



MOD SANDBOX DEMONSTRATIONS INDEPENDENT EVALUATION

CITY OF PALO ALTO AND PROSPECT SILICON VALLEY BAY AREA FVC DEMONSTRATION PROJECT EVALUATION PLAN



U.S. Department of Transportation
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16. Abstract The Mobility on Demand (MOD) Sandbox Demonstration Program provides a venue through which integrated MOD concepts and solutions – supported through local partnerships – are demonstrated in real-world settings. For each of the 11 MOD Sandbox Demonstration projects, the MOD Sandbox Independent Evaluation includes an analysis of project impacts from performance measures provided by the project partners, as well as an assessment of the business models used. This report constitutes the Evaluation Plan for the City of Palo Alto and Prospect Silicon Valley Bay Area Fair Value Commuting (FVC) Demonstration Sandbox project. It includes the following chapters: project overview; evaluation approach and process; evaluation schedule and management; and data collection and analysis plan.					
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Table of Contents

Project Overview	1
Introduction	1
Project Scope	1
Key Partners	2
Project Timeline.....	3
Evaluation Approach and Process	4
Project Goals	4
Evaluation Hypotheses	5
Performance Metrics	5
Data Types, Elements, and Sources	6
Data Sources Mapping	7
Methods of Evaluation	8
Evaluation Logic Model.....	9
Documentation and Reporting	12
Evaluation Schedule and Management	13
Evaluation Schedule	13
Roles and Responsibilities	13
Data Transfer and Storage.....	14
Data Collection Responsibilities.....	14
Risk Management	15
Schedule.....	15
Data Quality Assurance.....	16
Data Collection and Analysis Plan	18
Detailed Data Collection and Analysis Plan by Evaluation Hypothesis	22
Appendix A. Selected Draft Survey Questions: Before Survey	33
Addendum. Documentation of Evaluation Plan Variance Following Demonstration Deployment	58

List of Tables

Table 1. Project Goals, Evaluation Hypotheses, Performance Metrics, and Data Types for the FVC Sandbox Project	10
Table 2. Data Type and Data Collection Responsibilities for the FVC MOD Sandbox Evaluation	15
Table 3. Data Type and Risk Mitigation Strategies for FVC Sandbox Evaluation.....	17
Table 4. Data Type, Data Elements, Period of Collection, Collection Responsibility and Mechanisms, and Hypothesis Alignment	19

List of Figures

Figure 1. High-level Mapping of Data Sources, Data Types, and Performance Measures	8
Figure 2. MOD Sandbox Evaluation and Demonstration Schedule.....	13
Figure 3. FVC Data Collection Framework	14

Project Overview

This chapter gives a brief introduction to the City of Palo Alto and Prospect Silicon Valley Bay Area Fair Value Commuting (FVC) Demonstration Mobility on Demand (MOD) Sandbox project that will be evaluated through this independent evaluation.

Introduction

Despite clogged roads, single occupant vehicles (SOVs) are still the predominant mode of commuter transportation in the Bay Area and uptake of alternative commute modes among employees is low. Reasons for this include:

- Some commuters are faced with poor alternatives because they live in low-density areas that do not support traditional transit service, or areas where market-driven services are not available.
- Systemic obstacles limit the attractiveness and convenience of alternative modes. This is particularly a challenge with multi-modal trips due to a lack of integrated trip planning, competition and lack of interoperability between transportation service providers, and disparate payment systems.
- Most commute alternative programs do not have a stable or sizable funding mechanism to ensure their continuity and sustainability and the cost of providing commute alternative services is considered an overhead cost that should be minimized.
- A handful of suburban employers have reduced commuting from 75 percent to 50 percent SOV, yet without unifying technology and policymaking there is limited ability to extend these efforts to a larger population.

Project Scope

The Bay Area FVC Demonstration seeks to reduce Bay Area SOV commute share by implementing a FVC set of solutions designed to address many of the issues described above. Stanford University's commute program provides the conceptual FVC starting point. Stanford reduced SOV from 75 percent to 50 percent (with transit share increasing from 8 percent to 31 percent), eliminating the need for \$107 million in new parking structures. Two key concepts will be demonstrated with this project:

- An integrated "Commuter Wallet" software platform will attempt to maximize convenience for commuters to plan, compare, and pay for alternative transportation modes. Enterprise backend systems will be coordinated to present commute incentives and benefits seamlessly to employees.
- Either a "feebate" system or a "cash out" system will be demonstrated. A "feebate" system will simultaneously assess fees for SOV use (assigning a "fair value") and redirect the income received to fund incentives for use of alternative transportation modes, creating a self-sustaining commute program. A "cash out" system is an incentive-based program where an incentive is paid to non-SOV employees. While a pure cash out program would not address the "fee" part, it is

highly likely that a cash out program would generate measurable reductions in car use by participating employees.

The FVC project consists of five components:

1. **Component #1:** Enterprise Commute Trip Reduction (ECTR) software platforms automate employer commute programs. ECTR platforms will integrate with employer human resources and payroll functions and distribute benefits such as loading Clipper transit fare cards and allowing pre-tax commuter benefits purchase of transit passes, while collecting and reporting commuter mode choices. The project partner vendor is RideAmigos.
2. **Component #2:** Commuter Wallet is a mobile multimodal trip planning and payment app that will be developed with a seamless combination of public/private transit, bikeshare, rideshare, carshare, and electric scooter/bike share. Commuter Wallet integrates MOD products such as Lyft line, UberPOOL, Waze Carpool, Scoop, ZipCar, and Car2Go. A development partner will be procured to help build out the required feature set and to integrate the Commuter Wallet with ECTR.
3. **Component #3:** A “revenue-neutral workplace parking feebate” charges a fee for SOV commutes and rebates that revenue to non-SOV commutes, structured so that there is no cost to employers. Or a “cash out” system is used to incentivize non-SOV commutes.
4. **Component #4:** “Gap Filling” describes analytics to identify commutes with poor alternatives and subsequent attempts to improve them. Some examples of gap filling include: subsidizing Lyft/Uber rides to and from transit stops; e-scooter loan-to-own to provide first/last mile connections to transit; bike network improvements to connect to transit; microtransit to provide first/last mile service to higher-order transit services.
5. **Component #5:** Identifying and alleviating systemic obstacles such as: a) enable better public transit routes that cross county borders, b) better integrate transit fares within multi-agency trips, c) integrate transportation payment systems, and d) develop a healthy, interoperable mobility software ecosystem, following open standards.

The project will: a) collaborate directly with the top vendors that contribute to FVC by enhancing software/hardware feature sets and interoperability, b) pilot FVC at four employers, and c) collaboratively analyze commute patterns and develop/pilot new gap-fillers such as low-income subsidy and loan-to-own.

Key Partners

The City of Palo Alto is partnering with Prospect Silicon Valley, the City of Mountain View, the City of Menlo Park, RideAmigos, SPUR, and several other potential vendors and employer pilot partners.

Project Timeline

The main project milestones are captured in the timeline below. Please note that the evaluation timeline is provided in a later chapter of this report.

- **February 2017**– Cooperative Agreement Execution Date
- **December 2018** – Demonstration Start
- **December 2019** – Demonstration Completion.

The Palo Alto team will collect data relevant to this MOD Sandbox Demonstration (as outlined in this Evaluation Plan) between December 2018 and December 2019, and will share the data with the Independent Evaluation (IE) team for conducting the evaluation. More details on the data collection planning are provided in Chapters 3 and 4 of this report.

Evaluation Approach and Process

For each of the 11 MOD Sandbox projects, the IE team developed an evaluation framework in coordination with each project team—the framework is a project-specific logic model that contains the following entries:

1. **MOD Sandbox Project** – Denotes the specific MOD Sandbox project.
2. **Project Goals** – Denotes each of the project goals for the specific MOD Sandbox project. The project goals capture what each MOD Sandbox project is trying to achieve.
3. **Evaluation Hypothesis** – Denotes each of the evaluation hypotheses for the specific MOD Sandbox project. The evaluation hypotheses flow from the project-specific goals.
4. **Performance Metric** – Denotes the performance metrics used to measure impact in line with the evaluation hypotheses for the specific MOD Sandbox project.
5. **Data Types, Elements, and Sources** – Denotes the data types, elements, and the data sources used for the identified performance metrics.
6. **Method of Evaluation** – Denotes the quantitative and qualitative evaluation methods used.

This chapter details the evaluation approach and process, as finalized in the evaluation logic model for the FVC MOD Sandbox project. This includes listing project goals, evaluation hypotheses, performance metrics, data types and elements, data sources, and methods of evaluation.

Project Goals

The project goals denote what the City of Palo Alto is aiming to achieve through the MOD Sandbox demonstration. These project goals include the following:

1. Reduce overall SOV commuting to participating employers.
2. Reduce overall SOV vehicle miles traveled (VMT) among commuters of participating employers.
3. Reduce overall SOV fossil fuel consumption among commuters of participating employers.
4. Benefit lower income workers more than higher income workers.
5. Improve the accessibility of pre-tax payments for public transit by allowing such funds to be filled up on Clipper cards.
6. Develop a mobility aggregator, Feebate or cashout policy, and gap-filling analytics to encourage reduced use of SOVs in work commutes.
7. Attitudes of participating employees shift towards more favorable opinions of transit.

8. Across participating employers, generate a commute Feebate or cashout system that charges SOV commuters, and pays non-SOV commuters.
9. Develop lessons learned through the experimental deployment of FVC policies and systems.

The project goals set the foundation for the evaluation hypotheses.

