



Policy Requirements for the use of Personal Electric Mobility Devices



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Introduction

Personal electric mobility devices (PEMDs) are defined as an electric power-assisted motorized vehicle for transporting one person at speeds of 8-25 mph, such as electric skateboards, hoverboards, scooters, Segways, wheelchairs, and so on. The demand for these vehicles is increasing day by day among the walker, bicyclist, and driver of cars as these are useful for everyday mobility needs. According to the National Association of City Transportation Officials (NACTO), approximately 38.5 million trips were made in electric scooters in 2018 in the USA. However, the appropriate policy to use PEMDs is not yet thoroughly acknowledged. Because of growing popularity as an easily accessible mode of transportation, it is needed to fix rules and regulations for these devices. Usually, the walkways and sidewalks are constructed to accommodate pedestrians, wherein some parts of the world bicyclists share the space with pedestrians. However, some cities in South Carolina, it was observed that electric scooter and hoverboard share the space of walkways and sidewalks like a bicyclist. Since PEMDs are faster than the average human walking speed and much lower than the automobile, there are some rules and legislations required to operate these special non-traditional mobility vehicles. Due to safety hazards like the self-balancing issue, no protective gear, light or sound facilities, and brake facilities, several countries in the world and some states in the USA have banned or restricted the use of PEMDs and introduced some policies.

Literature Review

- Poncy et al. (2011) emphasized on policy enforcement with safety education and outreach programs to provide necessary information to improve safety.
- Litman et al. (2017) investigated the proper system to manage nonmotorized facilities along with a diverse range of potential activities for minimizing problems.
- Mwakalonge et al. (2019) examined the safety and operational impact of PEMDs by NEISS safety data and recommended that PEMDs should be operated in a separate lane.
- Consumer Product Safety Commission (CPSC) and the National Highway Transportation Safety Administration (NHTSA) incorporated several rules and legislation for motorized and electric bikes and scooters like helmet requirements.
- CPSC has enacted several warnings about PEMDs like a hoverboard and electric scooter for the fire hazard, speed, and balancing issue associated with these devices.

Research Approach



Existing PEMDs Policy: Global and USA

Table 1: Global View of PEMDs Policies

Country	Status	Minimum Age Limit	Maximum Allowed Speed (Mph)	Safety Requirement	License Requirement	Registration Required
Hong Kong	Banned	Not Specified	Not Specified	No	Yes	Yes
Japan	Classified as Motorcycle - Allowed on Road Only	Not Specified	Not Specified	No	Not Specified	No
Saudi Arabia	Banned	Not Specified	Not Specified	No	Not Specified	Not Specified
Singapore	Banned	Not Specified	Not Specified	No	Not Specified	Not Specified
European Union	Allowed with Restriction	Not Specified	Not Specified	No	Not Specified	Not Specified
Austria	Classified as Bike - Allowed on Bike Lane	Not Specified	Not Specified	No	Yes (For Bigger Segway)	Not Specified
Belgium	Allowed on Sidewalk and Bike Lane	Not Specified	11	Insurance and Protective Gear	Yes	Not Specified
Croatia	Allowed on Sidewalk and Bike Lane	Not Specified	Not Specified	No	Not Specified	Not Specified
Denmark	Classified as Moped - Allowed on Sidewalk	Not Specified	Not Specified	No	Yes	Yes
Finland	Allowed on Sidewalk and Roadway	Not Specified	9.3	Yes	Yes	Not Specified
France	Only Bike Lane	Not Specified	25	No	Not Specified	Not Specified
Germany	Only Sidewalk	Not Specified	Not Specified	Insurance and Protective Gear	Yes	Yes
Hungary	Allowed on Sidewalk and Bike Lane	Not Specified	Not Specified	No	Yes	Not Specified
Ireland	Banned	Not Specified	Not Specified	No	Not Specified	Not Specified
Italy	Allowed on Sidewalk and Bike Lane	Not Specified	Not Specified	No	Not Specified	Not Specified
Luxembourg	Allowed on Sidewalk and Bike Lane	Not Specified	Not Specified	No	Not Specified	Not Specified
Netherlands	Allowed on Sidewalk and Bike Lane	16	Not Specified	Insurance and Protective Gear	Yes	Yes
Norway	Allowed on Sidewalk and Roadway	16	20	Insurance and Protective Gear	Yes	Yes
Portugal	Public on Sidewalk, Police on Roads	18	Not Specified	No	Not Specified	Not Specified
Sweden	Allowed on Sidewalk and Bike Lane	Not Specified	Not Specified	No	Not Specified	Not Specified
Switzerland	Allowed on Sidewalk and Roadway	14	16	No	Yes	Yes
United Kingdom	Only at Private Area	Not Specified	Not Specified	No	Not Specified	Not Specified
Scotland	Banned	Not Specified	Not Specified	No	Not Specified	Not Specified
Canada	Only Sidewalk - Disabled Person	14	Not Specified	No	Not Specified	Not Specified
Mexico	Allowed on Sidewalk and Roadway	No	Not Specified	No	No	No
Australia	Allowed in Queensland, Canberra And Western Australia, Rest Not.	Not Specified	Not Specified	No	Not Specified	Not Specified
New Zealand	Classified as Moped - Allowed on Sidewalk	Yes	Not Specified	Yes	Yes	Yes

