



E-Mobility Solutions

Electric Moped Sharing



**Wuppertal
Institut**

UN HABITAT
FOR A BETTER URBAN FUTURE



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Future Radar project

UEMI SOLUTIONS

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Urban Electric Mobility Initiative (UEMI) was initiated by UN-Habitat and the SOLUTIONS project and launched at the UN Climate Summit in September 2014 in New York.

UEMI aims to help phasing out conventionally fueled vehicles and increase the share of electric vehicles (2-,3- and 4-wheelers) in the total volume of individual motorized transport in cities to at least 30% by 2030. The UEMI is an active partnership that aims to track international action in the area of electric mobility and initiates local actions. The UEMI delivers tools and guidelines, generates synergies between e-mobility programmes and supports local implementation actions in Africa, Asia, Europe and Latin America.

Future Research, Advanced Development and Implementation Activities for Road Transport (FUTURE-RADAR) project will support the European Technology Platform ERTRAC (the European Road Transport Research Advisory Council) and the European Green Vehicle Initiative PPP to create and implement the needed research and innovation strategies for a sustainable and competitive European road transport system. Linking all relevant stakeholders FUTURE-RADAR will provide the consensus-based plans and roadmaps addressing the key societal, environmental, economic and technological challenges in areas such as road transport safety, urban mobility, long distance freight transport, automated road transport, global competitiveness and all issues related to energy and environment.

FUTURE-RADAR will also facilitate exchange between cities in Europa, Asia and Latin America on urban electric mobility solutions. The FUTURE-RADAR activities include project monitoring, strategic research agendas, international assessments and recommendations for innovation deployment as well as twinning of international projects and comprehensive dissemination and awareness activities. Overall it can be stated that FUTURE-RADAR provides the best opportunity to maintain, strengthen and widen the activities to further develop the multi-stakeholder road transport research area, for the high-quality research of societal and industrial relevance in Europe.

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In brief

Electric moped share programs offer for-rent electrically-propelled scooters coupled with services enabled by the use of a smart phone app. E-mopeds (also called “e-scooters” in some parts of the world) can be defined as those electric two-wheelers that do not require pedal assistance, and have maximum speeds of around 45 kmph, and have an electric motor of maximum continuous rated power of 0.25 to 4 kW.¹ These schemes have primarily been operating in European countries, but have also recently increasingly becoming more popular in other regions, such as the United States, Mexico, and Taiwan. Mopeds are also referred to as “scooters” in certain parts of the globe.

In brief



1 <https://www-sciencedirect-com.ez-proxy1.library.usyd.edu.au/science/article/pii/S1361920915001315>

Examples

These electric moped sharing schemes have smart phone app customer interfaces that enable users to locate nearby units, access the units, and go about the whole transaction in a user-friendly manner. Many of the systems are free floating systems, which means that users do not need to put the mopeds in scheme-specific stations, or parking areas, but these can be left in locations where such mopeds are generally allowed to be parked. The scooters travel at around 45 kmph (depending on the regulation). They typically provide lower cost alternatives to using a car, and are more environmentally-friendly than conventional motorcycles or mopeds.¹ These schemes usually provide helmets (sometimes two), insurance, as well as other amenities such as sanitary towels.²³

Examples Measures



2 <https://electrek.co/2018/05/31/the-genze-2-0-electric-scooter-is-american-made/>

3 <https://www.ecooltra.com/en/>

4 <https://www.bosch.com/explore-and-experience/coup-escooter-sharing-platform/>

Results

E-scooters can be a viable alternative to more energy, and emissions-intensive modes such as the private car, shared car, or taxis. They provide higher levels of mobility (faster) than bicycles, and can perform travel distances well within the range of common urban transport trips. Such “sharing” schemes also contribute towards mitigating the need for vehicle ownership, as common vehicles can be made available for performing transport tasks.

