



Electric Bicycles

City of Durango
Parks and Recreation Advisory Board
Natural Lands Preservation Advisory Board
and Multi Modal Advisory Board

Joint Public Meeting

Durango Community Recreation Center
September 19, 2016

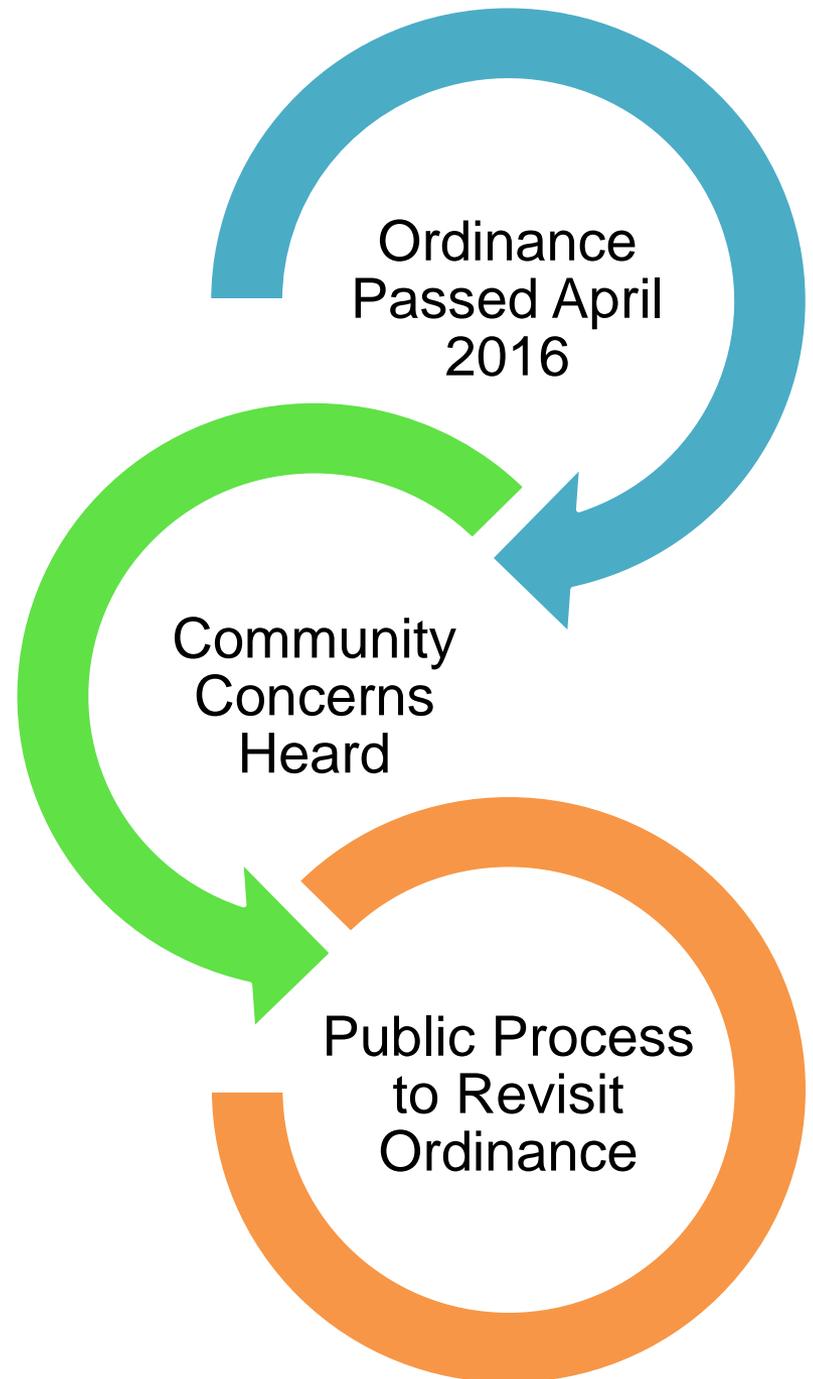
Overview

- **INTRODUCTION**
 - How we got here
 - Durango policy
 - Public process
- **RESEARCH HIGHLIGHTS**
 - What is an e-bike?
 - E-bike classes
 - E-bike usage
- **E-BIKE LAWS**
 - Federal
 - State
 - Local
- **Electric-assist mountain bikes**
- **NEXT STEPS**

How We Got Here



Photo: Cyclists on the Animas River Trail



Durango Policy



- An electric assist or electric bicycle (e-bike) is defined by the City of Durango as a tandem wheeled cycle that has an electric motor
- E-bikes are defined as motorized, and as such, use is allowed on City property only where other motorized vehicles are allowed
- E-bikes are not allowed in the City Open Space, Parks or Trail systems

Bike Networks



Protected Lanes



Local Streets
(Slow Speeds, Low Volume)



Separated Pathways

Status

- ***Should*** e-bikes be allowed on trails?
- What about as a personal mobility vehicle? For the mobility-impaired? Aging populations?
- What about trail ***speeds*** and safety?

Ordinance Review



Photo: A young cyclist on the Animas River Trail

1. **Joint board meeting (tonight!)**
2. **City staff and the Advisory Boards will formulate a recommendation to Council**
3. **Council Study Session on ordinance in early 2017**

What *is* an e-bike?



