ECO ELITE CONSULTING
UBC Operations Strategy Plan
Prepared for: UBC Building Operations

Danielle Hicks, Hanjason Kalirai, Igor Jesovnik, Jennifer Zhen, Madison Guy

University of British Columbia

COMM 486M

March 26, 2017

March 26th, 2017

2329 West Mall
Vancouver, BC
V6T 1Z4

ECO ELITE CONSULTING

UBC Operations Strategy Plan

Prepared for: UBC Building Operations

Project Team 5:
Madison Guy
Danielle Hicks
Igor Jesovnik
Jennifer Zhen
Jason Kalirai

Introduction

In recent years, there has been a large focus on the environmental footprint that public universities have left on their respective campuses. To mitigate this footprint, the University of British Columbia has developed a Climate Action with goals for 2020 through to 2050. The main goal is to reduce the overall GHG emissions that come from UBC operations. The purpose of this document is to outline the strategies developed by Eco Elite Consulting to aid UBC in reaching both its short-term and long-term goals for GHG reduction. The three strategies developed, provide a cost-effective solution to managing UBC fleet operations, while creating a positive impact on the environment.

Build Engagement

Our first strategy highlights building a platform for engagement between departments. To do this, we will create a Round Table Discussion for which each department at UBC can present their ideas and have an opportunity to discuss an alignment of goals across departments. This is designed to incentivize departments who previously felt disconnected from the decision-making process of Building Operations, and encourage participation in creating a vision that aligns with the needs of each individual department. Currently, there are some departments who are cooperating with the strategy of UBC Building Operations and their plans to reduce GHG emissions, but there are many departments who are not actively involved in the plans that UBC Building Operations has outlined. Our strategy aims to bring both sides together to find long-term, permanent solutions that can benefit everyone.

Operational Efficiency

Our strategy to implement operational efficiency across departments includes a new telematics system to be installed in the entire UBC fleet. These devices have the ability to track vehicle usage, driver behaviour via designated FOB, as well as supply second-to-second real-time updates to management. By utilizing the tracking ability of these devices, we intend to create tool-shed facilities around campus that would decrease the difficulty of having to go back to base between every job, and hence increase efficiency. As an additional alternative, we also will include the all-electric transport vehicle on a rental basis: trikes. They come attached with storage containers which allow for ease of material transport and result in absolutely no emissions being produced.

Sustainable Environment

Our strategy to reduce the GHG emissions on campus stems from UBC's own car-sharing model where, similar to other car-share companies like Car2Go and Evo, vehicles will be booked for a block of time versus their current scenario of workers having the vehicle with them for the entire day. Through car sharing we intend to promote more efficient behaviours by using cars when needed as opposed to having the cars idle for the majority of the day. We would like to pilot this project first with only the Building Operations fleet and then move into expansion with other departments. Also, forward-looking we have potential opportunities in the Waste to Energy field, in which we will be investing to look for more long-term solutions of solving our 2050 goal with UBC GHG emissions equal to zero.

Risks & Mitigation

Our most substantial risk will be the reluctance to adoption of this new model for all current workers. Handling multi-level organizational change can be the most difficult task faced by any organization. We aim to mitigate this by hosting Round Table Discussions and by providing various training programs and feedback opportunities for employees. Another risk is the feasibility of operations and in order to mitigate this we have developed an in depth implementation plan that has a specific allowance for flexibility in

order to adapt to any issues that may arise. We will also use the pilot program as a way to test various results before implementing across departments. The last two risks include going over budget and safety which of course are concerns but we found that cost implementation is primarily from the telematics device cost, and safety testing will be completed to see if specific vehicles are adept to carrying out a typical day job. In order to stay within budget, we have done a financial analysis to analyze the projected cost of our strategies. For safety, we will implement pre-testing for our models as well as have training for employees in order to further communicate the safety standards and address any issues.

Conclusion

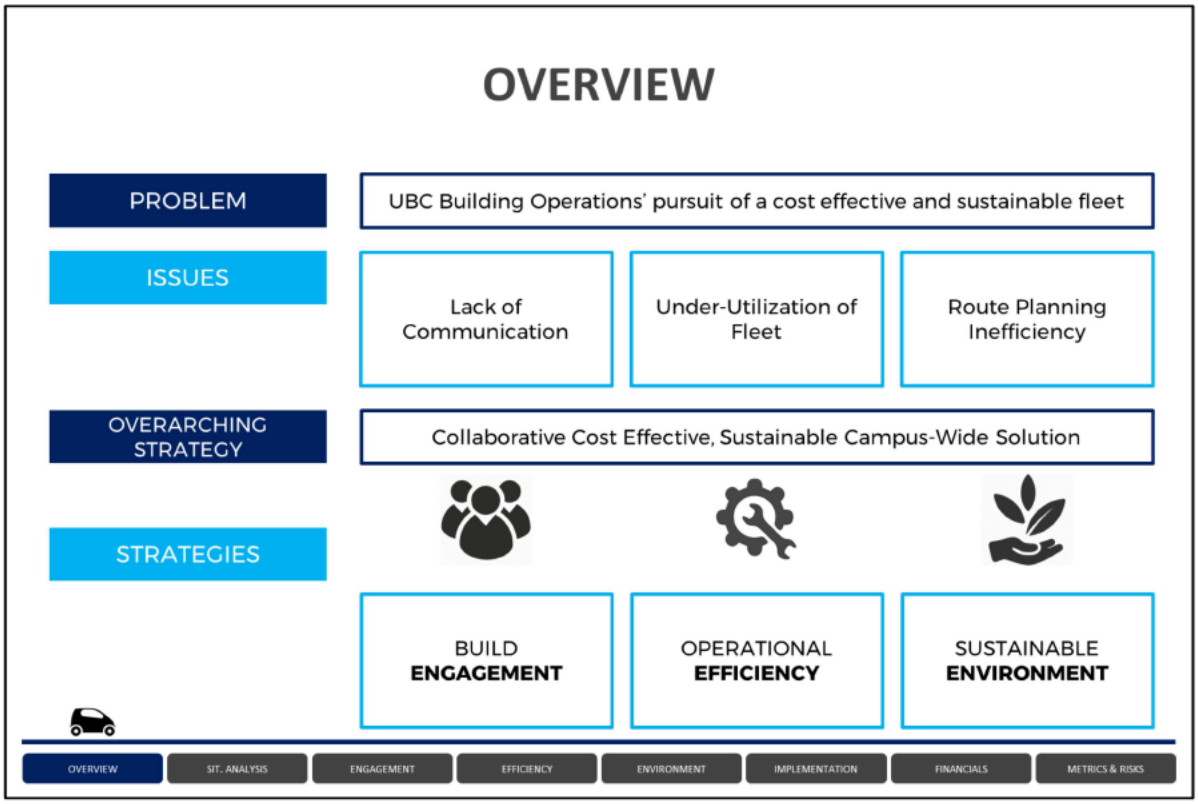
We are confident that the strategies provided have the ability to help UBC reach its overarching goals for reducing GHG emissions in cost effective manner by 2020 and onwards. The strategies provided give a much more cost efficient option than the alternative of buying new fleets. It also gives an opportunity to test a car share model and collect data, while minimizing risks. The implementation plan gives achievable milestones and provides a feasible and sustainable long-term solution for the entire UBC campus.

UBC BUILDING OPERATIONS

March 29th, 2017

Danielle H., Igor J., Madison G., Jason K., Jennifer Z.

By Eco Elite Consulting



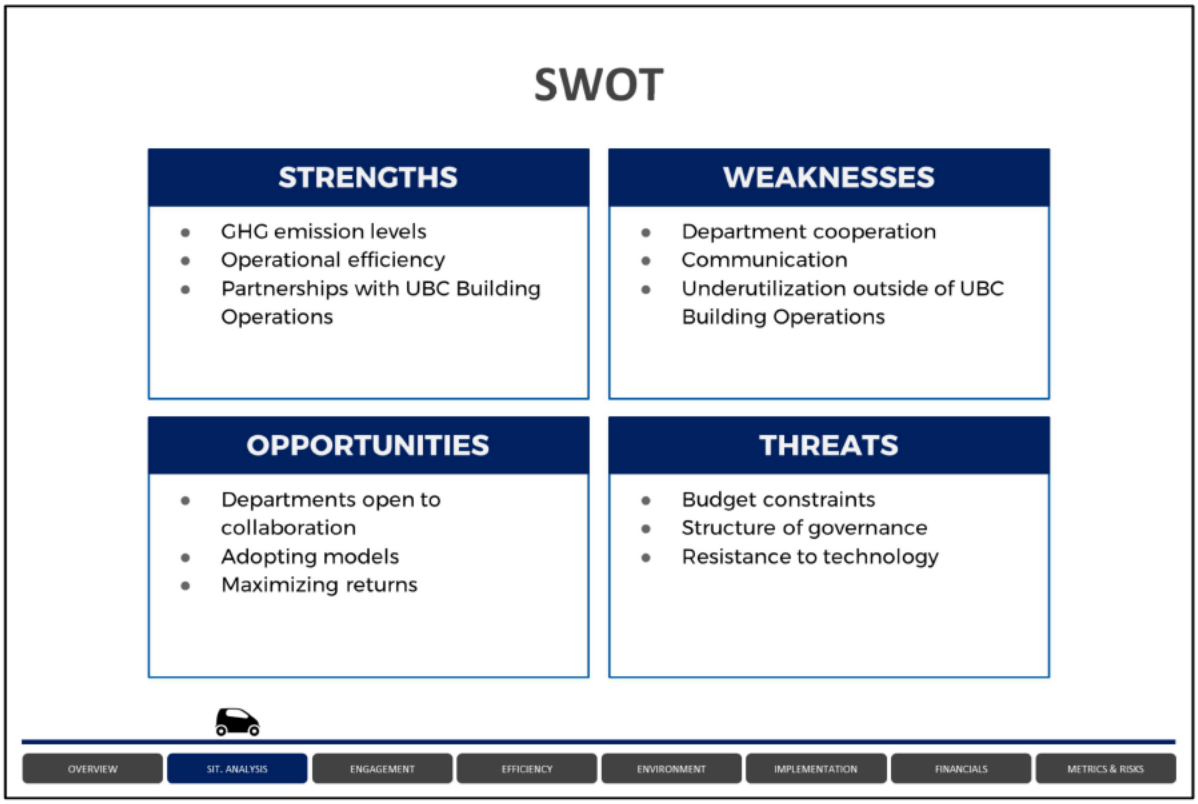
At the Vancouver 2010 GLOBE conference, UBC announced its future direction for environmental sustainability. The primary goals set were for GHG emission to be reduced by 33% for 2015, below 67% for 2020 and completely eliminated by the year 2050. The UBC Building Operations department has committed to achieving these targets with a cost-effective solution, but have faced challenges when attempting to collaborate with other departments. Currently, Building Operations has tasked our team, Eco-Elite Consulting, with creating unique and cost-efficient strategies that aid in their achievement of campus-wide sustainability goals.

Our consulting team has identified three current issues which may prevent UBC from reaching their goal of a cost-effective fleet and their GHG emission targets. These issues are:

1. Lack of communication and collaboration throughout the entire UBC organization when it comes to environmental initiatives and fleet management.
2. Currently, many vehicles are being under-utilized in UBC's fleet and therefore not much value is being derived from these assets.
3. Building Ops drivers drive from service location to service location during their shifts, but the routes are not being planned efficiently.

The strategies we have identified are:

1. Build engagement through Round Table Discussion and identifying the unique needs of each department.
2. Operational efficiency through the strategic placement of tool sheds in high frequency areas, implementation of more advanced telematics, and a partnership with a local trike company.
3. Achieving a sustainable environment through a car share program, the partnership with UBC professors and the implementation of a Waste-to-Energy program.



Prior to determining key recommendations and initiating a direction for the future to assist UBC Building Operations with their goals, we used relevant strategic tools to analyze their current scenario. Below is our detailed SWOT analysis to complement the slide (also available in the appendices):

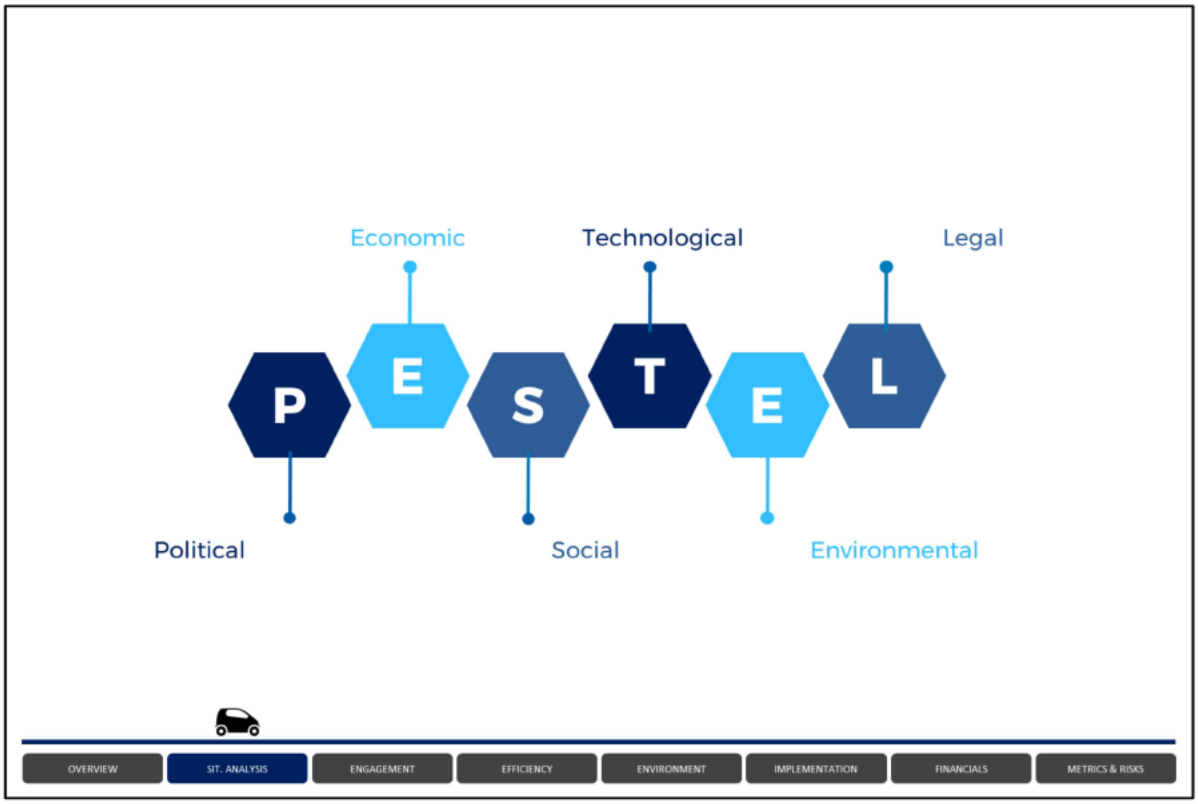
Strengths:
- Building Operations currently accounts for only 1.4% of total GHG emissions at UBC
- Building Operations has a robust operations plan in order to maximize both cost efficiency and sustainability
- Building Operations has developed partnerships with electric-friendly vehicle manufacturers

Weaknesses
- Building Operations has experienced difficulty getting other departments on board with their operations plan in order to reach UBC Sustainability goals
- Poor understanding and communication between departments
- Various vehicles are currently being under-utilized in departments outside of Building Operations

Opportunities
- Interviews suggest that departments are open to collaboration with Building Operations
- Maximizing returns on the vehicles that may be eliminated
- Opportunities to collaborate or adopt models from other companies that have been successful with GHG reduction in the field of transportation

Threats
- Budget constraints limit the ability to adopt new mainstream fuel efficient technology
- UBC Governance structure slows down process of approval for vehicles and projects
- Both employees and the public are resistant to new technologies and the car sharing model

comm486M-201 project brief 2017
http://blogs.ubc.ca/comm486mcubbon/files/2016/11/Pegasus-5.0.pdf



UBC is a public university and therefore we determined that a PESTEL analysis would allow us to be cognizant of the macro environmental factors affecting them. Below is our detailed PESTEL analysis:

Political

- Adoption of more green policies
- Labour laws

The Liberal party has recently emphasized environmental initiatives by focusing on investments in green technologies and stronger environmental policies. Justin Trudeau and the Liberal party will also look to repeal Bill C-377, which will give back strength to labour unions. This will directly affect employees as organizational changes occur within departments.

Economic

- Disposable income

The Building Operations department at UBC is regulated by a strict operating budget that determines yearly spending. As new technology and systems are implemented, it is important that decisions on spending are carefully analyzed in order to avoid a deficit and manage public debt.

Social

- Increase in environmentally conscious individuals
- Growing trend towards adoption of carshare models

The social climate has drastically changed in recent years. The impact of the environment has become a key topic both at UBC and globally. This makes it essential that UBC is adopting policies that minimize their environmental impact across departments and that they continue to increase environmental initiatives across campus.

Technological

- Waste to energy opportunities for naturally fueled resources
- Increasing technology such as telematics and dashboard to measure operational efficiency
- Increasing technological advances in electric vehicles

With technology developing and changing every day, and the Canadian Government's focus on clean technology, there are many opportunities that UBC Building Operations can utilize in order to increase their efficiencies and decrease their [redacted] impact. This can include waste to energy, telematics and electric vehicles.

Environmental

- Meeting UBC Sustainability Goals

Tracking environmental impact is a requirement for operational excellence in the 21st century. UBC has set goals for both 2020 and 2050 for environmental impact and these must be carefully considered in the process of decision-making.

