EVS30 Symposium
Stuttgart, Germany, October 9 - 11, 2017

Commuting with Pedelecs – ELECTWOCITY

Matthias Breust, Thomic Ruschmeyer

Bundesverband Solare Mobilität e.V.

EUREF-Campus 16 / 10829 Berlin / Germany

Tel. +49 - 30 - 32 66 29 99 / Fax -29 97

evs30@bsm-ev.de

Summary

ELECTWOCITY (short ‚e2c') will display ways to motivate people to use an (partly) electric bicycle for communting instead of a car. By communicating best practise and demanding seemingly far fetched measures the most common psychological, infrastrucural, technical or other impediments shall be challenged.

Keywords: bicycle, city traffic, municipal government, sustainability, user behavior

1 Initial Position

Commuting causes a major share of traffic's pollutants. But it is almost impossible to avoid, as almost everybody needs to get from home to his or her working place and back. To make commuting cleaner the developed countries may need to shift the Modal Split[1] towards pedelecs and other light-weight two-wheeled vehicles («e2wheels»). e2c focusses on e2wheels and what could commuters motivate to use them instead of their cars.

1.1 Polluted and Overcrowded Cities

The emissions of traffic include various harmful, noxious or even toxic substances like CO_2 and NO_X. The pollution by particulate matter forces cities in industrialized areas like Stuttgart (D) to take severe measures up to banning fossile fuel cars entirely from entering[2].

The traffic noise alone effects the quality of life and health of billions[3]. Along with substantial pollution these effects are increasingly considered as negative by both city officials and inhabitants.

Furthermore cars use up a lot of space. They are allowed to streets that lead almost everywhere, so you might drive exactly to where you want or need to go. If you find a place to park your car, that is. And then it blocks 15 m² idly waiting for its next journey. This inner city space might serve far better purposes than carrying a dirty and potentially dangerous vehicle.

1.2 Routines in Mobility

People became used to internal combustion engines. Thus they tend to ignore the damaging and endangering effects of their own behaviour. To keep up their routine they even romanticize their relation with the vehicle. After decades of optimating the infrastrucuture for cars they became too common to be instantly marked as

obsolete.

The dependency, that people attribute to their car, is quite often very real. The daily needs may only be satisfied with a car, when there is no shop, no medician, no post office or bank in walking distance. Many governments all over the world have been laying out communal and regional infrastructure exclusively for cars and their users. Public transport, bicycle or walking became exceptional modes for people too poor, too old, too young, too stupid or otherwise inapt to drive a car.

1.3 Electric Two-wheeled Vehicles

With e2c we aim at commuters with daily distances of less than est. 15 km. Up to this range the travel by e2wheel will not take at lot longer than by car[4]. In the first phase of e2c we gathered some of the appropriate vehicle types and developed a matrix with technical and legal data to seperate each vehicles‘ use cases.

By issue date of this paper there are no significant results. Since we are not scientific organisation and our ressources did not allow further exploration we might later pursue this approach in relation with commuting habits. But so far the variety of legal pedelecs is too vast to be categorised on a more elaborate level, that holds no significant relevance for our purposes.

The use of pedelecs is a proper substitute concerning the distances most people have to master. Thus we focus on pedelecs that legally can be used like normal bycicles. Whereever suitable we include electric motorbikes as well as e-motorized scooters or skateboards to illustrate not only the variety of vehicles but the future of mobility in general.

1.4 Sustainable Mobility

The BSM e.V. is a non-commercial association founded in 1989 to promote electric driving using regenerative energy. Its activities concentrate on sustainable mobility concepts including electromobility[5]. The most recent projects dealed with grid-serving on-board charging technology (PiVo) and driving school curricula.

This paper may not be used as guideline for cities how to increase e2wheel traffic in practise. The BSM aims to find a list of measures, that may apply for decribed challenges. The core perspective of e2c however is to communicate the idea that taking the proposed measures may not always seem rationally adequate, sensible or necessary, but creates an atmosphere that allows to leave the usual paths.

Generally people do not consider the enviromental consequences of their habits. e2c and many other activities hardly change that. Instead we have to make the people happier.

2. Structural Aspects

2.1 Motivation

What makes people change their routine? Best practice in European cities show various approaches. In this paper we can only give hints where to start. But it became clear that building bike lanes and changing traffic light sequences are only a few of a great number of areas to be involved. Also we presume democratic constitutions. In autocratic systems one might not have to consider the people‘s will.

The most successful policy is probably pursued in Copenhagen. We will refer to some details later, but already the outline of the Copenhagen model that enlightens how a change in mobility can be accomplished.

