

# Transforming Active Transportation Through Electrification

## The Community Electric Bike Project



November 2018

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## ACKNOWLEDGEMENTS

The project team would like to acknowledge and thank all funders and supporters of the Community Electric Bicycle Project (CEB.) The 11<sup>th</sup> Hour Project, a program of the Schmidt Family Foundation, provided \$25,000 in funding for CEB.

Thank you to GenZe by Mahindra and their Market Manager, Steve Spock. They loaned Forth ten e-bikes in different sizes and styles to use for the duration of the project. GenZe's Portland store also provided support and help maintaining the fleet for the duration of the project.

Thank you to our project partner, the Community Cycling Center (CCC.) They were instrumental in helping to facilitate and manage CEB. We also extend our gratitude to Ira Dixon, former Program Manager at CCC, who dedicated many hours to ensure the success of the project and remained a staunch advocate for the riders.

Thank you to all of our participants and riders. Know that Forth hopes to leverage your experiences from this project to make e-bikes and other transportation options more accessible to you and other Portlanders in the near future.

Finalmente, Forth le quiere dar gracias a la comunidad de Cully, especialmente a ABC, por su dedicación para aumentar el acceso y mejorar las opciones de transporte activo en su comunidad. Nos sentimos muy privilegiados de haber tenido la oportunidad de trabajar con ustedes y esperamos seguir trabajando con su comunidad en el futuro. ABC es verdaderamente un líder nacional en la promoción del transporte activo.

### CASE STUDY PREPARED BY:

Sergio Lopez

Program Associate, Forth

Catherine Teebay

Program Manager, Forth

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## EXECUTIVE SUMMARY

In late 2016, Forth began designing a complementary e-bike project after learning that some residents in the Cully neighborhood of Northeast Portland would not be served by Forth's community car sharing project. While the Community Electric Vehicle (CEV) Project would go on to have its share of successes, it was unable to accommodate unlicensed drivers.<sup>1</sup> The development of this project aimed to test the benefits of e-bikes for unlicensed drivers or for folks who lack access to a vehicle specifically in underserved communities.

Similar to the CEV Project where Forth partnered with the community-based organization (CBO), Hacienda Community Development Corporation (CDC), Forth partnered with Portland-based 501(c)(3), Community Cycling Center (CCC), for this project. Founded in 1994, CCC is a mission-driven nonprofit working to broaden access to bicycling and its benefits. They believe that all Portlanders—regardless of their income or background—should have the opportunity to experience the joy, freedom, and health benefits of bicycling. CCC has a large programs team, runs summer bike camps, and also operates a retail store and bike shop in Northeast Portland.<sup>2</sup>

This project launched in March of 2017 and ended in November of 2017. It consisted of three ten-week cohorts of approximately 10 participants each. Participants were loaned an e-bike, basic bike gear, and were guided through a short safety course and e-bike tutorial. The first cohort was composed of individuals who had preexisting relationships with CCC or CCC employees, the second consisted of students and staff from Portland Community College (PCC), and the last cohort consisted exclusively of members of the, *Andando en Bicicletas en Cully* (ABC) a grassroots active transportation advocacy group sponsored by CCC.<sup>3</sup> CCC Program Manager, Ira Dixon, facilitated the first two cohorts and Forth Program Associate, Sergio Lopez, facilitated the third cohort.

Over the course of the project, approximately 4,000 miles were traveled and a total of 28 individuals participated. The major scope of the project saw an outcome of young participants utilize the bikes more. With high usage, participants did state that the bikes lacked durability, but nonetheless the entire scope of the project gave Forth an insight on how new technologies are used amongst new communities. Overall, the e-bikes became a valuable and reliable source of transportation for folks, including one participant who got a job promotion because the e-bike decreased commuting time and they were able to put more hours at work.

Both internally through industry development and externally for consumer engagement, Forth hopes that projects like CEB help bring more awareness and advocacy for e-bikes and other modes of electric transportation.



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## INTRODUCTION

Over the last fifty years, the City of Portland's population has almost doubled in size, resulting in increasingly crowded roads and a strained public transit system.<sup>4</sup> With the rise in population and expected continued growth, many organizations, governments, businesses, and residents have been actively looking for and testing a multitude of transportation solutions to ease the growing pains. Close-in neighborhoods, like Cully in Northeast Portland, have seen some of the greatest change in recent years. In 2010, the City found that, based on U.S. Census data, Cully possessed 3 of 4 risk factors for gentrification and parts of the neighborhood were already experiencing gentrification.<sup>5</sup> Continual growth in Portland has led to widespread displacement and a race to keep pace with and meet evolving transportation needs in communities like Cully and other East Portland communities as residents move further away from the city center.<sup>6</sup> In response to this dynamic environment and needs discovered when designing another transportation pilot in Cully, Forth developed the Community Electric Bicycle Project (CEB) in 2017 to determine if electric bicycles, also known as e-bikes and pedal-assist bikes, could help address the transportation needs of people without driver's licenses and cards.

While designing the Community Electric Vehicle (CEV) Project, an affordable, electric, car sharing pilot in Cully, Forth learned that some people in the area wanted to participate, but did not have driver's licenses or cards. Some people may have grown up in a city where they never needed to learn to drive, others may not have the money for a car, insurance, and other costs associated with car ownership, and in 2014, Oregonians failed to pass Measure 88 and voted to not allow undocumented people to obtain driver's cards, which would have operated similarly to driver's licenses.<sup>7</sup> Regardless of the reasons as to why some people may not have a driver's license, the goal of this project was to find a transportation solution to help everyone get around with greater flexibility and greater affordability.

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## PROJECT PURPOSE

The primary goal of the Community Electric Bicycle Project was to test the benefits of e-bikes as a mobility option for individuals who not only lack a driver's license or card, but may also have limited transportation options. For this project, Forth collaborated with Community Cycling Center (CCC), a Portland-based community-based organization (CBO) to evaluate if and how e-bikes could help to diversify and improve transportation options for unlicensed individuals in underserved areas where there were fewer transportation options.

Forth elected to use e-bikes for this demonstration project for a myriad of reasons. First and foremost, e-bikes do not require riders to have a license or endorsement of any kind in the state

of Oregon, allowing for broad participation. Second, the e-bikes the project team used could be ridden like a normal bicycle, with pedal assist, or using a throttle, meaning that riders had a multitude of options for how they wanted to ride the bike. Additionally, if the e-bike ran out of power, riders could still ride the bike or get it home since it reverted to riding like a regular bike when out of charge. This methodology of “different strokes for different folks” allowed the project team to include participants from diverse backgrounds and abilities. This also enabled people who may have had trouble riding a traditional bike due to strength or agility requirements and people who may not have ridden a normal bicycle because of safety concerns to participate. The diverse settings on the e-bikes helped riders feel more comfortable on the e-bikes and allowed them to better keep up with traffic, which increased many rider’s sense of safety and confidence. Furthermore, e-bikes are environmentally friendly given their low carbon emissions and once purchased are relatively inexpensive to maintain, compared to options like a car or motorcycle. The e-bike also provided a more flexible option for people who rely heavily on public transit. It is not uncommon for public transit in Portland to experience delays forcing riders to either account for additional travel time or causing them to arrive late to their destination. Additionally, there are limited transportation options that operate around the clock and the e-bikes allowed for more freedom in scheduling.

Ultimately, as cities, including Portland, have grown in population, more low and middle-income residents have had to move further outside of the City to find affordable housing. This translates to longer commutes for these communities and lost opportunity cost. Our hope was that the e-bikes would be one more flexible option, potentially helping participants shorten their commutes and better connect to other modes of transportation.

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## PROJECT DESIGN

Project planning and design started in late 2016 with the project launching on March 20<sup>th</sup>, 2017 and continuing through November 22<sup>nd</sup>, 2017. A total of 28 riders went through the program for a period of about ten weeks each with the project lasting a little over thirty weeks. The only requirements to participate were that riders be at least eighteen years of age and not possess a driver’s license or card.

