Cape Light Compact Income-eligible E-bike Incentive Program Final Report

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Summary

In July of 2022 Cape Light Compact launched an income-eligible e-bike incentive program with funding from the MassCEC ACT4All program and implementation support from VEIC. The original goal of the program was to issue between 180 and 240 vouchers. We were able to issue 326 vouchers with the original program design and budget, which was completed late 2023/early 2024. In March 2024, we launched Phase 2 of the program with additional funds and a new, tiered incentive design. As of January 2025, the program has received a total of 836 applications and issued 590 vouchers (Table 1). Four-hundred and forty-six vouchers have been redeemed.

Table 1. Program application and voucher redemption status.

	Phase 1	Phase 2	Total
Applications Received	485	351	836
Vouchers Issued*	326	264	590
Vouchers Redeemed	237	209	446
Incentive Budget Remaining	$0	$0	$0

*This includes vouchers that expired and were re-issued to customers on the waitlist.

We performed program monitoring and evaluation through a combination of online surveys and deployment of e-bike logging devices. The surveys indicated that participants ride their e-bikes an average of 9 to 22 miles per week depending on the season, achieving over 175,000 lbs. of GHG avoided over the course of the program (Table 2, Figure 1).

Table 2. E-bike ridership and program metrics by quarter.

	2022			2023				2024				
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Total
	May-July	Aug-Oct	Nov-Jan	Feb-April	May-July	Aug-Oct	Nov-Jan	Feb-April	May-July	Aug-Oct	Nov-Jan	
Total Trips / Quarter[1]	654	5,960	4,501	7,431	19,932	40,274	12,586	16,825	18,542	48,369	18,860	**193,933[2]**
Avg. Miles / Week	14	9	12	12	14	22	12	12	14	15	12	**13**
Bikes Purchased / Quarter[1]	10	86	35	17	51	25	5	34	119	49	15	**446**
Total Miles Travelled / Quarter[1]	1,456	8,986	8,665	9,789	28,974	51,251	15,147	17,396	55,619	67,236	29,500	**294,020**[2]
Avoided GHG [lbs.] / Quarter[1]	872	5,384	5,191	5,865	17,359	30,706	9,075	10,422	33,323	40,283	17,674	**176,155**[2]

[1] Quarterly numbers shown have been finalized and may not match values previously provided in quarterly reports.
[2] Due to fractional rounding, totals are slightly higher than the sum of the values shown.

