E-Bike Policy: Safety Data & Regulatory Gaps

E-Bike Safety & Policy Solutions Forum

California Assembly Transportation Committee Briefing

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MINETA TRANSPORTATION INSTITUTE

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Policy challenge:
Balancing EB benefits & safety concerns

Benefits

- Cheap and convenient mobility
- When EB use replaces car trips:
  - Reduced greenhouse gas and air pollution emissions
  - Reduced traffic congestion
  - Reduced parking demand
  - Improves road safety*

*Would you prefer to be hit by a crazy e-bike rider or a crazy car driver?

Safety concerns

- EB riders are injured or killed from:
  - Collisions with motor vehicles
  - Solo crashes
- Other road users are
  - Injured or killed by EB riders
  - Intimidated by aggressive EB riders

Overview

A. E-bike basics

B. E-bike use and ownership

C. E-bike safety concepts

D. How dangerous are e-bikes?

E. Creating a better e-bike definition & class system

F. Other policy options

A.

E-bike device basics

What are legal electric bicycles (EBs) in CA?

Bicycles with pedals, batteries, and electric motors (750 watts max) that meet requirements for one of 3 “classes”:

Class 1: Motor assistance until 20 mph, but only if pedaling

Class 2: Motor assistance until 20 mph, even if no pedaling (throttle assistance)

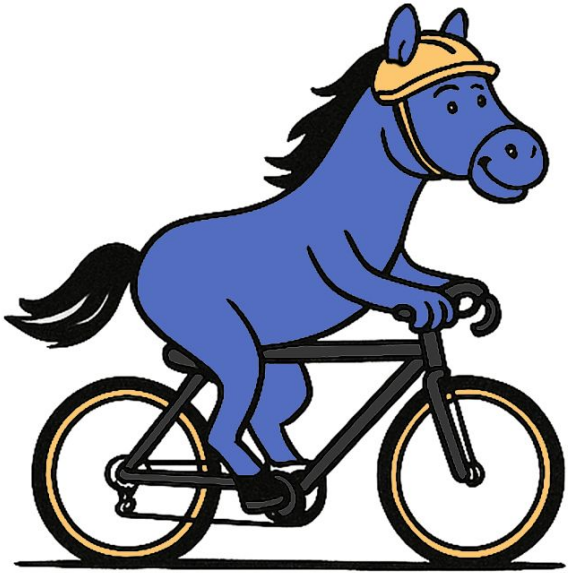
Class 3: Motor assistance until 28 mph, but only if pedaling

Many “bicycle-shaped objects” with pedals, batteries, and electric motors do NOT meet these requirements (higher wattage and/or assisted speeds)