- Almost identical to a traditional bicycle in appearance
- Has a small electric motor and battery to provide motorized assistance (pedal-assist or throttle)

What *is* an e-bike?

Consumer Product Safety Commission e-bike definition:

“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.**”



Photo: Janet Wiley uses her pedal-assist bike to commute to and from work. Photo by Jennaye Derge, courtesy of Durango Telegraph

E-Bike Classes

Bicycle Product Suppliers Association
devised 3 classes of e-bikes:

- **Class 1:** Pedal assist only, maximum assisted speed of 20 MPH
- **Class 2:** Throttle assist, maximum motor powered speed of 20 MPH
- **Class 3:** Pedal assist only, maximum assisted speed of 28 MPH

E-Bike Classes

Class 1 + 2

- Regulated like bicycles
- May be permitted on multi-use paths
- Local regulation allowed

Class 3

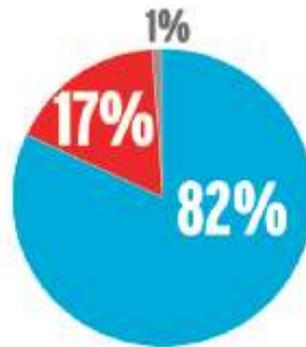
- Additional rules on use and equipment
- Local authorization required for path use

Technical Specs

THIS IS A BIKE (or mostly a bike)

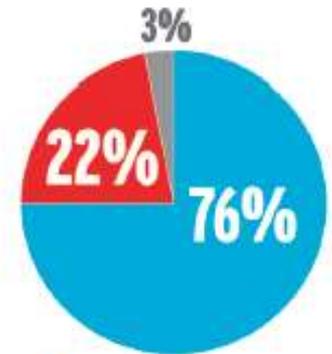
THIS IS (mostly or entirely) NOT A BIKE

NOT SURE



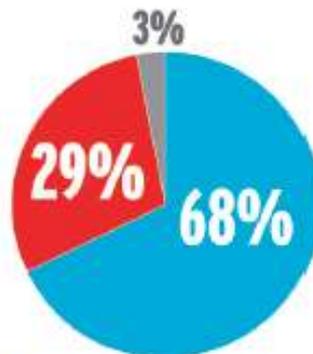
1 CLASSIC E-BIKE WITH PEDAL ASSIST

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



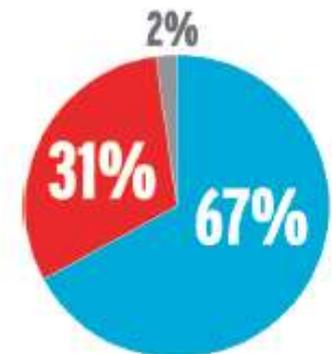
2 FOLDING E-BIKE WITH TWIST THROTTLE

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

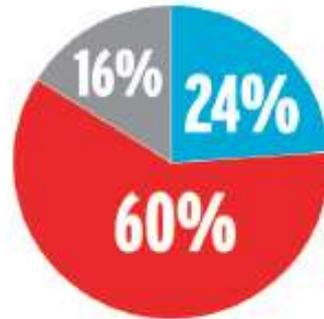
Wheels: 2 | Pedals: Fully operable; motor only runs when pedaled
Speed at which motor power stops: 28 mph | Weight: 50 lbs

Technical Specs

THIS IS A BIKE (or mostly a bike)

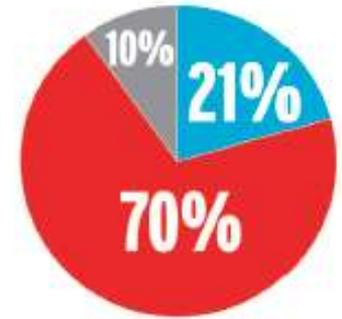
THIS IS (mostly or entirely) NOT A BIKE

NOT SURE



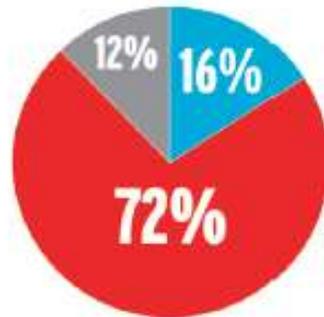
5 ORGANIC TRANSIT ELF

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



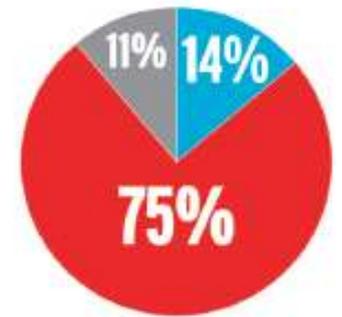
6 40-MPH E-BIKE

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

Why E-Bikes?

Why do people use e-bikes?

Portland State Transportation Research and Education Center

U.S. cities face transportation challenges related to traffic congestion, injury and loss of life from road crashes, local air quality, climate change, obesity and physical inactivity, economic burdens, and international supplies of oil. Shifting people out of cars to other modes of transportation, such as bicycling, can help address these challenges. By overcoming barriers to cycling such as distance, age and disability, e-bikes can help more people cycle and help people cycle more.



