FACILITATING LOW INCOME UTILIZATION OF ELECTRIC VEHICLES: A FEASIBILITY STUDY

Puget Sound Clean Air Agency

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• Compass Housing Alliance
• ECOSS
• Envoy Technologies
• Everett Housing Authority
• Greenlining Institute
• King County Housing Authority
• Lopez Community Land Trust
• Mt. Baker Housing Village
• OPAL Community Land Trust
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PROJECT MANAGER AND PRIMARY AUTHOR: Angela Song
CONTRIBUTING AUTHORS: Kimberley Cline and Linda Lyshall
GRAPHICS COORDINATOR AND REVIEWER: Landon Bosisio
REVIEWERS: Julio A. Sanchez and Amy Warren

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# TABLE OF CONTENTS

**Acknowledgments** ........................................................................................................................................i

**Executive Summary** ...................................................................................................................................... 1
  - Introduction ............................................................................................................................................... 1
  - Methodology .......................................................................................................................................... 3
  - Key Findings .......................................................................................................................................... 3
    - Findings from Affordable Housing Organizations ............................................................................. 3
    - Findings from Literature Review ......................................................................................................... 4
    - Findings from Surveyed Communities .................................................................................................. 4
  - Recommendations ................................................................................................................................... 7
    - Pilot Project Model A: Subsidized Community-Owned Shared Vehicle ................................................. 8
    - Pilot Project Model B: Mobility as an Amenity ....................................................................................... 8

**Section 1: Incentives and Research** ........................................................................................................... 11
  - Methodology ........................................................................................................................................ 12
  - Barriers and Opportunities for Individual Ownership, Car-Sharing, and Rideshare Platforms ............. 13
    - Barriers .......................................................................................................................................... 13
      - Cost ........................................................................................................................................... 13
      - Charging Infrastructure ................................................................................................................. 13
      - Level of Awareness ...................................................................................................................... 13
      - Technology ................................................................................................................................. 13
      - Insurance ................................................................................................................................... 14
    - Opportunities .................................................................................................................................. 14
      - Incentives and Best Practices ........................................................................................................ 14
  - Car-Share and Rideshare Programs .......................................................................................................... 17
    - California ......................................................................................................................................... 17
    - Watts Community Revitalization ................................................................................................... 17
    - BlueLA ........................................................................................................................................... 17
    - City CarShare .................................................................................................................................. 18
  - Community Electric Vehicle Project ...................................................................................................... 18
  - Lopez Community Land Trust – Common Ground ........................................................................... 18
  - Buffalo CarShare ............................................................................................................................... 18
  - City of Seattle .................................................................................................................................... 19
Summary of Initial Findings ......................................................................................................................... 21

Section 2: Shared Electric Mobility Pilot Projects ............................................................................................. 22

Methodology ............................................................................................................................................... 22
Purpose ........................................................................................................................................................ 22
Project Goals ............................................................................................................................................... 22
Scope ........................................................................................................................................................... 22
Challenges ................................................................................................................................................... 23
Anticipated Benefits ................................................................................................................................... 23
Access ...................................................................................................................................................... 23
Economic .................................................................................................................................................. 23
Health ...................................................................................................................................................... 23
Environmental Justice .............................................................................................................................. 24
Air Quality and Climate ............................................................................................................................. 24
Congestion Mitigation ............................................................................................................................... 24
Mobility Needs Assessment .......................................................................................................................... 25
Overview .................................................................................................................................................. 25
Survey Findings ........................................................................................................................................ 25
Participating Entities ................................................................................................................................ 31
    Everett Housing Authority ................................................................................................................... 31
    King County Housing Authority ........................................................................................................ 34
    Mt. Baker Housing Association .......................................................................................................... 38
    OPAL Community Land Trust ........................................................................................................... 41
    Seattle Housing Authority ............................................................................................................... 43
    South Park Neighborhood Association ............................................................................................. 50
    South Park Information and Resource Center .................................................................................... 52
    Lopez Community Land Trust .......................................................................................................... 53
    Compass Housing Alliance .............................................................................................................. 53
Summary – Mobility Needs Assessment ................................................................................................. 54
Pilot Project Proposal .................................................................................................................................. 56

Overview .................................................................................................................................................. 56

Pilot Project Model A: Subsidized Community-Owned Shared Vehicle .................................................. 56
Pilot Project Model B: Mobility as an Amenity .................................................................................... 57

Pilot Project Proposal Summary .............................................................................................................. 58

Prioritizing Potential Pilot Projects ...................................................................................................... 59

Considerations and Criteria for Prioritization ............................................................................................. 60

Monitoring, Adaptation, and Evaluation Plan ............................................................................................. 64

Success Criteria ........................................................................................................................................ 64
Threats to Validity of Pilot Results ............................................................................................................... 64
Adaptation ............................................................................................................................................... 64

Data Collection Process ........................................................................................................................... 65

Projects on the Horizon for Future Consideration ...................................................................................... 65

Overview .................................................................................................................................................. 65
Community Education and Outreach ........................................................................................................... 65
Tacoma Housing Authority ........................................................................................................................ 65
Seattle Housing Authority .......................................................................................................................... 66
Mt. Baker Housing ................................................................................................................................... 66
King County Housing Authority ................................................................................................................ 66

Appendices ............................................................................................................................................... 67

Appendix A – EV Laws and Incentives: Grants ......................................................................................... 67
Appendix B – EV Laws and Incentives: Loans and Leases ........................................................................ 67
Appendix C – EV Laws and Incentives: Rebates ....................................................................................... 67
Appendix D – EV Laws and Incentives: Charging Infrastructure .............................................................. 67
Appendix E – EV Laws and Incentives: Taxes ........................................................................................... 67
Appendix F – EV Laws and Incentives: Exemptions ................................................................................ 67
Appendix G – Estimated Budget .............................................................................................................. 67
Appendix H – Puget Sound Clean Air Agency Mobility Survey Results .................................................... 67
Appendix I – SDOT High Point Mobility Survey Results ........................................................................... 67
Appendix J – SDOT Yesler Terrace Mobility Survey Results ..................................................................... 67
### FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>How Often Do You Travel More Than 50 Miles Per Day?</td>
<td>25</td>
</tr>
<tr>
<td>2</td>
<td>When Do You Most Need A Car?</td>
<td>26</td>
</tr>
<tr>
<td>3</td>
<td>If You Travel By Car, What Challenges Do You Face?</td>
<td>26</td>
</tr>
<tr>
<td>4</td>
<td>How Much Do You Know About Electric Cars?</td>
<td>27</td>
</tr>
<tr>
<td>5</td>
<td>Would You Be Comfortable Driving An Electric Car?</td>
<td>27</td>
</tr>
<tr>
<td>6</td>
<td>Why Are You Not Comfortable Driving An Electric Vehicle?</td>
<td>28</td>
</tr>
<tr>
<td>7</td>
<td>Have You Ever Used A Car-Sharing Service?</td>
<td>28</td>
</tr>
<tr>
<td>8</td>
<td>Which Car-Sharing Service Have You Used?</td>
<td>29</td>
</tr>
<tr>
<td>9</td>
<td>Would You Use A Car-Sharing Service If It Was Close By?</td>
<td>29</td>
</tr>
<tr>
<td>10</td>
<td>What Questions Do You Have About Using A Car-Sharing Service?</td>
<td>30</td>
</tr>
<tr>
<td>11</td>
<td>If You Had A Car-Sharing Service Available, What Are The Most Important Features?</td>
<td>30</td>
</tr>
<tr>
<td>13</td>
<td>Would You Use A Car-Share?</td>
<td>32</td>
</tr>
<tr>
<td>14</td>
<td>If Interested In A Car-Share, Which Payment Method Would You Prefer?</td>
<td>33</td>
</tr>
<tr>
<td>15</td>
<td>How Much Do You Know About Electric Cars?</td>
<td>35</td>
</tr>
<tr>
<td>16</td>
<td>Would You Be Comfortable Driving An Electric Car?</td>
<td>35</td>
</tr>
<tr>
<td>17</td>
<td>Would You Use A Car-Sharing Service If It Was Close By?</td>
<td>36</td>
</tr>
<tr>
<td>18</td>
<td>How Much Do You Know About Electric Cars?</td>
<td>36</td>
</tr>
<tr>
<td>19</td>
<td>Would You Be Comfortable Driving An Electric Car?</td>
<td>37</td>
</tr>
<tr>
<td>20</td>
<td>Would You Use A Car-Sharing Service If It Was Close By?</td>
<td>37</td>
</tr>
<tr>
<td>22</td>
<td>How Many Vehicles Are Available In Your Household For You To Use?</td>
<td>39</td>
</tr>
<tr>
<td>23</td>
<td>Why Are You Not Comfortable Driving An Electric Vehicle?</td>
<td>40</td>
</tr>
<tr>
<td>24</td>
<td>Would You Use A Car-Sharing Service If It Was Close By?</td>
<td>40</td>
</tr>
<tr>
<td>25</td>
<td>When Do You Most Need A Car?</td>
<td>41</td>
</tr>
<tr>
<td>26</td>
<td>If You Travel By Car, What Challenges Do You Face?</td>
<td>42</td>
</tr>
<tr>
<td>27</td>
<td>If You Had Car-Sharing Available, What Are The Most Important Features?</td>
<td>42</td>
</tr>
<tr>
<td>28</td>
<td>If You Travel By Car, What Challenges Do You Face?</td>
<td>43</td>
</tr>
<tr>
<td>29</td>
<td>Would You Be Comfortable Driving An Electric Car?</td>
<td>44</td>
</tr>
<tr>
<td>30</td>
<td>Would You Use A Car-Sharing Service If It Was Close By?</td>
<td>44</td>
</tr>
<tr>
<td>31</td>
<td>How Much Do You Know About Electric Cars?</td>
<td>45</td>
</tr>
<tr>
<td>32</td>
<td>Would You Be Comfortable Driving An Electric Car?</td>
<td>45</td>
</tr>
<tr>
<td>33</td>
<td>Why Are You Not Comfortable Driving An Electric Car?</td>
<td>46</td>
</tr>
<tr>
<td>34</td>
<td>Would You Use A Car-Sharing Service If It Was Close By?</td>
<td>46</td>
</tr>
<tr>
<td>35</td>
<td>Why Are You Not Comfortable Driving An Electric Car?</td>
<td>47</td>
</tr>
<tr>
<td>36</td>
<td>Would You Be Comfortable Driving An Electric Car?</td>
<td>47</td>
</tr>
<tr>
<td>37</td>
<td>Would You Use A Car-Sharing Service If It Was Close By?</td>
<td>48</td>
</tr>
<tr>
<td>38</td>
<td>Would You Be Comfortable Driving An Electric Car?</td>
<td>48</td>
</tr>
<tr>
<td>39</td>
<td>Why Are You Not Comfortable Driving An Electric Car?</td>
<td>49</td>
</tr>
<tr>
<td>40</td>
<td>Would You Use A Car-Sharing Service If It Was Close By?</td>
<td>49</td>
</tr>
<tr>
<td>41</td>
<td>Would You Be Comfortable Driving An Electric Car?</td>
<td>50</td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

INTRODUCTION

Transportation is the number one source of air and climate pollution in the Puget Sound region, accounting for over 40 percent of greenhouse gas (GHG) emissions into the atmosphere. Outdoor air pollution can cause heart attacks, asthma, strokes, cancer, and premature death. An estimated 1,100 people die prematurely each year in Washington State due to outdoor air pollution. Air pollution disproportionately impacts underserved communities and people of color.

In our region, the communities that bear the highest impact of air pollution also tend to be those with greater socioeconomic challenges. For example, housing developments near high traffic areas are often occupied by lower-income residents and people of color. These communities face higher exposure to diesel exhaust. These communities have been frequently left out of finding solutions to air quality issues.

Electric vehicles (EVs) offer one solution to reducing GHG emissions and health impacts. These vehicles draw electricity directly from the grid and store it in batteries. All-electric cars produce no tailpipe emissions. Electricity generation in the Pacific Northwest has a large portfolio of renewable sources of power, making it one of the cleanest grids in the nation. Therefore, driving electric is one of the cleanest options for vehicle travel. In addition, the cost of “fueling” with electricity is considerably less than the cost of gasoline – Washington has the least expensive electricity in the nation – so families can save money over time by driving EVs instead of gas-powered cars.

Although EVs significantly reduce air and climate pollution and save money, there is unequal access to the technology. There are barriers that make the vehicles less accessible to some drivers, including low-income communities. New EVs can have higher up-front costs than traditional vehicles and can be out of reach for those in lower-income brackets. Access to charging infrastructure is another barrier, especially for those who live in multi-unit dwellings that lack somewhere to plug in. Other barriers associated with adopting EVs include the cost of insurance, lack of financing options, range anxiety, and lack of model availability.

