Final Report
December 2023

Future Communities Pilot Program - Evaluation Summary Report

Prepared for the Mobile Source Air Pollution Review Committee (MSRC) under the AB 2766 Discretionary Fund Work Program

Southern California Association of Governments
Our ref: 23661901
Client ref: 19-058-C01
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Clean Transportation Funding from the MSRC

SCAG Southern California Association of Governments

steer

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Implementation of Pilot Projects and Evaluation
City of Anaheim
City of Cerritos
City of Glendale
City of Los Angeles
City of Monrovia
City of Ontario
City of Riverside
San Bernardino County

This report was submitted in fulfillment of MS18015 and the Future Communities Pilot Program by Southern California Association of Governments under the partial sponsorship of the Mobile Source Air Pollution Reduction Review Committee (MSRC). Work was completed as of December 31st 2023.

Disclaimer

The statement and conclusions in this report are those of the contractor and not necessarily those of the Mobile Source Air Pollution Reduction Review Committee (MSRC) or the South Coast Air Quality Management District (South Coast AQMD). The mention of commercial products, their sources or their uses in connection with material reported is not to be construed as either an actual or implied endorsement of such products.

Executive Summary

Overview

We are in the midst of a paradigm shift in mobility. With growing availability of data systems, platforms, and service providers, municipalities are rethinking ways to leverage these advancements to provide new mobility options and improve existing services.

The Future Communities Pilot Program (FCPP) is an initiative led by the Southern California Association of Governments in partnership with the Mobile Source Air Pollution Reduction Review Committee, which has culminated in an evaluation report that summarizes the potential benefits and challenges of implementation of a series of mobility pilot projects that can reduce Vehicle Miles Traveled (VMT) and help cities and counties take a positive step towards fighting climate change.

The portfolio of pilot projects includes a range of innovative approaches, each designed to address the specific mobility challenges and opportunities of its location. From leveraging smart technologies in parking management to digitizing city services for greater efficiency, the pilot projects showcase a wide array of strategies aimed at improving mobility and reducing environmental impacts.

While some projects demonstrated remarkable reductions in VMT, other projects were not as successful in this specific metric, but brought other significant benefits. These included improved access to services, the introduction of innovative technologies in urban spaces and time savings for staff and the public. This range of outcomes highlights that the value of implementation of a similar project may extend beyond its primary objective, contributing to broader benefits to the jurisdiction and the public.

The specific circumstances of each project, including the demographic, geographic, and infrastructural context, played a crucial role in determining its feasibility and success. Policy and regulatory considerations also emerged as key factors, influencing project implementation and scalability.

A summary of the evaluation is shown on the next page in Table ES.1.

Results

Table ES.1: Summary of Pilot Project Results

Key Performance Indicators (KPIs)	City of Anaheim	City of Cerritos	City of Glendale	City of Monrovia	City of Riverside	County of San Bernardino	City of Ontario	City of Los Angeles DOT
Annual Vehicle Miles Traveled (VMT)	402,412.5	68,806	-9,152	24,482.2	146,943	266,233.9	102,656.8	82,875
Annual Number of Trips (mi)	160,965	2,892	6,084	6,772	11,748	24,254	n/a	30,692
Average Trip Length (mi)	2.5	23.8	48.5	3.76	12.51	10.98	n/a	38.53
CO (Carbon Monoxide) lbs.	1,011.01	189.62	270.55	67.47	360.78	1,644.50	256.75	3,490.85
CO_2 (Carbon Dioxide) lbs.	255,240.24	45,187.21	77,666.82	16,078.28	94,218.71	200,402.20	65,577.22	831,868.01
NO_X (Nitrous oxides) lbs.	63.08	11.87	25.24	4.22	22.23	145.55	15.73	218.60
ROG (Reactive Organic Gases) lbs.	107.80	19.68	1.24	7.00	35.87	211.39	25.75	362.26
SO_X (Sulphur oxides) lbs.	2.57	0.45	0.00	0.16	0.95	2.03	0.66	8.36
PM_{10} (Particulate Matter) lbs.	15.93	2.83	4.77	1.01	5.37	11.03	3.86	19.79
$PM_{2.5}$ (Particulate Matter) lbs.	5.70	1.03	0.17	0.37	1.91	4.29	1.37	9.73
CH_4 (Methane) lbs.	8.56	1.59	87.14	0.57	2.88	13.94	2.03	29.28
Cost Effectiveness	$0.12	$0.65	-$22.08	$3.15	$0.44	$0.15	$0.59	$52.93
Cost Savings	Over $65,000 in fuel costs per annum	Saved two full time positions' salary of $166,400	13% reduction of fuel use; reduced 49 trips to the dump per week	Users each save $1,000 annually	Staff hourly labor reduction of $41,702.93	Saved $84,700 dollars in fuel costs; saves 6,000 hours of police time	n/a	Saved $6.7 million dollars in fuel
Number of Customers Served/Users Served	160,965	2,529	85,298	503	3,036	2,000	428,000	17,782
Resource Utilization	441 additional parking spaces utilized	85-90%	100%	89%	82%	97%	n/a	33%

Customer Satisfaction	Reduction in parking complaints; significant increase in parking utilization	Increase in submissions due to ease of platform	City and employees no longer need to work overtime	92% very satisfied or satisfied with program	Reduced driving hours by 4,900	After-hour submission offers flexibility	Resident attendance high in smart city events	90% of members remain in BlueLA

1 Introduction

1.1 Background

1.1.1 The Future Communities Pilot Program

The Future Communities Pilot Program (FCPP) is a partnership between the Southern California Association of Governments (SCAG) and the Mobile Source Air Pollution Reduction Review Committee (MSRC) to support city and county agencies in implementing SCAG's Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS, or "Connect SoCal") and the funding goals of Senate Bill 1 (SB 1).

At the core of FCPP is a series of pilot projects that are expected to reduce vehicle miles travelled (VMT) from local travel and municipal operations through the use of new technologies and enhanced data analytics.

The goals of the FCPP are to:

- Reduce VMT from local travel and municipal operations to improve air quality
- Improve the efficiency and reduce cost of county and municipal services
- Test innovative approaches in a variety of contexts (large, small, urban, rural communities) for reducing VMT through the application of new technologies and data analytics
- Identify and quantify the relative impact of strategies to promote replication of best practices and policy development to facilitate wide-scale adoption of the most promising strategies.

The grant program is a major component of SCAG's Future Communities Initiative, which is a multi-year work program for implementing the policy direction from SCAG's Open Data/Big Data – Smart and Connected SCAG Region Committee. The Committee had discussed and identified significant opportunities for SCAG to support innovation and improvements by local cities and counties in the provision of their services through the use of technology and data innovations.

To identify regional resource needs related to data and technology, SCAG conducted a survey that identified an overall lack of capacity across the region for instituting new technology and data solutions. Results indicated that approximately 72 percent of respondents lack the financial resources to support data and technology projects. Likewise, approximately 70 percent indicated that they did not have sufficient staff resources to implement these projects without additional support. The FCPP Program is one avenue SCAG has pursued to provide needed assistance to enhance local capacity to undertake data and technology initiatives.

1.1.2 The Pilot Projects

Each pilot project has been designed and implemented with the goal of reducing VMT. Each pilot project is introduced below.

Anaheim: Smart Center City – Parking Guidance and Mobile App Integration

The pilot project involves the City of Anaheim and the Anaheim Transportation Network. It is focused on the integration of real-time parking guidance for Center City Anaheim and its transit planning and ride hailing mobile application. The mobile application was launched in connection with FRAN (Free Rides Around the Neighborhood), a micro-transit system implemented in 2019.

