recruitment can happen through TS channels only).
 - a. Labor regulations require an initial request be distributed through VPs and deans asking for them to appoint a representative in their community to serve as an ambassador. For large organizations such as Finance & Facilities, request that the leader (e.g. the senior vice president) appoint someone in his/her leadership team to help with the appointments.
 - b. Reference the Combined Fund Drive recruitment system as this is a system with which people are familiar.
- 2. <u>Recruit commute ambassadors</u>
 - a. Email VPs and deans to request that they nominate a representative who uses lower-carbon transportation to be a Commute Ambassador. (optional step, see above)
 - Email previous participants of campaigns, list serves regarding lowercarbon transportation, carpool permit holders, employees receiving vanpool subsidies, and employees with U-PASSes. (self-selected volunteer ambassadors will have greater buy-in than appointed ambassadors)
 - c. Promote in newsletters and social media.
 - d. Recruit annually through these outlets.

- e. 300-500 selectively disseminated ambassadors are required so that all employees have at least casual interaction with an ambassador.
- 3. <u>Welcome commute ambassadors</u> by sending them a welcome email about the program, thanking them for their participation, and inviting them to the first meeting.
- 4. <u>Prepare for meetings</u> (host multiple meetings divided by organization if the size of the program becomes too large for one meeting). Host one meeting a year that brings together all ambassadors.
 - a. Survey ambassadors to find out what they are most interested in learning more about.
 - b. Reserve space on campus for the meeting (a central location like the HUB is probably best).
 - c. Prepare resources to be distributed.
 - d. Prepare presentation materials and invite guest speakers.
 - e. Order refreshments to be served.
 - f. Obtain swag for ambassadors to distribute in their work group (work with the Office of Sponsorship). This helps them become champions in their community.
- 5. <u>Host quarterly meetings</u> for commute ambassadors.
 - a. Inform them of upcoming news, campaigns, and programs and provide them with resources to take back to their peers (e.g. posters, flyers).
 - b. Provide them with presentations and guest speakers to talk about behavior change tools and techniques.
 - c. Give them an opportunity to provide feedback.
 - d. Thank them with free lunch and swag to distribute.
 - e. Lunch time meetings from 12:10-12:50 (allows for walking time).
- 6. <u>Email</u> commute ambassadors about upcoming news, campaigns, and programs as well as remind them of upcoming meetings and thank them for their help.
 - a. Provide links to campaigns and news, flyers to print, short blurbs to include in newsletters, and pre-crafted social media posts. (ask ambassadors what they need to help get the word out)
 - b. Provide a link to share feedback.
- 7. <u>Encourage participation</u> at events and campaigns.
 - a. Ask ambassadors to lead teams for campaigns or find a peer to do so.
 - b. Provide resources to help ambassadors host their own events (such as team potlucks and breakfasts).
 - c. Foster friendly competition between teams.
- 8. <u>Respond to questions and comments</u>. There will be a constant stream of questions and feedback from ambassadors, people seeking to be ambassadors, and other programs on campus that will require responses.

Additional resources:

- The Whole U
- The Combined Fund Drive
- I:\groups\fac\trans\upass\A New File System\Climate Action Plan\FINAL DOCUMENTS\Additional Resources\Commute Ambassadors

Evaluation: Conduct a pilot study and compare a department with ambassadors to a similar department without ambassadors.

4.7.2 Commute Assistance

Constant of	1	
Carbon	impact: 10	

Influence level: 5

Cost: \$33,900

What: Customers can seek personal assistance regarding their commute over the phone or via email. The main components of the program include (1) helping customers discover the best commute option to meet their needs and values, (2) developing intrinsic motivation to use lower-carbon modes, and (3) helping customers access lower-carbon modes.

Why: One-on-one commute advice provides customers with the most tailored support, which has been proven to significantly change transportation behavior. Whereas targeted marketing focuses on a specific group, tailored marketing is customized to an individual and is catered to his or her particular barriers. Linking strategies with the characteristics of an individual can increase motivation, increase the likelihood of meeting goals, and decrease the likelihood of relapse. Personal commute assistance is particularly effective because it does not merely seek to increase awareness, but addresses personally relevant factors and actively engages customers. Furthermore, it delivers the information and motivation in the most supportive manner—through personal contact.

Personal assistance provided over the phone or via email is a low-effort technique that customers can receive help with their commute needs. Though systems that require significant time investments have proven relatively unsuccessful in terms of numbers of people using the program, opportunities that require little effort are more frequently used. Easy access to getting questions answered will better enable commuters to use lower-carbon transportation.

Who: All students and employees

• Target group: persons interested in changing

Strategy details:

1. <u>Train Sales & Admin staff</u> to answer the most common questions and how to use trip planning websites.

- a. According to Seattle Children's Hospital, the most common question is in regards to how to transfer between services (e.g. between transit agencies, shuttles).
- b. The Rideshare Coordinator currently answers questions about how to find a rideshare partner.
- 2. <u>Invite customers to contact</u> Transportation Services if they have any questions or need help troubleshooting their commute options.
 - a. Add this service on the TS website.
 - b. Promote it in presentations and when tabling.
 - c. Promote in written materials.
- 3. <u>Continually document common questions</u> and Commute Options staff will help craft standard answers/ways to find the answer easily.

Additional resources:

• Contact Ronna Dansky at Seattle Children's Hospital

Evaluation: Get customer contact info. Send them survey immediately after using service and six months later (or some interval).

4.7.3 <u>Commute Calendar</u>

Carbon impact: 11 Influence level: 5

Cost: \$75,900

What: A commute calendar is a calendar in which commuters can record their commute modes each day.

Why: A commute calendar enables commuters to receive feedback on their travel behavior. It helps them visualize and reflect on their travel patterns and encourages them to consciously think about the costs and benefits of the commute mode they choose. Commuters can track their progress towards a goal as well as opt to see how they compare to their peers. This comparison can promote social norms towards lower-carbon modes as well as build a sense of competition. Finally, a commute calendar extends the conversation between Transportation Services and commuters by providing a platform that commuters will return to over a period of time.

Who: All employees and students, in conjunction with SmartTrips programs, and in conjunction with campaigns

• Target groups: new employees, interested in changing, staff

Strategy details:

- 1. <u>Get approval from My UW:</u> Ideally, a commute portal could be located where people have easy access and will remember where to go, such as My UW.
- 2. <u>Develop web page</u>: Build a web page (or contract this out) with features that could include:
 - a. Calendar that commuters can log their commute modes each day (or have them automatically logged)
 - b. Connection to Commuter Calculator to report each day's costs, calories, and carbon (and allows people to see what it would have been if they'd used another mode)
 - c. Place to make short term and long term goals for the number of times they're committing to a lower-carbon mode in a given time period; ability to make these goals public
 - d. A tracker to visually show progress towards the goal
 - e. The ability to make the calendar public
 - f. Statistics on how other users are doing (team if applicable, staff/students/faculty, by neighborhood, etc.)
 - g. Badges when reach certain accomplishments (e.g. accomplish goal, log a certain number of miles or trips)

- h. Levels when reach different usage points (e.g. log a certain number of miles or trips)
- i. Mobile capabilities to allow for trip logging on smartphones
- 3. <u>Provide incentives:</u> Encourage use of the calendar through incentives associated with campaigns and programs. Incentives for short periods of time will provide initial exposure to the calendar, may be the right amount of time for people to comprehend the costs/benefits and change their behavior, and will compensate for trip logging fatigue. For example:
 - a. SmartTrips: SmartTrips participants who complete one month of their calendar can either automatically win a prize or can be entered into a drawing for a prize.
 - b. Campaigns: operate how they have in the past (e.g. need to record a certain number of trips made by a specific mode)
 - c. Experimenting can be done to determine the amount of incentives, the frequency of incentives, and the delivery type of incentives (guaranteed versus raffle) to achieve the desired participation levels.
 - d. Incentives should be large enough to warrant behavior change (but no larger), delivered in a timely manner, and clearly have an expiration date (e.g. explicitly state when the incentive will be removed).
 - e. Incentives can include:
 - i. Free transit passes
 - ii. Coupon to bike shop
 - iii. Gift certificate to local eatery
- 4. <u>Incorporate with wellness incentives:</u> The commute calendar could be used as a tool for recording active commutes to complete the wellness program activity offered by PEBB (SmartHealth). More research should be done to see if a more robust correlation between health care premiums and the commute calendar can be developed.
- 5. <u>Send email updates:</u> Email users about their results, such as:
 - a. Congratulations for meeting goals or earning badges
 - b. Weekly or monthly balances of their trip costs/bonuses
- 6. <u>Make automatic</u>: As technology develops, trip logging should occur automatically such that people do not manually need to record their trips. This will make use of the calendar much easier and thus more widespread.

Note: A commute calendar would be even more powerful if parking fees were charged each day rather than in large, one-time purchases of long-term parking permits.

Evaluation: Compare modal reports over time. Survey participants before and after use of commute calendar. Use a control group.

4.7.4 Improved Transportation Options

Carbon impact: 6	
Influence level: 5	
Cost: \$800	

What: Transportation Services notifies customers of their improved transportation options and helps customers take advantage of these improvements.

Why: Commuters whose barrier to change is overcome in part or in full due to the improvement of the context may change their commute behavior with the awareness of the improved conditions and even more so with additional resources that help them overcome other barriers.

Who: Commuters living under conditions in which a lower-carbon mode's infrastructure, service, or price has been improved (e.g. new transit line implemented, transit service improved, new park and ride developed, new HOV lane implemented, new bike facility built or improved, new pedestrian facility built or improved)

• Target group: individuals whose transportation options have improved or are interested in changing

Strategy details:

1. Identify affected customers using higher-carbon mode:

For off campus changes:

- Request a query in the Higher Education Payroll/Personnel System (HEPPs) to identify customers living within specified zip codes (e.g. if headways are significantly reduced for a transit line running along the eastern border of zip code 98103, query for zip codes 98103, 98115, and 98105).
- b. Have student employees with geographic information systems (GIS) skills identify which of those customers living in those zip codes live within a specified radius of the new or improved infrastructure or service (e.g. within a half mile of transit stops on this improved transit line) (optional step).
- c. Cross-reference the list of commuters living in the radius to commuters who purchase a product defining their current commute mode in Wheels (commuters using a higher-carbon mode) (e.g. SOV permit holders who live within a half mile of these transit stops) (optional step).

For on campus changes:

- a. Query in Wheels for commuters purchasing relevant product and potentially where they're located on campus (e.g. which parking facility they are assigned to).
- 2. <u>Email affected customers:</u> Identified customers are emailed shortly after the change. This email explains the change that is happening and directs them to more information (e.g. TS website or blog).