Evaluation Hypotheses

The evaluation hypotheses flow from the project-specific goals and denote what should happen if each project goal is met. These evaluation hypotheses include the following:

1. The mode share of commuting by SOVs for both participating employees and the broader population declines as a result of the FVC solution. This mode share is defined as a function of trips.
2. The total commute VMT for participating employees as well as the broader population declines.
3. The total energy consumption and CO₂-e emissions from participating employees as well as the broader population declines.
4. The FVC benefits lower income workers more than higher income workers.
5. The improved access to pre-tax payments increases public transit ridership.
6. The mobility aggregator, Feebate or cashout policy, and gap-filling analytics positively impact the propensity of commuters to take non-SOV modes.
7. The attitudes of employees towards transit become more positive.
8. The commute Feebate or cashout is financially sustainable at participation rates achievable during or after the pilot.
9. The project produces a series of lessons learned that will be documented through expert interviews with project stakeholders.

The success of each evaluation hypothesis is measured by the performance metrics below.

Performance Metrics

The performance metrics are used to measure impact in line with the evaluation hypotheses for the City of Palo Alto FVC MOD Sandbox Project's IE. These performance metrics include the following:

- Number of commuter trips in SOVs among employees of each of the participating employers; Number of commuter trips in SOVs among participating employees
- Measured VMT in any vehicle among employees of each of the participating employers; Measured VMT in any vehicle among participating employees
- Sum of the estimated marginal additional fuel consumption (from any mode) among employees of each of the participating employers; Sum of the estimated marginal additional fuel consumption (from any mode) among participating employees

- Dollar amount of rebates received by employees
- Number of unlinked trips (public transit ridership) among participating employees
- Survey response to questions probing change in SOV commuting (causality of individual components identified through the survey)
- Survey response to questions probing attitudes towards public transit
- Net revenue (profit/loss) of the Feebate or cashout policy
- Qualitative documentation from stakeholder interviews

The performance metrics will draw from a set of data sources that are specific to the project.

Data Types, Elements, and Sources

The following data types and elements are used for computing the performance metrics that are defined for this evaluation:

1. Survey Data

Participating and Non-Participating Employee Surveys:

- Vehicle ownership and driving
- Individual travel patterns and commuting
- Impacts of the FVC program on travel behavior, mobility, and accessibility
- Transit ridership
- Mode (including SOV) of accessing and egressing transit stations
- Mode share
- Recent commute trip attributes and alternative modes of travel
- Perceptions of mobility and accessibility
- Fees charged and/or rebates paid through the Feebate or cashout policy
- Purchase of pre-tax commuter benefits
- Impacts of the Mobility Aggregator App, Feebate or cashout policy, and gap filling efforts on SOV use
- Attitudes towards public transit
- Current and future participation in the feebate or cashout program
- Perception of first-mile and last-mile access, wait times, and travel times
- Demographics and socioeconomics
- Disability status
- Location of home and work

2. Commute activity data

- Employer
- De-Identified Employee ID
- Participant in FVC Program (yes/no)
- Date (YYYY-MM-DD)
- Main mode used to access workplace

- Other modes used to access work (if applicable)
- Fees charged to access workplace (if SOV)
- Rebates paid to access workplace (if Non-SOV)
- Main mode used to egress workplace
- Other modes used to egress workplace (if applicable)
- Fees charged to egress workplace (if SOV)
- Rebates paid to egress workplace (if Non-SOV)

3. Employee data

- Number of employees that are participating in the FVC program over time
- Total number of employees over time
- Home and work locations of employees
- Income data
- Purchases of pre-tax commuter benefits
(separate datasets for each participating employer)

4. Public Transit ridership data

- Unlinked public transit trips at relevant transit stations and bus routes

5. Feebate or cashout data

- Fees charged to SOV commuters
- Rebates paid to non-SOV commuters
- Feebate or cashout revenue allocated for other purposes

6. Gap Filling Data

- Information from analytics and any associated input data

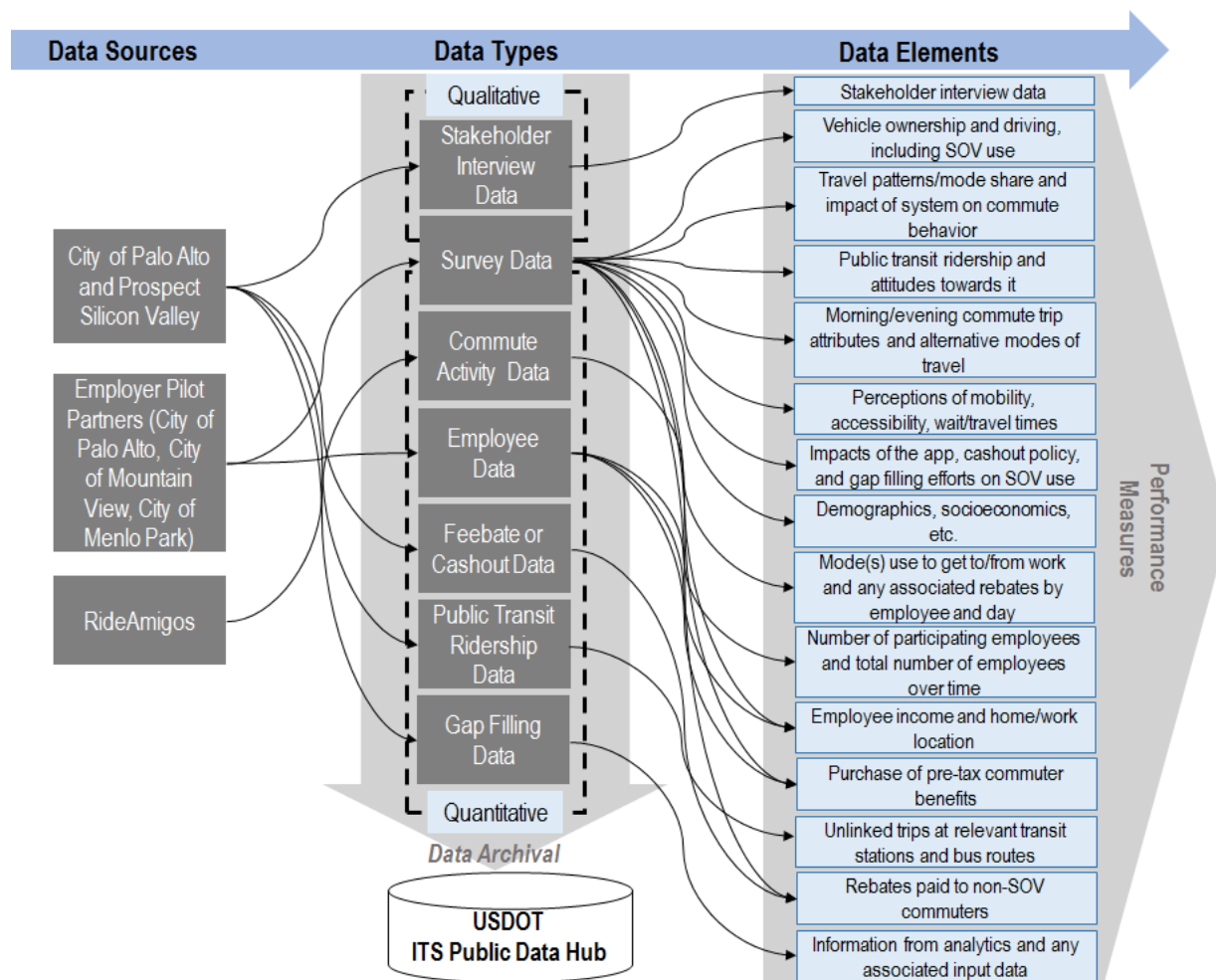
7. Stakeholder Interviews

- Lessons learned.

Please note that there is no one-to-one matching between the performance measures and the data types and elements. The mapping between performance measures and data types and elements is demonstrated in the evaluation logic model provided later in this chapter.

Data Sources Mapping

Figure 1 shows the high-level mapping of data sources, data types, and performance measures that will be used in the independent evaluation of the Palo Alto FVC MOD Sandbox Demonstration. As shown, the datasets include both quantitative and qualitative data, and will be submitted to the USDOT ITS Public Data Hub.



Source: Booz Allen Hamilton, December 2018

Figure 1. High-level Mapping of Data Sources, Data Types, and Performance Measures

Methods of Evaluation

The quantitative and qualitative evaluation methods used in the FVC IE include the following:

- Time series and cross-sectional analysis
- Activity data analysis
- Survey analysis
- Ridership data analysis
- Summary of expert interviews.

Further details about the analysis methods by evaluation hypothesis are provided in Chapter 4.

Evaluation Logic Model

Table 1 represents an extract from the final FVC evaluation logic model. Building on the project goals, the logic model lists evaluation hypotheses, performance metrics, and data types for the FVC project.

