EV FINANCING OPTIONS FOR LOW-TO-MODERATE INCOME INDIVIDUALS IN COLUMBUS, OH

AEDECON CAPSTONE FINAL REPORT

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1. Executive Summary

This report is focused on the research and analysis of personal financing options for low-to-moderate income (LMI) individuals in Columbus, OH to help increase access to electric vehicles. The analysis was done in collaboration with Smart Columbus and the EEDS Capstone course at the Ohio State University. Smart Columbus presented our team with three topics to consider analyzing to help improve equity in ownership of electric vehicles in Columbus: personal financing, smart mobility hubs, and access to charging stations, of which we were to choose one to research further. Our group decided to focus on personal financing.

Through the assessment of existing EV equity programs, this report aims to provide Smart Columbus with policy options that will help increase adoption of EVs in LMI households in central Ohio through financing for personal vehicle ownership/lease. We expanded upon the *American Cities Climate Challenge: Potential for a Used EV Financing Program for LMI Consumers in Columbus, OH* research completed in June 2020 to produce a refined source of recommendations that will assist Smart Columbus in the development of its own EV financing program.

We recommend that Smart Columbus consider developing a program to provide low-interest loans and grants as a financing option for an EV equity program in central Ohio. We provide a detailed list of funding sources and partnerships for such a program in Section 4. Section 4 also contains a structural outline for a five-step program that we recommend Smart Columbus adopt in pursuit of an EV equity program. Finally, we recommend two ways Smart Columbus can engage with the LMI community to alleviate barriers to EV adoption. These steps are to (1) create a financial literacy course in the program's application process (2) develop a set of key performance indicators to measure both environmental and social impacts within LMI communities.

2. Introduction

2.1 Research Goals and Objectives

We develop a set of recommendations for Smart Columbus for to build a personal financing program that will increase access for low- to moderate-income LMI individuals to electric vehicles. This program would also increase transportation options, reduce costs for the targeted group, and lower greenhouse gas emissions within the transportation sector.

To generate recommendations to Smart Columbus, we analyzed financial and social components of existing EV equity programs across the country. Our first objective was to evaluate the personal financing options used in these programs. From this research, we then determined which options would be feasible for the City of Columbus and would allow an EV equity program the best opportunity for success. Through the analysis of these programs, we addressed our second objective, which was to identify potential key stakeholders to be involved in the implementation of equitable EV adoption in Columbus. Key stakeholders identified in existing programs in other cities helped provide guidance for where Smart Columbus could seek similar partners in Columbus. Upon the completion of this research and analysis, our final goal was to provide Smart Columbus with recommendations as to the next steps to be taken in pursuit of its own EV equity program.

2.2 Background

The state of Ohio neither offers tax incentives for zero-emission vehicles (ZEVs) nor requires their sale through a ZEV policy, such that "many original equipment manufacturers have not historically prioritized Ohio markets for distribution of their limited supply of [electric

vehicles]" (Davis, 2020). As a result, Ohio lacks product inventory, a full range of financial incentives for customers, and sales experience within local dealerships. To address this issue, Smart Columbus has worked with dealerships in the central Ohio area to establish approximately 30 Smart Columbus Electrified Dealerships that are committed to sales readiness, EV promotion, and to support potential initiatives (American Cities Climate Challenge, 2017). **Figure 1** provides
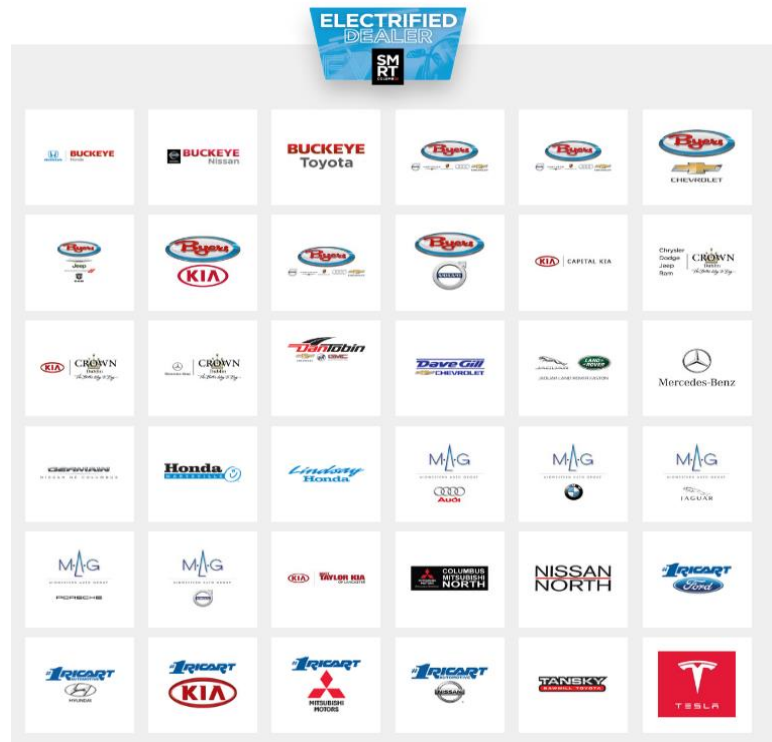

Figure 1. All 36 Smart Columbus Dealers. From *Electrified Dealers*. (n.d.). Retrieved from Smart Columbus: https://smart.columbus.gov/get-involved/drive-electric/

comprehensive list of all the certified dealerships with which Smart Columbus works. These partnerships provide a strong foundation for program expansion into used and new EVs.

