

**Plan for a Greener More Efficient Future: Balancing Costs, Efficiency and Sustainability
through Sharing Communities and Real-Time Monitoring**

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University of British Columbia

COMM 486M

March 27, 2017

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PLAN FOR A GREENER MORE EFFICIENT FUTURE:

BALANCING COSTS, EFFICIENCY AND SUSTAINABILITY
THROUGH SHARING COMMUNITIES AND REAL-TIME
MONITORING

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DATE: MAR. 27. 2017

EXECUTIVE SUMMARY

BACKGROUND

In an effort to contribute towards UBC's Climate Action Plan 2020, the UBC Building Operations department has made significant strides towards efficiency and sustainability. Its focus on innovation, data tracking, sustainable purchasing and strategic vehicle disposal allowed the department to reduce the GHG emissions of its 240 vehicles by 25%, while increasing fuel efficiency by 16% between 2011 and 2013 alone¹. However, despite Building Operations' efforts, UBC's advancement in its sustainability goals is impeded by the fact that other departments have not also aligned themselves with the vision and have not been involved in this process of improving UBC fleet efficiency and decreasing GHG emissions. Through our analysis, we have identified three sub-issues at play that have resulted in this lack of departmental involvement, and have developed a strategic plan for fostering campus-wide collaboration towards fleet efficiency and sustainability.

ISSUES

UBC fleet efficiency is suffering greatly because of the decentralized nature with which vehicle decisions are made. Firstly, the vehicle purchasing decisions of each department occur independently of one another. This reduces potential cost savings, specifically reduced acquisition costs and maintenance/repair costs, that can be realized due to bulk buying and standardization. Secondly, even though other UBC departments are not staffed with fleet specialists, each department is still responsible for monitoring its own vehicle usage. This has inevitably resulted in a lack of monitoring and reporting of vehicle usage and ownership, which has led to inefficient vehicle usage and redundancies. Finally, each department has its own budget and priorities. Their desire to keep a degree of independence in fleet decisions has led to significant cross-campus redundancies, underutilization of UBC's garage services and underutilization of vehicles. To deal with underutilized vehicles, some departments have started renting their vehicles to other departments for a fee. However, even this process is highly decentralized and inefficient. Thus, there is clearly a need for increased communication and coordination across departments. However, the challenge is fostering collaboration while creating value for departments and enabling them to maintain a viable level of autonomy.

DECISION CRITERIA AND ALTERNATIVES

As we developed our strategy moving forward, we examined several alternatives based on three key criteria:

1. Will it improve fleet utilization rates (KPI: vehicle utilization rates)?
2. Will it move towards accomplishing UBC's sustainability goals (KPI: current and projected emissions)?
3. Is it financially viable (KPI: cost)?

¹ UBC. (2017). E3 platinum fleet. Retrieved March 25, 2017, from <http://buildingoperations.ubc.ca/sustainability/fleet/>

One option we considered was leveraging the ARI Fleet Services that Building Operations currently uses to boost efficiency in other departments. Another option considered was investing in an electric grid system for custom vehicles to increase fuel efficiency.

However, both of these alternatives fell short on at least one of the aforementioned criteria. Therefore, we developed a third option that moves UBC closer to its sustainability and efficiency goals in a way that provides excellent data and is financially viable. Furthermore, we aim to create an integrated platform for on-campus fleet management that will enable departments to share their assets while earning department revenue, track their vehicle usage, and capitalize on Building Operations' expertise and connections with ARI.

TACTICS

The overarching strategic objective is to foster collaboration in a way that still creates value for departments and allows for the collection and tracking of valuable data. To achieve this, Team 8 recommends three key tactics:

1. Centralize the purchasing decisions of the UBC fleet across departments, by leveraging ARI services while still allowing department's full ownership and control of their vehicles.
2. Improve monitoring and reporting standards for the UBC fleet by proposing the installation of Geotab equipment in all vehicles.
3. Develop and deploy a user-friendly platform that simplifies the process of renting to/from other departments and tracks Geotab data in a consolidated space.

IMPLEMENTATION AND MEASUREMENT

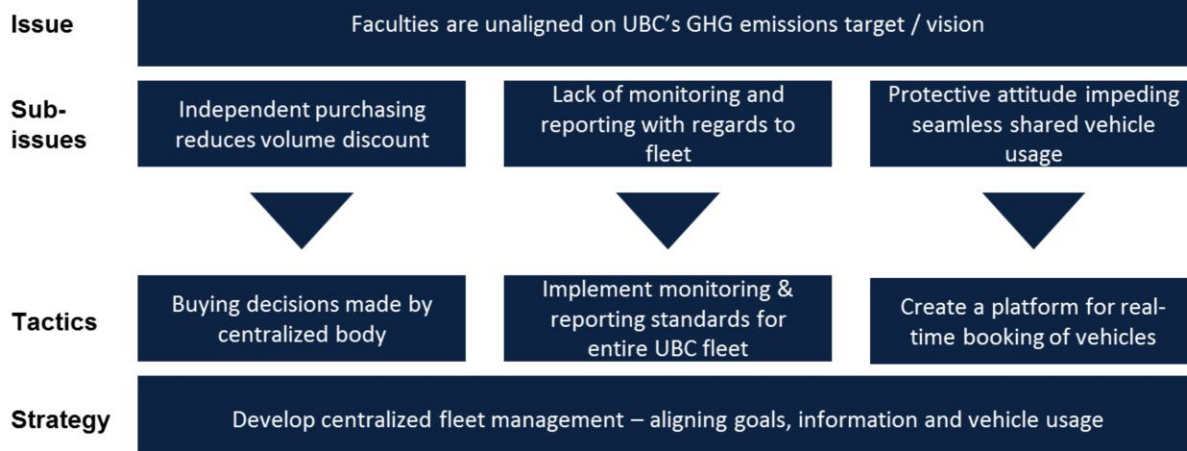
We anticipate the implementation of this project to be a multistage process. It will involve creating a team of individuals to manage the project as well as communicate the vision and benefits of the project to departments. It will also involve liaising with external parties to develop the user-friendly platform, as well as sourcing and liaising with internal (on-campus) personnel who will maintain the platform over time, track valuable data and act as the go-between for departments and the ARI. We anticipate the implementation process to occur over a period of 1.25 years. Throughout the process, the project will be measured on the KPIs mentioned earlier, in addition to the level of department engagement in the project, usage of the platform, cost savings, and resultant efficiency.

RISKS AND MITIGATION

We understand that there are several risks we may face moving forward with this project. Departments may remain hesitant to centralized decision-making, the platform may be underutilized and there is the risk of gaining too much data that is not valuable in informing future decisions. Nonetheless, we believe that effective communication with departments, proper training of personnel involved and a small scale 'pilot' approach will allow us to monitor project performance and minimize risks of failure moving forward.



Situational overview



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Overall Problem

UBC's Climate Action Plan 2020 goal is to reduce GHG emissions by 67% from 2007 levels. Although Building Operations is actively seeking to achieve the goal with their Pegasus project, other departments - less so. Some faculties are unaware of UBC's environmental initiatives due to poor communication. For example, according to UBC's Climate Action Plan 2020 Consultation report, only 39 people submitted their ideas online, 23 of them being staff and faculty. Moreover, faculties want to keep some degree of independence in their decision-making, and are not ready to consolidate and centralize fleet operations. The implication associated with this issue is that UBC will either fail to achieve 2020 objectives, or that UBC vehicle fleet will not provide sufficient contribution to reducing costs and GHG emissions. Furthermore, poor communication of UBC's initiatives prevents engagement of all departments into the initiative.

Sub-issue #1 Independent purchasing reduces volume discount

One of project Pegasus' implementation strategies is to use a standardized fleet of vehicles. Selection is based on several criteria, from initial acquisition cost to lifecycle costs. Standardization allows for:

- Better deal when buying cars in bulk
- Cheaper maintenance, because the garage needs to buy part for several models and will always have spare parts
- Efficient maintenance, since mechanics can specialize in repairing several model

Since other departments do not have a standardized fleet, they will incur higher maintenance and repair costs (e.g. 46.5% of their vehicles are older than 10 years). Moreover, since most departments do not have a procurement specialist, they may buy inefficient / unfit vehicles. As a result they will not be deploying finances sustainably.

Sub-issue #2 Lack of monitoring and reporting in regards to fleet

Unlike Building Operations, other departments do not have a standardized approach to fleet management, or a central decision making group for vehicle use. The implication of this issue is that departments cannot consolidate usage information and identify inefficiencies in fleet management and use. This can lead to the purchase of more vehicles that are required for operations. Moreover, it can lead to an inefficient use of vehicles, such as pickup trucks used to make small deliveries on campus.

Sub-issue #3 UBC departments look to keep a degree of independence in fleet decisions

Although currently there is no well-developed culture of sharing between departments, certain departments have realized the benefits car-sharing offers. For instance, Earth & Ocean Sciences have vehicles that are bookable to other departments. Other departments may be open to car-sharing options, but there is a lack of open dialog and no opportunity for engagement. Potential implications include lost potential of increasing vehicle utilization rate for some faculties and selling unused vehicles for others.

High-level strategy

To address these issues the overall strategy is to develop a centralized fleet management, which will enable UBC to purchase vehicles strategically, utilizing in-depth and well organized data, on a integrated real-time platform.