Table 1. Project Goals, Evaluation Hypotheses, Performance Metrics, and Data Types for the FVC Sandbox Project

Project Goals	Evaluation Hypothesis	Performance Metrics	Data Types
1. Reduce overall SOV commuting to participating employers	The mode share of commuting by SOVs for both participating employees and the broader population declines as a result of the FVC solution. This mode share is defined as a function of trips.	Number of commuter trips in SOVs among employees of each of the participating employers, Number of commuter trips in SOVs among participating employees.	<ul style="list-style-type: none"> • Survey Data • Commute Activity Data • Employee Data • Feebate or cashout Data
2. Reduce overall SOV VMT among commuters of participating employers	The total commute VMT for participating employees as well as the broader population declines	Measured VMT in any vehicle among employees of each of the participating employers, Measured VMT in any vehicle among participating employees	<ul style="list-style-type: none"> • Survey Data • Employee Data
3. Reduce overall SOV fossil fuel consumption among commuters of participating employers	The total energy consumption and CO2-e emissions from participating employees as well as the broader population declines	Sum of the estimated marginal additional fuel consumption (from any mode) among employees of each of the participating employers, Sum of the estimated marginal additional fuel consumption (from any mode) among participating employees.	<ul style="list-style-type: none"> • Survey Data • Commute Activity Data
4. Benefit lower income workers more than higher income workers	The FVC benefits lower income workers more than higher income workers	Dollar amount of rebates received by employees	<ul style="list-style-type: none"> • Feebate or cashout Data • Employee Data • Survey Data
5. Improve the accessibility of pre-tax payments for public transit by allowing such funds to be filled up on Clipper cards	The improved access to pre-tax payments increases public transit ridership	Number of unlinked trips (public transit ridership) among participating employees	<ul style="list-style-type: none"> • Public Transit Ridership Data • Survey Data • Employee Data

Project Goals	Evaluation Hypothesis	Performance Metrics	Data Types
6. Develop a mobility aggregator, Feebate or cashout policy, and gap-filling analytics to encourage reduced use of SOVs in work commutes	The mobility aggregator, Feebate or cashout policy, and gap-filling analytics positively impact the propensity of commuters to take non-SOV modes	Survey response to questions probing change in SOV commuting (causality of individual components identified through the survey)	<ul style="list-style-type: none"> • Survey Data • Commute Activity Data • Gap Filling Data • Feebate or cashout Data • Employee Data
7. Attitudes of participating employees shift towards more favorable opinions of transit	The attitudes of employees towards transit become more positive.	Survey response to questions probing attitudes towards public transit	<ul style="list-style-type: none"> • Survey Data
8. Across participating employers, generate a commute Feebate or cashout system that charges SOV commuters, and pays non-SOV commuters	The commute Feebate or cashout is financially sustainable at participation rates achievable during or after the pilot	Net revenue (profit/loss) of the Feebate or cashout policy	<ul style="list-style-type: none"> • Commute Activity Data • Employee Data • Feebate or cashout Data
9. Develop lessons learned through the experimental deployment of FVC policies and systems	The project produces a series of lessons learned that will be documented through expert interviews with project stakeholders	Qualitative documentation from stakeholder interviews	<ul style="list-style-type: none"> • Stakeholder Interview Data

Documentation and Reporting

The IE team will develop an evaluation report for this MOD Sandbox demonstration project. The report will include a summary of major findings of the project in an Executive Summary section, followed by multiple sections providing details of the demonstration, evaluation hypotheses, data collected, analysis performed, findings, and results. The results will be reported through a mix of exhibits including tables, graphs, and charts.

Evaluation Schedule and Management

This chapter provides details on the evaluation project schedule and other details on the management of the evaluation project.

Evaluation Schedule

Figure 2 shows the IE schedule from the beginning of the quantitative and qualitative data collection that spans throughout the demonstration period and leads to the analysis, whose results are included in the site-specific evaluation report. Note that interim data spot checks and sample analyses will be performed during the demonstration period to proactively mitigate data-related risks.

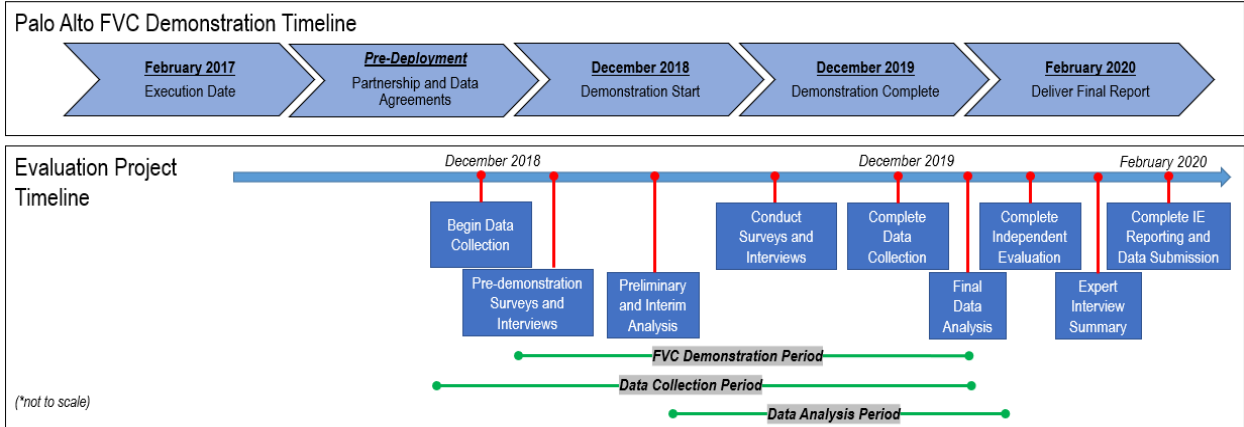


Figure 2. MOD Sandbox Evaluation and Demonstration Schedule

Data relevant to the program will be collected between December 2018 and December 2019. This data will be shared with the IE team for evaluation purposes. More details on the data types, elements, and collection timeframes are provided in Chapter 4.

Roles and Responsibilities

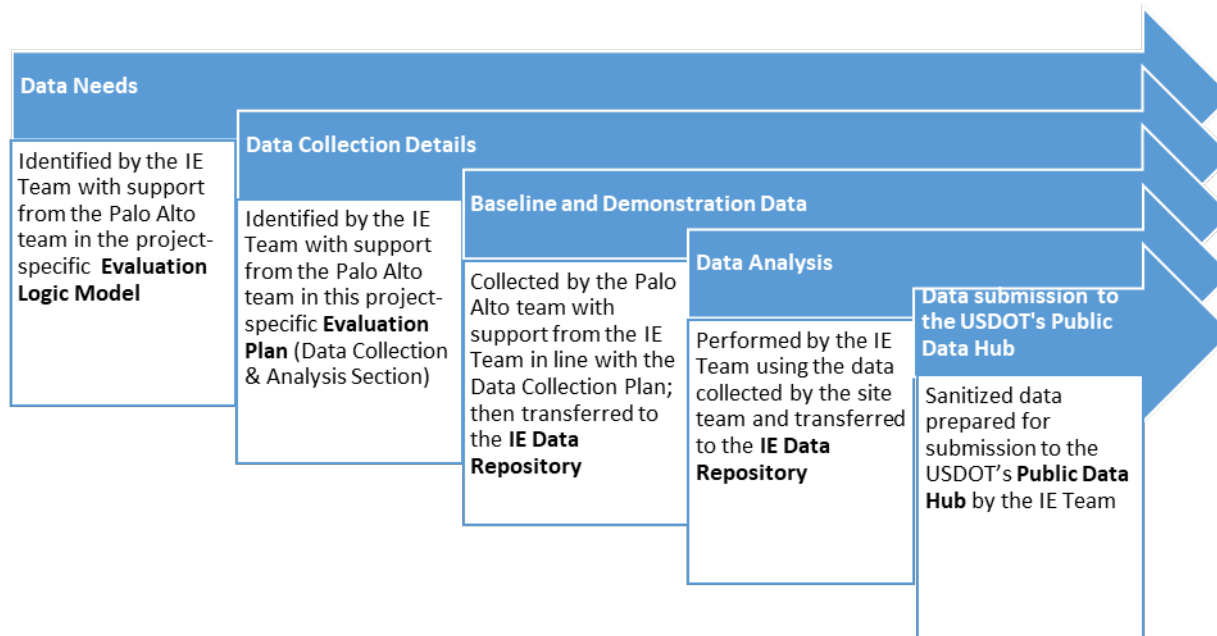
The three main entities involved in the evaluation and their corresponding high-level roles are as follows:

- **The site team** coordinates the collection of the requested evaluation data from the various project partners throughout the demonstration period and transfers the data to the IE team.
- **The IE team** supports the site team in the definition of the requested data elements, and performs the analysis using the data provided by the site team.

- **The USDOT team** supervises the work and provides support for topics that encompass more than one site (e.g., coordination with transportation network companies who are partnering with several Sandbox sites).

Data Transfer and Storage

Various types of qualitative and quantitative data sources are involved in the evaluation, as specified in Chapter 2. Figure 3 shows the overall data collection framework, including the steps and parties involved in data design, collection, transfer and storage.



Source: Booz Allen Hamilton, November 2018

Figure 3. FVC Data Collection Framework

Data Collection Responsibilities

Table 2 denotes the data collection responsibilities for the various data types required for the evaluation.

Table 2. Data Type and Data Collection Responsibilities for the FVC MOD Sandbox Evaluation

Data Type	Data Collection Responsibilities
Survey Data	<ul style="list-style-type: none"> The survey will be designed by the IE team, in coordination with the Palo Alto team, and will be administered by the Palo Alto team. The collected data will be transferred to the IE team at regular intervals.
Commute Activity Data	<ul style="list-style-type: none"> This data will be collected by the Palo Alto team and will be transferred to the IE team. The Palo Alto team can provide access to a downloadable or query-enabled cloud-interface of the data to the IE team. The data will be devoid of any Personally Identifiable Information.
Employee Data	<ul style="list-style-type: none"> The collected data will be transferred to the IE team by the Palo Alto Sandbox demonstration team. Alternately, the Palo Alto team can provide access to a downloadable or query-enabled cloud-interface of the data to the IE team. The data will be devoid of any Personally Identifiable Information.
Public Transit Ridership Data	<ul style="list-style-type: none"> This data will be transferred to the IE team by the Palo Alto Sandbox demonstration team. Alternately, the Palo Alto team can provide access to a downloadable or query-enabled cloud-interface of the data to the IE team. The data will be devoid of any Personally Identifiable Information.
Feebate or cashout Data	<ul style="list-style-type: none"> This data will be transferred to the IE team by the Palo Alto Sandbox demonstration team. The data will be devoid of any Personally Identifiable Information.
Gap Filling Data	<ul style="list-style-type: none"> The Palo Alto team will supply the IE team with a list of Census Blocks that are deemed to be relatively inaccessible, located far away from transit without other good options.
Interview Data from Stakeholders	<ul style="list-style-type: none"> Interviewees are identified by the IE team in collaboration with the Palo Alto team The IE team is connected to the interviewees by the Palo Alto team The IE team conducts the expert interviews via phone or in person.

