Deutscher Städtetag

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The New Rules of the Multimodal Road: Lessons from an Analysis of E-Scooter Regulation in Germany and the United States

Research Report

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Table of Contents

Preface

Transportation remains an omnipresent, personal and existential issue for individuals. It determines life quality, access to labor, education, leisure and consumption. It is equally regarded as a decisive factor for the "equality of life conditions" in Germany and attributed to the essential public services ("Daseinsvorsorge") in Germany at the national, state and local level. As a driver of economic, quality of life, health, social, and environmental outcomes, transportation policy has therefore been a key topic in German cities' discussion on urban development.

The environmental aspect of transportation, in particular, is growing ever more salient. Since the advent of the "Mobility Transition" ("Verkehrswende") decades ago, the Association of German Cities (Deutscher Städtetag) and its member cities have been actively shaping the debate on how cities can make mobility policy more climate-friendly. In a seminal position paper in 2018, the Association of German Cities called for "Sustainable Mobility for All", providing the agenda for the mobility transition from a municipal perspective.

There have already been major changes in the transportation sector since the position paper's publication. New forms of mobility – such as e-scooters – have hit the road, as this paper will describe. The German federal government has also changed hands, with the new coalition pledging to enable sustainable, efficient, barrier-free, intelligent, innovative and affordable mobility for all. But the federal government cannot go it alone. The states and the cities are essential partners in shaping and implementing sustainable mobility strategies.

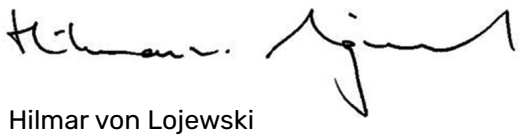
To this end, the Association of German Cities has been outspoken on the need for cities' empowerment to shape their own sustainable mobility. The Association's positions, have, among other recommendations, called for more federal funding for public transportation, more flexibility for cities in the development and implementation of mobility strategies, as well as more leeway for cities to experiment with sustainable mobility projects.

Additionally, a key component of such municipal experimentation is best-practice sharing and learning from other cities – including those overseas. For example, U.S. cities, too, are taking sustainability matters into their own hands, individually pledging climate commitments, such as to the Paris Climate Agreement and the UN's Race to Zero campaign.

This publication therefore homes in on one specific aspect of the mobility transition – micromobility – and places it in the context of international best-practice sharing. Rather than prescribing a one-size-fits-all approach, the paper is meant to encourage discussion on the topic by highlighting fundamental questions and providing best practice examples.

It is by leveraging pooled knowledge and exchanging ideas that we can continue down the road of reducing carbon emissions.

I hope this paper provides food for thought as we continue to shape the future of urban mobility.



Hilmar von Lojewski
Head of the Department of Urban Development, Construction, Housing and Transport
Association of German Cities

Executive Summary

A still recent addition to the transportation ecosystem, shared e-scooters have become a first and last mile solution for urban denizens globally. In addition to rides many describe as convenient and even fun, the vehicles also potentially provide a sustainable alternative to less-climate-friendly transport modes. With total lifecycle emissions less than half of that of the privately-owned gas-powered automobile – and further decreasing as e-scooter manufacturing and technologies develop – e-scooters have a potential to save carbon emissions in the transportation sector. Some estimates suggest shared micromobility options could replace up to 50% to 60% of city trips in the United States and Germany, respectively.

Integration of e-scooters has not come easy. Beyond public complaints of disorder and the endangerment of other road users, the underlying issue of how best to regulate the vehicles remains an open question. Both in the United States and Germany – two of the largest markets for micromobility – policymakers are still playing regulatory catch-up to meet the opportunities and challenges posed by this form of transportation.

This publication examines the regulatory frameworks for e-scooters in both countries, with a focus on Germany, followed by an analysis informed by both primary source interviews with U.S. and German expert and practitioners as well as secondary desk research. It finds a legal patchwork with significant regulatory ambiguities that are burdensome for local officials and e-scooter providers alike.

Concluding with recommendations for federal, state and local level policymakers in Germany, it is no surprise that this report considers cities to be best suited to assess and determine the exact e-scooter program parameters for their individual needs. However, the level of regulatory flexibility needed for cities to act is often lacking. In Germany, for example, several aspects of the Straßenverkehrsgesetz (StVG) and Straßenverkehrsordnung (StVO) are out-of-touch with modern-day transportation needs and concerns and place significant constraints on cities.

Federal level lawmakers should therefore allow for more autonomy of cities in urban transportation rulemaking. Additionally, the current structure of the Federal Ministry for Digital and Transport does not accurately reflect the diversity of vehicles on the road nor new mobility forms in the pipeline and should shift its focus accordingly. The specific rules within the federal regulation on e-scooters should also be reconsidered. Further federal funding for micromobility research and evaluation also remains critical.

On the state level in Germany, where it is determined whether commercial e-scooters require special permits, clarity around e-scooters and special permits is needed to provide certainty for cities, providers and stakeholders.

Finally, for the local level, this report has aggregated U.S. and German micromobility regulation guidelines, and, informed by the results of expert and practitioner interviews, distilled the material into key concrete measures and steps for municipal level decision-makers. Of the four regulatory options outlined for German municipalities in this report – 1. a memorandum of understanding; 2. a special permit statute; 3. a special permit statute combined with a selection process; and 4. procurement – this report recommends the third option. The selection process allows cities to add extra criteria unique to their goals and needs, while also creating more accountability for e-scooter providers.

Key components to a successful municipal e-scooter program include: taking a holistic approach; ensuring political will; securing sufficient personnel, especially in the legal team; experimenting with regulatory measures, especially regarding funding streams and program flexibility; ensuring program monitoring and evaluation mechanisms; maintaining robust stakeholder relationships, especially with the e-scooter providers; and exchanging best practices.

E-scooters will not be the last type of mobility invented; indeed, new forms are already piloting cities globally. It is therefore critical to not only gain a fundamental understanding of how transportation regulatory frameworks are structured, but to adjust them to the demands of today's challenges and ensure their agility to respond to the future demands of the transportation ecosystem.

Photo: © Hannah Wilson

1. Introduction

Since electric standing scooters (e-scooters), driven by a considerable amount of venture capital, took the United States by storm in 2017, their impact on cities has been tangible – and not necessarily received with positive public sentiment. Newspaper headlines such as "Hundreds of Scooters Lie Deep in the River Rhine" and "Citizens Warn Missoula City Council of 'Bedlam' Created by E-Scooters, Bikes" abound.[1, 2] Known best in the context of shared free-floating rental systems, e-scooters have posed numerous challenges for regulators, riders, and residents alike, from regulation to infrastructure to user behavior.

However, while more seldom reflected in the media's reporting, e-scooters also present a host of opportunities. As cities globally rethink their urban spaces and mobility schemes to combat global warming and improve urban quality of life, micromobility vehicles such as e-scooters offer alternatives to the car-centric city.

Take the average city trip length. In the 25 most congested U.S. cities, nearly 50% of trips are under 5 km (3 miles) in length, and 28% of them are even less than one mile.[3] In Germany, 40% of all trips in large cities are less than 5 km. And yet, most of these short trips are taken by car in the United States and Germany: 68% and 40%, respectively.[4] Research by INRIX, a transportation analytics company, suggests that shared micromobility options could replace up to 50% of short-distance (0-5 km) trips in the United States and up to 60% of short-distance trips in Germany.[5]

Reduced automobile usage has many benefits, such as greenhouse gas emission reduction and increased quality of life. While initial studies on the potential of e-scooters to replace other modes of transportation have yielded mixed results,[6] the direct effect of e-scooter substitution for a car trip is undisputed: e-scooters over their life cycle emit less than half the emissions that privately-owned, internal combustion engine cars do.[7] Fewer automobiles also lead to benefits that enhance quality of life, including less noise, less congestion, better air quality, and more space.[8]

E-scooters' political impact is also important yet underrated. As municipal officials and civil society strive to take back their streets, there are many actors in the mobility political ecosystem clamoring to be heard. To-date, the auto lobby has dominated the scene.

1, 2 "Hundreds of scooters lie deep in the river Rhine", Electrive, June 17, 2021, https://www.electrive.com/2021/06/17/hundreds-of-scooters-lay-deep-in-the-river-rhine/, accessed on January 18, 2023.

3 "Citizens Warn Missoula City Council of 'Bedlam' Created by E-Scooters, Bikes", Missoula Current, June 18, 2019, https://missoulacurrent.com/e-scooters/, accessed on January 18, 2023.

4 Deutscher Städtetag, "Nachhaltige städtische Mobilität für alle: Agenda für eine Verkehrswende aus kommunaler Sicht." Positionspaper des Deutschen Städtetags. June 21, 2018. https://bit.ly/40q90pt, accessed on January 18, 2023.

5 "Micromobility Potential in the US, UK and Germany", INRIX, 2019, https://www2.inrix.com/micromobility-study-2019, accessed on January 18, 2023.

6 Daniel Reck et al (2022) showed that personal e-bikes and e-scooters emit less CO_2 than the transport modes they replace, while shared e-bikes and e-scooters emit more CO_2 than the transport modes they replace. Hollingsworth et al (2019) also yielded mixed results.

7 Based on e-scooter emission values from 2020; new low-carbon technologies may have further reduced total lifecycle emissions. See "Good to Go? Assessing the Environmental Performance of New Mobility", International Transport Forum/OECD, 2020, https://www.itf-oecd.org/good-go-assessing-environmental-performance-new-mobility, accessed on January 31, 2023.

8 "Micromobility: Moving Cities into a Sustainable Future", EY, 2020, https://t1p.de/ijc0x, accessed on January 18, 2023.

Since their founding, however, e-scooter companies have set up their own political shops in country capitals with public affairs specialists – another actor advocating for the transformation of the urban streetscape in line with the vision of cyclist and pedestrian advocates. In January 2023, for example, bicycle and rail associations held a joint press conference decrying that German Chancellor Scholz's Mobility Summit took place with only the major automakers. Sharing this sentiment was Plattform Shared Mobility, the association representing most of Germany's largest e-scooter providers.[9]

Photo: © Hannah Wilson

As the "toddler of mobility", e-scooters are still integrating into the urban streetscape, sometimes with growing pains.[10] Regulatory frameworks for shared e-scooter systems are often ambiguous, leaving cities to manage the vehicles in legal gray zones. Indeed, this report will later show why these gray zones are detrimental.