4.7.5 Improve Commute Campaigns

Carbon impact: 13
Influence level: 5
Cost: \$30,000

What: Commute Options hosts or collaborates on several commute campaigns throughout the year. While these campaigns have been very popular, there are opportunities to make these campaigns even more successful at changing behavior. The campaigns that Commute Options currently works on include:

- We <3 Rideshare—February
 - Approximately 1000 UW participants
- Bike to Campus Month (BtCM)—May, in collaboration with Cascade Bicycle Club

 Approximately 1000 UW participants
- Try Transit Month—October, in collaboration with Transportation Choices
 - Coalition
 - Approximately 57 UW participants
- Ride in the Rain (RitR)—November, in collaboration with Seattle Children's Hospital
 - Approximately 1000 UW participants

Why: Campaigns can act as a catalyst to help people act on intentions, provide resources and support to change their behavior, and motivate people to continue using a lower-carbon mode. Campaign participants have self-selected as people that are interested in the mode. An initial questionnaire can sometimes be used to differentiate between those in the contemplation, preparation, action, and maintenance stages. This subdivision of the campaign participants will allow those in the contemplation through action stages to receive additional support and will help guide what type of assistance should be offered.

Who: Campaign participants

• Target group: persons interested in changing and retention of those who have changed

Strategy details:

- 1. <u>Attend to new users:</u> Participants who register as new users of the mode should receive extra attention, as these are the commuters for whom TS wants to create behavior change. These are people in the contemplation, preparation, and action stages of change. Additional support can include:
 - a. Care packages sent through campus mail with a few incentives and information (this has been done for RitR). These can include things such as:
 - i. Information on classes
 - ii. Opportunities to identify (such as stickers that indicate what mode they took to campus)
 - iii. Social norming materials (such as info on how many of their peers use that mode)
 - iv. Thank you for using the mode
 - v. Tire patch kits, seat cover, lights, coupon for bike shop
 - vi. Preloaded Orca card/transit tickets
 - vii. Include handwritten note thanking them and saying TS is here to help.
 - b. SmartTrips individualized information packets with personalized commute plan.
 - c. Personal phone calls or emails partway through the campaign to answer questions, address concerns, provide motivation, and check in on goals/progress.
 - d. Invitation to special events (e.g. BtCM's Trail Party), perhaps most effectively held as kick-off events to provide resources to help overcome barriers.
 - e. Help overcoming common barriers, via:
 - i. Classes
 - ii. Bike tune-ups
 - iii. Videos and tutorials about how to do a variety of things
 - iv. Trip planning websites
 - v. Commute buddies
 - vi. Personalized commute planning
 - vii. One-on-one advising
 - f. Incentive for committing via a new mode
 - i. Discounted/free carpool parking permits for a given period of time (e.g. one quarter) if trade in 2+ SOV permits
 - g. Assistance finding motivation/overcoming ambivalence: when signing up ask new participants questions such as, "Why do you want to begin bike commuting?", "What steps have you already taken to begin bike

commuting?", and "What steps do you hope to take this month to help you begin bike commuting?" (these can be optional questions to answer)

- h. Offer opportunities for trying a mode at low cost. This can include:
 - i. A parking permit buy-back that allows permit holders to retain their lot assignment and keep their free U-PASS for a given period of time (e.g. one quarter)
 - ii. Discounts on multi-day/multi-week bike rentals
 - iii. Publicize ability to trial a vanpool for three days
 - iv. Activating a U-PASS for a week for free (if SOV permit holders didn't already receive a free U-PASS)
- <u>Target higher-carbon users:</u> With the overall goal to increase usage of lowercarbon modes and decrease usage of higher-carbon modes, campaigns should be targeted to get those currently using a mode in a lower level of the Mode Hierarchy to use the lower-carbon mode instead. This means that walk and bike campaigns should target rideshare users, transit users, and commuters who drive alone. Transit and rideshare campaigns should target commuters who drive alone.
- 3. <u>Allow for personalized goal setting:</u> Provide a place for people to make a personal goal (instead of or in addition to the goal set by the campaign—e.g. 20 one-way trips). These goals can be either quantitative (e.g. trips per week/for the campaign) or more qualitative (e.g. get my bike tuned up, learn what bus to take). Allow people to make these goals public. This can be done in conjunction with trip planning or at events with people writing their goal and having it publicly shown (e.g. by posting it, by taking a picture with it). On completing their goal, participants could receive a small reward or recognition.
- 4. Give additional support and recognition to people traveling with children:
 - a. Allow people who bike, walk, or take transit with a child to receive greater credit and recognition.
 - b. Provide social norming, social diffusion, and educational opportunities to support commuters traveling with children.
- 5. <u>Have specific goals and metrics for campaigns:</u> The goal for campaigns should be to increase the use of lower-carbon modes and decrease the use of highercarbon modes. This means that efforts should focus on behavior change rather than behavior maintenance (i.e. don't primarily reward existing users). Campaigns should have metrics that enable TS to measure whether TS has succeeded or fallen short.
- 6. <u>Provide opportunities for social diffusion</u>: People are highly influenced by their peers and people can learn a lot from their coworkers and classmates. Providing opportunities for interaction, especially between veteran users and new users, is

important for modeling behavior and having a chance to ask/answer questions. Opportunities include:

- a. All-participant events (e.g. RitR luncheon)
- b. Team building events/contests that bring a team together (e.g. a picture scavenger hunt, a peep diorama contest for We <3 Rideshare)
- c. Encourage participants to invite others to participate (e.g. rewards for most new users recruited—RitR and BtCM do this; reward for vanpool/carpool that recruits a new rideshare participant)
- d. Provide resources for team captains/all participants to recruit & assist each other (e.g. a sign/button for captains that says "I'm getting rewarded to take transit, ask me how you can too!")
- 7. <u>Make the behavior visible:</u> To help spread social norms, it is important for people to see the behavior. Unless people see others actually commuting, they likely do not know how their peers get to and from campus. Therefore, providing a way to make people's commute mode public as they go about their time on campus will allow for that. Additionally, this instills identity (not just of a user of a mode, but potentially of the type of user—e.g. a bicyclist who is *respectful* of pedestrians). This can be done, for example, by:
 - a. Providing stickers or buttons that say what mode they came by (can combine with incentive strategies below)
 - b. Giving an incentive for people who bring/wear something that reveals their commute mode (e.g. on X day of the campaign stop in at any campus coffee shop with your helmet and get a free coffee)
 - c. Providing random incentives to people who bring/wear something throughout the campaign (e.g. get noticed by a transit ambassador wearing your "I ride transit" button and receive a \$5 gift card to a local restaurant)
- 8. <u>Invite testimonies:</u> Provide opportunities for people to tell their story. Opportunities include:
 - a. Social media posts that pose questions (e.g. "What's your favorite part of walking to campus?" or "How do you keep you and your gear dry when biking in the rain?")
 - b. Inviting participants to speak at events (e.g. ask a participant to speak at the RitR luncheon)
 - c. Emails/posts/articles highlighting a participant's story/experience
 - d. Videos
- 9. <u>Thank participants for using lower-carbon modes</u>: Thanking people for doing a desirable behavior helps instill identity and will help to perpetuate that behavior.

- 10. Provide feedback: Provide feedback both individually and in total for all
 - participants. Feedback can be given such as:
 - a. Miles walked/biked
 - b. Transit trips taken
 - c. Number of new mode users
 - d. Number of new campaign participants
 - e. Costs saved (versus driving alone)
 - f. Calories burned
 - g. Carbon saved (make this meaningful so that people can interpret (pounds of carbon is meaningless to most people)
 - h. Number of total participants

Feedback can be provided through the following sources:

- a. The trip logging platform
- b. Email
- c. Announcements at events
- d. Visual displays (banners, signs, etc. on campus)
- e. Social media
- f. Newsletters
- g. The media

Evaluation: Before and after surveys.

4.7.6 Improve Outreach through Partners

Carbon impact: 13
Influence level: 3
Cost: \$26,200

What: Improved information distribution through partner in other campus departments, including outreach through websites, social media, paper materials, personal communication, and other relevant means.

Why: Customers receive information about their transportation options from many people and departments besides Transportation Services. Transportation Services can expand its reach by working with departments and programs on campus who regularly distribute transportation information or who interact with a large percentage of TS customers. This collaboration will help to ensure that commuters are receiving the most up-to-date information as well as messaging that helps Transportation Services' achieve its goals.

Who: All students and employees

• Target groups: all

Strategy details:

- 1. <u>Identify departments who distribute transportation materials and/or who interact</u> with a large percentage of TS customers.
 - a. Special attention should be given to departments who interact with target groups (such as Human Resources, First Year Programs, and Housing and Food Services).
 - b. Information distribution can range from providing additional informational materials, posters, and a monitor display with visuals such as videos of how to use your U-PASS on transit, questions to encourage thought about commute choices, overview of commute options, etc., to inquiring about whether department staff could ask customers if they'd like more information, to placing Transportation Services staff in or near the department to provide customer support (perhaps at certain times of the year such as the beginning of the quarter).
 - c. TS could form collaborations with the following departments (not an exhaustive list):
 - i. Husky Card Services—all new students and new employees
 - ii. The Graduate School—all graduate students
- iii. Academic departments—select students and employees
- iv. Commuter Commons—select students
- v. Intramural Activities (IMA)—select students and employees with interest in fitness
- vi. HomeStreet Bank—select employees with interest in home buying
- vii. The Whole U—all employees
- viii. Off Campus Housing Affairs—select students and employees with interest in off-campus housing
- ix. HFS—select students living in or with interest in campus housing
- x. Disability Resources for Students—select students with disabilities
- xi. UW Bike Shop—select students and employees with bikes or interest in bikes
- 2. Identify opportunities to improve or increase transportation outreach.

Departments and programs on campus distribute transportation information on their websites, in paper materials, and through individual communication with customers (e.g. phone, email, in person). Many also have communication outlets that could provide transportation information (e.g. newsletters, social media). Opportunities for improved transportation information and outreach include:

- a. Reviewing partners' websites
- b. Providing informational materials for distribution
- c. Writing articles and posts to be distributed through communication networks
- d. Providing talking points for staff
- e. Developing standard email responses to FAQs
- f. Distributing posters and monitor displays

Working with partners would help Transportation Services achieve the following objectives:

- a. Encourage customers to think about their commute
- b. Provide information about commute options
- c. Provide information about how to use different modes
- d. Provide memorabilia for people to take with them

