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Expert study on the state of the art

Electric mobility and its target groups

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the mind of movement

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1 Introduction

E-mobility in all its forms is a rather new form of transport. Thus not much experiences exists so far in driving and charging electric drive systems. The missing experiences are causing a lot of resentments – regarding technical maturity, range limitations or additional costs - that still need to be overcome to realize the market potential of e-mobility.

Automobile and bike manufacturers and dealers as well as governments are having a common objective. They want to increase the number of electric vehicles in use. In order to reach this aim, information campaigns and other measures to promote e-mobility were conducted in recent years. But often the same experts – and not users or even buyers – are attending these events.

Hence the crucial questions are: Who are potential users and how can these users be addressed appropriately?¹ But there is no such thing as one e-mobility user group for the different kinds of e-mobility. This means that prior to the offer of new electric mobility measures or services, analysis on the needs and resentments of potential user groups for the specific offers is required.

Basically adaptation of innovations can be speed up as soon as they are linked to advantages for the potential users. Subsequently tailor-made campaigns for different identified user groups should be planned, to inform them on their specific advantages or to overcome their specific resentments.

This paper aims to give support in identifying potential user groups and their needs and in designing appropriate campaigns to promote the successful implementation of e-mobility offers.

¹ This trend is also visible in the current redirecting of the magazine of the Federal Association of E-Mobility from experts to a more end-customer orientation.



2 Influencing Factors of E-mobility Decisions

When aiming to promote e-mobility, all influencing factors of e-mobility decisions have to be taken into account, in order to be able to answer the question – “What kind of people are attracted by which mode and why?”. While public administration wants to save emissions and increase the quality of life in cities by reducing pollution and congestion, private users may have other preferences for buying or renting an e-vehicle. Figure 1 gives an overview on the five superior aspects – they will be described more detailed in the following sections, since they all have a likely impact on mobility patterns.