This report examines the regulatory frameworks and tools for shared e-scooter rental systems in the United States and Germany, with the aim of identifying best practices for maximizing shared micromobility program success. While each city defines success differently based on its needs, in the context of e-scooters, the following indicators of e-scooter program success are considered:

- uptake in e-scooter ridership and/or decreased car usage
- orderly e-scooter riding and parking
- societal acceptance
- sustainable regulation that efficiently utilizes finances, time and personnel
- integration into the (public) transportation ecosystem
- other holistic goals within plans for sustainable urban development

9 See post by Plattform Shared Mobility, January 2023, https://t1p.de/wbxml, accessed on January 18, 2023.
10 Lily Lizarraga, Senior City Planner, City & County of Denver, 2022, interview by author.

This report provides an important contribution to the dialogue on micromobility in policy in several ways.

First, this report is policy-oriented. While the scientific discussion on the environmental and economic feasibility of e-scooters is important, this report does not seek to further add to the scientific literature. Rather, it uses the literature's most relevant findings to inform recommendations for best regulating the vehicles.

Second, micromobility policy in two of the top ten global greenhouse gas (GHG) emitters – the United States and Germany – is considered.[11] The transportation sector accounts for over a quarter of U.S. GHG emissions and around 20% of Germany's GHG emissions, the latter of whose transportation sector is the only sector whose emissions have not decreased since 1990.[12, 13] As such, reducing transportation emissions in these countries is a major lever to decreasing global greenhouse gas emissions.

Finally, the United States and Germany serve as fitting comparison countries. Not only do both states have federalist governmental systems, with enumerated federal oversight authority paired with state and city level subsidiarity; there are also several transatlantic programs for policy exchange already in place that can serve as a platform for further discussion of this topic. Given that research was conducted in Germany for this publication, however, analysis and recommendations are focused on the German side.

This report positions the debate on micromobility policy as a microcosm for the broader dialogue on urban development and quality of life. A holistic approach asking many of the questions used to guide micromobility policy can serve as a blueprint for other and future modes of transportation and as cities evaluate their urban development goals.

The publication is particularly aimed at city administration employees or municipal elected officials in the United States or Germany; micromobility or new mobility coordinators who are introducing e-scooters in their city or revamping their e-scooter program; those working in transportation planning or mobility management; and those generally interested in micromobility and transatlantic policy exchange.

A brief overview of the methodology used to conduct the research and policy recommendation development for this publication will first be provided. Next, definitions and societal and historical backgrounds on micromobility and e-scooters will be outlined, followed by the details of the American and German e-scooter industry and stakeholders. These sections serve as context for the most substantial part of the report: a deep-dive into e-scooter regulation in the United States and Germany on 1) a "macro" or regulatory framework level and 2) a "micro" level or specific regulatory tools. Based on the research and interviews conducted on the topic, the report concludes with recommendations for federal-, state- and city-level policymakers in Germany. Final thoughts, open questions, and avenues for future research round out the publication.

11 As a GHG emitter by country, the United States ranks second and Germany ranks sixth as of 2021. See "CO_2 Emissions by Country", Worldometer, https://www.worldometers.info/co2-emissions/co2-emissions-by-country/, accessed on January 18, 2023.

12 U.S. Environmental Protection Agency, „Fast Facts on Transportation Greenhouse Gas Emissions", 2022, 14.07.2022, https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions, accessed on January 18, 2023.

13 Umweltbundesamt, „Klimaschutz in Verkehr", 20.05.2022, https://t1p.de/dnf4f, accessed on January 18, 2023.

1.1 Methodology

This report was created during a research project that was conducted from October 2021 to January 2023. It consisted of four work streams.

First, desk research on e-scooter industry trends, environmental and transportation impact, and regulation was conducted. This included existing scientific literature on e-scooters and their users (effects on greenhouse gas emissions, modal substitution effects, rider demographics, etc.). German and American legal articles and briefs served to provide contemporary descriptions of the legal framework governing the vehicles. Primary source information on e-scooter programs in German and American cities was also collected and synthesized.[14] Finally, daily media alerts with keywords were created ("e-scooter" and "E-Tretroller") to monitor public sentiment on the issue.

The second workstream consisted of relevant conference and event attendance, both in-person and online, to identify sentiments and concerns held by e-scooter policy stakeholders. Around two-thirds of the approximately two dozen events were in-person, which allowed for further informative side conversations. Such platforms for exchange included events like the Micromobility Expo in Hannover in May 2022, a workshop by The German Institute of Urban Affairs (Difu) in Cologne in June 2022, and National Competence Network for Sustainable Mobility (NaKoMo) Annual Meeting in November 2022.

Discussions of the topic in the Association of German Cities' Building and Transport Committee (Bau- and Verkehrsausschuss), the Association of German Cities' Working Group on Traffic Planning (AG Verkehrsplanung), the Association of German Cities' Working Group on Transportation and Mobility Management (AK Verkehrs- und Mobilitätsmanagement), the Association of North Rhine-Westphalian Cities' Working Group on Traffic Management, and the Association of North Rhine-Westphalian Cities' webinar on e-scooter regulation provided invaluable insights and feedback on the topic.

Thirdly and most critically, formal interviews were conducted with 25 experts and policy practitioners on the topic. Individuals included e-scooter company representatives, their lobbyists, public law attorneys, municipal employees and elected officials, and individuals in other associations and interest groups in the mobility sector. Countless other informal conversations also took place along the way. A list of interviewees can be found at the end of this report.

Finally, the information gathered from the first three workstreams was consolidated and synthesized into a description of the issue (current e-scooter regulation in the United States and Germany), analysis of the status quo, and recommendations for German policymakers.

14 Key cities in Germany analyzed were Berlin, Cologne, Leipzig, Bremen, Stuttgart, Munich and Nuremberg. Key U.S. cities were Atlanta, Baltimore, Denver, Portland and Washington, D.C.

1.2 Background

1.2.1 E-Scooters and Micromobility: Definitions

An e-scooter, or an electric kick scooter, is a light, battery-powered vehicle, ridden standing up. The number of wheels, weight, and speed vary based on the specific model and a locality's technical requirements. E-scooters are one form of micromobility. Micromobility, according to the U.S. Federal Highway Administration (FHWA), is any small, low-speed, human- or electric-powered transportation device,[15] including bicycles, scooters, electric-assist bicycles, electric scooters (e-scooters), and other small, lightweight, wheeled conveyances. Difu also uses this definition, as does this report.[16, 17]

1.2.2 E-Scooter Ridership and Demographics

Important to maximizing e-scooter program success is understanding the status quo of e-scooter usage. However, it is important to note a few caveats. Studies show a clear distinction between the effects of shared vs. private e-scooter usage, as privately-owned e-scooters have been shown to yield more positive modal substitution and environmental effects than shared e-scooters.[18, 19] This report, however, focuses on the effects of shared e-scooter usage. Furthermore, even the most recent studies on e-scooters acknowledge that the current discussion surrounding the vehicles is "insufficiently scientifically supported".[20] As mentioned later in this report, further evaluation and documentation of e-scooter usage are therefore needed.

Data from 2021 show an average e-scooter trip length of just over 2 km in both North America and Germany; this constitutes around an approximately 15-minute ride.[21, 22] In contrast to analysts' projections of a high rate of potential trip substitution by e-scooters, the actual rate of substitution of motorized vehicle trips by e-scooter rides varies greatly, depending on city characteristics, such as the degree of available public transportation infrastructure. In the United States, for example, cities are more sprawling and lacking major public transportation infrastructure, causing a higher dependency on cars. One result of this is that the substitution rates of motorized vehicles by e-scooters are 40% or higher in U.S. cities. This is at least 10% higher than in European cities.[23] In Germany, recent data shows substitution rates of personal car trips by shared e-scooter trips at just over 10%.[24]

15 "Was Ist Eigentlich … Mikromobilität?" Difu. Deutsches Institut für Urbanistik, June 2, 2021. www.difu.de/16682, accessed on January 18, 2023.
16 Jeff Price et al, "Micromobility: A Travel Mode Innovation." DOT. U.S. Department of Transportation, 2021. https://t1p.de/difm9, accessed on January 18, 2023.
17 The International Transport Forum characterizes micromobility as devices weighing up to 350 kg and with a maximum speed of 45 km/h.
18 Uta Bauer et al, "E-Tretroller in Städten: Nutzung, Konflikte und kommunale Handlungsmöglichkeiten." Difu. Deutsches Institut für Urbanistik, 2022. www.difu.de/17613, accessed on January 18, 2023.
19 Daniel J. Reck, Henry Martin, and Kay W. Axhausen. "Mode Choice, Substitution Patterns and Environmental Impacts of Shared and Personal Micro-Mobility." Transportation Research Part D: Transport and Environment 102 (2022). https://doi.org/10.1016/j.trd.2021.103134, accessed on January 18, 2023.
20 Laura Gebhardt et al. "Can Shared e-Scooters Reduce CO_2 Emissions by Substituting Car Trips in Germany?" Transportation Research Part D: Transport and Environment 109 (2022). https://doi.org/10.1016/j.trd.2022.103328, accessed on January 18, 2023.
21 North American Bikeshare & Scooter Share Association (NABSA). (2022). 3rd Annual Shared Micromobility State of the Industry Report. UC Berkeley: Transportation Sustainability Research Center. http://dx.doi.org/10.7922/G2HD7T0P, accessed on January 18, 2023.
22 LIME, 2021 in Gebhardt, 2022.
23 Hugo Badia and Erik Jenelius, 2021, in Gebhardt, 2022.
24 Bauer et al, 2022.

Critics also point out that e-scooter rides disproportionately displace sustainable forms of transportation, such as walking, cycling and public transportation.

The e-scooter user demographic skews to young, well-educated males in urban areas. Latest survey data from Germany from Difu in 2022 show that most German users are young professional male adults, especially those aged 18–29 (39%) and 30-39 (28%). In the United States, too, younger age groups (age 25–44) are the largest user group.[25] Men are also much more likely than women to ride e-scooters in Germany (75% vs. 25%)[26] and the United States (63% vs. 37%).[27]

Looking through the lens of diversity, equity and inclusion (DEI) in transportation also demonstrates a gap in user groups. In the United States, whites continue to be over-represented as shared micromobility users, though the gap between them and people of color has closed.[28] Studies on the rider demographics as pertain to racial and ethnic background are less common in Germany than in the United States.