A car-sharing program could address some of these barriers. Car-share refers to services that offer drivers access to a shared vehicle for short-term rentals. A study at the University of California, Berkeley that surveyed 9,500 car-share users documented several benefits from car-sharing:

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• 25 percent of members sold a vehicle and 25 percent postponed a vehicle purchase.
• Each car-sharing vehicle replaces between nine and 13 vehicles.

Other research indicates that households save $154 to $435 monthly after joining a car-share program. These savings benefit families that spend a disproportionate share of their income on transportation.\(^5\)

According to the Shared Use Mobility Center\(^6\), car-sharing can also:

• Provide more mobility choices
• Offer last mile and fire mile solutions
• Reduce traffic congestion
• Mitigate various forms of pollution
• Reduce transportation costs
• Create accessible mobility options for those with limited physical ability

Most car-share programs primarily offer vehicles with internal combustion engines. Incorporating electric vehicles into a car-share program can further increase some of these benefits, such as reducing pollution and transportation costs.

Other research indicates that households save $154 to $435 monthly after joining a car-share program. These savings benefit families that spend a disproportionate share of their income on transportation.\(^7\)

**PURPOSE**

The Puget Sound Clean Air Agency (PSCAA) undertook this study to identify opportunities and barriers pertaining to the use and purchase of electric vehicles by low-income residents of Washington State, and to design a pilot project to address these barriers.

This study:

• Evaluated incentives and programs that promote electric vehicles, with a specific focus on low-income populations.
• Assessed the mobility needs of low-income communities associated with nine organizations in the Puget Sound region and San Juan Islands.
• Conceptualized an electric car-sharing pilot program for low-income communities. This project focused efforts on areas where public transportation is limited. This included:
  • Identifying and evaluating prospective low-income housing sites.
  • Developing a project framework, budget, and timeline, and exploring partnerships with community stakeholders.

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6 “What Is Shared Mobility?” Shared-Use Mobility Center, sharedusemobilitycenter.org/what-is-shared-mobility/.
METHODODOLOGY

We began by conducting an extensive review of existing programs and incentives that support electric vehicle adoption, and also examined car-share models across the country. This included a literature review, and in-person conversations with organizations that are designing, implementing, and evaluating shared mobility programs. Primary questions asked of these organizations were:

- What have you identified as barriers?
- What ideas do you have to overcome barriers?
- What incentives, policies, and actions have worked?

Our findings are summarized in Section 1.

For the next phase of the study, we reached out to organizations that provide resources to lower-income and underserved populations throughout western Washington. The following nine organizations opted to participate in our study:

- Compass Housing Alliance
- Everett Housing Authority
- King County Housing Authority
- Lopez Community Land Trust
- Mt. Baker Village Housing
- OPAL Community Land Trust
- Seattle Housing Authority
- South Park Neighborhood Association
- South Park Information and Resource Center

These organizations span urban and suburban areas in King, Pierce, and Snohomish Counties and rural areas in San Juan County, and collectively serve over 1,000 residents.

Working with these partner organizations, we developed an approach to learn more about the transportation realities of people living in these communities. We wanted to understand their needs and challenges, and whether a car-share program would be useful. We further wanted to probe the feasibility of an electric car-share.

To that end, we created a mobility needs assessment (survey), which was translated into 7 languages and distributed to 2,500 residents. We also conducted several focus group discussions in select communities. Over 600 residents completed the survey.

Based on this research, we then conceptualized two potential electric car-share project models that could be piloted in several low-income communities.

KEY FINDINGS

This report’s key findings:

FINDINGS FROM AFFORDABLE HOUSING ORGANIZATIONS
• Affordable housing organizations are interested in the idea of an electric car-share program. Car ownership comes with a lot of expenses. Most of the organizations we engaged with liked the idea of a car-share program to provide residents a transportation option less expensive than owning a car. There are also many other stakeholders who are supportive of this concept.

• Housing authorities face funding challenges. In most cases, their budgets are already allocated to other programs. Through our discussions, we heard frequently that there is little funding or extra staff capacity to add a new program to their properties.

FINDINGS FROM LITERATURE REVIEW

• Access to charging is essential to electric vehicle adoption. The most convenient and affordable method of charging is to charge at home. People who live in multi-family housing, however, may not have a garage, carport, or other location to plug in a car. This could be partially addressed by requiring all new construction to include charging infrastructure and providing incentives for retrofits for existing development.

FINDINGS FROM SURVEYED COMMUNITIES

• Driving alone is the most common mode of travel. Nearly 50 percent of respondents indicated they take six or more trips per week driving solo.

![Car alone each week](image)

Trips per week alone in a car

• Transporting family and buying groceries are top reasons for needing a car. Most respondents indicated that they primarily need a car for running errands, taking family to medical appointments, transporting children to activities, and grocery shopping.
A large percentage of respondents are comfortable with the idea of driving electric vehicles. While knowledge of electric vehicles is low, there is higher interest in driving them. Nearly half of respondents said they’d feel comfortable taking an EV for a spin. Targeted education and outreach to low-income communities could enhance their understanding of electric vehicles and their potential benefits.
• **Most people are unfamiliar with electric vehicles.** More than half of survey respondents expressed unfamiliarity with electric cars. For electric vehicle adoption to increase in the low-income sector, community-based education and outreach is essential.

![Pie chart showing comfort level with electric cars: 47% Yes (201) and 53% No (231).]

**Would You Be Comfortable Driving An Electric Car?**

• **Car-sharing should be affordable and convenient.** When asked what concerns they had about using a car-sharing service, respondents cited cost, unfamiliarity with how car-share works, and whether a car would be available when needed.

• **Car-sharing is of greater interest in locations that are not well-served by public transportation.** Respondents in communities with less convenient public transportation options were somewhat more interested in the idea of a car-share program.

• **A majority of respondents have never used a car-share service.** Only 16 percent reported using a car-share service. Nearly 40 percent, however, indicated they would try it, if it was close by.

![Pie chart showing interest in car-sharing: 37% Yes (164) and 63% No (275).]

**Would You Use A Car-Sharing Service If It Was Close By?**
• **Older residents less likely to try car-sharing.** Respondents over the age of 65 were significantly less interested in taking advantage of a car-sharing program.

![Percent Of Age Group That Would Use A Car-share Service That Hasn’t Before](chart.png)

**RECOMMENDATIONS**

Our research concludes that a car-share program would be a useful service for many of the low-income housing communities we surveyed. A car-share program would augment existing transportation options, and provide an affordable alternative to car ownership. Offering an electric car share provides additional cost-savings over the long run, in the form of reduced operating, maintenance and fuel costs. An electric car share program would also support regional air quality and climate protection goals. Familiarity with electric cars is low, however many participants in our study expressed openness to driving electric vehicles.

Based on input gathered through this study, we developed two car-share model concepts that could be piloted. One model entails a community-owned, shared vehicle. Management of the vehicle would be the responsibility of the host property and its community members. In the second model, the host property would commission a third party car-sharing service that owns and manages the vehicle. Both models emphasize outreach and education as an essential component of success.

We found four organizations that are ready to move forward:

- South Park Information Resource Center has a transportation need that can be filled with electric vehicles.
- Lopez Community Land Trust already has charging infrastructure installed and is interested in developing a car-sharing program.
- King County Housing Authority is installing an electric charging station on-site.
- OPAL Community Land Trust is in the planning phase for a new community that will include an electric car-share option.

These properties range in transportation needs and have the ability to fill a transportation gap in properties that are not served well by transit. Seattle House Authority properties also generated a lot
of interest in a car-sharing service, although not every property we surveyed was interested.

The other organizations that we spoke with are interested but do not yet have the capacity to take on this type of project at this time. For these properties, we recommend additional outreach to residents and evaluation of different properties before a car-share pilot program is launched. There are many properties at these organizations and have the opportunity to expand a pilot project to many other communities.

**PILOT PROJECT MODEL RECOMMENDATIONS**

Based on our research, we conceived of two possible models for an electric car-share project that we believe meet the needs of the communities we consulted.

**PILOT PROJECT MODEL A: SUBSIDIZED COMMUNITY-OWNED SHARED VEHICLE**

There are two primary barriers to the utilization of electric vehicles in low-income communities: the initial cost and lack of understanding of the technology. This model seeks to address both. In it, the housing authority or community organization would own and manage an electric vehicle that would be shared amongst residents/community members. Participants would pay a modest fee for the use of the vehicle that would offset the cost of charging, insurance, maintenance, and replacement cost.

Primary benefits of this model include:

1. Lower cost for drivers. Current car-share programs in the Puget Sound area have rates ranging from $0.15 a minute to $9 an hour. This may be outside the reach of many people living at the poverty level. By having its own vehicle, the housing authority could design a rate/fee schedule that the community can afford.
2. More decision-making power for community members.
3. Increased awareness about EVs. Not only will members of the community become more familiar with EVs every time they take a drive, but they will also become ambassadors of the technology within their social networks.

A primary challenge of this model is capacity, as it requires the organization to administer and be responsible for the vehicle. Most affordable housing communities run on tight budgets without a lot of extra staff time or funding.

**PILOT PROJECT MODEL B: MOBILITY AS AN AMENITY**

Model B addresses the capacity challenge, by involving a third-party company to install, maintain, and manage a car-share program at the housing site. Drivers will pay by the minute. The rate is set by the third-party company.
Key benefits of this approach include:

1. Turnkey solution, which eases the burden from the property. The third-party handles everything, including installing charging infrastructure, procuring and maintaining the desired vehicles, and managing the use.
2. Reduced upfront costs of installation and procurement. The third-party makes the initial capital investment. The third-party company then charges the properties for vehicles, maintenance, insurance, and other expenses associated with managing the program.
3. Flexibility. Cars can be swapped for other models, based on community needs.
4. Revenue cost-sharing potential. Site hosts will be able to share revenues and can be invested back into the community.

A challenge to this approach is the host organization will have less control over the rates for the cars, likely resulting in a higher fee structure for low-income drivers. Another potential challenge is payment, as this model requires users to pay by credit card. This could pose a barrier for unbanked drivers.

Policy Recommendations

There are several state-wide policy recommendations that could greatly enhance access to electric vehicles on a large scale for low to middle-income communities. These include the following:

- Multi-Family Housing Infrastructure Requirements: Modify building codes to require the installation of electric vehicle charging infrastructure for all new multi-family housing.
- Electric Vehicle Charging Stations: Authorize utilities to provide and incentivize construction and operation of EV charging stations.
- Zero Emission Vehicle (ZEV) Standard: Require automakers to make a broad range of ZEVs available in our state, which would greatly enhance the variety of electric cars available to consumers. Ten states currently have a ZEV Standard. This will increase the number of ZEVs in our state and make electric vehicles more accessible for everyone.
- Electric vehicle incentives: Provide incentives to low-income drivers for the purchase of electric cars.
- Clean Fuel Standard. Implement a Clean Fuel Standard that will incentivize cleaner transportation fuels, such as electricity. This will support additional charging infrastructure and, through the credit market, could provide incentives for lower-income buyers.

Lastly, we recommend continued dialogue amongst all stakeholders interested in advancing electric mobility within low-income communities. Community-based organizations can help educate about car-sharing programs and electric vehicles. These programs are intended to be sustainable and create a sense of ownership by the community. Providing multi-language services and working with the communities at large can help strengthen the benefits of an electric car-sharing program.
SECTION 1: INCENTIVES AND RESEARCH

This first section is a summary evaluation of our initial findings related to incentives and programs designed to promote electric vehicle transportation options for the general public, with a specific focus on low-income populations. The objective is to gain an understanding of existing, planned or past incentives and programs geared toward low-income electric vehicle utilization. We have expanded this search to also include broad-based incentives and programs for the general public. These types of opportunities, while not specifically focused on low income, can benefit low-income individuals and communities and facilitate low-income utilization of electric vehicles.

Transportation, and especially access to automobiles, plays an important role in shaping the economic outcomes of low-income households.\(^8\) Automobiles can enable individuals to have better access to potential employment and retain employment, as well as achieve higher levels of school performance and reduce racial disparity in employment rates.\(^9\) This is especially true for low-income women who often have household and childcare responsibilities along with paid work. The ability to drive provides them with extra time and flexibility.\(^10\) In addition, lower-income families increasingly live farther away from public transportation, which can create an added challenge for the first and last portion of their trips.\(^11\)

Our research identified numerous pilot projects focused on low-income utilization of electric vehicles, many just getting underway and too new to evaluate effectiveness. We have also discovered similar evaluation work underway through other organizations and are communicating with them on an ongoing basis to share information and ideas. Our intent is to continue to monitor developments within these new pilot programs and evaluation efforts and to use that information to update our findings as appropriate.

Car-sharing can increase access to affordable mobility options; however, it is highly dependent on the fees and level of use. EV shared-use mobility programs can also increase exposure to the EV technology in underserved communities. There are many shared mobility models ranging from the small-scale community focused to large-scale region-wide focus. It is encouraging to identify numerous forward-looking jurisdictions, utilities, and public transit systems across the US that are moving towards equitable models with a climate-friendly and environmentally conscious focus.