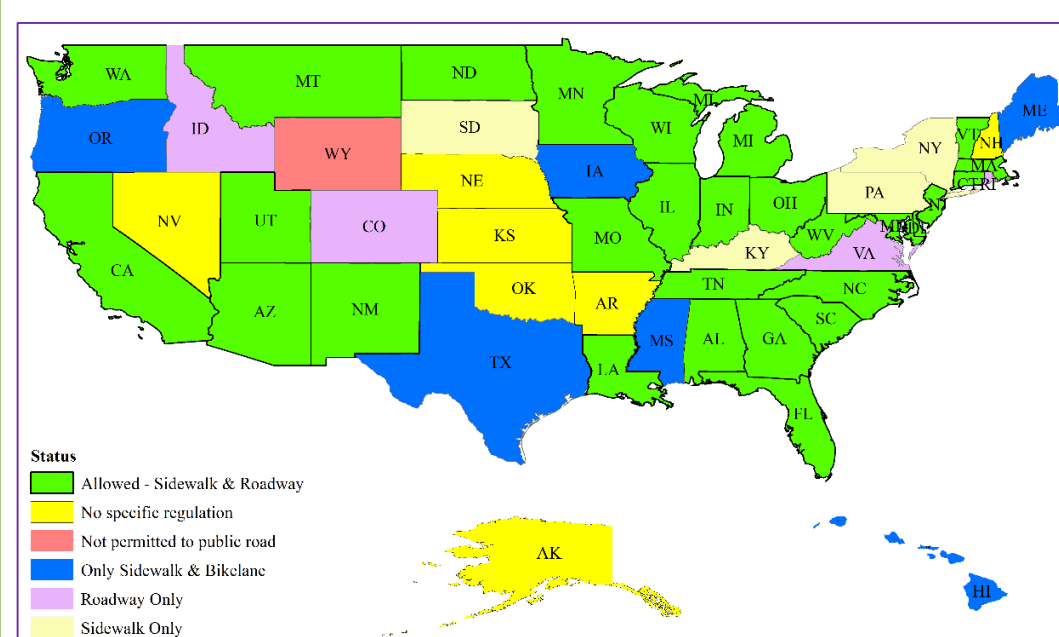


Figure 1: Permission Status in USA

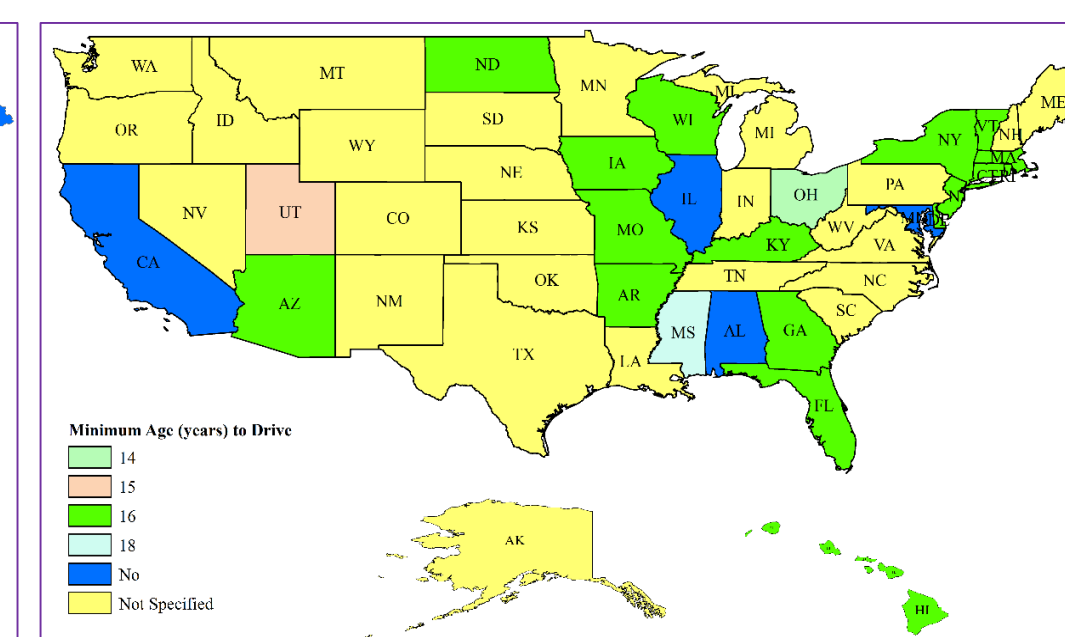


Figure 2: Age Requirement in USA