Photo: © Hannah Wilson

The psychology around e-scooters and transportation choice is also revealing. Reminiscent of children's kick scooters, today's e-scooters are often portrayed as a technology for leisure and play, rather than a valid form of transportation.[29] Studies on users from the early years of e-scooters, which showed the largest number of trips occurring on weekends and by tourists, seemingly confirm this.[30]

However, the situation is more nuanced. More recent user surveys show a distinction between first-time users, who are more likely to ride for fun or out of curiosity, and frequent riders, who ride e-scooters more often during off-peak hours – suggesting they integrate the mode of transportation into their everyday life.[31] This distinction demonstrates there is a degree of acclimation involved upon the introduction of a new form of transportation – a phenomenon not so different than the experience of the automobile. Upon their invention, automobiles were regarded as a toy, ridiculed and criticized by the public.[32] It was car enthusiasts who "bridged the gap" between the car's invention and its everyday usage.[33] This phenomenon may again be the case with e-scooters.

25 NABSA, 2022.
26 Bauer et al, 2022.
27 NABSA, 2022.
28 Ibd.
29 E-scooter industry representative, interview by author.
30 Gebhardt et al, 2022.
31 Jessica Hobusch et al 2021, in Gebhard et al, 2022.
32 Alexander Winton, Post Editors, and Tom Standage. "Get a Horse! America's Skepticism toward the First Automobiles." The Saturday Evening Post, July 26, 2022. https://t1p.de/pl3zu, accessed on January 18, 2023.
33 Ladd, Brian. "Autophobia." Autophobia: Love and Hate in the Automotive Age by Brian Ladd, an excerpt. University of Chicago Press. Accessed January 18, 2023. https://press.uchicago.edu/Misc/Chicago/467412.html, accessed on January 18, 2023.

2. Overview of E-Scooter Industry and Stakeholders in Germany and the United States

2.1 The E-Scooter Market in the United States and Germany: Developments Since 2017

Since the introduction of e-scooters in the United States in 2017 and Germany in 2019, the industry has developed rapidly. In little over a year, e-scooter providers were active in 45 cities across Germany in fall 2020.[34] Two years later, the number of cities nearly tripled to 117. A similar path of expansion has occurred in the United States. After the e-scooter debuted in Santa Monica, California in 2017, e-scooters were present in 58 cities after approximately a year. From that number, the city presence has also almost tripled, reaching 158 cities in July 2022.[35]

The e-scooter provider industry itself also remains a dynamic – and competitive – market. Despite the fluctuations in the market and economy and competition between numerous providers, a few have solidified their hold on the market. Following a turbulent year for shared e-scooter providers, LIME remains the only major provider still present in both the United States and Germany.[36] Other major providers in the United States include SPIN, BIRD, Veo, Helbiz and Superpedestrian.[37] In Germany, the major players in addition to LIME are TIER, VOI and BOLT. The selected events portrayed in Figure 1 demonstrate the dynamism of the e-scooter market in the United States and Germany.

Photo: © Hannah Wilson

34 Rachel Nadkarni. "Managing e-Scooter-Rentals in German Cities: A Check-Up." Difu. Deutsches Institut für Urbanistik, 2020. www.difu.de/15826.

35 "Bikeshare and e-Scooters in the U.S." Bureau of Transportation Statistics (BTS). U.S. Department of Transportation, August 17, 2022. https://data.bts.gov/stories/s/fwcs-jprj.

36 TIER, through its acquisition of formerly Ford-owned company SPIN, technically also has presence in the U.S. market.

37 Other providers are present in the United States, though in a smaller number of cities, including Razor, GOAT, Blue Duck, Lyft.

Figure 1. Selected E-Scooter Market Developments in the United States and Germany.

United States	Year	Germany
Shared e-scooters enter U.S. market upon entry of BIRD and Spin.	**2017** • E-scooters enter U.S. market	(2017–2018) E-scooters not yet permitted on German roads; Small Electric Vehicle Regulation (eKFV) is drafted and enters into force in June 2019.
LIME and Lyft join in the competition for the U.S. market.	**2018** • U.S. market expansion continues	
U.S. market growth continues; BIRD acquires Scoot.	**2019** • E-Scooters enter Germany	CIRC, LIME, TIER, VOI enter market following eKFV. JUMP and BIRD follow months later.
BIRD acquires CIRC; LIME acquires Uber JUMP; Helbiz acquires Skip; BIRD, LIME and VOI, citing Corona, conduct layoffs.	**2020** • COVID-19, economic uncertainty, market consolidation	BIRD acquires CIRC; LIME acquires Uber JUMP; Helbiz acquires Skip; BIRD, LIME and VOI, citing Corona, conduct layoffs.
Market dynamism continues.	**2021** • Rebound from Corona	BOLT enters German market.
TIER acquires SPIN; Layoffs by BIRD and SPIN; Bolt Mobility (different than the European BOLT) ceases operations in markets not owned by independent operators; BIRD tells U.S. Securities and Exchange Commission it overstated its revenue for two years.[38]	**2022** • Economic uncertainty stemming from inflation due to Russian invasion of Ukraine/ energy prices, supply chain issues, etc.	TIER acquires SPIN; Layoffs by TIER; BIRD exits German market; Layoffs by VOI.

38 Jaclyn Trop, "Bird Tells Sec It Overstated Revenue for Two Years." TechCrunch, November 14, 2022. https://techcrunch.com/2022/11/14/bird-tells-sec-it-overstated-revenue-for-two-years/, accessed on January 18, 2023.

2.2. The E-Scooter Stakeholder Ecosystem

Considering e-scooter regulation through a stakeholder approach shines a light on the complexities surrounding public policy debates.

Edward Freeman, who developed stakeholder theory, defines a stakeholder as "any group or individual who can affect or is affected by the achievement of the organization's objectives."[39] In the case of e-scooters, the "organization", depending on point of view, could be either the federal, state or city government creating e-scooter regulation and their regulatory agencies, or, through the lens of strategic business management, e-scooter companies.

Organizations using a stakeholder approach seek to include the views and concerns of the various stakeholders into their decision-making – because it is both practically and ethically advantageous to do so.[40]

Such a stakeholder approach should be considered vis-à-vis e-scooter regulation, especially given the vehicles' contentious standing. Cities who employ a stakeholder approach, rather than treating regulation in a context of zero-sum logic, couch any trade-offs in a long-term benefit for all stakeholders. In the transportation context, such a long-term benefit could include, for example, a reduction in vehicle emissions, fewer accidents, and harmony on the roads.[41]

As the next section will elucidate, stakeholders have been and remain influential in the e-scooter policymaking process. Additionally, this report's recommendations include measures that address the desires, values, and concerns of the stakeholders. Figure 2 visualizes the impact public and private stakeholders have on e-scooter policymaking, using Germany as an example.

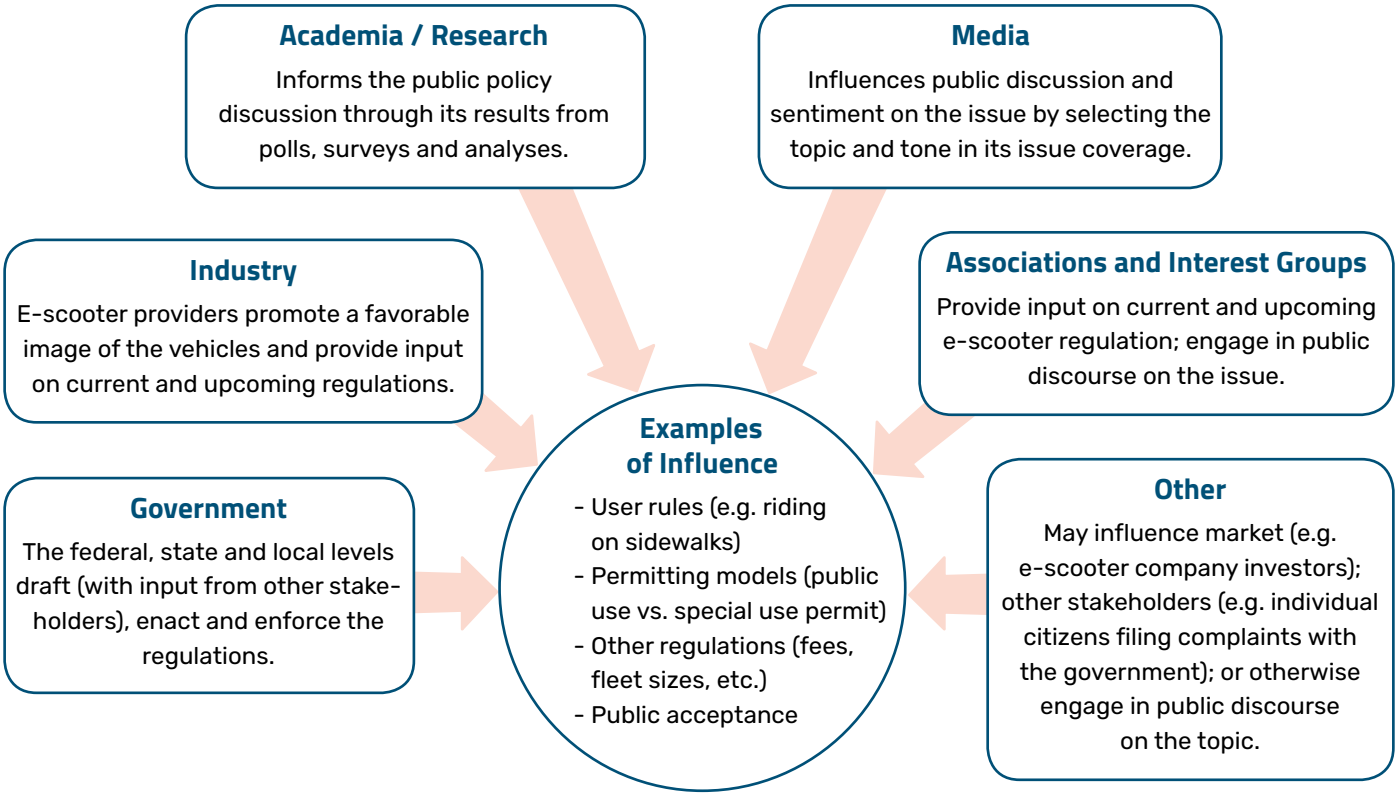
Photo: © Hannah Wilson

39 R. Edward Freeman, Strategic Management: A Stakeholder Approach. Boston: Pitman, 1984. p. 46.

40 R. Edward Freeman et al, Stakeholder theory and "The corporate objective revisited." Organ Sci. 2004;15(3):364–9. doi: https://t1p.de/s0yvj, accessed on January 18, 2023.