Putting “750 watts” of power in context

Adult on bicycle
~100 W

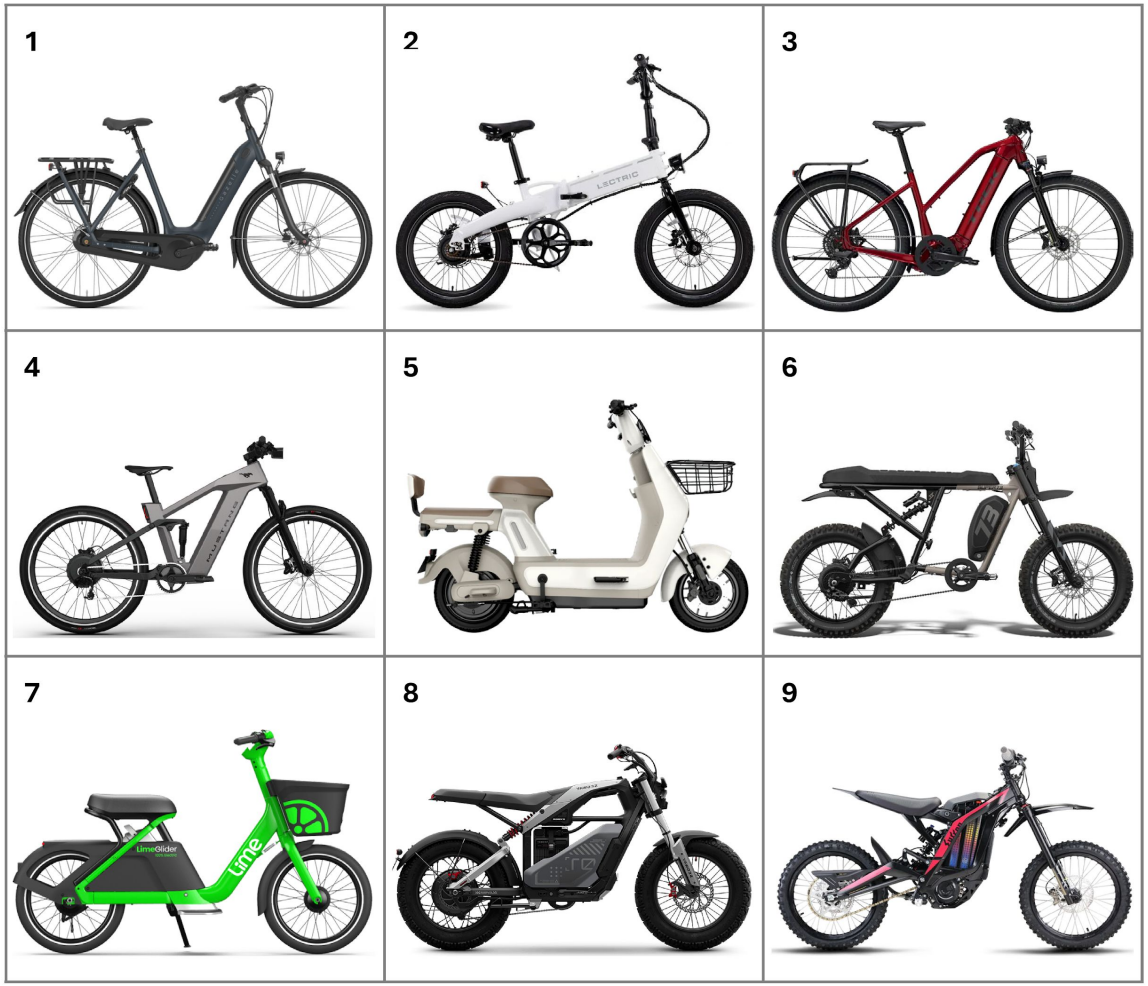
Pro cyclist on bicycle
~300 W



Horse
750 W

Quiz time!

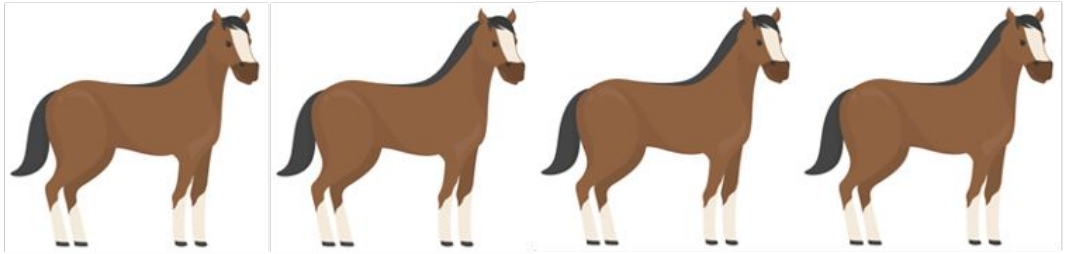
Which are the legal EBs?