A consortium of transportation experts developed the Shared Mobility Principles for Livable Cities to guide urban decision-makers and stakeholders in developing transportation models that are equitable and climate-friendly. C40 Cities Climate Leadership Group, ICLEI – Local Governments for Sustainability, Institute for Transportation and Development Policy, Natural Resources Defense Council, Partnership on

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Sustainable Low Carbon Transport (SLoCaT), Rocky Mountain Institute, Shared-Use Mobility Center, and WRI Ross Center for Sustainable Cities have all endorsed these principles and have developed the following vision statement:

“Sustainable, inclusive, prosperous, and resilient cities depend on transportation that facilitates the safe, efficient, and pollution-free flow of people and goods, while also providing affordable, healthy, and integrated mobility for all people.”

This project is in alignment with this vision and we hope the outcomes will contribute to the shared goals of equitable prosperity and sustainability. The social benefits gained through the programs outlined below provide sufficient reasons to pursue projects and programs in this realm. Proposals for potential projects will be addressed in Deliverable 2.

**METHODOLOGY**

We conducted an extensive review of existing programs and incentives pertaining to electric vehicle adoption and car-share models across the country. The primary methods used for this component of the evaluation are:

- Literature review of former, planned, and existing incentives and programs to promote electric vehicle adoption for the general public, with a focus on lower income populations.
- Literature review of car-sharing platforms with a focus on lower income users.
- Conversations with organizations that are designing, implementing, and evaluating shared mobility programs. Primary questions asked of these organizations were:
  - What have you identified as barriers?
  - What ideas do you have to overcome barriers?
  - What incentives, policies, and actions have worked?

We also conducted a mobility needs assessment survey of low-income residents, along with focus group discussions, to help us identify and understand any other considerations. We provide the findings from the survey and focus groups in Section 2 of this report.

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12 Shared Mobility Principles for Livable Cities. https://www.sharedmobilityprinciples.org/
BARRIERS AND OPPORTUNITIES FOR INDIVIDUAL OWNERSHIP, CAR-SHARING, AND RIDESHARE PLATFORMS

Research from the literature review indicated that a majority of car-share consumers rarely use a car-sharing service for daily commutes, such as trips to work and school. Most common uses are for grocery and other shopping, medical appointments, personal errands, and recreation. Some of the fundamental barriers to electric vehicle access for low-income residents are affordability, ability to charge, and awareness of options. Other barriers include access to technology, banking, and the need for family-size vehicles (i.e. mini-vans). We have outlined identified barriers and challenges below, as well as best practices, opportunities, and incentives from existing, planned, and past programs.

BARRIERS

COST
Cost is a barrier for many low-income drivers. The initial purchase price of new electric vehicles can be higher than an internal combustion engine vehicle. Cost is also a barrier with many of the for-profit shared vehicle platforms. There is some government and utility subsidized models that are trying to address this barrier. These are described in more detail below, and in Table 1.

CHARGING INFRASTRUCTURE
Industry-wide, EV drivers do more than 80 percent of their charging at home. A majority of low-income households are within multi-family housing developments that do not provide the ability to charge electric vehicles at home. Charging at home is usually the lowest cost method of charging. Without this ability, lower-income households are at a disadvantage for electric vehicle adoption.

LEVEL OF AWARENESS
The level of awareness of electric vehicle technology is low for the general public. There are many misperceptions about electric vehicles, including a misunderstanding that electric vehicles are more expensive. Studies have shown that the overtime lifetime cost of an electric vehicle is considerably less than a conventional internal combustion engine vehicle.

Much of the cost savings is from the lower cost of electricity to charge versus the cost of gasoline, however, there are also significant savings from the lack of maintenance that is required for an electric vehicle. Replacing an internal combustion engine with an induction motor greatly reduces the number of parts that need to be maintained and replaced. For instance, electric vehicles require no oil changes, spark plugs, or transmission fluid. There are no belts, mufflers, or tailpipes. In addition, electric vehicles utilize regenerative braking, which results in the brakes lasting much longer before needing replacement.

TECHNOLOGY
Another common barrier to car-sharing models is the lack of availability of technology to manage reservations. Car-sharing models almost exclusively depend on online reservation systems. Many low-income individuals do not own smartphones or computers and are not able to operate in an online platform.
INSURANCE
For several smaller start-ups and pilot programs, the cost and availability of insurance have been a barrier to affordable and sustainable operations. Buffalo Car-share, described below, was one casualty of insurance restrictions. Shared mobility has challenged conventional insurance models. The major insurance risks associated with car-sharing are the members’ driving ability and theft and vandalism while vehicles are parked. Risk management can address some of these concerns, such as requiring members to have a clean driving record, providing the technological capacity to help prevent accidents, and cameras that could monitor car-sharing parking spaces.\textsuperscript{13}

OPPORTUNITIES
There are numerous programs and projects underway across the US to address equitable climate-friendly transportation needs. California is a leader in this arena with policies and funding being provided to further EV adoption throughout the state, with incentives for lower-income populations. Austin Energy is another example of a leader in providing affordable vehicle electrification incentives.

INCENTIVES AND BEST PRACTICES
\textbf{Time of Sale Incentives:} Studies have shown that time-of-sale incentives are the largest contributor to the increase in electric vehicle sales. Twenty-two states are currently offering a time-of-sale incentives such as tax exemption or rebates. Washington’s sales tax exemption expired in 2018.

Beyond time-of-sale incentives, charging infrastructure availability and consumer awareness are the strongest EV market drivers for the general public.

\textbf{Charging infrastructure:} The availability of charging stations reduces range anxiety and studies show this is a strong driver of adoption. Currently, 27 states have provided incentives and financing to reduce the cost of constructing electric vehicle charging stations. There are hundreds of charging stations available for public use in the Puget Sound region. In Seattle, a program to provide Electric Vehicle Charging in the Public Right-of-Way (EVCROW) allows the installation of publically available Electric Vehicle (EV) charging stations at curbside locations in the public right-of-way.

The least expensive and most convenient option for “refueling” electric vehicles is to plug in at home if there is an outlet that is accessible. In most single-family homes, this works well, however, in multi-family developments, this is usually a barrier. Incentivizing charging infrastructure in multi-family housing would greatly reduce one of the barriers to adoption.

\textbf{Austin Energy}
Austin Energy’s Electric Vehicle program provides cost-effective charging city-wide as well as incentives to encourage new and existing multi-family development to install EV charging infrastructure. Over 40 percent of Austin’s population lives in multi-family properties. Austin Energy has recognized that affordable and reliable access to electric vehicle charging is essential for EV ownership in lower-income populations.

communities. In addition, all charging stations within the Austin Energy program are powered by 100 percent renewable wind energy.

Austin Energy provides rebates up to $4,000, or 50 percent of the cost to install approved Level 2 (240V) charging stations and/or EV Level One (120V) outlets. They also provide rebates up to $10,000 to entities who want to install a DC Fast Charger. EVs growth rate in Austin is nearly 200 percent over the last few years.

Austin Energy’s Plug-in EVerywhere network allows unlimited charging at public stations for just $4.17 per month, including fast charging. This is the most affordable charging network we have identified.

Puget Sound Energy
In 2018, Puget Sound Energy filed a portfolio of pilot programs to promote market transformation in the light-duty electric vehicle market. In designing these pilot programs, PSE has strived to meet the letter and intent of the Washington Utilities and Transportation Commission’s (WUTC) Final Policy Statement on EV charging services, while also meeting the Washington Legislature’s direction to promote EVSE on a regulated basis, in order to accelerate EV adoption to serve multiple public policy purposes.

Included in their portfolio is a pilot program designed to support and improve customer access to transportation electrification targeted at low-income customers. Puget Sound Energy created a partnership with Community Action Program Agencies that provide transportation services to low-income customers. There are three proposed programs including medical transportation, dial-a-ride, and multi-family housing services. Each of these programs targets a large demographic of their customer base and address various needs of the community.

**Scrap and replacement:** California’s Clean Cars 4 All program provides incentives to lower-income drivers to scrap their older, high-polluting car and replace it with zero or low emission replacement. The program also focuses on the education of the new technologies.

**Public awareness:** Broadening consumer awareness of the advantages and availability of electric vehicles is imperative for EV adoption. There are many misunderstandings and misperceptions about EVs. For instance, most people who have never driven an electric vehicle do not realize that the EV technology requires far less maintenance than a standard internal combustion engine vehicle and that EVs cost far less to operate. Promoting an education and public awareness initiative to help Washingtonians discover the benefits of electric driving will boost EV adoption.

**Policies**
There are numerous policies that are being implemented in California and other jurisdictions to address barriers to low-income utilization of electric vehicles. Reducing cost and making charging more accessible is the most common.

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15 Policy and Interpretive Statement Concerning Commission Regulation of Electric Vehicle Charging Services, Docket UE-160799, Paragraph 22. SHB 1853, Section 1, Paragraph 3.
• California’s Green Building Standards require new multifamily housing developments with 17 units + to install EV charging infrastructure in at least 3 percent of parking spaces.
• California prioritizes EV rebates for low-income individuals and the ‘Clean Cars 4 All’ program provides low-income eligible applicants compensation of $2,500 towards replacing high-emission vehicles.
• Oregon provides purchase rebates to all low-moderate income drivers and an additional rebate for individuals who live in an area with elevated concentrations of air pollution.
CAR-SHARE AND RIDESHARE PROGRAMS

A study completed by the Transportation Sustainability Research Center at the University of California, Berkeley of approximately 9,500 participants in car-sharing programs in U.S. and Canada documented numerous benefits of car-sharing, including:

- 25 percent of members sold a vehicle and 25 percent postponed a vehicle purchase due to car-sharing;
- Each car-sharing vehicle replaced between nine to 13 vehicles (including sold vehicles and postponed purchases);
- Car-sharing participants reduced vehicle miles traveled and greenhouse gas emissions by up to 43 percent, including vehicles sold and postponed purchases.
- Other research has indicated that households typically save money after joining car-sharing.

We have provided a summary below of some of the more noteworthy efforts we have identified that have provided increased EV access to low-income drivers who choose car and ridesharing opportunities.

CALIFORNIA

In 2014, California launched the Charge Ahead Initiative, with the goal of deploying one million electric vehicles by the year 2023. As part of the initiative, the California Air Resources Board (CARB) created electric vehicle sharing pilot projects in low-income and moderate-income communities. The intent was to simultaneously improve low-income transportation access while mitigating climate change and reducing air pollution. Two of the projects that are outcomes of this initiative are the Watts Community Revitalization and BlueLA.

WATTS COMMUNITY REVITALIZATION

On The Watts Rising Collaborative is comprised of 16 co-applicant organizations led by the Housing Authority of the City of Los Angeles (HACLA). The project includes construction of 81 affordable housing units for the Phase 2A of the Jordan Downs redevelopment. The project will electrify ten DASH buses serving Watts and will launch an electric vehicle car-sharing and shuttle program to serve the community.

There was significant community engagement undertaken to develop the $35 million proposal, which approved January 2018 by the California Strategic Growth Council (SGC). Funding is being provided through the Transformative Climate Communities (TCC) grant program.

BLUELA

The BlueLA Electric Car Sharing Program, in partnership with the City of Los Angeles DOT, is the nation’s largest EV car-sharing program for underserved communities. The focus of the program is to reduce greenhouse gas emissions and provide low-income communities with clean, affordable transportation options. Extensive outreach and education were conducted with over 140 community events to increase awareness of affordable, clean transportation options. Low-income users receive reduced rates of 15 cents a minute.
They have deployed 100 electric vehicles and 200 charging stations in lower-income neighborhoods surrounding downtown. This is a public-private partnership with funding from CARB, the City of Los Angeles, and a French car-sharing company Bolloré group.

**CITY CARSHARE**

City CarShare is a nonprofit “with a mission to improve the environment and quality of life in our communities by promoting innovative mobility options.” City CarShare in San Francisco has 45 percent all-electric and hybrid vehicles. City CarShare reduces membership service and rental fees for low/moderate-income residents. It has operated primarily in San Francisco’s low-income neighborhood of Bayview and is expanding affordable car-sharing services to other low-income neighborhoods. Members save an estimated average of $8,400 per year in costs associated with car ownership.

**COMMUNITY ELECTRIC VEHICLE PROJECT**

On a much smaller scale, Forth, in partnership with Hacienda CDC purchased three Honda Fit EVs to develop a low-income car-sharing pilot program. One vehicle was set aside for staff use and two for residents through a peer-to-peer car sharing platform. The overall number of participants was low, with a total number of 66 rides. Other concerns identified during the program were insurance, software, banking, and technology barriers.