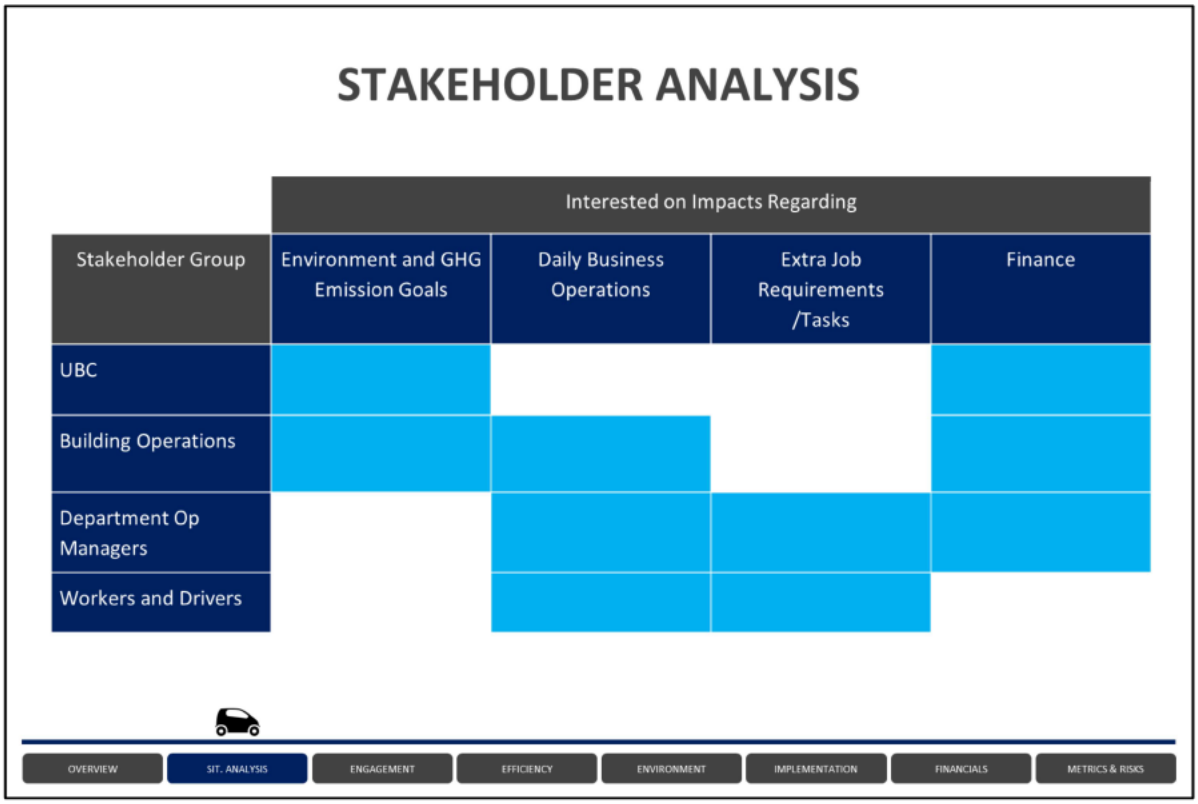
Legal

- Safety Hazards
- University Rules and Regulations

When choosing a strategic direction for fleet management, it is important to consider how these changes may impact the safety and well being of both employees and the public and that it falls within the safety and labour laws provided by the government.

Secondly, the UBC Governance structure has established policies and procedures in accordance with the BC Provincial College and Institution Act as well as the Budget Transparency and Accountability Act. The university requires any purchases above $50,000 require authorization from department heads and must be in accordance with the FO Sustainability Framework. Once criteria is met, the appropriate documentation can be sent for tender.

(Sources in Appendix #)



There are various stakeholders involved in the fleet management of UBC ranging from UBC, Building Operations, Departmental Operations Managers, and the employees who utilize the fleets on a regular basis. This stakeholder analysis shares the areas of interest that are of importance to each group of stakeholder. This understanding will help us to better satisfy and meet the needs of the stakeholders involved when providing our recommendations.

UBC: Concerned with the university's overall sustainability and environmental efforts such as reducing GHG emissions by set targets, and the financial impacts of the project.

Building Operations: Concerned with implementing the strategic goals of UBC in terms of GHG Emission goals through operational efficiency. They too would be concerned with the financial implications of the project, with an additional concern regarding risks towards changing their current daily business operations.

Department Operations Managers: The managers would be concerned with impact on their daily operations, extra job requirements stemming from the recommendations of the project, and the financial implications.

Workers and Drivers: These individuals would be largely concerned with the impact on their current daily operations and whether the project would require them to perform extra tasks.

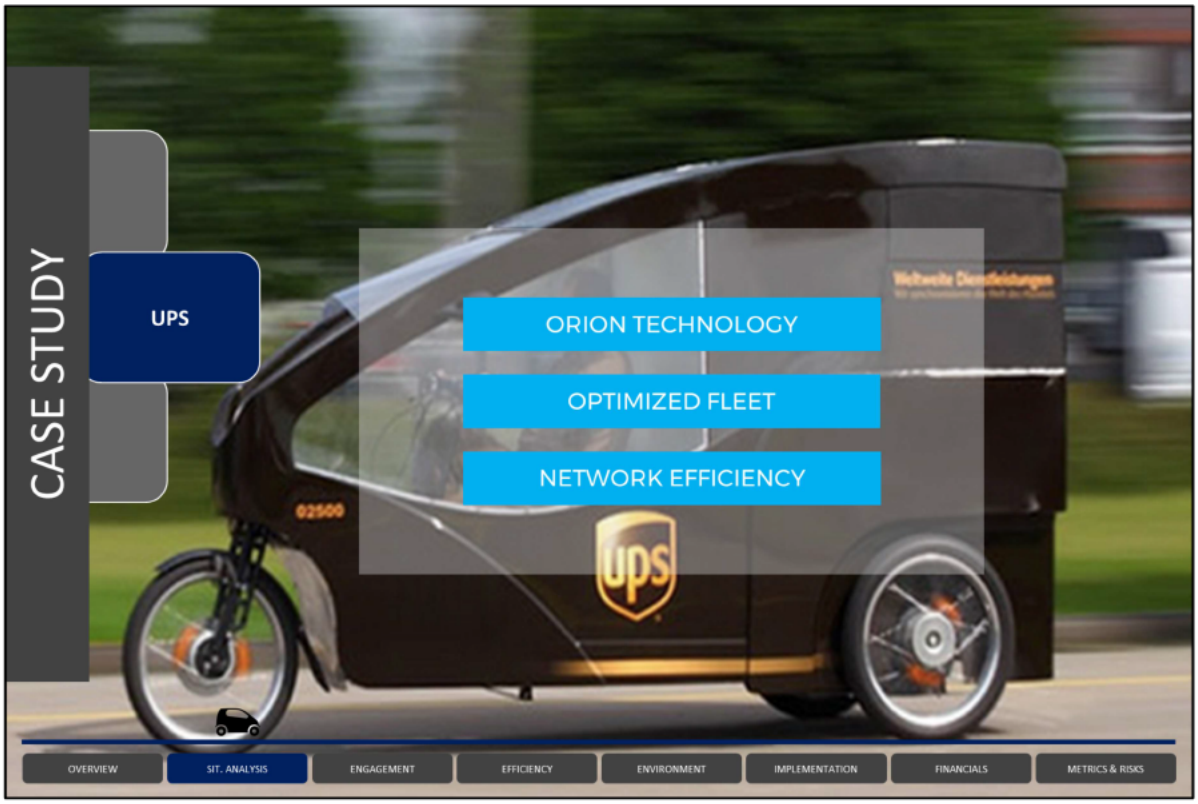
It is important that UBC Building Operations positions themselves as a leader relative to other top North American research universities. Harvard has created a sustainability program which, "…encourages and excites the diverse groups of faculty, students, and staff; it recognizes the different operational groups and faculty staff as well as their needs."

The university is committed to achieving the United Nations Intergovernmental Panel on Climate Change's goal of reducing 80% of emissions by 2050.
Harvard has been able to successfully introduce hybrid vehicles into their fleet; such vehicles include a Toyota Highlander and 2 Ford Escapes. The school has sustainability goals and standards that it requires all of their vendors to meet.

Another avenue pursued by the university's Sustainability Task Force looks to take Harvard's long standing academic excellence and links it to relevant research to determine cutting edge innovations to improve the climate change and sustainability efforts. The Task Force suggests: "[Harvard to] foster an aggressive program of innovations in GHG reductions engaging the entire university and elements of its neighboring communities…" (page 4).

In Harvard's commitment to achieving its Sustainability Plan it has created university-wide initiatives to ensure every department has a claimed stake in the overarching campus-wide goals. Implementing a decision-making process allows for departments and operating teams to input their ideas and provide feedback on current operating systems. Harvard's Central Administration established a baseline for sustainability and then the funnel of committees proceeding worked together to create complementary plans for each department. Establishing individuals from all levels of the university ensures that everyone is committed to achieving the outlined goals and the school is continuously searching for ways to remain a innovator.

https://green.harvard.edu/campaign/our-plan
https://green.harvard.edu/sites/green.harvard.edu/files/Harvard%20Sustainability%20Plan-Web.pdf
http://transportation.harvard.edu/fleet-management



A review of the UBC Sustainability Plan and goals of UBC Building Operations led us to research a variety of organizations who are leaders in environmental sustainability, particularly firms who are taking strides to reduce their GHG emission levels. UPS, especially their Scandinavian branch of operations, is at the forefront of reducing GHG emissions produced by their fleet (scope 1). UPS's overarching goal is to become carbon neutral. There are 3 avenues which UPS uses to pursue their goal:

1. Technology

Determined to ensure their drivers have the most optimized route, UPS created an R&D project called ORION (On-Road Integrated Optimization and Navigation). ORION calculates the most efficient and cost-effective route for pick-up and delivery. The routes are optimized in real-time based on distance, fuel, and time (the driver's shift and customer pick-up times). The implemented telematics save UPS 10 million gallons of gas consumer, reduce CO2 emissions by 100,000 metric tons, and save roughly 100 million miles annually.

2. Optimizing the fleet

In an analysis conducted by UPS they identified that as the population of individuals within a city increases it leads to urban congestions, thus creating difficulty for drivers to pick-up and deliver packages. Another discovery was urban access. According to Brookings Institution, metropolitan cities are seeing an increasing amount of traffic on their roads today due to modern societies. As a result, many of these cities have green initiatives in place to reduce the overall GHG levels in their city, which encompasses an increase in bike lanes and pedestrian only areas. To deal with this rising issue UPS has also added electric vehicles and tricycles to their fleet.

The use of a Cargo Cruiser, an electric-assisted tricycle, solved the issue of urban congestion and access. The tricycle allows drivers to ride through pedestrian only streets and bridges to deliver packages. Access onto these roads allows for drivers to take direct and efficient routes. Additionally, their goal in London, England is to have an all-electric fleet in the city center by 2017.

3. Delivery Network Efficiency

The selected optimized route decreases idle time by reducing the amount of left and right hand turns the vehicle must make and decreasing the amount of stopping at traffic lights and signs. Analytic reports on each vehicle of the fleet ensures its operating at its maximum miles-per-gallon. UPS also introduced UPS My Choice, UPS Smart Pick-Up, and UPS Access Point as solutions to the problem of no-one being home when packages are being picked-up or delivered.

https://sustainability.ups.com/committed-to-more/sustainability-solutions/
https://sustainability.ups.com/media/UPS_KPIs_Sustainability_Reporting.pdf
https://www.ups.com/content/us/en/bussol/browse/carbon_neutral_tools.html
https://sustainability.ups.com/media/ups-pdf-interactive/index.html
https://sustainability.ups.com/sustainability-reporting/
https://www.pressroom.ups.com/pressroom/ContentDetailsViewer.page?ConceptType=Factsheets&id=1426321616277-282

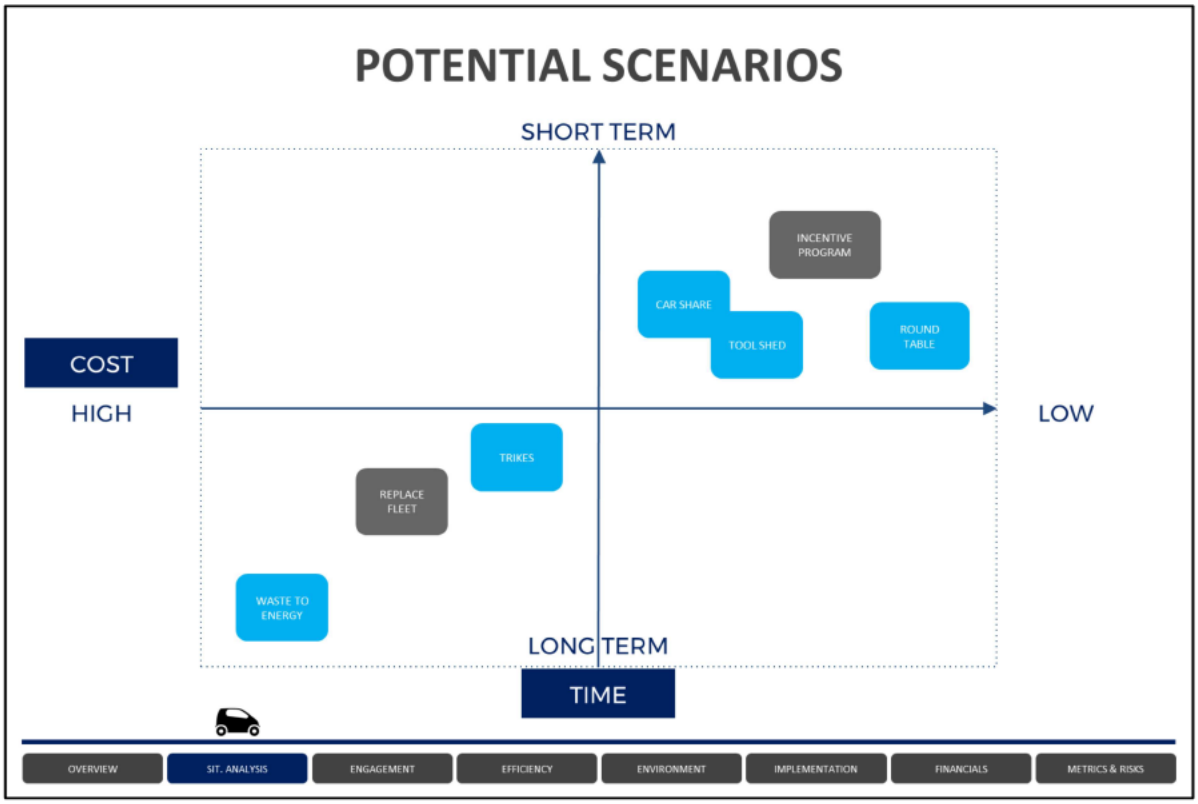
In 2004, oil reserve prices impacted and tanked shares and CEO left the company.

New CEO stated that there needed to be structural and process change to lift Shell out of it's ruins. The transformative plan was called Downstream-One where the plan needed to be cascaded to every member of the team in every business unit. This was not an opt-in policy; everyone was mandated to be a part of the change.

The team of experts – made up of senior leaders, in-house subject matter experts, implementation consultants and external change experts – who delivered the change program were crucial in this phase. They provided technical support to manage change, briefed those impacted on change, and went over risks and mitigations prior.

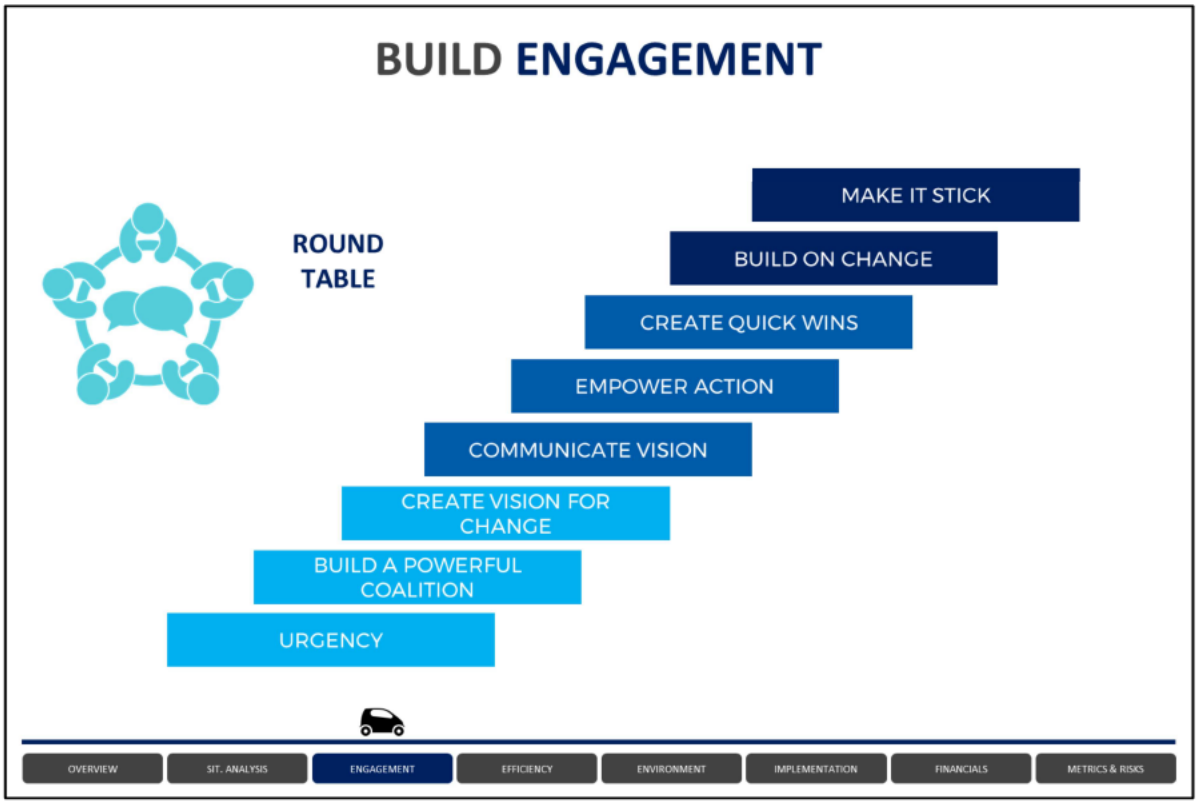
Shell is currently in a much healthier status as a result of Downstream-One.

http://www.managers.org.uk/insights/news/2015/july/the-5-greatest-examples-of-change-management-in-business-history



We have identified all viable options for UBC Building Operations based on time and cost. The top-right quadrant of the table has low-to-medium cost options that can be executed in the short-term. Our team advises UBC Building Operations to pursue the follow avenues within this quadrant: Round Table Discussion, Tool Shed, and Car Sharing. We will be explaining our decision to pursue these strategies in the following slides. We did not decide to pursue an incentive program as a primary strategy because we did not feel that creating competition between employees and faculties was going to create unison and productivity. It is important to acknowledge that individuals are motivated differently, some prefer a monetary incentive while others prefer non-monetary rewards and incentivisation.

