



ELECTRIC BICYCLES: PUBLIC PERCEPTIONS & POLICY

Results and analysis of a national survey
of American bicyclists

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INTRODUCTION AND PURPOSE

Electric bicycles: Friend or foe of the bike movement?

That was the basic question we hoped to answer earlier this year when we created a survey for League members and the general public exploring what they thought about electric bicycles.

Thanks to the participation of more than 700 people — including 246 self-reported League members — we learned a lot about how people currently perceive electric bicycles and how these new types of bicycles might fit into our work.

718 SURVEY RESPONDENTS

- » 246 League members
- » 276 Bike club members
- » 436 Members of another bike advocacy organization

WHY NOW? E-BIKES OFFER OPTIONS

Most of the respondents to our survey expressed some experience with electric bicycles. More than 50% of respondents said they had shared a road or trail with an electric bicycle, while only 12% had never seen an electric bicycle in real life. This suggests that many bicyclists are experiencing electric bicycles or those that have experienced them are particularly interested in sharing their opinions.

As electric bicycles become more common, it will be important to make sure that electric bicycles can accomplish their promise of replacing car trips, allowing more and new people to regularly ride, and improving communities through cleaner forms of transportation and healthier populations.

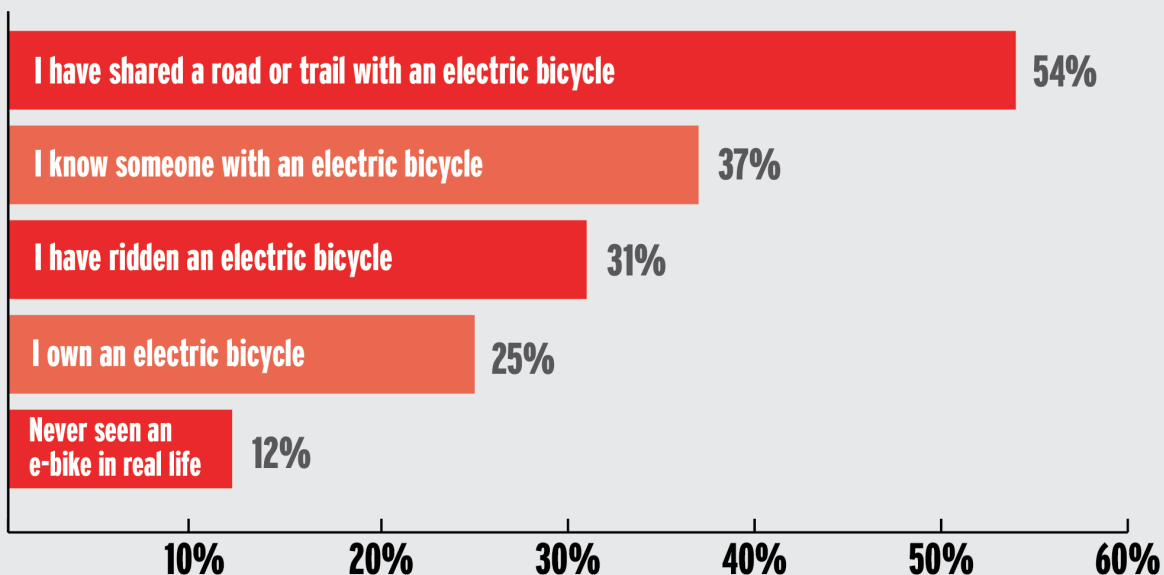
The bike industry estimates more than 200,000 electric bicycles may be sold in the United States this year. Data suggests that electric bicycles are experiencing study growth in worldwide markets, and

some people predict that electric bicycles may one day account for one out of every two adult bicycles sold. People choose to buy and use electric bicycles for a variety of reasons.

» According to [data from Accell North America](#), which manufactures bicycle brands, including Raleigh and Diamondback, economics are driving some people to buy electric bicycles: 34% of buyers hope to save on commuting and/or parking costs, and 18% hope to save money or replace a family car.

» According to survey data from the Transportation Research and Education Center at Portland State University, people use electric bicycles in different ways, particularly to increase their range and speed, to ride with less effort or more easily on hills, and to boost their health through increased physical activity. While electric bicycles don't provide the same health benefits as normal cycling, [research from the University of Tennessee-Knoxville](#) suggests riding an electric bicycle provides health benefits similar to walking.