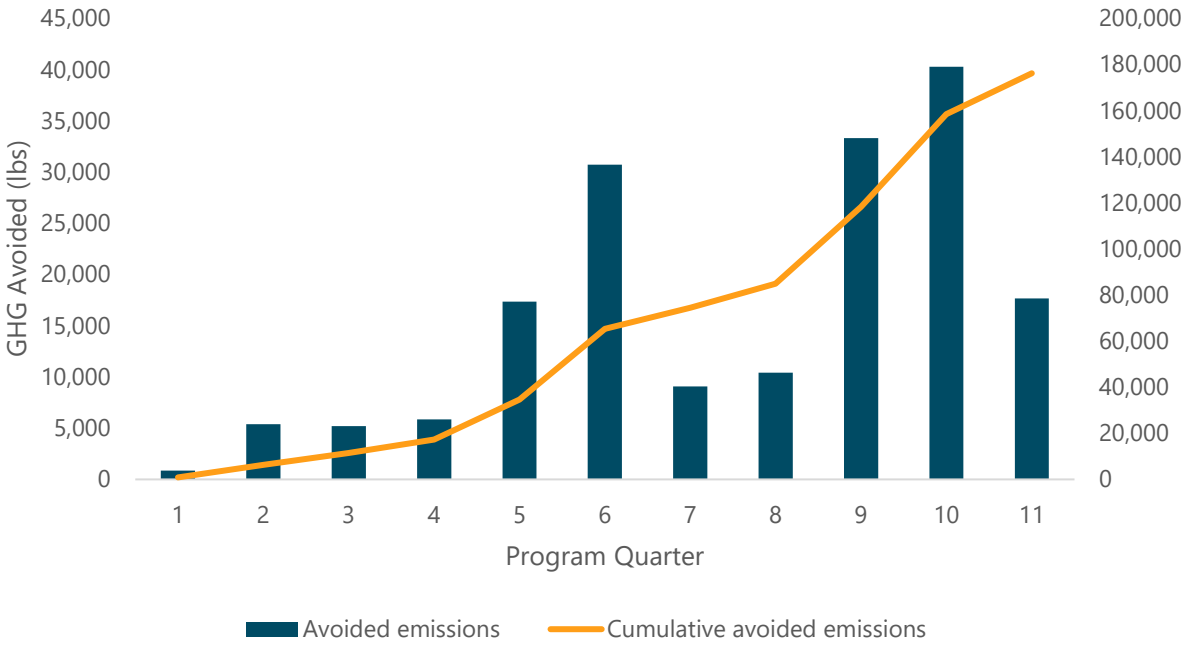

Figure 1. Quarterly emissions reductions.

Insights and Takeaways

1. **The program was a success.** We issued more than our target number of vouchers and due to the programs' popularity, we were able to reduce our marketing costs and issue additional incentives.
2. **E-bikes are a powerful tool for equity and decarbonization of transportation.** The program succeeded in both reducing GHG emissions and improving mobility for participants. Ninety-four percent of participants reported having an easier time getting around after purchasing their e-bike and approximately 40% of participants reported having lower transportation costs.
3. **Demand for the program was high**. For much of the life of the program we had an active waitlist of qualified applicants.
4. **E-bike ownership seemed to be smooth for most participants.** Participants reported very few technical issues and no thefts in their follow-up surveys.
5. **Multiple program applicants and participants identified as disabled**. Although this was not a population that we were targeting, several individuals noted in their applications and follow-up surveys that although they had trouble walking or riding a traditional bicycle, though they are able to ride an e-bike.
6. **Very low-income individuals need high incentive levels in order to participate in the program.** After hearing repeatedly during Phase 1 that participants were struggling to cover the 25% co-pay required, we increased the incentive amount to cover 90% of the cost an e-bike, up to $1,500.

Other observations

- Inventory of affordable models was adequate to meet participant demand.
- The point-of-sale vouchers and online application worked well. The feedback from both bike shops and program participants was positive. We aimed to reimburse bike shops within two weeks of receiving an invoice and were generally able to meet this goal.
- Early stakeholder engagement before program launch allowed us to build strong relationships with bike shops and ensure a program design that worked for CEC, bike shops, participants, and the Compact.
- E-bike loggers worked smoothly. Logger volunteers had few privacy concerns. We were careful to separate demographic data from e-bike usage data, but this was probably unnecessary.
- We compensated participants for survey completion through gift cards. In the future, we recommend using online gift cards due to the administrative work associated with mailing physical gift cards.
- The additional voucher to cover accessories was helpful to purchase helmets and locks and seemed to be an adequate amount. The range of spend on bike accessories was $43-$360, with an average of $138. Our accessories vouchers were capped at $125, and the average draw down on the accessories vouchers was $123.33.
- Follow-up surveys achieved a high response rate and provided important feedback about what aspects of the program were working well and what could be improved. We ended follow-up surveys at the end of Phase 1 to maximize our incentive budget in Phase 2.

Background

In July of 2022 Cape Light Compact launched an income-eligible e-bike incentive program with funding from the MassCEC ACT4All program. Cape Light Compact is an energy services organization serving the 21 towns on Cape Cod and Martha's Vineyard. The Compact's mission is to serve customers through the delivery of proven energy efficiency programs, effective consumer advocacy and renewable competitive electricity supply. Cape Light Compact led implementation of the e-bike program with support from VEIC, who served as the project consultant. The primary goal of the program was:

> *To improve mobility for low-income residents of the Cape and Martha's Vineyard without substantially increasing household GHG emissions or transportation cost burdens.*

The program also had two other goals:

> *To help local bike shops thrive; and*
>
> *To build a robust biking ecosystem on Cape Cod and Martha's Vineyard*

To date, the program has received 836 applications, issued 590 vouchers, and 446 vouchers have been redeemed.