In the lower left quadrant our team identified more long-term and higher cost options for UBC Building Operations to pursue. The options include the addition of trikes and e-bikes, replacement of fleet and waste-to-energy. We have chosen to pursue the addition of trikes and e-bikes to the fleet as well as a long-term goal of converting waste-to-energy since we believe these options add the most value. Furthermore, the addition of trikes and e-bikes have a lower cost than purchasing vehicles. Another identified benefit is the minimal amount of GHG emissions they produce. Looking long-term, many corporations have begun working towards harnessing their waste to power fleet vehicles. Acknowledging the high cost associated with this option, we identified professors at the university who are currently conducting research in this area. Our team has chosen not to pursue the option of replacing the current fleet to more environmentally friendly vehicles because we feel this is not practical to their operations and not an efficient use of the budget.



After conducting research and interviews with various departments such as the Forestry and Engineering-Applied Science department and Building Operations drivers, we recognize that there is little awareness, accountability and effort to reach the UBC Sustainability goals of reducing and eventually eliminating GHG emissions. Currently, departments have minimal communication with Building Operations and between one another. One of the most impactful ways for Building Operations to reduce GHG emissions is by gaining support from various departments to take part in their vision and adhere to the set goals. This short term goal of increasing collaboration between various departments and Building Ops, as well as managing organizational change, would effectively help reduce GHG [redacted] Combined, this effort would also allow new changes in operational or fleet changes to be accepted relatively quickly in the long term.
To facilitate change and encourage people to take part in the the Building Operations sustainability and GHG vision and goals, a roundtable will be established. People who sit on this roundtable will be the leaders and upper management within each department responsible for overseeing the fleet operations. They will meet regularly throughout the year, on a quarterly basis, to discuss any concerns and ideas from their department surrounding continued collaboration and aligning with the vision and goals. Initially, this roundtable will be established with a sense of urgency, as our goal to decrease GHG emissions below 67% by 2020 is nearing, and they will help collaborate on creating and/or critiquing the vision. They will work together to further establish small goals for their departments to reach those targets and be people who champion and encourage the change within their departments.

Build a Sense of Urgency: The GHG goals for 2020 are not being met and there needs to be greater support built to reach the targets.
Build a Powerful Coalition: Establish a group of individuals who are responsible for managing the fleet operations within each department on campus.
Create Vision for Change: Allow the members to critique and develop a shared vision together to allow for the vision to be a two-way dialogue and receive greater buy-in and support from various departments.
Communicate the Vision: The department operations managers would be required to communicate the vision of reaching GHG emission targets by 2020 through in-person department announcement to relay information to everyone in the department all the way to the drivers. Communicating the vision will be on-going task.
Empower Action: Communicate that UBC will need everyone onboard to create change. The department fleet manager can brainstorm with the department what actions can be done individually, as a team, and as a department in order to be successful.
Create Quick Wins: Develop quick and easy wins such as fuel efficiency or other alternative routes (i.e idling less, etc) to encourage workers to understand that taking part in the change is easy.
Build on the Change: As wins are created and people contribute to the change, Building Operations will roll out new initiatives such as tool sheds, car sharing and trikes to support the change. Adoption of these initiatives will be easier given the understanding and commitment to the vision and change of supporting the GHG initiatives in the short term and long term.
Make it Stick: A culture needs to be developed through encouraging others to partake in the goal, allowing workers to make suggestions, bringing interested individuals to meetings and continuously communicating and holding each other accountable to the goals.

http://blogs.ubc.ca/comm486mcubbon/files/2016/11/Pegasus-5.0.pdf

Given the research on telematics across several competitors with global reaches in Canada and beyond, we have come to the conclusion that one stands above the rest: Geotab. Their business model and relatively easy-to-use adaptable product, accompanied by an outstanding level of secondary assistance, training, and future add-on options make it the perfect fit. More specifically, their business model preaches innovation and they are the only device we found that explicitly stated they are able to monitor hybrid and electric vehicles as well. In addition, the MyGeoTab software also has scheduling, security, and inventory management functions built-in. Installation requires no tools or equipment, simply find the ODBII port via the free app on the Google Playstore or Apple Store called "OBD2 Port Lookup – Car's DLC". You directly plug it in and begin syncing it with MyGeoTab software and once connected will begin second-by-second reporting and feedback. Although there are some harnesses and brackets needed to make the device fit in particular cars, they have been accounted for based on the year and make of the vehicles and are minor in the grand scheme of things. Also, any vehicle 1996 and onwards has the ODBII port. Once the setup is complete on the GO7 device, there are numerous expansion options via the port on the back of the device which links what is called IOX; multiple IOXs' can be connected together to work in sync. We found a handful of IOXs' to be most effective in order to maximize the benefit pertaining to this project specifically. This included IOX-NFC Driver Identification via an individually designated FOB for drivers to use and behaviours to be tracked by management. Next was IOX-AUX, auxiliary connections that enable notifications to be known like plow up/down or read door open/close to be known based on the type of vehicle and its specific usage. Furthermore, a device is also available more rugged conditions called the IP67 which is dust and water resistant, designed for heavy duty use. We felt this could be helpful in areas such as Forestry where equipment and vehicles have more difficult needs to meet in order to maintain the same standard across the entire UBC fleet.

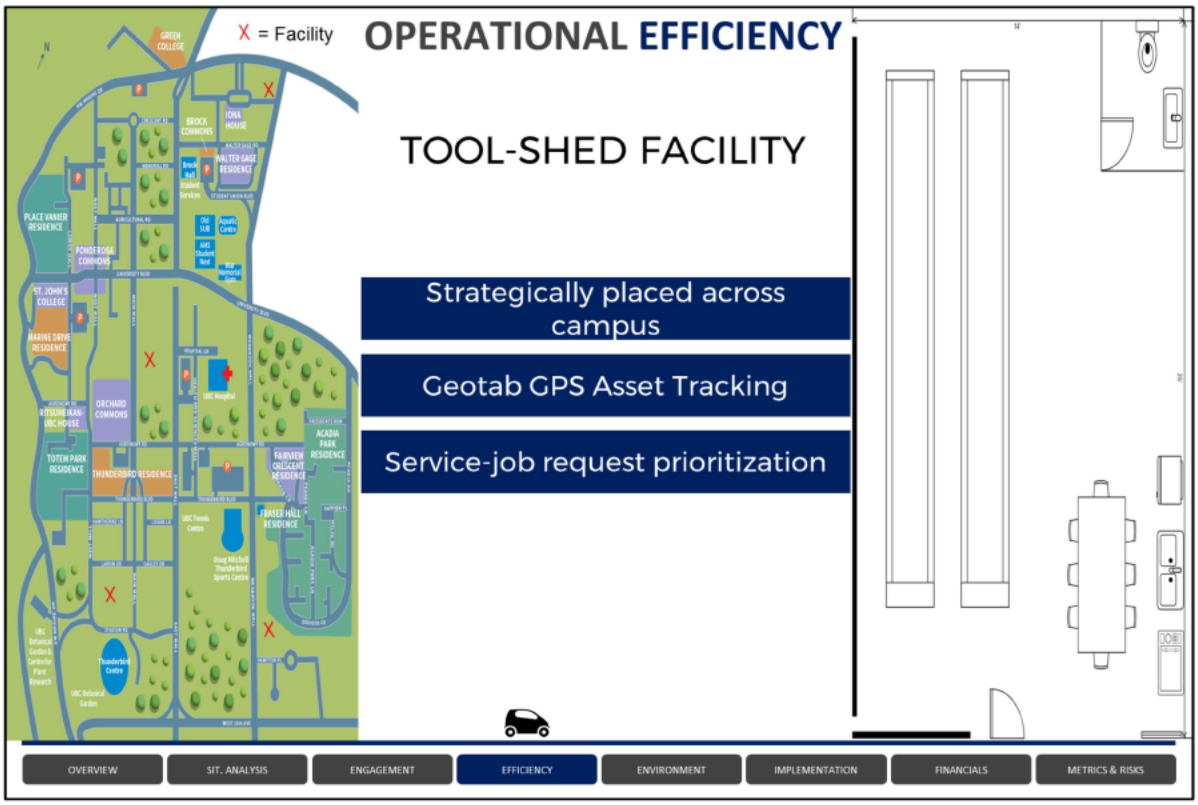
Short-Term

To begin, we would first like to install GO7 devices into Building Ops Vehicles and the IP67 on corresponding heavy duty vehicles, all with the IOX-NFC expansion in order to paint a full picture of usage with as much detail as possible. We would continue to track and monitor driver usage, behaviours, and routes taken until we are able to understand which areas are "hot spots" for jobs on campus. Taking this into consideration, we intend to adjust accordingly our efforts based on sub-locations so that we can reorganize the way Building Ops approaches jobs, and how else we can utilize extra vehicles and or people when and if they are idle.

Long-term

As we proceed, we would like to have all the data from the Building Ops pilot project to lead the way for other departments via open communication and collaboration of our Round Table meetings to discover how this model can best fit into other departments on campus, and match their needs. By having proofs of success with metrics for Building Ops, we can leverage that information to help acquire uncooperative departments to understand the benefits and be more open to joining. In addition to expansion amongst other faculties, we plan to take advantage of the numerous add-ins and Beta apps which can help monitor drivers in-vehicle behaviours as well as more specific measures to help with regulating GHG emissions.

https://www.geotab.com/vehicle-tracking-device/
https://www.geotab.com/wp-content/themes/geotab-template/resources/doc/geotab-plan-chart.pdf
https://www.geotab.com/blog/geotab-go-device-past-present-future/



After researching into how UPS has improved their operational efficiency and through conducting interviews across UBC, our group has identified the need to implement tool-shed facilities across campus.

Short-term:

The tool-shed facility program will start as a pilot. During this time, each facility will be quite minimal in regards to employee utilities (kitchen, table, etc..) and will only be established at two UBC locations. Throughout the pilot, employees will be assigned to facilities for a certain time (week, two weeks, etc..), but will still report to Building Operations in the morning. The benefit of having employees work from facilities is that it would increase route and service repair efficiency as the service jobs would be prioritized by facility locations and employee availability. Furthermore, each facility will have a fully-equipped tool inventory where drivers can stock up on required tools instead of having tools in their vehicles the entire day. This would lead to either a reduced vehicle moving weight or allow employees to travel with larger teams, thus reducing the number of vehicles on the road. In either case, the result would be positive with a decrease in GHG emissions (through interviews with Building Ops drivers, we understand that service jobs can require teams of six and they usually travel in three groups of two).

Operations:

Facilities will have extra vehicles parked outside for emergencies. Each tool-shed will have multiple sets of tools and will be tracked through Bluetooth beacon technology (See appendices - inventory tracking system) so that drivers have real time access to inventory information through MyGeotab. In extreme cases, where a driver requires specific tools and none are available, the driver can take a vehicle back to base of operations/other tool-shed facility to rent tools from there. Another important aspect of operations is driver communication. When prioritizing on-demand service jobs by the nearest facility it is important to contact available staff and receive confirmation. For instance, facility A is closest to a service request and will be radioed first. If all teams from facility A are busy then teams from the next nearest facility are contacted and so forth. Communication should be an open network to ensure everyone is aware a service request has been taken. Regular work which has been confirmed beforehand will continue as scheduled unless requiring a change.

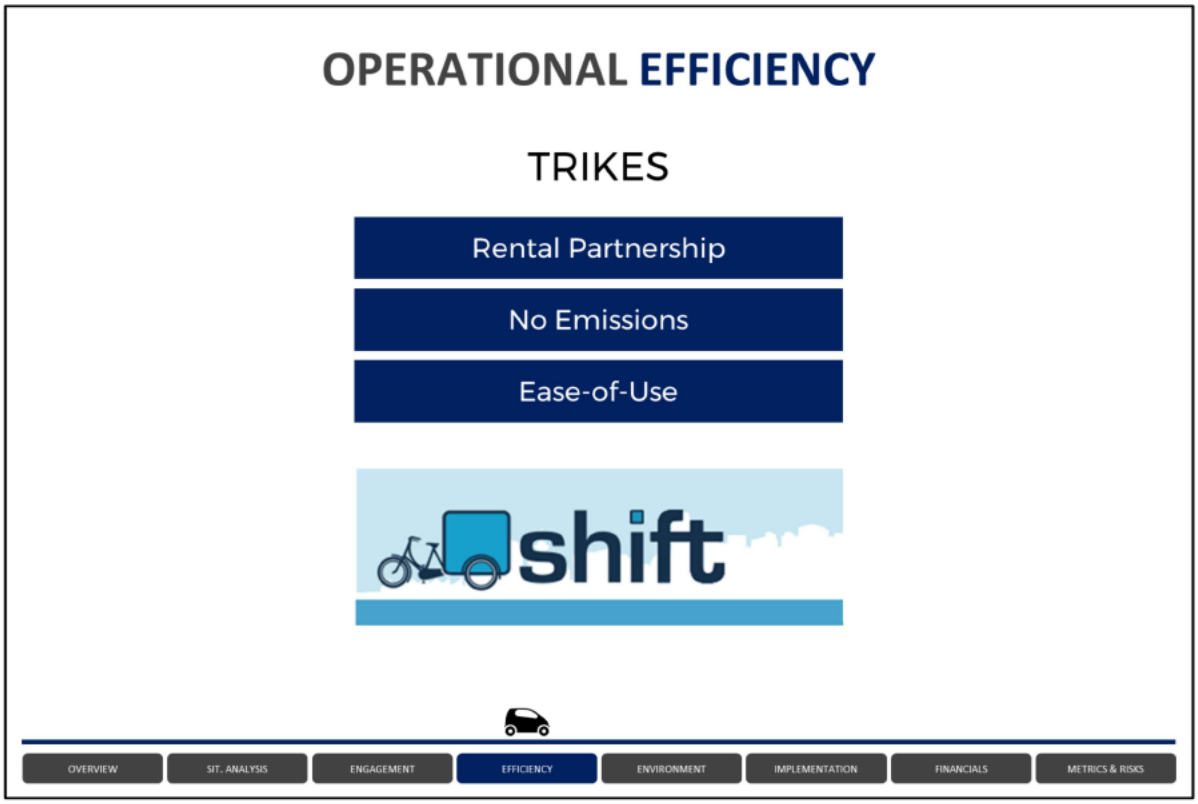
Security & Location:

For the short-term, we would ask to look at data regarding service location history and consult with Building Operations before deciding the locations for where to construct the 350 square foot facilities. These facilities need to be compact in size to avoid very high upfront costs for the pilot program. Size and amenities can be expanded in the long-run. Another option to consider is to renovate an existing, but empty or minimally utilized building. This would help further reduce costs and avoid potential construction issues. As far as security, the facility would be unlocked through the use of a key fob and a backup key in case of a system malfunction. The facility security system could be integrated to work with the same key fob employees would use to unlock the telematic-equipped vehicles.

Long-Term:

The long-term vision includes expanding the number of facilities and turning them into a base of operations. Employees would report for work each morning at their designated facility and all their jobs would be centralized from that location. Employees would also have a place where they can have a quick coffee, eat lunch and socialize with the rest of their team during their breaks. It would also have a positive effect on employee morale as one concern we identified through our interviews with Building Ops drivers is that they currently drive from service location to location, spending the majority of their time in vehicles. Employees could start considering facilities as their second “home.” In addition, the base of operations would have parking lots which would store general and speciality vehicles, e-bikes and trikes. E-bikes could be used primarily for getting around as well as jobs which require small tools, a minimal work force and are at easily accessible locations. By having tool-shed facilities located in high-service areas, employees will be less reluctant to using e bikes as they won’t have to travel long distances.