41 Mattia Gilmartin and R. Edward Freeman, "Business Ethics and Health Care: A Stakeholder Perspective." Health Care Management Review 27, no. 2 (2002): 52–65. https://doi.org/10.1097/00004010-200204000-00006, accessed on January 18, 2023.

Figure 2. Stakeholder Mapping of the E-Scooter Policy Ecosystem.



Source: Author rendering.

3. The "Macro Level": E-Scooter Regulation Frameworks in Germany and the United States

This section provides an overview of the legal frameworks guiding e-scooter regulation in Germany and the United States. These broader frameworks are essential to understand, as they define the grounds for a municipality's competencies when regulating e-scooter programs. The difference in German and American municipal authority in this sense is noteworthy. While German cities remain bound to regulation within the strict confines of German road and traffic law, American cities have more leeway in their design of shared micromobility concepts.

3.1 The Road to E-Scooter Legalization in Germany

Before June 2019, e-scooters were not legally permitted in Germany, as the EU-wide regulation governing Regulation (EU) No 168/2013, which regulates two- and three-wheeled vehicles, did not include e-scooters. Therefore, EU member states had to individually pass national legislation to allow e-scooters. E-scooters were legally admitted to German roads on June 15, 2019, with the entry into force of the Small Electric Vehicle Regulation (eKFV).

Photo: © Hannah Wilson

This regulation outlined the technical requirements for e-scooters as well as the general rules governing rider usage (age requirement, speed limit, required infrastructure usage, etc.).

The year and a half leading up to the eKFV was rife with controversy, political debates and lobbying regarding the contents of the regulation. For then-Transportation Minister Andreas Scheuer, e-scooters were a pet project; shortly after his assumption of office in March 2018, he was already pushing for their admission.[42] By September 2018, the transportation ministry had released a first draft of the regulation.

Certain provisions in the draft proved particularly controversial (and did not make it into the final regulation), such as mandatory helmet usage, a higher minimum rider age requirement of 16, and the permission for e-scooters to ride on sidewalks. Scheuer also wanted to admit monowheels and similar vehicles with amendment of the regulation. Nearly 40 associations submitted position papers regarding the regulation draft. Stakeholders such as the Association of German Cities and blind and disabled peoples' associations were instrumental in striking the monowheel and sidewalk allowance provisions from the regulation.

E-scooter company lobbyists were also afoot with persuasive arguments. Lobbyists not only framed the issue as a matter of sustainability in transportation, with studies in hand to back it up. They also hinted at the support of a key constituent group – young voters – who are the largest e-scooter user age group. Finally, they presented the vehicle itself, bringing e-scooters into the Bundestag for test rides with parliamentarians.

42 Simone Hage et al. "E-Scooter-Plage in Unseren Städten: Ohne Helm Und Verstand." DER SPIEGEL. DER SPIEGEL, September 6, 2019. https://www.spiegel.de/wirtschaft/e-scooter-plage-in-unseren-staedten-ohne-helm-und-verstand-a-00000000-0002-0001-0000-000165813307?context=issue, accessed on January 23, 2023.

The Transportation Ministry released a second draft of the regulation in February 2019, and a plenary debate about the issue took place in the German Parliament (Deutscher Bundestag) the next month. However, per German law, since the policy in question was a regulation, not a law, the parliament's approval – despite its active engagement on the issue – was not required. By early April, the German government had approved the draft. Before the final hurdle – approval by the Bundesrat (Federal Council representing Germany's 16 states) – could be crossed, a public hearing took place in the German Parliament in May 2019.

Aside from the CDU/CSU parliamentary group, the Free Democratic Party (FDP), a party known for its pro-innovation stance, was also in strong favor of the regulation. The Green Party, on the other hand, while initially ambivalent toward the arguments for e-scooters, wanted to demonstrate an openness to new forms of technology and ultimately went along with the regulation. Upon insistence from the CDU/CSU's coalition partner, the Social Democratic Party (SPD), a provision to conduct a multi-year evaluation of the e-scooters was inserted into the government's draft. Given that very few regulations include such evaluation requirements, this is remarkable. The Bundesrat ultimately approved the government's draft of the regulation on May 17, 2019, the regulation was signed, and entered into force a month later.[43]

3.2 The German Regulatory Framework

Herein begins the regulatory ambiguity. The eKFV, though outlining technical requirements and usage rules and standards, did not specify how to regulate the commercialization of shared e-scooter systems. In German law, there are namely traffic laws on multiple governance levels that can provide the basis for e-scooter regulation.

On the federal level, two major provisions comprise German federal traffic law ("Straßenverkehrsrecht"): the Federal Law on Road Transport ("Straßenverkehrsgesetz", or StVG) and the Federal Regulation on Road Traffic ("Straßenverkehrsordnung", or StVO). The StVG is the legal foundation upon which the StVO, which outlines the rules traffic participants must follow, is built. The StVG and StVO are institutional behemoths of the German legal system, dating back to 1909 and 1938, respectively. Within the framework of these laws, further laws and regulations regarding road traffic have since been added to the German legal framework.

The 16 German states, on the other hand, also have a great deal of regulatory authority through their respective Road Laws ("Straßengesetze der Länder"). These Road Laws define the criteria for public roads and for what purposes such public roads can be used ("Gemeingebrauch").

43 Former employee of the German Bundestag, 2022, interview by author.

To summarize: while German federal traffic law (StVG and StVO) regulates how traffic participants are to behave on the roads via traffic rules, the German state road laws ("Straßenrecht") define fundamentally what constitutes a public road and the purposes a public road may fulfill.

The eKFV regulates general registration of scooter models and issuance of license plates, but did not provide guidance on whether e-scooter providers require a permit to operate on public roads, nor under which level of governance such permitting would fall (e.g. federal vs. state).

Namely, the distinct federal and state laws offer two potential avenues through which to require e-scooter operating permits:

- Federal Level (StVG and StVO) – Under § 29 of the StVO, which governs excessive road usage ("Übermäßige Straßenbenutzung"), there is a general clause outlining a permit requirement for events or vehicles that exceed normal road usage. However, to date, this paragraph has not been used for e-scooter regulation, as more specific language would need to be added, prior attempts of which have failed.
- State Level ("Straßengesetze der Länder") – Should usage of public roads in the right of way ("Gemeingebrauch") exceed that of the state road law's dedicated public purpose for that road, a special use permit ("Sondernutzungserlaubnis") is required. Such a permit is required for everything from street signs to outdoor street dining to street vendors to beer bikes – and also e-scooters, should the state or the courts specify.

There have been attempts to require e-scooter permits via federal regulation. A suggestion for an amendment to the StVO's § 29, introduced in the Bundesrat by the city-state of Berlin, for example, attempted to impose a permit requirement for non-station-based commercial e-scooters. However, it failed to reach a majority in the German Bundesrat in 2020 – another instance of active lobbying in state capitals by e-scooter company and other shared mobility company representatives.[44]

The authority therefore currently lies with German state governments to determine whether e-scooters exceed the definition of public right of way usage and therefore require a special permit. In some states, the rules are clear. Berlin and Bremen both require special permits for e-scooter provider.[45] For others, the categorizations ("Sondernutzung" in North Rhine-Westphalia, "Gemeingebrauch" in Hamburg) rest on prior court rulings. However, these legal decisions are not only contradictory; they were also based on court decisions about bike rental systems, rather than e-scooters.

As such, a patchwork legal framework has developed in Germany. Especially in states with neither a state law nor court ruling on e-scooters, confusion among cities has arisen as they develop their e-scooter regulation requirements.

44 Another amendment suggestion by the state of Bavaria tried to create an e-scooter permit requirement via an amendment to the eKFV itself. This too, failed in 2020, again due to a flurry of lobbying.

45 Bremen's interpretation of its Straßengesetz includes a permit requirement, see „Bremen wird bundesweit erste E-Scooter-Genehmigung erteilen", Freie Hansestadt Bremen, September 21, 2019, https://t1p.de/wu2au. For Berlin's law, see „Berliner Straßengesetz (BerlStrG)", Berliner Vorschriften- und Rechtsprechungsdatenbank, https://t1p.de/0qpvi, accessed January 31, 2023.

3.3 German City-Level Regulatory Options

The possible regulatory approaches for governing e-scooters on the city level therefore depend on their respective state's overhead categorization of whether e-scooters require a permit ("Sondernutzung") or not ("Gemeingebrauch"). Figure 3 outlines the types of regulatory frameworks available based on the overarching state law and/or legal interpretation.

There is also regulatory ambiguity beyond the issue of special permits. Noteworthy – and consternating for cities – are the legal hurdles in including non-traffic-related criteria in such permitting processes. German federal law and regulations on road traffic (StVG and StVO) namely prohibit the inclusion of any criteria not pertaining to traffic fluidity or safety in the city's transportation statutes.

Thus, cities wishing to issue e-scooter permits based on criteria such as environmental and social standards cannot simply draft a special permit statute. Rather, in addition to the special permit statute, they must develop and pass a holistic e-scooter concept and then prepare a permit selection process. Given the burden of such additional bureaucracy, many German cities have forgone this and simply created a special permit clause. As a result, creative measures that could potentially contribute to a city's sustainability, social and urban development goals – but which may only be included in selection processes or procurement – are omitted.[46] This is unfortunate for German cities, as this provision excludes many potential creative regulatory opportunities and weakens the position of the cities.

Photo: © Hannah Wilson

46 In theory, memoranda of understanding can include such measures; in practice, however, given their voluntary nature, no commitments made are legally binding.

Figure 3. Approaches to E-Scooter Regulation in Germany.

"Gemeingebrauch" (Public Utilization)

Memorandum of Understanding (MoU)

No special use permit is required. The city and providers enter into a voluntary agreement regulating the terms of the shared e-scooter system. Since the agreement is voluntary, any type of provision can be included. If both MoU signatories agree, there is a possibility to limit the number of providers on this basis. Municipal proponents of this approach enjoy the flexibility and low-maintenance nature of the agreement. However, the absence of a legal foundation causes a lack of accountability on the part of the e-scooter companies.

"Sondernutzung" (Special Use Permit Required)

Special Use Permit Only

A statute requiring special use permit ("Sondernutzungserlaubnis") for e-scooters and the terms thereof is drafted and passed by city council. Terms can be as simple as a definition of the permit fee. Generally, an e-scooter provider who applies and meets the terms receives a permit. However, if the city has determined it has reached full capacity for e-scooters, it can theoretically deny a permit, though this is generally not seen in practice. In comparison to Gemeingebrauch, this route creates more accountability for the providers. However, due to federal law (StVG and StVO) the criteria determining permit authorization may only pertain to street traffic-related criteria.