Smart Columbus was established in 2016, when Columbus beat out 77 other cities across the country to win the Smart City challenge. This win earned the City a $40 million dollar grant from the U.S. Department of Transportation, in addition to a $10 million grant from the Paul G. Allen Family Foundation. Smart Columbus is a public-private partnership between the City of Columbus and the Columbus Partnership, a non-profit organization of CEOs from Columbus' leading businesses and institutions (Davis, 2020). These corporations are able to provide funding for specific projects and project areas to Smart Columbus. This ability to fundraise

between public and private parties is a great benefit that can help further the EV equity agenda (Rouan, 2016).

2.3 Motivation for Project and Importance

Smart Columbus set a goal to increase EV adoption from 0.37% of vehicles sold in the Columbus region in 2015 to 1.8% by 2020 (Smart Columbus, n.d.). Efforts to achieve this goal primarily included engaging employers through private programs and incentives, increasing workplace charging, and ride and drive roadshows. Although successful, these efforts primarily targeted consumers who already were positioned to purchase an EV (Slaymaker, 2020). Further, as Smart Columbus has already utilized all the grant funding from the Smart Cities Challenge, new funding sources and mechanisms are required to expand EV adoption efforts.

Many LMI individuals face discriminatory and predatory financial practices in the auto market. Among other things, these practices include providing incomplete or confusing information about the terms of the loan and charging high interest rates, in some cases exploiting loopholes in usury laws to charge higher rates than is legal (American Cities Climate Challenge, 2020). Additionally, research suggests that low-income consumers are more likely to take loan terms with lower monthly payments. When combined with higher interest rates, these longer-term loan conditions often result in "underwater" vehicles and higher rates of default (American Cities Climate Challenge, 2020). LMI individuals infrequently have the up-front financial capital required for a new vehicle purchase, as compared to their higher-income counterparts, creating an additional barrier to EV access given the high sticker price of the typical EV. An EV equity program may address issues of financial inequity in Columbus, as the city has some of the highest rates of economic segregation in the nation (EV Equity PPT., 2020).

Pollution sources tend to be located near disadvantaged communities, which increases exposure to harmful pollutants, resulting in disproportionate health effects (Milken Institute, 2017). Much of this local air pollution may indeed arise from transportation, given that 38% of
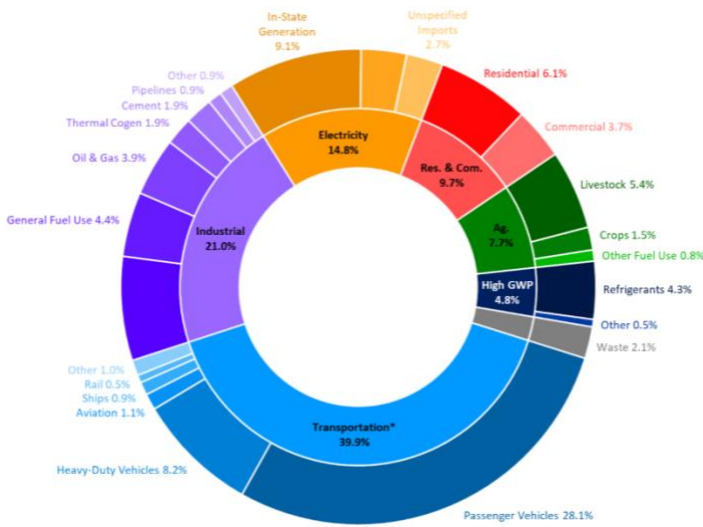

Columbus's greenhouse gas emissions stem from passenger vehicle transportation (EV Equity, PPT., 2020), a trend reflected in **Figure 2**. The expansion of electric vehicle adoption in central Ohio could mitigate some of the environmental pollution that disproportionately affects LMI communities. Providing

Figure 2. 2018 GHG Emissions by Sector. Clean Cars 4 All. (2016). Retrieved from Moving California: https://ww3.arb.ca.gov/msprog/lct/vehiclescrap.htm

financial assistance directed at LMI individuals can help provide them with a greater selection of electric vehicles than under current circumstances. Financial assistance would allow a more diverse group of people to experience the benefits of an affordable, environmentally friendly vehicle, thus increasing transportation options, reducing vehicle maintenance costs, and reducing overall vehicle emissions.