The program was open to all year-round, adult residents of Cape Light Compact territory that earned less than 60% of statewide median income and operated on a first come first serve basis. Program participants received an e-bike voucher that covered 75% of the cost of a class 1 e-bike,[3] up to $1,200. Participants also received a voucher to cover the cost of accessories (e.g., helmet, lock, lights, etc.). Each voucher was valid for 90 days and could only be redeemed at a participating bike shop.

Prior to program launch we were able to recruit 6 bike shops to participate in the program and achieved good coverage across most of the Compact's territory, with the exception of Martha's Vineyard. We continued to add partner bike shops over the life of the program, ending with 8 in December of 2024.

By the fall of 2022, most vouchers had been claimed (although not redeemed). In February of 2023, we were able to execute a contract amendment that allowed us to move money into the incentive budget and issue additional vouchers. These funds came out of the marketing budget and funds that we had set aside to cover the cost of e-bike repair. We had very little need to market the program; it was very popular immediately upon launching. In addition, we had set aside funds to cover the cost of repairs for each e-bike purchased through the program. This benefit was only accessed by a few program participants. We removed it from the program, and those funds were reallocated to additional incentives.

In 2023 we were awarded additional funds from MassCEC to continue the program. In March of 2024, we launched Phase 2, which included a tiered incentive design. The two most consistent pieces of feedback that we received from program participants under Phase 1 were:

1- People were happy with their bikes and appreciated the program
2- Even with the incentive, the bikes still felt expensive.

From data of participant household income, it was clear that we were serving many very low-income households. To better serve this population, we added an enhanced voucher option for participants who received benefits through a means-tested program, including but not limited to, SNAP, SSI, WIC, and Medicaid. The enhanced voucher covers 90% of the cost of a Class 1 e-bike, up to $1,500. The majority of vouchers issued in Phase 2 have been enhanced.

[3] Class 1 e-bikes are pedal assist with no throttle. Class 2 e-bikes also have a throttle.

Table 3. Program Timeline.

	2022			2023				2024				2025
Phase	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Program Design												
Launch												
Phase 1 Implementation												
Monitoring & Reporting												
Phase 2 Launch												
Phase 2 Implementation												

Applicant and Participant Demographics (Phase 1 and 2)

We collected demographic data from program applicants as part of the application. Applicant demographics were consistent over the course of the program, and we did not observe significant differences in applicant demographics between Phase 1 and 2 (described in an earlier memo to CEC). We compared demographics of program applicants to the overall population of Compact territory using the 2020 American Community Survey for Barnstable and Dukes Counties. Program applicants tend to be younger than the population of Compact territory overall (17% of applicants are over 65 vs. 37% of the population) and fewer identify as white (83% vs. 93%). Only 30% own their own home (vs. 80% of the population as a whole), and only 52% live in a single-family home (vs. 82%). Thirteen percent of applicants are unemployed vs. only 3% of the overall population in Compact territory.

The majority of applicants live in households with access to at least one vehicle (66%) and one traditional bicycle (59%). Average commute distance is 16 miles. In the past week, 40% of applicants reported using a personal vehicle to get to work, 30% reported walking, 16% reported using a traditional bicycle, and 15% reported using public transit. A third of applicants report an annual household income of less than $15,000 and average household size is 2.

Following program launch we tracked geographic patterns in program applications to understand if residents of environmental justice (EJ) communities were aware of and participating in the program. In September of 2022, 38% of participants were living in an EJ community.[4] Overall, 20% of the population of Compact territory lives in an EJ community.

During the program's first few months, we also tracked patterns in voucher redemption, to ensure that there were no consistent differences between participants who redeemed their voucher and those that did not; no such differences were found. We reached out directly to

[4] Massachusetts determines **EJ communities by census block group**. In September 2022, we were able to geocode 100 program participants to census block group; of those 100, 38 lived with in EJ block group.

participants before their vouchers expired. Most people who failed to redeem their voucher within the 90-day window simply needed more time to afford the co-pay (the cost not covered by the voucher) and these requests were generally granted. We also looked for any areas of the Compact territory with particularly low rates of voucher redemption, which could suggest that people were having a hard time accessing bike shops, but did not find any. We observed that rates of redemption were highest at bike shops known to have the most affordable models: availability of affordable models, rather than location drove rates of voucher redemption.