Risk Management

The IE team will continually monitor risk in an ongoing process throughout the demonstration period and identify the best resources within the team to address each risk. Some of the main risks involved in the evaluation are included below.

Schedule

The IE team will maintain a demonstration tracking schedule to track and contact the demonstration teams for data and documentation. The team will keep an up-to-date integrated schedule that reflects updates from the site teams on a constant basis. Components of the evaluation reports will be created throughout the demonstration period, as the data and documentation for the project becomes available. The site team should inform the IE team of any changes in schedule that could affect the overall evaluation schedule (e.g., delays in the demonstration schedule).

Pilot Partner Agreements

The project requires formal agreements with external partners that are critical to project implementation and employee participation. There is risk associated with the pace and success of these partner agreement negotiations. The IE team will work with the project team to adapt to changing conditions with respect to the pilot partner negotiations. The adaptations applied shall be situationally specific and designed with the broader objective of maintaining a robust evaluation of the project goals within the context of the negotiated agreements.

Data Quality Assurance

The IE team will perform spot checks on the data as it is being collected throughout the demonstration period to proactively manage risks related to data quality. This will allow the following:

- Avoiding insufficient data on performance of MOD demonstration to reliably estimate impacts and/or benefits.
- Addressing challenges in empirical data including lack of consistency, biases, and incompleteness.
- Identifying and controlling sources of error.
- Consideration of quality and quantity issues in data collection.
- Ensuring data privacy and proprietary protections in line with human subjects' protections
- Consideration of confounding factors.

Table 3 includes risk mitigation strategies that will be employed to ensure the availability of the requested data types for the evaluation.

Table 3. Data Type and Risk Mitigation Strategies for FVC Sandbox Evaluation

Data Type	Risk Mitigation Strategies
Survey Data	<ul style="list-style-type: none"> This data includes employee commute pattern data on services both before- and after- the Sandbox demonstration, to be stratified based on several demographics. The analyses primarily rely on identifying clusters of data for each of the type of demographics. If a gap exists in the number of surveyed persons under each category, the IE team will conduct stratified weighting and other statistical procedures to ensure adequate representation.
Commute Activity Data	<ul style="list-style-type: none"> Receiving all the Commute Activity data elements specified in this Evaluation Plan is vital to computation of performance measures. The IE team will communicate the elements to the Palo Alto team to ensure that they are included in the data transfer agreements between the site team and project partners.
Employee Data	<ul style="list-style-type: none"> The data includes data elements specific to participating employees (de-identified). Receiving all the data elements specified in this Evaluation Plan is vital to computation of performance measures. The IE team will communicate the elements to the Palo Alto team to ensure that they are included in the data transfer agreements between the site team and project partners.
Public Transit Ridership Data	<ul style="list-style-type: none"> The ridership data from Palo Alto need to be consistent over a temporal scale (Before/After). The IE team will convey the importance of consistent methods of data collection and elements to the Palo Alto team to avoid any disparity. In addition, the IE team will also collect data regarding any external factors that would affect ridership in any way (such as events).
Feebate or cashout Data	<ul style="list-style-type: none"> Receiving all Feebate or cashout data elements specified in this Evaluation Plan is vital to computation of performance measures. The IE team will communicate the elements to the Palo Alto team to ensure that they are included in the data transfer agreements between the site team and project partners.
Gap Filling Data	<ul style="list-style-type: none"> The IE team will work with the Palo Alto team to get a list of Census Blocks that are deemed to be relatively inaccessible, located far away from transit without other good options.
Interview Data from Stakeholders	<ul style="list-style-type: none"> The Palo Alto team will facilitate the connection between the IE team and expert interviewees and will help in getting their commitment to participate in the interviews.

Data Collection and Analysis Plan

This chapter describes the plan for data collection and analysis for the FVC MOD Sandbox project. It summarizes the data that needs to be collected by the project, and how that data should be processed in delivery to the evaluation team. The evaluation team will require data processing from the project team in order to produce the requested data format. The project team may also have to process data to remove any personally identifiable information if it is transmitted.

The data collection plan follows the logic model at the time of the plan composition. Each data field discussed is associated with a hypothesis and a performance metric. Certain types of data collected will address multiple hypotheses. In cases where the data structure is the same, the plan will refer to the data plan for a hypothesis that is already described. Most pilot-based data (data provided by project partners) should be provided from the beginning of the pilot. The evaluation team also requests that some data about general Palo Alto travel activity, such as ridership, costs etc., be provided back to 2015 if possible. The request for longer time series of activity is motivated by the need to help discern potential background trends that could have been present before the project and then continue through it. Naturally, any data collected as a result of the project itself, can only be produced from the beginning of data collection by systems implemented by the project. With this draft, the evaluation team does not know the data structures that are available for specific data types. In the discussion that follows, the team presents the structure that would be preferred if possible. Other structures may be capable of delivering the same or similar insights and these structures can be discussed with the Palo Alto team. The evaluation team has specified the ideal structure where possible in the sections that follow. Further detail will be produced in subsequent discussions.

Table 4 summarizes the data types, data elements, collection periods, collection responsibility and mechanisms, and hypothesis alignment for the FVC Sandbox project evaluation. The table is followed by a more detailed data collection and analysis plan for each evaluation hypothesis.

Table 4. Data Type, Data Elements, Period of Collection, Collection Responsibility and Mechanisms, and Hypothesis Alignment

Data Type	Data Elements	Period of Collection	Collection Responsibility and Mechanisms	Hypothesis Alignment
Survey Data	<p><u>Participating and Non-Participating Employee Surveys:</u></p> <ul style="list-style-type: none"> • Vehicle Ownership and Driving • Individual Travel Patterns and Commuting • Impacts of the FVC Program on Travel Behavior, Mobility, and Accessibility • Transit Ridership • Mode (Including SOV) of Accessing and Egressing Transit Stations • Mode Share • Recent Commute Trip Attributes and Alternative Modes of Travel • Perceptions of Mobility and Accessibility • Fees Charged and/or Rebates Paid Through the Feebate or cashout Policy • Purchase of Pre-Tax Commuter Benefits • Impacts of the Mobility Aggregator App, Feebate or cashout Policy, and Gap Filling Efforts on SOV use • Attitudes Towards Public Transit • Current and Future Participation in the Feebate or cashout Program • Perception of First-Mile and Last-Mile Access, Wait Times, and Travel Times • Demographics and Socioeconomics • Disability Status • Location of Home and Work 	<p>The <u>Before Survey</u> will have to be launched at the time the project is beginning with an established set of users that can be contacted. The same users will be contacted at the end of the project to fill out the <u>After Survey</u>.</p>	<ul style="list-style-type: none"> • Survey questions are developed by the IE team in collaboration with the Palo Alto team (<i>draft survey questions are provided in Appendix of this document</i>) • Surveys are administered by the Palo Alto team • Survey responses are transferred by the Palo Alto team to the IE team, once administered 	<p>1, 2, 3, 4, 5, 6, 7</p>

Data Type	Data Elements	Period of Collection	Collection Responsibility and Mechanisms	Hypothesis Alignment
Commute Activity Data	<ul style="list-style-type: none"> • Employer • De-Identified Employee ID • Participant in FVC Program (yes/no) • Date (YYYY-MM-DD) • Main Mode Used to Access Workplace • Other Modes Used to Access Work (if applicable) • Fees Charged to Access Workplace (if SOV) • Rebates Paid to Access Workplace (if Non-SOV) • Main Mode Used to Egress Workplace • Other Modes Used to Egress Workplace (if applicable) • Fees Charged to Egress Workplace (if SOV) • Rebates Paid to Egress Workplace (if Non-SOV) 	The data collection period would cover the project performance period (beginning with the launch of the FVC program and ending at the end of the MOD Sandbox evaluation period)	<ul style="list-style-type: none"> • Collected by the Palo Alto team and transferred to the IE team 	1, 3, 6, 8
Employee Data	<ul style="list-style-type: none"> • Number of employees that are participating in the FVC program over time • Total number of employees over time • Home and work locations of employees • Income Data • Purchases of Pre-Tax Commuter Benefits (separate datasets for each participating employer) 	The data collection period for the Employee Data is requested from 2015 (if available) to the end of the evaluation period	<ul style="list-style-type: none"> • Collected by the Palo Alto team and transferred to the IE team 	1, 2, 4, 5, 6, 8
Public Transit Ridership Data	<ul style="list-style-type: none"> • Unlinked Public Transit Trips at Relevant Transit Stations and Bus Routes 	The data collection period is requested from 2015 to the end of the evaluation period	<ul style="list-style-type: none"> • Collected by the Palo Alto team and transferred to the IE team 	5
Feebate or cashout Data	<ul style="list-style-type: none"> • Fees Charged to SOV Commuters • Rebates Paid to Non-SOV Commuters • Feebate or cashout Revenue Allocated for Other Purposes 	The data collection period would cover the project performance period (beginning with the launch of the FVC program and ending at the end of the MOD Sandbox evaluation period)	<ul style="list-style-type: none"> • Collected by the Palo Alto team and transferred to the IE team 	1, 4, 6, 8

Data Type	Data Elements	Period of Collection	Collection Responsibility and Mechanisms	Hypothesis Alignment
Gap Filling Data	<ul style="list-style-type: none"> Information from Analytics and Any Associated Input Data 	The data collection period would cover the project performance period (beginning with the launch of the FVC program and ending at the end of the MOD Sandbox evaluation period)	<ul style="list-style-type: none"> The IE team is supplied by the Palo Alto team with a list of Census Blocks that are deemed to be relatively inaccessible, located far away from transit without other good options. 	6
Interview Data from Stakeholders	<ul style="list-style-type: none"> Qualitative documentation from stakeholder interviews 	Stakeholder interviews should occur at least six months after the launch of the demonstration, but it may be conducted later, as long as it is within a maximum of two months after the end of the demonstration period	<ul style="list-style-type: none"> Interviewees are identified by the IE team in collaboration with the Palo Alto Team The IE team is connected to the interviewees by the Palo Alto Team The IE team conducts the expert interviews via phone or in person 	9

Detailed Data Collection and Analysis Plan by Evaluation Hypothesis

Hypothesis 1: The mode share of commuting by SOVs for both participating employees and the broader population declines as a result of the FVC solution. This mode share is defined as a function of trips.