An example of an “e-bike” that is NOT a legal e-bike

Segway Xyber Electric Bike

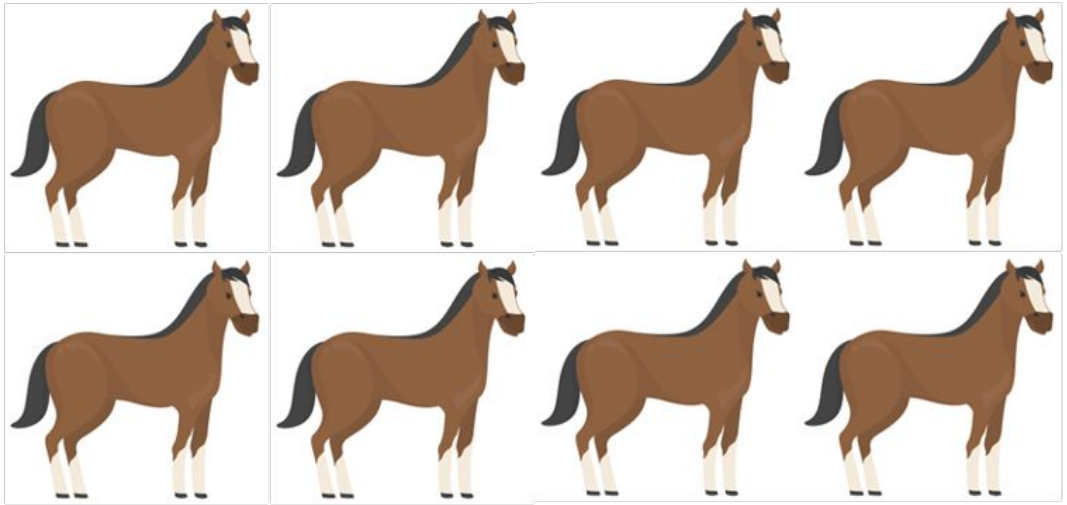
One battery variant: 3000 watts



Four horses

750 W x 4 = 3000 W

Two battery variant: 6000 watts



Eight horses

750 W x 8 = 6000 watts

B.

E-bike use & ownership

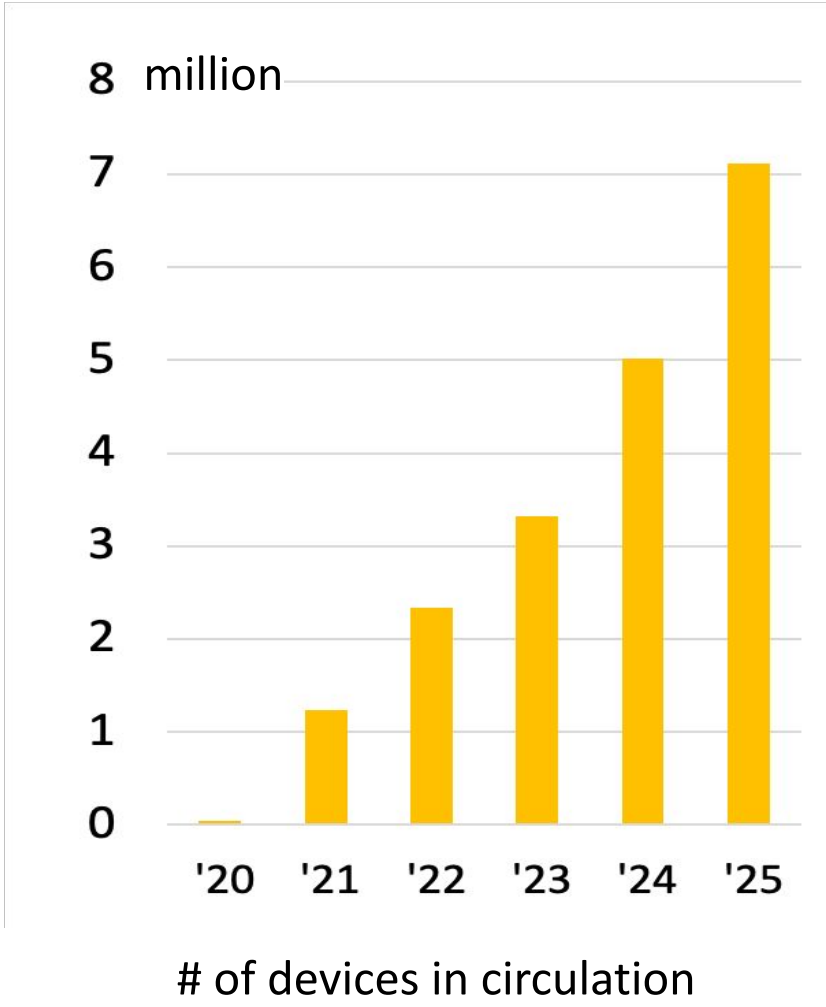
There is very little data about EB use and ownership.

Rapid growth of bicycle-shaped electric devices

The “fleet” of these devices in the US is around 7 million*

That is **49 times** more devices on the road than 2020

* Estimated by adding # of devices sold annually since 2020



# of devices in circulation

Source: Calculated with data from eCycleElectric

of people riding EBs

1. ~ 10% of US adults ride EBs, at least occasionally (data from 3 national surveys in 2024 and 2025)
2. No available data on ridership by children/teens

Types of “bicycle-shaped devices with electric motors” sold

Estimates from a 2025 Global Market Insights report

1. 43% of devices sold in 2024 were Class 1
2. Fastest growing segment of market is devices with motors above 750 watts (e.g., not legal EBs)

C.