QUESTION: How familiar are you with electric bicycles?



When we asked about the positive aspects of electric bicycles, most survey respondents indicated that they agreed with our suggested benefits. For all six of our suggested positive aspects of electric bicycles, more than 80% of respondents indicated that they agreed or somewhat agreed that electric bicycles can:

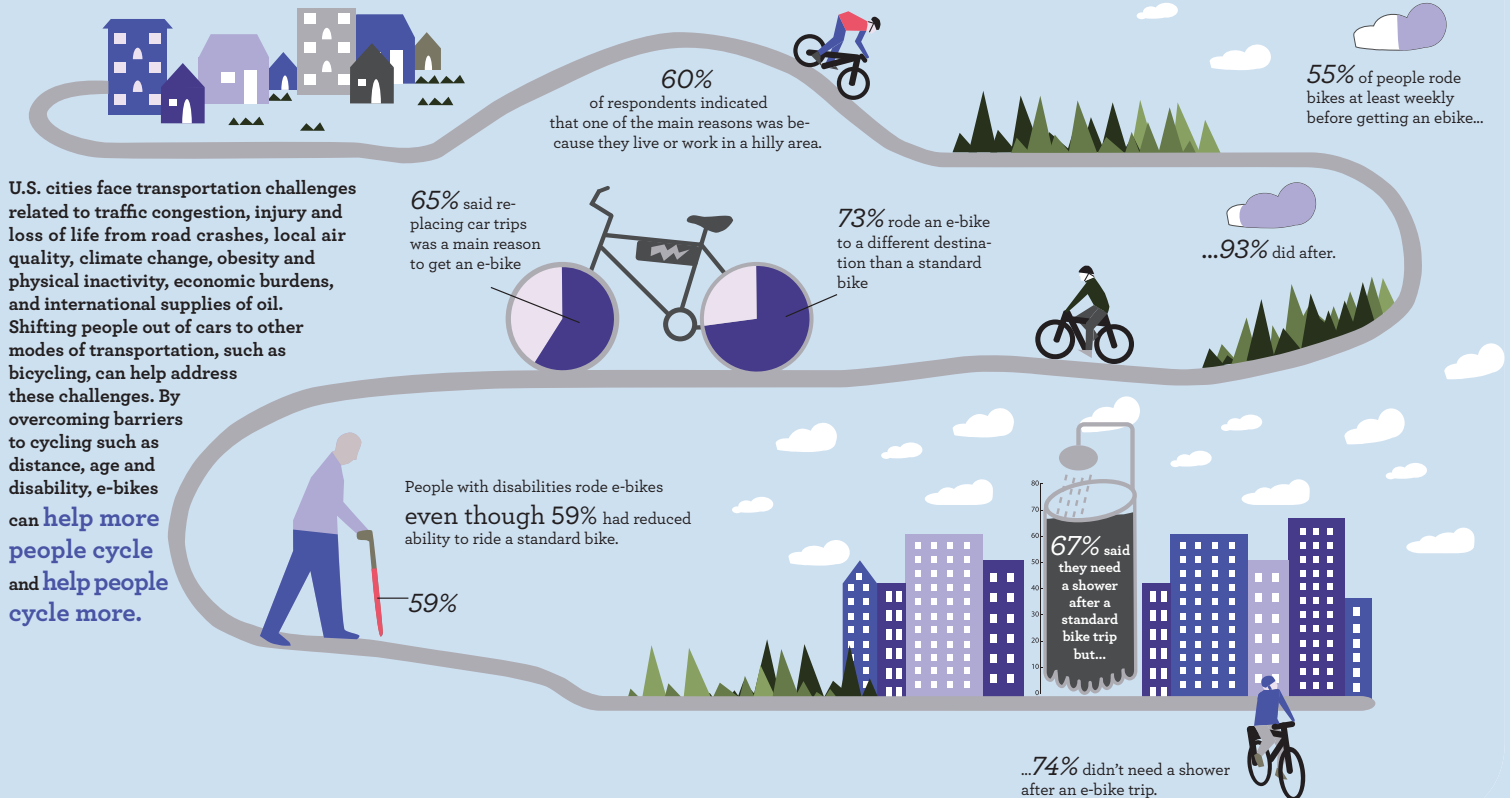
- » Be used by older people and people with physical challenges
- » Functionally replace cars for a wide variety of trips
- » Offer transportation options to people who can't drive
- » Expand the number of people using bicycles for transportation
- » Get more people biking more often
- » Make family bicycling more accessible

As electric bicycles become more common, it will be important to make sure that electric bicycles can accomplish their promise of replacing car trips, allowing more and new people to regularly ride, and improving communities through cleaner forms of transportation and healthier populations.