The goal was to reduce VMT and greenhouse gas emissions (GHG) generated by cars that circle area parking structures and neighborhood streets in search of parking. Neighborhood streets have become congested with drivers searching for parking, so mitigating those trips would alleviate congestion as well. With an existing mix of City-owned parking, both overutilized surface lots and underutilized parking structures, the project also hoped to redistribute parking in a more effective way by directing drivers to open, available structures that are typically underused.

Cerritos: Remote Services Enhancement Project

The City of Cerritos pilot proposed the online automation of many of its community development-related and business license applications to be led by the City's Community Development Department. By building a custom online portal and removing the need to physically travel to City Hall and submit applications for various entitlements, licenses, and permits, the City envisioned the potential for a drastic reduction in VMT and GHG. Additionally, the development of the online portal had been found to benefit City staff by streamlining internal review, approval, and coordination, supporting municipal cost saving efforts and effective operations as a positive by-product.

Most applications received by the Community Development Department otherwise required multiple trips to City Hall with an average of three trips per applicant. Beyond the VMT and GHG reductions however, the portal offers other advantages to residents via convenience, clarity, and consistency.

Glendale: Route Optimization and Fleet Telematics

The City of Glendale pilot project has been spearheaded by their Public Works Department and optimized and redesigned their refuse collection routes using advanced software analytics. Specialized route optimization software brings innovation through the ability to combine waste collection schedules with GIS routing systems. The opportunity to decrease municipal costs, emissions, and VMT made this an ideal candidate for piloting in the City.

Glendale's original refuse collection routes were developed using paper maps, only updated periodically, and had not been digitized. The process of developing baseline data and thereby digitizing the original routes provided valuable information regarding existing conditions, and combined with the innovative software capabilities, helps gather important insight into refuse collection systems.

Los Angeles: Measuring VMT Reduction from Shared Mobility Services through Real-Time Data

The project helps to verify the VMT impacts and benefits of car-share services along with other new, app-enabled mobility services by documenting the complete transportation behavior of people who participate in car-share services managed through LADOT's Carshare Pilot Program, including the BlueLA electric vehicle car-share pilot.

The project also expands the application of LADOT's Mobility Data Specification (MDS) to car-share services, which makes available the origin and destination (O-D) data of trips made by participating services. The O-D data is supplemented with travel survey data designed by a research team and completed by car-share users which informs transportation behavior change resulting in the availability of car-share services. The survey includes before and after mode shift information by common trip types, evaluates other factors such as change in auto-ownership, parking demand, and user-satisfaction.

Monrovia: Biking for Bucks Program

The City of Monrovia had to shift their intended scope of work in spring 2020 when the Covid-19 pandemic had fully disrupted travel. Originally planned to study shared ride behavior with Lyft, a Transportation Network Company (TNC), the project was halted when Lyft suspended shared rides indefinitely following the onset of the pandemic. The City instead pivoted to a bikeshare program focused on increasing ridership among core bike riders, including local employees, residents, students, and food delivery drivers.

The City quickly adapted and deployed a bikeshare program with the goal of mitigating short trips and incentivizing cleaner, sustainable modes of transportation. The project was developed to work with strategic groups of riders and collect valuable information from riders about their trip activities and preferences. The program funded around 500 participants over the grant period.

Ontario: Smart City Rapid Validation Hub

The City of Ontario along with its Management Services Department tested and monitored three different pilot technologies in its dense Smart Cities Hub area to understand and collect data on various types of trips and transportation modes. The City deployed an intelligent refuse collection pilot which monitored trash bins and their usage, an integrated sensor system which recorded millions of data points on trip types and activities at major intersections in the Hub, and a last mile mobility project which utilized micromobility and innovative technologies to mitigate trips and reduce VMT.

Riverside: Integrated Electronic Plans Solution

The City of Riverside and its Planning Division recognized the need for digital accessibility and identified an opportunity to provide greater access to reach and serve members of its community. The City developed the concept for an "one stop shop" virtual platform to assist both the public and City staff as it relates to the many requests, applications, and operations that occur in the Planning Division.

Interestingly the project obtained a significant amount of data prior to Covid-19 disruption in March 2020 as well as post-implementation data that extended throughout the pandemic. Use of online services at the City skyrocketed and the community was grateful to have a tool in place that allowed them to conduct their business online and remove the need to travel to City Hall. The platform remains popular and successful following the return to activities in a post-Covid world.

San Bernardino County: Remote Electronic Warrants

San Bernardino County, as the geographically largest county in the United States, recognized the potential to drastically reduce vehicle miles traveled via a partnership with the Sheriff's

Department. The County had recently passed a new policy allowing officers within the department to submit warrants online rather than driving to the nearest courthouse, and developing an online portal for these submissions was critical for removing the need to travel. The platform directly removed trips that otherwise would have occurred, often in SUVs and other larger vehicles when compared a passenger sedan.

1.2 Evaluation Summary Report

This Evaluation Summary Report summarizes the evaluation findings, research, and outcomes from all FCPP awardees. The report provides the following:

- A detailed description of each pilot project and an overview of the methodology employed for assessment of each pilot project, including information on applicable academic research, analytical considerations and practical limitations. (see Section 2 – Project Description and Work Performed and Appendix A - Future Communities Pilot Projects Evaluation and Metrics Guidance)
- Commentary on issues that arose as part of the program. (see Section 3 – Problems Encountered)
- A detailed description of the analysis for each pilot project. (see Appendix B – Technical Analysis)
- The results of the analysis for each pilot project, commentary on their comparison, policy and regulatory considerations, and recommendations for expansion to a regional-level. (see Section 4 – Emissions Benefits and Other Benefits)
- Information form the implementation of the pilot projects. (see Section 5 – Photographs and Outreach)
- An overview of the findings of the program. (see Section 6 – Summary and Conclusions)
- A series of factsheets outlining the benefits of each pilot project. (See Appendix C – Fact Sheets)

2 Project Description & Work Performed

2.1 Background

2.1.1 Future Communities Program Development

The Future Communities Pilot Program (FCPP) was a 2018 grant program designed to provide local cities and counties with the resources needed to reduce vehicle miles traveled (VMT) through the use of new technology and data solutions.

The FCPP resulted from a partnership between SCAG and the Mobile Source Air Pollution Reduction Committee (MSRC) to improve air quality and implement SCAG's 2016 Regional Transportation Plan/Sustainable Communities Strategy.

The program is a major component of SCAG's Future Communities Initiative, which is a three-year work program for implementing the policy direction from SCAG's Open Data/Big Data – Smart and Connected SCAG Region Committee.

The FCPP had the following goals:

- Apply new technologies and data analytics to test innovative approaches for reducing emissions-producing VMT from local travel and municipal operations.
- Explore opportunities for data analytics and technology projects that support and engage disadvantaged communities.
- Improve efficiency and reduce costs of county and municipal services.
- Identify and quantify relative impacts of a variety of technology-based VMT reduction strategies.
- Promote replicable pilot projects that support new policy development, improve processes for government service provision, and pilot innovative engagement practices with private sector mobility providers.

Projects eligible for the program included strategies such as fleet telematics, Internet of Things (IoT) applications, route optimization, and Mobility as a Service (MaaS) pilots. Innovative projects that reduce VMT production were emphasized. Project applications were scored on rationale, design, readiness, and sustainability.

City and county applicants from within the South Coast Air Quality Management District portion of San Bernardino, Riverside, Los Angeles, and Orange Counties were eligible to apply for the 2018 FCPP funding, with potential for partnerships as needed to implement projects. The funding available for the implementation of the 2018 projects totaled $2.7 million and included a

combination of both MSRC funding and Senate Bill 1 funding. The maximum award size for a project was $500,000 with the requirement of a 25% match from applicants.

To prepare for the development of the FCPP Call for Projects, SCAG assembled a project team to conduct a thorough review and analysis of practices that public agencies could implement to reduce VMT and vehicle emissions. The review included industry expert interviews and promising practice research. The review also solicited input via both a SCAG technical advisory committee and member agency surveys to understand the following qualifications of potential project applicants in the region, such as their:

- Capacity to collect, analyze, and manage big-data.
- Ability to right-size solutions for their needs.
- Readiness to implement innovative and data-driven solutions.