Special Use Permits + Selection Process

In addition to authorizing special use permits with the same characteristics as above, a city that wishes to limit the number of e-scooters or e-scooter providers may do so through a selection process. This is best achieved through the creation of an e-scooter concept that outlines a city's specific goals with regards to micromobility (creation of city zones, fleet size and distribution, etc.). This e-scooter concept, in addition to the special use statute, must also be passed by the city council. Following this, the city develops a transparent selection process. Permit criteria in this case may include non-traffic related aspects, such as environmental and social criteria.

Procurement Process

Should a city decide that the provision of micromobility services is a public good and desire guaranteed shared e-scooter services with the maximum amount of provider accountability, a formal procurement process is required. This, too, generally requires a city council vote. A subsequent call for tenders, like a special use permit selection process, limits the number of providers. Additionally, the call for tenders can include non-traffic related criteria. This approach, however, is extremely time-intensive for cities.

3.4 The American Legal Framework

U.S. e-scooter policy takes a different form than that of Germany, though the countries' underlying political systems are similar. Within transportation policy, while federal government (Department of Transportation, or DOT) is responsible for interstate highways,[47] most other roads are maintained by local and state governments. The creation of the U.S. constitution, like in Germany, was founded on the federalist principle that continues to this day: that any power not granted to the federal government is reserved for state and local governments.

To illustrate, federal law regulates certain motor vehicle standards and certain safety provisions. State governments, however, regulate speed limits, certain safety equipment requirements, insurance provisions, and private and commercial vehicle registration. This is more decentralized than the German StVG and StVO (even though the German legal system is also federalist in nature).

While states and localities can devise and implement their own transportation policies and plans, American cities also face restrictions via federal and state policy, most notably regarding revenue-raising measures and how federal grant money is allowed to be spent.[48]

The United States, in comparison to Germany, does not have a national provision explicitly defining and permitting e-scooters, though some interpret the 2003 amendment to the Consumer Product Safety Act of 1972[49] as applicable to e-scooters.[50] Moreover, e-scooters are their own unique breed: with a top speed of less than 20 mph are not considered motor vehicles in the United States and therefore not subject to Federal Motor Vehicle Safety Standards (FMVSS) enforced by the National Highway Traffic Safety Administration (NHTSA).

Federal regulators have not necessarily neglected the issue. The Consumer Product Safety Commission (CPSC), for example, held a forum on micromobility products in September 2020, where stakeholders presented on and discussed standards, safety, and regulation for micromobility products. Since January 2020, CPSC has also regularly engaged with ASTM International, an international standards organization, to discuss in a working group the newest voluntary e-scooter standard.[51]

As in Germany, the federal government in the United States has provided no legal provisions on the regulatory mechanisms to govern e-scooter-share-programs. However, DOT is involved in multi-stakeholder research efforts, which have included internal working groups and working papers on the topic, external coordination activities with actors such as the North American Bikeshare and Scootershare Association and the Transportation Research Board (TRB) Mobility Management Committee, support for external research

47 Even though local governmental agencies own nearly 75% of the nation's highway lane mileage. See "2022 National Municipal Policy and Resolutions", National League of Cities, 2021. https://t1p.de/wio9c, accessed on January 18, 2023.

48 Adie Tomer and Joseph Kane. "Localities Will Deliver the next Wave of Transportation Investment." Brookings. Brookings, March 9, 2022. https://www.brookings.edu/research/localities-will-deliver-the-next-wave-of-transportation-investment/, accessed on January 18, 2023.

49 The 2003 amendment to the Consumer Product Safety Act added a standard for low-speed electric bicycles.

50 Matthew Cohen, "Product Safety Regulations for Electric Bikes and Scooters." Lexology. Crowell & Moring LLP, August 7, 2020. https://t1p.de/qfy0r, accessed on January 18, 2023.

51 "WK70724 New Specification for Commercial Electric-Powered Scooters for Adults." ASTM International – Standards Worldwide. https://www.astm.org/workitem-wk70724, accessed on January 18, 2023.

Photos: © Hannah Wilson

products[52] and an interactive bikeshare and e-scooter map managed by DOT's Bureau of Transportation Statistics.[53] Further research, such as within the Federal Highway Administration (FWHA) and with the TRB is additionally underway. U.S. city officials, however, have indicated in interviews with the author that federal action on the issue is of little relevance to their daily work.

Thus, in the absence of mandatory federal standards, a patchwork of voluntary safety standards and state and local law and regulations governs the admission and usage of e-scooters in the United States. In contrast to definitions for bicycles, however, most states do not have a clear definition for e-scooters; in fact, e-scooters are not even defined in the statutes of five states.[54]

3.5 The Evolution of E-Scooter Regulation in American Cities

Shared e-scooters were first introduced in the United States in 2017, two years before they were authorized in Germany. Prior to this, American cities had regulated micromobility (then in the form of shared bike systems) using a single operator per city to manage the bikeshare system over a longer period of five to 10 years. E-scooter companies began with pop-up operations in an attempt to gain market share before U.S. cities sent them cease and desist orders.

52 For example, Pedbike's paper "E-Scooter Management in Midsized Cities in the United States."
53 "Bikeshare and E-Scooters in the U.S.", 2022.
54 Alexander Kolpakov, Austin Marie Sipiora and Jana E. Huss, "Micromobility Policies, Permits, and Practices." Transportation Research Board. 2022. https://www.trb.org/Main/Blurbs/182875.aspx, accessed on January 18, 2023.

However, as dockless e-scooters and e-bikes flooded the market, cities shifted their approach to short-term permits. Either through a pilot program or an "open license system", cities began allowing an unlimited number of operators in the city as long as permit conditions were met. This approach allowed cities to experiment not only with e-scooter regulations and the permit terms of agreement, but also trial the different vehicles providers. In recent years, cities, based on their experience with and evaluation of this "trial phase", have begun shifting to longer term agreements with fewer operators – a so-called "selective permit model".[55]

Depending on the regulatory model, municipal employees have varying levels of freedom to draft and adjust rules and guidelines. Whereas longer-term comprehensive procurement agreements, like the one in Denver, requiring a city council vote, leave little to no leeway for real-time adjustments to the program, annual permits, such as in Baltimore, are more flexible, allowing municipal employees (following a city ordinance empowering them) to modify rules and regulations in order to keep up with changes in the e-scooter industry and public sentiment.

Figure 4 shows the spectrum of regulation models available for e-scooter programs. Current regulatory trends show cities moving toward the right-side of the spectrum, which requires more city involvement and oversight, but also more accountability of providers. The most progressive cities in this sense, such as Denver and Portland, are implementing the comprehensive "multi-operator partnership" model.

Figure 4. Approaches to E-Scooter Regulation in the United States.

Open License	Limited License	Limited License Strong Oversight	Multi-Operator Partnership	Single-Operator Partnership	Municipal Program
Any eligible operator can receive a license if they meet the license terms	Any eligible operator can apply for a license, but limited number available (granted either first-come-first-serve or competitive process)	Any eligible operator can apply for a license, but limited number available; City works closely with operators to regulate service	Competitive process used to select operators for multi-year contracts to partner with City in developing and operating a program	Competitive process used to select one operator for multi-year contract to partner with City in developing and operating a program	City develops and operates program with internal resources and owns infrastructure; City may contract out for support services

Increasing City Involvement, Investment, Ownership, Control and Accountability for Outcomes

Source: Mark Bennett, Sam Schwartz

55 NACTO recently released a working paper summarizing recent trends in the micromobility industry and city regulation. Please refer to: https://nacto.org/publications/ for a full list of its publications.

As in the German case, there are tradeoffs involved among the different types of agreements between cities and providers.

Short-term agreements with more providers can be particularly beneficial at the outset of a micromobility program, when the city wishes to learn more about the industry, compare providers, and refine their goals. A short-term agreement may also lead to a wider range of vehicles, depending on what the operators offer (for example, e-scooters, e-bikes and e-mopeds). The larger number of operators and shorter time span also reduces risk should a vendor leave the market.

Long-term agreements with fewer providers, on the other hand, often reduce the administrative burden of the program, as the city needs to spend comparatively less time on program maintenance and provider selection for the lifespan of the agreement. Longer agreements with fewer operators are also more attractive for e-scooter providers, as they ensure a higher market share and stability. This increases the operator's confidence, potentially leading to more investment in their operations and infrastructure. Having fewer operators also reduces redundancy of vehicles in high-demand areas and simplifies rider options (fewer vehicles, apps, etc.).

3.6 Discussion

The legal and regulatory framework for e-scooter regulation as well as debate surrounding them are clearly different in Germany and the United States. The German debate is more fundamental, resting on the question of whether e-scooters legally require a special use permit or not. In the United States, on the other hand, cities, without waiting for a definitive legal opinion, have generally began regulating e-scooters via permit-based systems. The question for them is now how to best structure the selection and management of those permits.

American cities have also shown themselves to be more creative in their e-scooter regulation, both in the criteria for the selection of providers as well as in the administration of e-scooter programs themselves. In particular, there is a noticeable emphasis on the integration of diversity and inclusivity into American urban micromobility programs. The next section overviews this and other measures. However, it must be acknowledged that U.S. cities also have more freedom in their decisions, as they are not constrained by a comprehensive federal law in the way German cities are by the StVG and StVO. Nevertheless, with a courageous and creative approach, there are ways to overcome the relatively greater regulatory bar in German cities – namely through a selection-based permitting process. This report therefore recommends a selection process combined with the special use permit allowance, rather than a simple special use permit allowance or a voluntary agreement/MoU.

4. The “Micro Level”: The City’s E-Scooter Regulation Toolbox

Beyond the regulatory framework for administering a city’s shared e-scooter program (the “macro-level”), there are myriad combinations of requirements, selection criteria, measures, and tools on the “micro-level” to govern the day-to-day of the e-scooter program. Several reports, both in Germany and the United States, have provided recommendations on this, extensively describing different possible tools.

This report recommends the following publications that provide in-depth detail through an urban and transportation planning perspective:

- Pedestrian and Bicycle Information Center (PBIC), E-Scooter Management in Midsized Cities in the United States (2019).
- NACTO, Guidelines for Regulating Shared Micromobility (2019).
- Deutscher Städtetag, Agora Verkehrswende, Deutscher Städte- und Gemeindebund, Policy Recommendations for Local Government Shared – E-Scooters: Paving the Road Ahead (2019).
- Deutsches Institut für Urbanistik, E-Tretroller in Städten – Nutzung, Konflikte und kommunale Handlungsmöglichkeiten (2022).
- Transportation for America, Shared Micromobility Playbook (regularly updated).

