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Electric Scooters: Technologies and Markets

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Abstract

Promising announcements of new electric scooters cannot hide barriers for their market introduction, which mainly concern technology, charging facilities, user benefits, awareness and distribution. NewRide, the Swiss programme for the promotion of electric two wheelers, has started an e-scooter action plan. Its main activities are distribution networks, reliable information on technology and products, exhibitions with test rides, charging points and dealer education.

Keywords: city traffic, charging, demonstration, energy consumption, motorcycle, scooter

Figure 1: Hall 7 ALL ELECTRIC at Swiss-Moto 2009, Zurich

1 Introduction

In the past few years, the development of electric scooters has made tremendous progress in different ways:

- Battery technology: After the breakthrough in electric bicycles, the Lithium-technology has become feasible for e-scooters. The high energy density of this technology allows to keep the battery weight (and therefore the vehicle weight) on a similar level as conventional scooters, offering the same time ranges with one battery charge of 50 to 100 kilometers, which is sufficient for most of the scooter applications.
- Vehicle concepts: There is a huge variety of innovative vehicle concepts such as Segway, Bikeboard, Quantya, Vectrix (see fig. 2). The high satisfaction of people having done a test ride proves the fun to drive as an additional benefit of these vehicles.
- Market development: In China, e-scooters are already well established on urban roads. In Europe, a growing presence at motorcycle fairs such as Intermot (Cologne), EICMA (Milan) or Swiss-Moto (Zurich) as well as orders from fleet owners such as the Swiss postal service (250 Oxygen cargo scooters) shows, that the market introduction has started there, too.

Figure 2: e-scooter Parade at Swiss-Moto 2008, Zurich

2 Barriers for Market Introduction

Despite of these exciting perspectives, there are still some barriers for the market introduction of e-scooters:

- Technology: Despite the progress in technology, some e-scooters still don't meet the standards of conventional scooters. One reason is the fact that a lot of e-scooters are imported from China without respecting the higher requirements of European markets. Another one is that there are a lot of developers with a lack of experience either in vehicle technology or in marketing. Weak spots are batteries, battery management, chargers, cost (respectively cost-performance ratio), vehicle components etc.
- Charging facilities: At most of e-scooters, the battery cannot be removed for charging. Therefore, the user needs a place closed to a socket. If he has access to a parking garage, he can install a socket or an independent metering on an existing socket. If he doesn't, he needs a public charging station. Because the amount of electricity is small, the cost of access and billing is a critical issue.
- User benefits: The motives to buy an electric scooter are often not obvious: The environmental benefits are addressed preliminarily to the public, the individual is generally not ready to pay (much) more for an environmentally friendly product. The cost cannot serve as a benefit, neither, because the purchase cost is still considerably higher than those for a conventional scooter. The service and maintenance cost is certainly lower, but it is affected by a uncertainty regarding replacement of the battery during the vehicle lifetime. Cost can become an issue when an e-scooter can replace not only conventional scooters but cars (e.g. for commuting). The performance of e-scooters is lower as well, at least regarding range. However, the acceleration, especially at low speed levels (up to 30 km/h) is impressive. This is in fact essential as it is representative for the « fun to drive », which is an argument of high importance in the purchase process of a vehicle in general. Unfortunately, one can only appreciate the fun to drive of an e-scooter once one has ridden it.

- Awareness: Due to the fact that e-scooters look like conventional scooters, people don't get aware of them easily. In addition, most of the actual manufacturers don't have the means for expensive campaigns.
- Distribution Networks: Most of the motorcycle and scooter dealers don't have high confidence in the electric vehicle technology yet. They never had an education in electric drive-trains. That's why they have no experience and therefore they are reluctant. Selling an e-scooter today is generally much more time consuming, as the customers have a lot of questions. Furthermore they like to be treated as pioneers. Finally, some failures in the market introduction of e-scooters during the past ten years have damaged the image of e-scooters in general.

3 NewRide, the Swiss Association for the promotion of electric two wheelers [1]

Since 2001, NewRide, a Swiss association for the promotion of electric two wheelers, is pushing the market introduction of electric bikes and scooters. It is supported by the Swiss Government, by some 40 cities and the vehicle suppliers (manufacturers, importers and dealers). Therefore, NewRide can be considered as an intermediate between the policy who is calling for clean vehicles, and the suppliers, who are offering them, but don't have the means for a successful marketing. As an independent organisation, NewRide has some favourable conditions for making the market introduction fast and sustainable: It has a high credibility for customers as well as for the media, it can assist governments in developing and implementing favourable conditions for the market introduction, and last not least it can disseminate neutral information not on products and makes, but on technology (which is essential at this early state of market introduction).

In the first seven years, NewRide has successfully assisted the market introduction of e-bikes (see fig. 3). While the sales in the first years developed only little, they increased rapidly from 2005.