60% of respondents indicated that one of the main reasons was because they live or work in a hilly area.



55% of people rode bikes at least weekly before getting an e-bike...

65% said replacing car trips was a main reason to get an e-bike



73% rode an e-bike to a different destination than a standard bike

...93% did after.



People with disabilities rode e-bikes even though 59% had reduced ability to ride a standard bike.

59%



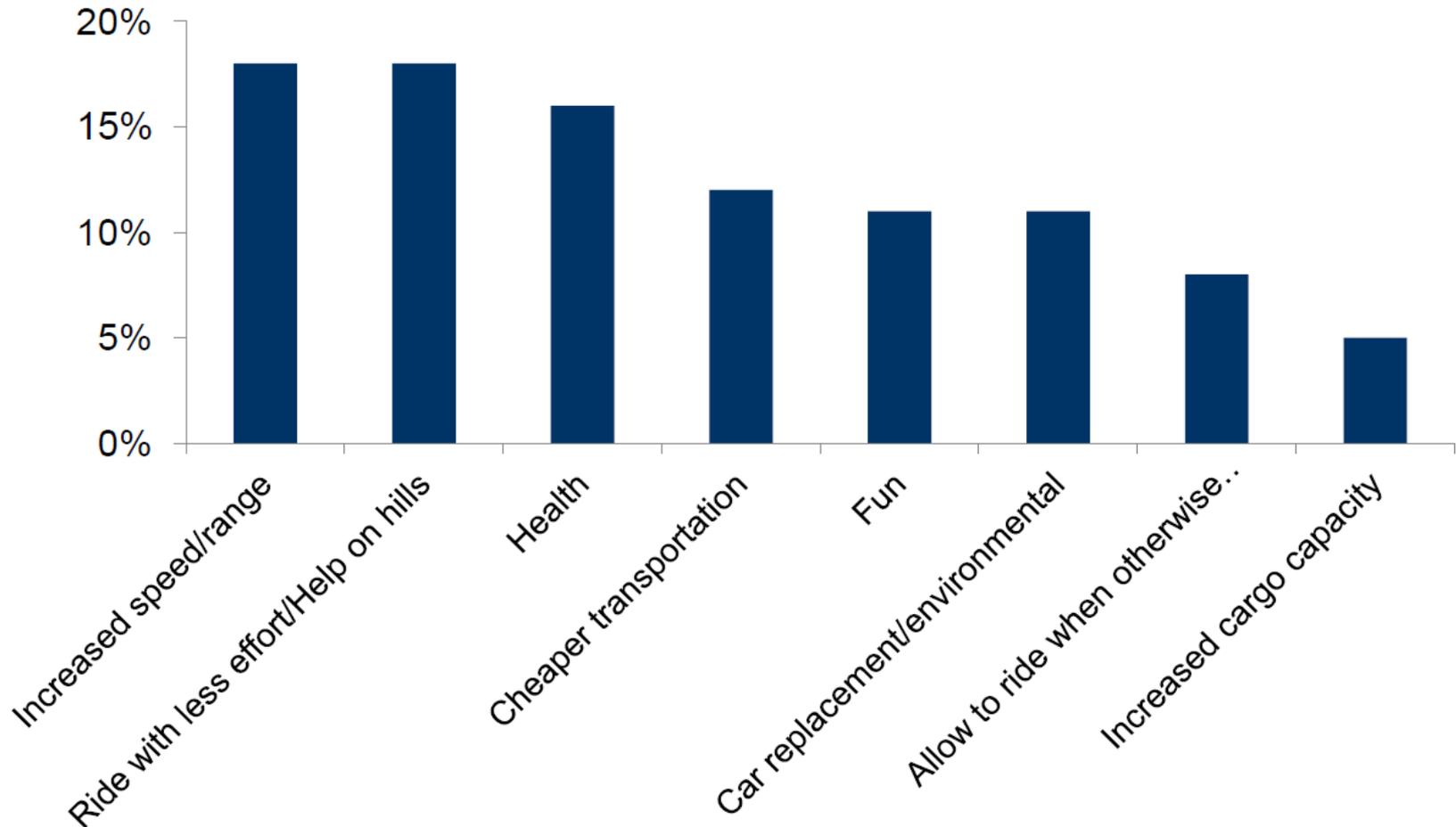
67% said they need a shower after a standard bike trip but...

...74% didn't need a shower after an e-bike trip.