First Year ProgramsFacebook catered to first year undergraduate studentsMartha ChanGraduate SchoolFacebook FacebookTransportation info catered to first year graduate studentsPrimarily beginning of fall quarterEleanor LeeGraduate SchoolWeekly DigestEvents, resources, and opportunities for upcoming two weeks on thrusday, distributed on Thursday)Primarily beginning of fall quarterEleanor LeeHomeStreet BankTwitterTransportation & and opportunities for upcoming two weeks on Thursday)March ChanHFSSocial media boards & flyersBig initiatives/events get home for the holidays (rideshare, LINK to airport, train, bus)March ChanHFSSocial media boards & flyersBig initiatives/events get home for the holidays (rideshare, LINK to airport, train, bus)Same content to be used each year.Marck Wheeler Administration: Clive Pursehouse (South Campus), Michelle Primley- Benton (North Campus)Margaret MurrayThe Whole UTwitterTwitterFail quarter: deciding where to liking and walking in the spring weatherMargaret Murray	Partner	Content Distribution	Content Type	Time	Contact
Graduate SchoolFacebookTransportation info catered to first year graduate studentsPrimarily 	First Year Programs	Facebook	Transportation info catered to first year undergraduate students		Martha Chan
Graduate SchoolWeekly DigestEvents, resources, and opportunities for upcoming two weeks and opportunities for upcoming two weeks and opportunities for upcoming two weeks and opportunities for upcoming two weeks and opportunities for opportunity 	Graduate School	Facebook	Transportation info catered to first year graduate students	Primarily beginning of fall quarter	Eleanor Lee
HomeStreet BankTwitterTransportation & housing relationship and what UW offers (they highlight one employer per week)One timeMack WheelerHFSSocial mediaBig initiatives/eventsTammy TaeckerHFSBulletin boards & flyersFall quarter (prior to get home for the holidays (rideshare, LINK to airport, train, bus)Same content to be used each year.Residential Services Administration: Clive Pursehouse (South Campus), 	Graduate School	Weekly Digest	Events, resources, and opportunities for upcoming two weeks	When new event or opportunity arises (needs content by Tuesday, distributed on Thursday)	Eleanor Lee
HFSSocial mediaBig initiatives/eventsTammy TaeckerHFSBulletin boards & flyersFall quarter (prior to winter break): how to get home for the holidays (rideshare, LINK to airport, train, bus)Same content to be used each year.Residential Services Administration: Clive Pursehouse (South Campus), Michelle Primley- Benton (North Campus)The Whole UTwitter Facebook InstagramTwitter FacebookTwitter Facebook InstagramMargaret Murray	HomeStreet Bank	Twitter	Transportation & housing relationship and what UW offers (they highlight one employer per week)	One time	Mack Wheeler
HFSBulletin boards & flyersFall quarter (prior to winter break): how to get home for the holidays (rideshare, LINK to airport, train, bus)Same content to be used each year.Residential Services Administration: Clive Pursehouse (South Campus), Michelle Primley- 	HFS	Social media	Big initiatives/events		Tammy Taecker
The Whole Twitter Margaret Murray U Facebook Instagram	HFS	Bulletin boards & flyers	<u>Fall quarter</u> (prior to winter break): how to get home for the holidays (rideshare, LINK to airport, train, bus) <u>Winter quarter:</u> deciding where to live next year (housing + transportation) <u>Spring quarter:</u> biking and walking in the spring weather	Same content to be used each year.	Residential Services Administration: Clive Pursehouse (South Campus), Michelle Primley- Benton (North Campus)
Instagram	The Whole U	Twitter Facebook			Margaret Murray
Lania /L_/LE Communication annortunition with partners	Table 4 4: Ca	Instagram	pontunition with north	nore	

Several communication opportunities with partners can be found in Table 4-4.

3. <u>Develop a calendar of regular communication</u>. Regular check-ins with partners will help to ensure information remains current. Additionally, many campaign materials and information can be distributed regularly at certain times of year and can be recycled with little effort. Finally, TS may find it useful to develop tripwires (other than by scheduled dates) for contacting partners, such as significant changes to commute options.

Evaluation: TS evaluation of the number and quality of engaged partners

4.7.7 Improve Presentations

Carbon impact: 3 Influence level: 5

Cost: \$1, 300

What: Improved presentation structure and content for presentations given to a variety of audiences throughout the year.

Why: Presentations represent an important opportunity for TS to have face-to-face interaction with the campus community. Presentations range in length from a few minutes to an hour and include audiences of both end customers as well as partners who will in turn provide transportation information to customers. The content, appearance, and structure of the presentation all strongly affect the presentation's effectiveness.

Who: Audiences, including new students, Dawg Daze student volunteers, employees, parents

• Target group: none

- 1. Identify your audience:
 - a. Commuters
 - b. Partners who work with commuters
 - c. Particular needs/concerns of particular audience (e.g. medical center staff, international students)
 - d. Expected size of audience and length of presentation (scale the presentation and staff to meet this)
 - e. Demographics with the greatest needs (will the audience be comprised of the people who really need this information? How best can you reach those with the greatest needs?)
- 2. <u>Determine desired outcomes for audience (also try to find out in advance what that audience in particular is most interested in):</u>
 - a. Understanding of the commute options available
 - b. The costs and benefits of each mode
 - c. Transportation Services and the services offered
 - d. Know what modes TS wants people to use
 - e. Know that most UW commuters do not drive alone/positive social norms of lower-carbon transportation

- f. Relationship between transportation and housing location (if appropriate for audience)
- g. Where to go for more information
- h. <u>NOT:</u> how to use modes or detailed information
- 3. <u>Presentation elements:</u> Though there are a variety of presentation elements that may be effective and appropriate, some suggestions include:
 - a. Storytelling: true stories about people can be inspiring and help the audience connect emotionally
 - i. Presenter can tell his/her story of self: why are they interested in helping others with their commutes?
 - ii. Story of how someone overcame their barriers (especially effective if relatable to audience)
 - b. Clear goal: Transportation Services' goal/university's goal of carbon neutrality and what that means in terms of what modes TS wants people to use (but above all that TS wants to help people find the commute that'll work for them)
 - c. Shrink the change: Help participants see that change is attainable by asking them what is one thing they can do this week that would bring them closer to using a lower-carbon mode: talk to a peer who uses a mode you're interested in, sign up on a rideshare website, Google a transit route, pump up their bike tires, etc.
 - d. Recognize ambivalence and the challenges of changing: Be upfront about the fact that using lower-carbon modes can be difficult and they may have setbacks, but that's normal and TS is here to help.
 - e. Social norming and identity: Provide surprising visual representations that depict UW mode splits/show how few commuters drive alone/show how people from different neighborhoods get to campus. Build identity that to be a Husky means using lower-carbon transportation.
- 4. When working directly with commuters, provide opportunities for social diffusion: If possible, after a brief introductory presentation about all commute options, divide the group into smaller groups based on their interest in different modes, by neighborhood, or by both. Provide a facilitator for each small group. Allow participants to rotate to discuss more than one or stay in their group if they are enjoying the conversation. This break out will ensure participants are exploring modes and neighborhood circumstances that are most relevant to them and allow them to identify their peers who are interested in the same mode or circumstances. The breakouts should not be solely focused on presenting solutions and information, but about developing motivations and social diffusion. The following prompts can be used:

- a. What is your experience with your current commute? What do you like about it? What don't you like about it?
- b. What appeals to you about trying ____ (insert mode) to campus?
- c. How do you think you might go about making _____ (insert mode) to campus work for you?
- d. I hear you have concerns about X. Has anyone faced those concerns and made commuting by ____ (insert mode) work for you?
- e. Would you like more information about X?
- f. What do you think you'll do next?
- g. For participants who enjoy their commute and are not interested in changing, encourage them to consider their colleagues and how they can support their colleagues in making a change.

Throughout these breakouts the facilitator should:

- a. Summarize what participants are saying (e.g. "What I'm hearing you say is that on one hand _____, but on the other hand _____.").
- b. Affirm what participants are saying (e.g. "Thanks for sharing your concerns." "It sounds like you've thought a lot about...").
- c. Ask an appropriate mix of open ended and close ended questions.
- d. At the end of each breakout, facilitators should ask participants if they would like more information about the mode (and then provide them with this information or take contact information and follow up) and remind participants that Transportation Services is always available to help them.
- e. Alternatively, if time does not allow for breakouts, ask participants to raise their hand if they ever commute by each mode and have the audience identify benefits and barriers.
- 5. <u>When working directly with commuters, offer follow-up information:</u> Allow participants to sign up for more information about a variety of modes. Then, add them to mode-specific email lists to allow the conversation to continue.
- 6. Offer informational materials and swag.

Additional resources:

- *Made to Stick* by Dan and Chip Heath
- Switch by Dan and Chip Heath
- I:\groups\fac\trans\upass\A New File System\Climate Action Plan\FINAL DOCUMENTS\Additional Resources\Motivational Interviewing
- I:\groups\fac\trans\upass\A New File System\Climate Action Plan\FINAL DOCUMENTS\Additional Resources\Presentations

Evaluation: Obtain contact information from participants and send a follow-up survey.

4.7.8 Improve Written and Graphic Communication

Carbon impact: 4	
Influence level: 5	
Cost: \$0	

What: Improved written communication to customers, including emails, paper materials, and website.

Why: For many customers, written communication will be their only exposure to Transportation Services (besides the physical infrastructure and services TS provides). Written communications provide an opportunity for TS to leave a lasting impression and a piece of memorabilia customers can return to and reference. TS can more effectively use its written communication by being more than just informative, but also to encourage behavior change. The content and appearance of the written material will influence its effectiveness as a tool to foster behavior change.

Who: All students, employees, and visitors

• Target group: none

- 1. <u>New written materials should consider using the following features:</u>
 - a. Simple—what is the core message?
 - b. Eye-catching
 - c. Inspiring photos and videos
 - d. Testimonies
 - e. Encourage people to imagine themselves using lower-carbon modes
 - f. Instill an identity that to be a Husky means to use lower-carbon modes
 - g. Use pictures and videos as much as possible over text (such as a one-minute video that outlines commute options at UW on the home page of the TS website)
 - h. Look at the major barriers and benefits people have to the mode in question to know what topics to highlight
 - i. Always direct people to TS website and invite them to call or email for questions or assistance
 - j. Write self-interest into the headline
 - k. Advertise a lifestyle, not attributes of a mode
 - I. Emphasize loss associated with using higher-carbon modes rather than savings associated with using lower-carbon modes
 - m. Create a sense of urgency to act now
 - n. Reduce complexity of using a lower-carbon mode

- o. Promote a social norm that most people use lower-carbon modes
- p. Create curiosity by developing information gaps and then filling those gaps
- Develop standard language and talking points for multimodal literacy: Utilizing each mode requires taking a series of steps that require knowledge and skills. Developing standard talking points that identify and explain the knowledge and skills required for each chapter in the experience design storyboard for each mode will help Transportation Services consistently provide the right information in the most effective manner.

Additional resources:

- I:\groups\fac\trans\upass\A New File System\Climate Action Plan\FINAL DOCUMENTS\Additional Resources\Written Materials
- *Made to Stick* by Chip and Dan Heath
- *Switch* by Chip and Dan Heath

Evaluation: Focus groups

4.7.9 Personalized Commute Plans

Carbon impact: 13

Influence level: 5

Cost: \$28,400

What: Personalized commute plans are developed for individuals upon their request. They can include applicable walk and bike routes, nearby transit stops with routes to the UW and with the transit schedules, how many posts on rideshare websites are near their home, and calorie/cost/carbon comparisons between modes. Personalized commute plans minimize the effort required to accessing lower-carbon transportation since customers merely need to provide their home address and destination on campus as well as their arrival and departure times. Personalized commute plans have successfully been employed at other agencies with exceptional mode splits.

Why: Some of the most significant barriers to accessing lower-carbon transportation include lack of knowledge, safety, time, different elements of transit service, and finding a rideshare partner. Some of these barriers may be overcome when information of available options is provided, the safest, easiest, and fastest routes are identified, and side-by-side comparisons are made between modes.

Seattle has a complex transportation system, which can be overwhelming for customers to navigate. As a result, some customers will choose the mode they find most familiar and easiest, which is often driving. Helping customers make sense of Seattle's lower-carbon transportation system will lower the barriers to using them.