80% OF SURVEY RESPONDENTS
 AGREED THAT ELECTRIC BICYCLES
 HAVE POSITIVE ASPECTS

Why do people use e-bikes?

Portland State Transportation Research and Education Center



Source: "E-bikes in North America: Results from an Online Survey," John MacArthur, <http://otrec.us/project/564>

WHAT DOES IT MEAN TO BE A BICYCLE?

In our survey, some of the most interesting results came when we asked respondents to categorize eight types of electric bicycles on a spectrum of options from:

- » This is a bicycle
- » This is not a bicycle, but should be treated like one in most circumstances
- » This is not a bicycle, but should be treated like one in limited circumstances
- » This is not a bicycle, and should never be treated like one
- » This is not a bicycle, and I do not know how it should be treated

The list of electric bicycles included both low-speed electric bicycles, as defined at the federal level by the Consumer Products Safety Commission (CPSC), and vehicles marketed as “electric bicycles,” but which exceed the power limit for CPSC-compliant electric bicycles.

We included a diverse array of “electric bicycles” in order to learn whether the CPSC definition reflected what people thought of as an “electric bicycle.”

When asked to rate bicycles based on the spectrum of bike perceptions — with #1 being the most recognized as a bicycle — the following ranking emerged.

- » 1 Classic E-bike with pedal assist only
- » 2 Folding e-bike with twist throttle
- » 3 Classic E-bike with twist throttle
- » 4 Specialized Turbo
- » 5 Organic Transit ELF
- » 6 40-mph E-bike*
- » 7 Scooter E-bike
- » 8 50 mph E-bike*

* Vehicles do not comply with the CPSC definition.

DEFINITION OF AN ELECTRIC BICYCLE

The Consumer Product Safety Commission defines a low-speed electric bicycle as “a two-or three-wheeled vehicle with fully operable pedals and an electric motor of less than 750 watts (1 h.p.), whose maximum speed on a paved level surface, when powered solely by such a motor while ridden by an operator who weighs 170 pounds, is less than 20 miles per hour.”

The CPSC adopted this definition in 2003 and vehicles that meet its definition are subject to the CPSC’s regulations for bicycles that are solely human powered.

The effect of this definition is that low-speed electric bicycles that comply with the definition are regulated by the CPSC for their production, initial sale, and recall. There is not a well-developed regulatory scheme for electric bicycles that do not meet the CPSC definition.

The CPSC definition does not affect the ability of states to enact laws regarding the licensing and use of electric bicycles. Most states do not have laws crafted for electric bicycles and states can adopt definitions that are different than the CPSC. A recent [Portland State report](#) provides a comprehensive picture of current federal and state electric bicycle regulations.

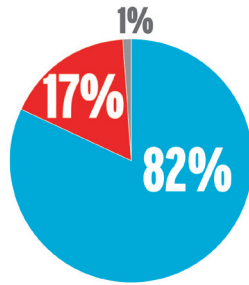
A BIKE OR NOT A BIKE?

That is the question...