Mobility

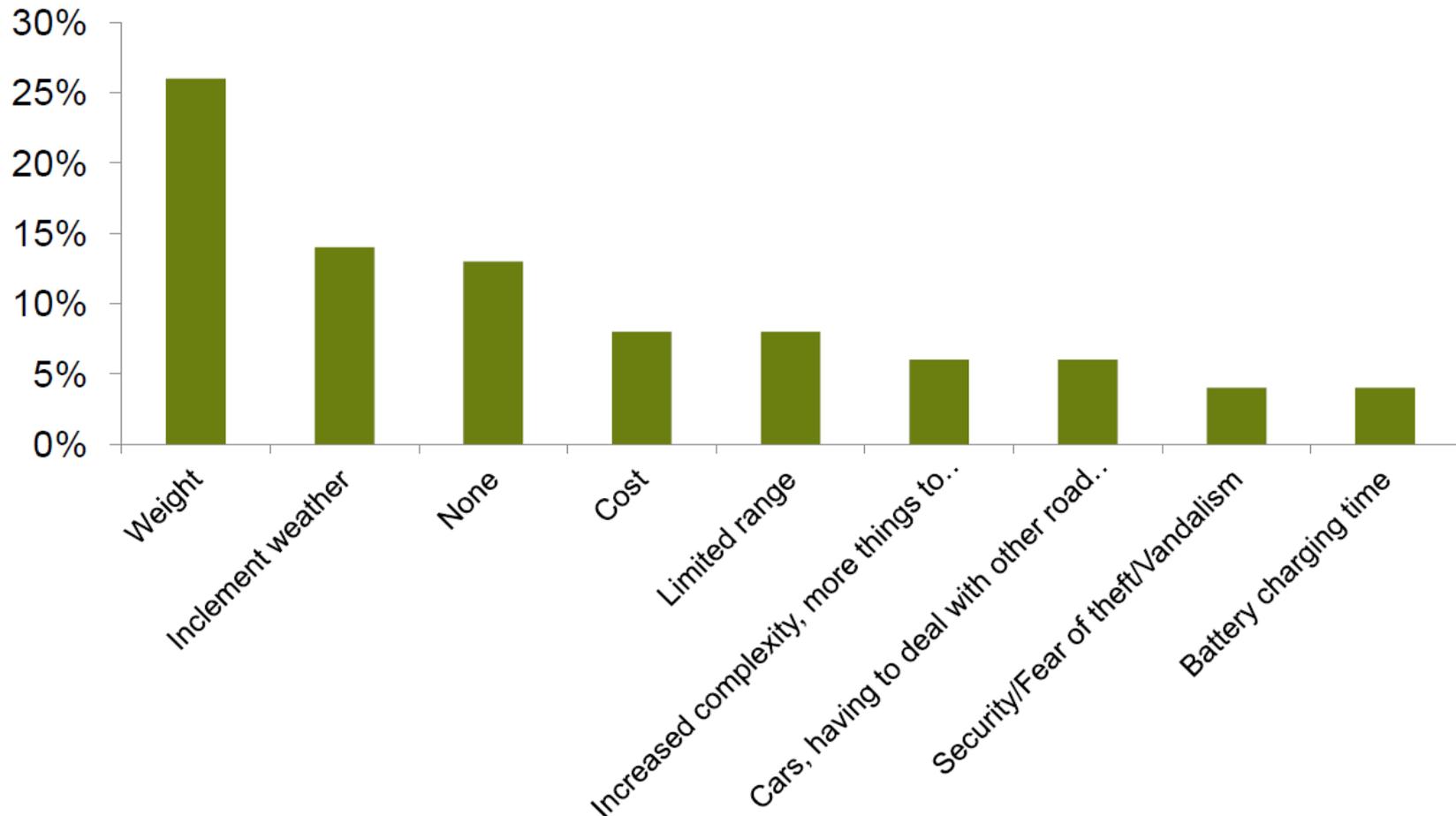
What are the main advantages to riding an e-bike?



Source: European Electric Vehicle Congress Brussels: Can Electric Bicycles Get More People in the United States to Cycle? By John MacArthur

Mobility

What are the main disadvantage to riding an e-bike?



Source: European Electric Vehicle Congress Brussels: Can Electric Bicycles Get More People in the United States to Cycle? By John MacArthur

Accessibility

E-bikes can provide options for commuting for a family to move from a two car household to one.



Photo: Families enjoying the Animas River Trail

Health

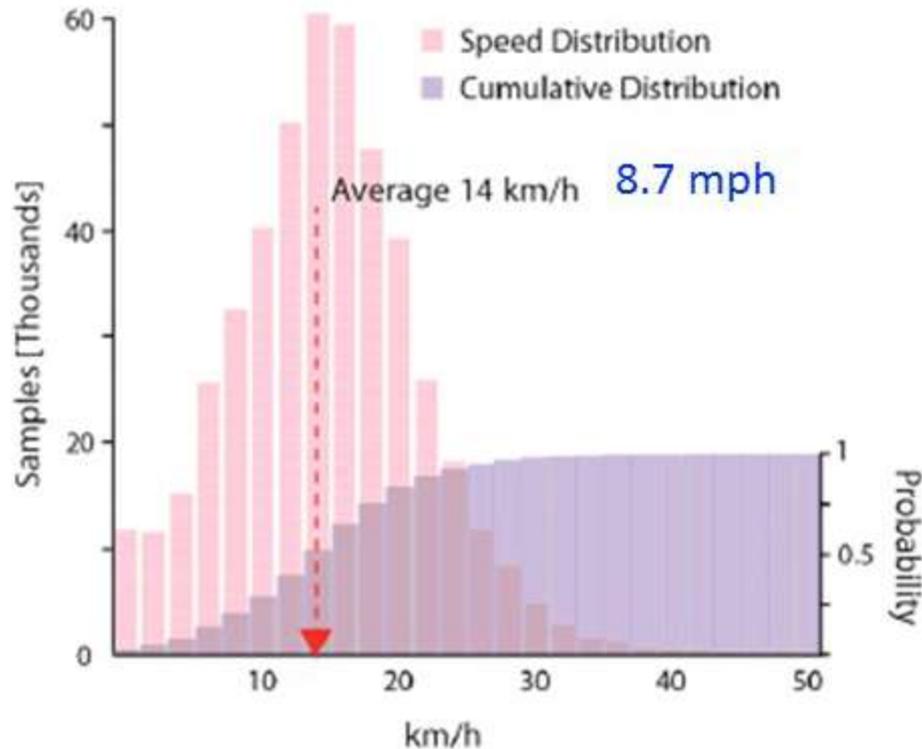
- Caloric expenditure (similar to pedal bikes)
- Weight management
- Reduced mortality
- Less air pollution