Sub-issue 1 - Independent purchasing reduces volume discount



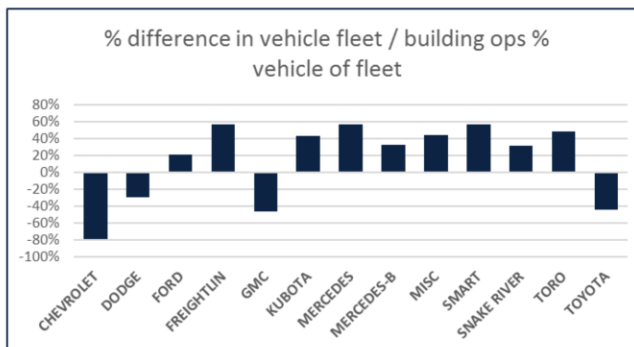
Lowers buying power to negotiate lower prices and interest rates



Forgoes potential cost savings related to standardizing vehicle specs



Misaligns purchase decision criteria with UBC's emission goals



Independent purchasing prevents cost-savings through volume discounts, and misaligns vehicle purchasing decisions and UBC emissions targets

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Sub-issue 1 - Independent purchasing reduces volume discount

Currently, most departments make their own vehicle procurement decisions based on their needs and budget. There are several issues which this practice:

1. Departments purchase from different manufacturers at different times, decreasing their power to negotiate lower prices and interest rates:

- Most departments purchase vehicles in small quantities which does not realize economies of scale through higher negotiating power
- On the other hand, Building Operations orders in bulk from a select number of manufacturers. This allows them to receive price concessions and fleet rebates. Better prices on vehicles and better availability of car parts provide incentives for Building Operations to renew its fleet of vehicles

2. They forgo potential cost savings from standardizing vehicle specs:

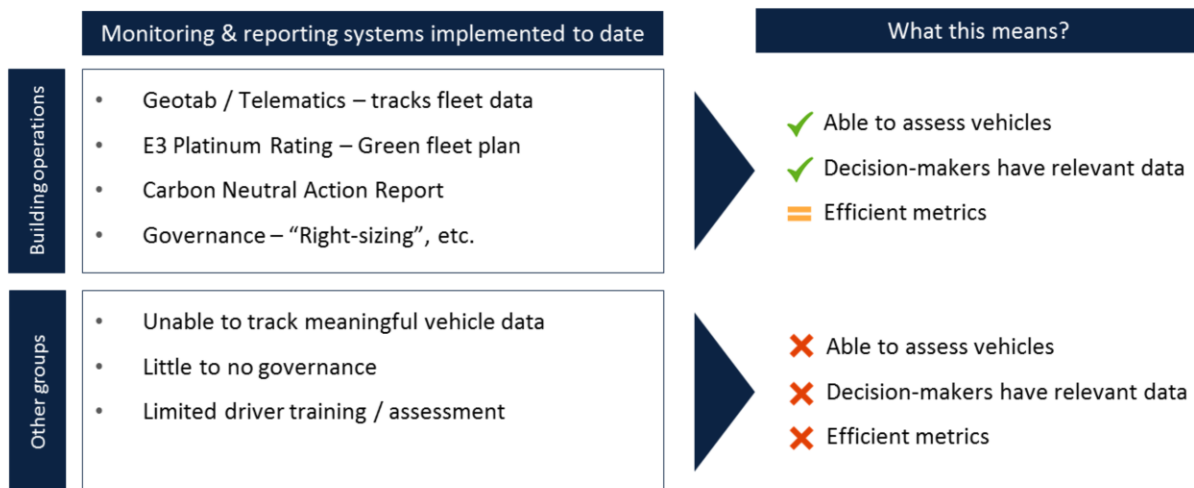
- According to UBC's inventory of fleet, UBC utilizes vehicles from more than 60 different OEMs (for departments other than Building Operations, 46.5% of vehicles are older than 10 years), which incurs higher maintenance and parts costs due to the variance in vehicle specs and parts. This variance may also reduce throughput rates and the overall efficiency of the UBC Garage
- Building Operations is currently standardizing its fleet by replacing 22 models with 5 (68% of the fleet has been replaced so far). We believe this is a move in the right direction, because standardizing vehicle specs will lower costs through:
 - An increase in negotiating power by purchasing from fewer OEMs, leading to better deals
 - Consolidation of parts inventory by stocking for relevant models instead of a spectrum of models
 - Enhanced technicians efficiency as they become specialized in fewer models, allowing them to accelerate repairs and improve equipment uptime

3. Decision makers may not use a purchase criteria that aligns with UBC's emissions goals:

- ARI used their expertise and technology to help Building Operations develop selection criteria for its fleet, from initial acquisition cost to lifecycle costs. The current portfolio ensures that purchased vehicles use less fuel and emit fewer GHGs
- Most other departments do not have expertise and best practices to procure vehicles, which may result in suboptimal choice of vehicles

The chart indicates the spread between the share a vehicle model comprises of the overall portfolio between Building Operations and other departments. In analyzing the chart, it is evident that there is inconsistency in the composition of the fleets. Moreover, being that most vehicles are not specialty vehicles, there is significant opportunity to reduce the spread.

Sub-issue 2 - Lack of monitoring & reporting



Lack of monitoring and reporting leads to higher costs, higher emissions, and unnecessary waste

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Sub-issue 2 - Lack of monitoring leads to higher costs and greater CO2 emission levels

Building Operations: several steps have been taken to better the performance of the fleet:

Most Building Operations vehicles have GPS devices (Geotabs) to support live reporting of fuel consumption and emissions. These reports help ensure that vehicle operators are following fuel efficient driving policies that reduce accident risk and fuel consumption (must not brake/accelerate/turn corner harshly).

- Adopted a green fleet plan
- Implemented better tracking and analysis of fleet data, including data on fuel use
- Replaced vehicles when due for replacement, to minimize repair costs and fuel use
- “Right-sized” the fleet in all vehicle classes—light, medium, and heavy duty—by choosing smaller, more efficient vehicles suited to the task
- Trained staff on fuel management and fuel-efficient driving practices.

Other faculties - evidence of the issue

Most other departments currently do not consolidate cost and emissions data in vehicle management and use, leading to higher operating costs and emissions. In addition, vehicle operators are not informed nor incentivized to follow fuel efficient driving practices. We contacted each faculty that controls a vehicle to isolate what they were doing to monitor their vehicle footprint. In each of our 14 responses from faculties, we didn’t find a single case where they were tracking their vehicles Greenhouse Gas contributions or vehicle utilization. This problem leads to many issues surrounding a lack of efficiency in regard to vehicle usage.

- Have not adopted a green fleet plan
- Have not implemented any tracking or analysis of fleet data, including fuel use
- Have not made decisions about vehicle purchasing with any consideration toward UBC vehicle portfolio
- Have not trained or informed staff of fuel management and fuel-efficient driving practices

Why GPS implementation and monitoring needs to be implemented in all vehicles

Utilization: Defined by days used; monitoring through GPS the vehicle movement will be clearly and accurately defined.

Safety: In the occasion that an employee is working in potentially hazardous environments it is important that vehicle management staff can track the specific location of the vehicle

Utilization: Monitoring a GPS system will provide data on the kilometers travelled by each vehicle to accurately ensure that the vehicles are serviced and regular (optimal) intervals

Emissions: Combining the data on kilometers travelled with the individual vehicles emissions levels will allow for the notification of a vehicle's emissions level drops below its factory set fuel efficiency (recommended to be set at 90%). This will allow for predictive maintenance across the fleet entire and to maximize efficiency.

Staff monitoring (may be controversial to union standards): Can allow for continuous, real-time monitoring of staff for performance management purposes. If this application is not sanctioned, at the very least GPS monitoring will allow for investigation data in the case of an accident involving a vehicle; speeding or reckless driving reports, use of the vehicle in an unauthorized use, or where the vehicle has been used in a breach of law or policy.

Sub-issue 3: Protective attitude impeding seamless shared vehicle usage



Building operations

- Systems in place to track utilization (telematics, etc.)
- Shares vehicles (12 Smart Cars and a Prius) with 5 other departments and Safewalk Program

Other groups

- 45 other departments with own budget, priorities and vehicle needs
- Not staffed with fleet specialists, leading to inconsistent vehicle usage: seasonality, excess capacity, underutilization

Vehicle usage purpose

- Faculty research
- Transport equipment/ students
- Specialty purpose



Vehicle frequency of usage

- Seasonal
- Daily
- Mixed
- Need-based
- Infrequent



High underutilization rates and excess capacity present opportunity in reducing emissions and costs

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Sub-issue 3 - UBC departments look to keep a degree of independence in fleet decisions

By using in-house fleet specialists and telematics systems within each vehicle, Building Operations is able to monitor the usage of vehicles to ensure maximum efficiency. They also have an active culture of sharing, with 13 cars that they often share with other departments, such as AMS's Safe Walk program. During the client interview, a key aspect that came up was Building Operation's desire to reduce redundancies. However, the current decentralized and unsystematic nature of budgeting and fleet management for all other departments has led to many inefficiencies. Currently there are approximately 45 departments other than Building Operations that have their own vehicular needs. Rather than sharing vehicles, many departments choose to purchase their own so they can use them as needed. Through our primary research, we are able to understand the diverse needs of each department, as well as highlight underutilization within the current system.

Diverse usage needs

Our research reveal that many of the academic departments utilize vehicles for research, site visits, and for taking students on field trips or other off-campus events. Vehicles are also used for transporting equipment and materials. We learned that some departments, such as Dairy Education and Research Centre / Botanical Gardens, need specialty vehicles (tractors, etc.) for their work.

Differing frequency of usage

Our research reveal that many departments differ in how frequently they use their vehicles. Only 2 of the 14 departments, Student Services and Hospitality and Dairy Education and Research Centre indicate that they use their vehicles daily. Both of these departments have very specialized vehicular needs. Two other departments indicated that they own a mix of highly utilized and underutilized vehicles. Two departments indicate that they are affected by seasonality. The Civil Engineering department commented that out of its three vehicles, perhaps one would generally be used only once during a week. Thus, there seems to be inconsistencies in how frequently different departments' vehicles are being used. Departments also acknowledge that vehicles often operate under capacity, with excess seats and cargo space during trips.

Evidence of need for change

Some departments have acknowledged this inefficiency and are now renting vehicles to other departments – Ex. Earth and Ocean Sciences and Civil Engineering. Three departments within the Faculty of Arts also indicated that they owned one or no vehicles, but borrowed from other departments as needed. Two other departments recognized their lack of need for a vehicle and gave them away to other departments. Thus, there seems to be a basic form of sharing that is taking place on campus. However, this system has proven to be quite tedious as it requires departments in need of vehicles to apply for a work order several weeks in advance and there is no real-time tracking of which vehicles on campus are available. Thus, there is no real dialogue taking place regarding how car-sharing on campus can be done efficiently, and the current inconvenience of the system does little to encourage sharing among departments.