The primary objective of this demonstration project was to expand transportation options for unlicensed individuals who often face more limited transportation options and who are oftentimes more heavily dependent on public transportation, rides from friends and family, taxis, and ride hailing services. These options do not always offer the flexibility needed and if they do, that flexibility often comes at a significant cost.

Some of the project participants may choose to not have a driver's license, while others are "license challenged," meaning that they may face barriers that make it difficult or impossible to obtain a driver's license. Forth did not ask participants why they did not have a driver's license as this may be a sensitive topic for some people and had no bearing on their ability to participate. Further, it would not have had and did not impact the success of the project. The goal of this project was not to understand why people did not have licenses or why they could not obtain one, but to understand if e-bikes could provide a better, more economical, and more readily accessible transportation option for these individuals.

Early on in the project design process, Forth made the decision to evaluate the possibility of collaborating with a local CBO. For CEB, Forth was responsible for project design, project management, project reporting, budget management, and partner outreach. Given that Forth had less community engagement experience in the communities we were hoping to work with, we decided it would be advantageous to work with a well-established and trusted CBO in Portland that often works directly with community members. Forth selected CCC as a partner for this project not only because their core competencies diversified the skill set of the project team, but also because of their established record as one of the preeminent nonprofits working to make bikes more accessible in underserved communities. With strong ties to various communities throughout Portland, decades of experience working to increase access to bicycles, and experience helping to facilitate BIKETOWN for All, it was clear that CCC would bring the right knowledge and experience to the project. Forth primarily worked with CCC Program Manager, Ira Dixon, who was responsible for coordinating and facilitating the project, including participant recruitment and serving as the primary point of contact for participants in the first and second cohorts.

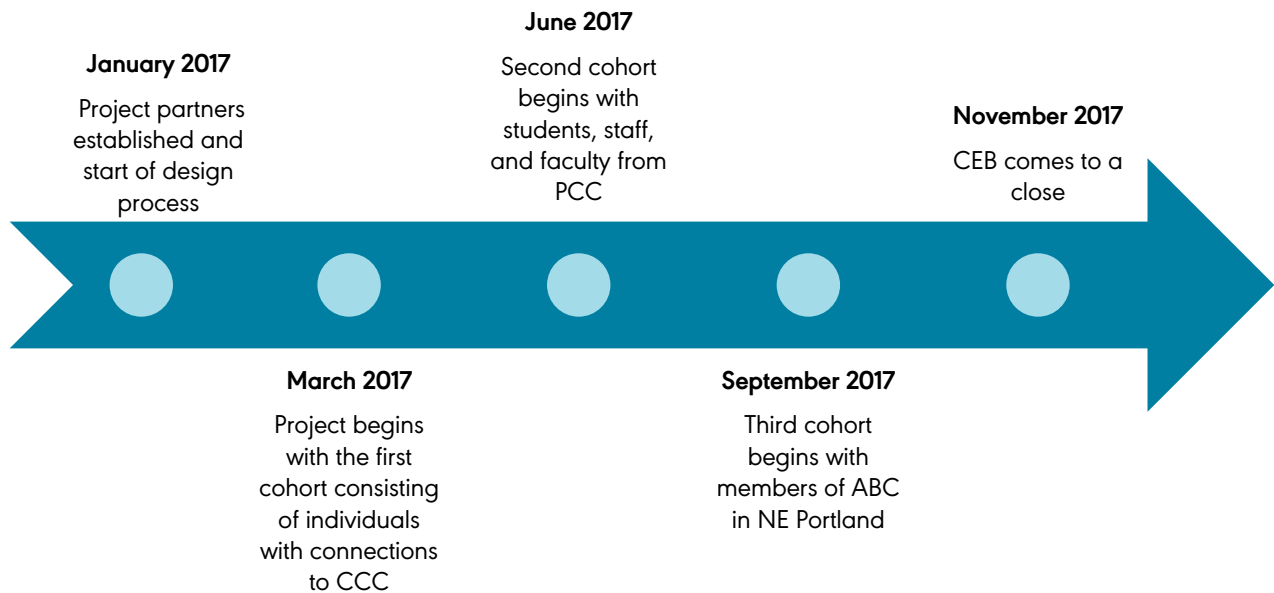
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## RESPONSIBILITIES

CCC was responsible for finding and recruiting participants for the first and second cohorts. They were also responsible for the initial distribution and maintenance of all traditional bike components on the e-bikes. GenZe and their Portland-based team maintained the electric components of the bicycles including the motor, battery, and computer. Prior to each cohort, CCC provided a rider safety course that included basic bike education, an e-bike tutorial, rules of the road, and helmet fitting for all participants. Once participants went through the training and took the first survey, they were allowed to take the e-bikes home to start the trial.

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## PROJECT TIMELINE



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## E-BIKES + GEAR

When designing CEB, Forth sought to eliminate as many barriers to participation as possible. The e-bikes were outfitted to be commute-ready with accessories capable of taking on Portland's rainy climate with ease. Each participant was allowed to keep their bicycle helmet and water bottle, but all other gear was returned for the next cohort to use. The e-bikes used for this project were silver, GenZe e-101s and e-102s that were previously in GenZe's rental fleet; five of the e-bikes had 16-inch frames and five, 18-inch frames. The frame styles varied between Recreational, a step-through frame, and Sport, a step-over frame. All e-bikes were defined as Class 2 e-bikes, which meant they included both electrical pedal assist and a throttle that allowed acceleration without pedaling. Table 1 features a list of the gear used for the project and the technical specifications of the e-bikes.



Bike Gear	E-Bike Specifications
Fenders (installed)	Top Speed: 20 MPH
Kickstand (installed)	Weight: 46 Lbs.
Rear Bike Rack (installed)	Range: 20-40 miles depending on mode
Helmets (40 in various sizes)	
Ankle Strap Reflectors	
ABUS Granit Plus 640 Mini U-Lock	
KryptoFlex 410 Cable 4' Cable Lock	
Knog Frog Strobe Headlights and Taillights	
North St. Route 7 Pannier	
CCC Water Bottle	

*Table 1: Every e-bike came equipped with all of the gear listed on the left. Gear that was already installed is noted. Technical specifications for the e-bikes are listed on the left.*



*Image 1: Some of the fully outfitted e-bikes before the first cohort took them for a short group ride. The kickstands, rear racks, fenders, panniers, and lights are all visible in the photo.*

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## **FRIENDS OF CCC PROJECT DESIGN**

Dixon, the CCC Program Manager, recruited and facilitated the first cohort of the project. Dixon found participants for the first cohort internally through his own contacts and other CCC employee contacts. Some participants were already familiar with CCC and had participated in their programming while others were new to CCC's programs. The project team initially focused on recruiting older adults who could use the e-bikes to get to appointments, run errands, get to work, and for leisure. Unfortunately, and this was true throughout the project, the project team found the recruitment process to be more difficult than anticipated. Dixon noted that many people he approached about participating in the first and second cohorts declined for a wide range of reasons. One common response was that some people perceived the e-bikes to be unsafe. One of the most common responses heard from older adults not interested in participating was that they perceived e-bikes to be unsafe either because of their speed or because of the lack of dedicated and protected bike infrastructure in Portland. Another common reason was that even after being told they would not be liable for the loss of an e-bike, people were still concerned about liability and concerned about having something so expensive in their possession. Due to the lack of interest from older adults, recruitment efforts shifted towards younger participants for the first cohort. Overall, the first cohort consisted of four individuals aged 18-29, four aged 30-49, and two over the age of 50. The bicycle safety training and orientation was held on March 20<sup>th</sup> 2017, marking the official launch of the project and beginning of the first cohort.