Photo: Families enjoying the Animas River Trail

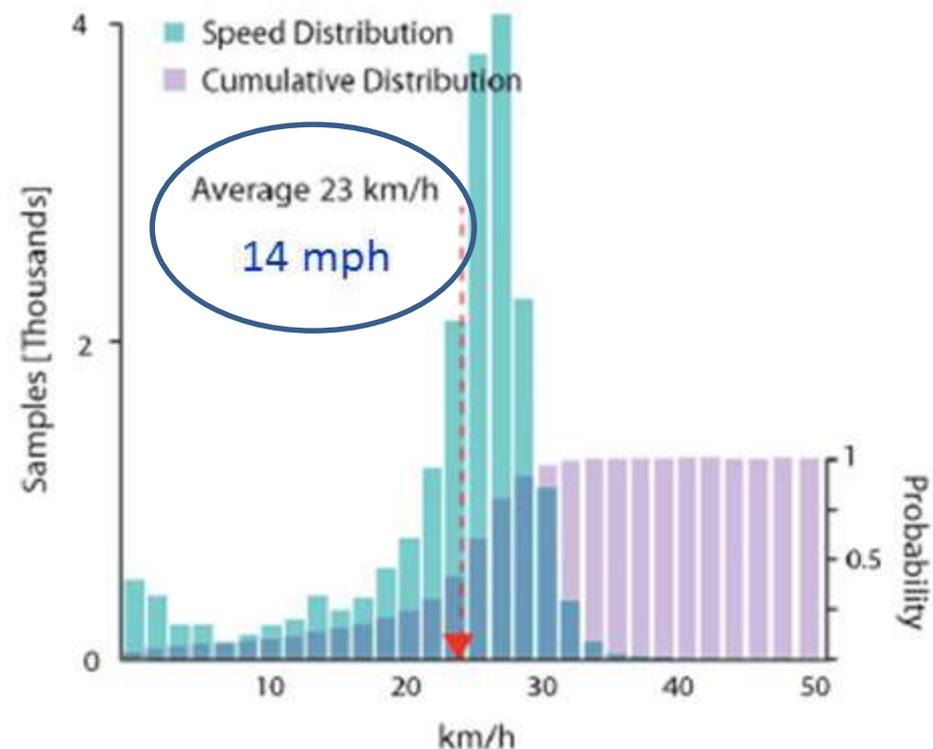
Speed and Safety

Comparison of e-bike and conventional from a naturalistic-cycling study in Sweden

Traditional Bicycles



Electrical Bicycles



Source: Naturalistic Data to Assess E-cyclist Behavior - Report, by Marco Dozza, Giulio Francesco, Bianchi Piccinini and Julia Werneke and E-bikes, Electric Assist Bikes and Transportation Presentation by Association of Pedestrian and Bicycle Professionals (November 19, 2014)

Speed and Safety

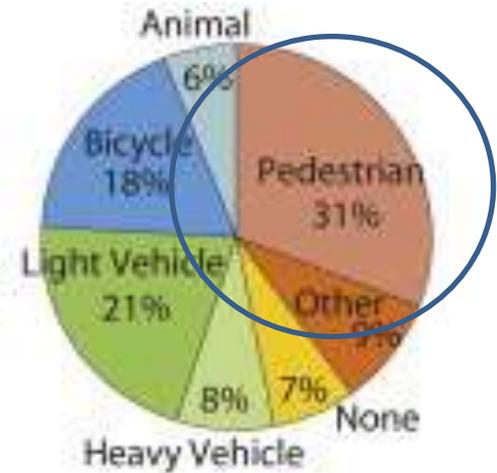
Main conflicts for e-cyclists from a naturalistic-cycling study in Sweden



Naturalistic data collection from e-cyclists (1500 km).



Crashes and near crashes analysis. Odds ratio analysis for environment and conflicts.