THIS IS A BIKE (or mostly a bike)

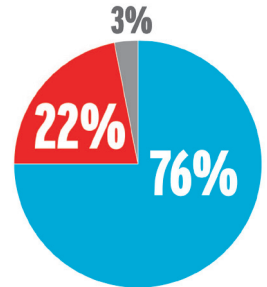
THIS IS (mostly or entirely) NOT A BIKE

NOT SURE



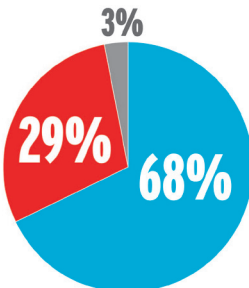
1 CLASSIC E-BIKE WITH PEDAL ASSIST

Wheels: 2 | Pedals: Fully operable; motor only runs when pedaled
Speed at which motor power stops: 20 mph | Weight: 48 lbs



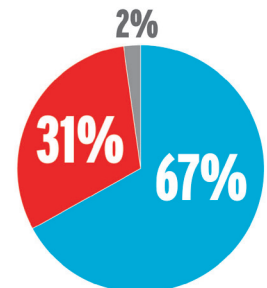
2 FOLDING E-BIKE WITH TWIST THROTTLE

Wheels: 2 | Pedals: Fully operable; motor can be engaged with twist throttle
Speed at which motor power stops: 15.5 mph | Weight: 40 lbs



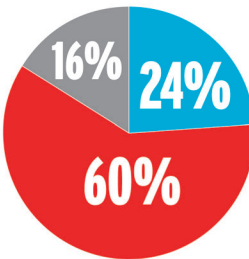
3 CLASSIC E-BIKE WITH TWIST THROTTLE

Wheels: 2 | Pedals: Fully operable; motor can be engaged with twist throttle
Speed at which motor power stops: 20 mph | Weight: 52 lbs



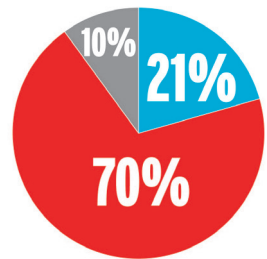
4 SPECIALIZED TURBO

Wheels: 2 | Pedals: Fully operable; motor only runs when pedaled
Speed at which motor power stops: 28 mph | Weight: 50 lbs



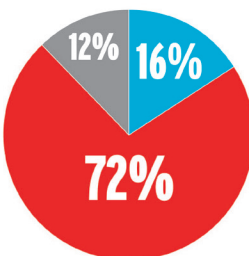
5 ORGANIC TRANSIT ELF

Wheels: 3 | Pedals: Fully operable; motor can be engaged with thumb throttle
Speed at which motor power stops: 20 mph | Weight: 150 lbs



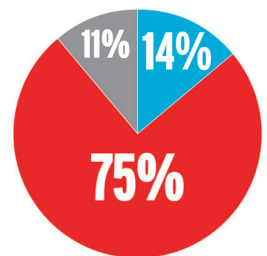
6 40-MPH E-BIKE

Wheels: 2 | Pedals: Fully operable; motor can be engaged with twist throttle
Speed at which motor power stops: 40 mph | Weight: 60 lbs



7 SCOOTER E-BIKE

Wheels: 2 | Pedals: Fully operable; motor can be engaged with twist throttle
Speed at which motor power stops: 20 mph | Weight: 165 lbs



8 50 MPH E-BIKE

Wheels: 2 | Pedals: Fully operable; motor can be engaged with twist throttle
Speed at which motor power stops: 50 mph | Weight: 116 lbs

These results highlight at least three issues with the CPSC definition and public acceptance of electric bicycles.

LOWER SPEEDS TEND TO MAKE PEOPLE MORE LIKELY TO SEE ELECTRIC BICYCLES AS BICYCLES

The two electric bicycles that had a majority of respondents say “this is a bicycle” were limited to 20 miles per hour or less.

The folding e-bike with a throttle was almost 10% more likely to be categorized as a bicycle, particularly by League members (see sidebar right), than the classic e-bike with a throttle, with a major difference being a 4.5 mph lower top speed for the folding e-bike.

FORM MATTERS

The Organic Transit ELF and the Scooter-style E-bike, both of which comply with the CPSC definition, had a majority of respondents say that they should not be treated like bicycles in most circumstances.

The Scooter-style E-bike scored lower than the ELF, perhaps reflecting public awareness of conflicts that have occurred with those vehicles in places like New York City.

THROTTLES ARE LESS ACCEPTED

Two extremely similar options were included with the major difference being the presence of a throttle. With that one major difference, close to 15% fewer respondents said the electric bicycle with a throttle was simply “a bicycle” and 5% more respondents said it should never be treated like a bicycle.