The best practices, key takeaways, and lessons learned from the research and engagement efforts were incorporated into the assembly of the FCPP Call for Projects and supporting materials. The suite of resource documents and supporting materials were made available to the public and potential FCPP applicants through the SCAG website.

The FCPP Call for Projects closed on December 13, 2018. Applications were scored by SCAG staff and interviews will all applicants were held in January of 2019. SCAG shared the final project rank list with the MSRC to further access VMT and emissions reduction potential and return on investment. The final project award list was approved at SCAG's February 7, 2019 Regional Council meeting.

2.1.2 Final Pilot Projects

City of Anaheim: Smart Center City – Parking Guidance and Mobile App Integration

The City of Anaheim and the Anaheim Transportation Network began their pilot in 2019 and focused on the integration of real-time parking guidance for Center City Anaheim and its transit planning and ride hailing mobile application. The mobile application launched in connection with the electric micro-transit system FRAN (Free Rides Around the Neighborhood) had the functionality to immediately direct drivers to available parking in City-owned parking lots and structures. Coupled with service provided by FRAN, drivers could park their vehicles in structures and lots further from their Center City destinations and simply catch a ride on FRAN to their destination. The goal was to reduce vehicle miles traveled (VMTs) and greenhouse gas emissions (GHG) generated by cars that circle area parking structures and neighborhood streets in search of parking, and instead to replace those miles/short trips with the electric shuttle service, removing VMT and reducing GHG emissions from these areas.

Parking and traffic congestion were also a concern in the neighborhoods immediately surrounding popular points of destination in Center City Anaheim. Neighborhood streets had become congested with drivers searching for parking, and drivers tended to frequent the overutilized surface lots rather than the underutilized parking structures. The project also hoped to redistribute parking in a more effective way by directing drivers to the open, available structures that are typically underused, thereby easing the demand for curb space and traffic in residential neighborhoods near Center City.

The VMT savings were promising. Research had shown that drivers likely travel half-mile distances or greater in search of available parking, and vehicles on average circle parking structures two and a half times during their search.[1] The City had existing infrastructure via parking sensors that allowed staff to monitor parking utilization rates, but the addition of real-time wayfinding signage coupled with the potential to direct drivers immediately to available parking through the ATN application was a game-changer. It created an opportunity for the City to expand upon their previous parking efforts and attempt to redistribute parking while simultaneously replacing a significant amount of mileage from vehicles in their pursuit of parking.

City of Cerritos: Remote Services Enhancement Project

The City of Cerritos pilot proposed the online automation of many of its many community development-related and business license applications, to be led by the City's Community Development Department, and began work in 2020. The idea to build a custom online portal and remove the need to physically travel to City Hall and submit applications for various entitlements, licenses, and permits had the potential to greatly reduce vehicle miles traveled. The platform development process and implementation allowed the team to monitor municipal impacts too, with a number of direct benefits observed for City staff by streamlining internal review, approval, and coordination, supporting municipal cost saving efforts, and reducing staff labor in the long term.

The City had begun tracking applications and establishing a baseline of data before the onset of the project. Records indicate that the City handles thousands of applications and permits each year. Calculating the average distance that each applicant would travel for their respective requests, City staff found 14-15 miles on average per one-way trips to City Hall had great potential for VMT removal.

The portal reached its first Go-Live milestone and launched during the Covid-19 pandemic, so it was widely used when it became available and continued to be a popular tool as the pandemic continued.

City of Glendale: Route Optimization and Fleet Telematics

The City of Glendale has committed to addressing sustainability by protecting the environment and working toward pollution reduction. As such, the City identified a project concept to upgrade their antiquated, out of date, handwritten routes currently in use in their Public Works Department, beginning with their refuse trucks. With the use of a new and innovative software programs, the City redesigned their refuse collection. The new optimized routes offer an innovative methodology for the reduction of the operational costs and the decrease of VMT and pollutant emissions.

The software's innovative feature lies in combining vehicle route optimization with that of waste collection scheduling. The optimization process of the routes to be traveled makes recourse to Geographical Information Systems (GISs) and uses interchangeably two optimization criteria: total spent time and distance traveled. Optimizing routes ideally would lead to reduction in the City's equipment inventory, as well as contribute to savings in personnel, vehicle maintenance and fuel

[1] Shoup, Donald: Cruising for Parking, 2007.

costs. The new, optimized routes had mixed results; the number of routes and fleet vehicles increased along with a slight increase in VMT, but the City witnessed a significant reduction in the number of labor hours and fuel costs.

Los Angeles Department of Transportation (LADOT): Measuring VMT Reduction from Shared Mobility Services through Real-Time Data

The City of Los Angeles pilot aimed to better verify the VMT impacts and benefits of carshare services by documenting the complete transportation behavior of people who participate in LADOT's Carshare Pilot Program, including the BlueLA electric vehicle carshare pilot. Surveys were developed to include before and after mode shift information by common trip types, evaluate other factors such as change in auto-ownership, parking demand, and user-satisfaction, and would help identify any barriers to greater utilization such as curbside management practices. The combination of survey data and origin-destination data provided the VMT performance.

Los Angeles had attributed a 0.7% maximum decrease in VMT as a result of carsharing and this pilot was designed to verify the VMT impacts and benefits of carshare services by documenting the complete transportation behavior. LADOT could then encourage enrollment in carshare strategies, and via outreach with housing developers, this allowed for the encouragement and promotion of carshare by reserving preferential on-site parking for car-share providers, enrolling on-site residents or workers into the carshare membership as a benefit through their building lease agreement, or incentivizing residents in housing complexes to participate in BlueLA for the first time. Unfortunately incentivizing residents proved challenging; the pandemic had dramatically altered participant preferences and a perceived risk of potential disruptions with new technology meant that people preferred to use their trusted transportation modes (car, bus, train).

City of Monrovia: Biking for Bucks Program

The Biking for Bucks program is a "ride-to-own" bicycle program, developed to evaluate how incentives and removing barriers to bicycle ownership encourages bicycle transportation within the City. The approach was to incentivize an increase in bicycle ownership and participation, providing residents with the means to choose a bike ride over a personal vehicle and thus reducing VMT.

Monrovia aimed to mitigate financial barriers to bike ownership by providing full or partial reimbursement up to $350 for a bicycle or bicycle accessory purchases. Residents of the City of Monrovia and employees of Monrovia businesses were eligible to apply for reimbursement for purchases made between July 1, 2021 – September 30, 2021. The program was so popular, however, that the City extended the deadline to make reimbursements apply until February 28, 2022. While over 1,100 applications were received, only 503 were accepted for reimbursement due to many applications being duplicates, incomplete or ineligible. Successful applicants were then asked to complete two surveys and track their bicycle trips using an Activity Tracker. The surveys received modest 46% and 61% response rates, respectively, while the Activity Tracker was only utilized by a disappointing 13%, resulting in incomplete quantification of VMT and greenhouse gas emissions reductions. However, Biking for Bucks was successful in aiding 503 applicants, including 44 low-income applicants, with purchasing bikes or accessories that enabled them to replace vehicle tips with bicycle trips. With nearly $200,000 budgeted for reimbursements

and a maximum reimbursement of $350, the program had the capacity to reimburse 564 participants, resulting in a resource utilization rate of 89%.

City of Ontario: Smart City Rapid Validation Hub

The City of Ontario developed a Smart City Rapid Validation Hub. At the core of their proposed solution is a physical location to enable the community to directly engage with Smart City Ontario efforts, a real-world technology testing zone, smart bin commercial refuse pilot, and a final-mile micro mobility program. In comparison to the other projects selected by SCAG, Ontario's approach was unique because it allowed for a range of technologies associated with reducing VMT to be explored which expanded the total projects and technologies supported by SCAG throughout the region by more than 40%.