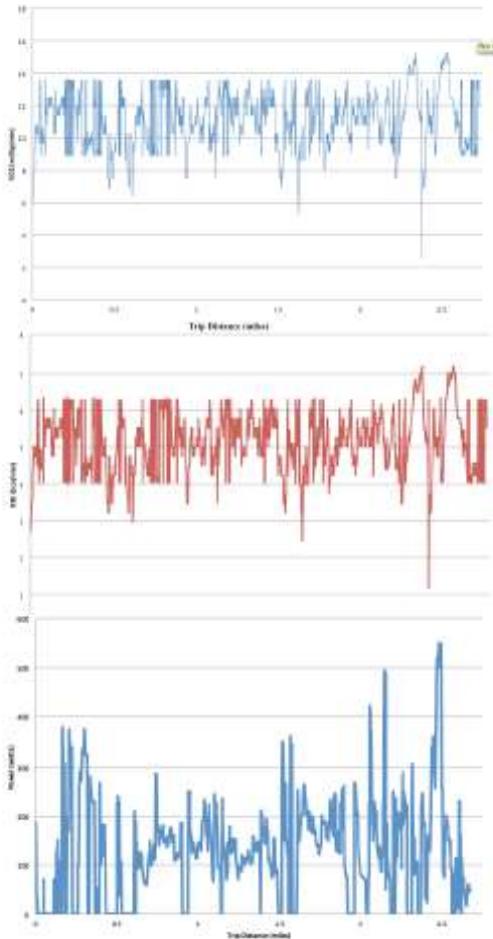


Main conflicts for e-cyclists.

Source: Naturalistic Data to Assess E-cyclist Behavior - Report, by Marco Dozza, Giulio Francesco, Bianchi Piccinini and Julia Werneke and E-bikes, Electric Assist Bikes and Transportation Presentation by Association of Pedestrian and Bicycle Professionals (November 19, 2014)

Speed and Safety

Results:



	Travel Mode ^{a,b}		
	Walking	R-Bike	E-bike
Average Power (watts)	N/A	59.21 (82.32)	55.01 (77.64)
Heart Rate (bpm)	115.19 (17.58)	122.48 (35.68)	119.79 (22.86)
VO2 (ml/kg/min)	14.72 (5.76)	18.97 (17.29)	15.43 (7.84)
REE (Kcal/min)	5.73 (2.67)	7.54 (6.87)	5.93 (3.43)
Average Speed (kph)	4.92 (1.51)	12.79 (7.54)	14.66 (7.88)

^aStandard deviations shown in parenthesis.

^bComparisons of means are significant at 99% confidence level across all categories.

Source: E-bikes: Impact on Physical Activity and Health, by David R. Bassett, Jr.

E-Bike Laws

E-BIKE REGULATIONS

ACCEPTABLE

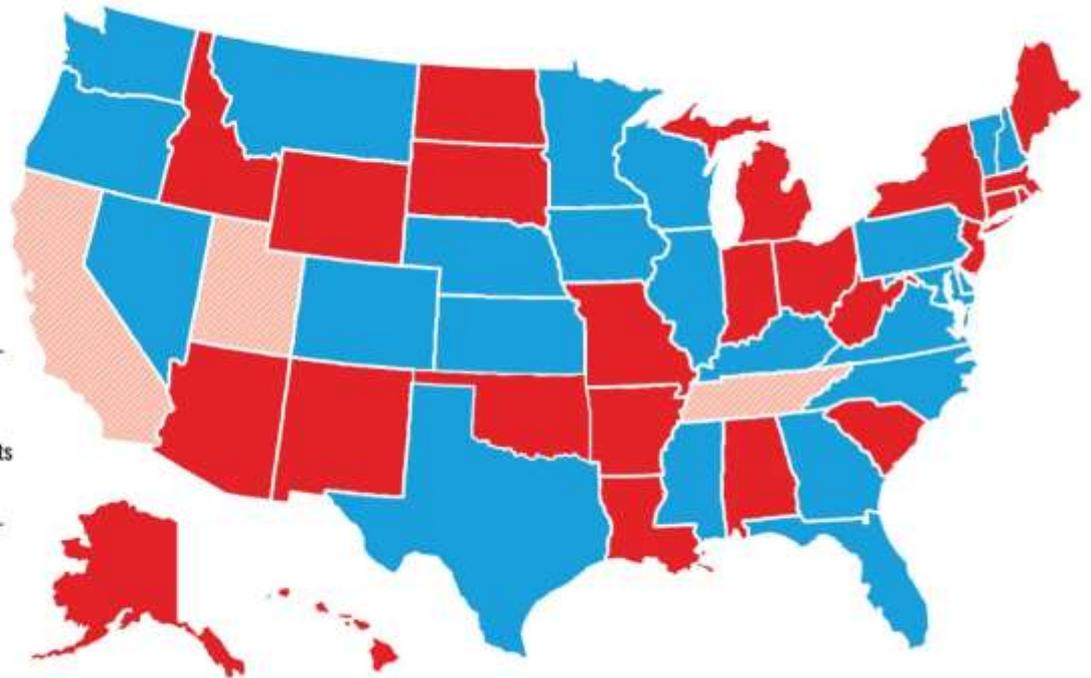
- » Regulated as a bicycle
- » Passengers allowed
- » No age minimum
- » No licensing or registration required
- » Can use existing bike infrastructure

PROBLEMATIC

- » Regulated as a moped or motor vehicle
- » Confusing equipment + use requirements
- » Confusing licensing + registration requirements
- » Confusing access to bike infrastructure