The CPSC definition does not give us tools to address these three issues. This suggests that states and communities may seek to regulate electric bicycles based upon the characteristics that are highlighted by these issues.

HOW DO LEAGUE MEMBERS DIFFER?

Both League members and non-League respondents were quite familiar with electric bicycles, with only 12% of respondents having no experience with an electric bicycle in real life.

League members and non-member respondents didn't have many disagreements in how to categorize these “electric bicycles.” There was no vehicle that had a disagreement of more than 10% for any category, but there were some noticeable differences between League members and non-League members:

» Non-League members were at least 5% more supportive of high-speed non-CPSC-Compliant vehicles (the 40 mph E-bike and 50 mph E-bike) being “bicycles” rather than another type of vehicle.

» League members were at least 5% more supportive of treating non-traditional, but CPSC compliant electric bicycles (Organic Transit ELF and Scooter-style E-bike), as bicycles in at least some circumstances.

» To some extent the differences between League members and non-League members reflects that people are not sure what to make of non-traditional electric vehicles. Respondents were at least 4 times more likely to say that they did not know how to treat the vehicles where significant differences were found.

» These differences also likely reflect the survey respondents. Respondents were more likely than the general population to own electric bicycles: 28% of non-League respondents own electric bicycles compared to 17% of League member respondents.

» According to the [National Bicycle Dealers Association](#), electric bicycle sales were 0.5% of all bicycle sales from 2005-2012.

WHERE SHOULD WE RIDE ELECTRIC BICYCLES?

The International Mountain Bicycling Association (IMBA) has been proactive in addressing the use of electric bicycles on dirt trails as part of its efforts to ensure bicyclists' access as a non-motorized form of recreation. Since 2011, IMBA has defended and refined its position on how electric bicycles should be managed off-road.

The League works with communities that have a variety of on-street and off-street infrastructure. One of the important questions we asked was what people thought about electric bicycle use on eight types of bicycle-specific and shared-use facilities.

The responses of League members and non-League members were very similar, not exceeding a 5% difference for any response type. The responses point to increasing uneasiness with the use of facilities by electric bicycles when those facilities are made for lower speeds and shared with non-motorized users.

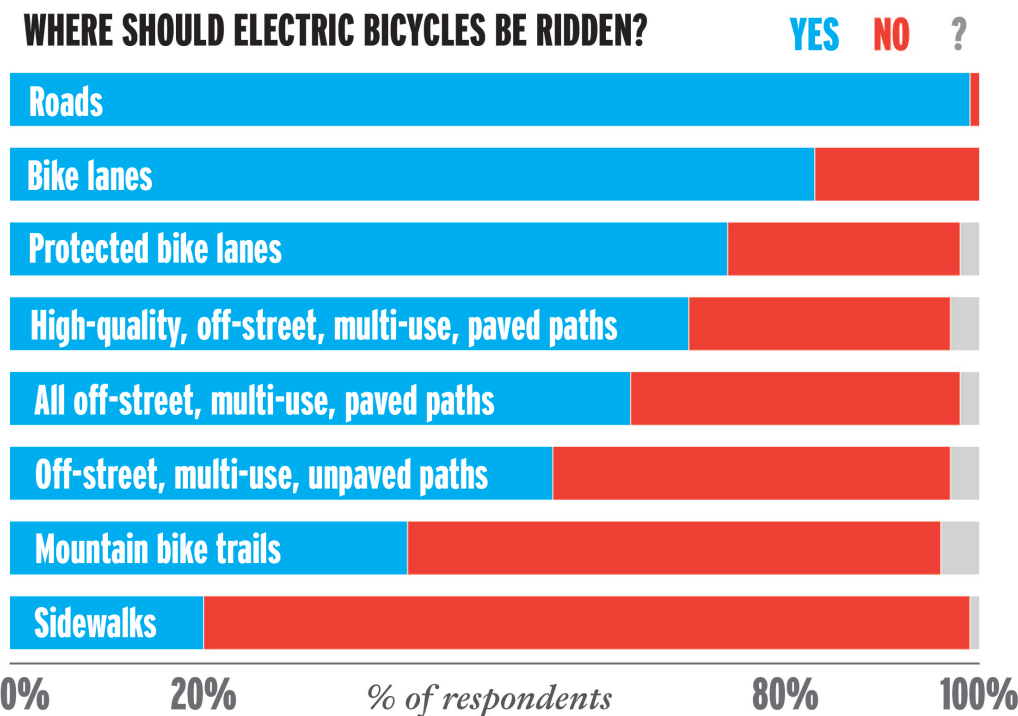
Some communities have already enacted regulations that restrict the use of electric bicycles on some of these facilities.

