

# *3<sup>rd</sup> World Light Electric Vehicle Summit*

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## ***PLEVs support urban transition***

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### **Abstract**

Kick scooters are enjoying a global resurgence in popularity. Formerly human-powered, the kick scooters now seen in the streets run on (green) electricity. Personal Light Electric Vehicles (PLEVs) contribute to environmental objectives. These vehicles encourage commuters to go car-free, particularly because foldable electric scooters are a first & last mile solution (combined with public transport or car sharing). Additionally, the use of shared PLEVs relieves the pressure on urban public transport systems. Although discarded scooters can also become a nuisance, the trend towards a sustainable urban experience is generally a welcome one. Cities are in transition; the need for entertainment and leisure in cities has increased. The aging population of Europe and the increasing number of chronic sick people raise the question of how urban infrastructure can be adapted in such a way that an inclusive society remains possible. For elderly people and people with limited mobility, PLEVs offer a more manageable and flexible alternative to mobility scooters. This requires regulations that makes it easier to allow use of PLEVs as well as an infrastructure without barriers: solid road surfaces, smooth transitions between bicycle lane and sidewalk, and a clear division of how the road should be shared.

In Europe, PLEVs are essentially divided into four categories: electric scooters, self-balancing vehicles, electric tricycles and electric bikes. Unlike cars, scooters and mopeds which are governed by EU regulations (EU168/2013 type approval), electric scooters and tricycles (without a seat) and self-balancing vehicles are regulated by national policies. A safety and quality standard is currently being developed at EU level (EN17128); member states will be able to voluntarily adopt this standard. By mid 2019 the use of electric scooters on public road is probably admitted in most member states. Manufacturers still have to adjust different national requirements. Countries with specific requirements and relatively small markets, such as the Netherlands, are unappealing to globally operating manufacturers. While innovative vehicles are important to the EU (environment and inclusive society), European policy is preferable. Belgium, the Scandinavian countries and Austria have imposed few restrictions on PLEVs. So far, there are no records of altering road safety risks. Knowledge exchange will support tuning national policies within Europe and offer opportunities for innovative manufacturers. Additionally adopting quality standard such as EN17128 would also ensure a road safety level for PLEVs in Europe.

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*Keywords: EN17128, PLEV, urban transition, inclusion*

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## **1 Introduction**

Two decades from now, autonomous cars will bring us straight to our places of destination. Cities will have become greener and quieter [1]. Until that time, health problems caused by traffic congestion and air

pollution force us to take measures. The European Parliament's Environment Committee has agreed to put its backing behind a higher carbon dioxide reduction target of 45% for cars and vans by 2030. In urban areas, PLEVs will be able to contribute significantly to achieving this target [2].

## 2 Opportunities for (foldable) electric scooters

In contrast to electric bicycles, foldable PLEVs such as electric scooters and mini mopeds require no parking space. This makes foldable PLEVs a complementary last-mile solution and, in combination with public transport, an attractive alternative to cars in urban areas. Additionally, strategies for air pollution control in cities through the introduction of environmental zones and a ban on old combustion-engine cars promote the use of foldable PLEVs for easy access to cities.

The recent emergence of start-ups and sharing concepts has caused a global resurgence in the popularity of electric scooters. There is a latent demand for a quick and cheap way to get around [3]. Local governments, however, struggle to regulate the nuisance caused by discarded scooters. Some cities – mainly tourist hotspots like Barcelona and Prague – have banned shared electric scooters and rental Segways. With regard to regulation, the approval of electric scooters is currently being arranged at national levels. This development began in the Scandinavian countries and is now being picked up by Central European countries such as Austria, France and Germany. The Netherlands, Ireland and the United Kingdom show little progress in this respect.

In this early phase, governmental incentives and collaboration with companies for car sharing systems in combination with last-mile PLEVs is necessary in order to develop an effective MaaS system (Mobility as a Service) [4]. This kills two birds with one stone. Car sharing reduces traffic congestion and air pollution. In the main European cities, traffic jams create a waste of an average of 50 hours per year per person [5]. Strategic hubs near highways should accommodate commuters using PLEVs. The start-up phase of car sharing plus last-mile PLEVs is not yet profitable, because only substantial participation (5-10%) in car sharing significantly affects traffic congestion [6].

## 3 Elderly and disabled

In the slightly increasing EU population, the old-age dependency ratio (the number of people aged 65 and above relative to the number of people aged 15 to 64) is expected to increase from 30% in 2016 to over 50% in 2070 [7]. The number of people who need support for mobility, balance, sitting and memory will increase drastically. A variety of PLEVs is in the interest of a sustainable, inclusive society. PLEVs give the ageing European population and chronically sick people access to society and offer a more manageable and flexible alternative for mobility scooters.