2.4 Columbus Sustainability Goals

The City of Columbus recognizes the impact a healthy environment can have on its citizens and has emphasized sustainability programs for all sectors. The Sustainable Columbus initiative "focuses on optimizing internal city operations and working with external stakeholders from throughout the community to enhance and promote environmentally friendly policies" (Sustainable Columbus, n.d.). One of the programs within the Sustainable Columbus initiative is

the *American Cities Climate Challenge*. When combined with our research, this initiative can help the City of Columbus move more quickly toward a sustainable future in the transportation sector.

2.5 Findings and Recommendations

We researched four personal financing options from several local and state-wide EV equity programs across the country. These four options and our assessment of their feasibility for Columbus are shown in **Figure 3**.

Financing Option	Feasibility in Columbus
Grants and low-interest loans	High
Trade-ins and vouchers	Moderate
Rebates	Low
Tax credits and no sales tax	Low

Figure 3. Personal Financing Options and Feasibility in Columbus. Original work by Kennedy, Richard, Sanchez, and Waits (2020).

2.5.1 Grants and Low-Interest Loans

Our assessment suggests that grants and low-interest loans would have the highest feasibility for implementation in Columbus through existing policies and available funding sources. Both public and private grants were found to be an especially effective way for consumers to receive money up front, and to apply those funds at the time of purchase. In other programs around the country, grants are sent either directly to the participant or to an approved EV dealership upon approval of an application. Low-interest rate loans were often administered through a partnered financial institution. Low-interest rate loans were found to provide standard, fair rates that are significantly less likely to harm a LMI buyer's credit history. Grants and low-

interest loans were chosen as the top personal financing option primarily because, within

Columbus, funding opportunities exist in partnerships with both private and public entities.

Despite the lack of state-level funding sources and incentives, funding for an EV equity program

in Columbus can be obtained from fundraising within the Columbus Partnership and from

national grant foundations, such as Bloomberg Philanthropies and the Robert Wood Johnson

Foundation.

2.5.2 Trade-Ins and Vouchers

In our assessment, trade-ins and vouchers have moderate feasibility for Columbus. These

options would require the individual to trade in their gasoline or diesel-powered car to a

dealership, in return receiving a voucher of a determined amount to go towards the purchase of

an EV. States like Washington and California utilize trade-ins and vouchers to get conventional

vehicles off the road and electric vehicles to replace them, with additional assistance to LMI

groups. Similar to grants and low-interest loans, the money to the buyer through a voucher would

be available at the time of purchase, which is of great importance for the target individuals.

Trade-ins and vouchers were considered to have moderate feasibility because vouchers from

existing programs were funded at the state-level, which is currently not an available funding

source for Columbus. Trade-ins and vouchers could become a viable financing option in the

future if proposed EV adoption legislation at the state level is implemented, or if grant funding

can be obtained.

2.5.3 Rebates

Rebate programs were considered not feasible for an EV equity program in Columbus,

OH. Although rebates can be administered at a small scale through private funding, they are not

available to the customer at the time of purchase, which is an obstacle for LMI individuals that typically do not have financial capital to cover initial vehicle fees or down payment requirements that keep interest rates low (American Cities Climate Challenge, 2020). This obstacle was also noted by Alex Slaymaker, Adoption Manager at Smart Columbus. In 2019, two members of the Columbus Partnership, Alliance Data and AEP Ohio, completed small-scale EV rebate programs for company employees through the Ignite Action Fund. When asked about the possibility of a similar rebate program targeted toward LMI individuals, Ms. Slaymaker stated that rebate programs are not ideal for LMI individuals because the participants must first purchase the vehicle, which as noted above may be difficult for them to do, before receiving the rebate.

2.5.4 Tax Credits & No Sales Tax

Tax credits and no sales tax for electric vehicles were also considered not feasible as an EV equity financing option in Columbus, OH. This financing option is dependent on state and/or federal legislation. Further, tax credits depend on tax liability, which creates an issue for LMI individuals who may not file taxes. While tax credits and no sales tax are commonly used for general EV adoption programs, we discovered no added advantage to LMI individuals.

3. Body

3.1 Methodology

The main goal of this project was to provide financing recommendations for Smart Columbus based on our research into existing electric vehicle equity programs. Research was completed on programs that provided the various financial options for LMI EV adoption discussed in the above section: grants and low interest loans, trade-ins and vouchers, rebates, and tax credits/no sales tax. Representatives from each program were contacted via email with a

prepared set of interview questions (see **Data Sets**). These questions allowed for more in-depth

information regarding specific structural components of each program. Through analysis of these

programs, recommendations for EV equity advancement in Columbus, Ohio were able to be

made to Smart Columbus.