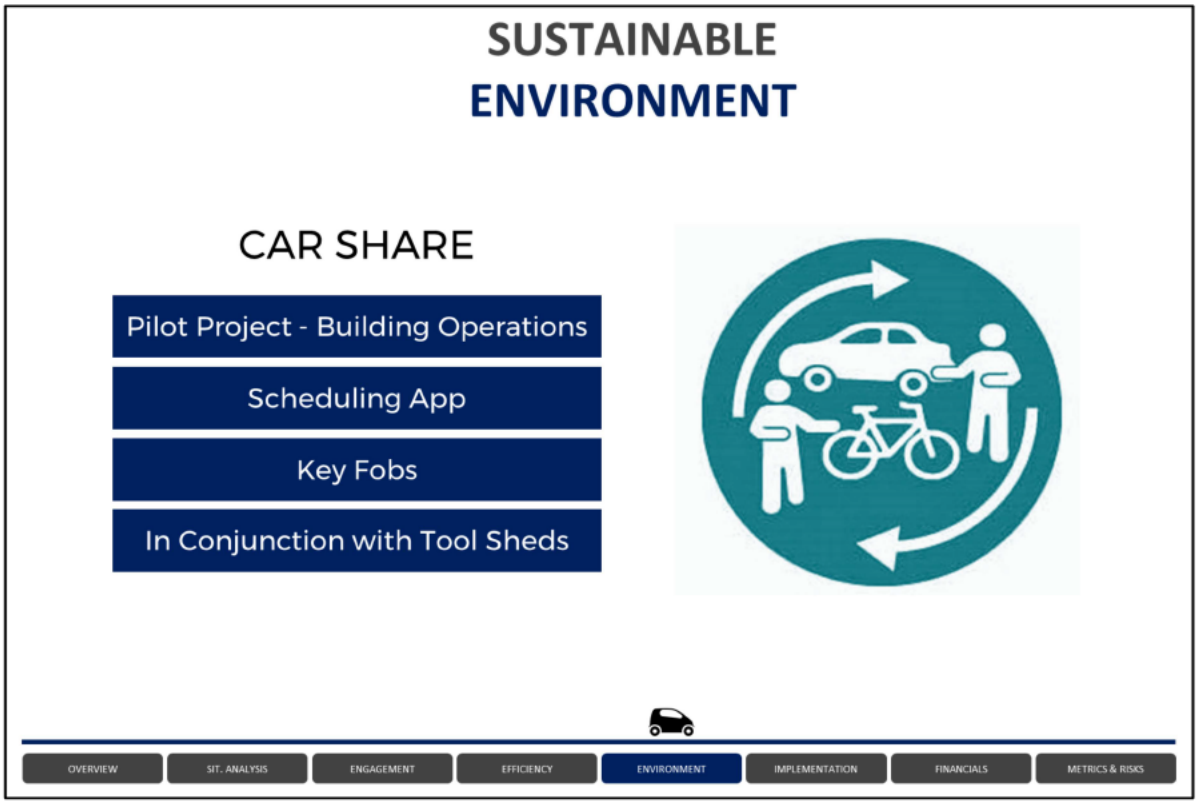
https://www.geotab.com/blog/gps-asset-tracking/;



After much thought and consideration between options in terms of trikes, we decided that instead of purchasing a fleet of E-Trikes like we did with the Smart Cars, mostly for human transport, we ought to partner with someone instead and look at our options. Once reaching out to Shift Delivery, local to Vancouver, we believed we found the ideal candidate. We decided to establish a rental program for E-Trikes with Shift on campus, supplying us the vehicles to carry out anything from small deliveries to job site transport on the fly. Also, they could be used by Building Ops personnel to transfer to and from base without the same restrictions a typical full-size vehicle would have; for [redacted] those mini poles along the UBC Bookstore roundabout. By having transportation that can avoid these minor interferences, transportation becomes more of a thru-campus effort versus an on-campus one. We strongly advocate in making the UBC campus fleet more dynamic and by enabling a vehicle such as this, which emit nothing contributing to GHG emissions, we open more doors for future adoption of experimental technology.

Another reason we chose to rent them is because of their substantial upfront costs which we found to be present because of their popularity in Australia and European areas, and with that conversion rate it comes up to roughly $10,000 each. It was too difficult to attempt to justify that given that it would not be a priority vehicle, but by renting them we have the opportunity to test them and see how they can complement our operations. This leaves the door open for us to come back to, versus being stuck with continuously depreciated inventory. We would begin with renting five trikes and seeing how that went and later adjusting if we needed more but we assumed five for the entire duration because it could just as easily be scrapped as welcomed.

http://www.shift.coop/#delivery
Phone Call with Co-Owner (Devan McClelland)



Short Term Objectives:

Prior to implementing the car sharing strategy across all departments, we would like to begin by testing a simple and cost effective pilot project with UBC Building Operations.

The short-term goal is to see how many vehicles can be reduced or eliminated when scheduled car sharing is implemented by looking at the variable amount in which a car is sitting in a lot unused.

Short-term implementation would look as follows:

- In the morning, workers will drive cars to their designated tool shed facility.
- Workers can take a car or trike from their designated tool shed facility in the morning to their working location.
- If they take a car, they may drive it to their work station, unload their equipment and park the vehicle at the nearest designated parking stall.
- These parking stalls will be strategically placed all over campus so that employees are always within a few meters from their work site to a car.
- Once they have completed their job, they can retrieve their cars from a nearby parking stall and load the vehicle back up with equipment to return to their designated tool shed facility or move to the next job site.
- If a particular job is going to be relatively short (ie. under an hour), they can reserve the car so that it remains in the parking stall until the job is complete.
- There will also be emergency vehicles on hand in case a car is unavailable.

Scheduling:

A scheduling system similar to the ones used by many other car share companies will be required in order to ensure that cars are available and can be reserved for use. This will also coincide with telematics, which will enable GPS to track the location of each car and its availability.

Key Fob:

Similar to other car share companies, a key fob system can be installed to allow access to the car, and the keys will be placed inside the vehicle.

Tool Shed Facility:

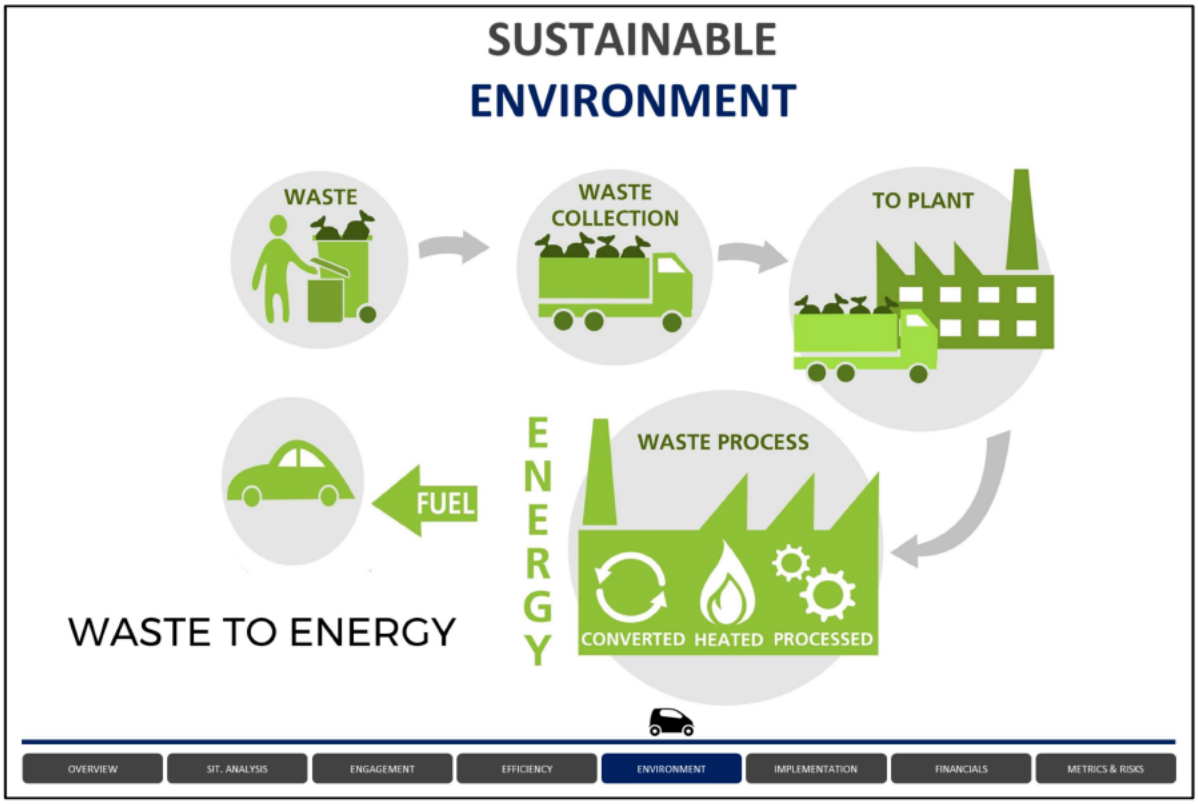
The tool shed facilities will directly aid in the implementation of the car share program by providing a base for employees to take a car or trike from, based on location. By working out of a specific location for the majority of the day, workers can easily access tools and a car from the parking lot in order to efficiently get to their designated work site.

Long-Term Objectives:

The long term objective of the car share model is to get other departments successfully adapting to the model. Dependent on the success of the car share within Building Operations, we would look to adapt the model to the needs of other departments in order to increase the utilization of vehicles across all departments of the UBC campus. Secondly, we may also consider moving into electric cars, once we maximize the utilization of vehicles within each fleet. This will make the adoption of electric vehicles a much easier transition.

Why Car Share?

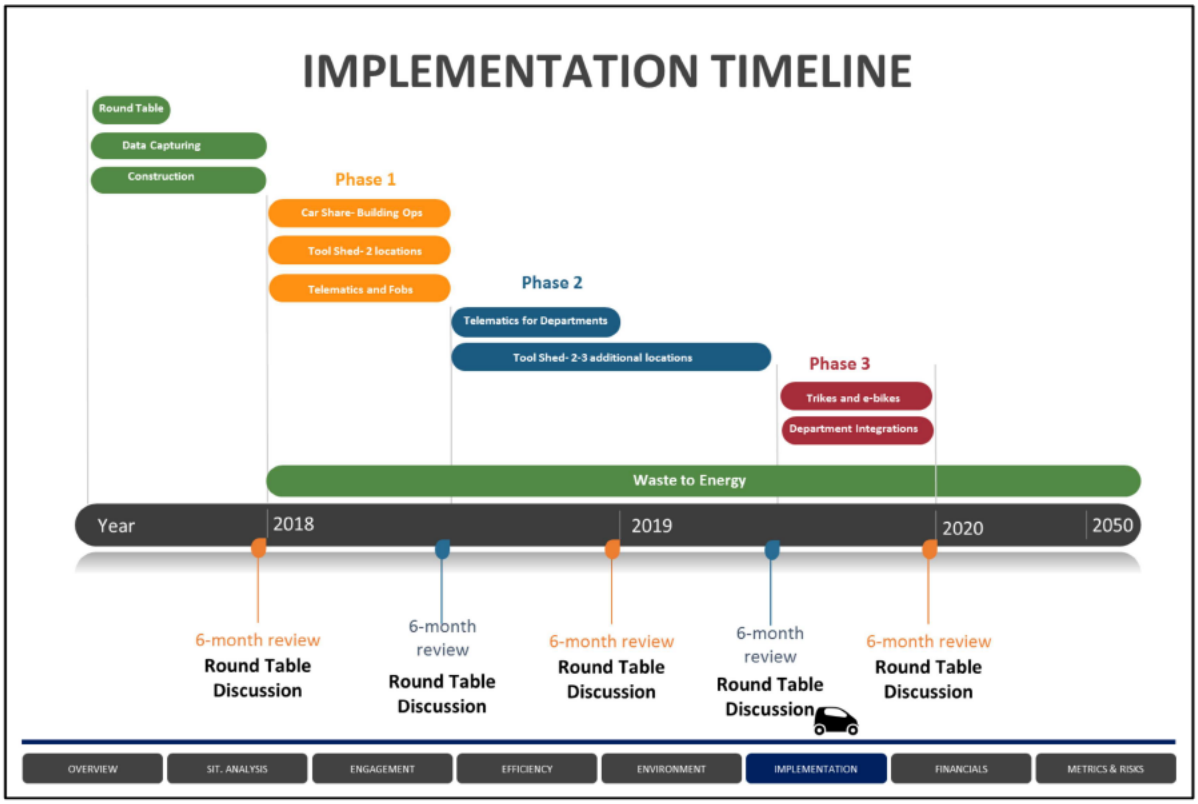
After careful consideration, we have recognized that UBC Building Operations has maximized its efficiency in fleet use by only having vehicles which are deemed necessary to perform a job. However, we also recognize that vehicles are often sitting idle when workers are performing jobs. We believe that by sharing cars between employees, we can greatly decrease the amount of time that these vehicles are sitting idle while jobs are being performed. We also believe that it is a cost effective alternative to adopting brand new electric cars, while still helping UBC reach its environmental goals. We would look to further reduce the number of cars, using a car share model, prior to buying new and more fuel efficient vehicles.



Through our PESTEL analysis we identified a global trend where numerous organizations were moving to waste-to-energy systems to power their fleet. Scientific America stated that "one third of all food produced around the world goes to waste," therefore engineers and scientists are investigating ways to turn this waste into energy. Our team has identified the potential for this to spark a long-term collaboration opportunity with Engineering Professor Cigdem Eskicioglu, at UBC-O. She along with her colleagues are researching the anaerobic digestion processes, also known as Waste-to-Energy. The process aims to turn organic waste into a biogas, which is a combination of methane and carbon dioxide. Currently, UBC produces 1,900 tonnes of compostable waste. We acknowledge the university gardeners' use this waste, but we feel there is a greater opportunity available.

The present opportunity to partner with Professor Eskicioglu provides an opportunity for her to further her research, while setting UBC Building Operations ahead of other post-secondary institutions and organizations. From comparables, our research showed that cost of implementing this system would exceed UBC Building Operations annual budget. We still believe it is of value to pursue. It allows UBC to work towards meeting and exceeding their GHG goals; for the university, it provides them the opportunity to continue their excellence in research.

https://www.scientificamerican.com/article/food-waste-to-energy/
http://buildingoperations.ubc.ca/sustainability/zero-waste/composting/
https://apsc.ubc.ca/spotlight/harvesting-energy-creating-fertilizer-sludge
https://phys.org/news/2015-04-food-solid-fuels-biodiesel-products.html#jCp
http://www.africaengineeringnews.com/wp-content/uploads/2014/11/waste-to-energy-4.jpg



We have decided on an implementation timeline which we feel will allow UBC Building Operations the greatest chance at success. In the appendices, we have the risks/mitigations for each recommendation along with the keys/metrics to evaluate [redacted] recommendation.

0-6 month

- 0-1 month - Establish Round Table

*every 6 months a round table discussion occurs

- 0-6 month - Data Capture
- 0-6 month - Tool-Shed Facility Construction

Round Table justification

- The departments we talked to have all expressed interest in collaboration with other departments to work out the issues and concerns.
- It is important to introduce a change specialist who attends and leads these meeting so everyone gets an opportunity to be heard.
- If an individual is unable to attend the meeting, then send in a proxy. Attending these meeting will be added to the job description.

6-12 Months - Phase 1

- First focus exclusively on Building Operations because we need to test before we spend time and money on other departments.
- Telematics & FOBS in all Building Ops Vehicles.
- Implement two tool shed facilities on both sides of campus - Track whether service jobs are completed in quicker timeframes due to facility location and gather employee feedback on working from facilities. Has the inventory management been successful?

12-24 Months - Phase 2

- New add-ons will be incorporated into the Telematic Systems to provide more accurate feedback. Will be tailor-fitted to Building Ops needs after reflecting on data collected. Furthermore, will install for fleets for department who are onboard.
- Depending on the success metrics for the two facilities in phase 1, 2-3 more facilities will be strategically placed across campus near the high-serviced areas. Inventory systems for all tool sheds will be incorporated to allow Building Ops real-time access to tool supply.

24-30 Months Phase 3

- Confirm the faculties that are on board and roll out the plan across UBC.
- Implement telematics to all faculty vehicles - at this point we will have success in phase 1 and 2 and we will implement the program to all faculties due to the success of the first phases.
- Trikes create a more dynamic way of transportation on campus, which can be used to deliver packages and people across campus with 0 emissions and more easily than vehicles.

30 Months Onwards

- Focus on waste-energy research to implement as a long-term fuel solution.

Justification for Time Period

- Data capturing that's more accurate. There is an ability to adjust for hiccups.
- 6-month window is more balanced. 12 months for phase 2 due to additional facility construction.

