U.S. Department of Transportation
Federal Highway Administration

Micromobility Research at USDOT

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What is Micromobility?

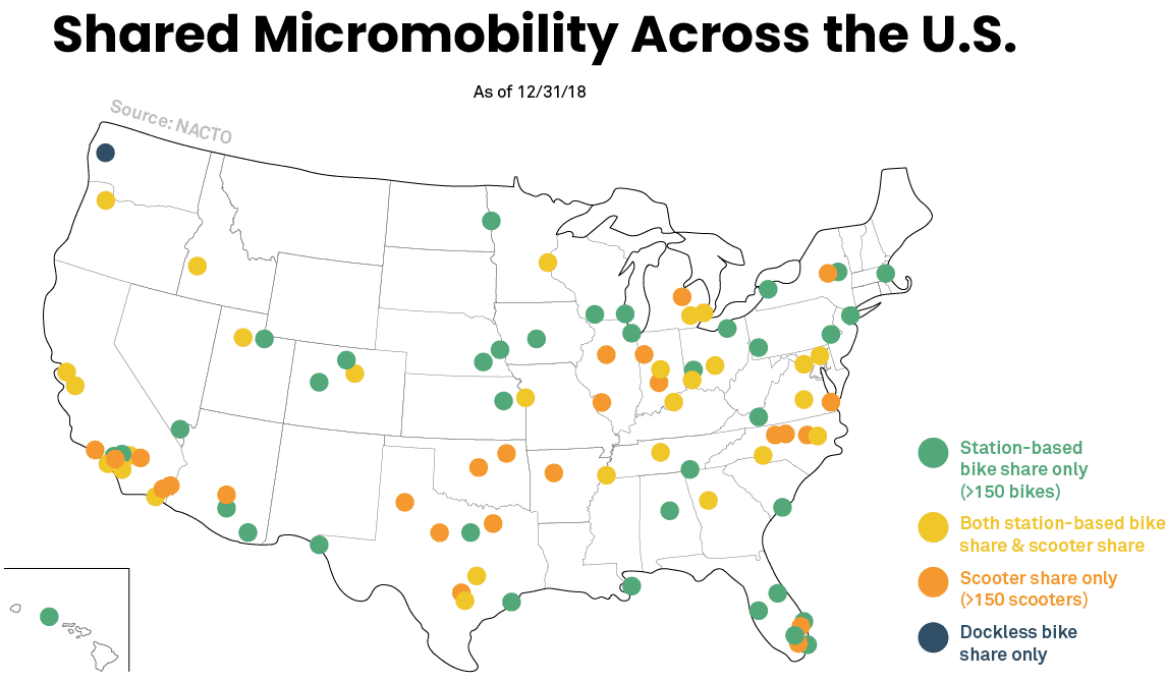
Micromobility refers to any small, low-speed, human or electric-powered transportation device, including:

- bicycles
- scooters
- electric-assist bicycles (e-bikes)
- electric scooters (e-scooters)
- other small, lightweight, wheeled conveyances