Who: All students and employees

• Target group: interested in changing

- 1. Invite people to order personalized commute plans
 - a. All SmartTrips users
 - b. On TS website
 - c. In presentations
 - d. When tabling
 - e. In written materials
- 2. <u>Have customers complete a personalized commute plan request form</u>. Including:
 - a. Name

- b. Home address
- c. Primary destination on campus
- d. Email address
- e. Arrival time to campus
- f. Departure time from campus
- g. Arrive within: __15 minutes or __30 minutes
- h. Depart within:__15 minutes or __30 minutes
- i. Type of commute days: ____Weekdays, ___Saturday, ___Sunday
- j. I'm interested in: ___Walk, ___Bike, ___Bus, shuttle, train, ___Carpool/vanpool
- k. Notes:
- 3. <u>Complete personalized commute plan</u> within one week.
 - a. Use Google Maps and transit trip planners and select the fastest commute with the fewest transfers.
 - b. Take into account UW shuttles as a transit option.
 - c. Use RideshareOnline and UW Zimride to find out how many carpool/vanpool matches they received.
- 4. <u>Email customer with their personalized commute plan.</u>

Additional resources:

 I:\groups\fac\trans\upass\A New File System\Climate Action Plan\FINAL DOCUMENTS\Additional Resources\Personalized Commute Plans

4.7.10 Prospective Movers

Carbon impact: 7 Influence level: 4

Cost: \$7,500

What: Tools to help prospective movers consider the effect of their housing location on their transportation options and costs.

Why: For most American households, housing and transportation represent the two largest expenses on their budget. These two budget items are closely related, especially in the university area. Living near the university is expensive, with the median price for a one-bedroom rental in the U-District at \$1,420 and the median home value at \$490,000. The prices in surrounding neighborhoods are even greater. In comparison, housing prices in the suburbs of Seattle can be considerably cheaper (for example, the median rent for a one-bedroom in Renton is \$1,160 and the median home value is \$310,000). It is important for people to consider, however, the financial implications as well as the time and quality of life impacts that a longer commute entails.

Furthermore, housing location determines the amount of carbon emitted in a person's commute. For most people, living more than a few miles from campus eliminates the potential for a walking commute and living more than about six miles from campus means biking is not practical either. Similarly, where one locates in relation to transit will determine whether transit is a feasible option as well. Even if the commuter is committed to driving alone, the commute distance and route will influence the amount of carbon emitted, time spent commuting, and costs.

It is important that Transportation Services promotes living near campus in order to reduce emissions over a significant period of time. This is especially important for those purchasing a house, since the average duration homebuyers stay in their home is 13 years, though renters are also important, with nearly half of renters anticipating to stay in their home for 3 or more years (however, it is likely that university students move much more frequently). This means that helping commuters locate in a transportation-efficient home can have implications for many years; likewise, not helping commuters with this decision represents a substantial lost opportunity.

Who: Prospective movers

• Target group: individuals seeking a new home, interested in changing

- <u>Mail housing + transportation information</u>: All new students and employees are mailed a *Housing and Your Commute Handbook* (within SmartTrips New Undergraduate Students, SmartTrips New Graduate Students, and SmartTrips New Employees).
- 2. <u>Email housing and transportation information</u>: Include transportation information in initial housing email that all new students receive and to current HFS residents when deciding where to live the next year (within SmartTrips New Undergraduate Students and SmartTrips New Graduate Students).
- 3. <u>Link to website with neighborhood commute profiles:</u> Add a link on all UW housing-related webpages to a webpage on the TS website with neighborhood commute profiles.
 - a. An interactive map provides a profile of each neighborhood within a given number of miles of campus
 - b. Profiles include:
 - i. Average commute time, distance, cost, calories, and carbon for each mode
 - ii. Ranking of ease-of-use for each mode and short description of why that ranking was selected
 - iii. Profiles of different mode users in each neighborhood and potentially their contact information. Real bike routes used by bike commuters and GoPro videos of the commute (for neighborhoods within 6 miles).
 - iv. Transit routes from that neighborhood to campus
 - c. Partner webpages include (but are not limited to):
 - i. HomeStreet Bank
 - ii. Off Campus Housing Affairs (OCHA)
 - iii. Summer Student Resources
 - iv. Housing and Food Services (HFS)
- 4. <u>Present to partners' staff:</u> Present TS goals and relationship between transportation and home location and request support from:
 - a. HomeStreet Bank's loan officers and real estate agents
 - b. OCHA staff
 - c. HFS staff
- 5. <u>Distribute informational materials</u>: Provide materials for:
 - a. HomeStreet Bank's on-campus loan officers to distribute during meetings with UW employees
 - b. OCHA's office
 - c. HFS open houses/office

- 6. <u>Develop class content:</u> Work with partners to add transportation information into existing classes and add transportation-specific class.
 - a. HomeStreet Bank's budgeting class could include transportation information
 - b. OCHA's monthly workshops about home buying and intro to renting
- 7. <u>Provide talking points:</u> Provide talking points to HFS tours
- 8. <u>Restart location efficient mortgages:</u> Work with HomeStreet Bank to restart location efficient mortgages.
- 9. <u>Table at Annual Home Improvement Fair:</u> In April, table at HomeStreet Bank's Annual Home Improvement Fair; approx. 1000 UW employees attend.
 - a. Provide Housing and Your Commute Handbook

Additional resources:

- http://htaindex.cnt.org/
- http://blogs.seattletimes.com/fyi-guy/2013/04/03/green-commuting-how-doesyour-neighborhood-stack-up/
- http://www.walkscore.com/apartments/

Evaluation: Before and after surveys. Use control group.

4.7.11 SmartTrips

A general template of the SmartTrips program is first provided followed by specific applications.

What: SmartTrips is a tool to maximize the use of existing infrastructure and services. The two main components of the SmartTrips program are to (1) motivate commuters to think about their commute behavior and (2) inform them about their commute options.

- 1. See individual SmartTrips programs in the sub-sections that follow.
- 2. <u>Email reminder to those who don't order:</u> For commuters who do not order, two weeks later they are sent an email reminding them of their opportunity to order information (optional step).
- 3. <u>Customer completes order form: C</u>ustomers who want customized commute options information fill out an online order form that is linked through the My UW commute portal (if exists).
 - a. When ordering information, customers must complete a survey regarding previous commute behavior and their home address (to calculate emissions saved). They can order their choice of information, incentive, and individualized services.
 - b. The informational materials they can choose from can include:
 - i. Neighborhood bike/walk maps
 - ii. Pedestrian laws and safety tips
 - iii. Walking, biking, and health
 - iv. Biking laws, safety tips, classes, campaigns, UW Bike Shop, riding Metro with your bike, bike parking options, bike share
 - v. Transit maps, trip planning tips, U-PASS information, how to ride
 - vi. Rideshare match-finding tips, how to join a vanpool, parking information
 - vii. Zipcar, Car2Go, and U-CAR information
 - viii. Info on buying a fuel efficient vehicle
 - ix. Employee benefits (payroll deduction)
 - x. Driving costs/Commuter Calculator
 - c. The individualized service they can order may include:
 - i. Personalized Commute Plan
 - ii. Commuter buddy (if exists)
 - d. The incentive they can order may include:
 - i. Coupon to local bike shop (Recycled Cycles?)
 - ii. Free transit passes

- iii. Gift certificate to campus eatery
- 4. <u>Email confirmation</u>: Once the order form is submitted, customers receive a confirmation email thanking them and assuring them their SmartKit will be delivered in the next week.
- 5. <u>Data submitted into database:</u> On the back end of the submitted order, the data entered goes into a Microsoft Access database.
- 6. <u>Package SmartKit:</u> SmartTrips student employee packages the requested information into a SmartKit. In addition to providing the requested information, they are invited to use the Commute Calendar in My UW (potentially with incentives attached).
- 7. <u>Deliver materials:</u> Materials are distributed via campus mail.
- 8. <u>Follow-up with materials:</u> Two weeks after the delivery of the materials, participants are either called or emailed to provide support and encouragement as well as an opportunity to ask questions.
- 9. <u>Targeted follow-up:</u> Participants are divided into sub-target groups based on what materials they ordered, where they live, and their previous commute patterns. These sub-target groups (e.g. those who previously drove alone, live more than 5 miles from campus, and live more than a mile from a transit stop) are emailed targeted messages (e.g. rideshare info, number of people in their area registered on rideshare matching websites, other benefits of ridesharing). These can be sent approximately once per quarter.

If the Comms team decides to launch a blog, this can be promoted through the SmartTrips program (through monthly emails inviting participants to visit blog and participate in contests)

Evaluation: Before and after surveys. Use control group.

Additional resources:

 I:\groups\fac\trans\upass\A New File System\Climate Action Plan\FINAL DOCUMENTS\Additional Resources\SmartTrips

4.7.12 SmartTrips New Home

Carbon impact: 13

Influence level: 4

Cost: \$47,800

Why: Moving to a different home represents a significant change in context at the location where most transportation decisions are made (at home). This means that stimuli of the home environment that once triggered commute behavior is now largely gone and a window of opportunity exists to establish new behaviors associated with the new stimuli. This needs to occur as soon as possible in order to instill new habits before habits of using higher-carbon modes take hold. Furthermore, if a person develops a lifestyle built around driving, it will make it even more difficult to replace it with one designed for lower-carbon modes because (1) the individual will establish networks (e.g. where he/she shops, exercises, etc.) that may rely on having a personal car and (2) the individual will drive on arterials and will begin to imagine that that is the route he/she would need to take if walking/biking.

New residents (primarily new to Seattle) can have the following main barriers to using lower-carbon transportation (adapted from research done by Portland SmartTrips):

- 1. System intimidation: Seattle is a big city with a complex transportation system. For many, the default easy transportation option may be driving.
- 2. Lack of awareness: New residents may not be aware of their options.
- 3. Lack of information: There is an information gap regarding how to access lowercarbon transportation (what route to take, how much a U-PASS costs, etc.).
- 4. Discordant social norms: New residents may come in with the idea that lowercarbon transportation is uncommon or socially unacceptable. SmartTrips can normalize lower-carbon modes.

New student residents will have other transportation concerns beyond their commute, and this may influence their decision to bring a car. These concerns include:

- 1. How to get to their parents' home (if relatively nearby) or to the airport.
- 2. How to get groceries without a car.
- 3. How to get to off campus jobs reliably, conveniently, and efficiently.

Who: HFS residents, employees who change their address in My UW

• Target group: individuals who are about to move or who recently moved homes, interested in changing, staff

Strategy details:

On-campus housing (no individualized information or incentives are provided):

- 1. <u>Provide HFS with informational materials, posters, PowerPoint displays for</u> <u>monitors</u>: HFS can display information in their office and in residence halls. These can be updated and reused each year.
- 2. <u>Develop talking points for broad audience</u>: HFS can incorporate transportation information into tours. Talking points should focus on housing and transportation, not needing a car, and how to get around Seattle.
- 3. <u>Develop talking points for parents:</u> HFS can incorporate transportation information into parent orientation. Talking points should focus on safety, not needing a car, and how to get around Seattle.
- 4. <u>Develop talking points & materials for residents:</u> Provide HFS with transportation talking points and *Transportation Handbooks* to distribute at mandatory floor meetings the first week of each quarter.
- 5. <u>Develop FAQs and standard emails</u>: Provide HFS staff with FAQs to help them answer simple transportation questions via phone and walk-ins. Provide standard emails for email inquiries.
- 6. <u>Provide canned programming to RAs</u>: Provide a pdf of info RAs can print and post to bulletin boards. These can be updated and reused each year.
- 7. <u>Provide business card:</u> HFS will hand out general TS business card from their offices when a transportation question arises.
- 8. <u>Present to HFS staff:</u> Present to HFS staff to describe TS work, goals, and what TS prefers they tell people/don't tell people.
- 9. <u>Mail transportation info with Move-in Guide:</u> Once residents are assigned HFS housing, they are mailed a Move-in Guide. Include the *Transportation Handbook* into this mailing.
- 10. <u>Include transportation info into newsletter:</u> Add transportation info into welcome newsletter that RAs send out.