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## **PCC STUDENTS AND STAFF PROJECT DESIGN**

Dixon also recruited participants for and facilitated the second cohort for the project. For the second cohort, Dixon focused on recruiting students and staff at Portland Community College (PCC) campuses across the Portland Metro. The strategy behind this decision was twofold. First, given the success and popularity of the project among the younger participants in the first cohort, Dixon believed the PCC campuses would have a more captive audience. Second, PCC is the largest community college system in Oregon and some classes are only offered at one campus meaning that students and staff often have to travel to multiple campuses. PCC operates four campuses and five additional facilities throughout Multnomah, Washington, Yamhill, Clackamas, and Columbia counties. The four main campuses are Sylvania, Rock Creek, Cascade, and Southeast with Rock Creek and Southeast located over 20 miles apart from each other and two hours away from one another via public transit. While the wide geographic net of the PCC campuses allows for more people to have easier access to at least one campus, it presents a transportation quandary for many students and staff who need to get from one campus to another. It should be noted that all campuses are accessible via public transit and a shuttle

system offered by PCC. Ultimately, the cohort consisted of seven individuals ages 18-29 and three ages 30 or older with the majority of participants being PCC students. Two bicycle safety trainings and orientations were conducted due to conflicting participant schedules and the cohort officially began on June 13<sup>th</sup> 2017.

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## ABC PROJECT DESIGN

Forth's Program Associate, Sergio Lopez, facilitated the third cohort comprised of members of Andando en Bicicletas en Cully (ABC). ABC is a group of residents in the Cully neighborhood in Northeast Portland who advocate for expanding the use of bicycles throughout the area. The name of the group translates to "Riding Bikes in Cully" and their work focuses on building community by hosting bike rides, advocating for secure bicycle storage, safe routes to school, and expanded bike infrastructure, providing basic bicycle maintenance, and teaching family, friends, and neighbors how to maintain their bicycles. Every member of ABC is fluent in Spanish and for many of them, it is their first language; therefore, communications for the entirety of the cohort were conducted in Spanish. Additionally, there are close ties between ABC and Hacienda CDC because many ABC members are residents of Hacienda CDC's properties and actively participate in their other programming.

Although the project team was enthusiastic about the prospect of an ABC cohort, ABC has long advocated about the need for secured bike storage due to concerns about bike theft in the City. Therefore, the project team agreed that the feasibility of an ABC cohort was contingent on our ability to help ABC find a semi-permanent solution for bike storage. We believed it would be unfair to not attempt to leverage our time and resources to help the community achieve some of its broader goals related to expanding bicycle use in Cully. Forth budgeted some of the project funds for bike storage, but given the limited budget, the team could not build or secure a permanent storage solution. However, before the start of the cohort, Forth was able to secure bike storage in the Living Cully Plaza on NE Cully Boulevard and NE Killingsworth Street. The storage space was across the street from Hacienda CDC's offices and Vista de Clara Vista, where some of the participants live and down the street from another property belonging to Hacienda CDC. The storage space was located in a locked building set back from NE Cully and NE Killingsworth and each participant was given a key to access the storage space as needed. Additionally, the Portland Bureau of Transportation provided two older bike corrals, blue public staple racks, which were bolted to the building's concrete slab and can accommodate up to six locked bikes per corral. Living Cully, a community environmental investment collaboration between four local CBOs, provided the space at no cost. At the end of the cohort, the storage space was still accessible to members of ABC and Hacienda CDC staff although the building will be redeveloped in the near future.



The ABC cohort consisted of eight total participants and its demographics were significantly different from previous cohorts with seven female and one male participant, all of whom identify as Latino. Five out of eight participants stated that they use public transit, biking and walking as their main modes of transportation and unlike the first two cohorts, only one participant was under the age of 29. Two bicycle safety trainings and orientations were conducted and the cohort officially began on September 19<sup>th</sup> 2017.



*Image 2: Six members of ABC with the e-bikes in front of the Living Cully Plaza.*

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## SURVEY DESIGN

Throughout the project, each of the participants were asked to complete three surveys; one when they picked up the e-bike (Appendix C), the second during the 5<sup>th</sup>-6<sup>th</sup> week (Appendix D), and the third at the end of the project when they returned their e-bike (Appendix E). Forth did not collect any names, addresses, phone numbers, or e-mail addresses for any of the participants. Dixon and Lopez were the only people who ever had access to personal information, which they used to facilitate communications with participants. Forth specifically asked CCC to not provide any

personal information for participants in the first two cohorts in order to better protect participant identities. When designing the project in late 2016 and early 2017, concerns surrounding privacy and safety in communities that many refugees and immigrants call home were at an all-time high. Given these heightened safety concerns, Forth believed it best to not collect personal information especially because it would not and did not impact the results of the case study. Instead, for the review process, the project team assigned a participant number to each participant and also linked participants to the serial numbers on the e-bikes. This ensured participants' privacy, but also allowed the project team to track each participant and their surveys throughout each of the cohorts.

The first survey was primarily used to establish participant's baseline with bicycles and to collect demographics. The first six questions on the first survey asked participants about their demographics (Appendix C) and the remaining questions on the first survey asked about the participant's past experience with bicycles and their current access to and use of various transportation options. The survey ended by asking for their assigned participant number and ZIP Code to help in linking the first survey to each participant's later surveys. The second survey's purpose was to determine how the e-bikes were being used and whether or not riders faced any challenges with using the e-bikes. The final and third survey was an expanded version of the second survey. The purpose of the third survey was to again, see how participants used the e-bikes and whether or not the e-bike was a viable transportation option for them. The survey also asked participants whether or not they would consider purchasing an e-bike and if so, at what price would they be open to purchasing an e-bike. Both the second and third surveys also provided ample space for participants to leave comments for the project team.

The project team tracked data on bicycle use and experience with e-bikes throughout the project. The data yielded valuable insights on how e-bikes can be used to get around Portland, how they compare to traditional bicycles, how organizations can use e-bikes for transportation, and other key success factors, such as more flexibility in their schedule, lower commute times, and fewer overhead costs when compared to owning a vehicle.

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## PROJECT OUTCOMES

During the first cohort (March 20<sup>th</sup> through early June), the bikes were being utilized daily by the majority of participants. Although many members of the first cohort were enthusiastic riders, the older participants stated that the e-bikes were too heavy and that they felt unsafe riding due to what they described as the instant torque of the e-bikes. According to the completed surveys, the riders from the first cohort who did ride the e-bikes found them to be useful as an alternative mode of transportation.



As the first cohort was coming to its conclusion, the project team discovered that collecting the e-bikes and bicycle gear from participants was more difficult than anticipated. The team initially thought that collecting e-bikes would be relatively easy and that the biggest issues would be participants losing some of the bike gear. Although participants were reminded to return the e-bikes and gear by a specific date, many did not return the e-bikes and gear in a timely manner. This resulted in a delayed start date for the second cohort and also meant that some participants in the second cohort had their e-bikes and gear while others were still waiting for the members of the first cohort to return the e-bikes. In order to get some of the e-bikes and gear back, Dixon had to personally go pick up some e-bikes at participant's homes and contact them through numerous channels of communication including social media channels and relatives. Once the last of the e-bikes were retrieved, a second orientation was held for the remaining participants in the second cohort.

The second cohort, consisting of PCC students and staff, officially began with its first orientation on June 13<sup>th</sup>. The second cohort was an all-male cohort with the majority of participants under the age of 29. Ridership flourished with the second cohort not only due to the younger participants being so enthusiastic, but also due to the drier weather. The cohort happened to take place during the driest and warmest months of the year in Portland—June through August. Although it was exciting to see ridership take off, the high ridership also placed more stress on the team of bike mechanics at CCC as wear and tear dramatically increased.