Source: Pedestrian and Bicycle Information Center, http://pedbikeinfo.org/

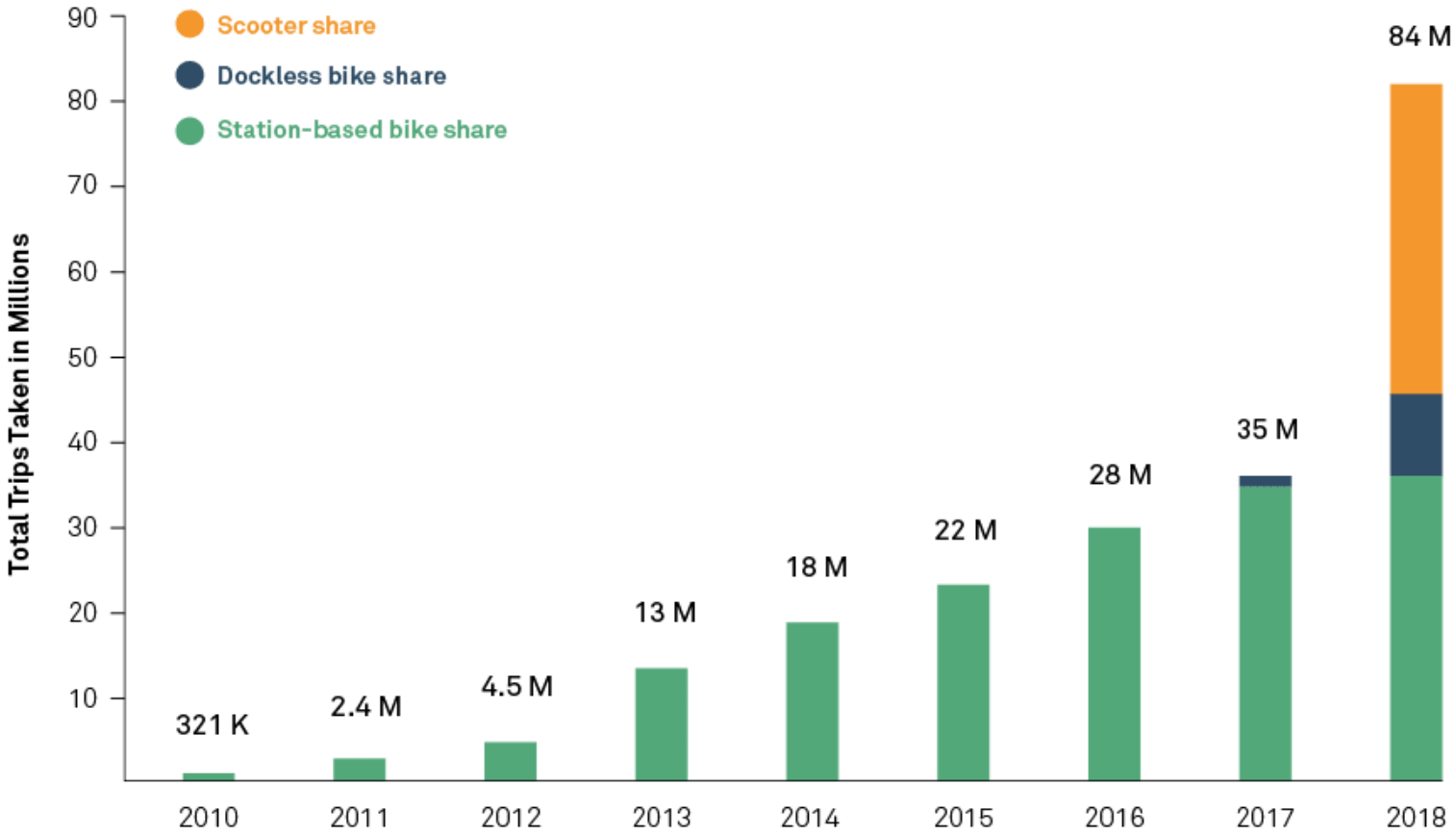
What are the trends?

- 1960s-1990s: Bikeshare 1.0 *(informal systems)*
- 2000s: Bikeshare 2.0 *(formal, dock-based system)*
- 2016: Dockless bikeshare and e-bikes
- 2017: E-scooters



Source: National Association of City Transportation Officials, *Shared Micromobility in the U.S.: 2018*

84 Million Trips on Shared Micromobility in 2018



Source: National Association of City Transportation Officials, *Shared Micromobility in the U.S.: 2018*

Bureau of Transportation Statistics (BTS) Interactive Bikeshare and e-Scooter Map