Employees:

1. <u>Mail general information:</u> When employees change their address on My UW, they are sent a *Transportation Handbook* through campus mail or via an email and are invited to fill out an online order form for mode-specific information and are incentivized to do so with a small reward.

Additional strategies:

When the new HR payroll system comes into effect (approx. 2016), change Employee Self Service page to have a pop-up screen come up when someone changes their home address. This screen invites them to receive free individualized information about their commute options as well as directs them to the commute portal in My UW (or TS website if this doesn't exist). This information can be found again under the new "Transportation" tab at the top of the page.

Evaluation: Before and after surveys for employees, annual surveys of HFS residents.

4.7.13 SmartTrips New Employees

Carbon impact: 19
Influence level: 4
Cost: \$47,800

Why: New employees are undergoing a context change and are likely to be making more deliberate and attentive transportation decisions that align with their intentions. This is a valuable window of opportunity in which they can establish habits using lower-carbon modes. Because faculty, on average, work at the university for 8.7 years and staff, on average, work at the university for 5.2 years, helping new employees begin using lower-carbon modes from the start can mean significant carbon reductions in the long run.

An abundance of information about lower-carbon transportation is available for commuters already, however empirical surveys demonstrate that this information does not reach people effectively and therefore does not change behaviors. Providing targeted and tailored information is far more convenient and motivating than generalized information that people must weed through. Transportation Services can better serve its customers by bringing information to customers rather than expecting them to come to TS. Though it is in part about providing desired information, it is also about generating thought about commute options as well as offering support. In addition, SmartTrips allows people to self-select so that efforts are concentrated on those interested in changing.

Who: All new employees

• Target group: new employees, interested in changing, staff

- 1. <u>Mail general information:</u> All employees, upon being hired are emailed/mailed a *Transportation Handbook* and *Housing and Your Commute Handbook* and are invited to fill out an online order form for mode-specific information and are incentivized to do so with a small reward. AND/OR materials are given to hiring managers to give to new employees.
 - a. Include handwritten note welcoming them to the university.

Additional strategies:

When the new HR payroll system comes into effect (approx. 2016), change Employee Self Service page to have a pop-up screen come up for new employees. This screen invites them to receive free individualized information about their commute options as well as directs them to the commute portal in My UW (or TS website if this doesn't exist). This information can be found again under the new "Transportation" tab at the top of the page.

4.7.14 SmartTrips New Students

Carbon impact: 19

Influence level: 4

Cost: \$17,100

Why: Most new students are undergoing a significant context change and are likely to be making more deliberate and attentive transportation decisions that align with their intentions. This is a valuable window of opportunity in which they can establish habits using lower-carbon modes. This context change is especially important because for many students (particularly undergraduate students), this is there first time living away from their parents and a point in time in which their living situation, finances, city, friends, and routine are new. Many students come to UW with little experience using lower-carbon modes and with preconceived social norms of these modes. Helping these students learn to use lower-carbon modes, view these modes as beneficial, and helping them access these modes are all key to fostering lower-carbon commuting. Because new undergraduate students, on average, study at the UW for 4.1 years, new masters students for 1.8 years, and doctoral students for 5.1 years, helping new students begin using lower-carbon modes from the start can mean significant carbon reductions in the long run.

An abundance of information about lower-carbon transportation is available for commuters already, however empirical surveys demonstrate that this information does not reach people effectively and therefore does not change behaviors. Providing targeted and tailored information is far more convenient and motivating than generalized information through which people must weed through. This is especially pertinent for new students who receive a tremendous amount of new information regarding many different subjects when they first arrive at UW. Information needs to be pointed and memorable and should direct students to resources they can turn to later (since they are being overloaded with information and because many new students live on campus and thus face more diverse commute needs in subsequent years).

Transportation Services can better serve its customers by bringing information to customers rather than expecting them to come to TS. Though it is in part about providing desired information, it is also about generating thought about commute options as well as offering support. In addition, SmartTrips New Students allows people to self-select so that efforts are concentrated on those interested in changing.

Who: All new students

• Target group: new students, interested in changing

Strategy details:

No individualized materials are ordered and sent.

New Undergraduate Students:

- 1. <u>Mail general information:</u> All students, upon confirming their intention to attend, are mailed a *Transportation Handbook* and *Housing and Your Commute Handbook* as part of their New Student Handbook.
- 2. <u>Email housing and transportation information</u>: Include transportation information in initial housing email that all new students receive.
- 3. <u>Post video:</u> Include a short (60 second) video on the New Student Orientation website introducing new students to their commute options and the TS website. This video can also be on the TS home page.
- 4. <u>Include information in New Student Orientation guide:</u> As the New Student Orientation transitions to paperless resources, electronic resources will need to be developed to fit the format required.

Graduate Students:

- 1. <u>Mail general information:</u> All students, upon confirming their intention to attend, are emailed a *Transportation Handbook* and *Housing and Your Commute Handbook* (when they receive email about Facebook page).
- 2. <u>Email housing and transportation information</u>: Include transportation information in initial housing email that all new students receive.
- 3. <u>Include handbooks in GOMAP resources</u>: GOMAP (minority students) student days is a spring time event. All GOMAP students receive resources.

Both:

- 1. <u>Package SmartKits</u> for walking, biking, transit, and rideshare. The materials in the SmartKit may include:
 - a. Neighborhood bike/walk maps
 - b. Pedestrian laws and safety tips
 - c. Walking, biking, and health
 - d. Biking laws, safety tips, classes, campaigns, UW Bike Shop, riding Metro with your bike, bike parking options, bike share
 - e. Transit maps, trip planning tips, U-PASS information, how to ride
 - f. Rideshare match-finding tips, how to join a vanpool, parking information
 - g. Zipcar, Car2Go, and U-CAR information

- h. Info on buying a fuel efficient vehicle
- i. Driving costs/Commuter Calculator
- 2. <u>Train TS student employees:</u> TS student employees are trained on how to best communicate transportation information to new students.
 - a. They are told to prompt students by saying, "Welcome to UW, have you thought about how you'll commute to campus?"
 - b. They then use motivational interviewing techniques to steer the conversation towards lower-carbon modes.
 - c. They are told to thank students for using lower-carbon modes and tell them they are helping make the UW one of the greenest universities in the country.
- 3. <u>Set up table at events:</u> Large props are used to attract students to the table and portray social norms (e.g. bikes, large infographic showing student mode splits, bike photo booth, mock-up of the entrance to a bus (with ORCA reader)). Small incentives can also entice students (e.g. place Pop Chip bags in a cargo bike).
 - a. Potential events to table at include:
 - Large graduate departmental student orientations (email departments to see if they have large orientations for the entire department, not just programs): http://www.grad.washington.edu/about/statistics/enrollment/enrollm ent13.pdf)
 - ii. Dawg Daze events
 - iii. Outside Husky Card Office
- 4. <u>Offer SmartKits:</u> When tabling at events, student employees offer new students SmartKits. New students can request as many packets as they desire.
- 5. <u>Provide opportunity to publicly commit, instill identity, and show social norms:</u> Provide stickers for people to wear that say that they use lower-carbon modes to get to campus (e.g. "Real Dawgs Travel in Packs...I Rideshare!").

Additional strategies:

Offer packets to Dawg Daze events and Commuter Commons: Transit packets are given to One Bus Away trips.

Evaluation: Obtain participant emails and send follow-up survey.

4.7.15 SmartTrips Commute Options

Carbon impact: 3
Influence level: 5
Cost: \$14,900

Why: Commuters whose current mode is changed will reevaluate the cost and benefits associated with that mode or may be circumstantially unable to use that mode at all. This context change disrupts commuters' habits and represents a time at which commuters are more likely to intentionally make decisions. Additionally, worsened conditions for the current mode represent a push strategy away from that mode. These are the most effective strategies in changing behavior and can become positive experiences for people and can make these push strategies more politically salient when they are combined with pull strategies. In addition, SmartTrips allows people to self-select so that efforts are concentrated on those interested in changing.

Who: Commuters whose current mode's infrastructure, service, or price has worsened (e.g. parking price increased, parking facility removed, severe traffic congestion happens (such as from construction), new toll implemented, transit service cut or diminished)

• Target group: existing mode has been made worse or interested in changing

Strategy details:

1. Identify affected customers

For off campus changes:

- Request a query in the Higher Education Payroll/Personnel System (HEPPs) to identify customers living within specified zip codes (e.g. if a transit line is cut running along the eastern border of zip code 98103, zip codes 98103, 98115, and 98105 may be queried for).
- b. Have student employees with geographic information systems (GIS) skills identify which of those customers living in those zip codes live within a specified radius of the worsened infrastructure or service (e.g. within a half mile of transit stops on this cut transit line) (optional step).
- Cross-reference the list of commuters living in the radius to commuters who purchase a product defining their current commute mode in Wheels (e.g. U-PASS holders who live within a half mile of these transit stops) (optional step).

d. Separate customers by their UW affiliation: students vs employees.

For on campus changes:

- a. Query in Wheels for commuters purchasing relevant product and potentially where they are located on campus (e.g. which parking facility they are assigned to).
- b. Separate customers by their UW affiliation: students vs employees.
- 2. <u>Email all affected customers:</u> Identified customers are emailed shortly before, during, or shortly after the change. This email explains the change that is happening and directs them to more information (e.g. TS website or blog). The email to employees also invites them to receive free customized commute options information and receive a free incentive.

4.7.16 SmartTrips Departments

Carbon impact: 1	
Influence level: 4	
Cost: \$4,900	

Why: Focused efforts on select departments allows TS to concentrate on creating significant awareness, support, and excitement. This provides a model similar to SmartTrips programs across the country, but instead of concentration by neighborhood, there is concentration by campus department.

Who: Employees working in select departments on campus

• Target group: staff, interested in changing

- 1. <u>Select a department</u>: Use Wheels to determine which departments have a percentage of employees who purchase SOV permits or whose buildings are located adjacent to high-demand parking facilities.
- 2. <u>Contact department</u>: Contact department leadership to determine if there is support to implement this program, discuss the pertinent issues at the department (e.g. what is the culture like? What are the best ways to reach out to employees? Who in the department has the greatest needs for transportation information? What contextual issues does that department specifically face?), and develop a plan for implementation.
- 3. <u>Provide flyers and marketing material</u>: To start getting the word out and excitement of the SmartTrips program, TS can provide marketing materials such as flyers and blurbs to be included in departmental newsletters.
- 4. <u>Email invitation to employees:</u> All employees in the department are sent an email inviting them to fill out an online order form for mode-specific information and are incentivized to do so with a small reward. Ideally the email comes from the managers.