The grant was expected to reduce 360,000 VMT, increase asset utilization, and provide unmatched access to important services. There were also significant unforeseen impacts unfolding behind the backdrop of ratcheting US/China tariffs, the emergence and persistence of the global COVID-19 pandemic, and the risk of start-ups to deliver on the promise of their offerings. The grant's period of performance was altered and expectations about outcomes were dramatically adjusted in response to these realities. The actual results covered the period from July 2019 through March 2023 and were derived from over 108 million collected traffic data points and a total reduction of 272,321 VMT. Three of the four micro-projects (Smart City Hub, Final Mile Mobility and Incentives, and Smart Collection of Commercial Refuse) directly contributed to the total VMT reductions, and all pilot projects produced community benefit.

There were also invaluable insights developed in addition to the direct metrics captured through the grant. These insights were critical to the successful execution of the grant and will have lasting value in guiding future smart city and other innovation initiatives aimed at making the city of Ontario a great place to live and work.

City of Riverside: Integrated Electronic Plans Solution

The City of Riverside enhanced its commitment to customer service by creating a "One Stop Shop" of all City departments that are part of the development process, and a significant portion of that effort was the proposed Integrated Electronic Plans solution. This concept could provide a digital experience for all customers by eliminating the need to travel to city hall. The City added the final piece of a digital "One Stop Shop" platform for online permitting applications and integrated electronics plan submittal and review as a part of this program, and the online services offered allowed customers to perform their entire permitting process online.

Riverside then could track the volume, type of permit, and status of all permits processed and therefore had rich data available for analysis and trending. To analyze the scope of VMT traveled, staff needed obtain the quantity of permits and enter the related VMT information into the EMFAC model. Part of the permitting process includes the review and approval of construction plans which requires contractors and residents to appear in City Hall for plan submission, and on average, with three trips prior to approval. Electronic submittal of plans will eliminated nearly all of these trips to City Hall. This service, like the other online portal services in this program, was responsible for a significant amount of VMT reduction due to the volume of customers visiting city

hall, the need for multiple rounds of review and trips to city hall, and the distance some customers are traveling through Southern California to Riverside city hall.

San Bernardino County: Remote Electronic Warrants

Law enforcement officers previously were required to spend significant time traveling to court to obtain search and arrest warrants. Previously, there was no way to avoid making those trips, because the officer was required to swear, under oath, that everything in the warrant application was true. Recent legislation eliminated the oath requirement for warrant applications and paved the way to submit warrants electronically. Warrant applications had been submitted to San Bernardino's judges electronically for many years, but various technological and legal barriers have precluded the full range of using the system, particularly during court hours. With the legal barriers removed, the County could tackle the technological barriers as a part of this grant program.

As such, the court was able to work with law enforcement agencies and build a system which allows for the reliable, accurate, efficient, and secure processing of search and arrest warrants, all without the officer needing to drive to court. San Bernardino County being the largest geographic county in California (and the contiguous US) the potential VMT savings were immense. Following the implementation of the portal however the County realized the tool had surpassed its intended VMT goals and emerged as one of the most effective pilots in this program. The original intended VMT reductions of approximately 12,000 miles per month was far exceeded; in less than two years, the portal effectively removed over 400,000 miles from the roadway, with impressive savings realized in fuel and labor costs.

2.2 Methodology

2.2.1 Holistic Assessment of Pilot Projects

In the evaluation of the Future Communities Pilot Program (FCPP), our methodology adheres closely to the framework provided by Nelson\Nygaard (see Appendix A), as detailed in their comprehensive guidance document. This approach centers on the critical objective of reducing Vehicle Miles Traveled (VMT), a key indicator of transportation efficiency and environmental impact. The methodology is designed to capture and quantify the effects of the various pilot projects in terms of VMT reduction, thereby contributing to a broader understanding of their efficacy in achieving the program's sustainability goals.

It is important to recognize that while VMT reduction is a primary focus, the evaluation of pilot projects encompasses a broader range of considerations. These include impacts on air quality, program costs, user experience, and productivity enhancements. This holistic perspective ensures that the assessment captures not only the direct effects on transportation metrics but also the wider implications for community health, municipal efficiency, and user satisfaction. Some pilot projects may demonstrate benefits in these additional areas even if they do not yield substantial reductions in VMT. Therefore, while VMT reduction remains a central metric, our methodology is structured to highlight the multifaceted impacts of the pilot projects, acknowledging that projects contributing positively to various aspects can be valuable and worth implementing, despite potentially modest VMT savings.

2.2.2 Research into VMT Savings

The measurement of VMT savings has gained increasing importance in recent years, particularly in the context of reducing greenhouse gas (GHG) emissions and other pollutants.

This has been driven in part by cities and other jurisdictions seeking to reduce congestion and improve the quality of life of their residents. At state level a big change to has occurred through the passing of California Senate Bill 743 (SB-743) which represents a significant shift in transportation planning and environmental review processes in the state. Instead of relying on Level of Service (LOS), a metric focused on vehicular traffic flow and congestion, SB-743 mandates the use of VMT as the primary metric for assessing the transportation impacts of development projects. This change emphasizes reducing greenhouse gas emissions and encouraging multimodal transportation, as VMT focuses on the total amount of vehicle travel induced by a project, rather than just the delay experienced by drivers.

Many transportation measures outlined in resources like the CAPCOA report, the "Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity," aim to reduce GHG emissions by focusing on the key source metric of VMT. The reduction in VMT is achieved through various means, such as decreasing vehicle ownership, reducing the number of vehicle trips, shortening vehicle trip lengths, or a combination of these factors. The formula for calculating VMT in a study area takes into account the number of vehicles and the frequency and length of trips. This emphasis on VMT measurement reflects a growing recognition of its role in environmental sustainability and urban planning.

CAPCOA Report

The CAPCOA report, the "Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity," is a comprehensive guide designed to aid local governments, institutions, project developers, and communities across California in addressing the multifaceted challenges of climate change. It emphasizes the profound effects of climate change on people and planning in California, highlighting the need for local governments, institutions, project developers, and communities to prepare for growing climate impacts while actively working to reduce GHG emissions. The report provides valuable data and methods to design and build healthier neighborhoods, develop solutions for clean air, and create more equitable, resilient communities and economies.

The report highlights the increasing experience of local governments and communities with the effects of climate change, prompting the development of measures and plans to mitigate and adapt to these effects. To combat the challenges of climate change, the report suggests that local, state, and national governments must create measures to mitigate the root cause of the issue, including GHG emissions from human activities.

The CAPCOA report categorizes emission reduction measures into nine sectors, each focusing on a similar emissions source or process. Of particular relevance to this study are measures in the transportation sector. These include strategies that promote transit and alternative transportation, support the use of alternatively fueled vehicles, and strategies that encourage land use planning practices aimed at reducing vehicle trips and VMT.

2.2.3 VMT Reduction

Our methodology for calculating VMT reduction starts with establishing a baseline for VMT by collecting historical data that reflects existing travel patterns and distances. This baseline is crucial as it serves as a reference point against which the impact of the pilot projects can be measured. Once the baseline is established, the change in VMT is calculated by tracking variations in the number of trips taken and the average trip length (both in terms of distance and time) after the implementation of the pilot projects. This involves a detailed analysis of travel data, which includes travel surveys, address information, vehicle counts and data and metrics.

The following formula is used to quantify the VMT reduction:

Δ VMT = (Δ number of trips taken) x (Δ average trip length)

As there are various timescales over which the pilot projects were operational, we have annualized the VMT savings for all projects to provide a consistent basis for comparison.