For all three cohorts, participants were shown how to properly lock the e-bikes using both the u-lock and cable lock provided during the orientation. One e-bike was stolen during the second cohort when a participant failed to lock up the bike properly. The incident occurred in July when a participant left the bike at a MAX light rail station overnight in East Portland. When the incident occurred, the battery was left in the frame of the bike and the frame was not properly locked to a bike rack using the u-lock and cable lock. During the orientation, participants were recommended to take the battery out and lock the bike up properly when leaving the bike in a public area. The project team also discouraged participants from leaving the e-bikes outside overnight if possible. Unfortunately, the stolen e-bike was never recovered. As agreed to from the beginning, Forth was responsible for repaying GenZe for the lost bike and CCC and the participant were not held liable for the loss. The missing e-bike was eventually replaced by another e-bike GenZe loaned to the project team for the duration of the project.

By the end of the second cohort in mid-September, two bikes were missing battery keys, while two others were missing the cable chargers used to charge the batteries on a 110v outlet. Eight out of ten panniers were returned at the end of the project and all 10 sets of bike lights had to be replaced. Any items that went missing throughout the project were replaced by CCC with similar gear from their retail store and paid for by Forth with project funding.

The project team approached the third and final cohort differently because of both organizations' preexisting relationships with ABC. When initially designing the project, it was both Forth's and CCC's intention to conduct a cohort including members of ABC because the project idea originated with the need for a solution like this in the Cully neighborhood. The third cohort launched with an orientation on September 19<sup>th</sup>. During the first few weeks of the cohort, participants were enthusiastic about the e-bikes and were consistently using them 2-3 times per week. However, by late October, only one participant continued to regularly use the e-bike. He stated that the bike was fast and easy to ride, making it very convenient for commuting to work. The rest of the participants explained that they were more so fair-weather riders and that the change in the weather to colder, darker, and wetter days discouraged them from riding.

The centralized storage space played a key role in the feasibility of this cohort, but also had other unexpected benefits. Primarily, having a centralized space where some of the e-bikes lived made collecting the e-bikes and gear at the end of the cohort much easier. At the end of the cohort, participants were instructed to meet at the storage room to return the e-bikes and bike gear. The e-bikes were then repaired by CCC mechanics before being returned to GenZe where the electrical components were repaired.

By the end of CEB, 28 people rode 11 e-bikes more than 3,997 miles over the course of seven months. It should be noted that since the stolen e-bike was never recovered, we were unable to determine the miles ridden using that e-bike during the second cohort. After the project, GenZe sold most of the e-bikes used in the project since a new generation of GenZe e-bikes had been introduced.

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## PROJECT INSIGHTS

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### DURABILITY

Throughout the project, many participants and some of the CCC mechanics expressed concern about the durability in part because they were not accustomed to working on e-bikes. One participant from the second cohort had an issue with the bike's front fender support breaking off while riding through a shallow pothole, making it impossible to ride the bike until the issue was resolved. Most participants were satisfied with their experience, but mentioned that they would have ridden more had the e-bike been more durable or had upgraded components. Another participant stated "better tires would have been nice" but due to these being project bikes for a short-term venture, Forth nor CCC invested in upgrading the bikes like someone may upgrade a personal bicycle. It was also not uncommon for the bikes to have internal electrical wiring problems which arose when the wires would be physically displaced by natural wear and tear.

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## WEATHER

Forth and CCC knew rain and cold weather were going to be potential barriers to high utilization rates during the project. In an effort to reduce participants potential apprehension to riding in less than ideal conditions, bikes were equipped with fenders and participants were given a waterproof pannier. Forth and CCC also explained that the e-bikes would reduce their time on the road in inclement weather compared to a normal bike. One participant from the first cohort expressed hesitation about riding in the rain since they were not accustomed to commuting by bike. They mentioned they did not have any rain gear and therefore took the bus to avoid getting wet while riding. Many of the participants throughout the cohorts were new to using a bike as their main mode of transportation and therefore were more likely to be fair weather bikers. Additionally, Forth did not have the funding to provide waterproof gear like jackets or rain pants although, we highly recommend providing that gear if funding permits. Participants from the first and third cohort experienced more rain than sun, which likely explains part of why both cohorts experienced lower utilization rates. Although all participants were excited to have the e-bikes, many of them stated that they would have preferred to have the bikes during the summer months.

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## LIABILITY CONCERNS

While recruiting participants, users were concerned about being liable for the e-bikes. Although program facilitators told users that they would not be held responsible for any damage or theft, participants were still worried about being liable for the loss of an e-bike. One user stated in the survey that they would have used the e-bike more, but were afraid of damaging it. The same user also noted that they were afraid they would get involved in an accident, which limited the utilization of the e-bike. As for the participants who did not utilize the bikes as often, they stated that the e-bikes looked too flashy and were worried they would be a target of theft.

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## SAFETY

Many people purchase e-bikes as opposed to regular bicycles because they have the ability to help riders travel further and travel more quickly than on a regular bicycle. However, as accessible as they are, many participants voiced safety concerns regarding the e-bikes. Many program participants were relatively new to using a bicycle as a main mode of transportation and their confidence riding the e-bikes alongside vehicular traffic was not particularly high. It was not uncommon for participants to state that more infrastructure, and particularly protected infrastructure, would have made them feel safer when riding and led to them riding the e-bikes more frequently. On a separate note, the speed of the bikes—although legally capped at 20

MPH—also concerned some riders as they felt the e-bikes were too fast at times. Fortunately, no participants were involved in a major accident at any time for the duration of the project.

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## CHALLENGES COLLECTING BIKES, GEAR & SURVEYS

Towards the end of the first cohort, Dixon experienced difficulties collecting the e-bikes and gear. Although Dixon kept in contact with participants throughout the cohort, a significant number failed to return emails, phone calls, and texts when it was time to return everything. In some cases, Dixon had to go retrieve e-bikes and gear from participants and even when participants did return the e-bikes and gear, some gear would be missing. In order to prevent this from happening in the second cohort, Forth and the CCC implemented incentives of \$15 Visa Gift Cards that were provided to participants when they returned bikes and gear. Not only did this serve as a thank you to all the users who participated, but it also helped accelerate the collection process. Members from the first cohort had their gift cards mailed to them. For the third cohort, the centralized storage hub served well as a meeting space to return all e-bikes and gear.

The project team also faced challenges when trying to collect survey results for the second and third surveys. The first and third surveys were much easier to regulate and mandate as they were administered when participants received their e-bikes and when they returned their e-bikes. The second survey, however, required that participants return an emailed survey. Most participants did not complete and return the second survey even with email and text reminders during the fifth and sixth weeks of each cohort. Out of the 28 participants, only five successfully completed the second survey.

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## DATA COLLECTION

Tracking participants' mileage played a large role in helping the project team to understand how often the bikes were being used. Initially, Forth considered attaching very simple GPS devices to the e-bikes to track daily mileage, but not location. However, the project team decided that the safety and privacy of the participants were more important than detailed data for the project. Therefore, the project team relied on surveys and checking the odometers on each e-bike at the beginning and end of each cohort to determine miles travelled per e-bike. The surveys asked participants how often they generally rode the e-bikes and to provide the current odometer reading at the time of the survey. Furthermore, each e-bike came equipped with a small onboard computer which includes an odometer reading. This allowed the project team to confirm the readings at the beginning and end of each cohort.

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## THE HORIZON

Two years ago, when the Forth team began designing this project, bikeshare was still working to gain a foothold in many cities throughout the U.S. People were beginning to experiment with adding e-bikes to the platform, but e-scooters were not even a glimmer in our eyes. Today, it is increasingly difficult to keep up with our evolving transportation sector. Options are more plentiful than ever and many are no longer single occupancy vehicles. At Forth, our team finds this to be incredibly encouraging. The innovation seems to be never ending and we have all had fun experimenting with new ways to get around here at home in the Pacific Northwest, but also across the country and the world. The doors and opportunities seem endless.