Performance Metrics

- Number of commuter trips in SOVs among employees of each of the participating employers
- Number of commuter trips in SOVs among participating employees.

Data Types and Sources

- 1) Employee Data
- 2) Commute Activity Data
- 3) Participating Employee Survey
- 4) Non-Participating Employee Survey
- 5) Feebate or cashout Data: Fees Charged to SOV Commuters
- 6) Feebate or cashout Data: Rebates Paid to Non-SOV Commuters
- 7) Feebate or cashout Revenue Allocated for Other Purposes

Number of Employees

These data describe the number of employees working at the participating employer. They shall consist of the number of employees that are participating in the FVC program as well as the total number of employees over time. There will be separate datasets for each participating employer.

Commute Activity Data

These data describe the commute activity of employees working at the participating employer. They should consist of the number of commute trips by mode by day by population (participating vs. non-participating). The suggested structure is as follows:

- Employer
- De-Identified Employee ID
- Participant in FVC Program (yes/no)
- Date (YYYY-MM-DD)
- Main Mode Used to Access Workplace
- Other Modes Used to Access Work (if applicable)
- Fees Charged to Access Workplace (if SOV)
- Rebates Paid to Access Workplace (if Non-SOV)
- Main Mode Used to Egress Workplace
- Other Modes Used to Egress Workplace (if applicable)
- Fees Charged to Egress Workplace (if SOV)
- Rebates Paid to Egress Workplace (if Non-SOV).

Some of this data may be collected by the surveys, but it would be preferred if it is known in a database by employer.

Participating Employee Survey

The survey of participating employees will be implemented in collaboration with the City of Palo Alto. The survey will probe employees of the impacts of the FVC program on their traveler behavior. It will ask questions about employee:

- Vehicle Ownership and Driving
- Individual Travel Patterns and Commuting
- Impacts of the FVC Program on Travel Behavior, Mobility, and Accessibility
- Transit Ridership
- Mode (Including SOV) of Accessing and Egressing Transit Stations
- Mode Share
- Recent Commute Trip Attributes and Alternative Modes of Travel
- Perceptions of Mobility and Accessibility
- Fees Charged and/or Rebates Paid Through the Feebate Policy
- Purchase of Pre-Tax Commuter Benefits
- Impacts of the Mobility Aggregator App, Feebate Policy, and Gap Filling Efforts on SOV use
- Attitudes Towards Public Transit
- Current and Future Participation in the Feebate or cashout Program
- Perception of First-Mile and Last-Mile Access, Wait Times, and Travel Times
- Demographics and Socioeconomics
- Disability Status
- Location of Home and Work.

The default design of the survey is a Before-After survey, in which employees are surveyed before participating in the FVC program and then again after the system has launched. Draft questions for the Before-After survey are provided in Appendix A.

Non-Participating Employee Survey

The survey of non-participating employees will also be implemented in collaboration with the City of Palo Alto. This survey will provide a baseline for the general population. The questions will be similar to the participating employee survey, with the exception of questions specifically targeting the FVC program. The format and logistical implementation of the non-participating employee survey will mirror that of the participating employee survey. Please see above for details.

Feebate Data: Fees Charged to SOV Commuters

These data describe the fees charged to employees who commute to work by SOV. They should consist of the amount charged over time by employee. This could be a separate dataset for each participating employer or could be derived from fields in the Commute Activity Data described above, specifically “Fees Charged to Access/Egress Workplace.”

Feebate or cashout Data: Rebates Paid to Non-SOV Commuters

These data describe the rebates paid to employees who **do not** commute to work by SOV. They should consist of the amount paid over time by employee. This could be a separate dataset for each participating employer or could be derived from fields in the Commute Activity Data described above, specifically “Rebates Paid to Access/Egress Workplace.”

Feebate or cashout Data: Feebate or cashout Revenue Allocated for Other Purposes

These data describe the flow of revenue from the feebate policy into other sources, such as ECTR vendors, bicycle infrastructure, etc. They should cover any other components of the feebate policy that are not captured by the flow of money from SOV commuters to non-SOV commuters. They should consist of the money allocated to each component over time.

Data Collection Period:

The data collection period for the Employee Data is requested from 2015 (if available) to the end of the evaluation period. However, it is likely that the Commute Activity Data does not exist prior to project implementation. In this case, Employee Data from the beginning to the end of the evaluation period will suffice.

Regarding the surveys, the Before survey will have to be launched at the time the project is beginning with an established set of employees that can be contacted, and the After survey would be launched at least six months after that.

The Feebate or cashout Data certainly does not exist prior to project implementation, and so these data are requested from the beginning to the end of the evaluation period.

Analysis Procedure:

The analysis will evaluate this hypothesis from three different perspectives. The first will include looking at the trends of SOV use over time through the lens of the Commute Activity Data. The number of employees will be used to compute the number of trips conducted by SOV as a percentage of all commuter trips. Researchers will plot the time series of this metric to determine if trends depart from historical data (if available) as well as whether trends change over the course of the evaluation period. The second will include a similar analysis using the Feebate or cashout Data. The time series of the fees charged to SOV commuters will be plotted as well as the rebates paid to non-SOV commuters to determine how trends change over the course evaluation period and how they correlate with each other. The Feebate or cashout revenue allocated for other purposes will provide context to any observed effects. Finally, the surveys will be used to measure the extent to which SOV use declines. Respondents will be asked to report their frequency of use for SOV commuting both before and after project implementation, and will be asked whether any changes were a result of the FVC program.

The above analyses will be conducted for both participating and non-participating employees separately. This will provide an understanding of how participating employees change their behavior relative to the general population that did not directly engage with the FVC program.

Hypothesis 2: The total commute VMT for participating employees as well as the broader population declines.

Performance Metric: Measured VMT in any vehicle among employees of each of the participating employers, Measured VMT in any vehicle among participating employees.

Data Types and Sources:

- 1) Employee Data
- 2) Participating Employee Survey
- 3) Non-participating Employee Survey
- 4) Home and Work Location

Commute Activity Data

These data are as defined in Hypothesis 1.

Participating Employee Survey

These data are as defined in Hypothesis 1.

Non-Participating Employee Survey

These data are as defined in Hypothesis 1.

Home and Work Location

These data describe the approximate home and work locations of employees. They will be derived from the participating and non-participating employee surveys, which will ask respondents to provide the city and cross streets of their home and workplace.

Data Collection Period:

The data collection periods for the Employee Data and surveys are as described in Hypothesis 1.

Analysis Procedure:

This analysis will rely on the connection between the surveys and the Commute Activity Data. Ideally, there will be a common De-Identified Employee ID that can link the Commute Activity Data to the survey responses of a particular employee. If this is possible, researchers will compute the distance between employees' home and workplace and identify trips in the Commute Activity Data that involve driving in a vehicle to derive VMT. This measure will control for carpooling/vanpooling. Researchers will plot the time series of measured VMT to determine if trends depart from historical data (if available) as well as whether trends change over the course of the evaluation period. The surveys will also be used to measure the extent to which VMT declines. Respondents will be asked to report their frequency of use for different commute modes (including SOV and other driving modes) both before and after project implementation, and will be asked whether any changes were a result of the FVC program. These results will be considered in the context of their home-workplace distance to get an additional measure of VMT.

The above analyses will be conducted for both participating and non-participating employees separately. This will provide an understanding of how participating employees reduce their driving relative to the general population that did not directly engage with the FVC program.

Hypothesis 3: The total energy consumption and CO₂-e emissions from participating employees as well as the broader population declines.

Performance Metric: Sum of the estimated marginal additional fuel consumption (from any mode) among employees of each of the participating employers, Sum of the estimated marginal additional fuel consumption (from any mode) among participating employees.

Data Types and Sources:

- 1) Commute Activity Data
- 2) Participating Employee Survey
- 3) Non-Participating Employee Survey
- 4) Home and Work Location
- 5) Vehicles Used in Commutes

Commute Activity Data

These data are as defined in Hypothesis 1.

Participating Employee Survey

These data are as defined in Hypothesis 1.

Non-Participating Employee Survey

These data are as defined in Hypothesis 1.

Home and Work Location

These data are as defined in Hypothesis 2.

Vehicles Used in Commutes

These data identify the vehicles that employees use when commuting to work. They will be derived from the participating and non-participating employee surveys, which will ask respondents to provide the vehicle year, make, and model for vehicles which are used in work commutes.