3.2 Data Collection

In order to make relevant recommendations for an EV equity program in Columbus, it

was essential to review various social, financial and structural components of existing EV

adoption programs comprehensively. We also researched Ohio's state and local policies to

determine the state's capacity for EV adoption legislation and funding mechanisms. This process

and subsequent analysis provided us with the data necessary to consider which components of

each program were feasible for Smart Columbus to include in the development of their own EV

equity program.

3.3 Means of Collection

The primary means of data collection came from researching program websites, as well

as any additional reports that detailed the general mission of the EV equity program, its funding

mechanisms, and personal financing methods. We were unable to identify an existing EV equity

program directly comparable to Columbus in terms of state and local policies, as the majority of

programs exist in cities or states with more advanced climate change laws, such as California or

Seattle, Washington. Once we had compiled a list of these programs, group members reached out

to representatives of each program with a list of prepared interview questions. Responses to this

set of questions were used to provide additional clarity for any remaining questions upon

complete review of existing reports and websites.

3.4 Benchmarking Results

Several of the programs we evaluated partnered with Community Development Financial Institutions (CDFIs), U.S. Department of Treasury certified organizations that lend at affordable rates and terms in under-served markets i.e., markets with a preponderance of people who may not qualify for a typical bank loan (CDFI Fund, 2020). Grant funding was available through state governments, private grant foundations, and local, state, and national non-profit organizations. Plug-In America, a national non-profit EV support organization, was a key partner in Seattle's *EVs for Everyone* program, and an entity Smart Columbus could partner with as well.

Seattle's *EVs for Everyone* Program provides EV auto financing with lower-than-standard auto rates and is targeted at first-time buyers and people with low credit scores who cannot afford a large down payment. A program like *EVs for Everyone* may also help LMI individuals in their long-term financial security (Plug In America, n.d.). This program was of particular interest for our analysis because it links Plug-in America and Express Credit Union, a CDFI, and it used low-interest loans as a primary financing approach.

Another program of interest was the *Clean Vehicle Assistance Program,* or CVAP, in the state of California. Launched in 2018, CVAP has served over one thousand individuals and families by providing funds for down payments and low-interest rate loans. Grants of up to $5,000 at the time of eligible vehicle purchase and subsidized loans capped at an 8% interest rate are available to LMI individuals. This is a significant benefit for lower credit borrowers who would otherwise qualify for a higher-interest loan, ranging anywhere from 16-25% (Clean Vehicle Assistance Program, 2020). Funding for CVAP is provided by California Climate Investments, a state-wide initiative that utilizes funding from the cap-and-trade program for other sustainability objectives (Clean Vehicle Assistance Program, 2020).

California Climate Investments also funds the *Clean Cars for All* Program (Clean Cars 4 All, 2016), which provides $9,500 to LMI individuals who discard their old vehicle and convert to an electric vehicle. This money is available to the consumer at the time of purchase. A third California-based program at the county level is the *Drive Forward* electric vehicle loan program. *Drive Forward* is supported by Peninsula Clean Energy, a community-based non-profit agency, and Peninsula Family Services. These organizations provide up to a $4,000 incentive to LMI households in San Mateo County. To receive this money, the individual must prove that they are a resident of the area and have a qualifying income under $51,040 a year. An aspect of this program that is particularly relevant to our research is that the qualified applicant must attend a financial empowerment workshop to qualify for the incentive, which helps provide education on financial security and decision-making (DriveForward, 2020).

We found several EV adoption programs that utilized rebates as the primary financing method. Although rebates are a commonly used incentive, we found they are not an especially effective tool for progressing EV equity. A common concern for LMI individuals in purchasing a vehicle is the large upfront cost (American Cities Climate Challenge, 2020). Rebates typically are not available at the time of purchase, which limits their usefulness for LMI individuals who often need assistance with a down payment. Although rebates may not be a feasible primary solution for equitable EV adoption, the added financial assistance to LMI EV consumers can still potentially be used as a supplement to help ensure equity in the process.

3.5 Key Informant Interview Results

We received responses from three representatives of existing EV equity programs: Jhana Valentine, Program Director of the *Clean Vehicle Assistance Program* (CVAP); Mattie Horne, Coordinator of the *Connecticut Hydrogen and Electric Automobile Purchase Rebate* (CHEAPR)

Program; and Alejandra Posada, Energy Programs Specialist of Peninsula Clean Energy's EV Rebate program in San Mateo County, CA. These interviews provided us with a deeper understanding of these programs, how they were developed, their primary functions and goals, and any additional information not available on their websites.