FINANCIALS

	Phase 0	Phase 1	Phase 2	Phase 3	Phase X
Round Table	0				
Car Share Telematics & Facilities		$236,000			
Car Share & Facilities Expansion			$372,000		
Car Share & Facilities Complete				$464,000	
Waste to Energy & Maintenance					$545,000

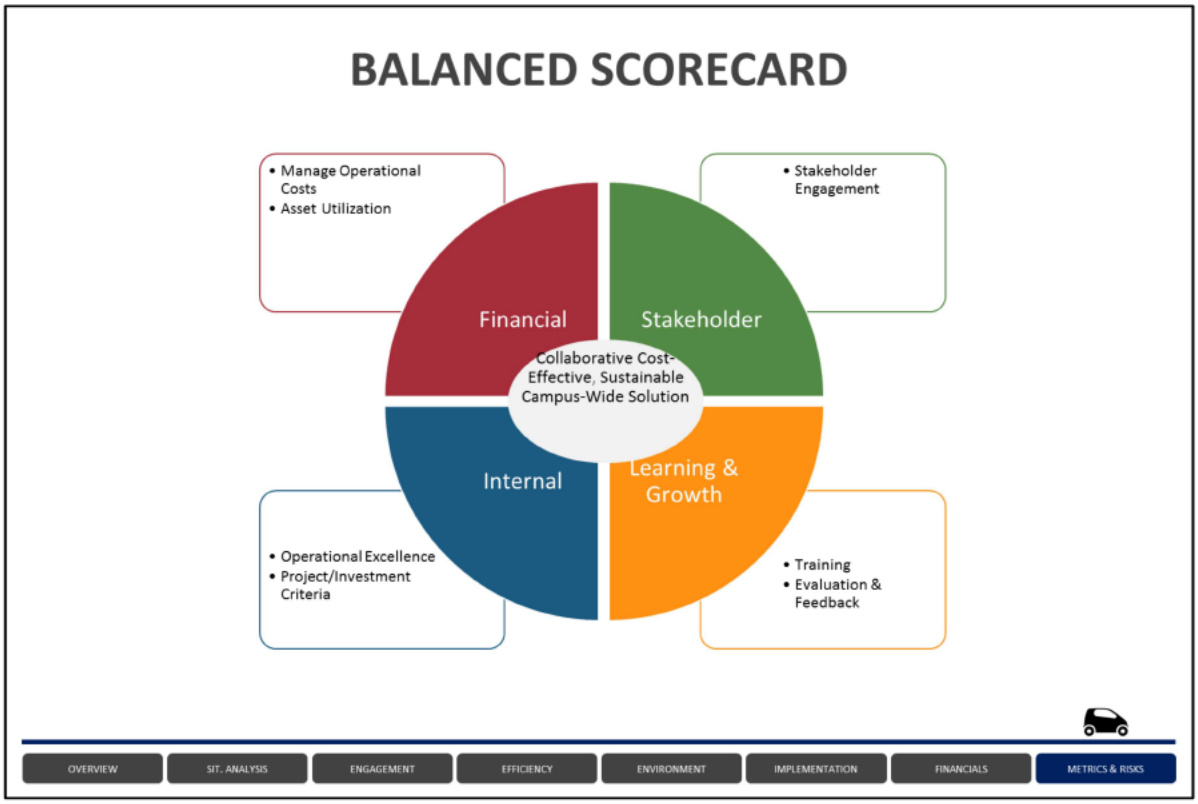
	2017	2018	2019	2020	2021	2022	2025-2050
Budget	1.8M	1.836M	1.882M	1.929M	1.977M	2.027M	0.981B
Usage	83.27%	94.66%	98.56%	99.28%	94.48%	86.77%	78.39%

Here each phase of our implementation plan is broken down into the associated costs per tactic (numbers have been rounded to the nearest 000' for ease of use)
We see a gradual progression of costs as each tactic has multiple parts to it but by Phase 3 we have accomplished all of our achievable goals and our last Phase X is accounting for the maintenance of our implementation plan as well as furthering research into new developments, primarily waste to energy research which is one of our most promising efforts to reach the 2050 goal of eliminating GHG emissions completely.

Just below we have our total budget and usage, and seeing how our Phases play into that budget exactly. The rest of the details are in our Appendices but to give you a rundown here we assumed an annual inflation rate of 2% which would increase our budget over the years, labor costs to stay constant, new vehicle purchases to be offset by a 30% salvage value in all cars sold at auction, fuel costs to decrease annually at 10% up until the conclusion of our Phase 3 where we expect a more drastic savings due to the full implementation of our strategies. The 2017 number is an estimate given the numbers available to us but as we move into Phase 1 of our plan in 2018, we did indeed use almost all of the budget up until 2020. Each incremental phase of telematic devices and subscriptions continues to grow leading to larger annual fees. Also, worker facilities required high capital expenditure and improvements to be at the level of usage and standards we would like. After all has been set and done we will be able to maintain a budget usage of roughly 78% out of the quarter-century average we calculated for simplicity, and along the way we strongly believe technological developments will be made available to further improve this campus initiative and build upon what we have started here.

Also, if we utilized this budget of our implementation plan chart above in a more direct approach such as purchasing fuel efficient cars directly, it would be equivalent to acquiring 90 Smart Cars ($17,900) or 47 average vehicles based on the the replacement vehicle list for upcoming years ($35,000). We feel that up front cost would come nowhere near rendering the same amount of value and at the end of the day having more inventory to work with without understanding how to maximize its value is in a way, another cost that is not accounted for, almost like a DWL.

https://www.xtss.com/products/geotab-go7
https://www.geotab.com/geoimages/blog/download/telematics-harness-cheat-sheet(web)1.pdf
http://blogs.ubc.ca/comm486mcubbon/files/2016/11/Pegasus-5.0.pdf



Metrics are key to determining whether our strategies are creating wins for UBC Building Ops. The Balanced Scorecard is the tool our team has selected to determine if we are winning. A detailed Balanced Scorecard can be found in the Appendix; here we have highlighted key metrics.

Managing Operational Cost ensures the department is operating with a balanced budget, and is in the black. Regular monitoring is important because we have anticipated fluctuations in the budget due to inflation, sale of vehicles, and new operating expenses.

Asset Utilization and Operational Excellence ensures that the department is using each individual asset to its maximum capabilities. Again, monitoring this metric must be done regularly to ensure that each fleet vehicle is operating at its maximum and producing the lowest amount GHGs. The telematics program we have selected provides the data required. If a vehicle is not performing at its maximum output then it should be pulled from operations, serviced then re-entered into use.

Stakeholder Engagement will look to see if UBC Building Ops is creating win-win relationships with departments on campus. During the client discover we learned that a handful of departments were willing to work collaboratively with UBC Building Ops. In our further research we learned that more were willing, but only if their individual department needs were being met and they were being heard by UBC Building Ops. Cultivating win-win relationships will allow UBC to achieve their Sustainability Plan to be achieved faster.

Project/Investment Criteria for R&D Joint Ventures creates a criteria for UBC Building Ops to use when determining who it will partner with. For example, partnering with UBCO's Applied Science Department on their Waste-to-Energy project is a win.

Training with the implementation of new programs and tools it is important UBC Building Ops staff understand [redacted] to use these tools. There will be modules for staff to work through then once complete will receive a letter grade.

RISKS AND MITIGATION

Risk	Likelihood of Occurring	Magnitude of Impact	Mitigation
Difficulty adapting to the organizational change across departments	3	Med-High	Host Round Table meetings to allow departments to take part in creating the vision, expressing concerns, and creating short-term wins within their departments
Feasibility of Operations	4	Medium	Pilot programs to test out operations in a 3 part phase to test the feasibility before rolling out to all departments
Going over budget	2	High	An in depth financial analysis to determine the actual cost of implementation
Safety	2	Medium	• Pre-testing the capabilities of vehicles in transporting various equipments • Communicating safety standards and risks

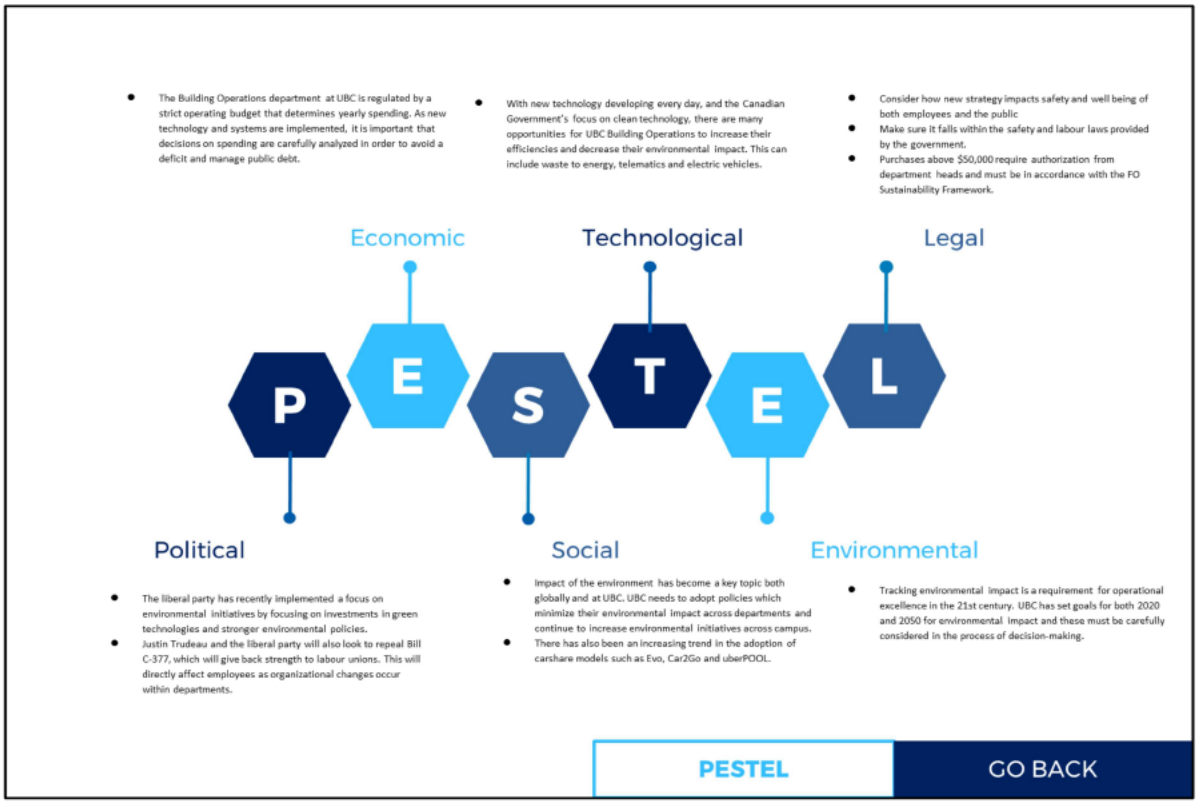
For our proposed strategy we have identified 4 overarching risks. The risks are ranked on a scale of 1-5, with 1 being very low chance of occurrence and 5 being high likelihood of occurring. Medium impact from projects would primarily affect UBC Building Operations, but would have minimal impact on the UBC Sustainability Plan. Whereas, projects with a high impact risk probability would affect UBC Building Operations, various UBC departments, and the UBC Sustainability Plan. To decrease the probability of occurrence our team has created mitigation strategies in correspondence with every risk.

APPENDICES

SWOT	PESTEL	Balanced Scorecard	Inventory Tracking
Sample Agenda	Organizational Structure	Managing the Team	Risks & Mitigation: Round Table Discussion
Risks & Mitigation: Tool-Shed Facility	Risks & Mitigation: Car Share	Risks & Mitigation: Telematics	Risks & Mitigation: Trikes
Metrics & Targets: Round Table Discussion	Metrics & Targets: Tool-Shed Facility	Metrics & Targets: Car Share	Metrics & Targets: Telematics
Metrics & Targets: Trikes	Financials	Financials	

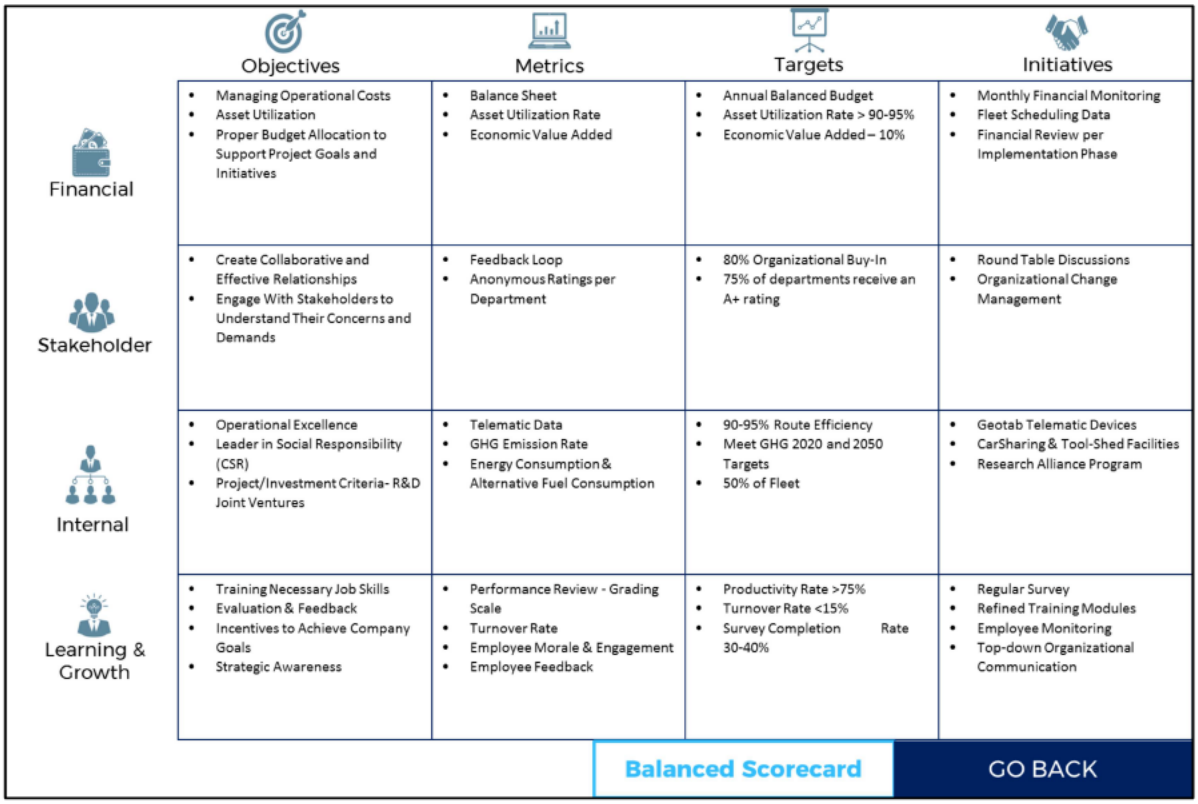
Above is a detailed slide of our SWOT analysis.

http://blogs.ubc.ca/comm486mcubbon/files/2016/11/Pegasus-5.0.pdf

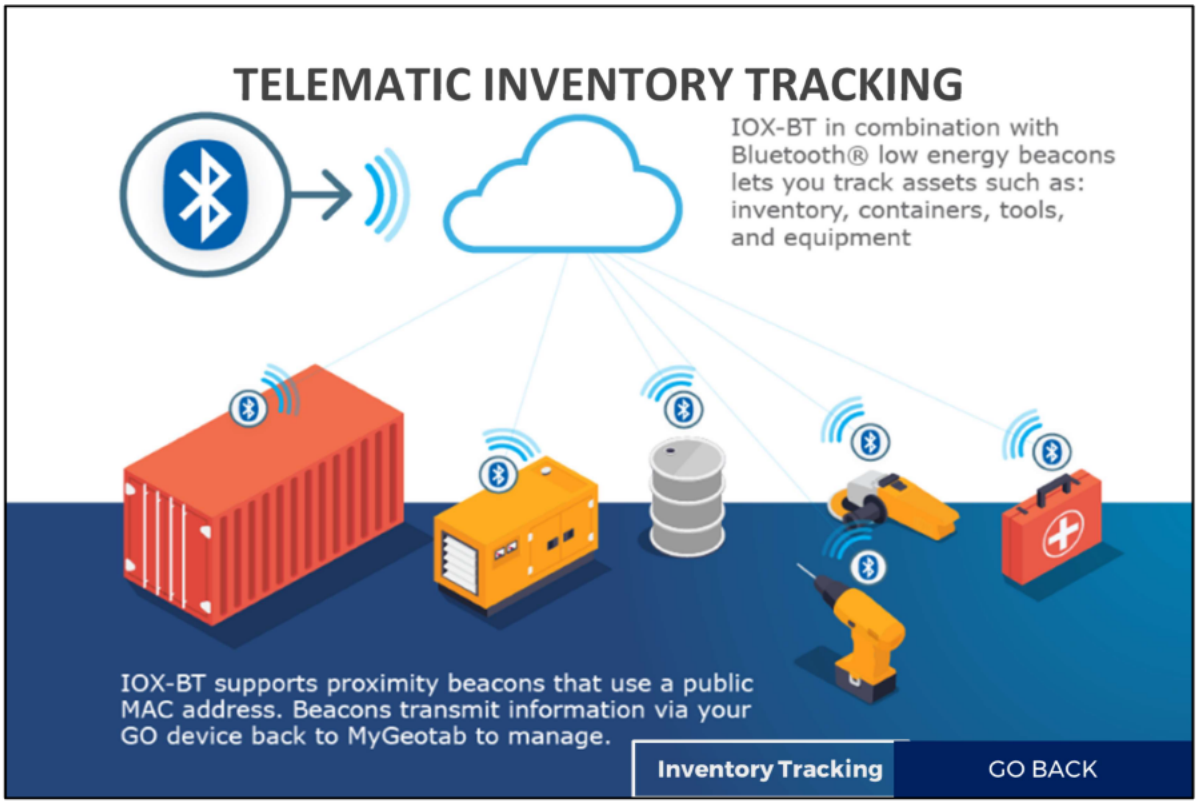


Above is a detailed slide of the the PESTEL strategic tool we utilized.

https://www.liberal.ca/real-change-a-new-plan-for-canadas-environment-and-economy/
https://www.liberal.ca/realchange/labour-unions/
https://sustain.ubc.ca/campus-initiatives/climate-energy/climate-action-plan-2020
http://planning.ubc.ca/sites/planning.ubc.ca/files/documents/planning-services/policies-plans/CAP_Report1.pdf
http://bog3.sites.olt.ubc.ca/files/2017/03/BoG-Manual-March-2017.pdf
http://www.news1130.com/2015/04/09/most-canadians-care-more-about-the-environment-than-pipelines-and-oilsands-poll/
http://blogs.ubc.ca/comm486mcubbon/files/2016/11/Pegasus-5.0.pdf
https://finance.ubc.ca/procure-pay
http://www.hr.ubc.ca/hr-networks/tag/supply-management/
https://mednet.med.ubc.ca/ServicesAndResources/Finance/Training/Documents/How%20to%20Procure%20to%20Pay.pdf



Above is a detailed balanced scorecard which will help UBC Building Operations assess the effectiveness of our proposed strategy in regards to the impacts on financials, stakeholders, the internal organization and how UBC Building Operations can continue to learn and grow as an organization.