However, Forth hopes all stakeholders, cities, states, private companies, people in the industry in positions of power and privilege listen to community members and listen to people in communities. These technologies have the power to transform lives, but they also have the power to widen divides. When developing regulations, applications, payment methods, and hardware, Forth encourages everyone to think not only optimistically, but also practically. If a city requires that there be a program specifically for low and middle-income riders, how can everyone work together to disseminate this information so people know it exists? There is no one size fits all solution for transportation, but putting communities first and meeting them where they are will lead everyone to better solutions that work well for more people.

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## CONCLUSION

The Community E-Bike Project presented many valuable takeaways on how e-bikes can be adopted and how they are received in new communities. As expected younger riders rode the most, rain led to lower utilization rates, and participants travelled further using the e-bikes than if they had been riding a traditional bicycle. Ultimately, the e-bikes did serve some of the transportation needs of the participants who do not have driver's cards or licenses and seemed to fill some of the mobility gap in communities with less than ideal transit access. Forth firmly believes that e-bikes, traditional bicycles, and other micromobility solutions will be crucial to reducing carbon emissions and diversifying transit options in the neighborhoods and for the people who can most greatly benefit.

More recently, Forth has continued its partnership with Hacienda CDC and continues to be committed to bringing new, diverse, and clean transportation options to the Cully neighborhood and other diverse communities in the Pacific Northwest. By the end of 2018, Forth will have completed another small transportation pilot project in conjunction with project partners Hacienda CDC and Uber Technologies. This pilot provided rides via Uber to members of the



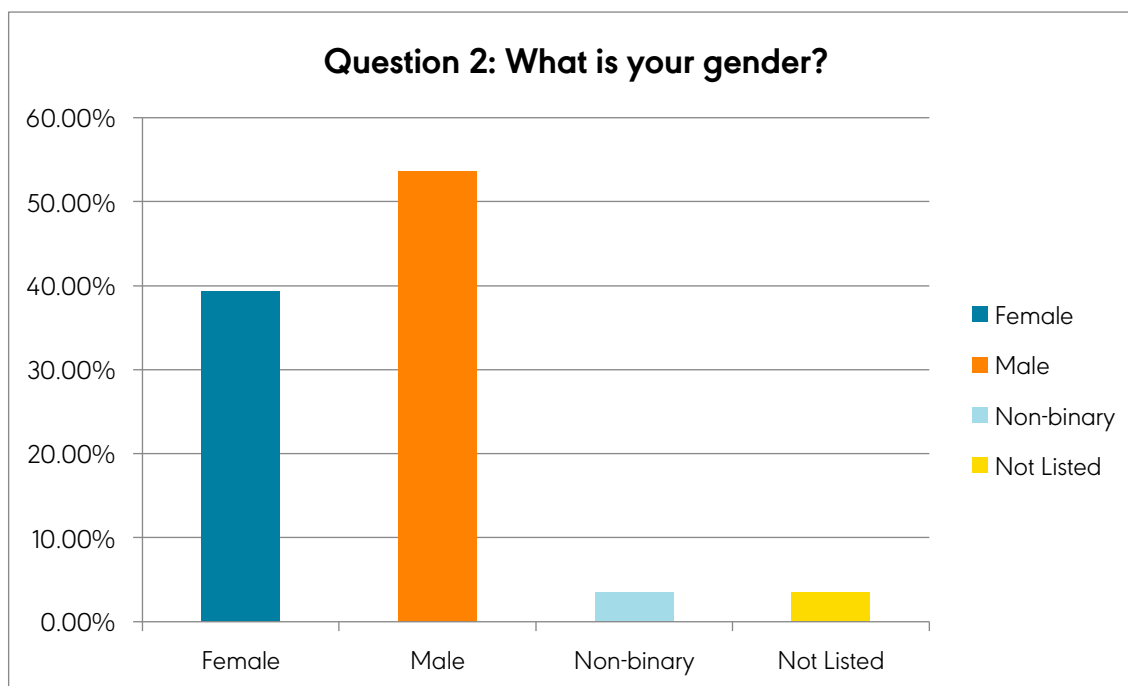
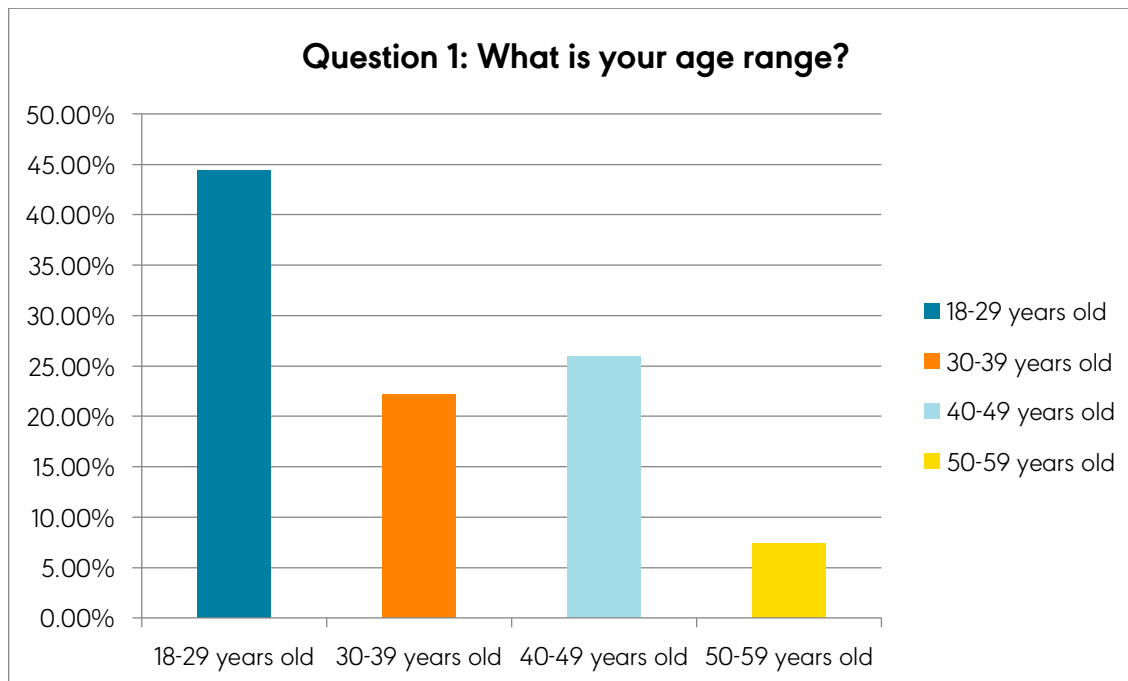
Cully community. These rides have enabled residents to get to doctor's offices, the grocery store, and other important destinations.

Far from perfect, the project team hopes to continue bringing micromobility and more specifically, e-bikes, to the people who can benefit from them the most. For future projects, Forth hopes to be able to bring e-bikes back to Cully and other neighborhoods on a permanent basis and is encouraged by the tireless efforts of organizations like CCC and ABC. Additionally, we hope to see greater investment in infrastructure, and particularly protected infrastructure, to support the riders, families, and communities in these neighborhoods. Bicycles are a crucial piece of the mobility puzzle and increasing access to traditional bicycles and e-bikes is key to ensuring more equitable transportation for all.