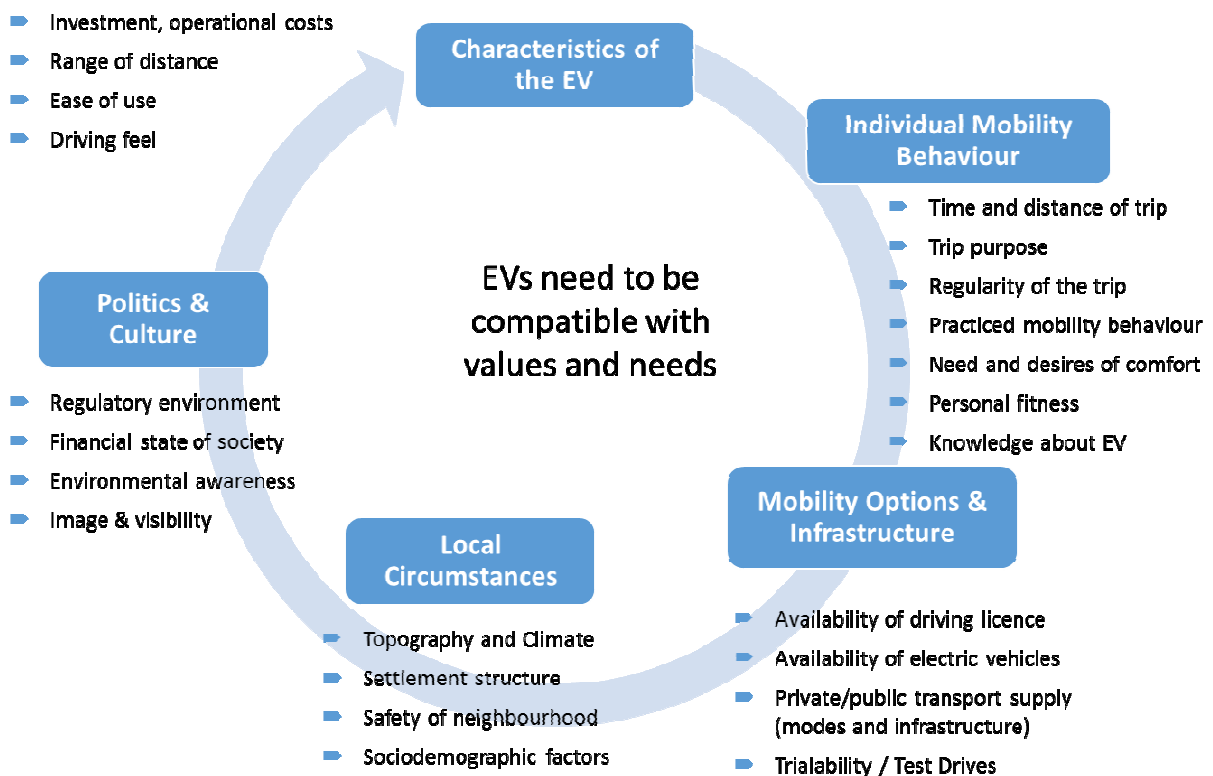


Figure 1: Influencing parameters to promote e-mobility (source: PTV Group)

Local Circumstances

The five middle- and small sized forerunner cities are assumed to be “early adapters”, which means that these cities want to implement already performed e-mobility strategies, with a special focus on e-cars and pedelecs. However, the adaptation of e-mobility action plans mainly relies on the local context. Table 1 below summarizes the local circumstances of the participating cities. The cities nevertheless do not have to start from the scratch, since there have been already local demonstrations initiated.

Table 1: Main characteristics of the local circumstances of the participating cities
(source: PTV Group)

	Karlskrona/ Sweden	Växjö/ Sweden	Malbork/ Poland	Trabki Wielkie/ Poland	Rostock/ Germany
Area in km ²	21,72	30,28	17.15	16,26	181,28
No. of inhabitants	35.200	83.000	39.300	10.200	202.900
Topography and Climate	Flat, maritime	Flat, continental	Flat, continental	Hilly, continental	Flat, maritime
Structure of society in terms of tourists and students	Tourists, Students	Tourists, Students (coop. Univ. Kalmar)	Tourists, Students (field office)	Tourists, no Students	Tourists, Students
Sustainable objective of the City	Sustainable city	Fossil free by 2030	Ongoing projects	25 villages, european natura 2000 network, Bicycle Policy Audit	RSAG objective: 2020 target for sustainable mobility

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The local circumstances encompass the social and environmental values. These external factors such as topography and climate, the presence of tourist attractions and the structure of society all influence the personal mode choice and indicate, whether there is a potential for a certain mode of e-mobility. Furthermore, the size of a municipality and the settlement structure – whether it is disperse or dense – has an effect on the length of the trips and probably on the public transport supply.

Mobility Options & Infrastructure

Besides the local conditions, mobility patterns are influenced and formed by both the transport supply and demand in the city. The quality of the transport supply, the presence of a (safe) public charging infrastructure, the accessibility to the different modes and the availability of a private vehicle (or a driving license at all) have an impact on the mode choice and determine the demand. In addition, they indicate, whether implementing a sharing system apart from purchasing may be possible.

The daily mobility patterns can be represented by the average modal split values. The following diagrams on Figure 2 depict the current (historical) situation, which reflects to the special features of the three countries. Since only the middle- and small sized cities have of special interests, this data has been accessed from the database of the *European Platform on Mobility Management* and from the *German Federal Ministry of Transport, Building and Urban Development* (EPOMM 2011; BMVBS 2008).²

² Since there was no data available in polish small sized cities, these modal split trends have been represented by the average of a Czech and Slovakian city with the same size. The data has been gained from a study on travel behaviour in Czech, Slovakian and Polish cities conducted by “Central Meet Bike“ EU Project (Schubert 2012).