Telematic Inventory Tracking

"Keeping track of your moveable assets is increasingly important in our connected world. In fact, it's been estimated that the use of IoT devices and GPS asset tracking solutions could generate $1.9 trillion dollars of economic value in the global supply chain and logistics sector"

It is important for UBC Building Ops to understand the value and simplicity that Internet of Things can bring when it comes to tracking inventory. By utilizing Geotab's IOX Bluetooth add-on technology each tool inside the tool-shed facility inventory would be linked through the use of GoBeacon Bluetooth Tracking Tags or through the use of supported third-party beacons. The beacons would transmit inventory data through the Geotab telematic device to the Building Operations' MyGeotab account, which would allow real-time access to item stock quantity and item geolocation. The location tracking feature for inventory would also provide alerts when an item is in or out of a beacon's range which would assist with locating lost inventory and making sure inventory is stored away correctly.
If required, small tool-boxes could still be stored within vehicles but larger tools should be stored in the tool-shed facilities.
Furthermore, vehicles will be parked outside facilities in cases of emergencies, however tools will be stored back into the tool-shed facilities for security purposes.

https://www.geotab.com/blog/gps-asset-tracking/;
http://uk.businessinsider.com/asset-tracking-in-the-supply-chain-and-logistics-2016-9
https://www.forbes.com/sites/homaycotte/2015/09/01/beacon-technology-the-what-who-how-why-and-where/#19ea57d51aaf
http://bluesensenetworks.com/how-can-beacons-help-with-asset-tracking-and-management/
https://www.geotab.com/geoimages/blog/extra/iox-bt-asset-tracking-infographic.png

SAMPLE AGENDA

A. Call to Order and Adoption of the Agenda

I. Attendance and Confirmation of Quorum

II. Amendments to and Approval of the Agenda

B. Introductions

C. Chair's Remarks

D. Presentations

I. UBC and Building Operations' Strategic Vision and Goals

E. Department Operation Managers Updates

F. Discussion

I. Vision and Goals

II. Department Initiatives

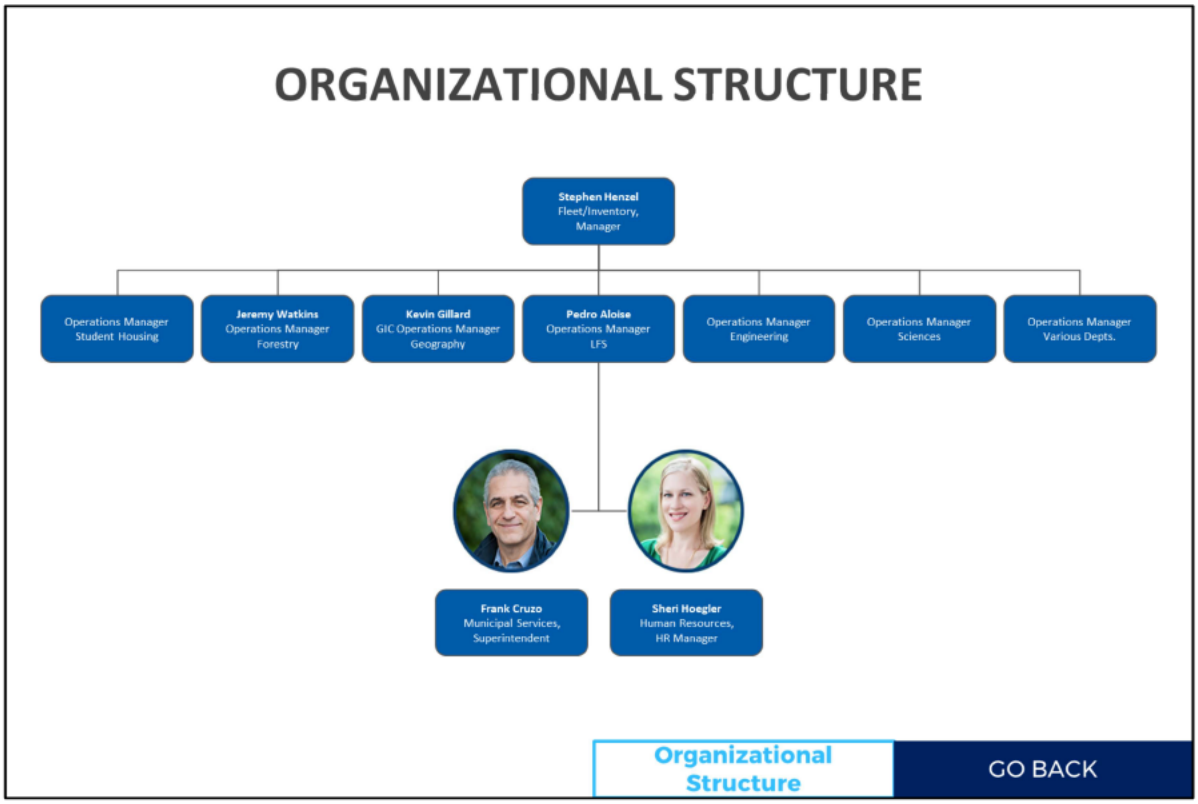
G. Next Meeting

I. The next regularly scheduled meeting shall be: _____.

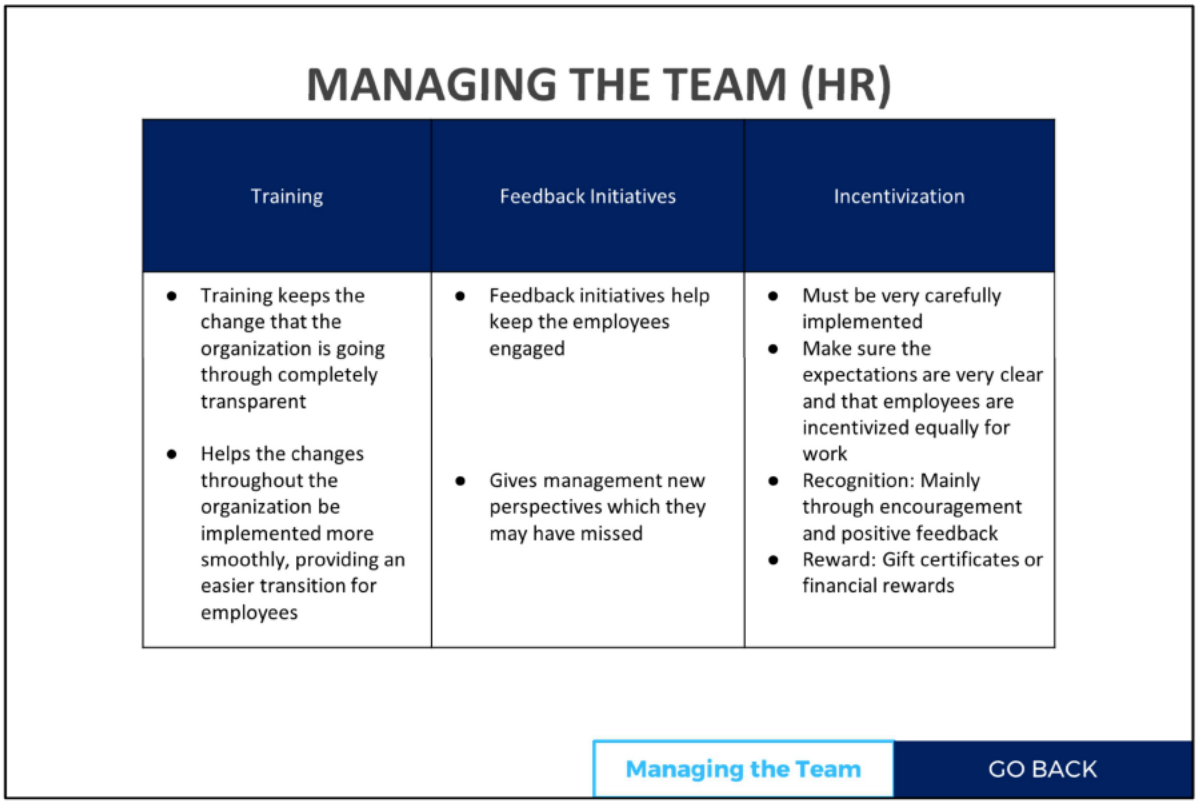
H. Adjournment

Sample Agenda | GO BACK

Above is a sample meeting agenda for the first meeting and a guideline for future meetings. Key parts to note include the presentation section which allows individuals such as Stephen Henzel or other relevant guests to present on items relevant for the Round Table to discuss, such as the UBC & Building Operations' vision and goals. There will be a part in each meeting in the future for Department Operation Managers to provide updates on their status and contributions to the vision and goal. The discussion portion allows for the round table discussion to take place to talk on any relevant agenda items such as goals and initiatives.



Above is a proposed organizational structure for the Round Table. It will be chaired by Stephen Henzel and invited to sit on the round table are the operation managers for all the departments with operations fleets at UBC. To provide further guidance on either the fleet operations or human resources areas, Frank Cruzo and Sheri Hoegler, respectively, will be invited to sit on various meetings deemed appropriate by Stephen.



Key HR Issues

Organizational Change: Change management is often one of the most difficult task that HR is faced with. When change occurs within any organization, it can cause employee dissatisfaction. Our project will require restructuring of departmental organization and technological change. It is important that we carefully manage how these changes impact the employees.

We have identified two key areas which we believe will be important to focus on as we implement our strategy:

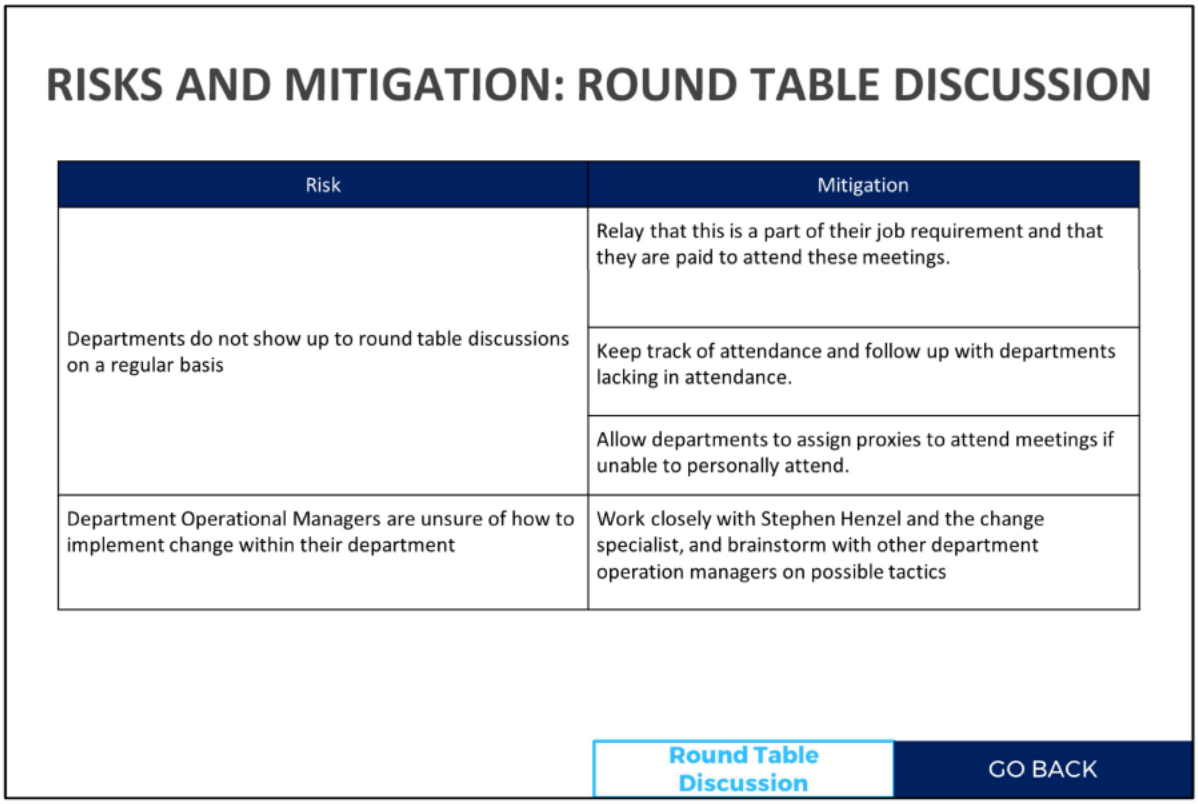
1. **Training:**
- Training keeps the change that the organization is going through completely transparent
- Helps the changes throughout the organization be implemented more smoothly, providing an easier transition for employees

2. **Feedback Initiatives:**
- Keeps employees engaged
- Gives management new perspectives and solutions that they may have missed

A third key area was incentivization. Incentives can be a particularly tricky issue. If you incentive the wrong way employees will get very upset and defensive therefore we have decided to not pursue an incentivization program at this particular time. However, we understand the potential of an incentivization program and if implemented correctly, it could encourage teamwork and increase employee morale.

3. **Incentivization:**
- Must be very carefully implemented
- Make sure the expectations are very clear and that employees are incentivized equally for equal work
- Two applicable types: Recognition and Rewards
- Recognition: Mainly through encouragement and positive feedback when employees have successfully adapted to new technology etc.
- Reward: Gift certificates or financial rewards for doing a good job (must carefully consider if this fits with the company culture before implementing)

Change Specialist: Often, companies will bring in a third party to help an organization adapt to change. The role of a change specialist can vary, but it is something that could be used to help employees adapt and speak to a third party, whom is outside the company. This brings a safe and secure feeling for employees to be able to express themselves.

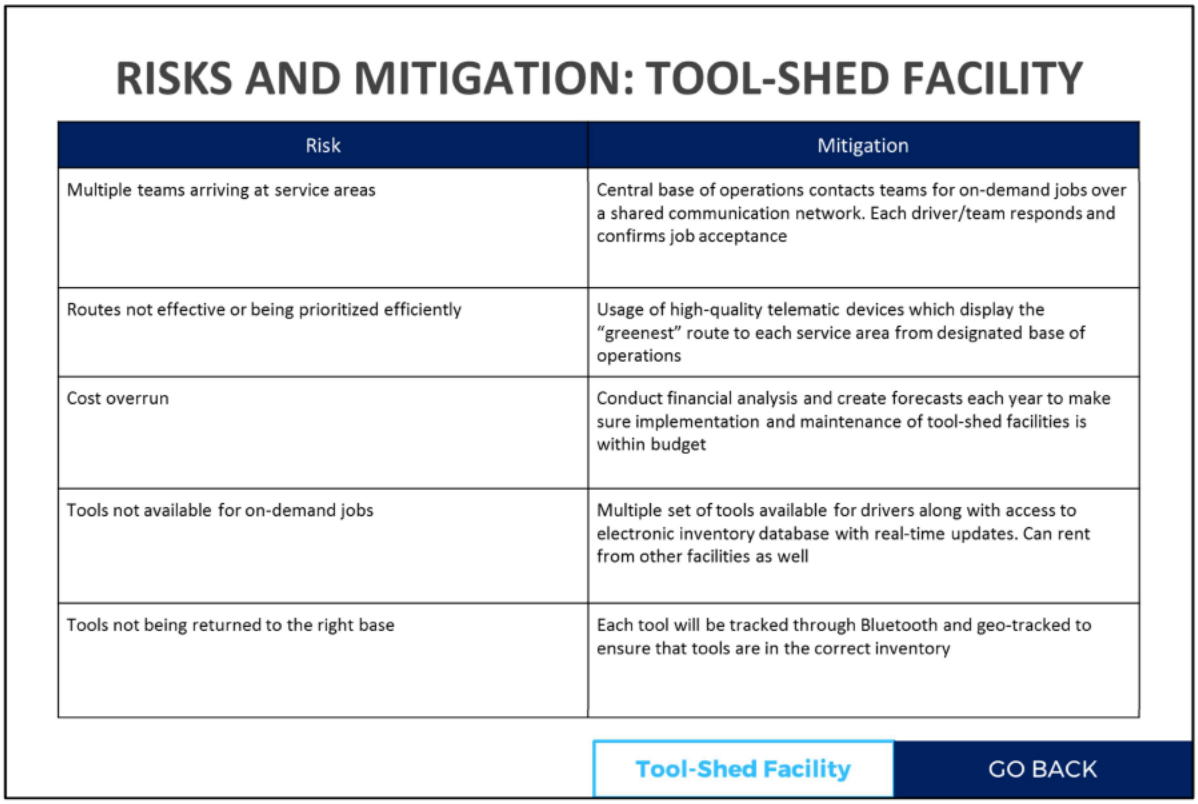


For each of our recommendations we have identified the associated risks and have developed mitigation strategies. Here are our risks and mitigations in regards to our idea of a Round Table Discussion.

Risk: Departments do not show up to round table discussions on a regular basis
Mitigation:

- Relay that this is a part of their job requirement and that they are paid to attend these meetings.
- Keep track of attendance and follow up with departments lacking in attendance.
- Allow departments to assign proxies to attend meetings if unable to personally attend.

Risk: Department Operational Managers are unsure of how to implement change within their department
Mitigation: Work closely with Stephen Henzel and the change specialist, and brainstorm with other department operation managers on possible tactics



The following are identified risks and correlating mitigations in regards to the implementation of a tool-shed facility.