## Appendix A: Approximate Budget

Approximate Budget	Description	Amount	Balance	Notes
Personnel	Year 1	\$2,100	\$2,100	2016-Scoping and Project Design
	Year 2	\$36,120	\$38,220	2017-Project Design and Execution
	Year 3	\$15,000	\$53,220	2018-Wrap-Up, Case Study Production
<b>Total Personnel</b>			<b>\$53,220</b>	
Contract Services	CCC/Partner Organization	\$10,000	\$10,000	Funding for CCC, the project partner
	Marketing Needs and 1-Pager	\$5,000	\$15,000	Development of 1-Pager in both English and Spanish; Other marketing needs
<b>Total Contract Services</b>			<b>\$15,000</b>	
<b>Total Travel+ Meetings</b>		<b>\$100</b>	<b>\$100</b>	Small, miscellaneous T+M expenses
Supplies and Materials	Bike Gear	\$3,400	\$3,400	All of the gear for the bikes and participants
	Participant Incentives	\$500	\$3,900	Visa gift cards used as 'thank yous' for participants
	Other S+M	\$1,100	\$5,000	Other miscellaneous expenses and bike maintenance
<b>Total Supplies and Materials</b>			<b>\$5,000</b>	
<b>Total Cost of Project</b>			<b>\$73,320</b>	

## Appendix B: Demographic Survey Results



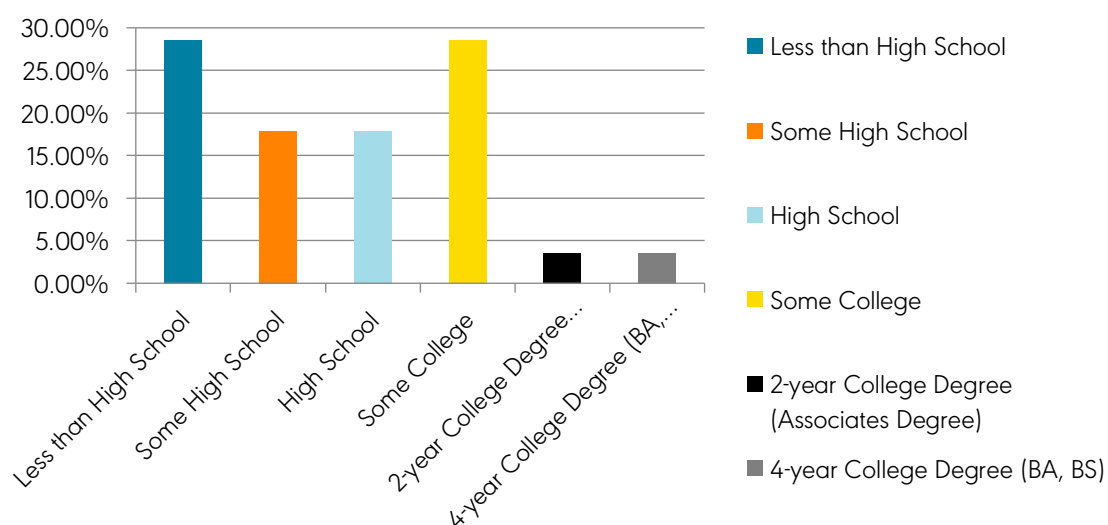
**Questions 3 and 4: Which of the following describes your race? Please choose all options that apply. Are of Hispanic, Latino, or Spanish origin, such as Mexican, Puerto Rican, or Cuban?**

Race/Ethnicity	Number of participants identifying as such
Native American/Alaskan Native	2
Black/African American	6
Asian	1
White	9
Latinx	9
Prefer not to say	2

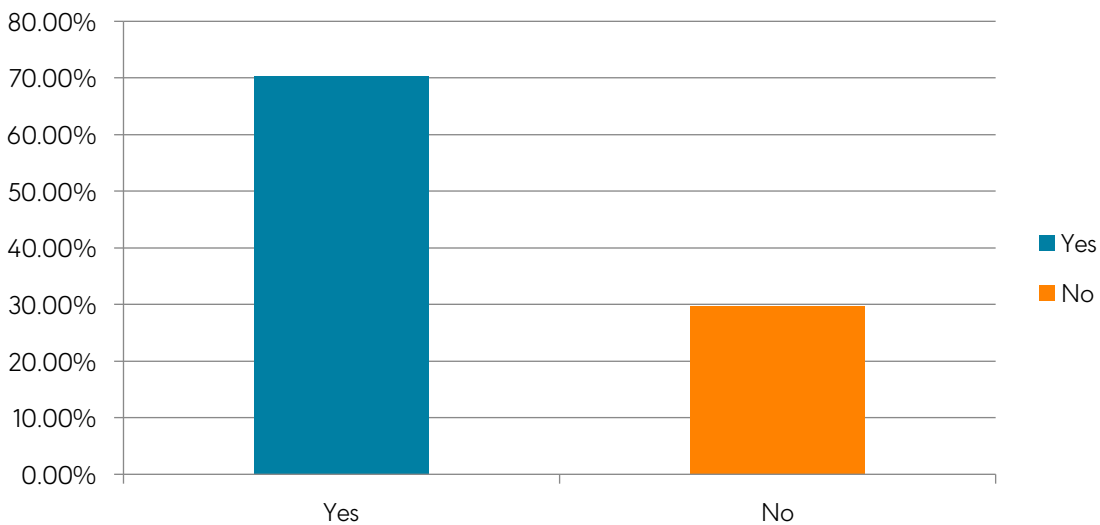
**Question 5: Which languages do you speak? Please check all that apply.**

English	21
Spanish	10
French	1

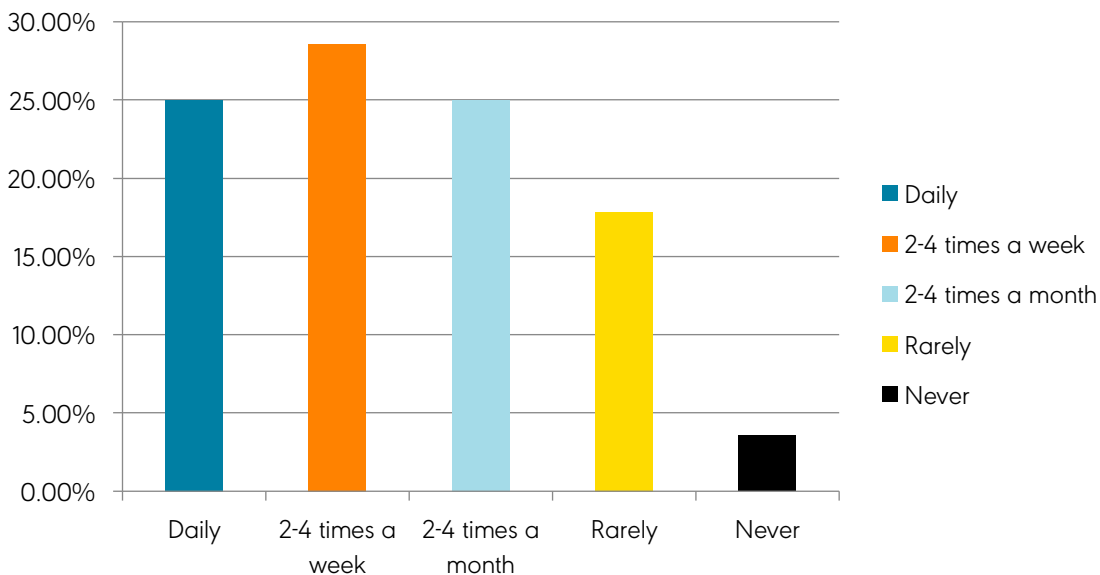
**Question 6: What is the highest grade or year of school you've completed?**