Electronic Approval Systems (Riverside, San Bernardino, Cerritos)

For the Riverside, San Bernardino and Cerritos pilot projects, the methodology to evaluate VMT reductions involved collecting address data from service requests to identify the origins of potential trips and used known information for the destination end of the trip, such as City Hall or a particular Courthouse. This data was then used with Google Maps to calculate the distances of these would-be trips to the appropriate service locations, estimating the VMT that would have been incurred for physical travel. These distances were aggregated over a specified period to determine the total estimated VMT and then converted to an annual value. To ensure accuracy and relevancy of the data, maximum cutoff distances were applied to exclude excessively long or unrealistic trips.

Bicycle Incentives (Monrovia)

The methodology for calculating VMT reductions in Monrovia's bikeshare program under the involved using data on program participation and bike usage which were primarily collected through a Biking for Bucks Activity Tracker, where participants recorded their bike trips. However, this was a voluntary tool, and not all program participants used it consistently, which presented challenges in data comprehensiveness. The actual VMT reductions were estimated using the information obtained from the Activity Tracker and surveys that were conducted with program participants to gather data on the frequency of bicycle usage, the purpose of bike trips, and the replacement of car trips with bike trips. These surveys were crucial in understanding the extent to which bicycles were being used in place of vehicles.

Car Share (LADOT)

The BlueLA electric car share program obtained baseline VMT metrics from the vehicle location technology (GPS). VMT could be defined easily from the start of a vehicle, initiating the trip and its respective starting location, and ending when the vehicle has reached its destination. As a part of a customer’s profile, the vehicles can track VMT from one-way trips, two-way trips, and a number of other useful characteristics. VMT reductions were calculated using the same data source and metrics but post-implementation of interventions and strategies to incentivize use. VMT reduction calculations assumed members are driving approximately 50% less when they have access to

BlueLA and can utilize carshare to supplement their overall VMT. However, the coinciding pandemic had a dramatic impact on ridership and behaviors. Despite multiple strategies and attempts to incentivize riders, the project was unable to attract new riders or encourage existing riders to make notable changes in their current car share use. VMT reductions were calculated from BlueLA data, similar to the baseline, but at a time period following the pilots' best efforts at marketing, outreach, and otherwise incentivizing increased ridership.

Parking Optimization (Anaheim)

For the parking optimization project, VMT reductions were estimated using previously installed parking sensors that captured parking utilization characteristics at several downtown parking lots. Digital parking signs indicate real-time parking capacity and encourages drivers to park rather than "cruise" around in search of parking. VMT reductions were calculated from parking lot occupancy data for the baseline and with the project operational, as well relative to distances between key parking locations. The methodology also integrated critical information from recent parking studies to apply known behavioral driving patterns to estimate VMT reductions when removing the need to seek out parking.

Refuse Collection Optimization Project (Glendale)

The Glendale project calculated baseline VMT using the original refuse collection routes. They were digitized and analyzed to calculate baseline figures, and following the optimization of the routes, VMT impacts could be compared relative to the observed baseline metrics.

Smart City Project (Ontario)

The Ontario pilot project consisted of three different sub-projects for which VMT was measured as follows:

Smart City Hub: Utilized data from smart city technologies and sensors to monitor and analyze transportation modes and activities within Ontario's downtown. VMT reduction was calculated by comparing this data to historical traffic patterns, focusing on changes in trip frequency and lengths.

Intelligent Refuse Collection: Involved deploying sensors in refuse bins to optimize collection routes. The methodology for measuring VMT reductions centered on comparing the mileage of refuse collection vehicles before and after the implementation of sensor-based route optimization, aiming to demonstrate a decrease in miles traveled.

Final Mile Mobility: Employed electric scooters and robots for last-mile connectivity. VMT reductions were measured by tracking the usage of these mobility solutions, with the assumption that their use substituted for personal vehicle trips, thereby reducing total vehicle miles.

2.2.4 Air Quality

In measuring the air quality impacts of the Future Communities Pilot Program, we utilized the EMFAC2021 v1.0.2 model, focusing on the South Coast and Mojave air basins, with 2023 as the year of analysis. This approach involved:

- Selecting appropriate fleet types for each pilot project, reflecting the diversity in vehicle usage across different initiatives.

- Using the annual Vehicle Miles Traveled (VMT) savings already calculated as a key input, ensuring a direct correlation between VMT reductions and emissions.
- Applying EMFAC2021 to estimate emission rates for various pollutants such as CO2, NOx, and PM10, tailored to the specific fleet composition and fuel types of the pilot projects.
- Comparing these emission estimates with baseline data to determine the air quality improvements attributable to the project, thus providing a clear picture of the environmental benefits achieved.

2.2.5 Program Costs

Our analysis of program costs for the Future Communities Pilot Program adopted a comprehensive approach, mindful of the perspective of other jurisdictions considering similar projects. The key aspects of our cost analysis methodology are as follows:

- **Direct Project Costs:** We began by examining the direct costs incurred by the city for implementing each pilot project. This included a detailed assessment of expenses such as technology, infrastructure, and importantly, staff time devoted to project execution and management. We looked at both the one-off costs of implementing the project and the on-going costs associated with operation.
- **Cost Savings Analysis:** A separate analysis focused on the cost savings resulting from the pilot projects. A notable example is the San Bernardino pilot project where the reduction in staff time for police officers, who no longer need to travel for arrest warrant approvals due to the pilot project implementation. These savings represent a significant aspect of the program's value.
- **Separate Consideration of Public Cost Savings:** Cost savings for the general public have been addressed distinctly in our evaluation. For a detailed understanding of these savings, readers are referred to Section 2.2.7, which delves into the user experience. This section outlines how the projects have economically benefited the community at large, beyond the direct scope of municipal operations.

Our treatment of program costs, therefore, provides a comprehensive analysis that not only encapsulates the direct financial implications for the city but also considers the broader economic impacts on municipal operations. This holistic approach ensures that the analysis of the pilot projects is useful and relevant for other jurisdictions considering similar projects.

2.2.6 Productivity

Our approach to evaluating the productivity aspect involved:

- Assessing the level of adoption and frequency of use of each pilot project, providing a clear indicator of how well these initiatives have been integrated into the daily lives of the community and municipal operations.
- Monitoring the number of users and the extent of service utilization, which served as key indicators of the project's success in meeting its intended goals. High usage rates not only signify project popularity but also indicate efficiency gains in municipal services and local transportation systems.

- Measuring changes in resource allocation and utilization, such as the number of vehicles in service or changes in service patterns. This allowed us to understand how the projects have impacted the efficiency of existing infrastructure and resources.

By focusing on project uptake, our productivity analysis provides valuable insights into how effectively the pilot projects have been implemented and embraced by the community.

2.2.7 User Experience

Our approach to understanding the effect of the pilot projects on the user experience included the following items:

- **Customer Satisfaction Surveys:** A core component of our assessment was the use of customer satisfaction surveys. These surveys were designed to gather direct feedback from users on various aspects of the services provided. The surveys included questions about the ease of use, satisfaction with the service, and any improvements users would like to see. The data collected through these surveys offered vital insights into the users' perspectives and satisfaction levels.
- **Anecdotal Evidence from Jurisdictions:** To supplement the structured feedback from surveys, we also collected anecdotal evidence from the jurisdictions involved. This included observations and informal feedback about the services, such as changes in the number of complaints or compliments from residents. This qualitative data provided a more nuanced understanding of the user experience, highlighting areas of success and opportunities for improvement.
- **Cost Savings Analysis:** An important aspect of user experience is the economic impact on the general public. In this regard, we assessed the cost savings to the public, particularly in terms of VMT reductions. By reducing VMT, there is a consequential decrease in the public's expenditure on vehicle maintenance, fuel costs, and other associated expenses. This analysis not only quantified the economic benefits but also served as an indicator of the broader positive impact of our services on users' financial well-being.