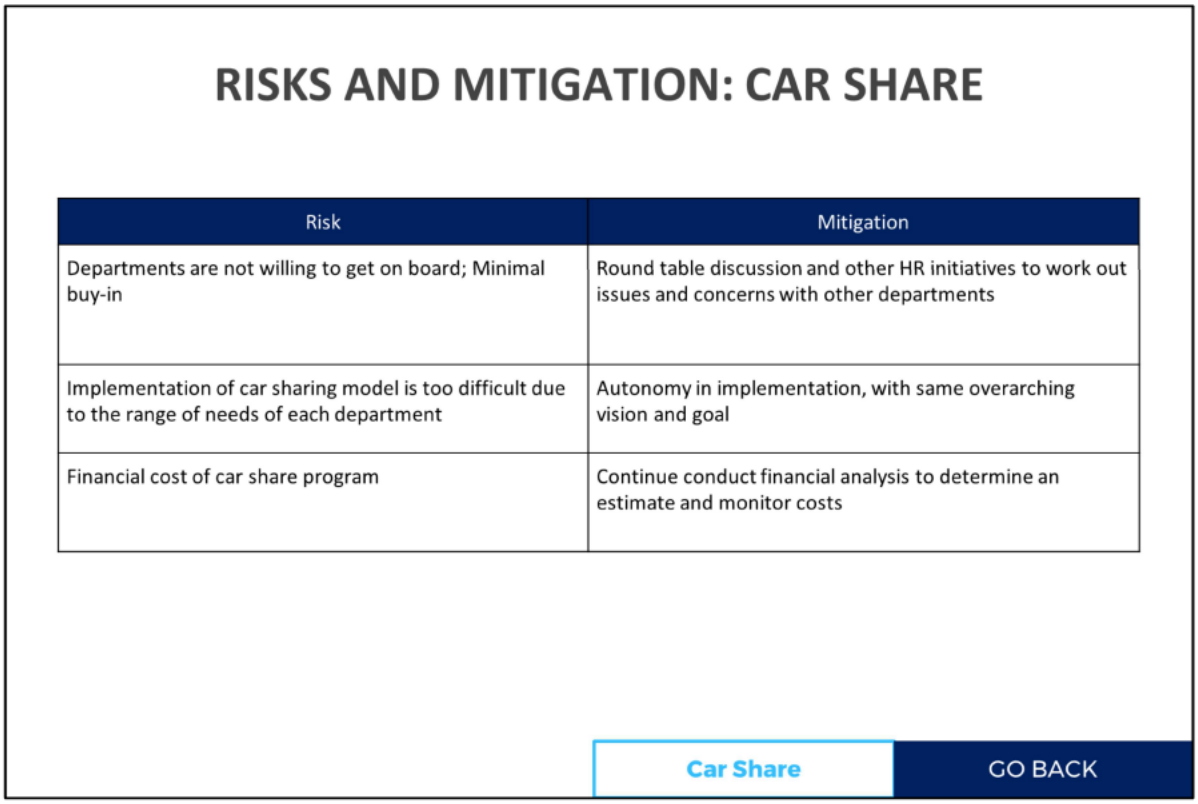
Operational Risks:
Risk: Multiple teams arriving at service areas.
Mitigation: Central base of operations contacts teams for on-demand jobs over shared communication network. Each driver/team responds and confirms job request so that everyone is aware of which jobs to do.

Risk: Routes not effective or being prioritized efficiently.
Mitigation: Usage of high-quality and precise telematic devices which display the "greenest" route to each service area from designated base of operations.

Financial Risks:
Risk: Cost overrun.
Mitigation: Conduct financial analysis and create forecasts each year to make sure implementation and maintenance of tool-shed facilities is within budget.

Inventory Risks:
Risk: Tools not available for on-demand jobs.
Mitigation: Multiple set of tools available for drivers along with access to electronic inventory database with real-time updates. Can take vehicle to borrow from another facility in cases of emergency.

Risk: Tools not being returned to the right base.
Mitigation: Each tool will be tracked through Bluetooth and geo-tracked to ensure that tools are in the correct inventory.

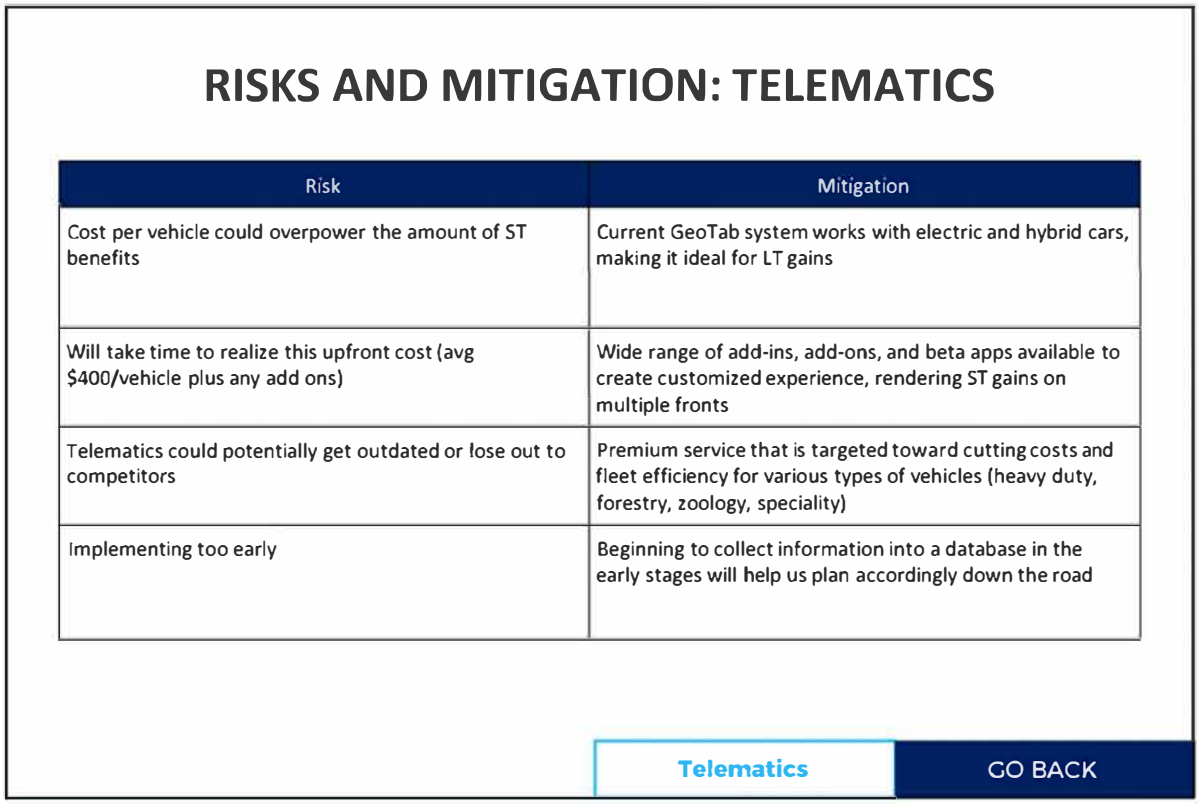


The following are identified risks and correlating mitigations in regards to the implementation of a car share program.

Risk: Departments don't get on board.
Mitigation: Round table discussion and other HR initiatives

Risk: Implementation of car sharing model is too difficult due to the range of needs of each department.
Mitigation: Autonomy in implementation, with same overarching vision and goal.

Risk: Financial Cost.
Mitigation: Conduct a financial analysis to determine an estimate; however it is actually predicted to save money



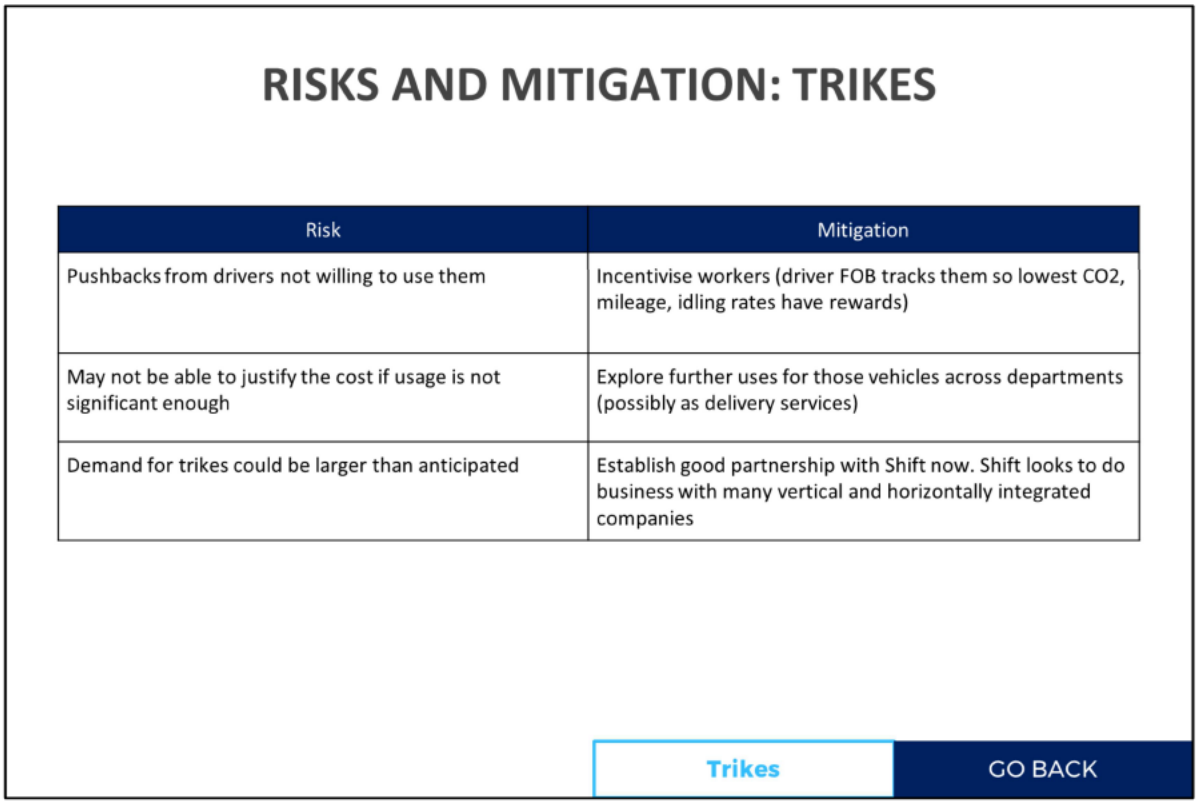
The following are identified risks and correlating mitigations in regards to our telematic strategy.

Risk: Cost per vehicle could overpower the amount of short-term benefits.
Mitigation: The current GeoTab system works with electric and hybrid vehicles, making it ideal for long-term gains.

Risk: Once the telematics are implemented it will take time to realize this upfront cost (avg $400/vehicle plus any add ons).
Mitigation: Geotab's slogan is "to innovate and continuously seek ways to improve; striving towards new innovations." There are a wide range of add-ins, add-ons, and beta apps which are available. These allow telematic owners to create a customized experience, rendering short-term gains on multiple fronts.

Risk: These telematics could potentially get outdated or lose out to competitors.
Mitigation: Customer service support is excellent and makes them more competitive in the market. It is a premium service that is targeted towards cutting costs and improving fleet efficiency for a variety of vehicles (general, heavy duty, specialty).

Risk: Implementing too early.
Mitigation: By beginning to collect information into a database in the early stages, this will assist in planning accordingly down the road.

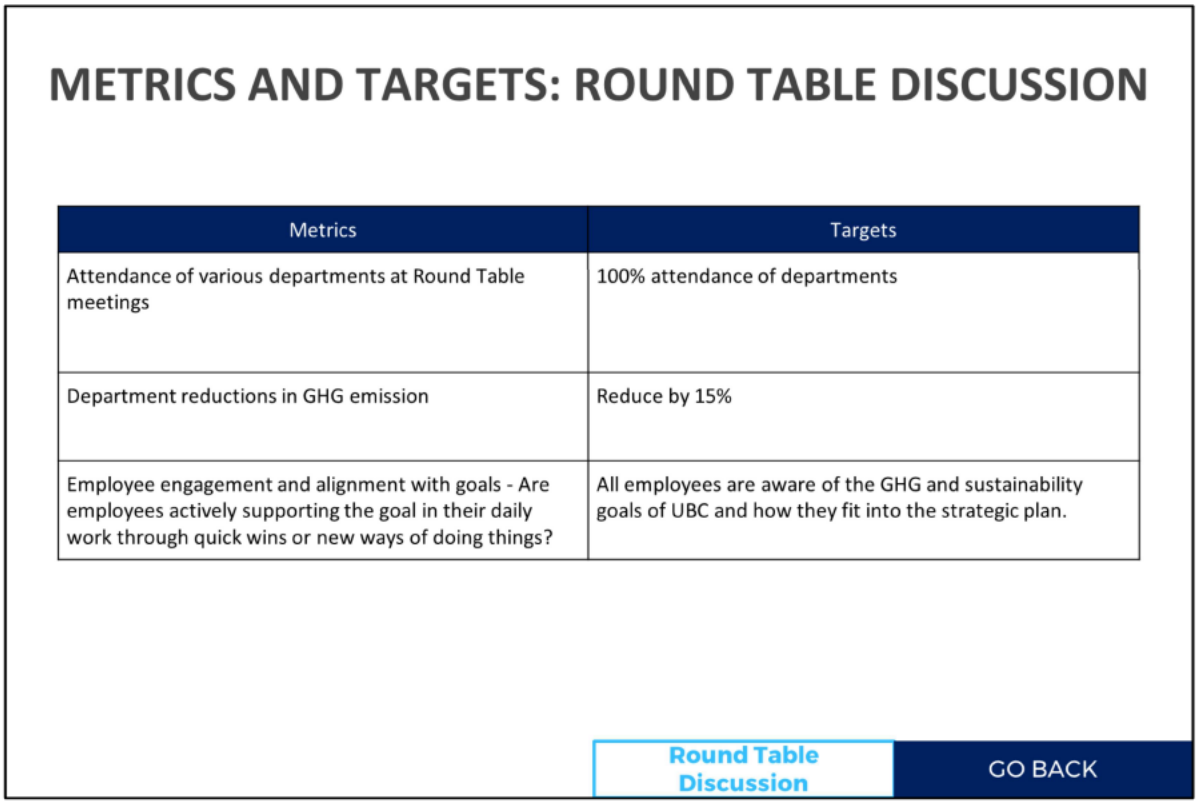


The following are identified risks and correlating mitigations in regards to the implementation of E-Trikes.

Risk: There may be pushback from drivers as they may not be willing to use the E-Trikes.
Mitigation: Introduce rewards or recognition for workers who meet specific goals through incentivization.

Risk: It may be a challenge to justify the cost of the E-Trikes if there are not being constantly utilized.
Mitigation: Work closely with departments to explore further uses for E-Trikes.

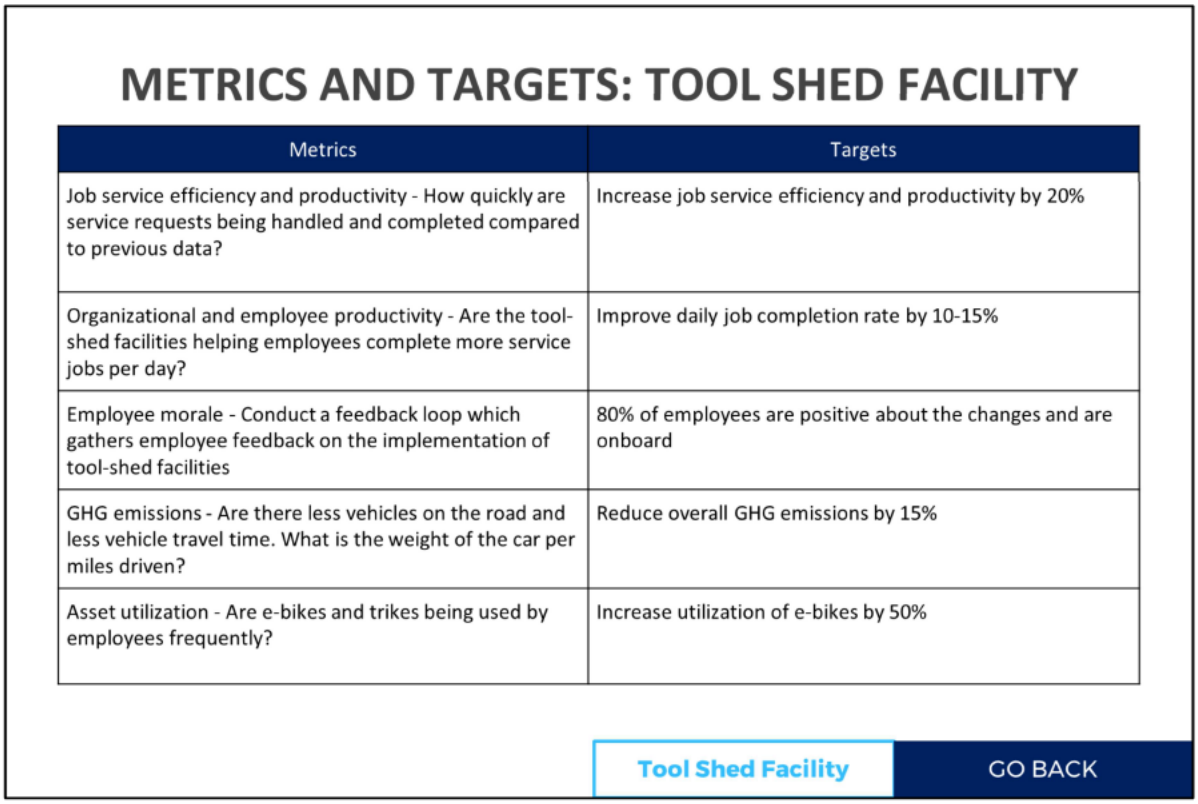
Risk: The demand across UBC for E-Trikes could turn out to be larger than anticipated.
Mitigation: Establish an effective partnership with Shift right away as Shift is looking to do business with many vertical and horizontally integrated companies.