California's Clean Vehicle Assistance Program utilizes grants and low-interest loans, making it a key case study for Columbus's own EV equity program. The interview responses from Jhana were especially useful in evaluating financing methods and partnerships, program structure, and community engagement efforts. CVAP utilizes several strategies for outreach. One strategy is to contract and collaborate with Community Benefit Organizations to promote the program in their community. A second strategy is to have a strong social media presence, specifically through the use of Facebook to reach out to community members and to expand awareness of the program. Radio station campaigns are a strategy the program is looking to deploy in February 2021. Finally, CVAP engages communities through coordinated community events (pre-pandemic) and now participates in webinars.

Performance measures being used to measure success are grants awarded (both number and total dollars) and the development of more nuanced equity metrics to monitor and evaluate success as an equity program. Jhana cited lack of education and promotion of clean vehicles and the lack of charging infrastructure as two challenges within the program. When asked how the program ensures that it is truly benefitting LMI participants, she stated that it does so "by working with CBOs and other stakeholders that serve communities that are classified as "disadvantaged communities" (per CalEnviroScreen) and building strong community connections [to] help [them] understand the impact the program is having in a more holistic way" (Valentine, 2020). Participants are surveyed one month and again one year after they

receive a grant and purchase or lease a clean vehicle. The program uses this survey data to get

feedback from applicants who did not complete the application or redeem a grant to better

understand what deterred them and/or what barriers came up. A notable characteristic of CVAP

is its involvement with customers after vehicle purchase and use of participant feedback to

improve the program. We would advise Smart Columbus to explore similar community

engagement initiatives when developing their own EV equity program.

 The interview responses from Mattie Horne of Connecticut's CHEAPR program were

useful when evaluating the relationship an EV equity program has with dealerships and how this

relationship affects the program as a whole. There are two monetary incentives for the CHEAPR

Program: a rebate applied at the point of sale (dealer claimed application) or a rebate sent

directly to the consumer (consumer claimed application). There is also a dealer incentive that is

given to the dealership with every approved application. The idea behind this is to "incentivize

consumers to purchase clean energy vehicles, while also incentivizing the dealerships to push

these sales" (Horne, 2020). When asked how the program ensures it is benefitting LMI

individuals, Mattie stated that the objective of the program is to bring equitable access to clean

energy technology that is traditionally too expensive for LMI participants. The biggest way this

is done is by putting a MSRP cap of $60,000 on vehicle eligibility in order to effectively target

individuals who are actually dependable on this rebate to be able to afford a vehicle. Mattie also

noted that a large challenge at program inception was training dealerships on the guidelines and

ensuring the correct information was distributed. Since the program relies on the dealerships to

tell consumers about the program and apply for them, there are times when incorrect information

is passed along to consumers. The Connecticut program relies almost exclusively on car

dealerships to communicate with target consumers, differing somewhat from Smart Columbus,

which aims to focus more on direct community-level engagement. With this in mind, we would still encourage Smart Columbus to take extra steps to ensure its electrified dealerships have the proper training and knowledge to educate LMI consumers.

Our interview with Alejandra of Peninsula Clean Energy's Used EV Rebate program in San Mateo County, CA helped provide additional information on the scale and objectives of the program. Peninsula Clean Energy is a non-profit organization and San Mateo County's electricity provider. It was launched collaboratively by the County of San Mateo and all twenty of its cities, with a goal to provide electricity that is 100% renewable by 2025 (Peninsula Clean Energy, n.d.) Created in 2019, and recently approved for a 3-year extension, the rebate program is funded by Peninsula Clean Energy's ratepayers and aims to serve 100 low-income customers a year. Alejandra stated that the main stakeholders are low-income county residents and "partnerships with community-based organizations that get the word out to those communities" (Posada, 2020). When asked how the program benefits LMI individuals, she noted that "in addition to a rebate of up to $4,000 to reduce the purchase price of the vehicle, EVs are cheaper to operate and cost loss to fuel than gasoline vehicles, saving owners money in the long term" (Posada, 2020). The key performance indicators for this program are greenhouse gas emissions avoided and economic savings for customers, both of which stem from the number of customers that participate.

4. Recommendations

4.1 Areas of Further Consideration

Our team recommends low-interest loans and grants as the most feasible financing option for an EV equity program in Columbus, OH. However, throughout the research process, we

discovered additional factors that we believe will have an impact on the implementation timeline and overall success of the program. Chief among these factors are the COVID-19 pandemic and proposed state legislation. COVID-19 is ongoing and will continue for an indefinite amount of time, making it difficult to predict the influence it will have on the implementation of an EV equity program in the future. The current nation-wide recession has resulted in many people, businesses, and banks experiencing varying degrees of uncertainty about their economic future. This means individuals and households are less willing and able to make large financial investments.