Additional strategies:

Host additional activities that are most pertinent to the department: In addition to providing personalized information, this SmartTrips program can provide focused activities that are deemed to be most effective for that department. For example, if there is one group of employees that is interested in ridesharing, a TS staff member can set up a workshop at a time and place that will work best for those employees. TS can foster activities that promote social diffusion, such as host a luncheon for current and interested bike commuters.

4.7.17 Level 2 Strategies

The following strategies were not given as great of detail as Level 1 strategies either because TS has low influence, the strategy had low impact, or the Commute Options manager requested less detail.

Strategy: Better regulate on-street parking near campus.

Carbon impact: 11

Influence level: 2

The availability of on-street city parking adjacent to campus that has few restrictions and low or no costs both encourages driving as well as increases congestion in the campus area. Approximately 13 percent of commuters driving to campus (either alone, in a carpool, or in a vanpool) are parking in on-street parking. Of those parking in on-street parking, 85 percent are doing so in free parking spaces. Working with the City to better regulate on-street parking around campus will help to discourage driving and discourage cruising for parking. Even better in some cases would be to convert on-street parking into improved walking, biking, and transit facilities such as protected bike lanes, bike parking corrals, bulb outs, bus bays, or widened sidewalks.

Strategy: Better understand barriers to finding a rideshare partner.

Carbon impact: 9

Influence level: 5

Finding a person with a similar schedule and route is a primary barrier to ridesharing. TS already offers both online and offline tools to help people find a partner, yet the vast majority of people who currently rideshare found their partner through other means (e.g. they already knew the person). Better evaluating the barriers commuters have to using existing tools will help Transportation Services brainstorm additional rideshare matching tools or revisions to how existing tools are used.

Strategy: Develop a means for on-going relationship with customers.

Carbon impact: 14

Influence level: 5

Transportation behavior change is a process in which people go through stages of change. It is unlikely that any one strategy will move someone through multiple stages, thus it is important that TS has multiple points of contact with customers, particularly those who are interested in changing. These multiple points of contact can provide the necessary encouragement, information, feedback, and prompts to move people from precontemplation or contemplation through to maintenance. Ideally these points of contact will be targeted and thus more relevant. TS can develop a standard means to maintain contact with customers, such as through a regular newsletter or blog. Additionally, tailored emails, especially those sent soon after initial contact, can be important opportunities for individualized support.

A database of interactions between a customer and TS (e.g. what campaigns and events the customer participated in, what products the customer orders, where the customer lives, etc.) will allow for a more comprehensive understanding of each customer as well as allow for a rich understanding of customers as a whole.

Strategy: Enable carpool parking permit fees to be split by more than three people.

Carbon impact: 1

Influence level: 4

Since most vehicles can hold more than three people, it is currently inconvenient for larger carpools to split parking permit fees.

Strategy: Identify and improve off-campus bike infrastructure

Carbon impact: 6

Influence level: 2

Roger Geller cites that the majority of people, who are classified as Interested but Concerned, would bicycle if they felt safer and they would feel safer if cars were slower, less frequent or absent, and were physically separated from a greater degree from bicycle facilities. Building on Geller's work, Mekuria et.al. (2012) worked to further define criteria to evaluate safe biking conditions for different traffic stress tolerances. The researchers developed a classification of four types of facilities based on their Levels of Traffic Stress (LTS). LTS-1 facilities are suitable for most children, LTS-2 facilities are suitable for most adults, and LTS-3 and -4 facilities are tolerated by "enthused and confident" and "strong and fearless" riders respectively. Mekuria et.al.'s (2012) study suggests that in order for a bicycle network to attract a broad spectrum of the population, routes between origins and destinations must be entirely low-stress, meaning users should not have to use a route that at any point exceeds their acceptable stress level and without undue detours.

Transportation Services cannot fully reach its potential of commute carbon reductions if it focuses solely on internal strategies. Bike commuting is an experience that happens primarily off campus (at home, on city streets and paths, and in transit agencies' vehicles). Transportation Services needs to be engaged in conversations with outside partners to influence infrastructure and services at the district, city, and state level.

This strategy involves using Mekuria et. al.'s (2012) criteria for evaluating the LTS of all streets and intersections within 6 miles of campus. This would be an excellent project for a GIS class or a year-long project for a GIS undergraduate or graduate student.

Then, work with partners to develop infrastructure to ensure that all households can reach campus on LTS-2 or LTS-1 facilities.

Also, work to provide better lighting and wayfinding for cyclists.

Strategy: Identify housing locations with high SOV rates.

Carbon impact: 5

Influence level: 5

If TS knows where SOV permit holders are primarily coming from, TS can improve the context and perceptions in these areas. The first step is to identify locations with high SOV rates. With this information, later TS can foster the development of better bike infrastructure and promote improved transit service in these areas, particularly by partnering with agencies to increase frequency, make direct routes to campus, increase hours of operation, and expand park and ride lots. In addition to helping implement contextual strategies, knowing where there are high concentrations of SOV drivers will enable TS to strategically focus perceptual strategies at a neighborhood level. Strategy: Identify why people don't drive lower-carbon vehicles to campus then develop strategies to address these barriers.

Carbon impact: 1

Influence level: 4

Encouraging more fuel efficient vehicles is a last-rung strategy that should be pursued after mode shifts have been attempted and apply to only those who really need to drive. In order to appropriately develop strategies for increasing the use of lower-carbon vehicles it is important to understand why people currently do not drive such vehicles. Do they perceive lower-carbon vehicles as too expensive? Do they not operate the way they want or need their vehicle to operate? Do they perceive them to be too inconvenient to fuel? Is there a lack of information?

Potential strategies that may emerge include:

- Collaboration between Fleet Services and Commute Options to obtain knowledge of fuel efficient vehicles.
- Look at Green Parking Garage suggestions for including infrastructure to support alternative fuel vehicles.
- Encourage drive alone commuters to purchase alternative fuel vehicles and vehicles with higher fuel efficiency.
- Obtain a merchant discount for alternative fuel/fuel efficient vehicles.
- Provide discounted parking/preferential parking to hybrid, electric vehicles

Strategy: Identify why people don't telecommute then develop strategies to address these barriers.

Carbon impact: 2

Influence level: 4

In order to appropriately develop strategies for telecommuting it is important to understand why people currently do not do so. Do they need to be on campus to carry out their work? Do they feel they'll be seen as unproductive? Do managers feel their employees will be unproductive? Once there is an understanding of the barriers to telecommuting, then strategies can be designed and implemented to help employees and students overcome these barriers. Strategy: Improve access to showers and lockers.

Carbon impact: 4

Influence level: 3

Walk and bike commuters who desire access to showers and lockers may currently be precluded from existing facilities or may be unaware of these facilities. Identifying where the facilities are, who is able to use them, and then working with departments/buildings to make them more broadly available will remove structural barriers to walking and biking.
Strategy: Improve accommodation of bicyclists and pedestrians in construction detours.

Carbon impact: 1

Influence level: 3

Both on-campus and off-campus construction can hinder access and decreases reliability in a route. Adequate detours around construction that provide safe and comfortable routes without excessive inconvenience in distance or time are essential to providing a better walking and biking experience. Strategy: Improve on-campus walk, bike, and transit infrastructure.

Carbon impact: 4

Influence level: 2

On-campus infrastructure influences the convenience of different modes. Campus should be welcoming and supportive to people arriving by lower-carbon transportation. This can in part be accomplished through the construction of secure bike parking, showers, and lockers in new construction and redevelopment. This construction and redevelopment should also consider access to transit, walk, and bike desire lines. TS can help ensure these elements are considered by being a part of decision-making processes regarding on-campus development to ensure new construction or redevelopment is done in a way that supports walking, biking, and transit.

Strategy: Improve transit service.

Carbon impact: 6

Influence level: 2

Removing structural barriers to using transit, especially for those who currently drive alone, is important to encouraging transit use. Of particular importance are providing direct routes, frequent service, longer operating hours, and less crowded vehicles. Vehicle occupancy should ideally be as high as possible in order to reduce carbon emissions per passenger, however, not so high that transit becomes unattractive to a significant number of commuters. Strategy: Increase access to real-time transit information.

Carbon impact: 6

Influence level: 2

Anxieties associated with the unknowns of transit are a primary barrier to riding transit. Providing better access to real-time information through promotion of apps such as One Bus Away as well as monitors at transit stops and populated areas of campus can help people overcome this barrier.

Strategy: Increase flexible work hours.

Carbon impact: 4

Influence level: 2

The ability to use transit and rideshare as well as reduce commute trips can be aided by flexible work hours. Flexible work hours include both compressed work weeks as well as flextime. Compressed work weeks refer to scheduling that allows a full-time employee to eliminate at least one work day every two weeks by working longer hours during the remaining days. Flextime refers to a fixed work schedule that enables employees to have some flexibility over when he/she starts and ends their work day. Transportation Services can work with managers to enable employees to adjust their schedules to make using transit or rideshare more convenient or to enable them to telecommute or have a compressed work week. For example, moving a work schedule to allow employees to avoid a long wait for the next bus to arrive or giving them some flexibility to accommodate rideshare will make these modes more available and convenient. Strategy: Increase housing on and near campus.

Carbon impact: 4

Influence level: 1

The primary barrier to walking is time. Though strategies for altering perceptions regarding the time it takes to walk can be implemented, there are few ways to reduce the time required to walk. The most effective way to reduce the time required to walk is for commuters to live closer to campus. Transportation Services can work with its partners to improve university-owned as well as privately-owned housing on and near campus.

Strategy: Increase parking pricing variability based on frequency of use.

Carbon impact: 9

Influence level: 4

Currently, long-term parking permits give a volume discount to commuters who frequently park on campus. These permits allow for unlimited parking and thus discourage commuters from driving less. Transportation Services could remove this perverse incentive to drive by discontinuing the sale of long-term parking permits and replace them with pay-per-use parking (PPUP) throughout campus. Pay-per-use parking encourages people to minimize their drive alone rate by not charging commuters on days they do not drive. Additionally, pay-per-use parking allows commuters to be open to changing their commute at any time. Commuters who have purchased a long-term parking permit are unlikely to be receptive to changing their mode since they feel that they have invested in the decision to drive (despite the ability to return the permit for a pro-rated refund at any time). Finally, research on incentives and disincentives shows that behaviors are more strongly influenced by consequences that are delivered close in time and space to the behavior rather than those delivered more distantly. This means that drivers' behavior will be more influenced if the "pain" of paying to park is delivered at the time that they park. Furthermore, the pain of disincentives diminishes as it is bundled, so small, incremental payments will be more effective than the larger purchase associated with a long-term parking permit.

While TS does currently offer Individual Commuter Tickets (ICTs), which are daily parking permits that commuters can purchase prior to use and use for on average of two days per week, these do not fit the needs of drivers parking more than two days per week on campus. Like long-term parking permits, ICTs require at least some level of anticipated need to park. Additionally, because they are purchased in advance, the detachment between the pain of paying and the behavior remains an issue.