3 Problems Encountered

3.1 Policy Considerations

When working with innovative and emerging technologies, it is common to encounter a regulation or policy (or lack thereof) that can have negative impacts on project progress. Some key regulatory challenges include standardization, safety and liability, infrastructure readiness, privacy and data security, land use and zoning, and education related to public awareness and perception.

- **Lack of Standardization:** The absence of standardized regulations for emerging technologies can make it difficult for companies to scale their pilot technologies and leads to interoperability issues, as witnessed in Ontario's trash refuse collection pilot.
- **Safety and Liability Concerns:** Innovative mobility solutions, such as autonomous vehicles or micromobility, are sometimes met with unclear guidelines and liability frameworks for accidents. The unique nature of emerging technologies often requires public-private partnerships, and public entities and their elected officials can have concerns about liability, as seen in Ontario's experience with the micro-mobility pilot.
- **Infrastructure Readiness:** Smart infrastructure tends to develop at a rapid pace and regulations may not accommodate new infrastructure quickly enough to adequately support. In the Anaheim pilot, the City discovered older infrastructure could not support the new digital wayfinding signs and needed replacing, causing significant delays. The Glendale pilot required purchasing additional equipment and infrastructure for the refuse trucks to implement new routes.
- **Privacy and Data Security:** The collection and protection of data associated with emerging and smart technologies remains an important consideration without much regulatory oversight. The gathering, processing, storing, and sharing of data, including personal and location-based data, should have clear regulations and standardized requirements. The LADOT pilot with BlueLA was particularly sensitive and respectful to data best practices and actively worked with the Mobility Data Specification (MDS) group to champion new regulatory standards for mobility technologies, and the San Bernardino County project was only made possible by the passing of new legislation, AB2710, allowing remote submission of warrants.
- **Land Use and Zoning:** Zoning laws and existing land uses will not always accommodate the latest in mobility or smart city technologies. Ride sharing and micro-mobility solutions, as seen in the Monrovia and Ontario pilots, require significant buy-in from planning and zoning groups as it relates to accommodation for new technologies. Monrovia and Ontario were both mindful of utilizing micromobility in meaningful, higher-density locations and within existing or new regulations. Ontario required City Council approval before micro-mobility could be deployed.

- **Education and Public Perception:** For many of the reasons above, education is critical to obtain community support and a maintain a successful technology deployment. Resistance and opposition from communities is possible when the lack of regulatory frameworks and policies cannot address community concerns.

As a best practice, communities should be proactive to address these challenges and a collaborative, regional approach can help. Working with government bodies, industry stakeholders, and the public to develop flexible and adaptive frameworks that balance innovation with safety, privacy, and societal concerns.

4 Emissions Benefits and Other Benefits

This Section presents a compilation of KPI results for each pilot project using the methodology described in Section 2 and the analysis set out in the Technical Analysis appendix (Appendix B), providing a comprehensive view of the impact and effectiveness of the different pilot projects. The results encompass a range of metrics, including Vehicle Miles Traveled (VMT) reductions, enhancements in user experience, cost savings, and qualitative feedback from the jurisdictions involved. The findings not only reflect the success and challenges of the implemented pilot projects but also offer valuable insights for future planning and decision-making. Through this section, we aim to transparently communicate the tangible benefits and improvements realized in the communities that hosted the pilot projects.

4.1 Summary of Emissions Benefits

We set out the results of emissions benefits for the pilot projects in Table 3.1.

Table 4.1: Summary of Pilot Project Results

Key Performance Indicators (KPIs)	City of Anaheim	City of Cerritos	City of Glendale	City of Monrovia	City of Riverside	County of San Bernardino	City of Ontario	City of Los Angeles DOT
Annual Vehicle Miles Traveled (VMT)	402,412.5	68,806	-9,152	24,482.2	146,943	266,233.9	102,656.8	82,875
Annual Number of Trips (mi)	160,965	2,892	6,084	6,772	11,748	24,254	n/a	30,692
Average Trip Length (mi)	2.5	23.8	48.5	3.76	12.51	10.98	n/a	38.53
CO (Carbon Monoxide) lbs.	1,011.01	189.62	270.55	67.47	360.78	1,644.50	256.75	3,490.85
CO_2 (Carbon Dioxide) lbs.	255,240.24	45,187.21	77,666.82	16,078.28	94,218.71	200,402.20	65,577.22	831,868.01
NO_X (Nitrous oxides) lbs.	63.08	11.87	25.24	4.22	22.23	145.55	15.73	218.60
ROG (Reactive Organic Gases) lbs.	107.80	19.68	1.24	7.00	35.87	211.39	25.75	362.26

SO_X (Sulphur oxides) lbs.	2.57	0.45	0.00	0.16	0.95	2.03	0.66	8.36
PM_{10} (Particulate Matter) lbs.	15.93	2.83	4.77	1.01	5.37	11.03	3.86	19.79
$PM_{2.5}$ (Particulate Matter) lbs.	5.70	1.03	0.17	0.37	1.91	4.29	1.37	9.73
CH_4 (Methane) lbs.	8.56	1.59	87.14	0.57	2.88	13.94	2.03	29.28

The results offer a combination of outcomes, learnings, and insights from the various pilot projects. These projects are each unique to their specific contexts and challenges and collectively contribute to a deeper understanding of the measures that cities and counties can use to help reduce VMT and make a positive step forward in tackling climate change.

Among the highlights, certain projects stand out for their exceptional performance. For instance, projects like the San Berardino and the Anaheim pilots demonstrated cost effective reductions in VMT. Similarly, the Riverside and Cerritos pilots, with their innovative approaches to online automation of services showcased the potential of technology in reducing environmental impacts.

Alongside these successes, the results also reveal some potentially surprising findings. Some projects that were expected to perform strongly encountered unforeseen challenges. For instance, the Monrovia pilot had to pivot from its original plan due to the COVID-19 pandemic, shifting from a shared ride study to a bikeshare program. This pivot, while challenging, brought forward new learnings about community engagement and adaptability in the face of external disruptions.

The nuanced nature of these projects is evident in the varying degrees of success in achieving VMT savings. While some projects demonstrated significant reductions in VMT, others found more moderate success. Factors such as community size, geographic location, existing infrastructure, and the specific nature of the interventions all played a role in determining the outcomes.

4.2 Effectiveness of the Pilot Projects in Reducing VMT

In the comparative analysis section of our report, we focus on evaluating the pilot projects through a specific lens: the cost-effectiveness measured in terms of dollars per Vehicle Miles Traveled ($/VMT). This metric offers a straightforward way to compare the financial efficiency of each project in reducing VMT. Table 3.2 is presented to illustrate these comparisons.

Table 4.2: Pilot Cost Effectiveness for Reducing VMT

Pilot Project	Annualized Project Lifecycle Cost	Annualized VMT Savings	Lifecycle Cost per VMT Saved
Anaheim	$49,963.40	402,412.5	$0.12
Cerritos	$44,794.25	68,806	$0.65
Glendale	$202,104.88	-9,152	-$22.08
Los Angeles	$4,386,737.53	82,875	$52.93
Monrovia	$77,200.00	24,482.2	$3.15

Ontario	$60,120.00	102,656.8	$0.59
Riverside	$64,995.89	146,943	$0.44
San Bernardino County	$39,633.20	266,233.9	$0.15

The best performing projects under the $/VMT metric are San Bernardino and Anaheim. They are very different projects, with the San Berardino project reducing VMT significantly across the county due to the warrant system being digitized and the Anaheim project helping direct drivers to available parking and removing wasted VMT cruising for spaces in a congested downtown area, however both projects benefit from relatively modest lifecycle costs and strong VMT savings.

It should be noted that while the Glendale project does not reduce VMT, there is actually a reduction in emissions due to the optimized refuse collection routes. This occurs due to the fact that refuse vehicles consume much more fuel when traveling door to door collecting trash than they do on a trip to the dump traveling with general traffic, and the optimized set of routes selected by the city are shorter, but with more trips to the dump.