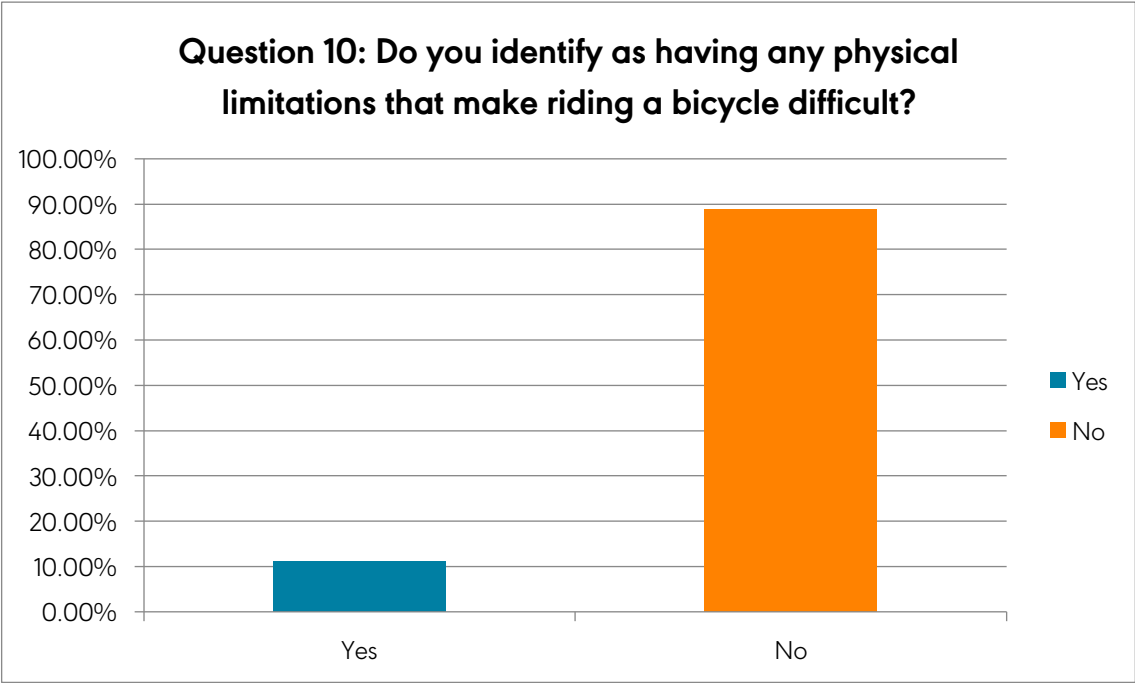
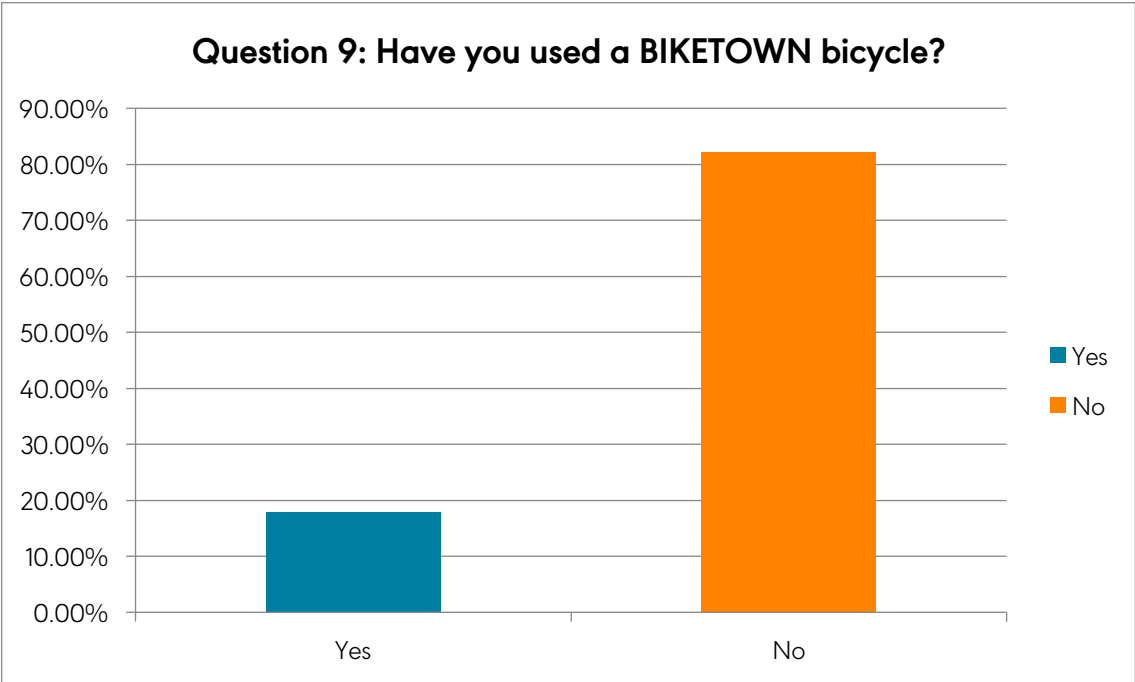
### Question 7: Do you own a bicycle or have access to a bicycle?



### Question 8: How often do you ride a bicycle?



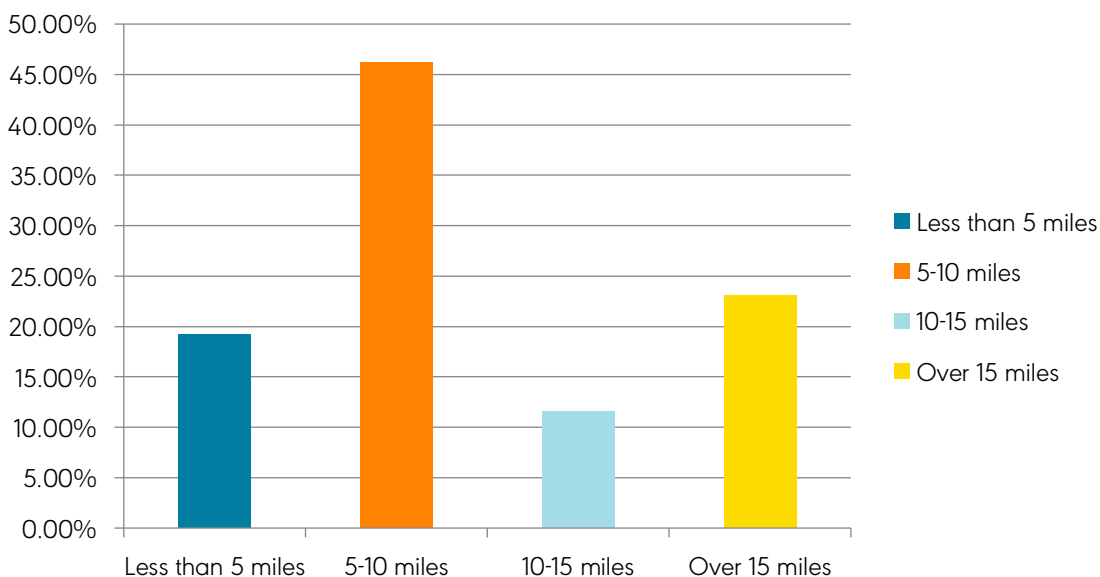




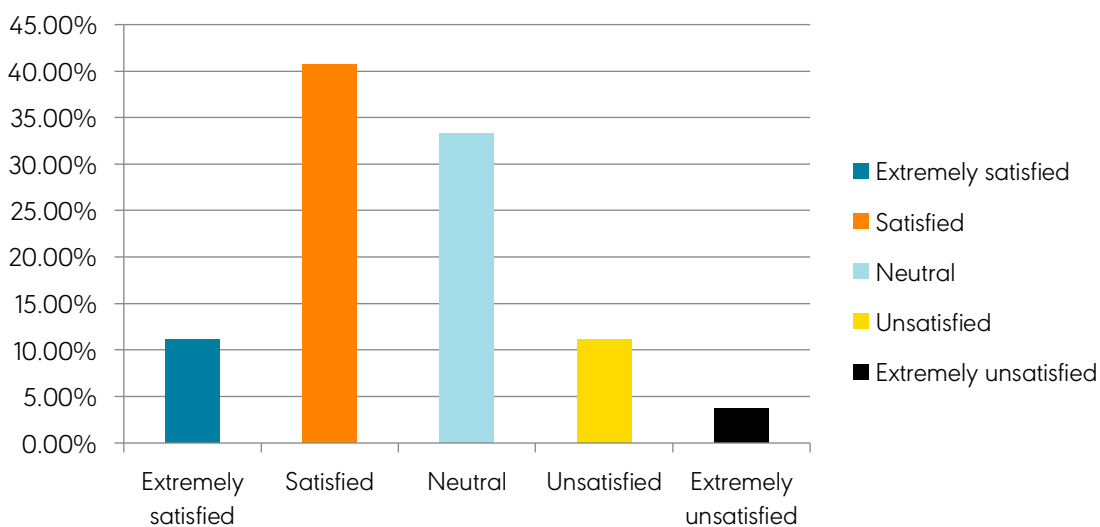
**Question 11: What modes of transportation do you regularly use? Please check all that apply.**