However, information exists in support of a more immediate time horizon for EV equity program adoption and implementation. The need for affordable vehicles and personal transportation has not stalled, and the implementation of an EV equity program would allow LMI individuals to better meet this need. This statement is supported by proponents of the proposed state legislation related to EV equity. While the state of Ohio currently has no legislation in support of EV equity, proposed state legislation changes would advance EV adoption efforts. House Bill 546, which is currently in the House Transportation and Public Safety Committee, is a proposal to reduce the EV and hybrid vehicle registration fees, currently at $200. If passed, this bill would further the accessibility and affordability of hybrid and electric vehicles for LMI residents in Columbus (Drive Electric Columbus, 2020). Another important piece of legislation relevant to EV equity is House Bill 202, also currently in the House Transportation and Public Safety Committee. House Bill 202 proposes to set up a committee to examine and make recommendations on EV infrastructure and ways to increase adoption of EVs (Ohio Legislature, 2020). If passed, this bill would be crucial in supporting wide-spread EV adoption.

4.2 Limitations of Current Analysis

One limitation of our current analysis is the lack of available market data for the geographic spread and the accompanying income-level of current and future EV customers. This information would likely enhance our recommendations by identifying in what settings or areas financial support is lacking, and therefore, where Smart Columbus should focus their efforts.

A second potential limitation relates to the little research our team did into the shift in the status of the federal government. This could lead to changes in the policies, regulations, and incentives at the state and federal levels and could potentially change the feasibility of the financing options.

4.3 Recommendations for Further Research

4.3.1 Financing Methods and Partnerships

Of the four personal financing options in existing EV equity programs, we determined grants and low-interest loans to have the highest feasibility and potential for success for an EV equity program in the Columbus area. To successfully implement this financing option, Smart Columbus must establish partnerships and funding sources.

We recommend that Smart Columbus consider a partnership with Plug-In America (or a similar EV equity support group) that operates on a national scale, as these institutions do not exist for Columbus at the state-level. This partnership would allow Plug-In America to act as a liaison between Smart Columbus and LMI individuals by providing personalized, expert assistance to current and prospective EV drivers (Plug-In America, n.d.). Further, we encourage Smart Columbus to do further research into the potential of partnering with a Community Development Financial Institution. IFF, as the largest non-profit CDFI in the Midwest, is a mission-driven lender that "helps communities thrive by creating opportunities for low-income

communities"(IFF, 2020), and would be a good partner to consider. Among other financial

products, IFF provides capital in the form of loans, with a lending focus on creating social

impacts within the realm of sustainability and residential development (Ohio CDFI Network,

2020). An institution like IFF in conjunction with an EV support non-profit would help ensure

stable, impactful, long-term support for an EV equity program. Additional funding for an EV

equity program in Columbus can be obtained from the Columbus Partnership and from national

grant foundations, such as Bloomberg Philanthropies and the Robert Wood Johnson Foundation.

4.3.2 Program Structural Outline

Based on our research, we recommend that Smart Columbus follow five general steps in

pursuit of its own EV equity program:

The first step is to establish awards and eligibility requirements, including determining

grant amounts, vehicle requirements, and vehicle eligibility criteria, verified with income taxes

or other documents if the participant did not file taxes. The second step is to determine

participant eligibility requirements, primarily through an application process. This would involve

setting residency requirements, income eligibility and verification, program education

requirements (including having participants complete a financial literacy course), and grant

recipient and ownership requirements. Eligibility terms in many of the programs consisted of

verification of residency with a driver's license. Qualifying household income was often

established at a set number below the federal poverty level and verified with income taxes or

other documents if the participant did not file taxes. All programs provided an online application

form available through their website. The third step involves establishing vehicle financing

options. This is especially relevant if Smart Columbus decides to provide different options for

the purchase of a qualifying EV through direct grant funding, in addition to giving participants

the option to obtain a loan or rebate from a partnering organization. The fourth step is developing program dealership responsibilities and requirements, with items such as purchasing requirements, applying program grants and loans to vehicle purchase, and determining how to send the payment to the approved dealership. The final step is to determine the program policies, including an open application expiration policy, application approval expiration policy, grants per lifetime, reservation and waitlist policy, and appeals policy.

4.3.3 Financial Literacy Course

We recommend Smart Columbus incorporate a financial literacy course and program education guidelines in the application process of a proposed EV equity program. Financial illiteracy is a major barrier to LMI EV adoption that is often exploited by lenders (American Cities Climate Challenge, 2020). Additionally, in our interviews from both CVAP and the CHEAPR program, lack of EV knowledge and program education of both dealers and customers were cited as challenges to the programs. Requiring applicants to complete financial literacy and program education courses before application approval allows LMI individuals to understand the nuances and terms of available financing options, the long-term implications of vehicle ownership, and ways to improve their financial security. A financial literacy course would support long-term financial stability of LMI individuals, a privilege regularly withheld from them.