» The State of Colorado has enacted a law to prohibit electric bicycles engaging their engines while on multi-use paths and authorizing local authorities to restrict electric bicycle use on sidewalks. The City of Boulder used the authority granted by Colorado law to allow electric bicycles to engage their engines on multi-use paths for a trial period that ended on December 31, 2014.

» Oregon law considers electric bicycles to be bicycles, but forbids using electric bicycles on sidewalks. In 2014, the City of Eugene repealed a ban on the use of electric bicycles on off-street paths that had been in place for all motorized devices since 2005.

There is little evidence of safety problems due to electric bicycles being allowed on paths and sidewalks. However, it seems reasonable to suspect that communities will consider where electric bicycles should be allowed even without evidence of safety issues. The experience of communities enacting

restrictions and differentiating between types of electric bicycles will be key to watch in the coming years.

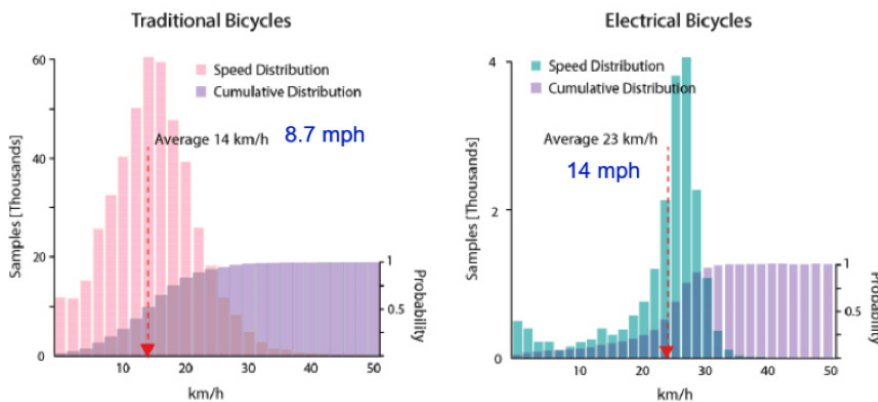


E-BIKES: CONCERNS & CHALLENGES

Electric bicycles have the potential to address some of the barriers to bicycling such as long distances, hills, limited cargo capacity, and the physical demands of bicycling. However, it is clear that bicyclists are hesitant about welcoming electric bicycles with open arms.

When we asked about negative perceptions, the overwhelming response, 72%, was related to safety.

Several studies have shown that electric bicycles result in higher speeds, particularly higher average speeds, but that maximum speeds are usually lower than 20 mph. A naturalistic study in Sweden, where speeds were collected along with comprehensive visual and other telemetry data for both traditional bicycles and electric bicycles collected the following speed data:



Safety-related comments to “If you have a negative perception of electric bicycles, please indicate anything that has contributed to that perception” included:

» “If there were restrictions on the speed of electric bicycles I might be more open minded to them. I think there is a difference between an electric bicycle and a traditional bicycle.”

» “... North America allows [20 mph] speed; beyond this is getting dangerous as helmets are not designed to protect beyond these speeds.”

» “The only e-bikes that I would feel safe sharing bike lanes or multi-use paths with would (1) allow motors to be engaged only when pedaled, (2) have a max motor-assisted speed of 15 mph and (3) weigh less than 50 lbs.”

» “I have had many interactions with high powered electric bicycles, mostly used for food delivery purposes, and they have not been good.”

The secondmost cited reason for negative perceptions was a concern about pedestrian reaction to electric bicycles. This may highlight the importance of shared facilities, including paths and sidewalks, to bicyclists.