**LOPEZ COMMUNITY LAND TRUST – COMMON GROUND**

Another small-scale project was initiated by Lopez Community Land Trust (LCLT), a non-profit located on Lopez Island in Washington State. LCLT’s Common Ground, completed in 2009, is a sustainable net zero energy project. Features include straw bale construction with earthen plaster, rainwater catchment, solar hot water, and a grid-tied solar electric system. This is a mixed-income development of 24 homes along with an office/resource center.

In 2012 LCLT purchased a used GEM EV as a community shared vehicle. They set-up a simple hard-copy calendar inside the vehicle with the key (this is a very low-crime neighborhood). Drivers recorded their mileage on a tracking sign-in sheet. It was largely run on an honor system. They charged a per mile fee that was determined by including the cost of electricity, maintenance, replacement, and insurance. The vehicle had a high use pattern of daily trips. The program was in place for eight months. The failure of the program resulted from too many maintenance concerns that could not be easily remedied by a local mechanic. Lopez Island is in a remote area with a lack of mechanical expertise for GEM vehicles.

**BUFFALO CARSHARE**

Buffalo CarShare was a nonprofit community-driven organization with the mission to advance affordable and environmentally friendly transportation. Buffalo CarShare’s business model was developed to serve the community at large, with over half of its customers in the low-income range. The service included some electric vehicles. Buffalo CarShare estimated savings of over $377,000 on transportation costs for its very low-income members. They initiated operations in 2009 and, although growth was steady, issues with insurance forced them to close and they sold their assets to ZipCar in November 2015.
Philadelphia Insurance ended their coverage in part because they couldn’t make the profits they wanted from Buffalo CarShare due to the state’s insurance laws. In New York, the personal injury protection law requires the insurance carrier to pay for the medical bills. There was no other insurance carrier willing to offer them coverage because of the no-fault law and the volume of drivers and use.

**CITY OF SEATTLE**

The City of Seattle has been heavily involved in the transportation electrification space. Through an aggressive initiative called Drive Clean Seattle, the city has led by example with rapid fleet electrification and now has one of the largest municipal fleets of electric vehicles in the nation. This initiative also calls for significant infrastructure investment by Seattle City Light, identifying opportunities for public/private partnerships, and pilot projects to help accelerate transportation electrification. To maximize the benefits of a clean transportation system for disadvantaged communities, the City has worked closely with the Environmental Justice Committee for guidance on how to implement electrification projects in marginalized communities. The Environmental Justice Committee has provided a comprehensive list of recommendations to inform future initiatives in the transportation electrification space.

The community car share pilot will deploy at least one pilot project for community EV car share that is designed in partnership with community members. Level 2 charging stations and supporting vehicles will likely be provided in a location identified by the community to increase access to electrified mobility particularly around affordable daycare sites or near home health care workers and/or other industry workers who work non-standard shifts or rely on vehicles to travel longer distances. If the community feels this pilot is successful, it can serve as a model that could scale to other neighborhoods or user groups.

**CAPITAL CARSHARE**

Capital Carshare is located in Albany, New York and does not charge application fees for students. Their fleet currently exists of six vehicles. Their intent in their business model is to provide subsidized plans to underserved populations; however, there is no indication of those programs on their website, other than waiver for students.

**WAIVECAR**

WaiveCar is a 100 percent electric, an ad-supported car-sharing program that lets users rent from a fleet of 20 Chevy Spark EVs with two hours of free driving. A fee is charged if drivers use more than two hours. The idea is that they subsidize the cost with advertising dollars. Businesses pay to display their ads on roof-mounted screens and body wraps.

**EVERCAR**

Evercar’s ride-sharing service launched in 2014 and closed doors in 2016 due to financing constraints. The service rented EVs and hybrids to drivers for ride-hailing services like Uber and Lyft and delivery companies like Postmates and Doordash. The rental cost was $5 to $8 hourly, depending on the car type and location. The company operated out of Los Angeles and expanded its operations to San Francisco.
just before shutting down. Evercar’s original business, providing electric vehicles and fleet management tools to cities and agencies is still in operation.

BLUEINDY

BlueIndy is an all-electric service with approximately 240 vehicles and 80 charging stations with additional sites under construction. They offer discounts to youth ages 18-25 but no other low-income specific discounts.

TABLE 1. BARRIERS AND OPPORTUNITIES

<table>
<thead>
<tr>
<th>Identified Barriers</th>
<th>Identified Opportunities and Incentives</th>
<th>Level of Effectiveness</th>
<th>Low Income Specific</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>Numerous time of sale incentives, such as rebates and tax exemptions.</td>
<td>High</td>
<td>Yes, in some areas</td>
</tr>
<tr>
<td>Charging Infrastructure</td>
<td>Necessary for large-scale expansion and acceptance of EV technology.</td>
<td>High</td>
<td>Largely no, but efforts are underway in many states to focus on low-income areas.</td>
</tr>
<tr>
<td></td>
<td>Numerous examples of effective programs, with many more in the planning phase.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Austin Energy has the most affordable program we have identified.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of Awareness</td>
<td>Numerous programs in at least 27 states are focusing on increasing awareness of electric vehicles.</td>
<td>High</td>
<td>Largely no, but efforts are underway to focus on low-income areas and underserved populations.</td>
</tr>
</tbody>
</table>
SUMMARY OF INITIAL FINDINGS

There is a lot of movement in the electric vehicle and equity space. It started with incentives and tax credits but has blossomed into an area of interest within the industry. The incentives now have a low-income focus that is being adopted along the West coast. California is ahead of the curve on investments into low-income communities with their cap-and-trade funds. Their model is being researched and studied across the nation. Oregon was able to adopt the Charge Ahead Rebate that also included extra rebates for low-income communities. Although Washington does not have any state specific incentives or rebates for low-income communities, this research highlights the need for additional funding to develop the markets and increase adoption of electric vehicles. Funding is not only needed to assist in purchasing infrastructure and vehicles but for outreach and education opportunities for low-income communities.

There have been several car-share pilot projects deployed with low-income communities as their target market. Some have been successful, while others have not been able to overcome the barriers that are still cited today. Insurance and ownership of the vehicles is the most commonly cited concern in existing programs. It is still the most common concern we have heard from Housing Authorities in our area. Despite concerns, there is a lot of work happening in Washington to bring electric vehicles to low-income communities. Puget Sound Energy is taking a step forward to deploy low-income electric vehicle pilot projects as well. The City of Seattle is also working on gathering information about equity and electric vehicles, with plans to launch their own community car-share pilot project.

Overall, most stakeholders in Washington are in the same phase of gathering research and data in order to deploy community focused car-share programs. There still needs to be a focus on the communities by deploying a mobility needs assessment at identified locations in order to understand the needs of the community.
SECTION 2: SHARED ELECTRIC MOBILITY PILOT PROJECTS

This pilot project proposal is the second section of the Feasibility Study to Facilitate Low-Income Utilization of Electric Vehicles funded through the Washington State Department of Transportation. This section includes a Mobility Needs Assessment and a suite of proposed pilot projects to test effective methods for facilitating low-income utilization of electric vehicles. We propose two separate models in low-income housing and resource center venues encompassing urban and rural areas. If funded, we intend to administer and manage the proposed pilot projects.

METHODODOLOGY

To better understand the current mobility needs and challenges of people living in low-income communities, as well as the readiness of low-income housing service providers to offer a car share program, we conducted the following study:

- Conducted a mobility needs assessment survey and focus group discussions in select low-income communities.
- Interviewed low-income housing providers to assess their interest and capacity with regard to car-share and pilot projects.

PURPOSE

The overall purpose of this project is to address equity concerns and assist in making electric vehicles accessible for everyone. The up-front costs of purchasing a new electric vehicle are out of reach for most people in the low-income bracket. Figuring out a way to affordably provide electric vehicle transportation on a broad scale that meets the needs of low-income communities is the focus of this proposal.

PROJECT GOALS

Our goal was to understand the mobility needs of low-income communities and explore whether a car-share program would be useful. We further wanted to probe the feasibility of an electric car-share program. With that understanding, we then aimed to conceptualize potential projects to pilot in those communities.

SCOPE

This study focused on nine organizations that provide resources for lower income and underserved populations, including affordable housing programs, a community association, and a resource program. The Puget Sound Clean Air Agency (PSCAA) contacted organizations that provide affordable housing and resources for low-income populations to gauge interest in participating in an electric car-share pilot program. These organizations included housing authorities in Bremerton, Everett, Tacoma, Renton, Seattle, Kitsap, King County, and Pierce County; affordable housing organizations; a Neighborhood Association; and a Resource Center. Three housing authorities, (King County, Everett, and Seattle), four affordable housing organizations (Compass Housing Alliance, Lopez Community Land Trust, Mt. Baker...
Village Housing, and OPAL Community Land Trust), one Neighborhood Association (South Park) and one Resource Center (South Park Information and Resource Center) opted to participate in this study and proposal.

These organizations span urban and suburban areas in King, Pierce, and Snohomish Counties and rural areas in San Juan County. Collectively, the initial proposed pilot project includes eight communities with over 1,000 residents.

**CHALLENGES**

Many challenges to low-income utilization of electric vehicles were identified during this study, with the primary being cost of vehicle or vehicle use, access to charging infrastructure, and understanding of technology. Additionally, the need for convenience was identified during the study. Studies on low-income populations show that an increased level of stress is often present due to the lack of financial security and associated challenges. A lower socioeconomic status often means more difficulty attaining education, less ability to advance professionally, more time spent working and/or commuting, less time available for personal and family needs, and limited opportunities and privileges afforded to people within society with higher income levels. Creating a car-share model that provided increased convenience could serve to alleviate stress.

**ANTICIPATED BENEFITS**

Expanding access to electric mobility and ride-sharing to low-income communities offers many social, economic and environmental benefits, which includes improved convenience, making transportation more affordable, improving air quality, and reducing congestion.

**ACCESS**

As noted in the earlier section on challenges, lower income individuals and families often have higher levels of stress due in part to more demands on their time. Consequently, convenience is often a high priority for mobility. This pilot project proposal is mindful of this need and seeks to provide convenient access to vehicles that will relieve stress related to time constraints.

**ECONOMIC**

Decreasing the cost of transportation for low-income individuals and families has direct and indirect benefits to quality of life. Directly, it allows for limited funds to be directed to other needs. Indirectly, it can have far-reaching positive economic outcomes related to increased mobility and the ability to search for jobs, get to work or go to school. It can also help families be more selective of where they shop for groceries and other necessities, saving them time and allowing them to find what they need at potentially more affordable prices.

**HEALTH**

This effort can also improve health outcomes by providing efficient transportation modes for getting to medical appointments, especially if health issues make public transportation challenging.
**ENVIRONMENTAL JUSTICE**

A large-scale transition to electric vehicles has the potential to greatly benefit lower-income communities near major roads where transportation pollution is at its worst. The health impacts from diesel and gas emissions are well documented and greatly exacerbated for individuals that live within 100 yards of a major highway.

**AIR QUALITY AND CLIMATE**

The underlying goal of electric vehicle adoption is to reduce greenhouse gas emissions. Facilitating the utilization of EVs for low-income communities is an important component of addressing equity in this intended market transformation with the underlying benefit of reducing emissions.

**CONGESTION MITIGATION**

Promoting ride-sharing and shared vehicle use reduces the numbers of vehicles on the road and vehicle miles driven. It can also encourage a behavioral shift towards multi-modal, sustainable transport which complements public transit.
MOBILITY NEEDS ASSESSMENT

OVERVIEW

To better understand the mobility needs and challenges of low-income communities, PSCAA conducted a survey at 11 sites. The surveys explored the travel options and behaviors for people living in these communities; how well they perceived their transportation needs being met; and their awareness of, and receptiveness to, electric cars and the concept of a car-share. We received a total of 603 survey responses. Many of the respondents represented communities rarely seen or addressed in this kind of survey. For example, respondents included many South East Asian, West African, Russian, and Latino individuals for which English is a second language. To accommodate this diversity in languages spoken, we translated the survey into seven languages and provided interpreters.

Eight of the sites took the same survey, yielding 456 responses. Due to some changes in questions and language, not every community answered the same questions. OPAL Community Land Trust, Everett Housing Authority, and South Park Information and Resource Center (SPIARC) chose different questions to ask their residents. These three organizations totaled 147 responses. The surveys that covered different questions are outlined below in each of their respective sections.

This section will cover the eight sites that completed the same survey. The organizations that are encompassed in this section include Birch Creek, Hoa Mai Gardens, High Point, Lake City Court, Mt. Baker Village, New Holly, Plaza Seventeen, and South Park Neighborhood Association.

SURVEY FINDINGS

The majority of participants (57%) takes short distance trips and do not travel over 50 miles on a consistent basis, as illustrated in Figure 1. This suggests that a car-share service, where short-term trips are most beneficial, could be viable in these communities.