Alternatives/ decision criteria



Decision criteria	Financial feasibility	Improve fleet utilization rates	Achieve short-term & long-term emissions goals
KPIs	Cost	% utilization	Current & projected emissions
Alternatives			
Expand ARI services to other faculties	✗	✓	=
Integrated fleet management group and platform	✓	✓	✓
Develop electric grid similar to trolley bus system	✗	✗	✓

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Decision criteria:

- Financial feasibility: Remaining cost neutral is imperative. As a public institution, UBC is held to the scrutiny of tax-payers and must make the most of its funds. Therefore, incurring high up front costs could lead to backlash and inability to recover. Also, the initiative should offer the potential for cost savings through strategic mechanisms that exploit inefficiencies.
- Improve fleet utilization rates: Sound, transparent data is important in making decisions. Moreover, the decisions themselves will allow UBC to make improvements and adjustments, enabling them to achieve improved utilization rates.
- Achieve short-term and long-term emissions goals: UBC has set emissions goals in the short-term that need to be realized. Although long-term success is important, priority must be placed on the immediate nature of the emissions mandate. However, the strategy should also put in place measures to lay the foundation for long-term success.

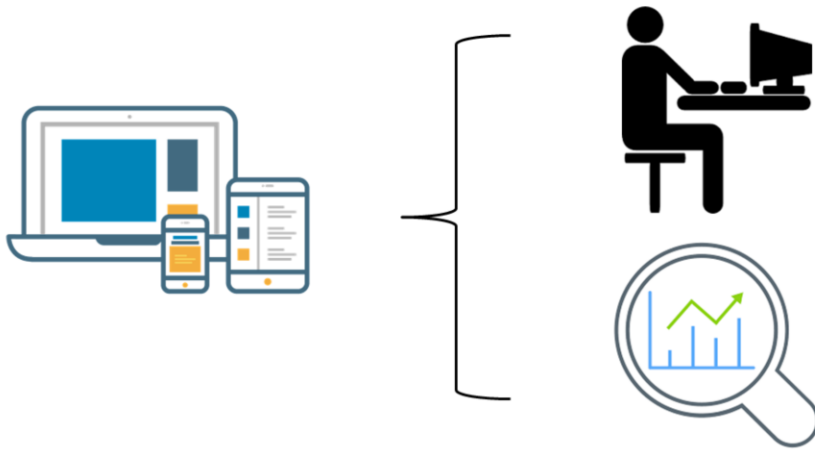
KPIs:

- Cost: To gage the financial ability to execute, the costs related to the program will be analyzed periodically and all costs to incurred will be scrutinized heavily.
- Percentage vehicle utilization rate: Data should be easily accessed, and tools and policies should be in place to analyze vehicle utilization rates.
- Current and projected emissions: Carbon dioxide emissions should be monitored frequently, as they relate directly to UBC's mandate.

Alternatives:

- Offer to expand ARI services to other faculties: Currently, UBC Building Operations employs ARI Fleet services to realize strong fleet management. However, other UBC groups with a vehicle fleet act independently and in accordance with their own processes. Being that ARI Fleet is a proven option, other UBC groups would immediately realize gains, in operational efficiency and costs.
- Create an integrated fleet management group and platform: Adjust certain Building Operations roles to manage all campus fleet operations and introduce a platform to integrate information and streamline decision making. Would encourage vehicle efficiency through shared usage, data transparency through online platform and governance, and optimal fleet through pooling of purchasing and resources.
- Develop trolley bus electric grid: Commence capital project to install electric grid for custom vehicles, maximizing fuel efficiency. Being that important areas on campus are well mapped, an electric grid could be added to high traffic / import areas, leading to 0 fuel consumption on most on campus trips.

Vision of overall strategic recommendation



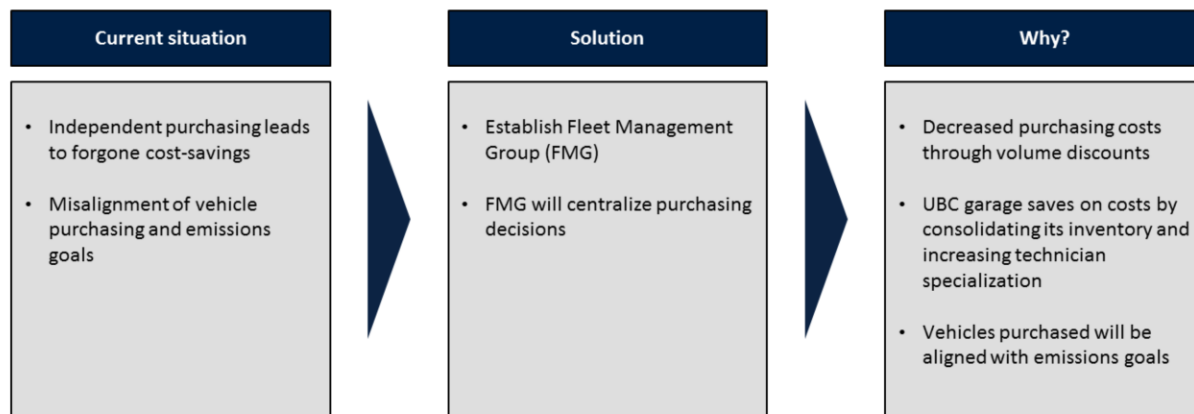
So how will these problems be absolved? We have developed a strategic recommendation that addresses all of the issues and maximizes the KPIs listed earlier.

The recommendation comprises of three inter-locking pieces:

1. Establishing a group within Building Operations that takes control of fleet purchasing decisions, as well as other fleet management decisions;
2. These vehicle fleet management decisions are supplemented by monitoring all UBC vehicles and implementing reporting standards for the entire fleet;
3. However, the issue is that these new monitoring and reporting standards may add a lot of extra paperwork, which will lead to significant push-back. As such, an online platform will be instituted which will allow faculties to share / book vehicles and centralize data with limited extra work required.

Overall, by centralizing purchasing decisions, monitoring vehicles and wrapping this all in a simple online platform, UBC will have a efficient and green future.

Tactic 1 - Centralizing purchasing decisions for the UBC fleet



Fleet Management Group will streamline purchasing, realizing cost savings and aligning emissions goals

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Tactic 1: Centralizing purchasing decisions for the UBC fleet

We propose to centralize UBC fleet's procurement management and repair/maintenance in order to capitalize on the pricing concessions available through the partnership with ARI and fleet rebates by OEMs, and achieve greater economies of scale. This would also allow to fix misalignment of vehicle selection criteria and GHGs goals.

Evidence of need:

There are many different vehicle models owned by UBC departments, more specifically according to the Inventory of Fleet spreadsheet, there are more than 60 different car models, some of which date back to 1978. This affects the cost of maintenance and repair and makes it hard to track inefficiencies of high fuel consumption and GHG emissions. Moreover, most departments do not have procurement specialists and selection criteria for vehicle purchases.

Solution:

To establish a Fleet Management Group (FMG) to centralize the vehicle purchasing process. The group will be assigned to the following tasks:

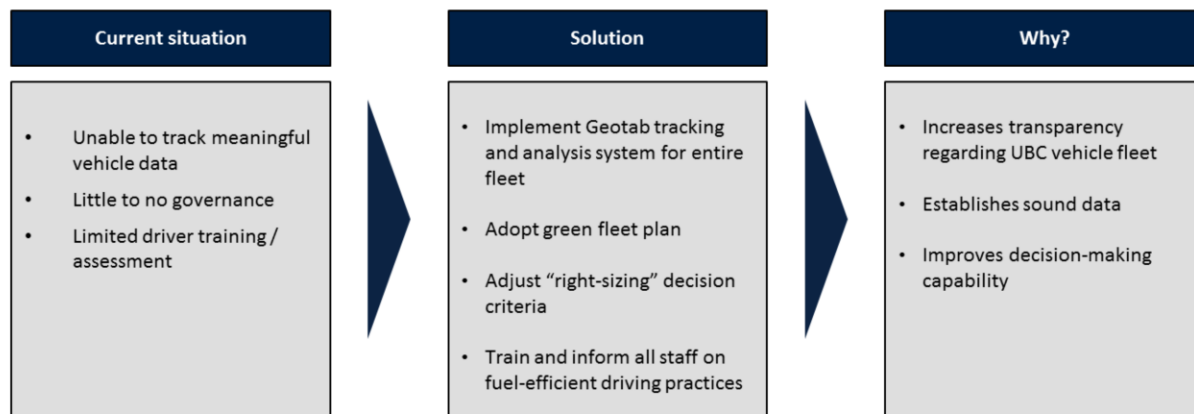
- The group will fulfill order requests for any additional vehicles put in by UBC departments.
- It will apply improved and redefined selection criteria with industry best practices to ensure purchased vehicles meet fuel efficiency and environmental standards.
- The group will continue working with ARI to receive price concessions – Use of ARI Financials assets will be dependent on the RFP process that will be undertaken in 2018 at the conclusion of their contract.
- The group will facilitate centralization of repair/maintenance of the proposed fleet at the UBC garage by engaging all departments.

Benefits and goals:

Through centralized procurement management, we want to simplify the ordering process for all UBC departments to receive higher vehicle and fuel quantity discounts. Moreover, this initiative would allow the project team to order fuel efficient and environmentally friendly vehicles and help UBC achieve its 2020 goals.

- If UBC departments agree to delegate vehicle procurement to the Fleet Management Group, it would allow procurement costs to decrease through receiving higher volume discounts from manufacturers due to increased buyer power.
- With the standard fleet of vehicles, UBC garage can consolidate its inventory. It will increase maintenance/repair efficiency, since necessary parts will always be in stock. Moreover, this will allow technicians to improve their efficiency through repairing a select number of vehicle models.
- The Fleet Management Group will develop selection criteria for the whole fleet and only purchase vehicles that meet internal standards which adhere to the outlines of the entire vehicle asset portfolio.

Tactic 2 – Implement monitoring & reporting standards for the entire fleet



Monitoring and reporting will increase transparency and access to valuable / sound data enabling improved decision-making with regards to fleet management

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Tactic 2: Implement monitoring & reporting standards for the entire fleet

Currently UBC Building Operations is the only department that is effectively tracking all vehicle user information. Without consolidation of end-user data an appropriate action plan will not be reached because decision makers are lacking relevant information. Thus, it's essential to immediately install tracking devices in all vehicles and improve the current monitoring and reporting systems.