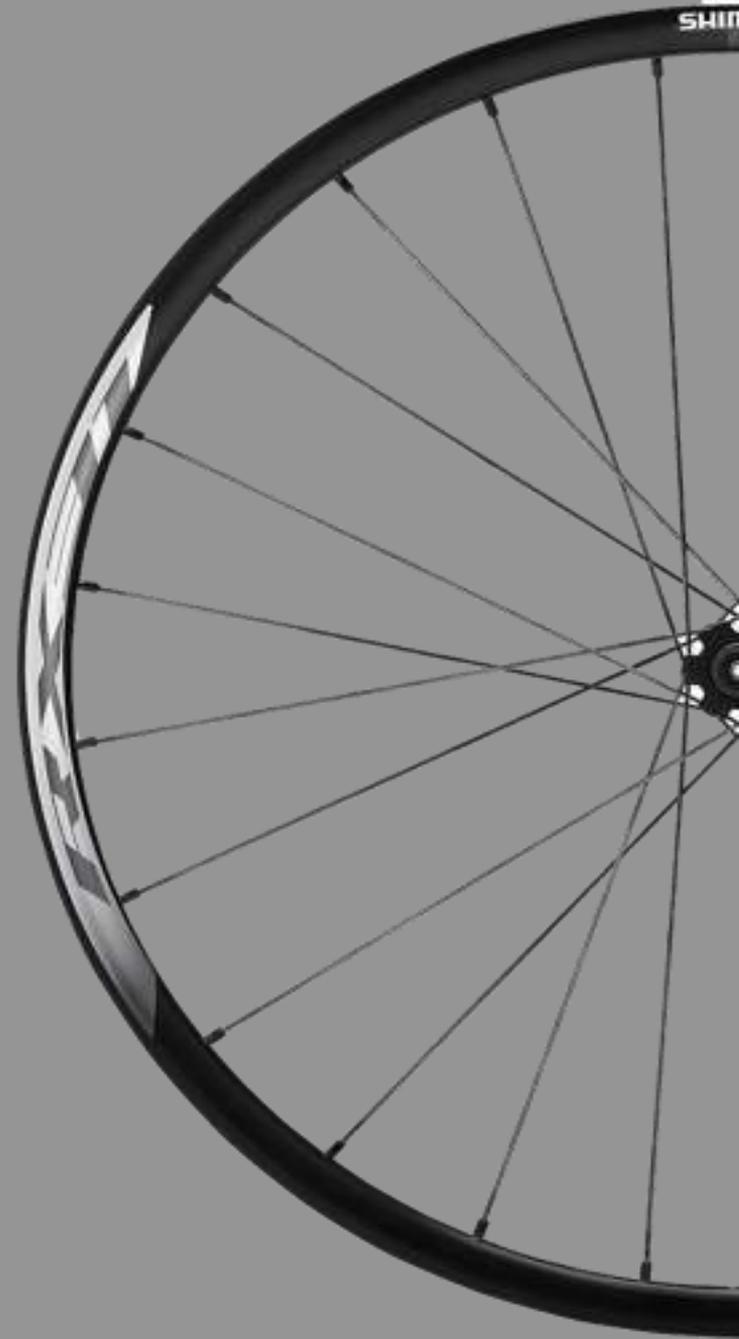
MODEL LEGISLATION

- » PFB and BPSA have enacted our model law, which defines and regulates three classes of e-bikes.



Federal Regulation

- E-bikes are federally regulated for the purposes of product safety
- Under jurisdiction of Consumer Product Safety Commission
- Federal law regulates their condition at the first point of sale, not their use
- Does not answer the question: **where can people ride?**



Federal Regulation

- Key points from definition:
 - Allows pedal or throttle assist bicycles
 - Maximum power of 750 watts
 - Maximum speed of 20 MPH under motor power alone
 - No specified maximum speed when operating under combined human and motor power

State Regulation



- States regulate the use of e-bikes on our streets
- About half of states define e-bikes in their traffic laws and regulate them similarly to bicycles
- The other half have not created a definition for e-bikes. E-bikes may be regulated under other classifications including bicycle, motorized bicycle, or moped
- State law is typically limited to regulating street or path use

California

CALIFORNIA ELECTRIC BICYCLE POLICY



VEHICLE TYPE	VEHICLE		USER				BIKWAY ACCESS			
	PEDAL OPERATED	MAXIMUM MOTOR-ASSISTED SPEED (MPH)	MINIMUM AGE (YEARS)	DRIVER'S LICENSE	LICENSE PLATE	HELMET	CLASS I BIKE PATH	CLASS II BIKE LANE	CLASS III BIKE ROUTE	CLASS IV PROTECTED LANE
BICYCLE 	YES	N/A	N/A	NO	NO	17 AND UNDER	YES	YES	YES	YES
TYPE 1 E-BIKE* 	YES	20	N/A	NO	NO	17 AND UNDER	YES	YES	YES	YES
TYPE 2 E-BIKE* 	NO	20	N/A	NO	NO	17 AND UNDER	YES	YES	YES	YES
TYPE 3 E-BIKE* 	YES	28	16	NO	NO	YES	NO	YES	YES	YES
MOPED 	NO	N/A	16	YES	YES	YES	NO	YES	YES	NO