An evaluation of electric mopeds in Lisbon shows that electric ones have 61% lower specific energy consumption against conventional ones.¹ In Oxford, United Kingdom, a study shows that an electric motorcycle required 6 times less energy than the best selling car model, and resulted in 3.8 less GHG on a well-to-wheel basis. The operational costs were also 6 times lower.² These vehicles also require substantially less space for parking as compared to cars, but can compete in terms of delivering more efficient door-to-door urban transportation services.

Results



5 <https://www-sciencedirect-com.ez-proxy1.library.usyd.edu.au/science/article/pii/S0968090X14003283>

6 <https://www-sciencedirect-com.ezproxy1.library.usyd.edu.au/science/article/pii/S0968090X-14003283#b0020>

Technical & Financial Considerations

These electric scooters can travel between 50-100 kilometers (depending on the model). These e-scooters typically run on Li-ion battery packs which are placed at low centres of gravity in order to improve handling. Other electric mopeds also run on lead-acid, nickel-metal hydride, or sodium-silicate batteries. Electric two-wheelers typically require battery capacities of 0.4 kW to 10 kW (larger models). Charging times for electric mopeds range between 1 (fast charge) to 8 hours (wall outlets), depending on the technology used. E-moped sharing schemes may also utilize swappable battery packs which enable on-the-fly battery change.¹

From the perspective of users, such schemes provide cheaper alternatives towards using four-wheeled vehicles for performing typical urban trips. These schemes typically charge 35 cents per minute. Other schemes offer packages which allow users to avail of discounted fees based on a minimum number of trips (e.g. 10 trips of 20 mins),² or graduated schemes using time as a factor (e.g. 30 cents per minute for first 15 minutes, then 10 cents per minute afterwards).³

From the perspective of government, such e-mopeds don't require specific road infrastructure requirement, as they can utilize the carriageway. Charging infrastructure may be needed, depending on the ownership structure. If private firms will be allowed to operate such services, they need to be responsible for overseeing the charging of the shared e-mopeds.

7 <https://www-sciencedirect-com.ez-proxy1.library.usyd.edu.au/science/article/pii/S1361920915001315>

8 <https://www.getyugo.com/barcelona>

9 <https://electrek.co/2018/06/18/electric-moped-sharing-programs-expand/>

Policy/legislation

The proliferation of electric mopeds (and mopeds, and motorcycles, in general) increases safety issues. While setting speed limits (and installing speed limiters) on the mopeds can contribute towards safety, external factors play significant roles in determining overall safety. Globally, 2-wheeler users are one of the most vulnerable segments of society when it comes to road crashes.

A strict driver licensing scheme (and driver training) that ensures that riders are equipped with the necessary skills, and proper mindsets for operating electric mopeds is necessary. The provision of dedicated lanes (even if not physically separated) may also be beneficial for the riders, but may pose capacity constraints to the road system. The issuance of minimum noise levels may improve safety by increasing audibility.¹

Strict enforcement of laws that are applicable to similar vehicles (e.g. motorcycles) should be applied.

The level of aggregate environmental benefits from such electric mopeds ultimately is impacted by the source of electricity, as well as the type of battery, and how these are maintained, and how end-of-life issues are handled. These should all be considered in policymaking.

Institutions

Government institutions which are primarily responsible for urban transportation, as well as those involved in the specification of standards for vehicles, would be the primary stakeholders in such a measure. As such schemes are primarily being implemented by private operators, entities that regulate commerce, and competition need to be involved closely. Ensuring public safety is of primary concern, and thus, the police, and traffic enforcement entities would need to closely be involved. Compliance to national standards pertaining to vehicles, for example, should be ensured, and so government agencies responsible for trade and industry must also be involved. Similarly, environmental, and energy goals and standards must be upheld, and thus, ministries of environment, and energy must also be involved in the process.