An evaluation of the effects of the current PPUP garages showed that there was a decrease in SOV trips for drivers who previously had long-term parking permits, but an increase in SOV trips amongst drivers who previously used ICTs. Though attempts had been made to discourage more than four SOV trips per pay period by increasing the parking fee for all trips taken when five or more trips had been taken in a pay period, this pricing structure did not dissuade previous ICT users from driving more. The study cited the convenience of using a Husky Card rather than purchasing ICTs, tax advantages from payroll deduction, and freedom from ICT restrictions as reasons why SOV rates increased for this group. The study recommended reforming

the pricing structure to more drastically increase the price after four days of parking in a pay period or successively increase the price of parking each day.

Not only does PPUP serve to decrease drive alone rates, but it is also very popular with customers. The current list of permit options is quite long because people do not want to pay for parking on days they do not anticipate needing to park and TS has catered their menu of permits to meet this demand. Switching to PPUP would eliminate the need to offer such a wide variety of permit types and also removes the need for commuters to anticipate their future parking needs. The appeal of PPUP can be seen in the long waiting lists for current PPUP garages.

PPUP can feasibly be implemented across campus. A study of implementing PPUP on campus showed that 18 parking facilities can be or currently are gated, representing approximately 60 percent of parking stalls. For the remaining 40 percent, drivers can use standalone machines to pay and print display single-use permits. Alternatively, license plate recognition can be used instead of a physical display permit. The advantage of gated lots and structures as well as license plate recognition is that little parking enforcement would be required, thus cutting costs for TS. In the end, PPUP would likely save TS significant sums of money. Strategy: Increase the price of parking.

Carbon impact: 15

Influence level: 4

The price of parking may be the single most effective way of encouraging a shift from SOV to lower-carbon modes since people respond quickly to price incentives/disincentives.

Strategy: Instill better bicyclist behavior.

Carbon impact: 1

Influence level: 2

One barrier to walking is dangerous and disrespectful bicyclist behavior. Though the university can help to encourage better bicyclist behavior through infrastructural changes that increase separation between modes, in areas where spaces are shared, bicyclists will need to yield to pedestrians and operate at slower speeds. Education of how and why to ride more respectfully, prompts to remind bicyclists, as well as identity-building of polite bicycling are tools to achieving better bicyclist behavior.

Strategy: Make it easier for customers to cancel their parking permits and to purchase a U-PASS.

Carbon impact: 6

Influence level: 5

Currently customers must come into the TS office in order to cancel their parking permit (since they need to return the physical permit). While they are able to renew their existing product (e.g. parking permit) online, they cannot switch from one type of product to another (e.g. cancel their parking permit and purchase a U-PASS). This requirement to come to the TS office in order to cancel a parking permit may dissuade some customers from doing so and encourages them to continue to drive. While the removal of long-term parking permits would eliminate this problem entirely, as long as long-term permits are sold, the ability to cancel a permit could be made easier (such as via mail). An alternative would be the replacement of physical permits with license plate recognition technology, which would not require customers to come into the office to cancel their permit.

In addition to making it easier for customers to cancel their parking permits, TS can make U-PASSes more accessible. Currently, employees must renew their U-PASSes each year, frustrating the many U-PASS members who do not realize this or forget to do so. An automatic renewal would eliminate this frustration. Additionally, TEMP PASSes can be made more available by allowing for online purchasing using a credit card and having the passes sent in the mail rather than requiring temporary employees to come to the TS office.

Strategy: Make it easier to sign up for a carpool permit.

Carbon impact: 2

Influence level: 5

Currently all carpool members must come into Transportation Services' office at the same time in order to sign up for a long-term carpool permit. Finding a way to obtain all the necessary information without burdening customers would help to make carpooling more convenient.

Strategy: Make social norms visible in TS facilities.

Carbon impact: 5

Influence level: 5

TS owns a considerable amount of real estate on which social-norming messages can be projected. Images, artwork, and infographics can be displayed on TS facilities such as: UTC lobby, parking facilities, bike lockers/houses/racks, bike repair stations, shuttle stops, shuttle vehicles, and kiosks.

Strategy: Provide more secure bike parking.

Carbon impact: 4

Influence level: 3

One barrier to both existing and potential bike commuters is a perception of bike theft. Providing more secure bike parking is necessary for meeting demand and helping people overcome this barrier. Strategy: Provide preferential parking to carpools and vanpools.

Carbon impact: 4

Influence level: 5

Reserving spaces for carpools and vanpools in high-demand parking facilities makes these modes more convenient and also provides an incentive over driving alone. It also makes ridesharing more visible, helping to spread social norms. Strategy: Remove ability for carpool permits to be used as an SOV permit up to two times per week.

Carbon impact: 0

Influence level: 4

The ability to use carpool permits as an SOV permit up to twice a week makes driving alone convenient and encourages fraudulent use of carpool permits. Furthermore it causes rifts in carpools when the person with the permit chooses to drive alone.

4.8 Institutional Cost per Mode

Not only will fostering lower-carbon modes and flexible work hours/telecommuting reduce Transportation Service's emissions, it will also reduce institutional costs. The university subsidizes commuting when it provides institutional funding and support that is not recuperated by user fees. The university provides direct funding by subsidizing student, staff, and faculty U-PASSes and indirectly by providing land, services, and infrastructure that is not paid in full by commuters. These institutional costs can be seen in Table 4-5. The calculations can be found in I:\groups\fac\trans\upass\A New File System\Climate Action Plan\FINAL DOCUMENTS\Appendices—Institutional Commute Costs.

Mode	Institutional Cost per Person
Drive alone	\$13.32
Carpool	\$6.15
Vanpool	\$3.16
Transit	\$2.09
Bicycling	\$0.08
Walking	\$0.01

Table 4-5: Institutional cost per commute trip (round trip) per mode

Chapter 5 Next Steps

As discussed in previous sections, Transportation Services has annual emissions reductions targets as well as a wealth of possible actions to take to meet these targets. Transportation Services understands that the long-range future is uncertain and that other strategies will emerge over time. To respond to changes over time, Transportation Services plans to follow a process on an annual basis to decide which strategies it intends to pursue in the next one to two years. This process is outlined below:

- 1. Relevant teams for each carbon focus area (electricity, fleet, and commuting) meet to discuss which strategies are most advantageous for them to pursue in the coming years. The goal will be to identify those strategies that can help meet or out-perform the carbon reduction targets for that year.
- 2. Each team develops a proposal outlining the strategies selected (see Step 1 of the Strategy Selection Process—Appendix 1).
- 3. The proposals are vetted through Transportation Services leadership.
- 4. To the extent that proposals are not fully integrated with operating enhancements for TS programs, that proposals have a negative ROI, or that proposals would compete with other programs for limited institutional or outside resources, engage with the CAP steering committee for guidance.

This process was completed in 2014 with the following strategies selected:

5.1 Electricity

- 1. Audit all parking facilities to better identify current electricity usage as well as opportunities for reducing hours of electricity usage and improving energy efficiency.
- 2. Use the Green Garage Certification Handbook as a guide in the design of new parking facilities as well as the retrofitting of existing parking facilities.

5.2 Fleet Vehicles

- 1. Add telematics to a selection of Fleet vehicles to better understand fuel performance and manage assets.
- 2. Through an academic partnership, collect and analyze data to further improve right sizing to match vehicle type to vehicle use.
- 3. Expand the use of Trapeze trip-scheduling software in Shuttles vehicles to help create operating and service efficiencies in the Dial-A-Ride system.
- 4. Purchase electric vehicles to replace combustion engine vehicles used for Parking Operations.

5.3 Commuting

- 1. Respond to the 2014-2015 Metro transit cuts with a Commute Concierge program that draws from Personalized Commute Plans, Commute Assistance, and SmartTrips Commute Options. Expand the program by offering it to other commuters facing a context change (e.g. new employees, new students, individuals moving homes, individuals whose transportation options have improved, and individuals whose transportation options have become worse).
- 2. Pilot a Commute Calendar (called the Husky Commuter Club) with Pay Per Use Parking members in partnership with Luum. If successful, expand to a larger population.
- 3. Launch a Commute Ambassadors program to increase peer-to-peer assistance.
- 4. Hire an Individualized Marketing Specialist to help integrate best practices in behavior change research to improve campaigns, written and graphic communication, presentations, and outreach through partners.

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Appendix 1 Strategy Selection Process—Commuting Strategies

Potential strategies can derive from the UW Climate Action Plan, from within Transportation Services, or from outside groups (including our customers). While a person may be excited to dive into a strategy, it is important to lay the groundwork and first properly assess the strategy and implement it in a thought-out way. Once a strategy has been scoped out and selected, the next step is to clarify the approach, then ideally pilot and evaluate the strategy, next execute the strategy on a broad scale, and finally monitor and evaluate. The larger the strategy, the more time and energy should be invested into each stage and the more critically it should be considered.

Stage 1: Strategy Selection/Assessment

The purpose of scoping a strategy out is to ensure the strategy is the best option for achieving the goals.

Step 1: Write up the scope of the strategy

Answer the following questions to the best of your ability; if you do not know the answer, try to answer them in subsequent steps.

General concept: In a nutshell, what is the strategy? What activities are involved in this strategy?

Goal: What are the desired results of the strategy?

Metrics: What metrics can be used to measure the success of the strategy based on goals?

Target audience: Who is this strategy intended to influence? Are there other people who may be influenced in either a positive or negative way (i.e. will the strategy unintentionally move people up the Mode Hierarchy)? Is this strategy tailored to meet this audience's barriers and motivations?

Timeline: What is the timeline for this strategy?

Dependencies: What does this strategy rely on to be successful? What would make this strategy unsuccessful?

Risks & Concerns: What are the primary risks or concerns associated with this strategy? What potential problems does this strategy have?

Cost: How much will this strategy cost to employ (e.g. supplies, infrastructure, consulting fees, etc.) in a pilot study and in broad-scale implementation (both initial investments and maintenance)? Will there be net savings (or revenue) in the long term? These can be rough estimates at this point.

Funding: What potential funding sources are available?

Staff: What Transportation Services staff will be involved and what are their responsibilities? How much of each of their time will be required initially and for maintenance? What are the opportunity costs associated with using staff time for this strategy?

Administrative feasibility: Is this strategy administratively feasible (e.g. works with existing software, policies, etc.)?

Political feasibility: Is the political climate (at the university, the City, etc.) favorable towards this strategy? How much political capital will be spent to carry out this strategy?

Carbon: What level of emissions reductions (or increases) can we expect to occur as a result of the strategy (upper and lower brackets)?

Multimodal literacy: To what extent does this strategy improve multimodal literacy?

Enjoyability: To what extent does this strategy make the user experience more enjoyable (either through structural or psychological changes)?

Affordability: Does this strategy influence users' financial cost of using a mode? Does this strategy influence users' perceptions of financial cost of using a mode?

Innovation: Does this strategy put Transportation Services at the leading edge of the industry? Is this something people outside of the university will talk about as being innovative?

Safety: Does this strategy improve users' safety from crime or traffic? How does this strategy, if at all, affect people's perceptions of safety?

Convenience: How does this strategy influence the convenience (and perceived convenience) of different modes (is it push or pull and for which modes)?

Efficiency: How does this strategy influence the efficiency (and perceived efficiency) of different modes (is it push or pull and for which modes)?

Equity: How does this strategy affect the conditions for marginalized members of the UW population (low-income, people with disabilities, etc.)?