This report is not meant to reinvent the wheel. Rather, based on prior reports, desk research, and expert interviews conducted on the topic, this publication provides an updated, streamlined and aggregated system – the $POISE_4$ Framework – to consider when administering an e-scooter-sharing program. $POISE_4$, an acronym of the categories, is short for: Partnerships; Operations; Infrastructure; System of Administration; Enforcement; Equity; Evaluation, Data & Metrics; and Education & Outreach.

Photo: © Hannah Wilson

Figure 5. The E-Scooter Regulation Toolbox: The POISE$_4$ Framework.

Category	Examples	Party Responsible for Implementation (CITY OR PROVIDER)	Considerations, Benefits, Drawbacks
Partnerships	- Cooperation between providers, cities (including city-to-city), public transit, universities and schools	**BOTH**	- Partnerships create synergies, amplify impact - Personnel required to run or serve as point of contact for partnerships
Operations	- Fleet size and specifications - Fleet maintenance, (re)distribution, composition - Customer service - Workforce - Pricing - Sustainability of operations	**PROVIDER** (City can influence providers)	- Many of these small measures or "levers" can be tweaked to greatly affect outcome - Most successful when there is a close partnership between City & Provider
Infrastructure	- Dedicated bike lanes - Closing of streets for cars - Signage - Parking stations - Geofencing/speed governance	**CITY** (In some cases, Provider may execute)	- Top measure cited by German & U.S. cities to improve micromobility program success. - Insufficient infrastructure often the underlying issue behind e-scooter problems/complaints - Cities (esp. in Germany) often restricted in their range of competencies - Changes can be unpopular/lack political will, especially as regards space for cars - Potential safety concerns with geofencing/speed governance - Overregulation due to too much geofencing and the imprecision of GPS in geofencing can pose an issue (the "Swiss Cheese Effect")
System of Administration	- Regulation type (MoU, pilot, permit, etc.) - Number of city employees (including in legal and enforcement) - City resources - Number of providers	**CITY**	- City council approval usually needed when implementing a comprehensive program; can be a political argument - City personnel and financial resources are limited

Enforcement	- Permit terms and conditions - User behavior (e.g. parking)	**BOTH**	- Addresses incorrect user behavior, a key source of public complaint - Requires personnel (e.g. police) to enforce - Enforcement practices can be discriminatory[56]
Equity (Diversity, Equity and Inclusion, or DEI)	- Low-income subscriptions - Equity Zones - Text-to-Unlock technology - Adaptive Vehicles - Multi-language offering	**BOTH** (City can influence providers)	- Contributes to a holistic approach to the transportation system and a sustainable, inclusive city - It is questionable if German law allows the inclusion of this in special use permit criteria; selection process or procurement required for criteria inclusion
Evaluation, Data & Metrics	- Collection of mobility (accidents, ridership, etc.) - User privacy - Synthesis, evaluation of data	**BOTH** (Depends on nature of cooperation)	- Results inform policy decisions and regulation tweaks - Evaluation and data collection can be time- and cost-intensive
Education & Outreach	- Safety trainings - Awareness campaigns - Town Halls - User Incentives	**BOTH**	- Requires personnel time - Providers can (and do) conduct such trainings and outreach on their own

Recommendations in the final section of this report incorporate some of these levers, tools and considerations, addressing in particular the issues cities have described as common and/or intractable. Ultimately, however, cities must decide for themselves – and also obtain the legal authority to decide for themselves – on what types of regulations and tools work best for them.

56 Researchers have consistently demonstrated clear patterns of disproportionate enforcement among racial and ethnic minorities as well as low-income communities; see "Breaking the Cycle: Reevaluating the Laws that Prevent Safe & Inclusive Biking", NACTO, 2022. https://nacto.org/wp-content/uploads/2022/08/Bikeway-Design-Enforcement-Paper.pdf, accessed January 19, 2023.

5. Recommendations for Germany

The following recommendations are based on desk research and input from expert and practitioner interviews. Proposals are addressed to German policymakers. To be sure, there are many considerations for improving U.S. e-scooter regulation – for example, the creation of a uniform federal standard for e-scooter technical and rider requirements. However, as the research was conducted in Germany, it remains the focus of this paper. These recommendations are addressed toward larger cities (those with more than 200,000 residents) where there are multiple micromobility providers and, when applicable, corresponding complaints and problems with the vehicles.

5.1 Federal Level

- **Immediate Reform of the Federal Law on Road Transport (StVG) and Federal Road Traffic Regulation (StVO).** As previously mentioned, German federal laws and regulations governing road transportation are constricting for cities. In simple terms, cities are not permitted to base many of their transportation measures on grounds other than the flow of and safety in traffic. After years of advocacy to reform this, the December 2021 coalition contract of the current government promises to add climate, environmental, health, and urban development as additional goals to provide municipalities with more leeway to regulate. When this reform will occur and how it will look, however, remain unknown, as the responsible actor for drafting new legislation, the Federal Ministry for Digital and Transport (BMDV), has not indicated a timeline for work on the issue. As such, cities and interest groups like the Deutscher Städtetag should continue to advocate, in both the general public and toward targeted stakeholders and the BMDV, for the swift implementation of this coalition promise. Initiatives with concrete examples, like city-friendly speed initiatives[57], send a particularly resonating message. This broader reform would likely trickle down to e-scooter regulation. Increased municipal freedom in the StVG and StVO would allow cities to implement more holistic and creative regulations, benefiting pedestrians, cyclists, and e-scooter riders over the less sustainable motorized individual transport.
- **Amendments to the Small Electric Vehicle Regulation (eKFV).** In response to the uncertainty and problems that cities, e-scooter users, and other participants have encountered due to the current rules governing e-scooters, policymakers should consider the following as regards the eKFV:
    - **Increased Inclusion.** Accessibility to and inclusion within the transportation landscape has been a longstanding goal for disabled and mobility-impaired people. Shared micromobility providers should also provide vehicles, such as e-scooters with seats, that are accessible to certain groups of mobility-impaired people. U.S. cities like Baltimore require the provision of such vehicles from e-scooter operators, and the vehicles are immensely popular. To this end, the eKFV would have to be modified to allow the vehicles to have seats.

57 For more information on this initiative, please refer to https://www.lebenswerte-staedte.de/.

- **E-Scooter/Bicycle Rule Discrepancies.** As Difu and many others point out, rules for riding an e-scooter are different to those for riding bicycles, despite the vehicles' similar size. For example, e-scooters are required to ride in the bicycle lane, so long as there is one available. Cyclists, on the other hand, are not required to ride in the bicycle lane except under certain conditions. There are also certain paths allowing the usage of bicycles, but not e-scooters – though this is not indicated through negative signage.[58] Policymakers should carefully consider the implications of such varying rules and consider measures to address them – such as the development of new traffic signs to assist users and indicate where riding e-scooters is explicitly prohibited.

- **Create Intra-agency Working Group on Micromobility ("Nahmobilität") within the Federal Ministry for Digital and Transport.**[59] To address the interdisciplinary nature of e-scooters, micromobility, and other new forms of mobility, BMDV should form a standing, regularly meeting intra-agency working group. Those in the working group could include representatives from seven departments: StV 24 (Vehicles in Road Traffic), which is responsible for the evaluation of the eKFV; Stab RV (Cycling and Traffic Safety); StV 22 (New Technologies); DP 21, DP 22, and DP 23 (Digital Services, Law, and Data Platforms, respectively); and G 20 (Basic Questions on Climate-friendly Mobility). The group's goals would be twofold: 1) policy evaluation and development and 2) specific stakeholder management. Jour fixes should take place monthly or bimonthly to discuss developments related to e-scooter and other micromobility policy. Additionally, quarterly meetings with stakeholders (e-scooter providers, cities, other associations, etc.) would facilitate the incorporation of practical, on-the-ground experience as well as foster innovative policy ideas. Such a working group would address a common complaint that has arisen from topic of e-scooters resting solely within StV 24: cross-sector stakeholders who participated in two workshops of the eKFV evaluation lamented the fact that the evaluation was one-dimensional, focusing nearly solely on safety aspects, rather than other regulatory and political considerations. The eKFV evaluation report and its implications, combined with stakeholder input, would serve well as a useful kick-off topic for such a working group.[60]

- **Expand Funding for Documentation, Evaluations and Studies of Micromobility Usage.** While BMDV has already funded several studies on the effects of e-scooter usage, the promotion of research remains important.[61] The reasons for this are twofold. First, the physical and technical specifications of e-scooters continue to rapidly change, and the vehicles have become more sustainably produced over time. Second, public acceptance and rider behavior vis-à-vis the vehicles may continue to change as e-scooters further integrate into the transportation ecosystem. These factors exert influence on the role of the e-scooter in the sustainable urban mobility streetscape. Further monitoring and evaluation of the vehicle is therefore needed under these changing circumstances. To this end, policymakers should expand the scope of evaluation

58 "E-Scooter: Was Erlaubt Ist – Und Was Nicht", Die Bundesregierung informiert. July 7, 2022. https://t1p.de/vr0c4, accessed on January 18, 2023.

59 The BMDV organizational chart can be viewed at https://www.bmdv.bund.de/SharedDocs/DE/Anlage/Z/organigramm.pdf, accessed on January 25, 2023.

60 The eKFV evaluation report was slated for publication in October 2022; the timing has since been delayed but is expected in the near future.

61 For example, Difu's Mikromobilität auf Geh- und Radwegen Project (MMoNK) and the evaluation of the Personal Light Electric Vehicles Regulation.