FIGURE 1: How Often Do You Travel More Than 50 Miles Per Day?
Running errands such as grocery shopping, medical appointments and child activities are identified as the top reason people need a vehicle, as shown in Figure 2. This would indicate that there is a high usage of vehicles for short-term trips. This indicates that a car-share service might be utilized for these local destinations.

**FIGURE 2: When Do You Most Need A Car?**

![Figure 2: When Do You Most Need A Car?](image)

Congestion, cost of owning a vehicle, and parking availability are the biggest challenges respondents face. A car-share program can help alleviate these problems, whiles addressing the smaller group who do not have access or have unreliable transportation, as shown in Figure 3.

**FIGURE 3: If You Travel By Car, What Challenges Do You Face?**

![Figure 3: If You Travel By Car, What Challenges Do You Face?](image)
The majority of participants have little knowledge of electric vehicles, as shown in Figure 4. This shows there is an opportunity for more education and outreach in these communities about electric vehicles and their benefits.

**FIGURE 4: How Much Do You Know About Electric Cars?**

[Pie chart showing knowledge levels of electric cars]

When asked if they would be comfortable driving an electric vehicle, 47 percent said "yes," as shown in Figure 5. Even though a majority of our participants know only a little about electric vehicles, there is a lot of interest in them.

**FIGURE 5: Would You Be Comfortable Driving An Electric Car?**

[Pie chart showing comfort levels]
Participants expressing reservations about driving an electric car were asked why. Figure 6 below shows some of their top concerns, which include not knowing how to operate a motor vehicle in general, nor an electric vehicle in particular.

**FIGURE 6: Why Are You Not Comfortable Driving An Electric Vehicle?**

![Bar chart showing reasons for discomfort with driving electric vehicles]

Few participants have ever used a car-sharing service, as shown in Figure 7.

**FIGURE 7: Have You Ever Used A Car-Sharing Service?**

![Pie chart showing usage of car-sharing service]
Of those who reported using a car-sharing service, car2go was the most utilized, as shown in Figure 8.

**FIGURE 8:** Which Car-Sharing Service Have You Used?

![Bar chart showing the number of respondents using different car-sharing services. Car2Go leads with 29 responses, followed by ReachNow with 7, Zipcar with 18, and Other (please specify) with 8.](image)

When asked whether they would use a car-sharing service if it was located close to their homes, 37 percent of respondents said that they would, as shown in Figure 9. This is a significant number considering only 16 percent of the participants reported ever using a car-sharing service.

**Figure 9:** Would You Use A Car-Sharing Service If It Was Close By?

![Pie chart showing the responses to the question. 37% (164) responded Yes, and 63% (275) responded No.](image)
This suggests an opportunity to provide outreach and information to these communities about car-sharing services. The top questions that people had were about the payment process, cost, and how car-share works, as shown in Figure 10.

**FIGURE 10:** What Questions Do You Have About Using A Car-Sharing Service?

When asked what car-share features would be important, should such a service become available to them, respondents cited affordability, proximity, and convenience, among others, as shown in Figure 11.

**FIGURE 11:** If You Had A Car-Sharing Service Available, What Are The Most Important Features?
**PARTICIPATING ENTITIES**

The following provides a description of each of the entities that are included in the pilot project proposal, as well as some detailed survey results relevant to their communities. The criteria for partner organizations in this project include longevity, stability, and a number of individuals served. They need to serve the needs of lower income families or individuals, be well established in their programs and financially sound, be interested in promoting electric vehicles, and serve at least 100 or more individuals on an annual basis.

In addition, the needs and interests of the community, as identified by the survey results, focus group discussions, and conversations with the partner organizations must be in alignment with the goals of the pilot project. In selecting the proposed pilot projects, we also considered how the projects would supplement transit, as well as the lack of transportation options available for the communities.

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**EVERETT HOUSING AUTHORITY**

Everett Housing Authority (EHA) has been committed to serving the citizens of Everett, Washington and their housing needs since 1942. As a consistent and reliable source of assistance for affordable housing, they have focused their efforts on creating housing options for a variety of income levels in the Greater Everett area.

The Everett Housing Authority has 12 affordable housing properties for family, elderly and disabled households earning between 50 percent and 60 percent of Snohomish County’s Area Median Income. There are 340 units consisting of one-, two- and three-bedroom apartments. These properties are offered at below-market rents. They have another 21 subsidized properties that include Section 8 Project Based Vouchers for a variety of households and Section 202 Supportive Housing for very low-income elderly persons. There are 1,128 of these units.

**DELTA NEIGHBORHOOD**

The EHA took the initiative to submit their own transportation survey to their residents. This created an opportunity to tailor questions to their community.

Everett Housing Authority currently does not have any charging infrastructure installed on their properties. Using some of the criteria above, staff identified two large properties within the Everett Delta Neighborhood. The Grandview and Wiggums Park Place properties have a combined 228 units and are not serviced well by transit. The residents are mostly families of multiple generations with a diverse population from Russia, Ukraine, Vietnam, Iraq, Iran, and Mexico. This Delta Neighborhood includes other housing locations nearby, with the potential to increase the utilization of a car-share program. These include the Bakerview & Meadows properties with another 303 units. Each of these properties could potentially access a car-share program that is centrally located on the Everett Housing Authority property.
During interviews with EHA staff, we learned that there have been past experiences from residents who are unable to meet rent expenses due to the high prices of owning/leasing vehicles. This causes great stress for the residents who are unable to meet living and transportation expenses. Some residents also do not qualify for medical taxis, which creates hardships getting to and from medical appointments. A car-share program here could provide access to transportation, without the financial burden of buying, owning and maintaining a vehicle. This location is also about to break ground on a clubhouse for the community, creating an opportunity to install electric vehicle infrastructure with significant cost reduction.

Residents in the Delta Neighborhood community mostly rely on single occupancy vehicles to get around, as shown in Figure 12.

The percentage of residents interested in a car-share program, as shown in Figure 13, is slightly below the average for all the properties surveyed, which is 37 percent.
In the survey, EHA wanted to gather information about how residents would prefer to pay for a car-share service if it were available. Two options were proposed in the survey: a monthly rate and an hourly rate. Fourteen individuals responded, with seven saying they would pay a flat rate of $50 per month and seven saying they would pay a flat rate of $10 per hour, as shown in Figure 14. This finding left us with more questions about what the best price point would be for a car-sharing model, which we intend to ask in the next phase of this project, if funded.

**FIGURE 14:** If Interested In A Car-Share, Which Payment Method Would You Prefer?
**King County Housing Authority**

The King County Housing Authority (KCHA) provides rental housing and rental assistance to more than 19,000 households. KCHA serves low-income people in 33 cities—not including Seattle and Renton—as well as in unincorporated areas of King County. KCHA’s service area includes 1.2 million of the county’s residents and the majority of its low-income households.

KCHA owns and manages 4,269 units of federally-funded housing for families, the elderly, and people with disabilities. KCHA also owns 133 properties with 10,215 units including 4,284 units of subsidized housing for families, the elderly and disabled people. An additional 6,000 units of low- and moderate-income housing are financed through tax credits or tax-exempt bonds. Federally funded Section 8 Vouchers help more than 10,000 households’ rent affordable housing on the private market.

KCHA is already implementing electric vehicle charging infrastructure in its housing sites. These have been selected by demand from the third-party property management groups and residents. They plan to have 15 chargers in place by the end of the year. KCHA is interested in deploying a car-share program and has been working with the PSCAA to identify barriers for the past two years.

Surveyed properties included Plaza Seventeen and Birch Creek.

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**Plaza Seventeen**

Plaza Seventeen provides subsidized housing for seniors age 62+ and disabled persons. There are 70one-bedroom units. This community has an overall walk score of 78 out of 100.¹⁶

PSCAA and KCHA conducted a focus group discussion at Plaza Seventeen, which included a short presentation on air quality, electric vehicles, and car-sharing. Approximately 40 residents attend this meeting. A Russian interpreter helped translate the presentation and Q&A session afterward. This group had a lot of interest in this idea due to the lack of parking spaces and transit options. Top takeaways included:

- Residents were concerned about the reservation process and if vehicles would be available when needed.
- There are several residents who don’t have cars because of affordability issues and several more who can’t afford the cars they already have.
- When it comes to electric cars, residents questioned how far they can travel on a charge.
- They also expressed concern about the costs of a car-share, and what the expectations are surrounding insurance.
- Some residents were familiar with the electric charging station that was located at the nearby Walgreens.

According to the survey data collected, the most common ways residents move around are driving alone, walking, and carpooling. Roughly 70 percent of residents do not own a vehicle and 36 percent do not know how to drive a car.

When asked about electric vehicles, this community did not have any participants who have an excellent understanding of electric vehicles, as shown in Figure 15.

**FIGURE 15: How Much Do You Know About Electric Cars?**

![Chart showing knowledge of electric cars](chart15.png)

When asked if they’d be comfortable driving an electric vehicle, a large portion of participants said yes, as shown in Figure 16.

**FIGURE 16: Would You Be Comfortable Driving An Electric Car?**

![Chart showing comfort with electric cars](chart16.png)
Plaza Seventeen residents showed some interest in using a car-sharing service if it was located nearby, as shown in Figure 17.

FIGURE 17: Would You Use A Car-Sharing Service If It Was Close By?

BIRCH CREEK

Birch Creek is a large complex with 262 units that provide subsidized housing for families; seniors age 55+, and disabled persons. KCHA has already installed a Level 2 charging station at this property. This community has an overall walk score of 57 out of 100 and is not served well by transit options. W mailed surveys to Birch Creek residents on KCHA letterhead and provided an option for translated surveys. According to the survey results, the most common way that participants travel is by driving alone. About 80 percent of participants own one or more vehicles. The biggest barrier to car travel is traffic congestion (73%) and the cost of owning a vehicle (65%). This community overall has a little understanding of electric vehicles, as shown in Figure 18.

FIGURE 18: How Much Do You Know About Electric Cars?

However, this community indicated they’d be comfortable driving an electric car, as illustrated in Figure 19.

**FIGURE 19: Would You Be Comfortable Driving An Electric Car?**

Two respondents said that it would be great as a backup vehicle, while others commented that high costs would be a barrier. This site could benefit from a follow-up education and outreach event to discuss some of the benefits of car-sharing and how it could help reduce the cost of owning a vehicle. The residents at this site were moderately interested in a car-sharing service, as shown in Figure 20.

**FIGURE 20: Would You Use A Car-Sharing Service If It Was Close By?**
Mt. Baker Housing began as a community redevelopment project focused on the Mt. Baker Village Apartments. The complex had been poorly maintained by the previous owner, leaving hundreds of low-income residents living in unsafe conditions. In March of 1988, the City of Seattle purchased the property and sold it to the newly established Mt. Baker Housing Association. Rehabilitation on the nine-building complex began in 1988 and was completed in 1990.

To date, Mt. Baker Housing Association owns and operates seven low-income and affordable housing properties with just over 300 units. Mt. Baker Housing plans to add up to 150 new affordable, workforce- and market-rate units two blocks from a mass transit light rail station. The project started in April 2017 and will be completed in 2019.

The Puget Sound Clean Air Agency and Mt. Baker Village Apartments have been working together on transportation and air quality issues for over two years. Mt. Baker residents have been a strong voice in the larger community to advocate for transportation access and affordability. They have been actively seeking alternative transportation solutions for their residence. This work has allowed them to help subsidize their residence bus fares. Residents receive about 12 bus tickets a month.

Mt. Baker Village Apartments

During our study, we conducted outreach and education at the Mt. Baker Village Apartments complex, which is part of the Mt. Baker Housing Association. Mt. Baker Village is within two blocks of the Mt. Baker light rail station. It has 256 units across nine buildings and features one-, two-, three- and four-bedroom apartments. This community has an overall walk score of 66 out of 100.

Mt. Baker has an active resident group that has been at the forefront of advocating for their transportation access needs. This group meets on a regular basis to address the needs of the community and relay information back to the community. We conducted two outreach events with Mt. Baker. The first included a presentation about air quality, electric vehicles, and car-share information for six members of the Resident’s Coordinator Group who assisted in conducting the survey outreach to the other residents. During this event, a Vietnamese translator helped convey the information and a team member from the Environmental Coalition of South Seattle (ECOSS) spoke about his experiences with a used Nissan LEAF. Top takeaways of this first session included:

- This group was already knowledgeable about the benefits of electric vehicles and sources of air pollution.
- It is hard for individuals to conceptualize a car-share program if they haven’t had that experience before.
- There is strong interest in developing a program to help individuals learn how to receive their driver’s license.

https://www.walkscore.com/score/1423-31st-ave-s-seattle-wa-98144
The second outreach event that PSCAA and Mt. Baker hosted was open to all residents. Twenty-five people attended this focus group, which also had a Vietnamese translator present. A shorter version of the above-mentioned presentation was given with a question and answer session. Some of the interesting findings include:

- The majority of people are very satisfied with public transportation.
- The residents receive some subsidized bus tokens.
- The average cost of public transportation for a senior in this community is about $36/month.
- The community suggested a vanpool system with a driver to shuttle them to and from appointments. The Residence Task Force expressed interest in managing this program.
- The community suggested that there be a rent-to-own electric vehicle purchasing plan.