E-bike safety concepts

The primary types of safety data available

1. Medical: hospital records, ambulance records, death certificates
2. Police: collision reports

ALL have major limitations:

- High probability of devices being miscategorized
  "EB" data includes electric pedal devices with higher speeds or more powerful motors than are legal for EBs
- E-bike class rarely reported
- The is no record for many (most?) incidents

What we want to know about EB incidents to set policy

1. How *many* incidents occur and how *severe* the outcomes are
2. Incidents *per exposure* (per trip or per distance traveled)
   To calculate, need the # of EB trips taken and/or distances traveled
3. How the numbers and types of EB injuries compare to similar devices (bicycles, e-scooters, etc.)
4. Factors associated with more frequent incidents
   Examples: specific street types, EB rider characteristics, EB rider behaviors, or motorist behaviors

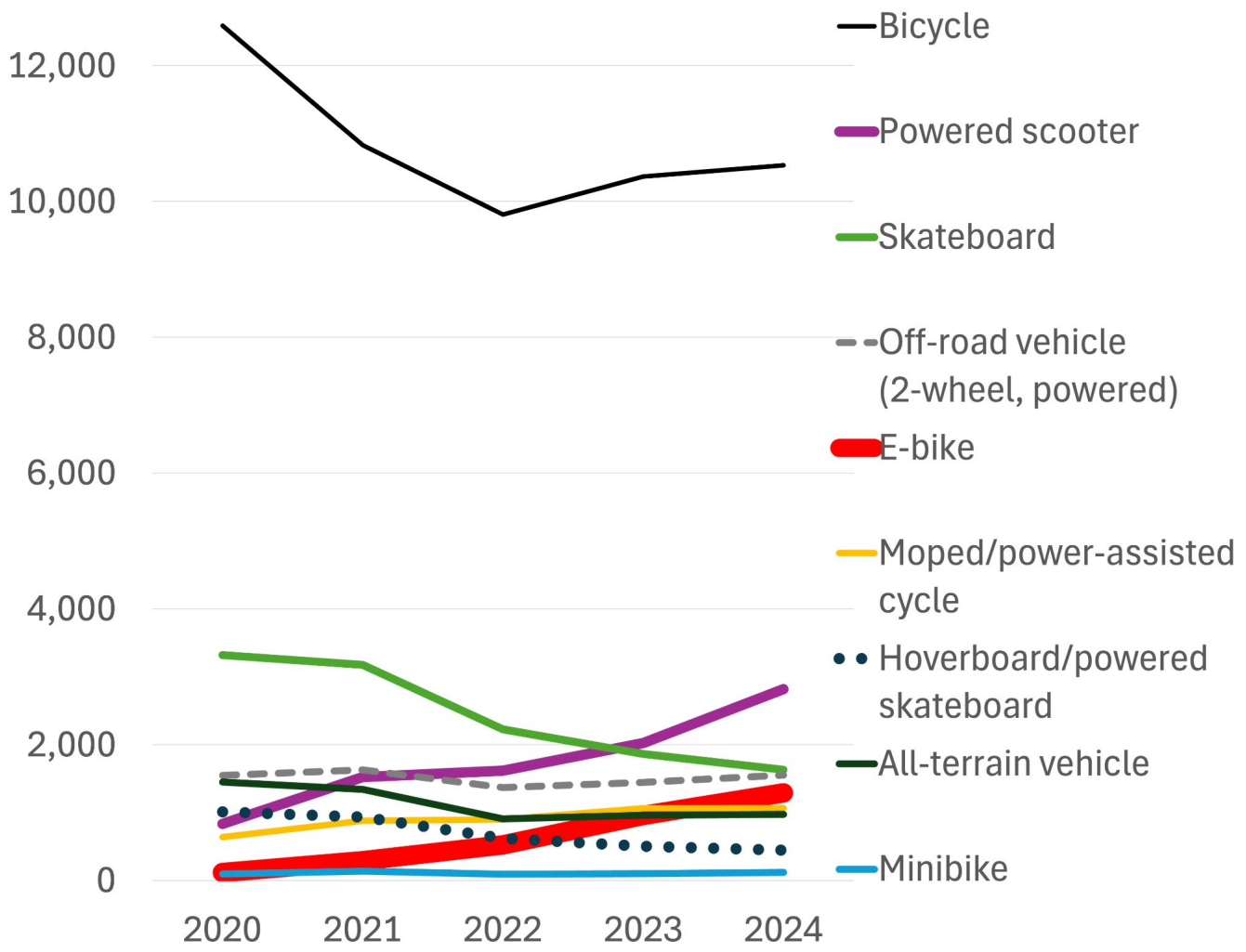
D.

