National Center for Sustainable Transportation

POLICY BRIEF

E-bike Incentive Programs Reduce GHGs and Support Recreational Travel

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Issue

Across the United States, local and state electric bike (e-bike) incentive programs offering point-of-sale or post-sale monetary discounts to consumers have been implemented since around 2018. As yet, little is known about their effectiveness in changing travel behavior.

To better understand the outcomes of these types of programs, researchers at UC Davis analyzed survey data from rebate recipients in Northern California. Programs offered by Contra Costa County, Redwood Coast Energy Authority, and Peninsula Clean Energy were evaluated for effects of e-bike ownership on travel behavior, including changes in bicycling, driving, and use of transit, and on greenhouse gas (GHG) emissions. This study was informed by data from two points in time: (1) two months and (2) one year after program participants acquired e-bikes. Results may help guide the design of future policy interventions to promote e-bicycling.

Key Research Findings

Rebate recipients reported an increase in bicycle use after acquiring an e-bike, which declined over time but remained above what it had been prior to getting an e-bike.

Two months after getting an e-bike, most recipients reported shifting from bicycling "never" or "1–3 times per month" to bicycling "1–3 times per week," with a few increasing to "daily." This finding suggests that programs were successful in creating an increase in bicycling in the short-term. Daily bicycling rates were lower one year later, but "1–3 times per week" bicycling remained elevated with a more than 20% increase compared to bicycle use before the acquisition of an e-bike.

Most e-bike rebate recipients replaced driving with their e-bikes "1–3 times per week" or "1–3 times per month." A large share of respondents, 82%, reported having replaced at least one car trip with their e-bike. In the short term, most recipients said they replaced car trips "1–3 times per week" or "1–3 times per month" with less than 10% reporting daily replacement (Figure 1). Over time, fewer car trips were replaced by e-bike trips. Still, nearly 40% of respondents said they replaced at least one weekly trip, even though daily driving replacement fell by about 50%, one year after the acquisition of an e-bike.

More than 50% of reported recent e-bike trips were for recreation (Figure 2).

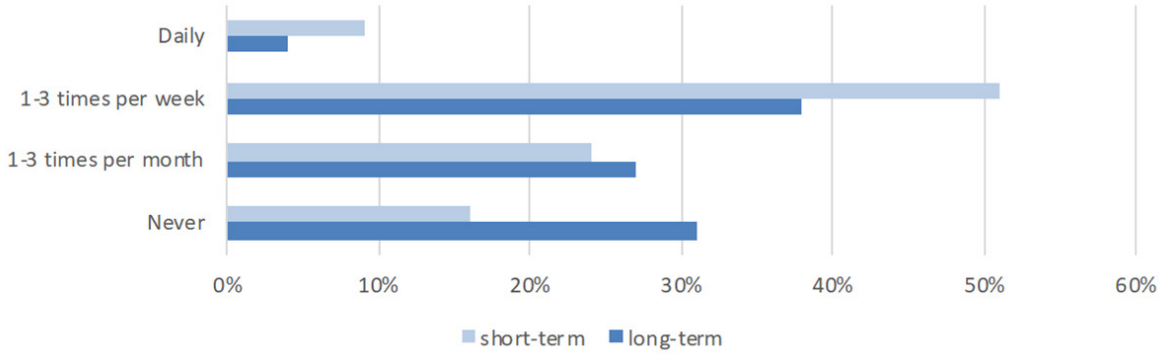

Figure 1. Frequency of replacing car trip with e-bike (Short term: n = 449, Long term: n = 247).

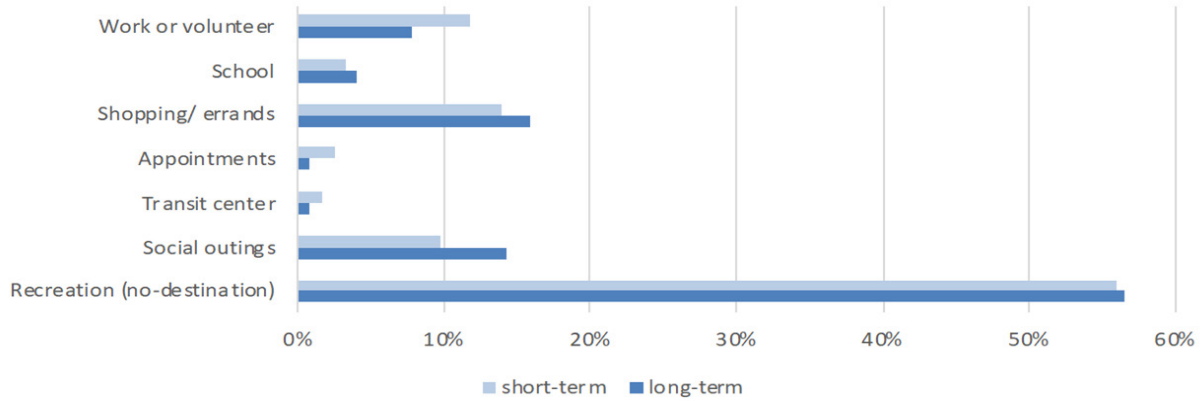

Figure 2. Reported purpose of last e-bike trip (Short term: n = 457, Long term: n = 250).

This finding differs from previous studies on the effects of e-bike rebates and incentives in Europe and North America, which report commute- and destination-oriented travel as the most common use of e-bikes. Because this study was conducted during the COVID-19 pandemic, when destination-oriented travel was greatly reduced, it is possible e-bike recipients sought these bikes primarily for recreation. Longer-term follow-up studies of these recipients are needed to know if recreation remains a primary use for these e-bikes.

GHG reductions were estimated to be 12–44 kilograms (kg) of CO2 equivalent (CO2e) per rebate participant per month. Based on self-reported car trip substitution with an e-bike, and distance of substituted trips, the researchers calculated that each program spent approximately $9.50–$18.00 per kg of CO2e reduced. This result suggests that low fixed rebate amounts ($150–$300) are more cost effective than large percentage rebates (50%–80% capped at $500–$800) at reducing GHGs. However, because this study did not include a measurement of participants' intent to purchase an e-bike regardless of the rebate, more research is needed to evaluate this possibility. It is likely that some recipients of small rebates would have purchased their e-bikes even without a rebate, which would reduce the GHG reductions attributable to the program.

E-bike rebate program requirements were successful at targeting those with low incomes, though these requirements did not seem to result in representative participation from people of color. Peninsula Clean Energy's program focused exclusively on low-income recipients and had the largest rebate amount. It was far more successful at effectively reaching low-income recipients. However, those recipients were not as racially diverse as the population the program intended to serve. More research is needed to determine if the rebate amount or the eligibility requirements are more effective in recruiting low-income participants, and what additional strategies might help increase racial diversity in program participation.

More Information

This policy brief is drawn from "Impacts of E-bike Ownership on Travel Behavior: Evidence from Three Northern California Rebate Programs," a report from the National Center for Sustainable Transportation, authored by Nicholas Johnson, Dillon Fitch-Polse, and Susan Handy of the University of California, Davis. The full report can be found on the NCST website at https://ncst.ucdavis.edu/project/examining-e-bike-rebates-california.

For more information about the findings presented in this brief, contact Dillon Fitch-Polse at dtfitch@ucdavis.edu.

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