Evidence of The Problem: In each of our 14 responses from faculties that control vehicles, we didn't find a single case where they were tracking their vehicles fuel consumption, greenhouse gas contributions, or vehicle utilization. This problem leads to many issues surrounding a lack of efficiency in regard to vehicle usage which has lead to increased costs and higher than necessary levels of emissions.

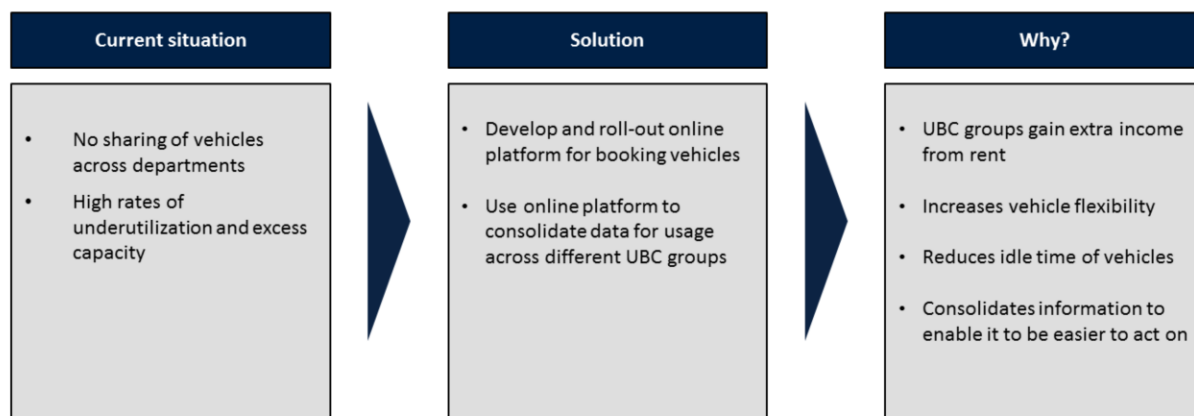
Solution:

1. Implement Geotab and GPS tracking and analysis system in the entire UBC fleet - Will allow for consolidation of fleet data into one place and help to improve tactics for defining metrics (e.g.. Utilization).
2. Adopt a green fleet plan across all faculties – Creates a guideline for all faculties which will align incentives toward reaching UBC's Climate Action Plan.
3. Adjust “Right-sizing” Decision Criteria – Introducing new information by gathering data surrounding the number of open-seats by end-users will help to reduce / eliminate single passenger rides.
4. Train all staff on fuel management and fuel-efficient driving practices – Will reduce costs associated with inefficient driving practices, while simultaneously reducing emissions.

Benefits and Goals: Implementing Geotab and GPS tracking systems within all vehicles on campus will allow the majority of the required data to be tracked. Data that will be generated through the GPS system will include; the main routes being taken by each vehicle user, where the common destinations lie, as well as identifying inefficient routes vehicle users are taking. Employing ARI's Geotab system will allow for a complete consolidation of vehicle data into a single source, and provide accurate information on fuel consumption (MPG), CO2 emissions, and maintenance costs. The Geotabs will also indicate those vehicle operators who are not following fuel efficient driving policies; such as harshly accelerating, braking, and cornering. Finally, implementing a new system of tracking the number of occupants within a vehicle, while also recording the amount of open seats for each vehicle's trip will truly identify the opportunities for assessing total vehicle utilization and efficiency. This is because redundant trips can be eliminated / reduced, while increasing vehicle occupancy and allow for fuller vehicles which can reduce transportation costs and greenhouse gas emissions.



Tactic 3 – Create a platform for real-time booking of vehicles



Real-time booking platform increases vehicle utilization, reduces idle time, and consolidates data from different monitoring tools to improve decision-making

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Tactic 3: Create a platform for real-time booking of vehicles

One of the pain points that was identified in our research was that it can be time consuming and difficult to procure a vehicle on a desired date and time for faculties that do not own a vehicle – including finding the right type of vehicle for their task. The current process of pairing demand with supply of a vehicle, as well as filling out the work order associated is tedious and creates needless overhead and administrative work.

Main Idea:

Develop an online platform that will allow departments to access real-time information about the number & types of vehicles on campus that are available for use, and that will allow quick and seamless booking of vehicles from different departments.

Evidence of Need

There are over 45 departments with vehicle needs, many of which have vehicles that are under utilized and are used with excess vehicle capacity. Due to the vast number of departments, communication and transparency of vehicle availability is impeded without a system that easily consolidates and disseminates information about availability of vehicles in a timely manner. Finally, we mentioned that Building Operations currently owns 12 shared vehicles that it has already begun sharing with 5 other departments with great success.

Goals and Benefits:

The main goals of this platform is to reduce underutilization of vehicles, reduce vehicle redundancies and to transform the current ad-hoc system of sharing across departments into one that is more efficient, systematic, consolidated and simple. There are several additional benefits associated with the creation of an online real-time platform:

- Departments gain extra income from renting out their vehicles to other departments – Each vehicle owning faculty will have the ability to reserve their vehicle for their own use and rent it when it's not needed.
- Departments without vehicles are able to easily access vehicles when needed – Do not have to waste resources procuring their own vehicle which will be underutilised and create redundancies across campus.
- Departments will be able to coordinate vehicle usage and reduce single passenger rides – reducing fuel and maintenance costs as well as emissions.
- All Departments will be able to track mileage and monitor GHG emissions on a campus-wide scale since all vehicle information will be openly available in a consolidated space.

Through this consolidated approach, departments are encouraged to work together towards an efficiency boosting goal, fostering ownership of on-campus fleet efficiency across departments.

Implementation

Step 1: Gather the human capital



Create Fleet Management Group



Suggested Personnel

Team led by personnel with fleet management experience

Overarching Role

Initiate, coordinate, and oversee project and be the bridge between departments

Build relationships with other departments



Specific Responsibilities of Fleet Management Group:

- Connect with other departments and encourage sharing culture
- Communicate vision of project; emphasizing the opportunities that collaboration offers, and autonomy that is still afforded
- Consolidate relevant vehicle information of departments
- Select "pilot" group for centralization model

One of the main contributors to inefficiencies is that there is a lack of communication between UBC departments regarding vehicle use. In order to address this problem a team of individuals should be identified to connect with departments, communicate the benefits of this on-campus sharing community and create a willingness to work together and share information and assets. This group will be designated as the Fleet Management Group (FMG), and moving forward will be the central governing body that handles all decisions related to UBC's fleet.

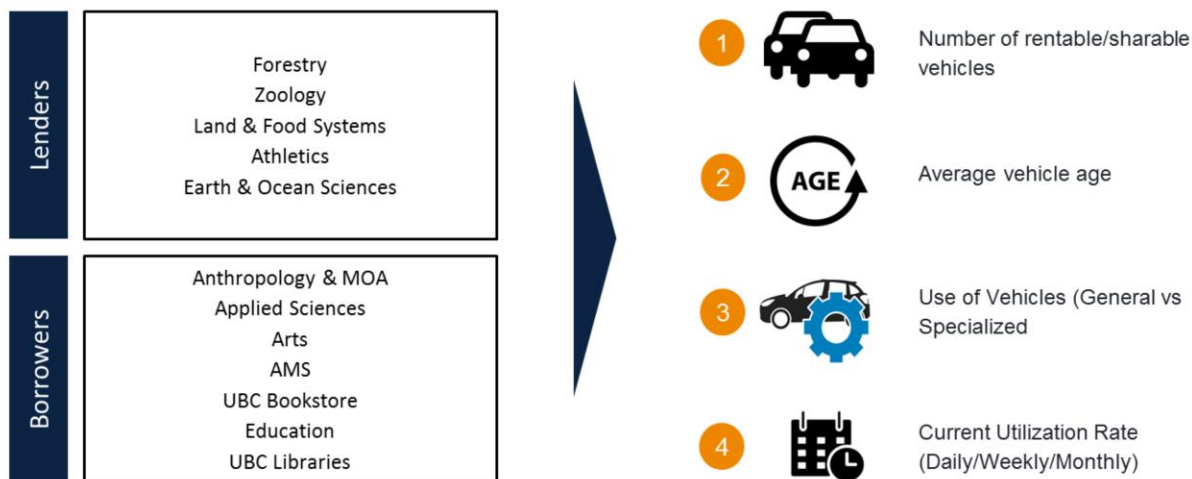
The FMG will also be responsible for consolidating any information that willing departments provide. Specifically, this will involve:

- Updating the current location/ownership status of each vehicle that is owned cross departments. Currently, the information is not complete and/or incorrect as many of the faculties that have been contacted have stated that they have either sold or transferred ownership of the vehicle to other departments.
- Taking note of departmental needs: the number of vehicles each department needs and for what purposes (general use versus specialized use) as well as the frequency of use of each vehicle (daily/weekly/seasonally).
- Identify inefficiencies: underutilized vehicles, redundant vehicles across departments, etc.
- Determining suitability of departments for the sharing platform.

It is imperative that the FMG communicate openly and often. Moreover, by truly trying to understand the business needs of the different departments, the FMG can position itself to offer relevant benefits that will win over hesitant departments. Once the information is collected, the FMG will present a business case to select "pilot" departments indicating the benefits they will realize through: reduced administrative overhead, reduced fleet costs, and increased fleet efficiency.

Implementation

Step 1, cont'd: Departments to be targeted



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Based on the team's initial interactions with departments, as well as their assessment of the data gathered, the FMG will select the departments that are most suitable to be lenders in the shared platform. In the analysis we have conducted, we identified two groups:

- Lenders (have underutilized vehicles):
 - Forestry, Zoology, Land & Food Systems, Athletics, Geography, Earth & Ocean Sciences
- Borrowers (have need for extra vehicles):
 - Anthology, Museum of Anthropology, Applied Sciences, Arts, AMS, UBC Bookstore, Education, UBC Libraries

Although they may be designated as lenders, this does not mean that they cannot use the platform to perform the opposite of their designation (borrowers can only borrow, because they currently do not own any vehicles). What it does mean, however, is that the bulk of activity and benefit for the lenders will come from the designated categorization.

In selecting the faculties/departments the criteria used were: number of rentable vehicles owned (including transit connect), average age of vehicles, whether the vehicles are used for general use (e.g. moving people or small equipment) or are customized for specific work (e.g. farming trucks) and current vehicle utilization rate.