*PENDING AB-1096

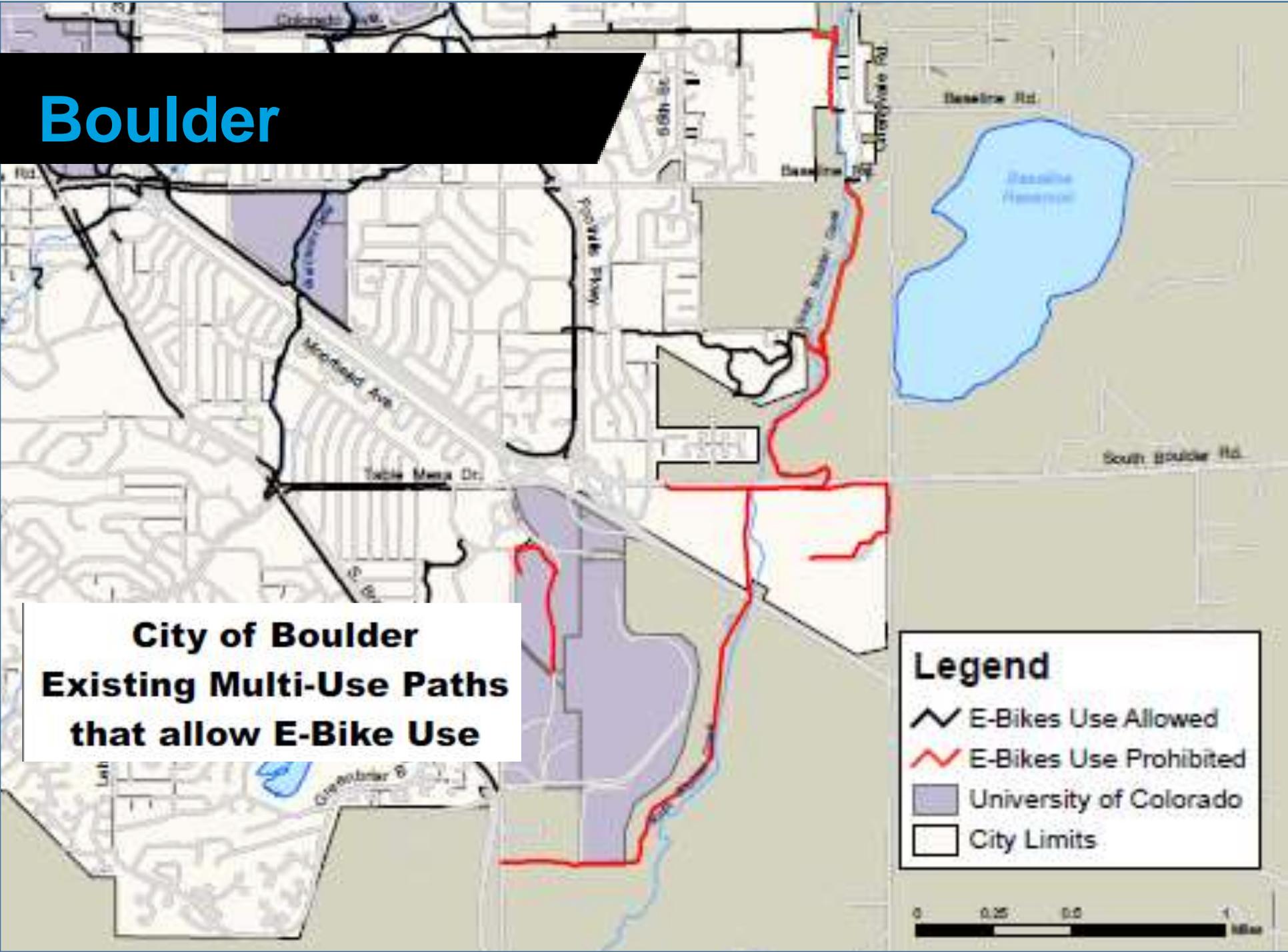


Colorado



Colorado passed rules in 2009 that allow low-powered electrical assisted bikes, those limited to 750 watts, or about one horsepower, in bike lanes and on streets without the license, registration and insurance that motorcycles, scooters and mopeds are required to carry

Boulder



Other Policies



ELECTRIC
VEHICLE
CHARGING
STATION

- E-bikes have major potential to replace car trips
- Working on incorporating e-bikes into electric vehicle purchase incentive programs

e-Mountain Bikes (eMTB)

- 
- **Policies**
 - **Existing Research**

eMTB

- **What does “eMTB” mean?**
- **Class 1 e-bikes**
- **Pedal assist only – no throttles**
- **Typically 250-350 watts**

eMTB Policy

- **Federal: Considered “motor vehicles” and allowed on trails with other motorized devices**
- **State + Local: Variable, most agencies have not addressed e-bikes**

eMTB Policy

- **Motorized trails are open to eMTBS**
- **Some provide single-track type experience – e.g., Monarch Crest**



eMTB Research

- **Study on physical impact of Class 1 eMTBs released this year by IMBA**
- **Under study conditions, “soil displacement and tread disturbance from Class 1 eMTBs and traditional mountain bikes were not significantly different, and both were much less than those associated with a gasoline-powered motorcycle.”**

Next Steps



- **Public process**
- **Community discussion**
- **Council recommendation**
- **Website:**

<http://www.durangogov.org/electricbikes>

THANK YOU!

Q & A



Photo: Bicyclists and walkers on the Animas River Trail