## 4 Safety regulations

Europe initially ignored upcoming PLEVs because of their low numbers and presumed low safety risk (low speed, light weight). Since January 2016, the European type approval for two and three wheelers (EU168/2013) excludes self-balancing vehicles and electric vehicles without a seat. Increasing sales have forced both manufacturers and national governments to start setting standards for PLEVs.

Belgium, the Scandinavian countries and Austria have imposed few requirements on all self-balancing vehicles and electric vehicles without a seat. So far, there have been no records of this affecting road safety. Germany, France and Spain are imposing requirements on electric scooters and Segways this year. In the Netherlands, Ireland and the United Kingdom, there are no initiatives yet for admitting more PLEVs to public roads. Specific national requirements for PLEVs are expected to contribute to last-mile, parking and congestion solutions in urban areas.

Lack of (national) regulation is a sales barrier for PLEVs in Europe. In summer 2013, the CEN set up a Workgroup under the Technical Committee on road vehicles (PrEN17178). The prEN17128 standard will be implemented by the member states voluntarily once it supports regulation (in progress) on PLEVs. This quality standard may prevent unsafe products from being dumped in Europe.

## 5 Place on the road

Increased use of PLEVs will introduce altered use of vehicle lanes. Pavement, bicycle and car lanes in cities will no longer meet future needs. Cars will be

increasingly banned and the maximum speed is expected to be lowered to 30 km/h in city centres.

In urban areas in mainland Europe, we'll see a shift from fast traffic on the left side of the road and slow traffic on the right side of the road to vehicles travelling at similar speeds divided according to weight and impact. Freight traffic and PLEVs won't have the same place on the road. Depending on the infrastructure and amount of space in the city in question, PLEV users will be provided with a separate lane or directed to use the pavements if space allows (as is the case in Moscow, for example). Ideally, PLEV users would be able to flexibly determine their place on the road depending on their speed: above 15 km/h on bicycle lanes or roads and walking speed on pavements. Belgium and Finland are already used to this flexible concept, which is common practice for mobility scooters. This flexible concept allows vehicles travelling at similar speeds to use the same place on the road and increases the opportunities for PLEVs as a more manageable and flexible alternative to mobility scooters.

## 6 Road safety

Each type of PLEV comes with specific safety risks. Foldable moped users are poorly visible due to their low sitting position, for example, and monowheels have a long braking distance. We know from electric bicycles and scooter safety that risk often originates in inexperience. As of yet, there is no consistent etiquette for driving PLEVs. This means that pedestrians, car drivers and cyclists are not necessarily able to anticipate the presence of an electric scooter at a conflicting intersection. Road safety of PLEVs is also an interaction between road conditions (uneven pavements, potholes, slippery spots), place on the road (among vans and cars), driving behaviour and technical performance. We cannot afford to limit our focus to only one of these aspects.

(Voluntary) quality systems, product safety guidelines (such as prEN17128) and coordinated national regulation (knowledge exchange) for PLEVs need to be embedded in a strategy for the transition of urban mobility and the resulting redesign of roads, lanes and pavements. A supportive vision of an inclusive society will lead to a safe and healthy urban environment.

## References

- [1] <https://www.youtube.com/watch?v=TG74dkrrE7I>
- [2] <https://industryeurope.com/eu-backs-strict/>
- [3] Vox Media, Sep 7; 2018; <https://www.vox.com/2018/8/27/17676670/electric-scooter-rental-bird-lime-skip-spin-cities>
- [4] Mobility as a Service: concept and Practice; NCMM; March 2018
- [5] <https://www.consultancy.nl/nieuws/11091/de-25-europese-steden-met-de-hoogste-verkeersdruk>
- [6] <https://www.technologyreview.com/s/607841/a-single-autonomous-car-has-a-huge-impact-on-alleviating-traffic/>
- [7] [https://www.ecb.europa.eu/pub/pdf/other/ebart201802\\_02.en.pdf](https://www.ecb.europa.eu/pub/pdf/other/ebart201802_02.en.pdf)

## Author

Jacoba van Gastel previously worked at the Delft University of Technology, serving as a director of European subsidy programme Leonardo da Vinci, which aids to bring innovations to small and medium sized enterprises more quickly. After that, she became a managing director at the Dutch Vehicle Authority (RDW), where she was responsible for testing a Whole Vehicle Type Approval worldwide. In 2016, she launched Dutch PLEV platform <http://we-all-wheel.com> supporting manufacturers, consumers and living labs.