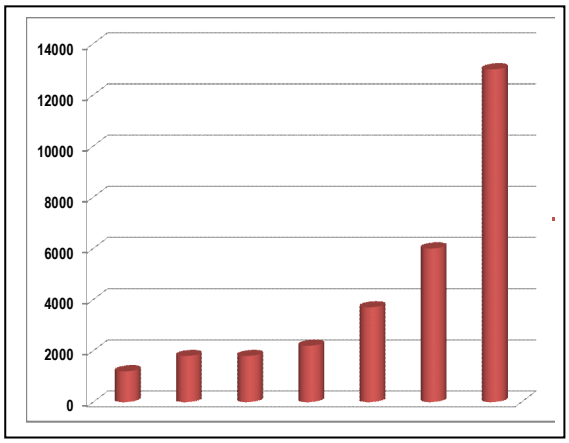

Figure 3: Annual e-bike sales in Switzerland between 2002 and 2008

Unfortunately, e-scooters didn't develop the same way, due to several reasons described above.

4 Methods to Overcome the Barriers for Market Introduction

After the promising announcements in the last two years, NewRide believes that the market introduction of e-scooters may become successful in the coming years. However, the barriers mentioned above have to be respected. Learning from the experience in supporting e-bikes, NewRide has started to assist the market introduction of e-scooters with different promotion measures:

- Swiss-Moto 08: NewRide has presented in a special sector of the Swiss-Moto, the most important motorcycle fair in Switzerland, in February 2008 in Zurich nine makes and more than 20 models of e-scooters. A brochure with a portrait of the exhibitors incl. a table with the technical data of the vehicles was distributed before and during the exhibition. During these four days more than 1'000 test rides were carried out by the visitors. Thanks to its neutral status this exhibition became a high interest of the media incl. the daily news on the Swiss National Television. In February 2009 the organizers of the Swiss-Moto dedicated an entire floor of 2'500 m2 to electric scooters, including an indoor test track of 120 m. This show has created a high acceptance by the media as well as by the 1'200 test riders, by the motorcycle dealers (the target group of this show) and by the exhibitors of the conventional motorcycles. More than half of the visitors of

the Swiss-Moto visited hall 7 ALL ELECTRIC (see picture on front page).

- Distribution Networks: In collaboration with the Swiss Bicycle and Motorcycle Dealer Association (sfmgv) NewRide invited the members of this Association (500 dealers) to Swiss-Moto 08, which was a unique opportunity for contacting the vehicle suppliers and their products and services. In 2009, sfmgv has invited its members itself and welcome them to a « e-scooter breakfast » which allows them to enter into the exhibition one hour before the official opening of the fair. In addition, NewRide organized excursions for motorcycle dealers to EICMA (Milan) in 2007 and 2008, visiting the most important booths with e-scooters. Thus, the dealers got in a short time an insight in the technology and market development.
- Charging facilities: Together with committed cities, NewRide will collect public and private outlets where e-scooter drivers can charge their batteries. This is considered as an intermediate solution until a simple and robust charging system including user access and billing is available on the market. At an initial stage, electricity can be provided at simple outlets for free, but in the long term there is a need for a low cost and consumer friendly, but still safe system.

Fig. 4: Outlets in the backyard of the customer service at ewz, the utility of Zurich

5 E-Scooter Action Plan

As e-scooters are a typical urban means of transport, NewRide will focus the promotion of e-scooters on some committed cities : Basel, Bern, Fribourg, Neuchâtel and St. Gallen. Each of these cities will organise two e-scooter test-days per year and the will look for charging points.

Fig. 5: E-Scooter test-day in Berne in August 2008

Together with the e-scooter manufacturers and importers, NewRide will set e-scooter-centers in theses cities. These are dealers which are willing to market e-scooters as pioneers.

This action plan is limited to serious e-scooter suppliers which are willing to participate in the advertisement for the e-scooter test-days mentioned above.

NewRide will act as coordinator in this action plan.

The project period of the action is planned from 2009 – 2012.

6 Research

The e-scooter action plan will be accompanied by a research project in order to evaluate its effects and to provide a scientific base for an eventual adaption. In contains the following work packages :

- Project management and communication
- Market development and market actors
- Vehicle and battery technology
- Promotion measures
- Energy and environment

In coordination with the e-scooter action plan, the project period will last from 2009 – 2012.

References

[1] www.newride.ch

Author

Urs Schwegler (55) studied transport-tation engineer at the Swiss Federal Technical High School at Zurich. In the management of NewRide, the Swiss association for the promotion of electric two wheelers, he is responsible for the supplier's side (manufacturers, importers, dealers).
Urs Schwegler participated in several research and demonstration projects of the EU and the IEA.