Participant Experience (Phase 1)

Follow-up surveys were administered via email approximately one to three months following e-bike purchase over the course of 2022 and 2023. We received a total of 198 responses. We stopped follow-up surveys at the end of Phase 1 because the results were generally consistent and were not telling us anything new about the program: people were happy with their e-bikes, happy with the service and selection at local bike shops, riding their bikes regularly, but even with the vouchers, the bikes still felt expensive.

Participants' satisfaction with both their bikes and the program was high: 90% of follow-up survey respondents reported being 'very satisfied' with their e-bike and 92% with the application and voucher process.

Access to vehicles, bikes, and e-bikes

Nearly all follow-up respondents live in a household that owns or leases a personal vehicle (87%), and 77% of households own a non-electric bike. Notably, these are higher levels of access than applicants overall: only 66% of applicants have access to a vehicle and 59% have access to a traditional bicycle. Seven percent of follow-up survey respondents report living in households with another electric bike, in addition to the one purchased through our program.[5] Some of these households reported purchasing more than one e-bike through the program and others say they purchased a second e-bike, either at the same time that they used their voucher, or after.

E-bike Ridership

Eighty percent of follow-up survey respondents had used their e-bike in the previous seven days. Other prominent modes of transportation among respondents were walking (70% reported walking to a destination in the previous week) and personal vehicles (85% of respondents had used a vehicle in the past week). E-bikes were ridden an average of 22 miles in the previous week. Seventy-one percent of respondents report that their e-bike is replacing vehicle trips and 18% report that their e-bike is replacing transit trips. Thirty percent of

[5] We noted a small number of follow-up survey respondents reporting that they lived in a household with more than one e-bike and added a question to the survey to better understand this phenomenon. The program eligibility guidelines state that households should not receive more than one voucher. There was one household that appears to have received more than one voucher (unmarried romantic partners who live together). Other households report that they bought one e-bike through the program and subsequently purchased another bike on their own.

respondents have used their e-bike to commute in the previous week (for context, according to the most recent American Community Survey, fewer than 1% of people in Massachusetts or nationally, report commuting to work via bicycle).

Mobility

Ninety-three percent of respondents strongly agree or somewhat agree that their e-bike improves their ability to get around. Seventy percent strongly or somewhat agree that they are able to get places that they wouldn't otherwise. Eighty-two percent are biking and walking more than before their e-bike purchase.

Eighty-nine percent report that their bike has experienced zero mechanical problems/been unrideable zero days. Forty-one percent of respondents report that their transportation costs have gone down since their e-bike purchase, and of that 41%, 61% confirm that these reduced costs are due entirely to their e-bike.

Each e-bike voucher came with a separate $125 voucher for bike accessories. By far, the most common accessories purchased were helmets and locks. Other common accessories included baskets, racks, and lights. The average full retail cost of accessories was $138 (a $13 cost to the participant, after the voucher).

E-bike Logging

We recruited volunteers to GPS log their e-bikes through the program application. Logging proved to be a cost-effective way to understand how participants were using their e-bikes. Generally, logging data was consistent with follow-up survey responses overall. We were not able to connect individual logger volunteers to any demographic characteristics (all logger data was anonymized to protect participant privacy).

Data from the deployed loggers was recorded with each trip and the logs downloaded quarterly. We cleaned and processed the data before introducing it into the project analysis. This cleaning included removing extremely short trips (where the bike likely did not leave the premises), trips where miles were logged out-of-state, and trips where high speeds were recorded (likely because the bike was being carried in a vehicle). Daily average trip count and trip mileage was then found across the sample of logged bikes and summed across each three-month quarter.

Weekly mileage of active riders varied considerably between 0.5 and 29 miles. To mitigate potential skew on this metric, mileage per week survey results were averaged and preferentially utilized before scaling the results up to the full population of all bikes deployed for a given quarter. That scaling introduced two additional factors: the percent of riders who had responded in the surveys saying that they had ridden their bike in the last seven days (80%); and in cold-weather months a much more substantial seasonal ridership adjustment (53%), a figure based on a more in-depth logger data assessment. The quarterly logged data summary can be seen in Table 4, below. The first quarter and last quarter results relied on extrapolation from the other quarters and have been omitted from Table 4.

Table 4. Logger data summary by quarter.