In the long-term all departments would be able to use the platform, but it is recommended to first pilot the program with the initial group recommended to test the waters.

Implementation

Step 2: Computer-based platform



Request for proposal



Suggested Personnel
Fleet Management Group

Responsibilities

- Identify requirements / launch RFP
- Liaise with UBC IT on project
- Communicate with departments

Develop computer-based platform



Suggested Personnel
Platform developers and UBC IT personnel

Responsibilities

- Utilize Agile development methodology involving key stakeholders
- Develop platform to perform and track vehicle requests in real-time, as well as house information pertaining to the vehicles

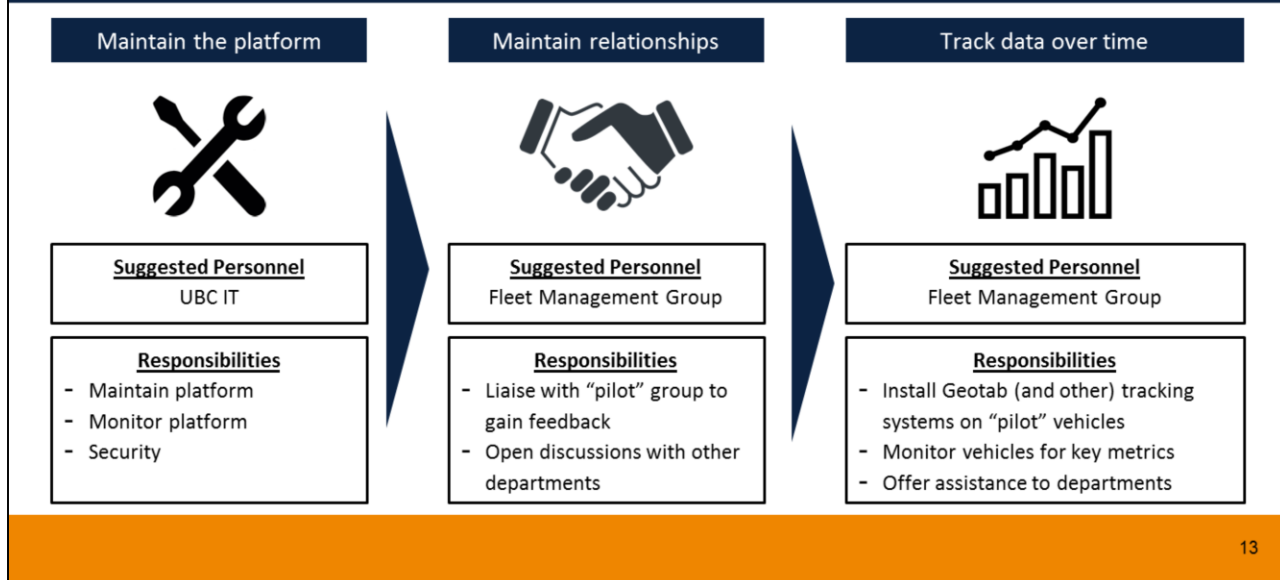
Once departments willing to pilot the project have been selected, the next step is to develop the computer-based platform that will make the process of cross-department sharing easy, efficient and cost-effective. The Fleet Management Group will need to identify the requirements for the computer-based platform and the relevant staff needed to create and maintain it. This will be done through interviews with key stakeholders, mapping out the work systems to be accommodated, and discussing with IT the details of maintaining such a platform.

External consultants will likely be required to develop the platform, as well as conduct more detailed user-interviews to ensure the scope is correct. The development strategy will be an agile methodology, to maximize shareholder involvement (while weighing the risk of "scope-creep"). In addition, the UBC IT team will be extremely valuable in ensuring that any system being built complies with security and governance protocol at UBC, properly integrates with Shibboleth, and performs adequately (throughput speed, storage requirements, and reliability). Lastly, the FMG will work closely with the external consultants to decrease the likelihood of product re-design, and going over budget.

Once complete, the FMG will utilize the platform to manage bookings, and analyze data to support future fleet management decisions. UBC IT will serve to manage the platform, consistently working to maintain it, and ensure strong performance.

Implementation

Step 3: Maintain the platform and track data over time



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Tracking Data Over Time: FMG personnel will be needed to keep track of vehicle usage, fuel efficiency, costs, utilization, etc. through ARI technologies and the recommended platform.

- These devices will allow for consolidation of the user data into one place
- The stated \$30-80 cost associated with installing the devices will need to be covered by the departments involved in the test pilot program - Convey long-term benefits associated that will outweigh costs

Maintain Online Platform: Internal IT personnel will be needed to maintain the online platform long term. This will involve: maintaining the software, detecting and fixing any bugs or glitches or inefficiencies in the system over time and to updating information as needed.

Maintain Relationships: Throughout the entire process, cross-department communication must be maintained. It is imperative that departments feel like their voice is being valued within this sharing community and that they are able to share concerns, offer feedback on the program. Thus, the overseeing committee's role is to continue to build relationships with departments and to reinforce the vision of this sharing community, which is to boost campus-wide efficiency and sustainability.

Incentives Offered to Participating Departments

1. Reduced administrative costs associated with dealing with vehicles, since departments will now have free access to FMG specialists
2. All maintenance and servicing costs of vehicles will be consolidated
3. Revenue gained from rented vehicles go directly to the departments
4. Departments who rent out their vehicles get a period of 'priority booking' during the last week of each month, in which they are able to have first access to booking any of their own vehicles for the upcoming month. At the start of the next month, all vehicles are then open to all departments to book.
5. Departments who are renting from other departments can book any vehicles from any departments at any time, up to 2 days in advance of use.
6. Any vehicles that need to be replaced will be replaced through the FMG utilizing more attractive rates than market prices, allowing departments to lower their costs and retain full ownership of their vehicles while giving them access to more energy efficient and sustainable vehicles (discussed further in step 4)

Information that should be tracked

1. Changes in utilization rates of the vehicles including the change in average capacity of vehicle usage – Calculated through determining idol time and passenger occupancy & unused space
2. Data on drivers' fuel-management as well as fuel-efficient driving practices (Geotab data) – Further producing information on potential liabilities through reckless driving practices by the end-user group
3. Revenue generated for participating faculties – Will increase demand to join the program through sharing its contributing to efficiencies, cost savings and revenue growth

Implementation

Step 4: Co-ordinate vehicle replacement process



Coordinate vehicle purchase and replacement



Suggested Personnel
Fleet Management Group

Responsibilities

- Manage the purchasing and disposing decisions of all vehicles
- Determine best vehicle providers
- Act as a bridge between ARI and departments

Maintain relationships



Suggested Personnel
Fleet Management Group

Responsibilities

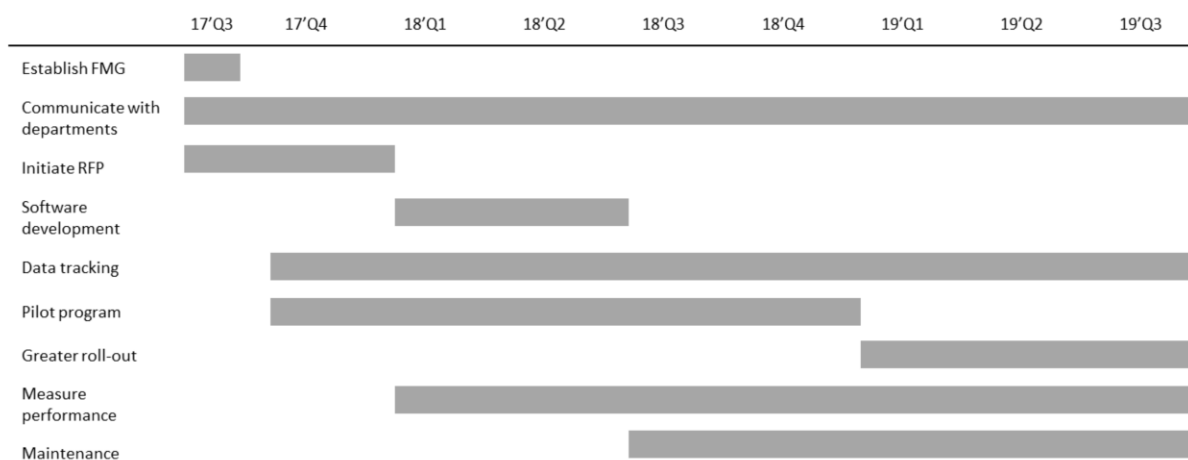
- Speak with departments to ensure vehicles exceed expectations
- Communicate future plans (transparency)

To address the problem of independent purchasing of vehicles by departments and the inherent loss of cost-savings, a procurement management advisor will need to be selected to manage the purchasing and disposing decisions of all vehicles. This manager will be able to centralize the purchase decision so that it is possible to maximize the overall portfolio of vehicle assets while reducing the burden on the UBC garage surrounding maintaining and repairing the currently diverse portfolio of vehicles. Allowing one asset manager to handle vehicle procurement, we will see immediate advantages through scale of purchases and be able to increase manufacturing discounts as one of the manager's tasks will be to create relationships with those firms in which he/she identifies as the ideal vehicle provider.

Rules for Replacing Vehicles

- Any vehicles within the system that need to be replaced as follows:
- The department selling their vehicle will make a purchase order to Building Operations through the platform
- Building Operations will then purchase the old vehicles at an appropriate salvage value.
- Through Building Operations' partnership with ARI, they will sell new, more fuel efficient and sustainable vehicles to these departments through the platform, allowing UBC to move closer towards its goal of having a more energy efficient and sustainable fleet across departments, while enabling departments to still gain full ownership and control of their vehicles.

Implementation Timeline



With the proposed timeline, greater roll-out (beyond the pilot program) should commence by the first quarter of 2019, providing over one year of pilot success. Furthermore, two aspects that are pivotal to the success of any change are communicating with departments, as well as measurement of performance. By communicating throughout the timeline of the project, it serves to have all stakeholder on the same page, and address any concerns immediately. Moreover, by measuring performance often, and systematically any shortcomings of the project can be addressed and all initial hypothesis can be adjusted accordingly.