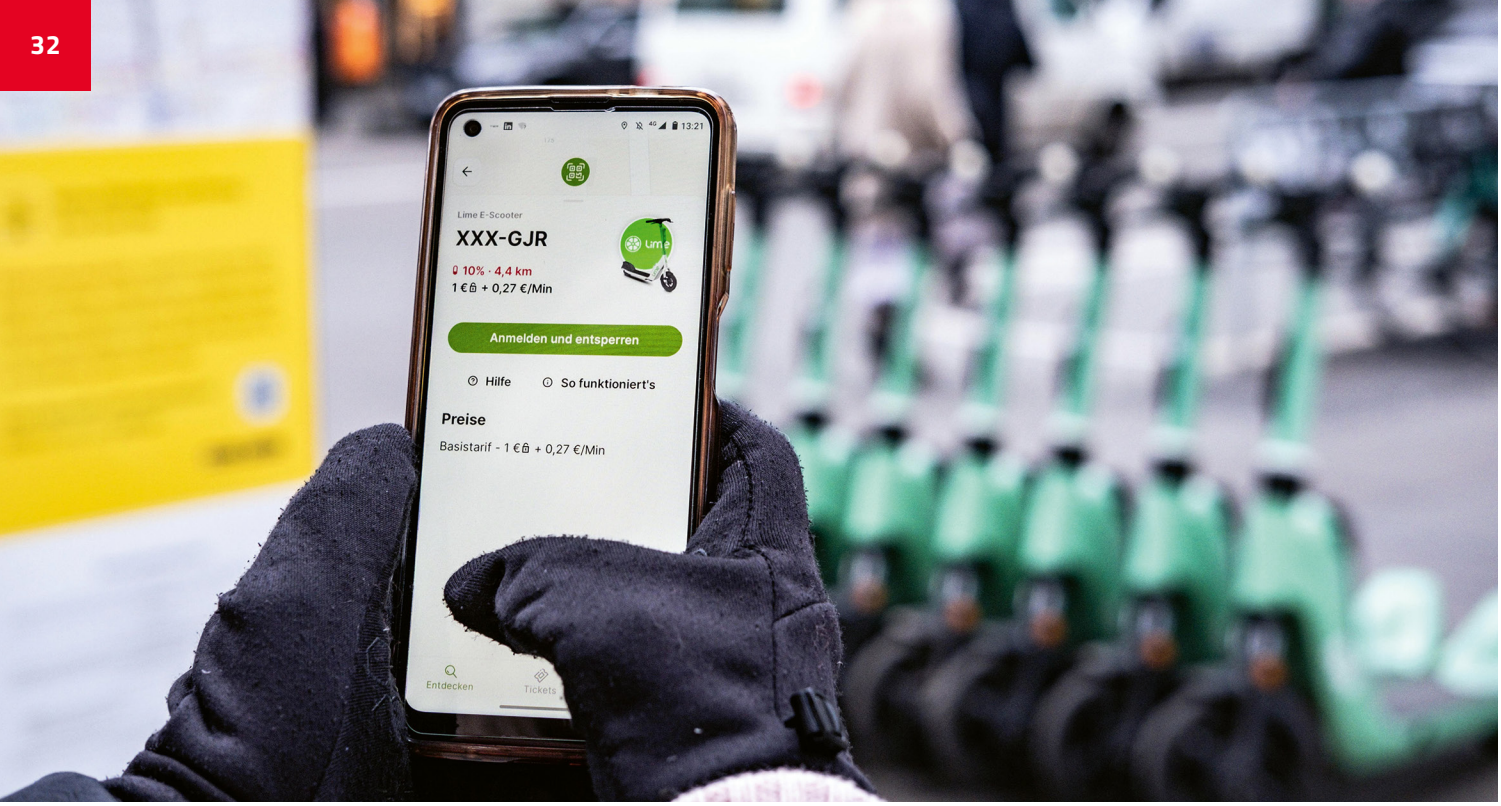


Photo: © Hannah Wilson

beyond safety concerns to include more factors, such as sustainability (carbon footprint), social factors (diversity and inclusion), and the effect of specific regulatory tools (geofencing and speed governance). Furthermore, a tranche of funding for the development and improvement of urban monitoring instruments, such as through software dashboards, would allow municipalities to collect the necessary information to better inform their on-the-ground e-scooter regulations. This support need not be exclusive for e-scooters; a funding category for all new mobility forms would suffice and simultaneously facilitate mobility innovation.

5.2 State Level

- **Clarify Whether Special Use Permit ("Sondernutzungserlaubnis") is Required for E-Scooter Providers or if the Principle of Common Use ("Gemeingebrauch") Applies.** As previously discussed, the overarching rules governing e-scooters is a regulatory patchwork in Germany. In states where there is neither a state law nor court ruling to determine whether e-scooters require permits, cities face the challenge of interpreting the law for themselves – an often herculean, time-intensive undertaking. This can result in adverse outcomes, for example, if cities decide to take no action at all – a decision in itself leading, in the worst-case scenario, to uncontrolled e-scooter fleets. Moreover, lack of regulator action relegates decision-making to the courts, who are not necessarily able to better judge technical questions.[62] Each of the 16 German states should therefore, when applicable, review and update their Road Laws to clarify whether e-scooters require a special permit. There need not necessarily be uniformity – indeed, comparing the approaches could even yield innovative and hybrid regulatory solutions – but legal certainty is essential for both the cities regulating e-scooters and companies providing them.

62 In January 2023, the Administrative Court of Cologne ruled on the issue of special permit pricing, determining the fee of 85 to 130 EUR per e-scooter per year was appropriate. This decision has proved controversial, given the stark difference between e-scooter permit fees and those for bicycles (10 EUR). See https://t1p.de/wti36.

5.3 City Level

Cities have the knowledge and must ultimately have the authority to decide for themselves which regulatory approach works best for them. Research undergone to produce this report, however, suggests that approaches to e-scooter regulation are most successful when undertaken holistically – thereby requiring a selection process with criteria that reflect a city's overarching urban development goals. The U.S. National Association of City Transportation Officials (NACTO) terms this "goal-based selection."[63] In this approach, a city first decides which outcomes it would like to achieve from the e-scooter program and works backward from there. This method also aligns well with the updated EU Commission guidelines on Sustainable Urban Mobility Plans (SUMPS), which nod to the incorporation of first- and last-mile solutions.[64]

To this end, the following recommendations are based on best practices found in U.S. cities that follow the goal-based selection approach. As stated previously, this report recommends a selection-based permitting process. First, recommendations for the ideal starting point, types of goals, and the selection process itself will be provided. Best practices vis-à-vis more granular tools will then be introduced. Finally, factors that should be considered and implemented in an ongoing manner are described. Cities should feel especially encouraged to experiment with tools that mitigate insufficient financial resources and/or personnel – a nearly universal urban issue.

Step 1: Starting Out

- **Secure Political Will.** City council approval is usually needed to establish an e-scooter program. Political will is therefore a critical component of a successful e-scooter program. Furthermore, the program should allow a scope of administrative discretion in the execution of individual aspects of the e-scooter program. This would ensure flexibility and durability of the program.
- **Ensure Sufficient Personnel.** Successful programs do not run themselves; personnel are needed to manage the e-scooter program, from conceptualization to implementation to evaluation. The exact number of personnel needed may vary by city, but in best practices cities of more than 500,000 residents, at least one employee is dedicated entirely to shared or new mobility. In some cities, like Denver, there is even a team of three that works on different program aspects.
- **Obtain Legal Backing.** Though often understated in its importance, a competent legal team is indispensable to a strong e-scooter program. Lawyers should be read into the concept, as they provide the justifications for regulatory measures (procurement, permit terms, etc.). Support from bolder lawyers coupled with creative measures can yield major progress. Otherwise, shying away from any kind of risk leads to a conservative interpretation of regulations and therefore slower progress.

63 NACTO, 2022.

64 "Questions and Answers: The Revision of the TEN-T Regulation." European Commission. European Commission, December 14, 2021. https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_6725, accessed on January 18, 2023.

Step 2: Drafting the Concept – Identifying Goals

- **Create Synergies: Align Program in Context of Comprehensive City Strategy.** Putting in the effort at the outset to draft a comprehensive shared micromobility plan can contribute to a city's overall goals and maximize program impact. This step is therefore critical. Responsible city planners should, in cross-collaboration with other city departments and in alignment with the broader city vision (for example, a 2030 City Strategy), identify how shared micromobility can contribute to those goals. Such goals can pertain to: safety; climate mitigation and environmental resiliency; and equity, inclusivity, social justice, and affordability. At this point, the duration of the agreement with the providers and the number of e-scooter operators should also be determined.

Step 3: Leveraging Unconventional Tools and Measures and Determining Selection Process Criteria

- **Maximize Program Flexibility and Dynamism.** It is worth repeating the value in providing the municipal administration with leeway to adjust or adapt aspects of e-scooter program. This expedites the program's feedback loop. Examples of this include changes to geofencing and parking corrals/zones based on rider behavior. Other built-in program measures can ensure the program's scope automatically responds to changing circumstances – for example, a dynamic fleet size provision allowing operators to increase their fleet only if average e-scooter usage exceeds a certain average over a certain period.[65]
- **Experiment with Program Features.** Though not exhaustive, the following types of e-scooter agreement provisions are particularly creative and have proven successful in U.S. cities:
  - **Deployment Zones** – Cities can require operators to deploy a certain percentage of the fleet from certain areas (for example, areas with limited access to public transit) or prohibit deployment from certain zones.
  - **Parking** – Zones via geofencing technology can also be used for parking, by creating certain areas ("hubs") where the user must park, or by prohibiting parking in certain areas. Additionally, many American cities have implemented a "lock-to" system, requiring riders to lock devices using a cable on the vehicle to bike racks and signposts – thereby addressing the common problem of disorderly-parked e-scooters. This option, however, requires sufficient infrastructure.
  - **Subscriptions/Pricing** – Many U.S. cities require e-scooter providers to offer a discounted pricing plan to low-income or disadvantaged individuals.[66] In Germany, e-scooters could be integrated into public transportation and in that context justify e-scooter use in public assistance programs.
  - **User Incentives** – Financial incentives are a powerful behavioral tool. Increasing or decreasing ride costs based on riding or parking behavior can curb e-scooter misuse. This option, already deployed by e-scooter providers, should continue to be explored.
- **Leverage E-Scooter Providers.** E-scooter providers are deeply invested in the success of their fleets. As such, cities can benefit from providers' personnel resources and other offers. E-scooter companies can provide technical and institutional knowledge as well as personal support – for example, through the attendance of community events or the implementation of safety trainings.

65 Denver's dynamic fleet sizing under its pilot permitting process allowed operators to increase their fleet size by 25% if e-scooter usage averaged at least three rides per vehicle per day in the previous three months.

66 For example, the Lyft Community Pass (pricing varies by city) or LIME Access program (50% off all rides).

- **Think Outside the Box to Secure Funding for Program Measures.** American cities more often look for the opportunity to allow in-kind support or rearrange their internal funding streams. Lacking infrastructure, American cities have for example secured the installation of parking corrals by the providers themselves (Denver), and the funding of parking corrals by the subordinate districts/communities themselves via tax revenue (Atlanta). American solutions in these cases might not be able to be translated one to one to the German context.
- **Incorporate Program Goals into E-Scooter Provider Selection Process.** Once the program's goals are identified, the city should think how e-scooter providers can contribute to those goals, and which factors are most important within the criteria. From this, a weighted selection criteria matrix should be drafted. The matrix can be organized in categories similar to the $POISE_4$ framework described in this paper and weighted based on city priorities.