Bike	16
Transit	17
Carpool	4
Car	6
Walk	17

**Question 12: How far do you usually commute?**



**Question 13: How satisfied are you with your transportation options in your neighborhood?**



## Appendix C: First Survey

1. What is your age range?
  - a. 18-29 years old
  - b. 30-39 years old
  - c. 40-49 years old
  - d. 50-59 years old
  - e. 60-69 years old
  - f. 70 years or older
2. What is your gender?
  - a. Female
  - b. Male
  - c. Non-binary
  - d. Transgender
  - e. Another (please specify)
3. Which of the following describes your race? Please choose all options that apply.
  - a. Native American/Alaskan Native
  - b. Black/African American
  - c. Asian
  - d. Native Hawaiian/Pacific Islander
  - e. White
  - f. Prefer not to identify
  - g. Another (please specify)
4. Are you of Hispanic, Latino, or Spanish origin, such as Mexican, Puerto Rican, or Cuban?
  - a. Yes
  - b. No
5. Which languages do you speak? Please check all that apply.
  - a. English
  - b. Spanish
  - c. Vietnamese
  - d. Russian
  - e. Chinese
  - f. Another (please specify)
6. What is the highest grade or year of school you completed?
  - a. Less than High School
  - b. Some High School
  - c. High School
  - d. Some College
  - e. 2-year College Degree (Associates Degree)
  - f. 4-year College Degree (BA, BS)
  - g. Masters, JD, MD, Professional Degree

7. Do you own a bicycle or have access to a bicycle?
  - a. Yes
  - b. No
8. How often do you ride a bicycle?
  - a. Daily
  - b. 2-4 times a week
  - c. 2-4 times a month
  - d. Rarely
  - e. Never
9. Have you used a BIKETOWN bicycle?
  - a. Yes
  - b. No
10. Do you identify as having any physical limitations that make riding a bicycle difficult?
  - a. Yes
  - b. No
11. What modes of transportation do you regularly use? Please check all that apply.
  - a. Bike
  - b. Transit
  - c. Carpool
  - d. Car
  - e. Walk
12. How far do you usually commute?
  - a. Less than 5 miles
  - b. 5-10 miles
  - c. 10-15 miles
  - d. Over 15 miles
13. How satisfied are you with your transportation options in your neighborhood?
  - a. Extremely satisfied
  - b. Satisfied
  - c. Neutral
  - d. Unsatisfied
  - e. Extremely unsatisfied
  - f. Other (please specify)
14. Describe your current state of general health.
15. What is your ZIP Code?
16. What Participant # are you?
17. How many miles does the bike have on it? (the odometer reading can be found at the bottom of the small screen when it's on.)

## Appendix D: Second Survey

1. Have you had any issues using your e-bike?
  - a. Yes
  - b. NoIf yes, why?
2. How often do you use your e-bike?
  - a. Daily
  - b. 2-3 times a week
  - c. Once a week
  - d. Never
3. What keeps you from using the e-bike more often?
4. Approximately how many miles do you usually ride your e-bike per day?
  - a. Less than 5 miles
  - b. Between 5-10 miles
  - c. More than 10 miles
5. How are you using your e-bike? Please choose all that apply.
  - a. Work commute
  - b. Recreation
  - c. Grocery shopping
  - d. General shopping and errands
  - e. Medical appointments
  - f. Other (please specify)
6. What has been your general experience with the e-bike?
7. What Participant # are you?



## Appendix E: Third Survey

1. What did you like about riding the e-bike? Please choose all that apply.
  - a. To replace car trips
  - b. Health-a medical condition reduced my ability to ride a traditional bicycle
  - c. Health-to increase fitness
  - d. Easier to ride than a traditional bicycle
  - e. Felt safer riding the e-bike compared to a traditional bicycle
  - f. Because I live or work in a hilly area
  - g. To ride with less effort
  - h. To be able to keep up when riding with friends/family
  - i. It's a cost-effective form of transportation
  - j. To start cycling or cycling more often
  - k. To ride longer distances to places I need to go
  - l. To avoid traffic in my car
  - m. To avoid the hassle of parking my car
  - n. For environmental reasons
  - o. For recreation purposes
  - p. Other (please specify)
2. What did you dislike about riding the e-bike? Please choose all that apply.
  - a. E-bike was heavy
  - b. E-bike was not easy to ride
  - c. Charging the battery
  - d. Not as many health benefits
  - e. Felt unsafe riding
  - f. Other (please specify)
3. Did you notice a positive difference in your mood or attitude after riding the e-bike during this project?
  - a. Yes
  - b. No
  - c. Not sure
4. Did you see any positive changes in your health after participating in this project?
  - a. Yes
  - b. No
  - c. Not sure
5. How did you use your e-bike? Please choose all that apply.
  - a. Work commute
  - b. Recreation
  - c. Grocery shopping
  - d. General shopping and errands
  - e. Medical appointments

- f. Other (please specify)
- 6. How often did you use your e-bike in the last 5 weeks?
  - a. Daily
  - b. 2-3 times a week
  - c. Once a week
  - d. Rarely
  - e. Never
- 7. Approximately how many miles did you usually ride your e-bike per day?
  - a. Less than 5 miles
  - b. Between 5-10 miles
  - c. More than 10 miles
- 8. Did the weather impact your choice to ride the e-bike?
  - a. Yes
  - b. No
- 9. Would you like to continue using an e-bike?
  - a. Yes
  - b. No
- 10. At what price would you buy an e-bike?
  - a. Less than \$250
  - b. \$250-500
  - c. \$500-750
  - d. \$750-1000
  - e. \$1000-1250
  - f. \$1250-1500
  - g. \$1500-1750
  - h. \$1750-2000
- 11. What is your ZIP code?
- 12. What Participant # are you?
- 13. How many miles does the bike have on it? (the odometer reading can be found at the bottom of the small screen when it's on)
- 14. Please provide any additional comments or feedback.

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## SOURCES

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<sup>1</sup> The case study for the CEV Project can be found at <https://forthmobility.org/CEVreport>

<sup>2</sup> Community Cycling Center., [www.communitycyclingcenter.org/about/](http://www.communitycyclingcenter.org/about/)

<sup>3</sup> Learn more about Andando en Bicicletas en Cully (ABC) and their work at <https://www.communitycyclingcenter.org/community/partner-programs/hacienda/>

<sup>4</sup> United States Census Bureau., QuickFacts Portland, Oregon., <https://www.census.gov/quickfacts/fact/table/portlandcityoregon/PST045217>.

<sup>5</sup> Steve Dotterer and Uma Krishnan., Portland Bureau of Planning and Sustainability., 2010 Census Briefing for Planning & Sustainability Commission., 3., 14 June 2011.

<sup>6</sup> Lisa K. Bates, PhD., Gentrification and Displacement Study: implementing an equitable inclusive development strategy in the context of gentrification., City of Portland Bureau of Planning and Sustainability., 18 May 2013., <https://www.portlandoregon.gov/bps/article/454027>.

<sup>7</sup> <http://sos.oregon.gov/elections/Documents/results/results-2014-general-election.pdf>