How dangerous are EBs?

Overall findings from CA, US, & global safety data

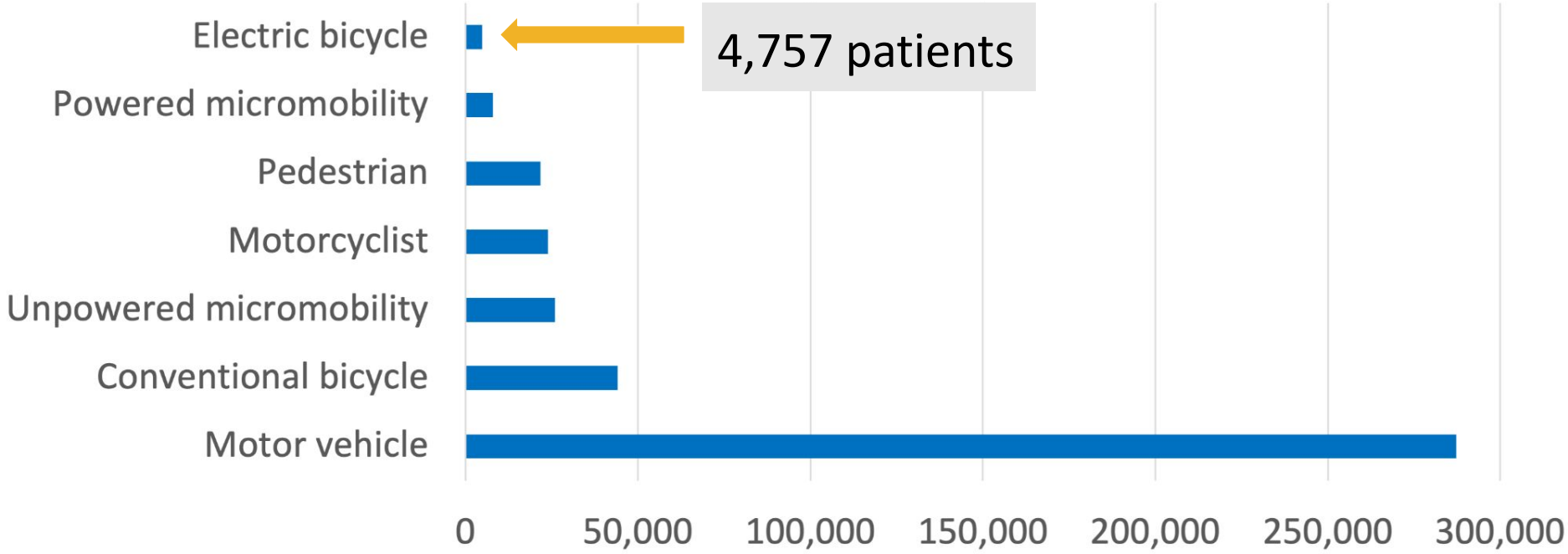
1. The # of reported EB crashes/injuries each year is rising, fast (as is the # of EBs)
2. Far fewer people are injured on reported EBs than on most other travel modes, including conventional bicycles and cars

Injuries from EBs and other light modes treated in US hospital emergency rooms



Source: Data from the National Electronic Injury Surveillance System (NEISS), produced by the US Consumer Product Safety Commission

Transportation patients treated in CA hospitals (2023)



Data: Hospital Emergency Department – External Cause of Injury/Morbidity Code Frequency and Hospital Inpatient – External Cause of Injury/Morbidity Code Frequency

Overall findings from CA, US, & global safety data

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2. Far fewer people are injured on reported EBs than on most other travel modes, including conventional bicycles and cars
3. Reported EB injuries treated in hospitals are, on average, somewhat more serious injuries injuries from conventional bicycle incidents
4. Majority of reported EB incidents involve adults
5. Very few bystanders injured by reported EBs

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BUT some important caveats:

- Many (most?) of these are incidents likely did not involve <u>legal</u> EBs
  If so, maybe legal EBs are actually pretty safe
- Some local data sources show different patterns
- Not much data available yet from 2025

E.