According to the data we collected from this community, the most common transportation methods are walking and taking public transportation, as shown in Figure 21. More than half of the respondents do not own any vehicles (Figure 22) and about 40 percent do not know how to operate a car. During the focus group discussion, residents stated that they were happy with their public transportation access.

**FIGURE 21:** What Is The Most Common Way You Move Around?

**FIGURE 22:** How Many Vehicles Are Available In Your Household For You To Use?
Although the majority surveyed does not own a vehicle or know how to drive, the community is still interested in electric vehicles and their benefits. There is an opportunity to provide outreach and information about electric vehicles. The second top reason people are not comfortable driving electric vehicles is that people do not know how to operate an electric vehicle, as shown in Figure 23. This indicates that there needs to be more education and outreach on the basics of operating an electric vehicle. This could be addressed by hosting a ride-and-drive event with this community, where members could experience the similarities and differences of electric vehicles and a gas vehicle.

**FIGURE 23: Why Are You Not Comfortable Driving An Electric Vehicle?**

Mt. Baker ranked lowest in their interest in a car-sharing service, as shown in Figure 24. This community heavily relies on public transportation as their main source of transportation. Also, large populations of this community do not drive or own a vehicle.

**FIGURE 24: Would You Use A Car-Sharing Service If It Was Close By?**
OPAL Community Land Trust is similar to the Lopez Island Community Land Trust in that it is also located in the remote community of the San Juan Islands where transit options are not available. OPAL was one of the first community land trusts in the West, established in 1989 to help maintain the character, vibrancy, and diversity of the Orcas Island community by addressing the ongoing need for permanently affordable housing. They help bridge the gap between the island’s high property values and the modest incomes of many who live and work on the island. OPAL households currently represent nearly 5 percent of estimated full-time residences on Orcas Island.

OPAL is a member-based, registered 501(c) (3) nonprofit corporation with the following community assets, which includes 135 households in eight neighborhoods:

- 105 permanently affordable ownership homes
- 30 permanently affordable rental apartments
- 55.7 acres of land
- 5 community gardens

The development of a new neighborhood of 45 affordable rental townhomes is underway on four acres in Eastsound. The neighborhood will feature an electric vehicle charging station. OPAL is highly interested in participating in a pilot project to provide a shared electric vehicle for resident use. Consistent with the mobility needs assessments in other communities, the survey showed that the highest need for a vehicle in the collective OPAL communities is for running errands, such as grocery shopping, medical appointments, and taking family and children places (Figure 25). The second highest need is getting to and from work, and the third is for fun and outdoor activities.

**FIGURE 25: When Do You Most Need A Car?**
The most significant and relevant finding from the survey in this community is the large percentage (73%) that identified the cost of owning a car as a challenge (Figure 26). The respondents also indicated that the most important features of a car-sharing program would be affordability and convenience, as identified in Figure 27.

**FIGURE 26:** If You Travel By Car, What Challenges Do You Face?

![Figure 26: Cost of owning a car challenge](image)

**FIGURE 27:** If You Had Car-Sharing Available, What Are The Most Important Features?

![Figure 27: Important features of car-sharing](image)
Seattle Housing Authority

Seattle Housing Authority (SHA) was established in 1939. It was then and remains today, a separate public corporation that has ties to but is not under the jurisdiction of the city, state or federal government. SHA provides long-term, low-income rental housing and rental assistance to approximately 34,000 people, representing more than 17,000 households, in the City of Seattle. SHA owns and operates more than 8,000 apartments and single-family homes at nearly 400 sites throughout the city. Additionally, SHA administers more than 10,000 Housing Choice Vouchers, enabling low-income tenants to receive rental assistance with other landlords in Seattle. Nearly 80 percent of those served are children, elderly or disabled.

Working with SHA’s Sustainability of Housing Operations team, we surveyed four different properties, with help from their interns. The interns were introduced to the concept of a low-income car share and provided some education and training prior to the outreach and surveying events. SHA identified that many residents pay rent by submitting payments to the management offices. This was the best time to capture many residents in the buildings and have face-to-face interactions as well. Staff was provided with seven different translated surveys and some EV basics literature. Surveyed properties included High Point, New Holly, Hoa Mai Gardens, and Lake City Court.

High Point

High Point is a mixed-income community. There are 600 units with a variety of buildings and layouts. This community has an overall walk score of 61 out of 100. SHA administered a mobility survey among High Point residents to assess the transportation needs of the community. The information gathered will inform the development of a car-share pilot in High Point. SHA’s survey provided supplemental data including household financial information, technology access, and demographics (Appendix I).

Residents of this community indicated that traffic congestion is the biggest challenge they face when traveling by car, followed by parking availability and the cost of owning a vehicle, as shown in Figure 28. A car-sharing service at this location could help alleviate these challenges.

**FIGURE 28:** If You Travel By Car, What Challenges Do You Face?

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19 [https://www.seattlehousing.org/properties/high-point]
Almost three-quarters of the community would be comfortable driving an electric vehicle, as shown in Figure 29. This community also has a high percentage who own vehicles, with 90 percent reporting they own one or more vehicles. This could be an opportunity to replace existing vehicles with electric.

**FIGURE 29: Would You Be Comfortable Driving An Electric Car?**

The majority of respondents had not used a car-sharing service before, but over half said they would use one if it was close by, as shown in Figure 30. Many commented that it would be more convenient, cost-effective and better for traffic congestion. This is the second highest community interested in a car-sharing service of the properties that were surveyed.

**FIGURE 30: Would You Use A Car-Sharing Service If It Was Close By?**

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**NEWHOLLY**

NewHolly is a mixed-income community with 620 units and a variety of building sizes and layouts. This community has an overall walk score of 68 out of 100\(^2\). According to our survey, NewHolly residents predominately rely on driving a vehicle alone. Approximately 83 percent of participants own one or more vehicles, with only 18 percent who do not have access to a vehicle. When asked when a vehicle is needed most, running errands (72%) and commuting for work (61%) were the highest ranked.

\(^{20}\) [https://www.seattlehousing.org/properties/newholly](https://www.seattlehousing.org/properties/newholly)
Transportation challenges faced by this community include traffic congestion (70%), the cost of owning a vehicle (52%), and parking availability (52%). These factors suggest a car-sharing service could improve access to, and reduce the cost of, transportation for residents.

While NewHolly residents did not express a lot of understanding about electric vehicles (Figure 31), many indicated they’d be comfortable driving one (Figure 32). Their top reservation about driving electric is a lack of knowledge in how to operate them (Figure 33). This is an opportunity to provide information about electric vehicles and offer ride-and-drives to address the knowledge gap of electric vehicles.

**FIGURE 31:** How Much Do You Know About Electric Cars?

**FIGURE 32:** Would You Be Comfortable Driving An Electric Car?
FIGURE 33: Why Are You Not Comfortable Driving An Electric Car?

Only 16 percent of participants have used a car-sharing service; however, 46 percent said they would use one if it was close by, as shown in Figure 34. Many cited convenience, cheaper cost of ownership, and parking as reasons why they would use a car-share service.

FIGURE 34: Would You Use A Car-Sharing Service If It Was Close By?
HOA MAI GARDENS

Hoa Mai Gardens is open to individuals and families with children. There are 111 units with a variety of layouts. This community has an overall walk score of 93 out of 100. Due to the close proximity to other SHA properties, nearby residents from Raven Terrace, Rainer Vista, and Leschi House also participated in the survey. SHA had also previously administered a mobility survey during their Go SEA! Mobility Fair at the Yesler Terrace Community Center. Their survey yielded results similar to the findings below, and also covered household financial information and budgets, technology access, and demographics. A copy of SHA’s survey is included in Appendix I.

This community predominantly gets around by walking and taking public transportation. Sixty-seven percent do not own vehicles and 72 percent do not know how to operate a vehicle (Figure 35). Many responses indicated that they were too old to drive. This community has 60 percent of participants that are 65+.

This also translated to low comfort in driving electric vehicles (Figure 36).

FIGURE 35: Why Are You Not Comfortable Driving An Electric Car?

FIGURE 36: Would You Be Comfortable Driving An Electric Car?
This community has some familiarity with car-share, with 20 percent of respondents reporting they have used a car-share service. Car2go and Zipcar were the most used organizations. A few respondents listed Uber as a car-sharing service, which suggests there is confusion between ride-hailing and car-sharing. Although some individuals have used car-share, 74 percent said that they would not use a car-sharing service if it was nearby, as shown in Figure 37.

**FIGURE 37:** Would You Use A Car-Sharing Service If It Was Close By?

![Pie chart showing the responses to the question.](image)

LAKE CITY COURT

Lake City Court is a mixed-income community. There are 86 units with a variety of layouts. This community has an overall walk score of 85 out of 100. We had a small sample size for Lake City Court, with 18 respondents, but the results are still important. Those who took our survey indicate they predominately get around by driving alone in a vehicle. There is a wider range of vehicle ownership with 71 percent owning one vehicle and 30 percent owning two or more vehicles. The majority drive when commuting for work (89%) and running errands (79%). This community indicated a high level of comfort in driving an electric vehicle, as shown in Figure 38.

**FIGURE 38:** Would You Be Comfortable Driving An Electric Car?

![Pie chart showing the responses to the question.](image)

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They also ranked not knowing how to operate an electric vehicle as a top challenge, as shown in Figure 39. This is another opportunity to offer a ride-and-drive event for education.

**FIGURE 39: Why Are You Not Comfortable Driving An Electric Car?**

A small sample said they had utilized car-share before, but when reviewing responses we noticed that there was confusion between car-sharing and ride-hailing services. Overall, general interest in a car-sharing service is high in this community (Figure 40), the highest, in fact, of all the communities we surveyed.

**FIGURE 40: Would You Use A Car-Sharing Service If It Was Close By?**
South Park Neighborhood Association

South Park is in close proximity to the main lines of the BNSF Railway and Union Pacific Railroad, Boeing Field, manufacturing facilities, and major roadways. This community is a hub of transportation, industry, and residential spaces. Because of the major transportation corridors and active industry in the area, air quality is greatly impacted. PSCAA has identified this community as a focus area to address air quality and environmental justice and has undertaken numerous efforts to address concerns, including:

- Participating in a process to relocate the South Park Children’s Playground and advocating moving it to the east side of the park, away from the major polluting roadway.
- Helping retrofit a number of diesel engines (trucks and boats) that traverse the community by replacing older, dirty engines with cleaner, more efficient technologies. Developed a training video series for truck drivers on proper maintenance of the cleaner and newer trucks.
- Partnering with Seattle Parks and Recreation's RecTech on a summer youth program that raises awareness of environmental justice issues while providing career development through technology.

On October 9, 2018, PSCAA attended a South Park Neighborhood Association meeting and presented information on air quality, electric vehicles, and car-sharing. Seventeen people attended our presentation. We asked a few open-ended questions about electric vehicles and learned that no one owned an electric vehicle, although three people knew someone who drove one. Several people expressed interest in driving an electric car. We also learned that the community is already familiar with car-share programs, citing Car2Go as the main company that they utilize in the area.

This is another community that we surveyed that had a small sample size – 15 respondents – but we still gathered valuable input. Survey respondents predominately use vehicles to get around. Everyone who took the survey owned one or more vehicles and one household had six vehicles. Running errands and commuting for work are the highest needs for vehicles, both at 53 percent.

Respondents expressed high interest and comfort in driving an electric vehicle, as shown in Figure 41. The battery range of electric vehicles was cited as the top concern.

### FIGURE 41: Would You Be Comfortable Driving An Electric Car?

- **Yes** (73%, 11 people)
- **No** (27%, 4 people)

Answered: 15, Skipped: 0
This community had the largest percentage of individuals that had used a car-share service (Figure 42), with Car2go as the main organization.

**FIGURE 42:** Have You Ever Used A Car-Sharing Service?

South Park respondents showed a high interest in a car-sharing service, as shown in Figure 43. Some of the top questions that were asked about the car-share program were about cost, available accessories (car seat, bike rack, etc.) and how the program might work.

**FIGURE 43:** Would You Use A Car-Sharing Service If It Was Close By?
SPIARC is located at the South Park Neighborhood Center. The Center is active and vibrant with over 1,000 people participating in programs and activities each week. Since 2014, SPIARC has provided a six-week workshop series three times a year to teach Latina women how to obtain a driver’s license. The Mujer al Volante (Woman Behind the Wheel) workshops focus on Washington State traffic rules, laws, and safe driving. SPIARC also identifies financial, social, and family hurdles and develops strategies and resources to successfully assist the women to gain mobility. Each workshop series is fully subscribed and has 35-40 participants.