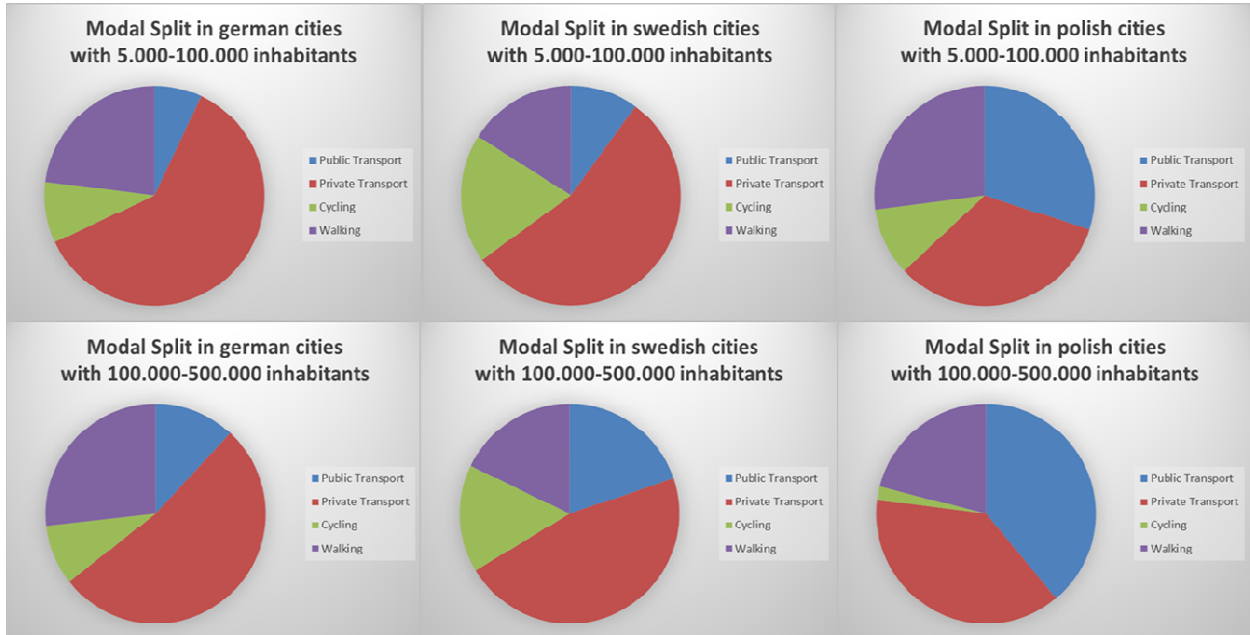


Figure 2: Modal Split data in small- and middle-sized cities in the three participating countries (Source: PTV Group)

The general fact can be observed in all three countries concerning public transport: the bigger the size of the city is, the higher is the demand on public transport, since the distances are increasing and the accessibility is improved. In the most cases, this share raises against the usage of private transport. Besides these facts, the diagrams show a particular low share of cycling all over Poland – the acceptance of cycling in Sweden and Germany is considerably higher.

However, the reasons for choosing an alternative transport mode to the private vehicle lies on the different way of thinking between Eastern and North-Western Europe. On the one hand, choosing mass transit as a form of mobility in some regions is not only an option, but the one and only possibility for being mobile, since there is no car available due to financial reasons. With other words, the availability of a car already determines the selected form of mobility. On the other hand, Poland and Germany are perceived to be car-oriented cultures (Urbanczyk 2011), where possessing a car is still a status symbol (mainly in Poland), or the influence of the domestic automotive industry is still so strong (Germany).

In general, car is still the dominating mode of transport, but in the recent years, the importance of cycling has been emphasized and promoted to increase public awareness. In Poland for instance is making every effort to develop the cycling culture at all (Urbanczyk 2011).

Politics & Culture

On the highest level, the demand on state-of-the-art transport modes and their perceived mobility patterns can be influenced by new traffic policies and the adjustment of the regulatory environment. A prerequisite is the adaption of the European laws and directives. Nationwide governmental support through the provision of subsidies and incentives (e.g. tax reduction, use of bus lanes, possibility to reserve parking lots for electric cars) is essential to catch the society’s attention and increase acceptance for e-mobility. Table 2 introduces the currently provided measures and summarizes the policy frameworks that enhance e-mobility.