	2022			2023				2024			
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
	May-July	Aug-Oct	Nov-Jan	Feb-April	May-July	Aug-Oct	Nov-Jan	Feb-April	May-July	Aug-Oct	Nov-Jan
Loggers Active in Field	-	18	21	10	13	26	15	4	23	-	-
Trips Logged	-	960	193	128	488	332	197	157	505	-	-
Miles Logged	-	1447	372	169	709	422	237	162	1515	-	-
Miles per Trip	-	1.5	1.9	1.3	1.5	1.3	1.2	1.0	3.0	-	-

Results of our logging are described in more detail in previous memos and quarterly reports, but we do want to note that logging was a useful means of measuring and verifying e-bike ridership. A total of 32 e-bikes were logged and a total of 2,960 trips were recorded. Volunteers agreed to log their bikes for a minimum of 3 months, but some kept their loggers attached for 6 months, and some over a year. In total, we gathered data on 388 months of e-bike usage. The first loggers were deployed in August of 2022 and logging continued through the fall of 2024. Most trips were relatively short (less than 2 miles) and peaked in the middle of the day. Riding was steady across weekends and weekdays. Although ridership dropped during the winter, riding occurred in nearly every month that loggers were deployed. The length of trips did not vary by season, but the number of trips and total miles declined during colder months.

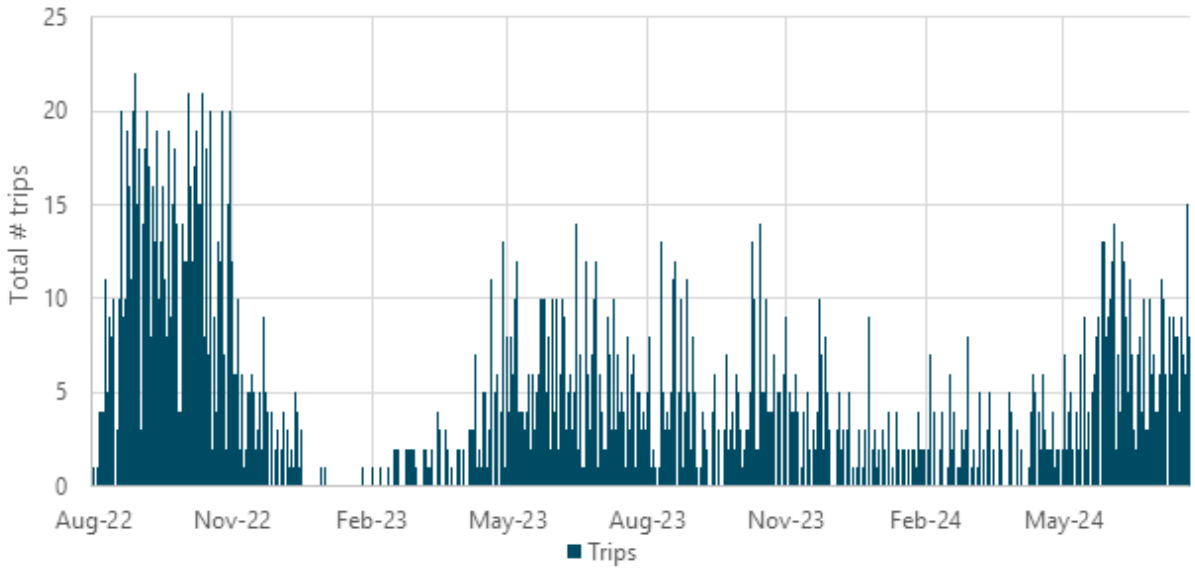

Figure 2. Total number of GPS logged e-bike trips per day, August 2022 - September 2024.

Feedback from participants

Both the baseline survey included in the application and the follow-up survey provided opportunity for respondents to give the program feedback and comments. This feedback was helped us understand which aspects of the program were working well (online application, bike shop staff were helpful) and what felt difficult (during Phase 1, the bikes still felt expensive to many participants). Many applicants noted that they struggled to get around without a vehicle, or that their vehicle felt unaffordable. Applicants were challenged to find stable employment and reach medical appointments without access to reliable transportation. Many also noted that they had health problems and that an e-bike would significantly improve their mobility and independence. Multiple applicants requested an e-trike due to balance issues.