In interviews with the director of the resource center and program director, we identified the need for a vehicle for class participants to practice driving. We also surveyed 31 class participants and learned that nearly 75 percent of respondents do not feel that their transportation needs are met well (Figure 44).
LOPEZ COMMUNITY LAND TRUST

Lopez Community Land Trust (LCLT) is a 501(c) 3 non-profit incorporated in 1989 with the mission to build a diverse, sustainable Lopez Island community through affordable housing, sustainable agriculture, and other dynamic rural development programs. LCLT completed their first affordable housing project in 1992 and was featured in the New York Times (“Low-Cost Houses on a High-Price Island,” New York Times, May 2, 1993).

LCLT now has six affordable housing neighborhoods, three of which are designed to be net zero in energy usage, for a total of 42 households. One of the neighborhoods, LCLT’s Common Ground, is a net zero energy development with 24 homes and an office/resource center, completed in 2009.

In 2012, LCLT purchased a used GEM EV as a community shared vehicle for Common Ground. The project was successful in that the vehicle had high use, but the project was terminated after eight months due to maintenance concerns that could not be easily remedied. They are very interested in participating in a pilot project with a more reliable vehicle. Lopez Island is located in the remote San Juan Islands where there is not any transit available, so the availability of a shared vehicle is highly desirable.

COMPASS HOUSING ALLIANCE

Compass Housing Alliance helps people in need and has provided affordable housing for almost 100 years. Their portfolio includes 11 locations that offer essential services and affordable housing for men, women, veterans, and families who are low-income or experiencing homelessness in the Puget Sound region. Most residents have an average household income of under $20,000.
SUMMARY – MOBILITY NEEDS ASSESSMENT

The survey results indicate that traveling alone in a vehicle is still the most common way people are moving around. Traveling alone in a vehicle, however, exacerbates regional traffic congestion, which makes it more challenging and time-consuming for people to meet their everyday transportation needs. Unstable fuel costs create financial uncertainty for people living on limited budgets. Providing access to a car-share service for low-income populations could ease congestion, emissions, and the cost of fuel. In general, there is a lot of interest in electric vehicles, but not a great understanding of the basics of them. Targeted education and outreach to low-income communities could enhance their understanding of electric vehicles and their potential benefit as well as information about the alternative modes of transportation that are available. The general interest in a car-sharing service is also fairly high, as shown in Figures 45 and 46.

FIGURE 45: Would Use A Car-Share But Never Have Before

<table>
<thead>
<tr>
<th>Location</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birch Creek</td>
<td>31%</td>
<td>69%</td>
</tr>
<tr>
<td>High Point</td>
<td>51%</td>
<td>49%</td>
</tr>
<tr>
<td>Hoa Mai Gardens</td>
<td>14%</td>
<td>86%</td>
</tr>
<tr>
<td>Lake City Court</td>
<td>67%</td>
<td>33%</td>
</tr>
<tr>
<td>Mt. Baker</td>
<td>17%</td>
<td>83%</td>
</tr>
<tr>
<td>New Holly</td>
<td>42%</td>
<td>58%</td>
</tr>
<tr>
<td>Plaza Seventeen</td>
<td>37%</td>
<td>63%</td>
</tr>
<tr>
<td>South Park</td>
<td>38%</td>
<td>63%</td>
</tr>
</tbody>
</table>

FIGURE 46: Would You Use A Car-Sharing Service If It Was Nearby?

<table>
<thead>
<tr>
<th>Location</th>
<th>Would use a car-sharing service if it was nearby</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake City Court</td>
<td>72%</td>
</tr>
<tr>
<td>High Point</td>
<td>55%</td>
</tr>
<tr>
<td>OPAL</td>
<td>54%</td>
</tr>
<tr>
<td>South Park</td>
<td>53%</td>
</tr>
<tr>
<td>New Holly</td>
<td>46%</td>
</tr>
<tr>
<td>Plaza Seventeen</td>
<td>33%</td>
</tr>
<tr>
<td>Birch Creek</td>
<td>32%</td>
</tr>
<tr>
<td>Everett</td>
<td>31%</td>
</tr>
<tr>
<td>Hoa Mai Gardens</td>
<td>26%</td>
</tr>
<tr>
<td>Mt. Baker</td>
<td>19%</td>
</tr>
<tr>
<td>SPIARC</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Our findings showed that properties that had good access to public transit and mostly relied on public transportation or walking scored lower in their interest with a car-sharing service. These properties, Mt. Baker and Hoa Mai Gardens, also exhibited high portions of the elderly population, as shown in Figure 47.

**FIGURE 47:** Percent Of Age Group That Would Use A Car-share Service That Hasn’t Before
PILOT PROJECT PROPOSAL

OVERVIEW

PSCAA is proposing to administer and manage the pilot projects detailed below. Our staff has extensive experience working in low-income communities as well as experience with electric vehicle transportation. Based on in-person interviews and surveys, site visits, focus group discussions, and an extensive literature review we have identified challenges and opportunities for expanding access to electric vehicles for low-income residents. Here we propose two possible models that we believe meet the needs of the communities with which we consulted. This pilot project proposal includes an overarching education strategy and two different models tailored to the needs of each community. Model A provides a community-owned shared vehicle while Model B provides an easily accessible low-rate shared vehicle service.

PILOT PROJECT MODEL A: SUBSIDIZED COMMUNITY-OWNED SHARED VEHICLE

There are two primary barriers to the utilization of electric vehicles in low-income communities: the initial cost and lack of understanding of the technology. This pilot project model seeks to address both barriers. The basic premise is that the housing authority or community organization would own an electric vehicle that would be shared amongst residents/community members. Participants would pay a modest fee for the use of the vehicle that would offset the cost of charging, insurance, maintenance, and replacement cost.

COMPONENTS OF THIS MODEL:

1. Ownership and liability. The association will own, insure, and maintain the vehicle.
2. Education and experience. Educational and driving sessions will be held with each community so every member that is interested in participating has the opportunity to learn the details of the program and experience driving the vehicles.
3. Voucher. All licensed drivers in the community will receive a voucher for one free drive to test it out on their own. Community members who volunteer to help coordinate scheduling and to maintain the cleanliness of the vehicle will also receive a free weekly voucher.
4. Fee. Members will be assessed a fee that covers the cost of charging, insurance, maintenance (such as new tires and brakes), and eventual replacement. We propose a rate of $0.15 a mile and $2 an hour.
5. Shared EV Committee. Each community will form a Shared EV Committee to coordinate management of the vehicle. A member of the organization's staff will also serve on the committee. The committee will be responsible for schedule management and developing community rules for use of the car. PSCAA will provide suggested guidelines for each of the committees.
6. Carpool option. Each Shared EV Committee will consider offering carpooling options on the schedule, such as shared trips to grocery stores or city centers on certain days of the week. This would allow those with transportation needs, but who cannot or do not want to drive, to get where they need to go.
Benefits of this model:

4. Lower cost for drivers. Current shared car models have rates as low as $.15 a minute and $9 an hour. While this rate is intended for lower-income individuals and families, it is still outside the reach of many people living at the poverty level. The rates for this program will be approximately half of what the car-sharing service programs are charging for lower-income populations.

5. More decision-making power for community members. Having the ability to participate on the coordinating committee provides the option for community members to have a voice in how the program operates.

6. Community members can receive a certain amount of free use if they help coordinate the schedule and clean the car.

7. Sense of ownership. The car is owned by the organization for the benefit of community members who will develop a shared sense of ownership. They will also drive the same car every time, which will increase their understanding and comfort level of the technology.

8. Increased awareness. Members of the community will increase knowledge of EVs.

Challenges of this model:

1. Capacity. This model requires the organization to administer and be responsible for the vehicle. Most affordable housing communities run on tight budgets without a lot of extra time or funding.

Pilot Project Model B: Mobility as an Amenity

One of the biggest themes in deploying a car-sharing service at affordable housing is the capacity of the staff. Currently, most affordable housing properties do not have additional staff or capacity to manage a new program and reservation system for the residents. The recent trend and movement towards mobility as an amenity offers a potential solution to these barriers. Mobility as an amenity is a community-based shared vehicle located at residential sites. It allows property management groups to offer shared transportation model to its residents. In this model, a third-party company would install, maintain, and manage a car-share program at the housing site.

Components of this model:

1. Education and outreach. A comprehensive outreach program will provide all residents the opportunity to learn about the program and how to use it.

2. Turnkey solution. This service includes electric vehicles and infrastructure.

3. On-demand service. You can receive more cars as they are utilized and exchange models.

4. Fee. Rates are set by third-party management.

5. Revenue cost-sharing potential. Site hosts will be able to share revenues and can be invested back into the community.

6. Location. Car-share would be located on-site at multi-unit dwelling.

Benefits of this model:

1. Capacity. Takes the burden off the property to manage cars and reservation

2. Easy access. Online reservations system. Kiosks can be offered as an alternative reservation method for those without smartphones or computers.
3. Variety of models available. Can offer a whole suite of vehicles that are interchangeable based on community needs.
4. Reduced upfront cost. This model helps reduce the upfront installation and procurement costs.
5. Increased awareness. Members of the community will increase their knowledge of EVs.

CHALLENGES OF THIS MODEL:

1. Higher cost. Because this model is utilizing a for-profit business, it will likely cost users more per trip than Model A.
2. Payment. Because this model requires credit cards for payment, this model could be more difficult for unbanked users, as compared to Model A.

PILOT PROJECT PROPOSAL SUMMARY

The pilot project proposal includes the following components:

• Over-arching outreach and education program for all communities participating in the pilot projects.
• Implementation of multiple community-owned car-share projects as detailed in the Model A description.
• Facilitating implementation of a car-sharing service at one location, as detailed in the description of Model B.
• Monitoring, data gathering, assessment, and reporting.

The intent of the project is to identify methods to promote EV utilization in low-income communities. At the end of the pilot project, the final report will provide an assessment of how well the models worked, at what level the goals were achieved, lessons learned, and, if successful, how the models could be replicated at a broader scale in other communities.
PRIORITIZING POTENTIAL PILOT PROJECTS

The following proposal summary includes a weighted matrix that shows the prioritization of projects based on the decision making criteria described below. Based on our work with each of these communities, we have concluded that a successful pilot program can be implemented with each of the organizations, however, the higher ranked projects we believe will have a higher likelihood of success. Values were assigned to each organization on a 1-5 scale, with 1 being low and 5 being high. The projects are listed in order of the scores – highest to lowest.