Table 2: Overview of measures provided by the national governments (Source: PTV Group)

Country / City	GDP (USD/capita)	Form of Realized Public Interest	Policy Framework	Measure of Government	Additional Information
Germany/ Rostock	37.479	Regular events and campaigns Pilot projects	Clear long-term e-mobility strategy	Incentives (tax) no subsidies for purchasing, fund on research	Strong influence of automotive industry (VW), high share of cycling
Sweden/ Växjö, Karlskrona	44.091	Award of zero emission cities Pilot projects	Clear long-term e-mobility strategy; research programs till 2030	Incentives (tax) subsidies for purchasing fund on research toll-free initiative	New development of nat. automotive industry (Volvo) high share of cycling
Poland/ Malbork, Trabki Wielkie	10.570	Occasional events and campaigns smaller pilot projects	No clear nationwide strategy, adaptation of EU Policy	EU fund, support to regional development agency, BYPAD-monitoring	lack of automotive industry low share of cycling

Concerning the role of the public sector, Germany and Sweden show high public awareness, and the regular e-mobility events as well as pilot projects are fully supported by the national government. In Poland, medium public interest and limited government support are observed, which results in a lack of a clear nationwide e-mobility strategy, which may decelerate the successful implementation of such measures – this was the conclusion of a study published by Roland Berger Strategy Consultants (Zsilinszky et al. 2011).³ Another counteracting problem in Poland according to this study lies on the supply side – the absence of the national automotive industry makes it difficult to provide an e-mobility team and conduct pilot projects involving the domestic car manufacturers.

³ A study by Roland Berger Strategy Consultants called *E-mobility in Central and Eastern Europe* evaluates the maturity of Poland based on four criteria – demand, supply, regulatory- and operating environment



The most national support- and research programs are provided for cars. Incentives through taxation (tax relief for e-cars for the first 5/10 years) are realized both in Sweden and Germany, whereas subsidies for purchasing are so far only given in Sweden. Poland is in the phase of building the electric vehicle market, completed with private offers for electric vehicle conversion. Nevertheless, based on the experiences of the last conferences organized in Poland in the field of e-mobility, as well as the conclusion of the study of Roland Berger Strategy Consultants, the country is also mature to initiate nationwide programs and eligible to implement e-mobility strategies (Zsilinszky et al. 2011) – in this field, some smaller pilot projects have been implemented.

Individual Mobility Behaviour

Individual mobility behaviour includes the duration and the distance of a daily trip taken as well as the trip purpose and its regularity. Personal preferences play an important role by the daily decision on the preferred mode of transport. Some further factors such as the personal fitness and the need or desire for comfort also have an impact on the practiced form of mobility. While an elderly woman prefers to have a car for her daily activities, a youngster could only rely on his bike on a daily basis for years. There is interdependence between the driving characteristics of one person and socio-demographic factors. Age, gender, size of household and household income, all determine the mode and type of tenure: purchase, rent or lend. Some trends can be derived from the recent years' statistics. Up to now, people with higher household income are potential buyers of electric cars, while students live with the option of electric carsharing. In the recent years, pedelecs have been bought mainly by elderly persons, while segways are mainly rented by tourists. But either way: most important for the interest in electric mobility is the implicit and available knowledge and information about electric vehicles.

Characteristics of Electric Vehicles

The special features of e-vehicles cannot be neglected. Electric cars, pedelecs as well as electric motor bikes differ from the conventional counterparts. Investment and operational costs are one of the most important decisive factors by purchasing a vehicle in general. Concerning vehicles with electric propulsion, low operational and maintenance costs as well as the prevention of harmful emissions and the reduction of noise generation are enormous advantages of this technology. In the case of pedelecs, these general advantages are completed with a facilitating system while pedaling and a wider range compared to a conventional bike.

On the other hand, high acquisition costs of the EVs together with the limited range of car usage as well as the unsatisfactory charging infrastructure are considered to be the biggest obstacles. Even though 85% of the daily car-driven distances take up less than 70 kilometers and most car owners have a private garage so that reloading the battery can mainly be done at home.