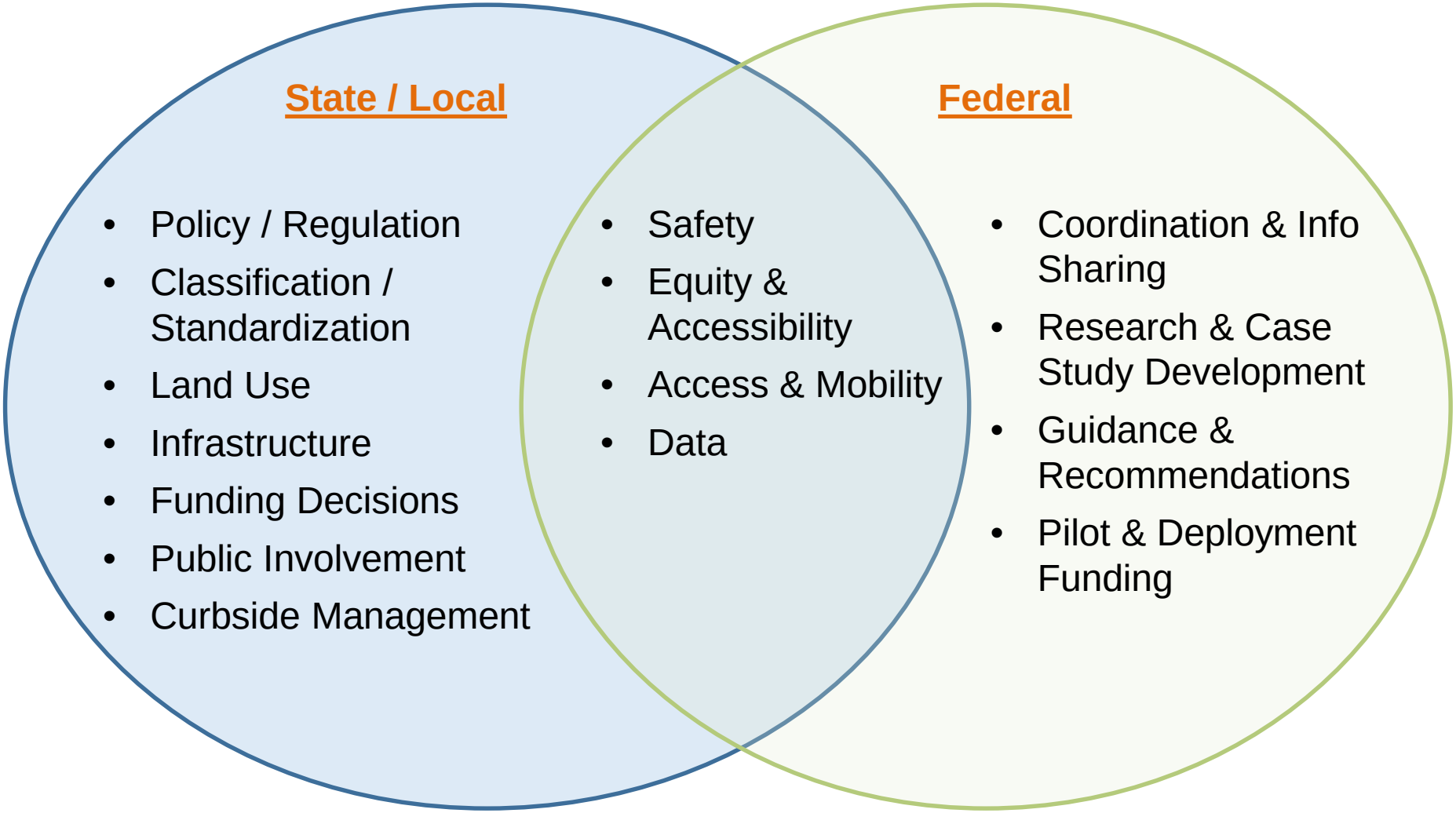
https://www.bts.gov/topics/passenger-travel/bikeshare-and-e-scooters

Expanded Use Examples

- Madison, WI
  - More than 231,000 bikeshare trips and 64% more users in 2019 since conversion of the fleet to e-bikes

- New York City, NY
  - 517,768 bikeshare trips (67% increase) in early March 2020 as alternative transportation mode during social distancing

Emerging Roles and Responsibilities



USDOT Micromobility Activities

Internal Working Groups

- **Mobility Innovation**
  - Maintains a list of current and past mobility research
- **Micromobility**
  - Maintains a list of ongoing micromobility research
- **Mobility on Demand**
  - Tracks research, events, and publications that promote MOD