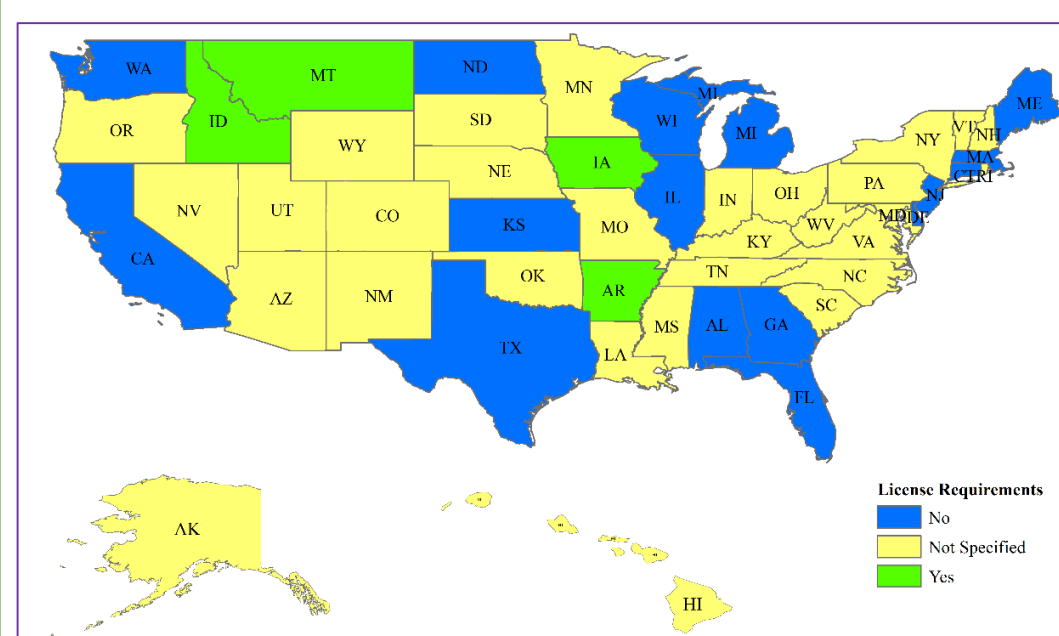


Figure 3: License Requirement in USA

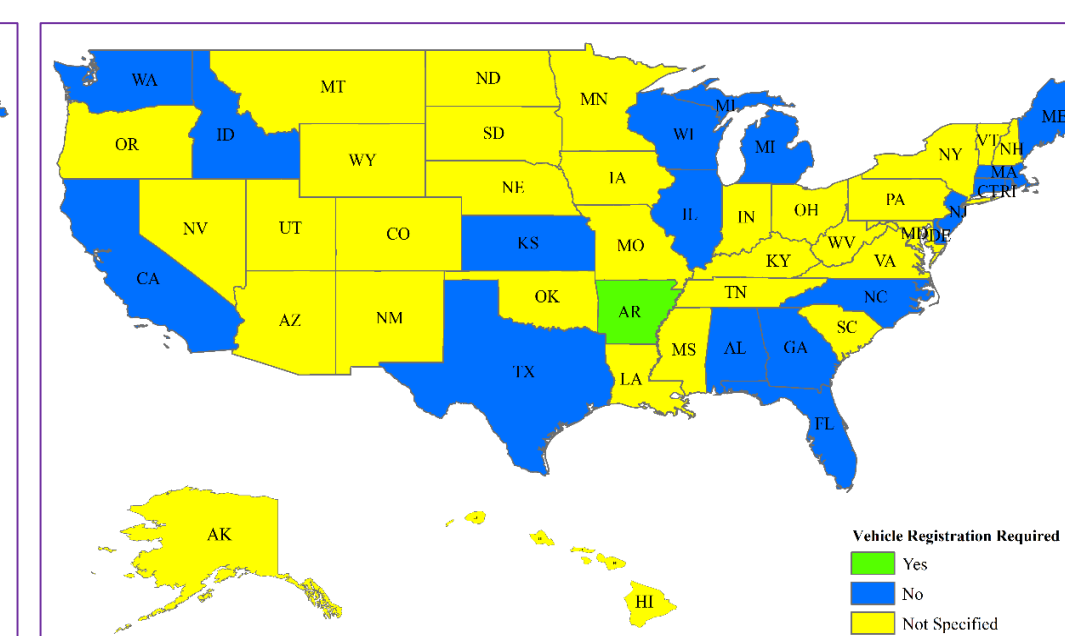


Figure 4: Registration Status in USA

Existing PEMDs Policy, cont.