For further direction, we recommend Smart Columbus review the financial literacy courses of the Clean Vehicle Assistance Program in California and the Peninsula Clean Energy EV equity program in San Mateo County, CA. Peninsula Clean Energy provides a financial empowerment workshop where applicants can learn about budgeting, money management, and

how to responsibly use credit. After attending this workshop, the applicant can then meet with a financial empowerment team member to review their credit report and application (Peninsula Family Services, n.d.). The Clean Vehicle Assistance Program, in collaboration with the Beneficial State Foundation, provides customized financial literacy education videos that are created to show financing options and keys for financial stability for LMI individuals before purchasing an electric vehicle (Beneficial State, 2020).

4.3.4 Key Performance Indicators

In addition to these steps, we encourage Smart Columbus to consider developing key performance indicators (KPIs) to ensure positive societal and environmental impacts. Some examples of KPIs in existing programs include increased mobility, increasing the portion of EV ownership, and avoided greenhouse gas emissions. Various cost savings measures included debt reduction/increased financial security, reduced maintenance costs, and improved credit scores. The LMI EV Barrier Survey that Smart Columbus and the Smart Cities Climate Challenge started administering in November of this year can provide information necessary for Smart Columbus to construct and refine its own set of KPIs. The data from this survey is expected to be completed in December.

5. Conclusion

From the results of our program and key stakeholder analyses, our project team recommends low-interest loans and grants as the most feasible financing option to support electric vehicle adoption for low- to moderate-income individuals in the Columbus area. In order to create wide-spread and lasting change, Smart Columbus will need to consider and comprehensively address all issues related to EV inequity. We found that Smart Columbus can

alleviate traditional barriers to LMI EV adoption through several means, including: the provision of grants and low-interest loans to target individuals through an EV equity program, implementation of a financial literacy course within such a program, public support for state-wide EV adoption legislation, and the creation of key performance indicators developed from community-level engagements and input.

6. Resources

American Cities Climate Challenge. (2017). Bloomberg Philanthropies. Retrieved December 05, 2020 from
https://www.bloomberg.org/program/environment/climatechallenge/#overview

California Air Resources Board. (n.d.). *California Greenhouse Gas Emissions for 2000 to 2018.* Retrieved December 05, 2020 from
https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2018/ghg_inventory_trends_00-18.pdf

CDFIs. (2020). Ohio CDFI Network. Retrieved December 05, 2020, from
https://www.ohiocdfis.org/cdfis

Clean Cars 4 All. (2016). Moving California. Retrieved December 05, 2020, from
https://ww3.arb.ca.gov/msprog/lct/vehiclescrap.htm

Clean Vehicle Assistance Program. (2020). Retrieved December 05, 2020, from
https://cleanvehiclegrants.org/

Clean Vehicle Assistance Program. (2020, April 10). Beneficial State Impact. Retrieved December 05, 2020, from
https://impact.beneficialstate.org/clean-vehicle-assistance-program/

Community Development Financial Institutions Fund. (2020). U.S. Department of the Treasury. Retrieved December 05, 2020,
from https://www.cdfifund.gov/Pages/default.aspx

Davis, J. (2020, November 17). Columbus Ohio's Bold Goal: Increasing EV Adoption. Retrieved December 05, 2020, from *https://smart.columbus.gov/playbook-assets/electric-vehicle-consumer-adoption/columbus-ohio-bold-goal-increasing-ev-adoption*

Drive Electric Columbus. (2020). Current Proposed Ohio Legislation. Retrieved December 05, 2020, from
https://driveelectriccolumbus.com/legislative-action

DriveForward. (2020). Peninsula Family Service. Retrieved December 05, 2020, from
https://www.peninsulafamilyservice.org/our-programs/financial-empowerment/

Financial Empowerment Programs - Peninsula Family Service - Auto Loans. (n.d.). Peninsula Family Service Retrieved December 05, 2020, from
https://www.peninsulafamilyservice.org/our-programs/financial-empowerment/

House Bill 202. (2020). The Ohio Legislature. Retrieved December 05, 2020, from
https://www.legislature.ohio.gov/legislation/legislation-summary?id=GA133-HB-202

Horne, M. (2020, November 18). CHEAPR Key Informant Interview Questions [E-mail].

IFF's Mission and History. (2020, May 27). IFF. Retrieved December 05, 2020, from
https://iff.org/about/mission-history/

Incentives & Rebates. (n.d.). Go Electric Oregon. Retrieved December 05, 2020, from
https://goelectric.oregon.gov/incentives-rebates

*Low-Income and Communities of Color at Higher Risk of Serious Illness if Infected with
Coronavirus*. (2020). Kaiser Family Foundation. Retrieved December 05, 2020, from
https://www.kff.org/coronavirus-covid-19/issue-brief/low-income-and-communities-of-
color-at-higher-risk-of-serious-illness-if-infected-with-
coronavirus/#:~:text=A%20larger%20share%20of%20non,elderly%20adults%20with%2
0low%20incomes

Milken Institute. (2017). *Financing Models to Expand Access to Electric Vehicles in California.*
Retrieved December 05, 2020, from https://milkeninstitute.org/reports/financing-models-
expand-access-electric-vehicles-california

Plug In America. (n.d.). Retrieved December 05, 2020, from https://pluginamerica.org/

Posada, A. (2020, October 30). Peninsula Clean Energy Rebate Program [E-mail].