It's crucial to acknowledge that while $/VMT is a significant indicator, it does not encompass the full spectrum of benefits each pilot project brings. Some initiatives, despite scoring less favorably on this metric, contribute substantially to their respective jurisdictions in other valuable ways. These benefits could include indirect cost savings to the jurisdiction or the public, convenience for staff or quality of life improvements.

Furthermore, it's important to consider the unique circumstances surrounding each project. Factors such as geographical context, population density, and local infrastructure significantly influence the outcomes and effectiveness of these initiatives. Additionally, the unprecedented impact of the COVID-19 pandemic has varied across projects, affecting some more severely than others. This disruption has undoubtedly skewed some of the results and should be taken into account when interpreting the data.

4.3 Summary of Other Benefits

In addition to the primary objectives of reducing Vehicle Miles Traveled (VMT) and mitigating emissions, the Future Communities Pilot Program (FCPP) has yielded a broad array of ancillary benefits that have positively impacted the participating communities. These benefits are not directly related to VMT or emissions savings but nonetheless have contributed to the overarching goals of the program by enhancing economic efficiencies, improving public services, and elevating the quality of life for residents. The following table provides a summary of these key performance indicators across the various pilot projects, highlighting the various benefits that the FCPP has delivered.

Table 4.3: Summary of Pilot Project Results

Key Performance Indicators (KPIs)	**City of Anaheim**	**City of Cerritos**	**City of Glendale**	**City of Monrovia**	**City of Riverside**	**County of San Bernardino**	**City of Ontario**	**City of Los Angeles DOT**

Annual Vehicle Miles Traveled (VMT)	402,412.5	68,806	-9,152	24,482.2	146,943	266,233.9	102,656.8	82,875
Cost Savings	Over $65,000 in fuel costs per annum	Saved two full time positions' salary of $166,400	13% reduction of fuel use; reduced 49 trips to the dump per week	Users each save $1,000 annually	Staff hourly labor reduction of $41,702.93	Saved $84,700 dollars in fuel costs; saves 6,000 hours of police time	n/a	Saved $6.7 million dollars in fuel
Number of Customers Served/Users Served	160,965	2,529	85,298	503	3,036	2,000	428,000	17,782
Resource Utilization	441 additional parking spaces utilized	85-90%	100%	89%	82%	97%	n/a	33%
Customer Satisfaction	Reduction in parking complaints; significant increase in parking utilization	Increase in submissions due to ease of platform	City and employees no longer need to work overtime	92% very satisfied or satisfied with program	Reduced driving hours by 4,900	After-hour submission offers flexibility	Resident attendance high in smart city events	90% of members remain in BlueLA

Some projects, while not providing significant VMT savings, did have other notable benefits. For example, the Glendale project did not produce VMT savings, but did allow shorter working days meaning the City saves money through reduced overtime payments. Similarly, San Bernardino County's pilot project saves police time that can be used to improve service elsewhere. The City of Cerritos's technological solution that is estimated to have saved two full-time positions' salaries, amounting to $166,400, illustrating the potential for smart technology to optimize workforce allocation.

Other noteworthy outcomes that have tangibly improved community well-being include the City of Anaheim's improved neighborhood parking situation, and the City of Monrovia's health and well-being associated with improving access to active transportation.

The City of Ontario's smart city initiatives fostered high community engagement in smart city events, signifying a robust public interest in sustainable urban development. Similarly, the City of Los Angeles's BlueLA program reflects a shift in community transportation preferences, with 90% of members remaining in the program, signifying strong user endorsement for eco-friendly transportation options.

Additionally, those pilot projects that reduced the need for the general public to drive, particularly the Cities of Anaheim, Cerritos and Riverside, benefit the public by saving them time traveling and by reducing their expenditure on gasoline and wear and tear associated with vehicle upkeep.

5 Photographs and Outreach

The photos below document the work completed by SCAG to solicit interest in participating in the pilot, as well as the work completed within each of the pilots.

5.1 SCAG Program Outreach

SCAG solicited participation in the program by developing a call for projects based on the initial Future Communities Framework. Both are pictured below. They made use of graphics to demonstrate program goals and priorities.

Figure 5-1. SCAG Future Communities Framework report cover

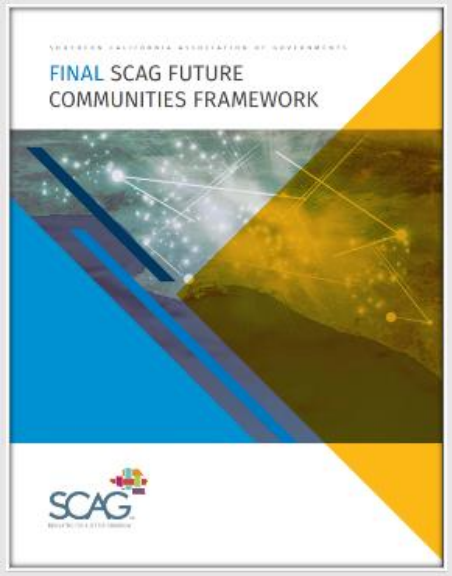

Figure 5-2. SCAG FCPP Call for Applications

Figure 5-3. SCAG Graphic demonstrating benefits of the FCPP projects

5.2 Pilot Program Outreach and Documentation

Each pilot solicited participation and was documented graphically according to unique project needs. A selection of those images are included below.

Figure 5-4. Excerpt from City of Anaheim website documenting usage of FRAN service

Figure 5-5. FRAN vehicles in City Center Anaheim

Figure 5-6. Excerpt from article detailing impact of Cerritos pilot project

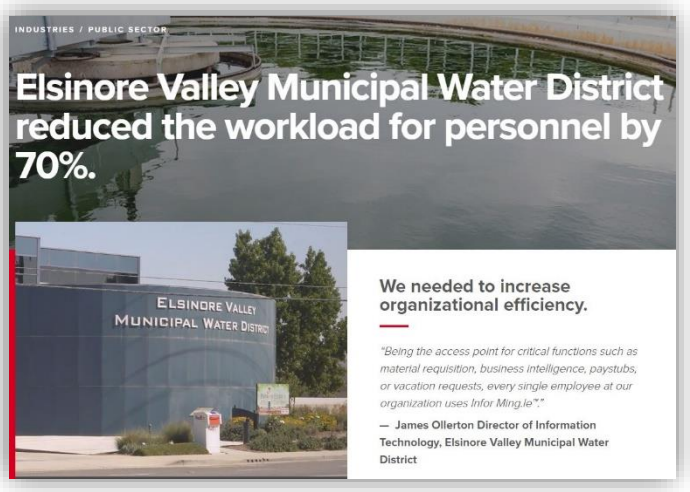

Figure 5-7. Excerpt from article detailing impact of Glendale pilot project

Figure 5-8. Image of Blue LA vehicle used in LADOT pilot project

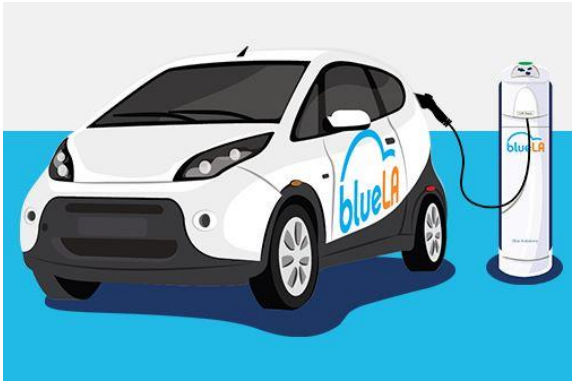

Figure 5-9. Advertisement for original Monrovia pilot project

Figure 5-10. eScooters within the Smart Validation Hub in historic downtown Ontario