Assessment of progress



Decision criteria	Financial feasibility	Improve fleet utilization rates	Achieve short-term & long-term emissions goals
KPIs	Cost	% utilization	Current & projected emissions
What to measure	<ol style="list-style-type: none"> 1. Upfront costs 2. Ongoing costs 3. Unexpected costs 	<ol style="list-style-type: none"> 1. Vehicle utilization 2. Platform usage rates 3. Appropriate resource usage ("right-sizing") 	<ol style="list-style-type: none"> 1. 2020 emissions goals 2. Longer-term goals
How / when to measure	Financial statement analysis each quarter	Monthly reports utilizing online platform gathered information	Half year reports utilizing online platform gathered information

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The KPIs established earlier will serve as the foundation for how project success will be measured. There are three main KPIs we decided to focus on: cost, % utilization, and current and project emissions.

Cost:

What to measure: There are three forms of costs that will be measured: upfront, ongoing and unexpected costs. The upfront costs refer to costs associated with initiating the strategy, such as the development of the online platform. The ongoing costs pertain to regular operations, and will be benchmarked to historic figures to gauge performance. Lastly, unexpected costs are costs that the strategy has not planned for, and are therefore uncertainties that may arise. These are to be similar to upfront costs, but the simple difference is that the upfront costs are what was planned for.

How / when to measure: Utilizing quarterly financial statements will ascertain the ability to measure each of these costs on a cash and income statement basis.

% utilization:

What to measure: The vehicle utilization measure analyzes the frequency of use for the vehicle. Additionally, the platform usage rate will measure the use of the online platform to understand how this has effected these utilization levels. Lastly, it is also important to understand how the vehicles are being utilized to work to identify any inefficiencies.

How / when to measure: Monthly platform generated reports should be produced and scrutinized in-depth by the Fleet Management Group.

Current & projected emissions:

What to measure: It is important to ensure that both the short-term 2020 emissions goals are being realized, as well as the potential for more lofty future goals.

How / when to measure: Being that information being compiled regarding greenhouse gas emissions requires significant amounts of effort (at least compared to other data), it should be measured semi-annually, with the potential for more frequent analysis in the future (contingent on improved processes).

Financial needs & requirements



Line Item	2017	2018	2019	2020
1 Initiate Project				
1.1 External Software Developers	64,000	-	-	-
2 Execute and Control Project				
2.1 Project Team	50,000	50,000	50,000	50,000
2.2 Administrative Costs	42,250	42,250	42,250	42,250
2.3 Telematics Devices	32,200	27,600	47,600	43,200
3 Cost Savings				
3.1 Volume Discount	-	(26,600)	(38,000)	(38,000)
3.2 Inventory Consolidation	-	-	(1,000)	(1,000)
3.3 Reduction in Vehicles	-	-	(1,312)	(3,937)
3.4 Vehicle Replacement	-	(1,531)	(3,718)	(5,905)
3.4 Eco-Driving Practices	-	(2,460)	(4,101)	(5,741)
Total	188,450	89,259	91,719	80,868

Within the \$1.8m annual budget, we believe our proposal is an effective allocation of capital to reduce emissions while realizing cost savings through consolidated purchases and reduced fuel consumption. Building Operations has been successful in achieving several milestones, including improved utilization rates and lowering the average fleet age to below 9 years. We believe this portion of the budget will be more impactful when invested in other departments, whose vehicles are not well utilized and have an average fleet age of 12+ years. The number presented are very rough estimates and will be revised as more data is gathered from Building Operations, stakeholders, and the fleet.

1.1 External Software Developers: the cost of hiring 2 software developers from a contracting company for 4 months to develop and test the platform.

2.1 Project Team: the incremental cost of hiring an analyst to initiate and monitor the project

2.2 Administrative Costs: the cost of IT and Building Operations personnel to maintain the platform and assist with paperwork

2.3 Telematics Device: the cost of installing Geotab device on each vehicle and paying monthly fee

3.1 Volume Discount: 10% discount on the market price of ARI's recommended vehicles, based on projected replacement schedule

3.2 Inventory Consolidation: cost savings from stocking on fewer parts due to standardization of vehicles

3.3 Reduction in Vehicles: reduction in fuel consumed by reducing number of vehicles through rental program

3.4 Vehicle Replacement: reduction in fuel consumed by replacing older vehicles with more fuel efficient models, based on projected replacement schedule

3.5 Eco-Driving Practices: 5% reduction in fuel consumed from promoting eco-driving practices

https://www.glassdoor.ca/Salaries/vancouver-software-developer-salary-SRCH_IL0,9_IM972_KO10,28.htm

http://www.anythinggps.com/index.php?route=product/product&product_id=51

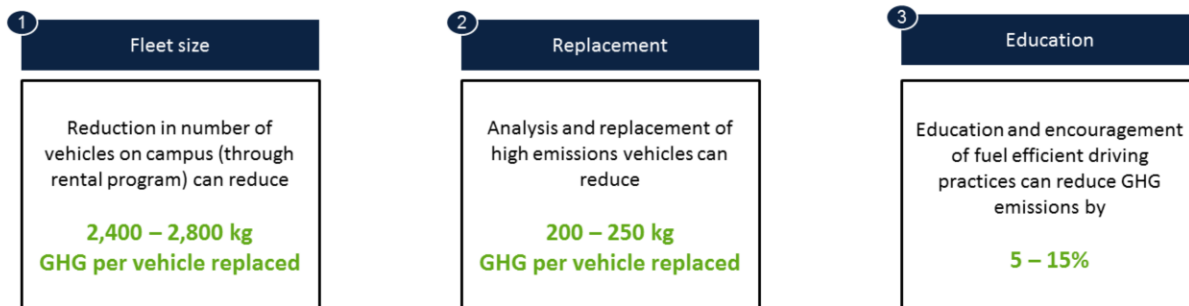
<https://www.toyota.ca/toyota/en/build-price/Tacoma>

<https://www.toyota.ca/toyota/en/build-price/tundra>

<http://www.caranddriver.com/mercedes-benz/sprinter>

<http://www.nrcan.gc.ca/energy/efficiency/11938>

Contribution to 2020 emissions reduction target



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In order to meet UBC's short term emissions goal of 67% reduction by 2020, we believe our recommendation can contribute in the following ways:

Reduction in the number of vehicles

As the vehicle needs of departments can be met with fewer vehicles through the rental program, we believe we can eliminate 1 to 2 underutilized and fuel inefficient vehicles after tracking their utilization in this fleet. Assuming the vehicle is driven for 8,000 km annually with GHG emissions of approximately 300 – 350 g/km, each vehicle reduction can reduce 2,400 – 2,800 kg GHG.

Replacement of high emissions vehicles

Through the monitoring of the fleet's fuel consumption and emissions, the project team can assess the need to replace high emissions vehicles. Through our research, we found that 2017 models of ARI's recommended models produce 20 – 25 less g per km compared to 10+ age vehicles of the same class. Assuming the replaced vehicle is driven 10,000 km each year, each replacement can reduce 200 – 250 kg GHG emissions.

Promotion of fuel efficient driving practices

Real-time monitoring and feedback of fuel consumption to drivers can help educate and encourage fuel efficient driving practices, which include minimizing idling, harsh acceleration and braking. Evidence from eco-driving programs around the world suggests that these driving practices can reduce GHG emissions by 5 – 15%.

<http://ncst.ucdavis.edu/wp-content/uploads/2014/08/06-24-2015-ECODrivingTrucksPolicyBrief-FINAL.pdf>
<http://www.nrcan.gc.ca/energy/efficiency/11938>



Risks & mitigations

Risks	Likelihood	Severity	Strategic mitigation	Contingency
UBC groups hesitant to centralize	Medium	High	Highlight benefits to them and work alongside them	Speak with UBC Board to mandate initiative
Too much data and not enough information	Low	Medium	Dedicated team, and easy to use online platform that aggregates data	Focus on smaller set of key metrics
Low adoption of online platform	Medium	Medium	Work with departments to build platform and train them on the platform	Speak with UBC groups to understand problems and adjust platform / approach

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We have identified potential risks associated with our strategic recommendation. As such, we have worked to highlight mitigation strategies as well as contingencies:

Risk #1: UBC groups hesitant to centralize

By highlighting the benefits to UBC groups and working alongside them we are confident that this risk can be mitigated. More specifically, this comprises of working with the different departments early and often. However, this does not mean sending frequent meaningless emails, rather it stipulates that urgency must be established, benefits communicated, successes highlighted, and challenges addressed head on. However, if this is not enough to gain appropriate levels of support, then a contingency is to speak with the UBC Board and present the opportunity, so that it is mandated across campus. This contingency is only to be used as a last resort upon failure of the mitigation.

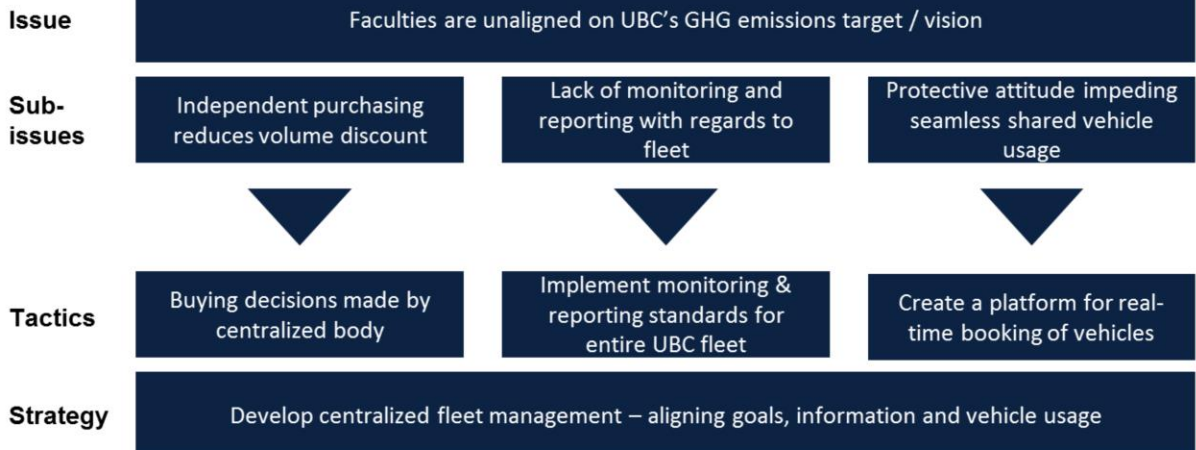
Risk #2: Too much data and not enough information

The recommendation put forward a plan that creates and mines significant amounts of data. In the past data regarding Building Operations vehicles has been kept closely and measured, however the same cannot be said about other UBC departments. As such, by establishing the Fleet Management Group (FMG) and leveraging the online platform, we are confident that this risk can be easily mitigated. The FMG will be familiar with the types of data and the processes involved in transforming it into meaningful insights. Moreover, the online platform will aid in organizing the information and building reports in a sophisticated and efficient manner. If this is still not enough, we recommend a contingency of initially measuring a smaller set of key metrics, and slowly adding on additional pieces once processes have been optimized.