¹⁰ <https://www.sciencedirect-com.ez-proxy1.library.usyd.edu.au/science/article/pii/S1361920915001315>

Policy/legislation

Institutions

Transferability

These schemes have experienced recent increase

in popularity due to the advantages that they provide, in terms of providing relatively fast, and convenient options for urban commuting amidst worsening urban traffic congestion. The transferability of such schemes seems to be quite feasible in areas where mopeds and two-wheelers consist a significant share of the mode share. However, a strong social marketing initiative about the use of such electric mopeds, as well as the use of mobile technology-enabled sharing systems must be considered. The infiltration of electric bikes and mopeds in two-wheeler reliant countries such as Vietnam, and India, has not been successful in the past, partially due to the perceived uncertainties that come along with the usage of such vehicles.

It is estimated that there are 29 cities worldwide that have moped sharing activity, and 17 are in the pipeline. There are more than 8,000 shared scooters, 92% of these are electric servicing more than 350,000 users.¹

11 https://www.innoz.de/sites/default/files/howe-bock_global_scootersharing_market_report_2017.pdf

Transferability

Context

The City of Paris is the capital and most populous city in France. It is home to more than 2.2 million people and covers 105 square kilometers. Lack of space, coupled with high demand for social, and economic-related mobility, has resulted in several transport-related issues for Paris, including congestion, and severe episodes of air pollution - such as the winter air pollution episodes in 2016. The City government has initiated several drastic measures in the recent past to curb air pollution from transportation, including the expansion of its bike-sharing scheme Velib, including cycling infrastructure, banning older and/or low occupancy vehicles, and is now also mulling the idea of providing free public transport to further discourage the use of private cars.

In action

The City of Paris initiated an electric moped sharing program called CityScoot in 2016, primarily to contribute towards the fight against urban air pollution by encouraging shifting trips from cars to the more environmentally-friendly electric mopeds.

The program initially offered 50 scooters which resulted in 4,500 journeys by 1,200 users in the first three months of testing, 65% of whom said that they will use the system regularly.² As of February 2018, there are 1,600 mopeds under the scheme.³

The system is available to all who have a valid driver's license, and a smartphone. There is also a free initiation lesson for those who are not experienced riders. The system works on a per minute basis, with a base price of 28 cents. The app is used for locating (the mopeds are GPS-enabled), and accessing the vehicles. The system generates a code that the user receives through the app, and this is used for unlocking the vehicle.

The mopeds can be used anywhere within the "CityScoot Zone" which covers Paris, Neuilly-sur-Seine, Levallois-Perret, Boulogne-Billancourt and Issy-les-Moulineaux.⁴ These can be rented from 7 am to 12 am.

12 <https://electrek.co/2016/02/03/paris-1000-electric-scooters-velib-autolib/>

13 <https://techcrunch.com/2018/02/07/city-scoot-raises-50-million-for-its-european-electric-scooter-service/>

14 <https://www.cityscoot.eu/en-savoir-plus/?lang=en>

Case Study: Paris, France

In action

After use, the mopeds can be parked anywhere mopeds are legally allowed to park and need not be parked near charging stations as the batteries are swappable. The mopeds are maintained, and have their batteries swapped by staff who go around in electric vans.⁵ The system provides competitive prices when compared to the bus or metro systems, and lower than taxis.

Results

CityScoot has recently announced raising 40 million Euros for expanding its services in Paris by providing 5,000 electric mopeds by the end of 2018, and launch services in France, Switzerland, and Italy.⁶ It now has 70,000 users and caters to up to 9,000 rides per day. The system strengthens the idea that such smaller electric scooters can be more suited to mobility options under a shared economy, particularly as these require no charging points due to the swappable batteries.⁷ They can potentially contribute towards freeing up road space, as well as parking requirements, assuming that the trips done through the e-mopeds would have been done using larger vehicles. The citizens in Paris, including the tourists, are now also benefiting from competition, as the entry of Coup in the market provides more options, and potentially lower usage rates.

Results

15 <http://www.eltis.org/discover/news/lets-scoot-pariss-scooter-sharing-scheme-france>

16 <https://techcrunch.com/2018/02/07/city-scoot-raises-50-million-for-its-european-electric-scooter-service/>

17 <http://www.sharedmobility.news/forget-car/#>



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