FIGURE 48: Pilot Project Proposal Summary

<table>
<thead>
<tr>
<th>Entity</th>
<th>Elements of Importance for Selection</th>
<th>Recommended Model and Actions</th>
<th>Readiness to Proceed Categories and Ranking</th>
<th>Readiness to Proceed</th>
<th>Air Quality Concerns</th>
<th>Transporta tion Needs</th>
<th>Overall Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 South Park Information and Resource Center (South Park Neighborhood Association)</td>
<td>SPIARC has expressed a strong interest in car-sharing and air pollution reduction and has a program coordinator in place. The Mujer al Volante Program does not have a vehicle to teach class participants, so transportation needs are high. The mobility needs survey showed that only 18 percent of respondents had a vehicle consistently available for driving practice. This area is considered one of the top six areas of concern for air pollution, as identified using the Community Air Tool. The vehicle could also be made available to staff and community residents.</td>
<td>Model A. Install level 2 charging station at South Park Community Center and purchase one EV for shared use by class participants.</td>
<td>Capacity – High Level of Interest – High Strategic Alignment – High Resource Commitments – Medium</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>4.5</td>
</tr>
<tr>
<td>2 Lopez Community Land Trust</td>
<td>LCLT has an EV charger installed. The community has demonstrated interest through a previous pilot project. The community’s over-arching strategic vision of zero net energy use and sustainability is in alignment with this project. There is not any public transit on Lopez Island, making it difficult for residents without vehicles to get to appointments and run errands, such as grocery shopping.</td>
<td>Model A. Purchase one EV for shared use by residents.</td>
<td>Capacity – High Level of Interest – High Strategic Alignment – High Resource Commitments – High</td>
<td>5</td>
<td>1</td>
<td>4</td>
<td>4.2</td>
</tr>
<tr>
<td>3 King County Housing Authority: Plaza Seventeen &amp; Birch Creek</td>
<td>EV installation is already happening in several locations. Plaza Seventeen and Birch Creek had the same level of interest in a car-share service. Plaza Seventeen residents generated a lot of interest and inquiry with their property manager. Plaza Seventeen is not served well by transit and is in the top six areas of concern using the CAT tool.</td>
<td>Model B. Coordinate with a third-party company to install, maintain, and manage a car-share program at the housing site.</td>
<td>Capacity – High Level of Interest – High Strategic Alignment – High Resource Commitments – High</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>4.2</td>
</tr>
<tr>
<td>4 OPAL Community Land Trust</td>
<td>OPAL is developing a new neighborhood of 45 affordable rental townhomes in Eastsound. The neighborhood will feature an electric vehicle charging station and they have identified interest in piloting a community shared EV within their existing strategy. There is not any public transit on Orcas Island, making it difficult for residents without vehicles to get to appointments and run errands, such as grocery shopping. In the survey, a large percentage (73%) identified the cost of owning a car as a challenge.</td>
<td>Model A. Purchase one EV for shared use by residents.</td>
<td>Capacity – High Level of Interest – High Strategic Alignment – High Resource Commitments – Medium</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td>3.7</td>
</tr>
<tr>
<td>5 Seattle Housing Authority – High Point</td>
<td>SHA has sustainability goals, strong interest, and adequate staffing to implement. High Point has one of the highest levels of interest in a car-share service. Traffic congestion, parking availability, and cost of owning a vehicle are the highest barriers to vehicle travel.</td>
<td>Model A. Install level 2 charging station and purchase one EV for shared use by residents.</td>
<td>Capacity – High Level of Interest – High Strategic Alignment – High Resource Commitments – Medium</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3.6</td>
</tr>
<tr>
<td>6 Everett Housing Authority</td>
<td>Everett Housing will be constructing a new clubhouse in 2019, which provides an opportunity to lay the conduit for the EV charging station. This clubhouse will also be centrally located for several other properties to utilize. This area is not serviced well by public transportation. SHA has expressed concerns about capacity to manage a project.</td>
<td>Model B. Coordinate with a third-party company to install, maintain, and manage a car-share program at the housing site.</td>
<td>Capacity – Low Level of Interest – Medium Strategic Alignment – Medium Resource Commitments – Low</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>7 Mt. Baker</td>
<td>Strong interest from MBHSA and alignment with their overall strategy. Residents of the property we surveyed were largely happy with public transit. Although there are other properties that could be evaluated.</td>
<td>Model B. Coordinate with a third-party company to install, maintain, and manage a car-share program at the housing site.</td>
<td>Capacity – High Level of Interest – High Strategic Alignment – High Resource Commitments – Medium</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>2.6</td>
</tr>
<tr>
<td>8 Compass Housing Alliance</td>
<td>CHA expressed interest, but lacked the capacity to participate fully in the study and had minimal resources to commit. Some locations are identified in the top areas of concern using the CAT tool.</td>
<td>Model A. Install level 2 charging station and purchase one EV for residents and field staff to utilize at one of the locations.</td>
<td>Capacity – Low Level of Interest – Medium Strategic Alignment – Low Resource Commitments – Low</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>2.1</td>
</tr>
</tbody>
</table>
To prioritize the proposed pilot projects, we have developed a weighted scoring matrix with the following categories and decision-making criteria.

**READINESS TO PARTICIPATE**
To determine each community’s readiness to participate in the pilot project we had in-depth discussions with each organization to assess their capacity, level of interest, strategic alignment with the goals of the program, and resource commitments. This category carries the most weight (50 percent) because it encompasses the components that are essential to the success of the project. Ranking was based on the four categories above using the following scale:

- 5 = 4 High
- 4 = 3 High + 1 Medium
- 3 = 1-2 High + 2-3 Medium
- 2 = 0-1 High + 3-4 Medium, or 2-3 Medium + 1-2 Low, or 1 High + 3 Low
- 1 = 1-2 Medium + 2-3 Low

**TRANSPORTATION NEEDS**
This category considers how well survey respondents’ transportation needs were met, as determined by the survey. This category has a weight of 40 percent.

**AIR QUALITY CONCERNS**
While the primary purpose of this project is to increase utilization of EVs, the underlying goal is to improve air quality and reduce carbon emissions from transportation. Several of the communities identified within this project are within areas of poor air quality from transportation emissions as identified using Puget Sound Clean Air Agency’s Community Air Tool (CAT). The CAT assesses the geographic impacts of air pollution, populations sensitive to air pollution, and other demographic factors that have led to economic or historic barriers to participation in clean air decisions and solutions. Some of the types of information include proximity to traffic volumes, industrial sources, asthma and heart-related hospitalization rates, underrepresented minority races, and income. This category has a weight of 10 percent.

Ranking for this category was based on the following scale:

- 5 = 27-32
- 4 = 23-26.9
- 3 = 19-22.9
- 2 = 15-18.9
- 1 = less than 15
FIGURE 49: Community Air Tool Map of Potential Pilot Projects
FIGURE 50: Map of Organizations Participating In Pilot Project
The locations on the Community Air Tool map are ranked in the table below. Rankings for the Community Air Tool range from 0-39, with 0 being the least impacted by air pollution, to 39 being the most impacted.

**FIGURE 51: Community Air Tool Rankings**

<table>
<thead>
<tr>
<th>Organization</th>
<th>Name of Facility</th>
<th>CAT score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seattle Housing Authority</td>
<td>Hoa Mai Gardens</td>
<td>32</td>
</tr>
<tr>
<td>King County Housing Authority</td>
<td>Plaza Seventeen</td>
<td>31</td>
</tr>
<tr>
<td>Seattle Housing Authority</td>
<td>NewHolly</td>
<td>29</td>
</tr>
<tr>
<td>Compass Housing Alliance</td>
<td>Dekko Place</td>
<td>28</td>
</tr>
<tr>
<td>South Park Information and Resource Center</td>
<td>South Park Neighborhood Association</td>
<td>27</td>
</tr>
<tr>
<td>Compass Housing Alliance</td>
<td>Angle Lake Court</td>
<td>27</td>
</tr>
<tr>
<td>Compass Housing Alliance</td>
<td>Ronald Commons</td>
<td>26</td>
</tr>
<tr>
<td>Seattle Housing Authority</td>
<td>High Point</td>
<td>26</td>
</tr>
<tr>
<td>Compass Housing Alliance</td>
<td>Karlstrom Apartments</td>
<td>26</td>
</tr>
<tr>
<td>Compass Housing Alliance</td>
<td>The Courts</td>
<td>26</td>
</tr>
<tr>
<td>Everett Housing Authority</td>
<td>Grandview Apartments</td>
<td>25</td>
</tr>
<tr>
<td>King County Housing Authority</td>
<td>Birch Creek</td>
<td>24</td>
</tr>
<tr>
<td>Compass Housing Alliance</td>
<td>Compass on Dexter</td>
<td>21</td>
</tr>
<tr>
<td>Seattle Housing Authority</td>
<td>Lake City Court</td>
<td>19</td>
</tr>
<tr>
<td>Compass Housing Alliance</td>
<td>Easternwood Co-op Apartments</td>
<td>16</td>
</tr>
<tr>
<td>Mt. Baker Village Apartments</td>
<td>Mt. Baker Village Apartments</td>
<td>16</td>
</tr>
<tr>
<td>Compass Housing Alliance</td>
<td>Compass Broadview</td>
<td>16</td>
</tr>
<tr>
<td>Lopez Community Land Trust</td>
<td>Common Ground</td>
<td>No data</td>
</tr>
<tr>
<td>OPAL Community Land Trust</td>
<td>April’s Grove</td>
<td>No data</td>
</tr>
</tbody>
</table>

SUCCESS CRITERIA

The success of this pilot project will be determined by the level of utilization of electric vehicles by low-income communities. Measurement variables will be slightly different for the different models. A high level of success would be at least one-quarter of the members of each community using the vehicle, carpool option, or ride-share service at least once a week. Success criteria for all pilot project models include the total numbers on the following measures. Number of:

- People utilizing vehicles/service.
- Vehicle miles traveled.
- Trips.
- Carpool trips.
- Greenhouse gas reduction.
- People participating in EV education workshops.
- Staff hours for the agency and participating organizations.

PSCAA will conduct a survey of all participants at the beginning and end of the pilot to capture changes in other variables, such as:

- Improvement to the quality of life (i.e., less time spent commuting, increased level of convenience, increased level of comfort, increased ability to work or go to school).
- Level of understanding and acceptance of EV technology.
- Number of people replacing personal gas vehicles with electric vehicles.
- Number of people delaying the purchase of a vehicle, or opting to not purchase a vehicle.

Additionally, through the post-pilot survey and through interviews with the partner organization staff, we will seek to identify any concerns or challenges that arose, to capture lessons learned, and to gather suggestions for improvement. The partner organizations will be consulted and requested to provide input in developing the surveys.

THREATS TO VALIDITY OF PILOT RESULTS

We recognize that some of the variables can be impacted by external factors, such as the replacement of gas cars with EVs could be influenced by a financial incentive offered through a different program. For variables with potential external factors, we will attempt to gather that information during the survey.

ADAPTATION

Partner organizations will be required to provide monthly reports to PSCAA with a summary of usage data, identification of any issues or challenges, and any ideas for improvement. As issues or challenges arise or ideas for improvement are considered, the PSCAA staff will confer with the partner organizations to determine if any modifications are needed to the pilot program. If it is determined that a modification is needed, PSCAA will document changes made, reasons why, and modify the agreement with the partner organization.
DATA COLLECTION PROCESS

1. Each partner organization, in collaboration with the Shared EV Committees, will be required to provide a monthly report that includes usage data, challenges or issues, and ideas for improvement. PSCAA will review these reports for data accuracy and follow-up with partner organizations as needed on issues or suggested modifications.

2. PSCAA will conduct a debriefing at the end of the pilot with all partner organizations, Shared EV Committees, and interested community members to collect feedback and lessons learned.

3. PSCAA will store and aggregate all data for reporting to the legislature.

PROJECTS ON THE HORIZON FOR FUTURE CONSIDERATION

OVERVIEW

In undertaking this study we communicated with multiple organizations with similar goals to better serve our low-income communities, to promote electric vehicle transportation options, and to look for strategic solutions to address equity and air quality concerns. There are many communities that were not surveyed and should also be considered for future projects. An over-arching need that we identified is for significantly more outreach and education about electric transportation and car-sharing options. We also identified a lot of good work in the planning phase and a lot of ideas that need further exploration.

COMMUNITY EDUCATION AND OUTREACH

To promote low-income utilization of electric vehicles and car-sharing, there needs to be community focused outreach and education. In developing an outreach program, it is important to consider the needs of each community by seeking input from members. Suggestions include:

- Hosting workshops to provide more in-depth information about car sharing and its benefits.
- Hosting ride and drive events for the communities to learn about electric vehicle benefits.
- Conduct further research to identify car-share program needs and develop models to fit the community. Create a resident focus group to help develop project goals and strategy.

TACOMA HOUSING AUTHORITY

One of the exciting projects on the horizon is Tacoma Housing Authority’s development of James North, an equitable mixed-use, a mixed-income apartment complex in a transit-oriented development area. Tacoma Public Utilities is interested in potentially partnering to bring electric vehicle charging infrastructure capacity to the site and Envoy is potentially interested in providing electric vehicle car-sharing. This project is currently in the planning phase.

Another of Tacoma Housing Authority’s properties of interest is Salishan. There were initial conversations with the Tacoma Housing Authority about including this property in our study, but we were not able to survey residents. We would recommend surveying residents to identify mobility needs and interest in electric vehicles or car share programs.
SEATTLE HOUSING AUTHORITY
We received a small sample size from Lake City Court, but also a high-interest level in a car share. We would recommend another round of surveying to improve the data and the validity of the results for this community.

MT. BAKER HOUSING
Although Mt. Baker Village residents were generally not interested in a car-share program, there are still opportunities at other Mt. Baker housing locations. There are new properties that will be developed in the next few years, where the installation of electric infrastructure will be significantly cheaper. Parking availability could be a concern and a car-share program could alleviate shortages on parking. A car-share program will offer access to mobility while reducing the burden of owning a vehicle.

KING COUNTY HOUSING AUTHORITY
King County is already installing electric charging stations on its properties. We recommend expanded outreach to residents at other properties to identify if there is any interest in an electric car-sharing service on-site.
APPENDICES

APPENDIX A – EV LAWS AND INCENTIVES: GRANTS

APPENDIX B – EV LAWS AND INCENTIVES: LOANS AND LEASES

APPENDIX C – EV LAWS AND INCENTIVES: REBATES

APPENDIX D – EV LAWS AND INCENTIVES: CHARGING INFRASTRUCTURE

APPENDIX E – EV LAWS AND INCENTIVES: TAXES

APPENDIX F – EV LAWS AND INCENTIVES: EXEMPTIONS

APPENDIX G – ESTIMATED BUDGET

APPENDIX H – PUGET SOUND CLEAN AIR AGENCY MOBILITY SURVEY RESULTS

APPENDIX I – SDOT HIGH POINT MOBILITY SURVEY RESULTS

APPENDIX J – SDOT YESLER TERRACE MOBILITY SURVEY RESULTS