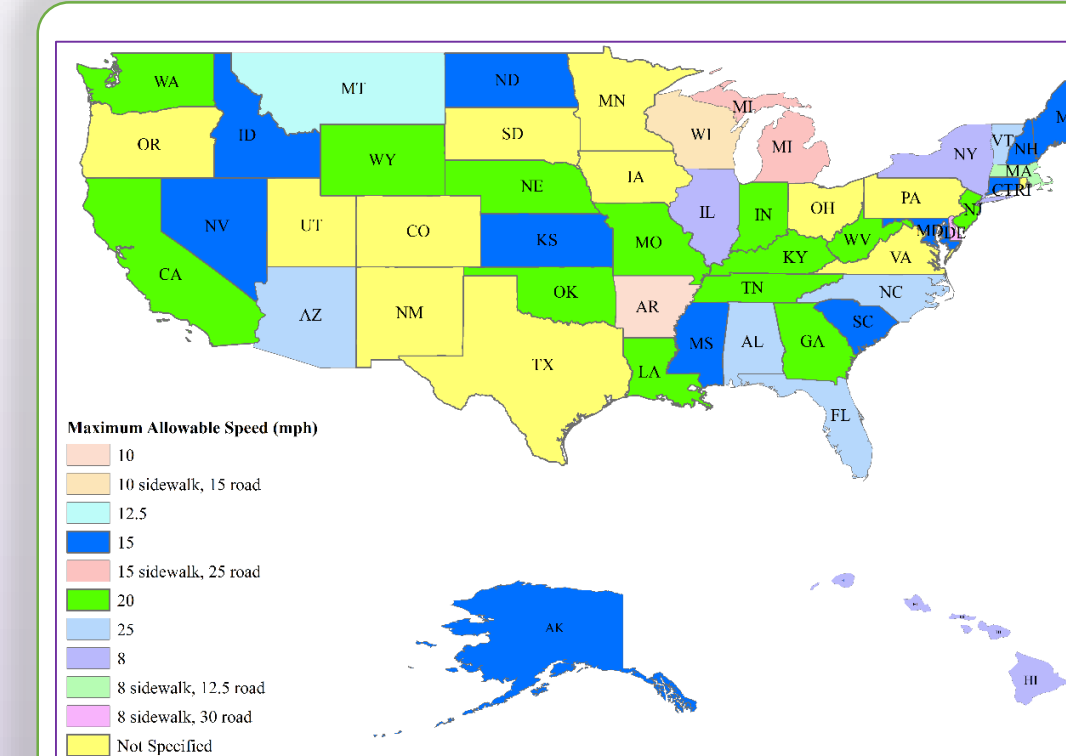


Figure 5: Allowable Speed in USA

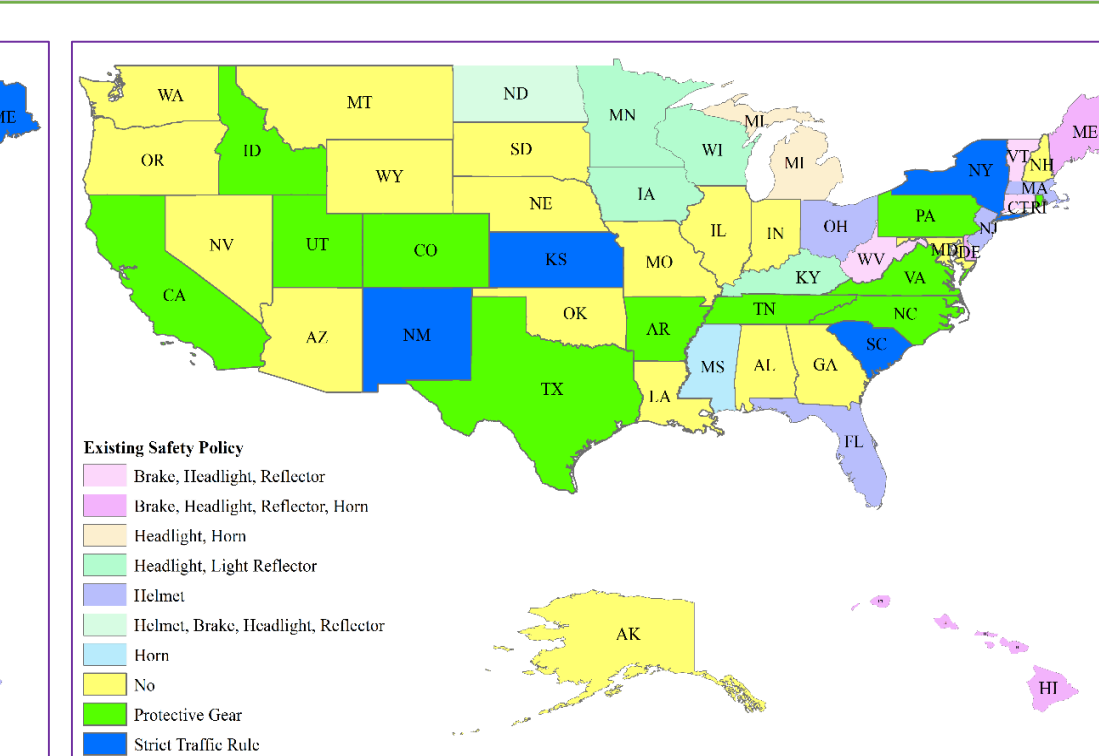


Figure 6: Safety Policy in USA

Conclusion

Out of 26 countries and the European Union (EU):

- 4 countries allow PEMDs on sidewalk and roadway; 7 on sidewalk and bike lane; 5 on the sidewalk only; 2 on bike lane only; 1 on road only; 5 countries have banned; EU allowed with some restriction; Restricted on the public road in the UK; Allowed at 3 states in Australia.

Out of 50 states and District of Columbia (D.C.):

- 29 states allowed on sidewalk and roadway; 6 on sidewalk and bike lane; 4 on road only; 4 on sidewalk only; 7 has no regulations; 1 restricted on the public road;
- 21 states have age limit (4-18 years) and 4 no age limit. Only 4 states required license to drive.
- 38 states & D.C. have speed restriction in operating PEMD (8-30 mph), and 4 have separate speed restriction for sidewalk and road.
- 32 states & D.C. have helmet and safety gear requirements, 4 have specific rules for PEMDs.

Recommended Policy

- PEMDs should be operated in separate lane if possible, otherwise can be merged with bike lane. PEMDs can be allowed on sidewalk where bike lane is not available. However, it must be restricted on freeways.
- Helmet and protective gear for the neck, arm, and knee should be mandatory.
- Age restriction and license requirement should be imposed.
- Every state should introduce rules and regulations regarding the use of PEMDs.
- Since this mode of transport is not well-known, different marking signs or traffic control system can be displayed to acknowledge its user, pedestrian, and bicyclist.

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