Sustainable Columbus. (n.d.). City of Columbus. Retrieved December 05, 2020, from
https://www.columbus.gov/sustainable/

Scauzillo, S. (2017, August 30). *Voucher program helps you trade in your gas guzzler for an
electric car*. Retrieved December 05, 2020, from
https://www.sgvtribune.com/2015/07/12/voucher-program-helps-you-trade-in-your-gas-
guzzler-for-an-electric-car-2/

Slaymaker, A. (2020). *EV EQUITY EEDS* [PPT]. Columbus: Smart Columbus.

Slaymaker, Alex. EV Equity Microsoft Teams Check-in Meeting. 6 November. 2020.

Rouan, R. (2016, May 25). *Columbus public, private sectors pledging $90 million to help
'Smart Cities' effort.* Retrieved November 22, 2020, from
https://www.dispatch.com/article/20160524/NEWS/305249760

Valentine, J. (2020, November 18). Clean Vehicle Assistance Program Interview [E-mail].

7. Data Sets

Dataset #1: CHEAPR_interview.dox
Source: Mattie Horne, Coordinator for CHEAPR, Center for Sustainable Energy. Phone: (855) 704–6350. Website: EnergyCenter.org
Description: Mattie responded to a list of prepared questions to better describe the CHEAPR program in Connecticut and the variables involved in its success. Questions included:
1. How is the program being funded?
2. What existing local and state policies influence the program?
3. Who are the key stakeholders in the program?
4. What are the requirements for program eligibility? Is there an application process?
5. What monetary incentives are being used for the program? Are there any non-monetary benefits that incentivize participants?
6. Is the program short or long term? How many individuals/ households does the program plan to serve?
7. Was any market/demographic data considered before program implementation? If so, what kind?
8. Does data exist regarding demographics, income level, type and # of EV's being purchased through the program?
9. Are there any noteworthy barriers that have existed throughout the various stages of the program adoption process?
10. How successful has the program been? What direct (and indirect, if applicable) performance measures are being used to track success?
11. How is the program being communicated to target consumers?
12. In what ways is it being ensured that the program is truly benefitting LMI participants, as opposed to creating unintended adverse effects?

Dataset #2: CVAP_interview.dox
Source: Jhana Valentine, Program Director Clean Vehicle Assistance Program, Beneficial State Foundation. Phone: 510-463-6562. Website: Beneficialstate.org
Description: To gain a better understanding of the specific components of the Clean Vehicle Assistance Program, Jhana Valentine provided responses to a list of questions focused on how the program functions and how it promotes EV equity. Questions included:
1. How is the program being funded?
2. What existing local and state policies influence the program?
3. Who are the key stakeholders in the program?
4. What are the requirements for program eligibility? Is there an application process?
5. What monetary incentives are being used for the program? Are there any non-monetary benefits that incentivize participants?
6. Is the program short or long term? How many individuals/ households does the program plan to serve?
7. Was any market/demographic data considered before program implementation? If so, what kind?
8. Does data exist regarding demographics, income level, type and # of EV's being purchased through the program?

9. Are there any noteworthy barriers that have existed throughout the various stages of the program adoption process?
10. How successful has the program been? What direct (and indirect, if applicable) performance measures are being used to track success?
11. How is the program being communicated to target consumers?
12. In what ways is it being ensured that the program is truly benefitting LMI participants, as opposed to creating unintended adverse effects?

Dataset #3: Key Informant Interview Questions.docx
Source: Alejandra Posada, Energy Programs Specialist, Peninsula Clean Energy. Phone: (650) 257–2462. Website: https://www.peninsulacleanenergy.com/
Description: Alejandra responded to a list of prepared questions to better describe the Peninsula Clean Energy Rebate program in San Mateo County California, and the variables involved in its success. Questions included:
13. How is the program being funded?
14. What existing local and state policies influence the program?
15. Who are the key stakeholders in the program?
16. What are the requirements for program eligibility? Is there an application process?
17. What monetary incentives are being used for the program? Are there any non-monetary benefits that incentivize participants?
18. Is the program short or long term? How many individuals/ households does the program plan to serve?
19. Was any market/demographic data considered before program implementation? If so, what kind?
20. Does data exist regarding demographics, income level, type and # of EV's being purchased through the program?
21. Are there any noteworthy barriers that have existed throughout the various stages of the program adoption process?
22. How successful has the program been? What direct (and indirect, if applicable) performance measures are being used to track success?
23. How is the program being communicated to target consumers?
24. In what ways is it being ensured that the program is truly benefitting LMI participants, as opposed to creating unintended adverse effects?