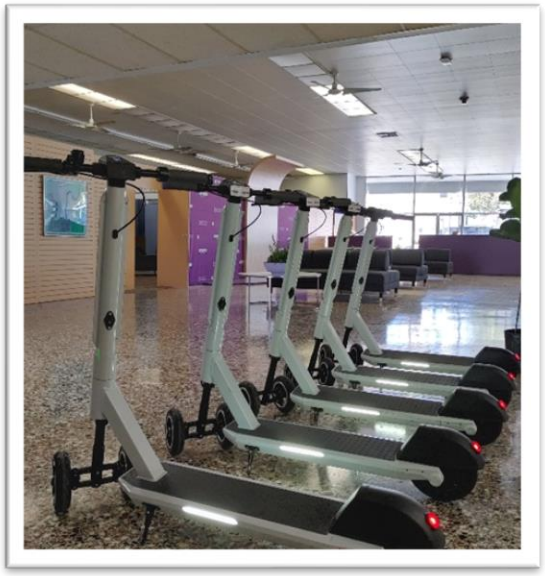

Figure 5-11. A local Ontario resident from the Smart City Zone leads "George" the robot from the public library to his house

Figure 5-12. Screenshot from Riverside online permit portal

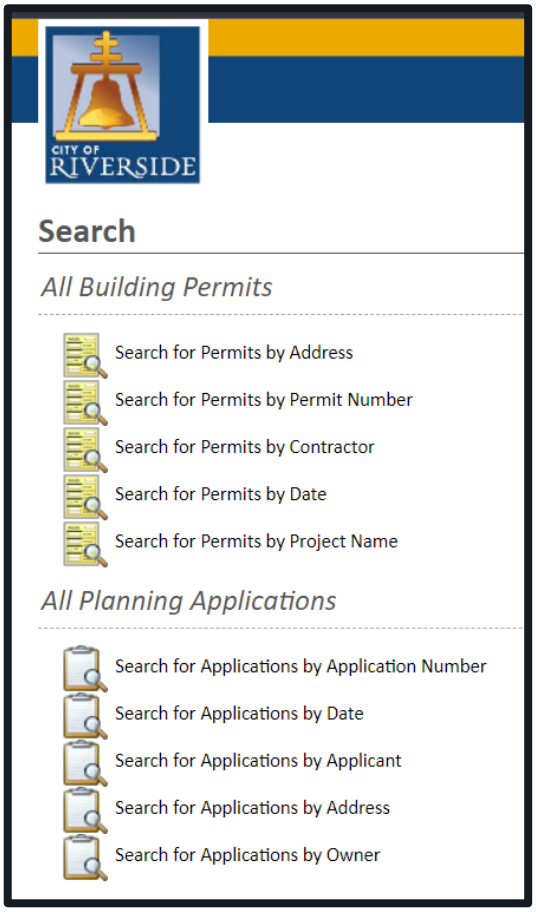

Figure 5-13. Excerpt from article detailing impact of Riverside pilot project

Residents Government Business Services Media

Riverside's "One Stop Shop" Boosts Customer Service, Welcomes Investment

Published: 5/31/2017

Innovative approach combines city departments on one floor, improves customer service at City Hall

RIVERSIDE, Calif. – The City of Riverside has upped its commitment to customer service even further by creating a "One Stop Shop" that brings together on one floor all City departments that are part of the development process, with exclusive use of an express elevator, cell phone charging stations and a concierge-type system that helps customers obtain permits and approvals faster than ever.

Figure 5-14. Graphical list of San Bernardino County sheriff stations

6 Summary and Conclusions

6.1 Summary

Curtailing community-level Vehicle Miles Traveled (VMT) is a critical factor in combating urban congestion and reducing greenhouse gas emissions. The pilot projects assessed in this report highlight a range of diverse measures, each uniquely tailored to address the specific needs and characteristics of the participating communities.

All of the pilot projects have delivered pronounced benefits to their respective communities, albeit with varying degrees of efficacy in VMT reduction. Our analysis shows this variance, employing a cost-per-VMT-saved metric that provides a quantitative measure of each pilot's effectiveness.

Among the array of projects, some emerge as 'quick wins': projects that not only promise immediate VMT savings but also yield considerable time and cost savings for staff and the public. These initiatives stand out for their immediate, tangible benefits and show how targeted interventions can lead to rapid gains in efficiency and sustainability.

Conversely, the report acknowledges that other projects, while potentially more costly per VMT saved, should not be undervalued. These initiatives may play a vital role in a broader, long-term strategy aimed at fostering behavioral change and systematically reducing VMT over time. Though their immediate cost-effectiveness may be less pronounced, their value lies in their potential to contribute to a cumulative, enduring impact on travel behavior and community planning.

Our analysis also points to the importance of understanding community contexts, the need for diversified approaches, and the significance of both immediate and long-term strategies in the pursuit of reducing VMT and advancing sustainable community development.

6.2 Recommendations for Regional Implementation

Regional governance can facilitate the successful implementation and scalability of pilots such as these elsewhere in the region. With a coordinated approach, Southern California can test these technologies in other communities, contexts, and capacities to explore the potential for VMT and GHG reduction. Several immediate opportunities for the SCAG region include the following.

- **Cross-Agency Task Forces.** Steering committees, technical advisory committees, and agency working groups comprised of relevant staff from across multiple agencies offer a holistic, collaborative approach to regional teamwork. To continue reducing VMT and GHG, representatives from transportation, urban planning, environmental agencies, and public safety should be involved.
- **Comprehensive Regulatory Framework.** SCAG, in cooperation with partner municipalities, should create a clear and adaptable regulatory framework that addresses the safety

standards, data governance and privacy requirements, liability concerns, and environmental impacts that relate to projects like the ones carried out through FCPP. Policies can then be built from this framework. One example is the SCAG Technology Guiding Principles which offers concise but flexible policy recommendations which can be adapted to any community.

- **Public-Private Partnerships (PPP).** It is critical for public agencies to engage with private companies when it comes to innovative, clean, and emerging technologies. Without adequate partnerships to address funding, technology deployment, and technical expertise, the capacity to manage responsibilities and risks can be challenging.
- **Infrastructure Investments.** Significant investments in infrastructure readiness will prepare the region for current and future technologies. By allocating sufficient resources to the development and maintenance of smart infrastructure, technology projects will be capable of supporting the connectivity requirements of emerging technologies.
- **Community Engagement and Education.** As a regional agency, one of the greatest values SCAG can bring to the region is through education and outreach. Engaging with community based organizations (CBOs), stakeholder groups, SoCal residents, and other public agencies is critical for addressing community concerns, securing public support, and ensuring equity is integrated from the ground-up.
- **Pilot Test Beds and Hubs.** Creating spaces to test newer technologies on smaller scales in real-world environments can help address the feasibility, safety, and public acceptance of mobility solutions. The Los Angeles Cleantech Incubator, or "LACI," is a great example of this.
- **Research Institutions.** Local, county, and regional governments alike can foster partnerships with research institutions and universities to leverage their expertise and maximize impact. Engaging in research projects with these institutions will help contribute to the successful development of innovative solutions and policies.
- **Monitoring and Evaluation.** Regional agencies can monitor pilots across multiple agencies, environments, and communities. Data that can be standardized, aggregated, and cover geographic areas outside an individual agency's boundaries offers great value to southern California. Similarly, agencies can then provide information to the region to make informed decisions on scaling, modifying, or discontinuing specific technologies.

By embracing a regional approach to collaboration and innovation, southern California can pave the way for the future of pilot technologies and the ever-changing needs of our mobility ecosystem. Partner agencies should evaluate the feasibility of the Future Communities Pilot Program technologies for replication, scalability, and financing.

A Future Communities Pilot Projects Evaluation and Metrics Guidance

B Technical Analysis

C Pilot Project Factsheets

Control Information

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