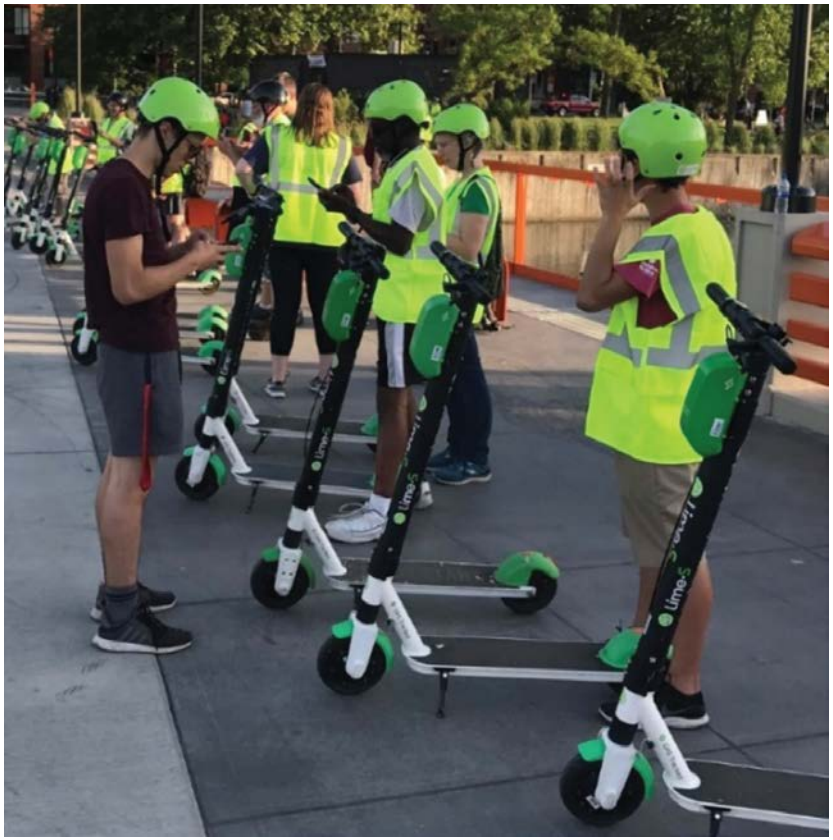
External Coordination Activities

- APTA Integrated Mobility and Communities Consortium
- TRB Mobility Management Committee
- NSF Smart and Connected Communities
- North American Bikeshare Association

FHWA Micromobility Research

Internal Memos:

- **Micromobility Memo**
  - Federal, State, and local roles in developing policies and establishing regulatory frameworks
  - Questions for future research
- **Micromobility and Children**
  - Explores child usage and injuries from micromobility devices
  - Safe Routes to School programs are not currently addressing micromobility use



Source: http://pedbikeinfo.org/cms/downloads/PBIC_Brief_MicromobilityMidsizeCitiesScan.pdf

The Basics of Micromobility and Related Motorized Devices for Personal Transport

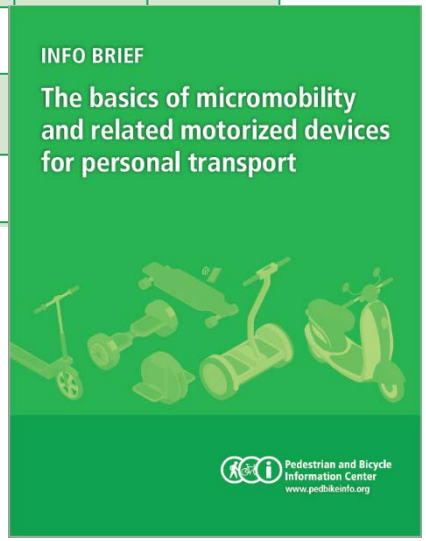
- Establishes common vocabulary and characteristics
  - Motorized
  - Low Speed
  - Small Size
- Provides a micromobility device typology chart

Categories of Micromobility Devices

The following table provides examples and key characteristics of common micromobility devices.