Other options: What other strategies could achieve the same goal? Develop other strategy ideas by looking at strategy ideas in the UW Climate Action Plan, bright spots on campus, and best practices in the industry.

Activities to reality test your assumptions: What information can you gather or what tests can you run to teach you more about the strategy's potential problems or lessons to make it more successful? Can you pilot this strategy?

Step 2: Share write up within Commute Options

Share write up with the commute options manager and anyone else on the team who is involved or has relevant experience. Set a deadline in the email subject for responses. This is a heads up communication, not waiting for permission.

Step 3: Share write up within Transportation Services

Share write up with managers and involved staff from participating/impacted work groups, senior leaders. Set a deadline in the email subject for responses. This is a heads up communication, not waiting for permission.

Step 4: Depending on responses, set up meetings

Talk through points of question, revise the scope based on feedback, or proceed with the original plan.

Stage 2: Clarify Strategy Approach

Before taking action, it is important that the strategy is based on and carried out with careful consideration rather than on assumptions.

Step 1: Consult target audience

Consult the target audience to get feedback on the proposed strategy (host a focus group).

Step 2: Communicate with team

Clearly communicate roles, responsibilities, and deadlines with strategy team. Have any conversations needed to clarify these items.

Stage 3: Pilot

If the strategy allows for it, conduct a pilot study on a small sample (e.g. one or two departments, one building, a few blocks, etc.). This allows you to test run your strategy to work out any problems before launching into an expensive, full coverage strategy. This allows you to refine your strategy with much less difficulty and expense than would making alterations to a larger strategy. Expect problems and allow time and expense to make revisions.

Throughout the process, if you encounter barriers, reach out to leadership (the commute options manager, others as needed) for assistance. Additionally, check in with team members regarding deliverable progress, especially on critical path items, and confirm completion of each task. Report progress to team, leaders, and stakeholders.

Step 1: Select two or more similar groups/areas

In order to determine whether the strategy is effective, you'll need to compare groups/areas receiving the strategy (this will be your intervention group/area) and a similar group/area unaffected by the strategy (this will be your control group/area). Randomly determine which group/area will receive the strategy and which will be the control (flip a coin).

Step 2: Collect baseline data

Collect baseline data from both groups/areas, since they may differ initially from each other. Use metrics that will reveal success in regards to the goal.

Step 3: Apply the strategy

Apply the strategy to intervention group/area.

Step 4: Collect post-strategy data

Collect data on both groups/areas during and/or following the strategy (depending on the nature of the strategy).

Step 5: Evaluate effect

Determine the impact of the strategy by comparing the difference between the changes observed for the control group and the intervention group.

Impact = (Intervention Baseline – Intervention Post-Strategy) – (Control Baseline – Control Post-Strategy)

Step 6: Revise strategy

If the results show little or no effect due to the strategy, revise the strategy until significant enough changes are found. Make sure you retest your revised strategy on the pilot groups/areas rather than just assume you learned your lesson from the pilot and move on to broad-scale implementation.

Step 7: Calculate return on investment

We want strategies to be both effective in achieving the goals as well as being costeffective.

Calculate return on investment:

A. Dollars Spent: Includes all costs associated with developing and conducting the
pilot (e.g. materials, consulting fees, staff time, etc.)
B. Behaviors Influenced: number of people who engaged in the target behavior.
C. Cost per Behavior Influenced: Divide Dollars Spent (A) by Behaviors Influenced
(B).
D. Benefit per Behavior: Costs avoided (e.g. health care costs, social cost of
carbon, etc.). This can be difficult to calculate.
To calculate return on investment:
 Gross Economic Benefit = B*D
 Net Benefit = Gross Economic Benefit – A
3. ROI = (Net Benefit/A)*100
Step 8: Report to team, leaders, stakeholders
Access outcomes and process with strategy team. Popert back the results to the

Assess outcomes and process with strategy team. Report back the results to the strategy team, leaders, and key stakeholders.

Stage 4: Broad-Scale Implementation

You've done your due diligence in ensuring the strategy is appropriate for achieving the goals and have a plan for how to effectively implement the strategy. Now it's time to implement!

Throughout the process, if you encounter barriers, reach out to leadership (Commute Options manager, others as needed) for assistance. Additionally, check in with team members regarding deliverable progress, especially on critical path items, and confirm completion of each task. Report to team, leaders, and stakeholders on the progress.

Step 1: Collect baseline data

Collect baseline data on current behaviors. As much as possible, use data representing actual behavior rather than self-reported behavior. Use metrics that will reveal success in regards to the goal.

Step 2: If appropriate, create public awareness

If the strategy lends itself to public attention, host media events/send a press release at the launch of the strategy.

Step 3: Apply the strategy

Apply the strategy broadly.

Stage 5: Evaluate and Monitor

It's important to know whether the strategy was successful, how it could be improved, whether it should be done again in the future, and record how it was done.

Step 1: Evaluate effect

Immediately following project completion, assess outcomes and process with the strategy team. Consider whether a future change should lead to a reevaluation of the project. Identify a trigger for that reevaluation and schedule/set mechanism for encountering trigger.

Step 2: If appropriate, follow-up with people affected by strategy and media

Provide feedback to those affected by the strategy to reinforce the changes they've made. This can be done through distributing results of the strategy to the media.

Step 3: Document process

Document process and store documentation, deliverables, and supplies so that they are ready to use in the future. If the project will reoccur, schedule the beginning of the next project cycle in the Commute Options shared calendar, with links to the documentation.

Step 4: Report to team, leaders, stakeholders

Share project summary/learnings with team, leaders, and key stakeholders.

Appendix 2	Strategy List					
Strategy	Who	Target Group/Mod e	Carbon Impact Level	Influence Level (1=weak, 5=strong)	Annual Cost	
SmartTrips New Employees	All new employees	New employees, staff	19	4	\$ 47,776	
SmartTrips New Students	All new undergrads & grads	New students	19	4	\$ 17,139	
Increase the price of parking	All students and employees	SOV push	15	4		
Develop a means for on-going relationshi ps with customers	All students and employees	None	14	5		
SmartTrips New Home	Students in HFS, all employees who change address	Individuals who are about to move or who recently moved homes	13	4	\$ 47,776	
Commute Ambassad ors	All employees	Interested in changing, staff	13	4	\$ 60,227	
Personaliz ed Commute Plans	All students and employees	Interested in changing	13	5	\$ 28,413	
Improve Commute Campaigns	All students and employees	Interested in changing	13	5	\$ 29,954	
Improve Outreach through Partners	All students and employees	None	13	3	\$ 26,235	
Commute	All students	None	11	5	\$ 75,897	

Appendix 2 Strategy List

Strategy	Who	Target Group/Mod e	Carbon Impact Level	Influence Level (1=weak, 5=strong)	Annual Cost
Calendar	and employees				
Better regulate on-street parking near campus	All students and employees	SOV push	11	2	
Commute Assistance	All students and employees	Interested in changing	10	5	\$ 33,916
Better understand barriers to finding a rideshare partner	All students and employees	Carpool, vanpool	9	5	
Increase parking pricing variability based on frequency of use	All students and employees	SOV push	9	4	
Prospectiv e Mover	All new students, employees, people seeking info from HFS, OCHA, HomeStreet Bank, TS website	Individuals seeking a new home	7	4	\$ 7,478
Improved Transporta tion Options	People whose options improved	Individuals whose transportati on options have improved	6	5	\$ 781
Identify and	All students and	Bike	6	2	

Strategy	Who	Target Group/Mod e	Carbon Impact Level	Influence Level (1=weak, 5=strong)	Annual Cost
improve off-campus bike infrastruct ure	employees				
Improve transit service	All students and employees	Transit	6	2	
Make it easier for customers to cancel parking permit, purchase U-PASS	All students and employees	Transit, all	6	5	
Identify housing locations with high SOV rates	All students and employees	SOV push	5	5	
Make social norms visible in TS facilities	All students and employees	None	5	5	
Improve Written and Graphic Communic ation	All students and employees	None	4	5	\$ -
Increase housing on and near campus	All students and employees	Walk	4	1	
Provide more secure bike parking	All students and employees	Bike	4	3	

Strategy	Who	Target Group/Mod e	Carbon Impact Level	Influence Level (1=weak, 5=strong)	Annual Cost
Improve on-campus bike, walk, and transit infrastruct ure	All students and employees	Walk, bike	4	2	
Improve access to existing showers and lockers	All students and employees	Walk, bike	4	3	
Provide preferential parking to carpools and vanpools	All students and employees	Carpool, vanpool	4	5	
SmartTrips Commute Options (options worse)	People whose current mode worsened	Individuals whose existing mode has been made worse	3	5	\$ 14,896
Improve Presentatio ns	All students and employees	none	3	5	\$ 1,275
Increase access to real-time transit informatio n	All students and employees	Transit	3	4	
Make it easier to sign up for a carpool permit	All students and employees	Carpool	2	5	
SmartTrips Departmen ts	Employees in select department s	Staff, interested in changing	1	4	\$ 4,910

Strategy	Who	Target Group/Mod e	Carbon Impact Level	Influence Level (1=weak, 5=strong)	Annual Cost
Improve accommod ation of bicyclists and pedestrian s in constructio n detours	All students and employees	Walk, bike	1	3	
Instill better bicyclist behavior	All students and employees	Walk, bike	1	2	
Enable carpool parking fees to be split by more than 3 people	All students and employees	Carpool	1	4	
Remove ability for carpool permits to be used as SOV permit 2x/week	All students and employees	SOV push	0	4	

Appendix 3 Evaluation Questions

Behavior:

- In the past week, how many one-way trips did you make to/from campus by ____(insert mode)? (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, more than 10)
- *Commute trip diary for past week

Intention (proxy for future behavior):

- My intention to commute to campus by ____(insert mode) is (scale from 0-5 with 0 being weak and 5 being strong)
- My intention to switch from my current commute mode to ____(insert mode) when commuting next time is high (scale from 0-5 with 0 being strongly disagree and 5 being strongly agree)

- The likelihood of me switching to ____(insert mode) when commuting next time is high (scale from 0-5 with 0 being strongly disagree and 5 being strongly agree)
- I will make an effort to switch to _____(insert mode) when commuting next time (scale from 0-5 with 0 being strongly disagree and 5 being strongly agree)

Perception:

- As a means of getting to campus, how do you perceive ____(insert mode)? (scale from 0-5, with 0 being not at all attractive and 5 being very attractive)
- *For me, to commute to campus by ____(insert mode) would overall be... (scale of 0-5 with 0 being very unpleasant and 5 being very pleasant)

Self-efficacy:

- How confident do you feel being able to _____(insert mode) to campus? (scale of 0-5 with 0 being not confident and 5 being very confident)
- *For me to commute to campus by ____(insert mode) would be (scale of 0-5 with 0 being very easy and 5 being very difficult)
- For me to commute to campus by ____(insert mode) is easy (scale of 0-5 with 0 being strongly disagree to 5 being strongly agree)

Social norm:

- *Most people who are important to me would support my commuting to campus by ____(insert mode) (scale of 0-5 with 0 being very unlikely and 5 being very likely)
- Most people who are important to be think that I should commute to campus by (insert mode) (scale of 0-5 with 0 being very unlikely and 5 being very likely)