For each of our recommendations we have created associated metrics and targets. Here are our metrics and targets in regards to our idea of a Round Table Discussion.

Metrics
Attendance of various departments at Round Table meetings
Department reductions in GHG emission
Employee engagement and alignment with goals - Are employees actively supporting the goal in their daily work through quick wins or new ways of doing things?

Targets
100% attendance of departments
Reduce GHG emissions by 15%
All employees are aware of the GHG and sustainability goals of UBC and how they fit into the strategic plan.



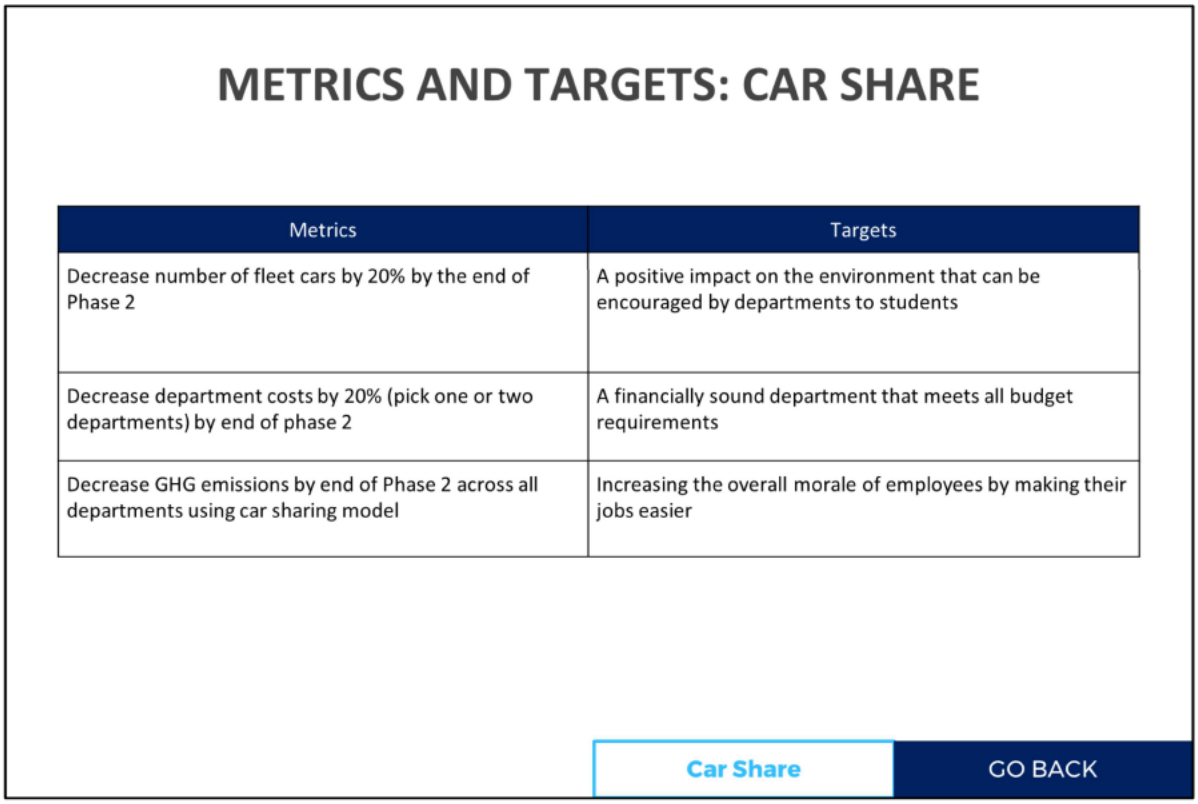
The following are the metrics and targets we have set in regards to our tool-shed facility recommendation.

Metrics

Job-service efficiency and productivity - How quickly are service requests being handled and completed compared to previous data.
Organizational and employee productivity – Are the tool-shed facilities helping employees complete more service jobs per day.
Employee morale - Conduct a feedback loop which gathers employee feedback on the implementation of tool-shed facilities. Are employees enjoying the amenities within the tool-shed facility? Are they enjoying working from a base compared to spending most of their time in vehicles?
GHG Emissions – Are there less vehicles on the road and less vehicle travel time. What is the weight of the car per miles driven. Has this resulted in a decrease in GHG emissions?
Asset utilization – Are e-bikes and trikes being used by employees frequently?

Targets

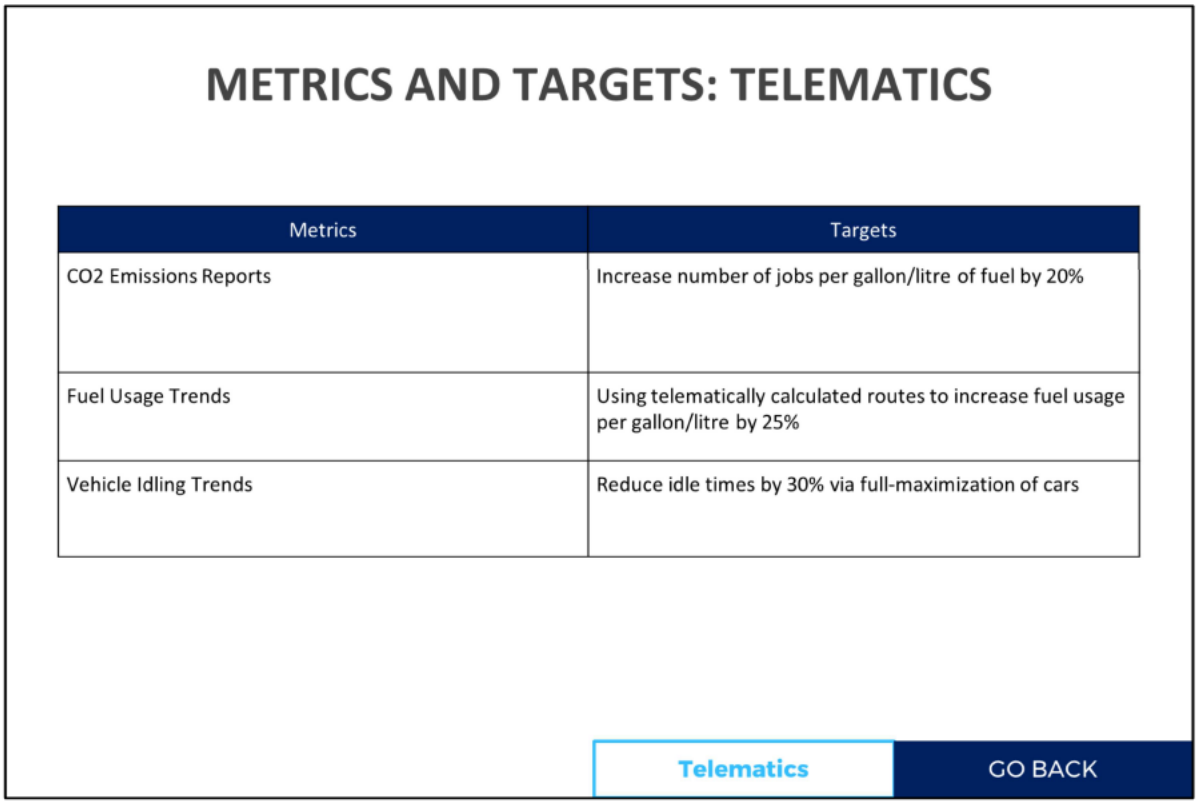
Increase job service efficiency and productivity by 20%
Improve daily job completion rate by 10-15%
Reduce overall GHG emissions by 15%
Increase utilization of e-bikes by 50%.



These are the metrics and targets we have set for the car share program.

Metrics
Decrease the number of fleet cars by at least 20% by the end of Phase 2.
Decrease the department costs by 20% (maybe pick one or two department to consider) by the end of Phase 2.
Decrease the GHG emissions by 30% by the end of Phase 2 across all departments using a car sharing model.

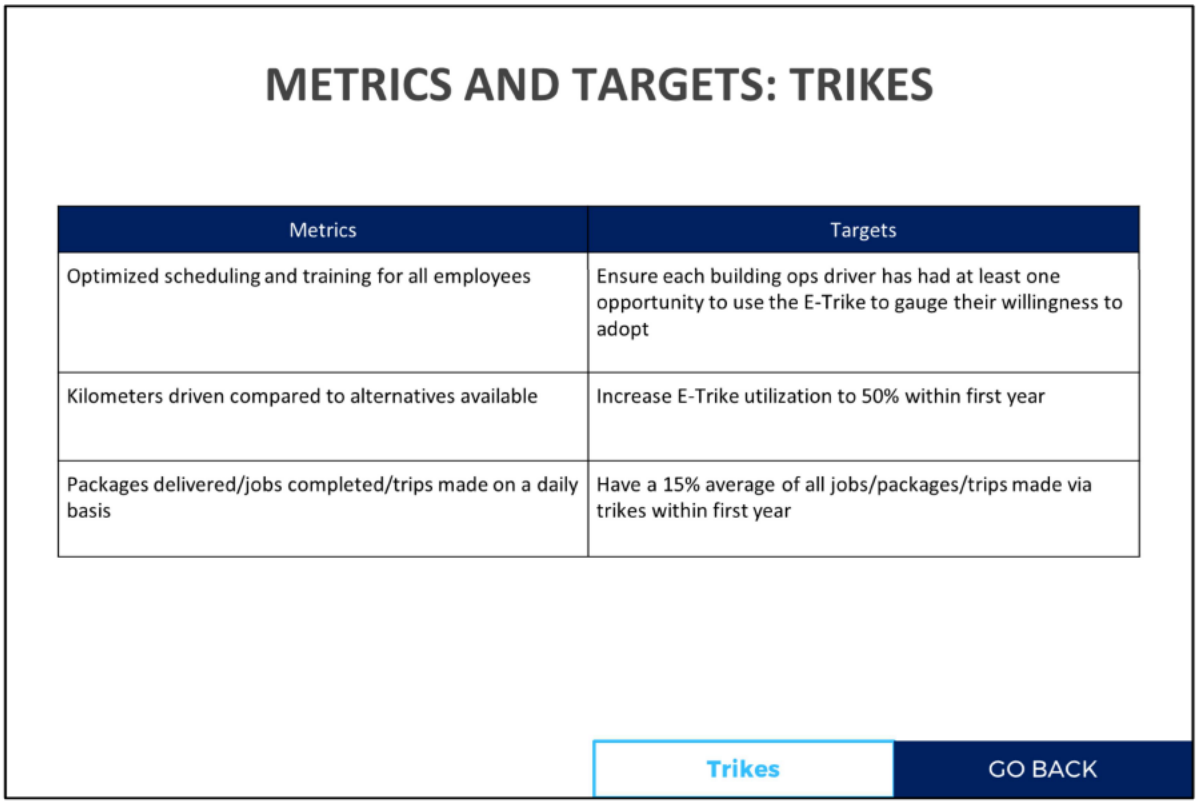
Targets
A positive impact on the environment that is encouraged by department and communicated all the way down to students
A financially sound department that continuously meets all their budget requirements
Increasing the overall morale of employees by making their jobs easier to complete



For the telematics below are the metrics and targets we have chosen to evaluate success.

Metrics
Continuously monitor and analyze the C02 Emission Reports
Monitor vehicle fuel Usage Trends
Monitor vehicle idling Trends

Targets
Increase the number of jobs per gallon/litre of fuel by 20%
Use the telematically calculated routes to increase fuel usage per gallon/litre by 25%
Reduce vehicle idle times by 30% via full-maximization of cars



The following are the metrics and targets we have selected for the E-Trikes.

Metrics
Optimized scheduling and training for all employees
Kilometers driven compared to alternatives available
Packages delivered/jobs completed/trips made on a daily basis

Targets
Ensure each building ops driver has had at least one opportunity to use the E-Trike to gauge their willingness to adopt
Increase E-Trike utilization to 50% within first year
Have a 15% average of all jobs/packages/trips made via trikes within first year

FINANCIALS

Costs	Prices	2017	2018	2019	2020	2021	2022	2025	2030	2035	2040	2045	2050	Total
GO7	$106.59	-	$17,348	$23,706	$2,938	$1,599	$1,066	$1,599	$3,198	$5,330	$5,330	$5,330	$5,240	$72,681
Pro Plus Subscription	$53.43	-	$104,349	$238,031	$251,495	$445,406	$445,406	$1,002,163	$1,670,272	$1,670,272	$1,670,272	$1,670,272	$1,670,272	$10,838,209
IP67	$240.45	-	$2,164	-	$240	-	$240	-	$1,443	$2,405	-	$3,607	-	$10,099
Base Subscription	$40.06	-	$361	$361	$361	$361	$361	$1,082	$1,803	$1,803	$1,803	$1,803	$1,803	$11,898
Trike Rentals	$5,000.00	-	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$15,000	$25,000	$25,000	$25,000	$25,000	$145,000
Fuel Costs	$309,000	$262,650	$231,750	$208,575	$181,460	$145,168	$116,135	$348,404	$464,538	$435,505	$348,404	$290,336	$174,202	$3,207,126
Labour & Maintenance Costs	$639,000	$639,000	$639,000	$639,000	$639,000	$639,000	$639,000	$1,917,000	$3,195,000	$3,195,000	$3,195,000	$3,195,000	$3,195,000	$21,726,000
Repair Costs	$334,000	$267,200	$250,500	$250,500	$250,500	$250,500	$250,500	$751,500	$1,252,500	$1,252,500	$1,252,500	$1,252,500	$1,252,500	$8,533,700
Waste to Energy Research		-	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$300,000	$500,000	$500,000	$500,000	$500,000	$2,900,000
Change Management		$80,000	$80,000	$80,000	$80,000	$80,000	-	-	-	-	-	-	-	$400,000
New Vehicle Purchases Less Salvage Value*	$25,000.00	$250,000	$200,000	$200,000	$200,000	$200,000	$200,000	$600,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000	$6,850,000
Worker Facilities			$100,000	$100,000	$200,000	-	-	-	-	-	-	-	-	$400,000
Security Devices		-	$854	$961	$854	-	-	-	-	-	-	-	-	$2,670
Inventory Beacons		-	$857	$1,029	$1,029	-	-	$10,289	-	-	-	-	-	$2,915
T Harness	$119.91	-	$1,079	$600	$1,199	$240	$120	-	$240	$240	-	$320	-	$4,037
Deutsch	$106.59	-	-	$959	-	-	-	-	-	-	-	-	-	$959
9 Pin	$46.63	-	-	$140	$140	-	-	$47	$93	$140	$140	$140	$140	$979
Extension	$43.97	-	$220	$220	$220	$220	$220	$220	$660	$1,099	$1,099	$1,099	$1,099	$6,376
Standard	$34.64	-	$970	$1,212	$104	$346	$277	$242	-	-	-	-	-	$3,152
Bracket for NFC Reader	$15.98	-	$3,468	$4,442	$447	$160	$160	$160	$479	$799	$799	$799	$799	$12,512
Ford Brackets	$17.31	-	$69	$104	$35	$69	$87	$87	$173	$260	$138	$87	$87	$1,194
		$1,498,850	$1,737,989	$1,854,839	$1,915,022	$1,868,069	$1,758,571	$4,737,792	$7,905,398	$8,090,351	$8,000,484	$7,946,292	$7,826,141	$55,129,507
Annual Budget		$1,800,000	$1,836,000	$1,881,900	$1,928,948	$1,977,171	$2,026,600	$6,079,801	$10,133,002	$10,133,002	$10,133,002	$10,133,002	$10,133,002	$68,195,432
% Used		83.27%	94.66%	98.56%	99.28%	94.48%	86.77%	77.93%	78.02%	79.84%	78.95%	78.42%	77.23%	80.84%

Financials GO BACK

Above is a detailed financial analysis for the 2017-2050 time period. The above is a screenshot of the balance sheet for UBC Building Operations based off of the $1.8 million dollar operating budget were told about in the client briefing. We have included the costs required to implement each of our strategies as well as our assumptions.

We assumed the budget would increase by 2% annually to match the rate of inflation. From the Pegasus 5.0 document we learned that in 2010 UBC Building operations spent $309,000 on fuel cost, $639,000 on labour and maintenance costs, and $334,000 on repair costs. Our financial analyst assumed that labour and maintenance costs would not exceed the 2010 value. He then assumed that in 2017 UBC Building Operations would spend 80% of the 2010 value and it would not increase. Finally we assumed with the increase in trikes, e-bikes, and a ca share program there would be a decreasing amount spent on fuel.

FINANCIALS

Strategies	Phase 0	Phase 1	Phase 2	Phase 3	Phase X	Smart Car Purchase Equivalents	Average New Purchase Equivalent
Round Table	-						
Manual Scheduling	-						
Total	-						
Car Share Telematics (BOPS)		$130,027					
Telematic FOB Add-ons		$3,839					
Strategic Facilities		$101,712					
Total		$235,577				13	7
Car Share Expansion			$269,774				
Facilities Expansion			$101,990				
Total			$371,764			21	11
Car Share Complete				$257,179			
Facilities Complete				$201,883			
Trikes				$5,000			
Total				$464,062		26	13
Telematic Maintenance					$445,406		
Waste to Energy					$100,000		
Total					$545,406	30	16
Total Costs					$1,616,809	90	46

Financials | GO BACK

Above is a breakdown of the required cost of each phase of implementation for our strategies. We have then compared it to the cost of purchasing a new Smart Car or any mid-sized vehicle. The average cost of a Smart Car is $17,900, while the average cost of a mid-sized vehicle is $35,000. In the snapshot you can see the cost of each phase compared to the number of cars you would be able to purchase for the same amount. Each phase provides UBC Building Operations a greater value than purchasing vehicles to add to the existing fleet.