Table 1: Common micromobility devices

	Electric standing or sitting scooters (e scooters)	Electric bicycles (e-bikes)			Other[1]
Device					
		Class 1 Pedal assist (pedalec)	Class 2 Throttle assist	Class 3 Pedal assist (pedalec) at higher speed	
Example brands	**Shared:** Bird, Lime, and many others **Owned:** Inboard Glider, Segway 9Bot	**Shared:** Lime, Mobike, Ofo, Pace, Spin, and many others **Owned:** Most major bike brands; multiple passenger versions include Organic Transit (ELF) and Yuba	**Owned:** Several bike brands (less common than Class 1 and 3)	**Owned:** Several major brands; multiple passenger versions include Better Bike (PEBL), and Podride	**Owned:** Boosted, Inboard, Mellow Boards, Metroboard
Weight	Typically < 50 lbs	Typically < 100 lbs; multiple passenger versions near 200 lbs	Typically < 100 lbs		
Occupants	Single rider	Usually a single rider; some cargo e-bikes or bike cars designed for multiple riders	Typically designed for single riders		
Power supply	Electric motor typically < 750 watts	Electric motor typically < 750 watts	Electric motor typically < 750 watts		



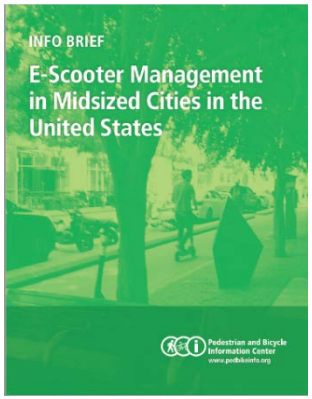
http://pedbikeinfo.org/resources/resources_details.cfm?id=5200

E-Scooter Management in Midsized Cities in the United States

- Interviews with 9 cities on challenges and successes
  - Safety
  - Regulation & Permitting
  - Infrastructure Design
- Identifies issues for future discussion

Figure 2. E-scooter interview subject areas.

City	Population
Columbus, Ohio	880,000
Charlotte, North Carolina	860,000
Portland, Oregon	650,000
Memphis, Tennessee	650,000
Tucson, Arizona	540,000
Spokane, Washington	220,000
Providence, Rhode Island	180,000
South Bend, Indiana	100,000
Charlottesville, Virginia	50,000



http://pedbikeinfo.org/resources/resources_details.cfm?id=5201

Micromobility Activities on Federal Lands

- FHWA Interagency Agreement proposed with Forest Service to include *Assess and Evaluate Emerging Trail Uses*
- Proposed Research – "The Future of E-Bikes on Public Lands: How to Effectively Manage a Growing Trend"
- National Park Service Emerging Mobility Working Group

Source: https://www.fhwa.dot.gov/environment/recreational_trails/overview/report/2019/

Micromobility Research Under Development

FHWA

- Integrating Emerging Mobility into Transportation Management
- Curbside Management Tool & Resources

ITS/JPO

- Mobility on Demand (MOD) Special Studies – Opportunities and Challenges of Shared Micromobility: Safety and Infrastructure
- Impact of New Transportation Providers on the Transportation System
- Multimodal and Accessible Travel Standards Assessment

TRB

- TCRP B-47 (FTA POC): "Impact of Transformational Technologies on Underserved Populations"
- TCRP J-11/Task 37 (FTA/FHWA POCs): "Transit and Micro-Mobility (Bikeshare, Scooter-share, etc.)"

Upcoming Events & Publications

- USDOT E-Scooter & Micromobility Workshop (TBD)
- NABSA Shared Micromobility State of the Industry Report (Spring 2020)
- AASHTO Guide for the Development of Bicycle Facilities (under development)
- TRB Conference on Sustainability and Emerging Transportation Technology (SETT): Shaping the Future of Mobility (August 31–September 2, 2020)

FHWA Program Links and Resources

- **Transportation Planning Capacity Building (TPCB) Shared Mobility**
  - https://www.planning.dot.gov/planning/topic_sharedmobility.aspx
- **Bicycle & Pedestrian Program**
  - https://www.fhwa.dot.gov/environment/bicycle_pedestrian/
- **Pedestrian and Bicycle Information Center (PBIC)**
  - http://www.pedbikeinfo.org/
- **Environmental Justice, Title VI, Non-Discrimination, and Equity**
  - https://www.fhwa.dot.gov/environment/environmental_justice/equity/
- **Office of Transportation Policy Studies**
  - https://www.fhwa.dot.gov/policy/otps/
- **Intelligent Transportation Systems Joint Program Office (ITS JPO) MOD Program**
  - https://www.its.dot.gov/research_areas/MOD/index.htm