Data Collection Period:

The data collection periods for the Employee Data and surveys are as described in Hypothesis 1.

Analysis Procedure:

This analysis will be an extension of Hypothesis 2. Researchers will use the measured VMTs derived from the Commute Activity Data, as well as from the surveys, for both participating and non-participating employees to estimate fuel consumption. This process relies on the vehicle year, make, and model

provided in the surveys, which will be used to query the EPA fuel economy database and ultimately get estimates for fuel consumption based on the vehicle specifications and measured VMTs. These can then be translated into energy consumption and CO2 emissions. Researchers are specifically interested in the marginal fuel consumption, which is defined as that which occurs because of the trip (a private car or taxi, but not a bus). Using the Commute Activity Data and surveys, these marginal trips will be able to be identified for a more comprehensive analysis of energy consumption and CO2 emissions. Once these metrics have been computed, researchers will inspect the trends over time to determine whether any significant changes have occurred as a result of the project.

Hypothesis 4: The FVC benefits lower income workers more than higher income workers.

Performance Metric: Dollar amount of rebates received by employees

Data Types and Sources:

- 1) Employee Income Data
- 2) Feebate or cashout Data: Fees Charged to SOV Commuters
- 3) Feebate or cashout Data: Rebates Paid to Non-SOV Commuters
- 4) Participating Employee Survey

Employee Income Data

These data describe the employee income for employees at the participating employer. Ideally, this dataset would be linked to the Commute Activity Data through a common De-Identified Employee ID, but this is not necessarily needed as long as there is some connection of the Feebate or cashout Data to employee income on an employee-by-employee basis. The data can be categorical in nature, mapping employees to discrete income brackets as opposed to the actual numerical value.

Feebate or cashout Data: Fees Charged to SOV Commuters

These data are as defined in Hypothesis 1.

Feebate or cashout Data: Rebates Paid to Non-SOV Commuters

These data are as defined in Hypothesis 1.

Participating Employee Survey

These data are as defined in Hypothesis 1.

Data Collection Period:

The data collection periods for the Feebate or cashout Data and surveys are as described in Hypothesis 1. The data collection period for the Employee Income is requested to match that of the Feebate or cashout Data, from the beginning to the end of the evaluation period.

Analysis Procedure:

The analysis will evaluate this hypothesis from two different perspectives. The first will include looking at trends in fees charged and rebates paid over time from the lens of the Feebate or cashout Data, which

will be linked to Employee Income. Researchers will classify employees by income bracket and total the amount of fees charged and rebates paid for each income bracket. The time series of each will be plotted to determine how trends change across different income brackets over the course of the evaluation period and how they correlate with each other. The second will utilize the survey of participating employees. Respondents will be asked socioeconomic questions, including household income, allowing for the identification of lower income workers. They will also be asked to provide estimates of any fees charged and/or rebates paid through the FVC program. The responses of lower income workers will be compared to non-lower income workers to see whether there is a statistically significant difference between the two by conducting a t-test.

Hypothesis 5: The improved access to pre-tax payments increases public transit ridership.

Performance Metric: Number of unlinked trips (public transit ridership) among participating employees

Data Types and Sources:

- 1) Unlinked Public Transit Trips at Relevant Transit Stations and Bus Routes
- 2) Participating Employee Survey
- 3) Employee Data: Purchases of Pre-Tax Commuter Benefits

Unlinked Trips at Relevant Transit Stations and Bus Routes

These data describe the ridership at appropriate transit facilities and bus routes with the transit agencies that could be affected by the project. The scale of the project may not reflect changes in overall ridership, however, there may be detectable changes at transit stations and bus stops located near participating employers. It is requested that these data focus on these specific locations. The data would ideally consist of the unlinked trips, or daily counts of users at each facility or route. If count data for facility transfers exist (transfer counts), this would be useful to include in this data. If available for transit stations, the data is requested to distinguish access and egress activity. If daily OD counts are available for activity to and from these stations, this structure would be most preferred, but otherwise raw entrance and exit counts by day by station would be sufficient.

Participating Employee Survey

These data are as defined in Hypothesis 1.

Purchases of Pre-Tax Commuter Benefits

These data describe the money paid into pre-tax commuter benefits by employees. They should consist of the amount paid over time, but do not necessarily need to be disaggregated by employee. Total dollar amounts by month would be sufficient.

Data Collection Period:

The data collection period for the Public Transit Ridership Data is requested from 2015 to the end of the evaluation period. The data collection period for the survey is as described in Hypothesis 1. The data collection period for the Purchases of Pre-Tax Commuter Benefits is requested from the beginning to the end of the evaluation period.

Analysis Procedure:

The analysis will evaluate this hypothesis in different ways. Researchers will look at trends in unlinked trips using the Public Transit Ridership Data. The time series of this metric will be plotted to determine if trends depart from the historical data and to see how it changes over the course of the project, specifically at the transit stations and bus stops located near participating employers. Researchers will simultaneously plot the time series of Purchases of Pre-Tax Commuter Benefits to see whether there is a positive relationship between the two at overlapping time intervals. Additionally, the analysis will rely on the survey to determine the extent to which public transit use increases. Respondents will be asked about their frequency of use for different commute modes (including bus, rail, etc.) both before and after project implementation, and will be asked whether any changes were a result of the FVC program. It is of particular interest to probe causality of this due to access to pre-tax commuter benefits, so there will be questions dedicated to this as well.

Hypothesis 6: The mobility aggregator, Feebate or cashout policy, and gap-filling analytics positively impact the propensity of commuters to take non-SOV modes.

Performance Metric: Survey response to questions probing change in SOV commuting (causality of individual components identified through the survey)

Data Types and Sources:

- 1) Participating Employee Survey
- 2) Home and Work Location
- 3) Feebate or cashout Data: Fees Charged to SOV Commuters
- 4) Feebate or cashout Data: Rebates Paid to Non-SOV Commuters
- 5) Gap Filling Data: Information From Analytics and Any Associated Input Data
- 6) Commute Activity Data

Participating Employee Survey

These data are as defined in Hypothesis 1.

Home and Work Location

These data are as defined in Hypothesis 2.

Fees Charged to SOV Commuters

These data are as defined in Hypothesis 1.

Rebates Paid to Non-SOV Commuters

These data are as defined in Hypothesis 1.

Commute Activity Data

These data are as defined in Hypothesis 1.

Gap Filling Data: Information from Analytics and Any Associated Input Data

These consist of any data associated with the gap filling analytics that will identify commutes with poor alternatives and attempt to improve them. Any data that comes out of this effort should be provided to the Evaluation Team. One option is that the Evaluation Team is supplied with a list of Census Blocks that are deemed to be relatively inaccessible, located far away from transit without other good options. Then efforts will focus on these areas when conducting the analysis. For example, using the “Request Origin” field in the App Activity Data, researchers can identify whether this was included in the list of Census Blocks and consider this context when analyzing results.

Data Collection Period:

The data collection periods for the survey, Feebate or cashout Data, and Employee Data are as described in Hypothesis 1. The data collection period for the Mobility Aggregator Data and Gap Filling Data is requested from the beginning to the end of the evaluation period.

Analysis Procedure:

The survey will be the main tool used for evaluating this hypothesis. The survey allows researchers to link causality to the individual components of the FVC program, which is the most important aspect of this hypothesis. Respondents will be asked whether specific components encouraged them to take non-SOV modes as opposed to traveling by SOV and to what extent they were impactful. They will also be asked to rate the components in this context relative to each other. To supplement this, researchers will also incorporate data from each of the individual components as necessary, although the capacity do this will very much rely on the data availability and quality. The Gap Filling Data would be used to identify inaccessible regions, and researchers would focus on comparing the SOV mode share within these regions as compared to others. The Feebate or cashout Data and Commute Activity Data would provide insight into the importance of the Feebate or cashout policy. Researchers would look at Feebate or cashout and commute mode share trends and consult the survey responses in a similar manner to that described above.

Hypothesis 7: The attitudes of employees towards transit become more positive.

Performance Metric: Distribution of attitudes towards public transit

Data Types and Sources:

- 1) Survey of Employees

Participating Employee Survey

These data are as defined in Hypothesis 1.

Data Collection Period:

The data collection period for the survey is as described in Hypothesis 1. Please see Hypothesis 9 for the data collection period for the stakeholder interviews.

Analysis Procedure:

The evaluation of this hypothesis will mostly rely on analysis of the survey. Respondents will be asked about their attitude toward public transit and whether the FVC program in general was responsible for any shift in attitude. They will also be asked whether specific components of the FVC program led to more positive or negative views of public transit.

Hypothesis 8: The commute Feebate or cashout is financially sustainable at participation rates achievable during or after the pilot.

Performance Metric: Net revenue (profit/loss) of the Feebate or cashout policy

Data Types and Sources:

- 1) Employee Data
- 2) Commute Activity Data
- 3) Participation Rates
- 4) Feebate or cashout Data: Fees Charged to SOV Commuters
- 5) Feebate or cashout Data: Rebates Paid to Non-SOV Commuters
- 6) Feebate or cashout Revenue Allocated for Other Purposes

Number of Employees

These data are as defined in Hypothesis 1.

Commute Activity Data

These data are as defined in Hypothesis 1.

Participation Rates

These data describe the percentage of employees that are participating in the Feebate or cashout program. They should consist of the percentage of employees over time covering the entirety of the pilot. In order to capture data after the pilot, the survey will ask about future participation, whether this be continued participation or new interest. There will be separate datasets for each participating employer, likely derived from the Number of Employees (assuming these data can be broken out by participating and non-participating employees).