Step 4: Creating a Plan to Measure Success

- **Draft Evaluation Process and Timeline.** A process to monitor and evaluate the program is critical for measuring success and informing or modifying future iterations of a shared micromobility concept. Cities should agree upon a process that identifies key performance indicators and metrics (such as rides per vehicle per day, accidents, overall usage, etc.), the actor responsible for collecting and analyzing the data, and timeline for the evaluation. To facilitate evaluation, data dashboards, though often costly, are excellent, user-friendly tools. Many U.S. cities use an application programming interface (API) such as Ride Report or Populus.[67]

Step 5: Ongoing Management

- **Develop Partnerships with E-Scooter Providers.** A strong relationship with the providers not only makes municipal staff's lives easier; it facilitates stability and confidence in the program as well as the swift remediation of any issues. When a city and operators frame themselves as a team, synergies can arise and the entire city benefits.
- **Dedicate Time to Stakeholder Engagement.** Stakeholder engagement should not be underestimated. City and providers should agree on a strategy for public outreach and education (for example safety training) and meetings with local associations and clubs. Such measures address public concerns and provide citizens with a voice, as well as increase program visibility. Regular updates via website, newsletters and other means about the micromobility program can also facilitate public buy-in.
- **Exchange Experiences.** Finally, the share of practices – both what has worked and what has not – between cities helps the spread of best practices and avoids negative redundancies. This may occur informally, or through institutionalized platforms such as NACTO, Deutscher Städtetag, the German Platform for Mobility Management (DEPOMM), and other fora. It was through NACTO, for example, that U.S. officials first shared tips about developing measures to advance equity within e-scooter programs.

67 Ride Report can be accessed at https://www.ridereport.com/; Populus can be accessed at https://www.populus.ai/forms/api-registration.

6. Conclusion, Outlook and Call to Action

This report has demonstrated the potential of e-scooters and micromobility as a key component of sustainable urban mobility. For this, a clear regulatory framework is needed. In both Germany and the United States, current micromobility regulation is in a patchwork state and often ambiguous.

In Germany, the root cause is anything but a well-kept secret. For several legislative periods, many interest groups have been trying to effect reform to the StVG and StVO.

Apart from a best-case scenario with StVG and StVO reform, this report, like Difu, recommends the option to make use of all legal options by pairing a special permit statue with a permit selection process. The latter allows for the inclusion of more comprehensive criteria and parameters for e-scooter provides.

New in this report is the appeal to German cities to be bold in their sustainable mobility plans (SUMPs). Rather than reactively regulating the bare minimum, cities should think holistically and ambitiously. Some innovative components of U.S. city shared micromobility programs, such as DEI requirements and lock-to parking mechanisms, have not yet reached Germany. These and other resourceful moves, especially in devising creative ways to draw from financial or in-kind resources, should be considered.

Photo: © Hannah Wilson

As e-scooters are still in the early stages of their integration into the transportation ecosystem, further monitoring, evaluation and research are critical, especially given the rapid pace of technological development that is occurring. This includes data collection on both the user side and device side. For example, beyond gender and age data, information to include a user's socio-economic data can lead to consequential findings. On the technology side, data on injuries and accidents due to speed governance and geofencing are sorely lacking.

Studies on the overall efficacy of e-scooters vis-à-vis transport mode substitution and environmental impact should be continued. It would be a revealing exercise to empirically gauge the effect of mobility culture and e-scooter perception on micromobility behavior and modal split patterns. For example, Americans are known to be relatively more open to innovation and less risk averse than Germans. And anecdotal evidence of mobility activists preaching the "morality" of bicycles over e-scooters abounds. Could these factors affect the uptake of e-scooters and their overall potential? Finally, effect of the extent of existing street infrastructure on e-scooter uptake also remains underexplored. As alluded to earlier in this paper, the United States has higher rates of personal car trips by e-scooter trips than European countries. More concrete data on this would have implications for e-scooter uptake in other countries.

In the context of the "Verkehrswende" (mobility transition) as countries and cities globally strive for lower-carbon mobility ecosystems, a radical rethink is needed. In order to facilitate sustainable mobility and combat climate change, the same rules cannot apply. Micromobility forms have cracked open the door to a shift in thinking. New mobility forms, technologies and data will open that crack even wider. It is up to policymakers to harness such developments, paving the way for sustainable mobility in livable cities of tomorrow.

7. Appendices

7.1 Abbreviations

BMDV	Federal Ministry for Digital and Transport (Bundesministerium für Digitales und Verkehr)
CDU/CSU	Christian Democratic Union/Christian Social Union
CPSC	The Consumer Product Safety Commission
DEI	Diversity, equity and inclusion
DEPOMM	German Platform for Mobility Management (Deutsche Plattform für Mobilitätsmanagement)
Difu	German Institute of Urban Affairs (Deutsches Institut für Urbanistik)
DOT	Department of Transportation
eKFV	Small Electric Vehicle Regulation (Elektrokleinstfahrzeuge-Verordnung)
FDP	Free Democratic Party
FHWA	Federal Highway Administration
FMVSS	Federal Motor Vehicle Safety Standards
GHG	Greenhouse gas
MoU	Memorandum of Understanding
NACTO	National Association of City Transportation Officials
NaKoMo	National Competence Network for Sustainable Mobility (Nationales Kompetenznetzwerk für nachhaltige Mobilität)
NHTSA	National Highway Traffic Safety Administration
PSM	Platform Shared Mobility
SPD	Social Democratic Party
Städtetag NRW	Association of North Rhine-Westphalian Cities
StVG	Federal Law on Road Transport (Straßenverkehrsgesetz)
StVO	Federal Road Traffic Regulation (Straßenverkehrsordnung)
SUMP	Sustainable Urban Mobility Plan
TRB	Transportation Research Board

7.2 Interview Questions

Selection of open-ended interview questions posed to experts during subject-matter interviews. Questions varied based on expert's role, country of origin (USA/DE) and flow of conversation.

- What are the differences in federal vs. state vs. city competencies as regards e-scooter regulation? How much does the EU play a role in e-scooter regulation, if at all?
- As a city, how much leeway do you have to create your policies? What requires a decision by the city council?
- How did the eKFV develop? Were you involved in the process at all?
- How is the evaluation of the eKFV going? What were your impressions from its stake-holder workshops?
- Do you think there will be (further) e-scooter regulation on the federal level? Would you want this?
- As a city, where (if at all) do you derive your funding for monitoring and evaluation, infrastructure, program consultants, data dashboards, etc.?
- What is your opinion on the following regulatory tools: geofencing/negative signage/ speed governance/helmet requirement?
- Is it possible for you to incorporate Diversity, Equity and Inclusion (DEI) into your e-scooter program? If yes, how so?
- What have been trends in micromobility regulation?
- What do you consider the greatest regulatory hurdle for governing e-scooters?
- Are there any "holes" in current e-scooter regulation?
- What is your opinion on the multiple paths for e-scooter program regulation? (for US: pilot program/limited permits/procurement/etc.); for DE: Gemeingebrauch/Sondernutzung/ Sondernutzung and selection process/procurement)
- What regulatory tools are available to limit the number of e-scooter providers or e-scooters in a city?
- Are there any current lawsuits on e-scooter regulation, or do you think there will be?
- Would it be imaginable for an e-scooter provider to file a lawsuit against a city in order to secure more regulatory clarity?
- Describe the market entry strategies of the different e-scooter providers. How did they differ from each other?
- Were there some providers and/or strategies that have proven more successful in their approach to decision-makers? Why?

- How would you describe the state of the e-scooter industry/market currently? Do you think consolidation will continue?
- Are you involved with PSM? How has this association evolved?
- On which regulatory topics do e-scooter providers generally agree, and where do they differ?
- What are the main sources of complaint reaching you as a (city/e-scooter provider)?
- How do the local media discuss the issue?
- Are there other e-scooter interest groups other than the companies themselves?
- Which interest groups are most anti e-scooter? Are they successful?
- How are you getting the public to understand and follow the rules? How do you as a (city/provider) help with education/outreach?
- Which cities are role models as regards their e-scooter regulatory concept? Which ones have less than desirable or unsuccessful programs?
- Do cities learn from each other as regards e-scooter policy? How can you give an example?
- Do you personally see e-scooters as an opportunity for cities? Why/why not? Will e-scooters still exist on the roads in 10 years, or rather other forms of mobility?

7.3 Interviewees List

In Alphabetical Order, with Affiliation at Time of Interview.

Dr. Sibylle Barth	Partner and Attorney, BBG & Partner*
Cary Bearn	Senior Program Manager for Biking, NACTO
Christoph Egels	former Public Policy Manager DACH, VOI
Tim Erhardt	former Public Policy Associate DACH, BIRD
Ashley Finch	hared Micromobility Coordinator, City of Atlanta
Juliane Friebel	Policy Advisor, Office of Stefan Gelbhaar, Member of the German Bundestag
Tobias Griesmeier	Senior Public Policy Manager, TIER
Joanna Gubman	Executive Director, Urban Environmentalists
Martina Hertel	Research Associate, Project Leader, Department Mobility, Difu
Roland Huhn	Legal Officer, ADFC
Alexander Jung	Senior Director Public Policy DACH, LIME
Inga Karten	Senior Special Advisor, Miller & Meier Consulting
Simon Kase	Associate, BBG & Partner*
Lily Lizarraga	Senior City Planner, City & County of Denver
Ted Randall	Washington D.C. Department of Transportation
Dr. Philipp Raidt	Partner, FGS Global
Florian Reeh	Head of Office for Traffic Management, City of Düsseldorf
Neele Reimann-Philipp	Head of Public Policy DACH, VOI
Timo Resch	Advisor for Mobility, Zukunftsnetz Mobilität
Natascha Spörle	Public Policy Manager DACH, BOLT
Christian Storch	Policy Advisor, Office of Sven-Christian Kindler, Member of the German Bundestag
Norbert Vechtel	Head of the Public Order Office, City of Münster*
Christine Wenzel	Head of Public Policy DACH, TIER*
Meg Young	New Mobility Coordinator, City of Baltimore
Frieder Zappe	Lead for Innovative Mobility Services, Transport Association Rhein-Neckar (VRN)

*Interviews and insights occurred within the context of the Association of North Rhine-Westphalian Cities' virtual local festival in a webinar organized by the author, May 23, 2022, https://youtu.be/P-ygLeRVJXc.

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