While on-street infrastructure is essential to safe and comfortable bicycling, often bicyclists are

asked to share off-street facilities with pedestrians and other non-motorized users. The use of those facilities can make quite different demands of bicyclists than road riding, including deference to pedestrians. Pedestrian-related concerns included:

» “If a person on a fast-moving 100+ lb e-bike hits a pedestrian it will be like a dirt bike or a motorcycle hitting a pedestrian”

» “... they are going to be ridden by immature, idiotic young men who will terrorize pedestrians and make ‘them’ think even worse of ‘us.’”

» “I think speed should restrict access to bicycle facilities more than the presence of electric assist. Over 15 mph belongs on the street, not endangering path/lane users.”

Several of the options we gave to explain negative perceptions attempted to capture how electric bicycle riders might have a different identity than bicyclists or undermine the sense of a bicyclist identity.

We know that bicyclists are a diverse group of people and that there should not be generalizations about the actions of bicyclists or what it means to be a bicyclist. To be a bicyclist is simple – you ride a bicycle. At the same time, you don't have to look far for a reference to “bicycle culture.”

Culturally-related comments to “If you have a negative perception of electric bicycles, please indicate anything that has contributed to that perception” included:

- » “Would I like to see every car on the road replaced by an electric bicycle? Yes. Would I then like to see most electric bicycles replaced by non-motorized bicycles? Yes.”
- » “The motor part. I ride bicycles.”
- » “What becomes of the Zen of bicycling? ... Sweet Mother of God, we don't want yet one more motorized ‘it’ displacing bicycles from transportation facilities.”
- » “Many of my friends have e-bikes, but a lot of them rejoice in chasing down and passing people riding quickly on road bikes and I don't think that's the right attitude or use. But I love that more people are biking because of them.”
- » “I ride bicycles, unicycles and motorcycles. Like e-bikes, they're different from one another and require their own skill set to be safe for oneself and others. Just don't call them bicycles.”

Interestingly, respondents identified a lack of shared values as the biggest cultural reason for negative perceptions of electric bicycles. This may point to values that are not culturally based, but are instead values related to safety, the environment,



health, or community. This might be a natural reaction to a new type of road user and not reflective of any particular concern about electric bicycle users. It will be interesting to watch how electric bicycle user types emerge — whether they are older adults getting back to bicycles, families or businesses using electric bicycles to carry kids and cargo, or car-less individuals finding a transportation solution.

Ultimately, how we sort out concerns about electric bicycles will come down to personal and social experiences with them. Electric bicycles can be a tremendous improvement for some people, but open up the possibility of bad behavior for others. We believe that bicycling brings people together, and are hopeful that electric bicycles will bring more people to bicycling.

- » “I ride an e-bike myself, and love that I can be an old lady with bad knees and still be able to keep up with friends who are more fit. The most negative experience I had with electric bikes was in the Netherlands. Fast moving, noisy scooters, often driven by younger men, felt intrusive and dangerous on otherwise orderly protected Dutch bike lanes. My e-bike is NOT a scooter. It's a bike with a little extra power that allows me a bit more flexibility.”

WHAT'S THE FUTURE FOR ELECTRIC BICYCLES?

Based on what we have learned, the future for electric bicycles, treated as bicycles, is promising.

People broadly support low-speed pedal-assisted electric bicycles as bicycles, with their riders having the same rights and responsibilities as bicyclists. At the same time, it seems clear that there are also types of electric bicycles that are more challenging to accept.

The League supports a wide variety of innovative approaches to overcoming the barriers to bicycling, including improvements to the bicycle itself. Electric bicycles have the potential to reduce the impact of hills and trip distance and increase the carrying capacity of the bike -- all significant barriers to the utility of the bike in everyday situations -- such that more people are likely to choose bicycling as a transportation option.

Changes to the legislative and regulatory environment that may be necessary to accommodate electric bicycles should preserve the inherent characteristics of the bicycle as a primarily human-powered



device and should not have adverse impacts on existing bicyclists and bicycle facility users, including those on multi-use paths.

Soon, we'll publish a position statement on electric bicycles and look forward to working with our members, advocates, educators, states, and communities to ensure that roads become safer, communities become stronger and that our nation is bicycle friendly for everyone.

Electric bicycles are an important part of the future where everyone recognizes and enjoys the many benefits of bicycling. Ensuring that they are accepted and support a bicycle-friendly America will take work, but it is an exciting technology to make the bicycle better so that more people can ride bikes in more circumstances.