

The little (clean) engines that could: incentivizing micromobility solutions through regulation

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The world of personal mobility is changing. Since 2015, more than 195 countries have adopted the Paris Agreement, an international treaty that seeks to combat climate change and its resulting effects. As signatory countries look for ways to reduce carbon emissions, micromobility solutions, such as scooters and autonomous delivery robots, have emerged as clean-energy mobility options that allow humans and goods to be transported in densely populated urban areas.

Since these micromobility technologies are in their infancy, the federal government has not enacted robust regulatory frameworks specific to scooters and PDDs.

Escooters are standup electric scooters with inline or asymmetrical wheels, which weigh between 23 and 33 pounds, and are powered by rechargeable lithium-ion batteries that can be fully charged in three to five hours via standard electrical outlets. Personal Delivery Devices (or PDDs) are four- to six-wheeled autonomous delivery robots that utilize a combination of GPS, cameras, LIDAR, and radar mapping technologies — technologies that also underpin autonomous vehicle driving systems — to navigate street grids and provide point-to-point delivery services.

In most states, PDDs have payload limits of 450 to 1,000 pounds. As with scooters, PDDs are powered by rechargeable lithium-ion batteries that have five- to eight-hour operational cycles.

According to the Pew Research Center, more than 30% of the world's population lives in cities that are inhabited by more than 1 million people. The United Nations' "World Urbanization Report" projects that by 2050 more than 60% of the world's population will live in urban areas.

Since short-distance travel — trips less than five total miles — comprises the majority of automobile trips in the United States and the European Union, the mass adoption of micromobility devices for

short-distance trips is critical to reducing greenhouse gases emitted by internal combustion engines.

Based on incentives offered in countries party to the Paris Agreement, as well as high oil prices, scooters are increasingly becoming the "go-to" method for short-distance trips in cities. This change in human behavior for personal transportation serves as a litmus test for micromobility stakeholders to confirm whether people are ready to reduce their dependency on internal combustion engines by utilizing micromobility solutions.

The early numbers are promising. In 2021, more than 128 million shared micromobility trips were taken across the U.S., Mexico, and Canada, according to North American Bikeshare and Scootershare Association's (NABSA) 2021 State of the Industry Report.

Similarly, during COVID-19, PDDs exploded in popularity on college campuses as a way to reduce the number of students and faculty in dining halls at the same time, because the PDDs were able to deliver food to dormitories and offices. Even when colleges resumed normal operations, the demand for PDD food deliveries continued to grow, and this technology was marketed by colleges as a differentiator in prospective student recruitment.

These substantial increases in micromobility acceptance have not gone unnoticed by the financial sector and investors. Seeking to capitalize on this clean-energy movement spurred by the Paris Agreement, micromobility startups have raised more than \$5.7 billion in funding in the last seven years, led by investment in autonomous delivery robots, according to McKinsey & Co. Market analysts who have followed these trends project that the micromobility sector will be valued at \$300 billion to \$500 billion by 2030.

In the United States, the regulation of micromobility devices is handled at the federal, state, and local levels.

Federal Level. Since these micromobility technologies are in their infancy, the federal government has not enacted robust regulatory frameworks specific to scooters and PDDs. Instead, the federal government has applied minimal regulatory requirements to these devices and deferred most regulatory responsibilities to state and local jurisdictions. The federal government's oversight of scooters is still something of an open question.

In 2005, the National Highway Traffic Safety Administration (NHTSA) issued draft guidance on two- and three-wheeled scooters, which stated that if an scooter is designed for “on-road” use and can reach speeds in excess of 20 mph, it would be regulated as a “motor vehicle” under applicable NHTSA safety regulations. However, if an scooter for “on-road” use cannot attain 20 mph, it is not a “motor vehicle,” and it would be regulated by the Consumer Products Safety Commission. Currently, there are no PDD-specific federal regulations.