Comments from program applications

Applicants noted health and mobility challenges:

"This chance of having transportation will allow me to get more work, get to important doctors appointments, make my life much easier as it is difficult enough living with disabilities."

"I came out to the Cape to make a fresh start. Getting around and keeping commitments without dependable transportation has been impossible. Having an E-bike will eliminate the barriers I've been facing in finding and getting back to working full time."

"I have had MS for 40+ yrs, but worked until my legs got too weak. I have a regular bike I try to exercise with to help with the MS, but sometimes get caught unable to continue the ride sometimes and find myself stuck a lot (lol). Thank you, really wanted to try 1 of these bikes, I think it would help a lot."

"I have no money and no way to get to work, but food, Dr.s appt.s and upcoming court hearings. This would be a game changer!"

"I often have to struggle with my independence because I do not own a car. Having an e bike would greatly increase my independence and also give me more time at home with my family and less time trying to get places. Thank you so much for the opportunity."

"I'd be truly grateful to receive help in getting one of these devices. It is so hard here on Cape Cod to get around!"

Other applicants noted the financial savings that could come with e-bike ownership:

"The electric bike will save me much needed money, that I can use for other essential, that my large family needs."

"I begin the Nursing Program at Cape Cod Community College in September. The cost of owning a car and the cost of gas is very prohibitive when it comes to finding time to focus on school work. I have to work about 20 hours a week just to cover the cost of owning my car. Having an electric bike would allow me to commute to school and work using the ebike and, when necessary, public transportation. Eliminating the need for a car would also allow me to cut back on my work schedule by at least 10 hours a week, which I could use to focus on school."

"Thank you for this opportunity, it is very challenging now to afford living on the Cape if you work here, I am barely making rent & the price of gas makes it hard to get around; an e bike would be a savior, thanks"

Applicants commented that they would use their bike for commuting and errands:

"I would enjoy an electric bike to do errands and commute to work. Parking is limited in Provincetown."

"An ebike would be very helpful to me for seeking employment."

A few applicants specifically noted that an e-bike could help reduce their isolation:

"Having only your two feet and the bus service in order to get out into the community, enjoy our natural surroundings, follow through on errands, visit family, etc., is difficult and isolating, which is just a downward spiral."

"I would use an ebike to go food shopping, post office, and visit friends. I cannot walk well without pain and this will allow me to run errand in my neighborhood without using my car, transport myself to Provincetown without having to find parking, socialize with friends, attend events and basically reduce my isolation, a problem that, as an elder woman, is increasingly becoming a problem since my partner passed two years ago."

Feedback from participants on follow-up surveys

"Unbelievable program I am so thankful, I told the few friends and they purchased e-bikes through the program as well."

"The rebate program was a very simple process!"

"The bike satisfies my needs, is easy to use and charge."

"It's easy to use and achieves my intention of getting me out of the house. It was, and continues to be, a small adventure at age 72."

"I enjoy using the bike instead of my jeep to do my errands."

"I am disabled and have a hard time walking. The e-bike has given me a new freedom to ride the rail trail, go to the corner store and explore places I was previously cut off from. I did have to upgrade the bike's tires to handle the sandy terrain around here but for the $100 it is well worth it."

"Every step of this process was easy and satisfying."

"My e-bike has allowed me the freedom to get around without relying on others for transportation. It has improved the quality of my life."

Multiple participants noted that the bikes still felt expensive, even with the Standard $1,200 voucher:

"Application could not have been easier. Purchase choices were a bit limited on the outer cape. The application and everything was very easy."

"More bike shops need to carry inventory in the reasonable price range. P-Town Bikes was the only store with the correct bikes in the realistic price range."

"The application process was straightforward and easy in my opinion. Using the voucher presented challenges as most of the bike shops that were listed did not have e-bikes in the price category covered by the voucher. They were willing to sell me a $4,000 e-bike but only 2 places had $1,700 bikes available, one in Ptown and one in Buzzards Bay."

"As I mentioned the minimum cost of an e-bike is an expensive purchase vs purchasing a non-e-bike. I do feel that I paid too much out of pocket price for this e-bike for a low-income person. This was one of the requirements for the program."