Feebate or cashout Data: Fees Charged to SOV Commuters

These data are as defined in Hypothesis 1.

Feebate or cashout Data: Rebates Paid to Non-SOV Commuters

These data are as defined in Hypothesis 1.

Feebate or cashout Data: Feebate or cashout Revenue Allocated for Other Purposes

These data are as defined in Hypothesis 1.

Data Collection Period:

The data collection period for the Number of Employees, Commute Activity Data, and Feebate or cashout Data are as described in Hypothesis 1. The data collection period for the Participation Rates is requested from the beginning to the end of the evaluation period, noting that this also includes survey data that will be collected as described in Hypothesis 1.

Analysis Procedure:

This analysis will be broken up into two time intervals: during the pilot and after. The first will be assessed by computing the net revenue of the Feebate or cashout policy and contextualizing the results using the participation rates from during the pilot. The Feebate or cashout Data, broken out into fees charged (profit), rebates paid (loss), and revenue allocated for other purposes (loss), will allow researchers to understand the flow of money and ultimately compute net revenue over time. The time series of this metric will be inspected to see how it changes over the course of the project, and how it correlates with participation rates. The second will involve using survey data to estimate future participation rates after the pilot, and determine whether participation rates are expected to rise or fall. Using the net revenue at particular participation rates during the pilot as a proxy, researchers will estimate the net revenue that will result at these future participation rates. The Commute Activity Data will provide further context to understand how net revenue correlates with commute mode share.

Hypothesis 9: The project produces a series of lessons learned that will be documented through expert interviews with project stakeholders.

Performance Metric: N/A

Data Sources:

Stakeholder interviews

This data is qualitative in nature. The project team will identify members that can be available to interview with the Evaluation Team. The project team should specify a minimum of three people with enough knowledge on the project to talk candidly about its successes and challenges. The Evaluation Team will interview these candidates to understand the lessons learned from project implementation.

Data Collection Period:

The data collection for stakeholder interviews should occur at least six months after the launch of the demonstration, but it may be conducted later, as long as it is within a maximum of two months after the end of the demonstration period.

Analysis Procedure:

An expert interview protocol will be developed. The interviews will be conducted and synthesized from notes and recordings into a summary describing key insights from experts directly involved in the project. Other interviewees from project partners will be added once the demonstration starts.

- Commuter Rail (e.g., Amtrak, Caltrain)
- Uber/Lyft
- UberPOOL/Lyft Line
- Uber Express Pool
- Taxi
- Bikeshare (e.g., Ford GoBike, JUMP)
- Scooter Sharing (e.g., Lime, Bird, Skip)
- Personal Motorcycle or Moped
- Shared Electric Moped (e.g., Scoot)
- Vanpool
- Microtransit (e.g., Chariot)
- Water Taxi or Ferry (for commuting)
- Employer Shuttle (for commuting)
- Carshare (e.g., Zipcar, GIG)
- Car Rental within the Bay Area
- Other(s), please specify: _____

8. Please indicate how frequently you **currently** use the following modes.

<Show only modes selected in Q7>

	Not available to me or not in my area	Never in the last year	Once a year	Once every 6 months	Once a month	Twice a month	1 to 3 times per week	4 to 6 times per week	7 to 13 times per week	2 to 4 times per day	More than 4 times per day
<Mode that was selected in Q7>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<Mode that was selected in Q7>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<...>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. Currently, how many days a week do you typically work?

- 1
- 2
- 3
- 4
- 5
- 6
- 7

- 17 minutes
- 18 minutes
- 19 minutes
- 20 minutes
- 21 minutes
- 22 minutes
- 23 minutes
- 24 minutes
- 25 minutes
- 26 minutes
- 27 minutes
- 28 minutes
- 29 minutes
- 30 minutes
- More than 30 minutes
- I don't know

24. When commuting **from work to home**, on average, about how long do you wait for vehicle(s) to arrive (in total)? This is the time spent waiting for the vehicle (e.g., at the station, after the request, etc.).

<Can be dropdown menu>

- I don't ever have to wait
- 30 seconds or less
- 1 minute
- 2 minutes
- 3 minutes
- 4 minutes
- 5 minutes
- 6 minutes
- 7 minutes
- 8 minutes
- 9 minutes
- 10 minutes
- 11 minutes
- 12 minutes
- 13 minutes
- 14 minutes
- 15 minutes
- 16 minutes
- 17 minutes
- 18 minutes
- 19 minutes
- 20 minutes
- 21 minutes
- 22 minutes
- 23 minutes
- 24 minutes
- 25 minutes
- 26 minutes
- 27 minutes

- 7:30PM
- 8:00PM
- 8:30PM
- 9:00PM
- 9:30PM
- 10:00PM
- 10:30PM
- 11:00PM
- 11:30PM
- 12:00AM
- 12:30AM
- 1:00AM
- 1:30AM
- 2:00AM
- 2:30AM
- 3:00AM
- 3:30AM
- 3:00AM
- 3:30AM
- 4:00AM
- 4:30AM

31. What days do you typically commute to this location?

- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday
- Sunday
- It varies significantly

32. Did this morning commute trip cost you anything? Please include costs of any kind (e.g., bus fare, toll, gas, etc.). Do **not** include any parking costs.

<Can be drop down menu>

- Free
- Less than \$1
- \$1
- \$2
- \$3
- \$4
- \$5
- \$6
- \$7
- \$8
- \$9
- \$10
- \$11
- \$12

- \$13
- \$14
- \$15
- \$16
- \$17
- \$18
- \$19
- \$20
- \$21
- \$22
- \$23
- \$24
- \$25
- \$26
- \$27
- \$28
- \$29
- \$30
- More than \$30

33. Did you pay for parking once you arrived?

- I did not drive
- I drove, but parking was free
- \$1
- \$2
- \$3
- \$4
- \$5
- \$6
- \$7
- \$8
- \$9
- \$10
- \$11
- \$12
- \$13
- \$14
- \$15
- \$16
- \$17
- \$18
- \$19
- \$20
- \$21
- \$22
- \$23
- \$24
- \$25
- \$26
- \$27
- \$28

- \$29
- \$30
- More than \$30

34. If the primary mode you used to get to work **had not been available**, then how would you have gotten to work instead?

- I would not have gone to work
- Drive alone
- Drive/Ride with family/friend (non-commute)
- Carpool (for commuting)
- Walk (to a destination)
- Personal Bicycle
- Public Bus (e.g., AC Transit)
- BART
- Light Rail (e.g., MUNI)
- Commuter Rail (e.g., Amtrak, Caltrain)
- Uber/Lyft
- UberPOOL/Lyft Line
- Uber Express Pool
- Taxi
- Bikeshare (e.g., Ford GoBike, JUMP)
- Scooter Sharing (e.g., Lime, Bird, Skip)
- Personal Motorcycle or Moped
- Shared Electric Moped (e.g., Scoot)
- Vanpool
- Microtransit (e.g., Chariot)
- Water Taxi or Ferry (for commuting)
- Employer Shuttle (for commuting)
- Carshare (e.g., Zipcar, GIG)
- Car Rental within the Bay Area
- Other, please specify: _____

Now think about the **evening commute home for this most recent trip**.

35. At what time did you start your typical evening commute trip?

<Can be drop down menu>

- 3:00PM
- 3:30PM
- 4:00PM
- 4:30PM
- 5:00PM
- 5:30PM
- 6:00PM
- 6:30PM
- 7:00PM
- 7:30PM
- 8:00PM

- 8:30PM
- 9:00PM
- 9:30PM
- 10:00PM
- 10:30PM
- 11:00PM
- 11:30PM
- 12:00AM
- 12:30AM
- 1:00AM
- 1:30AM
- 2:00AM
- 2:30AM
- 3:00AM
- 3:30AM
- 3:00AM
- 3:30AM
- 4:00AM
- 4:30AM
- 5:00AM
- 5:30AM
- 6:00AM
- 6:30AM
- 7:00AM
- 7:30AM
- 8:00AM
- 8:30AM
- 9:00AM
- 9:30AM
- 10:00AM
- 10:30AM
- 11:00AM
- 11:30AM
- 12:00PM
- 12:30PM
- 1:00PM
- 1:30PM
- 2:00PM
- 2:30PM

36. Did this evening commute trip cost you anything? Please include costs of any kind (e.g., bus fare, toll, gas, etc.).

<Can be drop down menu>

- Free
- Less than \$1
- \$1
- \$2
- \$3
- \$4
- \$5

- \$6
- \$7
- \$8
- \$9
- \$10
- \$11
- \$12
- \$13
- \$14
- \$15
- \$16
- \$17
- \$18
- \$19
- \$20
- \$21
- \$22
- \$23
- \$24
- \$25
- \$26
- \$27
- \$28
- \$29
- \$30
- More than \$30

37. If the primary mode you used to get home from work **had not been available**, then how would you have gotten home instead?

- Drive alone
- Drive/Ride with family/friend (non-commute)
- Carpool (for commuting)
- Walk (to a destination)
- Personal Bicycle
- Public Bus (e.g., AC Transit)
- BART
- Light Rail (e.g., MUNI)
- Commuter Rail (e.g., Amtrak, Caltrain)
- Uber/Lyft
- UberPOOL/Lyft Line
- Uber Express Pool
- Taxi
- Bikeshare (e.g., Ford GoBike, JUMP)
- Scooter Sharing (e.g., Lime, Bird, Skip)
- Personal Motorcycle or Moped
- Shared Electric Moped (e.g., Scoot)
- Vanpool
- Microtransit (e.g., Chariot)
- Water Taxi or Ferry (for commuting)
- Employer Shuttle (for commuting)
- Carshare (e.g., Zipcar, GIG)

- Car Rental within the Bay Area
- Other, please specify: _____

Now, we will ask you some broader questions about your travel behavior and perceptions.