Risk #3: Low adoption of online platform

With any new platform adoption rates are a concern. As such, it is critical that measures be put in place to mitigate the risk. In particular, by working with the departments in an agile manner to build the platform, constant user-feedback would enable an effective product. Furthermore, after the product is launched, the FMG and UBC IT should work closely with departments to ensure that they understand how to effectively use the platform. If this is not successful, speak with the different departments to understand shortcomings and re-evaluate approach.

Conclusion



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At present faculties are severely unaligned on UBC's GHG emissions target / vision. As such, UBC is on pace to fail to realize the 2020 emissions goal, and more importantly fail to realize its green vision. Flowing out of this main issue are the three sub-issues:

1. Independent purchasing reduces volume discount
2. Lack of monitoring and reporting with regards to fleet
3. Protective attitude impeding seamless shared vehicle usage

Each of these is fully addressed by the strategy that we have recommended. The strategy establishes a centralized group of decision-makers who help set best practices and purchase vehicles in alignment with UBC's emission goals. Furthermore, to aid in vehicle cooperation and analysis of data, a computer-based platform will be developed. Overall, developing a centralized fleet management system, will align goals, information and vehicle usage; allowing UBC to achieve its short-term and long-term emissions goals.

Appendix – Table of contents



Financial (AF)

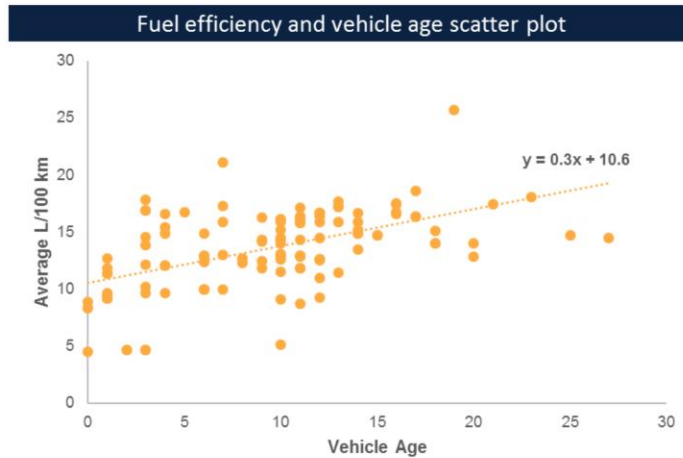
1. [Fuel efficiency and vehicle age](#)
2. [UBC fleet size and short-term replacement schedule](#)

Analysis / Recommendations (AAR)

1. [EERC Grid](#)
2. [SWOT Analysis](#)
3. [Percentage of total fleet by year purchased](#)
4. [Automobile industry strategic overview](#)

Implementation (AI)

1. [Functional & non-functional requirements](#)
2. [Change management – Kotter's 8 steps](#)
3. [Agile development](#)
4. [Change process](#)
5. [Platform layout, part 1](#)
6. [Platform layout, part 2](#)



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Each year the age of the vehicle increases its fuel efficiency compared to peers that are newly introduced degrades by approximately 30%. This is alarming, as it showcases that the lack of replacement in vehicles by other departments can be directly linked to inability to achieve 2020 emissions targets.

<http://www.nrcan.gc.ca/energy/efficiency/11938>

AF: UBC fleet size and short-term replacement schedule



Pilot program	
Age	Number of Vehicles
0	2
1	0
2	0
3	2
4	3
5	1
6	1
7	3
8	2
9	3
10	5
11	4
12	5
13	2
14	2
15+	11
Total	46

UBC fleet, excl. B.Ops.	
Age	Number of Vehicles
0	5
1	13
2	15
3	20
4	21
5	7
6	17
7	19
8	16
9	24
10	19
11	21
12	23
13	11
14	11
15+	53
Total	295

Replacement schedule				
	2017	2018	2019	2020
Vehicles Replacement Schedule	0	7	10	10



This schedule will allow the fleet to achieve target average fleet age of below:

9 years

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In the pilot program, we estimate 46 vehicles being added to the rental fleet, followed by 40 additional vehicles being added in 2019. To assess the replacement need of these vehicles, we mainly considered the vehicle age, which affects maintenance costs and operating costs, as a proxy for lifecycle costs.

We forecasted the above replacement schedule, which will allow the fleet to achieve target average fleet age of below 9 years by 2020.



Eliminate

- Redundancies
- Eliminate tedious vehicle booking process
- Underutilized vehicles
- High costs associated with ad-hoc vehicle purchasing

Reduce

- Time between when vehicles are booked and when they are used
- Downtime for previously underutilized vehicles
- Departments' administrative costs associated with vehicle maintenance

Raise

- Opportunities to gain revenue through renting out vehicles
- Access to vehicles across departments
- Access to Building Operations resources
 - Fleet specialists
 - Efficiency measurement tools
 - Connections to sustainable vehicles through ARI
- Campus-wide collaboration towards efficiency management

Create

- Ease of booking vehicles
- Ease of tracking vehicle usage, mileage, age, GHG emissions
- Access to campus wide information on vehicle usage
- Partnerships between UBC departments and ARI

AAR: SWOT Analysis



Strengths

- UBC's commitment to environmental goals and initiatives
- Project Pegasus offers a successful framework for fleet management
- Substantial annual budget
- Only 15.5% of Building Operations vehicles are older than 10 years

Weaknesses

- Departments prefer to be independent in their decision-making
- Lack of sharing culture
- Departments other than Building Operations have 47.1% vehicles older than 10 years.

Opportunities

- Increase awareness of environmental initiatives
- Access to electric vehicles
- Car-sharing services
- Bike-sharing services on campus

Threats

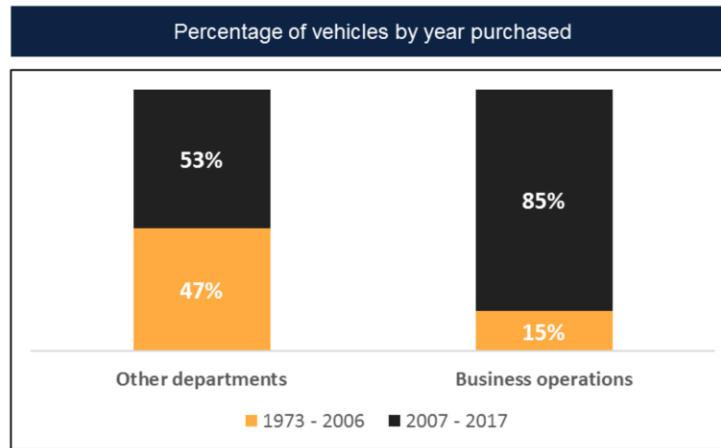
- Increase in fuel prices
- Unforeseen decrease in budget
- Unions and associations may prevent the use of vehicle tracking devices
- Departments request a higher degree of independence in fleet decisions

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Used to analyze the current situation on fleet usage at UBC.

AAR: Percentage of total fleet by year purchased

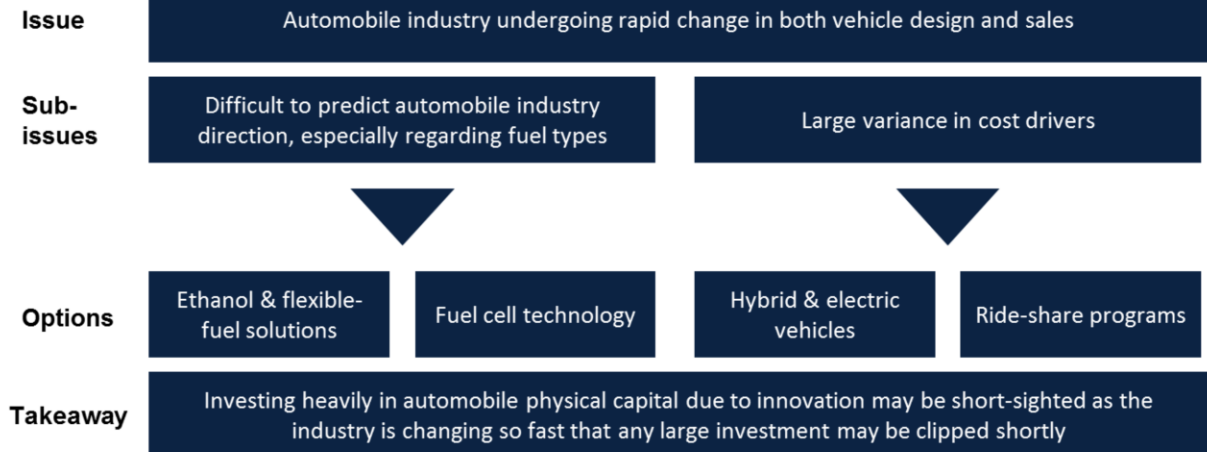


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The chart highlights how Building Operations replaces its fleet effectively. This ensures that the vehicles employed are up to date with new emissions standards, and align with goals set out by UBC. However, other departments have a nearly 50% split between outdated cars and new cars. This is an alarm for concern, as it means that the vehicles being employed by individual departments are directly impacting the likelihood of realizing UBC's emissions goals. If Building Operations trained personnel managed the fleet of other departments, they could realize a similar split, improving emissions figures.