However, certain provisions of the Department of Transportation’s “Ensuring American Leadership in Automated Vehicle Technologies: Automated Vehicles 4.0” (AV Policy 4.0) apply to the autonomous driving systems in PDDs. AV Policy 4.0 is a comprehensive set of voluntary guidelines for autonomous vehicle stakeholders that address passenger safety, technology development, privacy, cybersecurity, patents, and accessibility of vehicles.

State Level. Scooter regulations have been enacted in 46 states. PDD regulations are active in 12 states with more state frameworks on the horizon. Depending on a jurisdiction’s motivation to incentivize micromobility solutions, states have taken varied approaches to regulating scooters, which in turn have yielded mixed results.

For example, California enacted a comprehensive scooter-specific statutory framework that, among other things, prohibits scooters from traveling above the speed of 15 mph on any public road or bike lane and from utilizing sidewalks, and it requires operators to have a valid driver’s license.

In contrast, Texas has taken a more hands-off approach to regulating scooters at the state level and empowered its counties and local governments to develop safety regulations that are appropriate for their populations.

While the different approaches taken by California and Texas have contributed to the proliferation of scooters, states that rely on overbroad, preexisting regulations, which were not intended for scooters, have experienced less-than-favorable results. For example, Pennsylvania does not have specific laws that govern scooters. Instead, scooters are considered “motor-driven cycles” and must comply with the laws and regulations applicable to motorcycles. As such, public adoption of scooters in Pennsylvania has been stagnant.

In the 12 states with PDD laws, they are treated as a form of “pedestrian” and can operate on sidewalks, crosswalks, and certain roads to deliver items to consumers without causing vehicular congestion on streets. Many state PDD statutes require active human observation or oversight to monitor PDDs or rovers’ autonomous driving systems.

In the last five years, micromobility companies have invested in the development of PDDs, which have proliferated, in particular, on college campuses and in tech-forward cities such as Ann Arbor, Michigan. PDDs are an important part of autonomous vehicle systems manufacturers’ portfolios, because they allow them to develop autonomous driving architecture that could

be used in autonomous vehicle systems designed for motor vehicles.

However, PDD growth has caused legal challenges for university users, including privacy concerns around the type of data collected by third-party software providers and concerns regarding the storage of short-term videos on the robots and where and how to safely charge and store the vehicles (commonplace issues and potential development areas for electric vehicle infrastructure).

Local Laws. As noted above, state regulatory frameworks often grant broad powers to local governments to enact appropriate micromobility safety laws in their jurisdictions. For example, in the wake of numerous pedestrian injuries, Dallas banned public and private scooter rental programs until robust safety measures could be implemented. Scooters will return to Dallas in early 2023.

Further, the Biden administration’s signature Build Back Better Act challenges state and city planners to rethink how people will move in urban markets alongside micromobility devices on street and sidewalk grids.

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These experiments began during the COVID-19 restrictions, which afforded major U.S. cities the opportunity to begin experimenting with integrating micromobility solutions into their street grids to allow for the better flow of people in populated areas. For example, New York City closed off roadways to allow pedestrians and micromobility devices to operate on streets and sidewalks. By the end of 2021, it had closed more than 100 miles of streets to vehicular traffic in the five boroughs, with more than half of them remaining closed today.

However, closing streets is not a fool-proof solution. San Francisco tried implementing a “slow streets” program to reduce or eliminate through traffic in various wards in the city, but it had to reopen some of them after a mixed public response from businesses and citizens.

To date, the best method has proven to be a balanced approach to harmonizing vehicular and pedestrian traffic, alongside micromobility solutions. In Philadelphia, the installation of a designated and protected “third lane” for bicycles and micromobility devices has successfully created an east-to-west corridor that allows people to traverse the city between the University of Pennsylvania and City Hall.

The road ahead

As micromobility solutions become more commonplace, countries can make even more gains in reducing carbon emissions generated

on short trips by internal combustion-powered vehicles. In order for this personal mobility paradigm shift to continue on its positive trajectory, the public sector must maintain current regulations and incentivize micromobility solutions at the local level. The mass adoption of micromobility solutions will be a substantial

move toward meeting the emissions reduction goals of the Paris Agreement and beyond.

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