38. What are your current estimated monthly transportation expenses?

Please include: Expenses related to public transportation, personal vehicle expenses (e.g., gas and maintenance), taxi/Uber/Lyft, and any biking expenses.

Please exclude: Airfare expenses.

<Can be drop down menu>

- Less than \$50
- \$50
- \$100
- \$150
- \$200
- \$250
- \$300
- \$350
- \$400
- \$450
- \$500
- \$550
- \$600
- \$650
- \$700
- \$750
- \$800
- \$850
- \$900
- \$950
- \$1000
- More than \$1000
- I don't know

39. Overall, how easily are you able to get around? This question refers to your access and use of personal, private, and public transportation services, **not** your physical capabilities.

Overall, I currently consider myself to be...

- Very mobile
- Somewhat mobile
- Not very mobile
- Not mobile at all

44. Currently, how do you view public transit? Please rate on a scale of 1 to 10, where 10 is Very Favorable and 1 is Not At All Favorable.

- 1 (Not At All Favorable)
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 (Very Favorable)

45. [OPTIONAL] Please feel free to expand here on your opinion of public transit and how you feel about it.

Now, we will ask you questions about your demographic profile.

46. What is your gender?

- Male
- Female
- Other
- Prefer not to answer

47. In what year were you born?

Drop-down <years>

55. Please indicate two streets that cross near your **home location** as well as the city.

City: _____

Street #1: _____

Street #2: _____

56. Please indicate two streets that cross near your **work location** as well as the city. If you do not travel to a work location, you can skip this question.

City: _____

Street #1: _____

Street #2: _____

[OPTIONAL] This survey asked a lot of questions about your travel behavior and commute parameters. If you would like, please feel free to elaborate here on how you travel.

Your comments (if you provide any) will only be reviewed confidentially in support of your other responses. You will not be contacted about them. Anything you write may help support the impact analysis, or clarify responses you provided in the survey.

You can tell us about elements we might have missed through the survey questions or that you feel need additional clarification. This is completely optional, you can write as much as you would like or nothing at all.

If you do choose to provide comments, please try to be kind, constructive, and/or helpful; what you write will be read by a real person. In either case, thank you again for taking this survey.

End Message:

We thank you for your time spent taking this survey. Your response has been recorded.

If you are interested in participating in the Bay Area Fair Value Commuting Demonstration project, please click the link provided below. This is an opportunity to receive monetary incentives for changing the way you commute to work.

<insert link>

Addendum. Documentation of Evaluation Plan Variance Following Demonstration Deployment

The evaluation plans for the MOD Sandbox Demonstration projects were developed in the planning phase of the project, prior to the execution of the demonstration. As part of this process, data structures and data availability were anticipated. As project implementation proceeded, certain elements of the project and data availability changed.

This addendum presents differences between the planned and executed analyses for the independent evaluation of the City of Palo Alto and Bay Area Fair Value Commuting (FVC) project. Due to changes to pilot operations, data availability issues, and other unforeseen circumstances, some of the hypotheses proposed as part of the original scope of work were modified or their analyses were adjusted to better encompass these changes. In this addendum, changes that were made to each hypothesis (if any) and the key reasons why study methods may have differed from what was planned are identified and discussed. Many hypotheses and their proposed analytical approaches did not change significantly or at all. In these cases, it is noted that there were no differences between the proposed and executed analyses.

Hypothesis 1: The mode share of commuting by SOVs for both participating employees and the broader population declines as a result of the FVC strategy. This mode share is defined as a function of trips.

Proposed analysis: The analysis outlined in the evaluation plan proposed analyzing commute activity data to evaluate any trends in SOV use throughout the pilot or as compared to historical trends. Also, the planned analysis proposed analyzing Feebate or cashout data to compare trends of fees charged to SOV commuters to that of rebates paid to non-SOV commuters. Finally, the evaluation plan proposed analyzing survey responses to evaluate the frequency of commuting by SOVs and the attributional impact of the FVC program on it.

Executed analysis: Due to the lack of historical commute activity data, the executed analysis did not analyze the change in the mode share of commuting by SOVs as a result of introducing the FVC program. Instead, the analysis evaluated changes in SOV use throughout the duration of the pilot and analyzed after survey responses to evaluate the effect of the pilot on the frequency of use of different transportation modes. The analysis did not evaluate trends in fees charged or rebates paid since a Feebate system was not implemented.

Hypothesis 2: The total commute VMT for participating employees, as well as the broader population, declines.

Proposed analysis: The analysis outlined in the evaluation plan proposed analyzing commute activity data to evaluate any trends in vehicle miles traveled (VMT) throughout the pilot or as compared to historical trends. The plan suggested linking survey and activity data to use employee home/workplace locations reported in the surveys in order to compute trip distances. Also, the planned analysis proposed analyzing survey responses to evaluate the frequency of use of different commute modes and the attributional impact of the FVC program on it.

Executed analysis: Due to the lack of historical commute activity data, the executed analysis did not directly evaluate the change in VMT as a result of introducing the FVC program. Instead, the analysis concurrently analyzed activity data and survey responses, that probed the effect of the pilot on the frequency of use of different commute modes, in order to estimate the change in VMT as a result of the pilot. The analysis did not use home/workplace location data to calculate trip distances since those were already reported in the commute activity data.

Hypothesis 3: The total energy consumption and CO₂-e emissions from participating employees, as well as the broader population, declines.

Proposed analysis: The analysis outlined in the evaluation plan proposed using VMT measures computed in Hypothesis 2 in order to estimate fuel consumption and CO₂-e (carbon dioxide equivalent) emissions. The plan suggested using vehicle data reported in the surveys, such as year, make, and model to estimate fuel consumption based on vehicle specifications and measured VMT. Also, the planned analysis proposed evaluating any trends in energy consumption and CO₂-e emissions throughout the pilot or as compared to historical trends.

Executed analysis: Due to the lack of historical commute activity data, the executed analysis did not directly evaluate the changes in energy consumption and CO₂-e emissions as a result of introducing the FVC program. Instead, the analysis built off of the analysis executed in Hypothesis 2 to estimate the changes in energy consumption and CO₂-e emissions as a result of the pilot.

Hypothesis 4: The FVC benefits lower-income workers more than higher-income workers.

Proposed analysis: The analysis outlined in the evaluation plan proposed analyzing Feebate or cashout data to compare trends in fees charged or rebates paid as a function of income brackets. Also, the planned analysis proposed analyzing survey responses that estimate fees charged or rebates paid through the FVC program and evaluating them as a function of household income reported by respondents.

Executed analysis: Since a Feebate system was not implemented, the executed analysis did not evaluate trends in fees charged or rebates paid as a function of income brackets. Instead, the executed analysis used commute activity data, which included an estimate of savings achieved as a function of commute mode used, to compare trends in savings for different income brackets.

Hypothesis 5: The improved access to pre-tax payments increases public transit ridership.

Proposed analysis: The analysis outlined in the evaluation plan proposed analyzing public transit ridership data to evaluate any trends in ridership throughout the pilot or as compared to historical trends. Also, the planned analysis proposed analyzing pre-tax payment data to evaluate any correlation between that and public transit ridership at overlapping time intervals. Finally, the evaluation plan proposed analyzing survey responses to evaluate the frequency of use of different commute modes and the attributional impact of the FVC program and access to pre-tax payments on it.

Executed analysis: Due to the lack of public transit ridership data and pre-tax payment data, the executed analysis did not analyze the change trends for both metrics as a result of introducing the FVC program. Instead, the analysis used commute activity data to evaluate the change in use of different commute modes, including public transit, over the pilot duration. Also, the executed analysis used after survey responses to evaluate the effect of the pilot on the frequency of use of different transportation modes including public transit.

Hypothesis 6: The mobility aggregator, Feebate or Cashout policy, and gap-filling analytics positively impact the propensity of commuters to take non-SOV modes.

Proposed analysis: The analysis outlined in the evaluation plan proposed analyzing survey responses to evaluate the effect of different components of the FVC program on commute by non-SOVs. Also, the planned analysis proposed using gap-filling data and Feebate or cashout data, if available, to obtain additional insights.

Executed analysis: The executed analysis did not use gap-filling data and Feebate or cashout data since the former was not available and a Feebate system was not implemented. The analysis was based on survey responses that probed the effect of different pilot benefits on the use of non-SOV modes. Also, the analysis evaluated changes in non-SOV use throughout the duration of the pilot using commute activity data, similarly to the analysis done in Hypothesis 1.

Hypothesis 7: The attitudes of employees toward public transit become more positive.

There were no differences between the proposed and executed analyses for Hypothesis 7. Before and after survey questions gauged user ratings of public transit before and after the pilot.

Hypothesis 8: The commute Feebate or Cashout is financially sustainable at participation rates achievable during or after the pilot.

Proposed analysis: The analysis outlined in the evaluation plan proposed analyzing Feebate or cashout data to evaluate trends in the net revenue of the Feebate or cashout policy as a function of participation rates. Also, the planned analysis proposed using survey data to estimate future participation rates and resulting net revenues.

Executed analysis: Since a Feebate system was not implemented, no revenue was generated from the implementation of the project, and the financial sustainability could not be evaluated in the form that it was originally planned.

Hypothesis 9: The project produces a series of lessons learned that will be documented through expert interviews with project stakeholders.

There were no differences between the proposed and executed analyses for Hypothesis 9. Expert (stakeholder / project partner) interviews were conducted and summarized to describe key insights about the pilot.

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