AAR: Automobile industry strategic overview

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The automobile industry is undergoing rapid change in both vehicle design and sales. What this means is that, year over year companies are developing new technologies to improve performance and fuel efficiency, while concurrently new forms of purchasing models, such as ride-share programs, become increasingly popular. Due to this quickly changing landscape, we suggest that UBC refrain from any large scale capital investment on vehicles until certain technologies have reached proven maturities. Once this happens the ROI of purchasing these vehicles will be much greater and the technologies will be properly developed, by companies that have strong balance sheets. That is why focusing on optimizing processes at present is a more valuable endeavor.

AI: Functional & non-functional requirements



Functional requirements

- Ability to rent and lend vehicles
- Real-time tracking of vehicle bookings
- Track relevant vehicle usage data:
 - Emissions
 - Idling
 - Route
 - Purpose of use
 - Department using vehicle
- Build reports regarding departments and vehicles

Non-functional requirements

- Comply with UBC IT security standards
- Comply with union regulations
- Integrate with Shibboleth single sign-on
- Bandwidth to accommodate all UBC departments
- Maintain user anonymity
- Strong throughput speed

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In developing the platform functional and non-functional requirements must be determined. Of course this will require much more thorough due diligence, however we have identified certain key requirements that we believe will be necessary in the development of the platform.

The functional requirements focus on the tasks to be accomplished by the platform, and how they play into the greater worksystem. The non-functional requirements differ from the functional requirements, in that they do not focus on tasks, rather the background workings of the platform. More specifically, they ensure that the platform not only complies with stringent regulatory frameworks, but also performs strongly.

AI: Change management – Kotter’s 8-steps

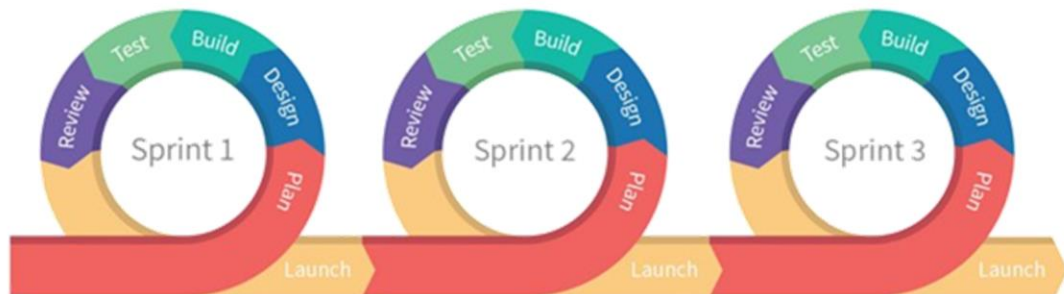


1	Create urgency	This change is not trivial, it is urgent and important. Communicate this by having open / honest discussions with stakeholders, performing thorough due diligence, and communicating
2	Form a powerful coalition	Align with key stakeholders that support the vision. Ensure the aggregate of stakeholders have a full view of the vision, and check-in with them consistently to identify strengths and weaknesses
3	Create a vision for change	Ensure that you have developed a clear vision at all steps of the transformation. It is important to align these with the values of the organization and also summarize them for easy understanding
4	Communicate the vision	Communicate often with urgency, and ensure to communicate with the vision in mind. Moreover, do not shy away from concerns and anxieties, instead address these head on
5	Remove obstacles	Tackle issues and concerns head-on. Additionally, reward those who act in favor of the vision, and continue to adjust dissent to put in line with the vision. Work with people not around them
6	Create short-term wins	Set-out key milestones and metrics early on, and communicate progress towards achieving them or achieving them. Also highlight, ad hoc wins that occur throughout the timeline
7	Build on the change	Never stop establishing goals. Continually review previous efforts and work to build-upon them through identifying areas of improvement or new goals that add new challenges to overcome
8	Anchor the changes	The culture needs to move alongside the vision. Make sure that workers inside the organization are behind the change and have adapted not only their workstyle but attitudes to align with the vision

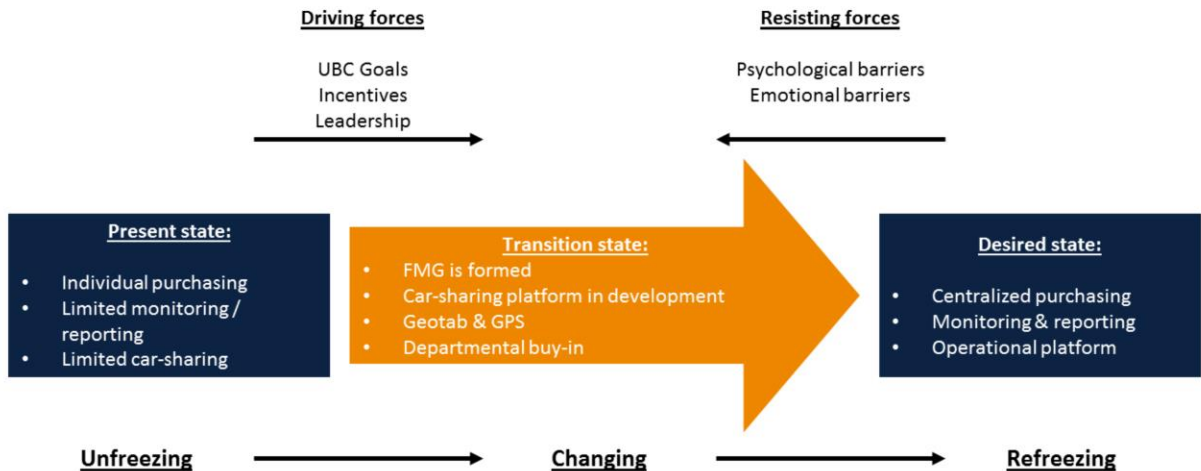
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Kotter’s 8-steps should be followed closely throughout the strategic change. By adhering to the principles outlined, the chances of success for the project increase substantially. In particular, communicating consistently and removing obstacles will ensure that the solution is both accepted by stakeholders and is free of most errors.



The agile development process is centered around stakeholder feedback and continual iteration. By communicating frequently and ensuring the product is on track throughout the various stages of the process, user-focused products have a higher likelihood of succeeding.



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Kurt Lewin's model for managing change looks at three distinct stages of change **Unfreezing - Changing - Refreezing**. There are several action items that are to be done during each stage.

Unfreezing:

- Identify initial problem
- Preparing ground for communication
- Obtaining data

Changing:

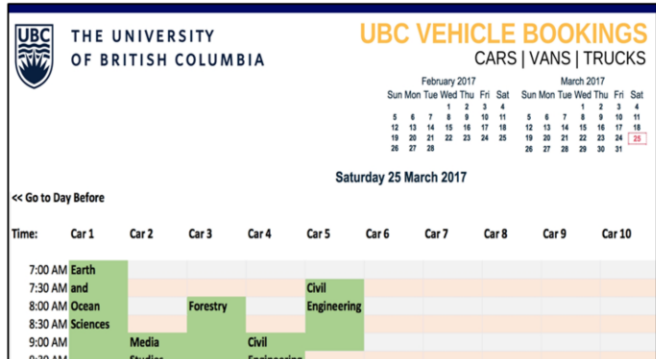
- Obtain more data
- Diagnose problem and propose and action plan
- Implement the action plan, assess implementation

Refreezing:

- Assess implementation and monitor the new system

Landing page

Calendar view of vehicles



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One of the pain points that was identified in our research was that it can be time consuming and difficult to procure a vehicle on a given day at a certain time for faculties that do not own a vehicle, or the right type of vehicle. The process of finding a faculty that had the vehicle you require, as well as filling out the work order associated were deemed tedious tasks that further added unnecessary administrative work and paper waste. This platform will make the entire process of booking and sharing vehicles more efficient and convenient.

Information Available on Platform

1. Easily visible monthly calendar of booking schedule. Departments would be able to see a daily/weekly/monthly list of vehicles booked on campus
2. A full listing of all vehicles available for use on the platform, along with up-to-date information on the age of the vehicle, fuel efficiency, GHG emissions, and availability of the vehicle for booking. Vehicles would be broken down into Vans, Trucks and General Purpose vehicles for easy selection.
3. Information regarding vehicle utilization, emissions, idling, departmental usage, purpose of use, average distance travelled, and individuals per trip will all be available to the FMG to see on the platform. Furthermore, information pertaining to a specific department will also be visible to them, so that they can track their own performance and set internal goals. An important distinction must be made in the fact that tracking will be based on vehicles used by each department, rather than vehicles owned by each department. This encourages each department to be more aware of how they are utilizing vehicles, incentivizing departments to both purchase and rent out fuel efficient vehicles.

Map view



Booking page

THE UNIVERSITY OF BRITISH COLUMBIA

UBC VEHICLE

Add Entry

Brief Description:

Full Description:
(Number of people, Internal/External etc)

Date: 26 Mar 2017

Time: 13:30

Duration: 1 hours ☐ All day

Type of Vehicle: General Purpose Car

Model: Car 1, Car 2, Car 3, Car 4, Car 5

Department: Earth and Ocean Sciences

February 2017

Sun	Mon	Tue	Wed	Thu
		1	2	
5	6	7	8	9
12	13	14	15	16
19	20	21	22	23
26	27	28		

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Home Page

- Pictures of each car in the rental system: Hovering over pictures will show other camera views of the vehicle
 - Cars (separated by number of seats), Vans, Trucks, Utility Vehicles
- Directly underneath each picture there will be a 'Book Now' hyperlink
- Search Option Tab: The User can isolate the specific information that they require for their search
 - Date availability: Month / Week / Day
 - Vehicle Type
 - Cargo Space (will need to measure the dimensions within each vehicle)
 - Number of seats required
 - Place of Departure
 - Destination

Booking Page

- Horizontally list each vehicle that could be booked, even if it is not currently available
- Vertically list time of day
 - The display should easily show if a certain vehicle has been booked
- Clicking on 'Booked' vehicle time slot opens a window with:
 - Description of use
 - Start time, Duration, End time
 - Last updated
 - Place of Departure
 - Destination
 - Produces number of available seats
 - Faculty booked
 - Contact Information
- Clicking on 'Available' time slot
 - Prompted with Login ID & Password
 - Date, time, duration
 - Vehicle Identification
 - Description of use
 - Place of Departure, Place of Destination
 - Number of occupants
 - Produces number of available seats
 - Repeat vehicle request option