Creating a better EB definition and class system

Objectives for revised rules

Create **simple, intuitive** rules

People won't follow rules they can't understand or remember

Preserve **an EB option for everyone**

Don't limit e-bikes to adults with driving licenses

Preserve **options that offers more power**

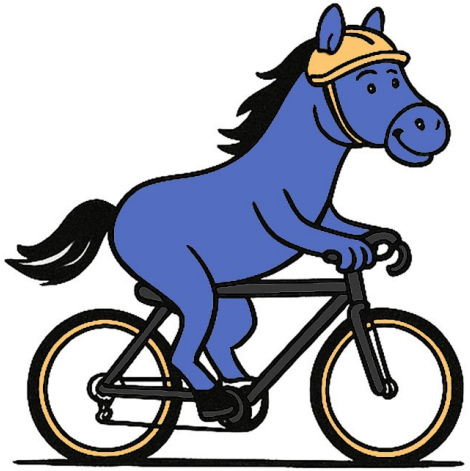
Don't ban higher-powered e-bicycles for everyone

Align the max wattage with global EB norms

If electric bicycles can be ridden by anyone, without a license, should they give riders the continuous power of:

A professional cyclist?
~ 300 watts continuous power

A horse?
750 watts continuous power



Align the max wattage with global EB norms

If electric bicycles can be ridden by anyone, without a license, should they give riders the continuous power of:

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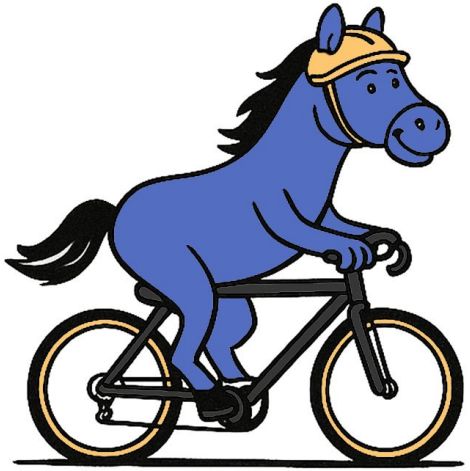
~ 300 watts continuous power

What Europe, Japan, China, etc., allow

A horse?
750 watts continuous power

What US & CA rules allow



Replace the 3-class system with a 2-class system

- 750 watt PEAK power EBs are legally equivalent to bicycles: Rnyone can ride them, no license required, use bike paths, etc.
- Higher speed/power EBs are legally equivalent to mopeds: Minimum age; require license, helmet, and safety equipment; can't use bike paths, etc.

This is simple: it builds off existing rules and reduces the complexity of different rules for many device types

This is what the rest of the world does

F.

Other policy options

Fund safe bicycling infrastructure

1. Redesign streets to give EBs (and all small devices) a safe location to ride, such as bike lanes
2. Redesign streets so that motorists are more aware of EB riders, such as by adding “bike boxes” at intersections, removing right-turn “slip lanes,” and adding turn lanes for vehicles

Require retailers to disclose what they are selling

Don't expect consumers to research state EB laws before a purchase

1. Require retailers to disclose whether or not the device is a legal EBs, the EB class, and California rules on who may ride the device

2. Facilitate enforcement by the California Attorney General county district attorneys

Standardize riding rules, with very limited exceptions

1. Keep most rules consistent statewide, including age & helmet rules

   Imagine the confusion if vehicle driver age minimums varied by city

2. Permit local governments to introduce limited, place-specific limitations like sidewalk riding bans in crowded pedestrians areas **and** require all such deviations from state standards be well signed

   Imagine the confusion if speed limit changes weren't indicated with signs

Let people know what the rules for riding are

How can people be expected to follow rules they don't know?

1. Create an official state **handbook of rules for riders of EBs**, pedal bicycles, and other small devices

   The state doesn't provide all the rules anywhere *except* in the CA Vehicle Code

2. Run public service educational campaigns to educate ALL road users
3. Encourage bicycle and EB rider education in schools

Collect better data on EB use and incidents

Good data supports good policy

Work with police, local hospitals, and local EMS to collect better data that

- Documents the device make, model, and key characteristics (e.g., throttle)
- Includes quality data on crash circumstances (location, behaviors of everyone involved, light, weather, etc.)

Support research into EB incidents

- Direct state agencies like the Department of Public Health to analyze and publish existing data *rapidly*
- Fund researchers outside state government
- Encourage transportation and public health researchers to collaborate

  Each discipline brings different and critical insights

Contact information

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MTI report:
Exploring Electric Bicycle Safety Performance Data and Policy Options for California (Full Report)