One of the top references is fun. Leaving the car behind means – like a lot of enviromental-friendly - abdication to most people. But cycling is fun, and electrified cycling is even more fun. Cyclists are happy[6], and around them most people are happy. Maybe not the ones inside cars.

2.2 Devotion

To move people you have to be serious about your goals. If you do not really believe in them yourself, no one else will be convinced either. One way to communicate devotion is money. Another way is priority. So any

administration that decides to support e2wheeled traffic has to activate ressources and cut budget somewhere else. This process already requires to convince the community to shift its priorities.

2.3 Planing

Substantial changes in infrastructure to enable, ease or activate e2wheeled traffic need some time. It took Copenhagen twenty years from 1995 to double the number of bicycles crossing the city[7]. In democratic communities you win this time only by long term commitments, or the next election may put an end to it.

If you look at cities that have a vast share of two-wheeled traffic they either protected and nourished existing structures like Amsterdam, that preferred canals to motorways, and built up infrastructure for bikes in the 70s merely for safety reasons[8]. More often communities put up a plan for a decade or more to what to achieve in a certain amount of years, how much to spent on measures and what benchmarks to meet.

2.4 Documentation

The focus on cars is mirrored in accessable data. It is easier to find the number of rain detectors used in cars than the number of commuters taking the bike. The mere counting of vehicles shows for example how a parking space in front of a shop affects its sales (10%, not a lot).

The decision pro e2wheels has to be accompanied by statistical data, if not results of scientific research. Whenever an experimental approach is taken this requirement to documentate the changes and their effects are crucial for keeping track.

2.5 Publication

In Copenhagen the local government follows the guidelines of Jan Gehl and others for two decades now. The city wants to be the most bycicle-friendly town on the planet. Thus Copenhagen produces transparency by publishing data every year. This „Bicycle Account“[9] compiles how much Copenhagener cycle, plus what they think about it. So Copenhagen not only keeps track of the numbers, but also of how they are perceived by its citizens.

The research for best practise faces some difficulties because a lot of cities don‘t do any marketing.They just solve problems they consider as local. If successful they move to the next challenge.

2.6 Participation

Copenhagen wanted to make the city friendly for all inhabitants, whereas other cities paved its inner areas for cars. And the citizens join that trip, because it is their data, their modal split, their ranking. The project‘s success makes more people to join in, which makes it even more successful. Most Copenhageners are proud to live in the world‘s most bike-friendly city.

You will hardly find people to be proud of their car-friendly home town. ‚Car-friendly‘ is another word for ugly, dirty, loud and dangerous – an excuse for motorways right through medival towns e.g. To rise e2wheeled traffic might be a project to unite a city‘s community.

2.7 Benchmarking

Almost every city that lays out plans to become more bike-friendly refers to Copenhagen. One international comparison of bike-friendly cities is the „Copenhagenize Index“[10] compelled by an agency specialized in designing urban enviroments (Copenhagenize Design Company). The Danish capital is widely considered the most bike-friendly place on earth. And it researchs, generates and publishes its data. Therefore it is justified to refer to Copenhagen as benchmark to most measures that are suggested in this paper.

2.8 Competition

People like to compete. Although it may take some time and effort to win this competition there are more and more communities contesting. It may be hard in the beginning, but after a certain point the process becomes dynamic. To keep leadership the focus has to switch for Copenhagen e.g,

The Copenhagenize Index[10] listed twenty cities, number 2 being Utrecht (NL) with a share of 60% commuters cycling. During the e2c project we will try to compile as many examples as possible.

3 Individual Aspects

The modes of mobility most often follow personal habits, that grew out of many individual experiences and circumstances. The aspects described below may not have the impact to change habits. But they could serve as reasons given.

3.1 Security

Personal safety is far more important on a bike than on most other modes of mobility. In 2016 a very detailled study on Urban Mobility compared London and Berlin[11]. Statistically the main reason given for choosing bike or public transport instead of a car is safety. Whereas in London people prefer tube and bus, in Berlin more people take the bike.

The design of bike lanes is probably one of the most important issues to make two-wheeled traffic safer. Within this paper we will not go deeper into that subject; in the final results of the project we will give a detailled overview.

Another finding of the London/Berlin-Study is that cycling gets safer the more cyclists are under way. One bike may be overseen, but ten cannot be ignored.

3.2 Speed

Average travelling speed of car in German cities is around 25 km/h[12]. During rush-hour it drops way under 20 km/h. The gross travel time including walks, waits, searchs make the car not faster than the e2wheel with max. 25 km/h probably for inner city distances up to 15 km. Faster bikes beat any car as soon as they are allowed to bike lanes or get their own.

The main reason given by Copenhageners, why they go by bike, is «it is faster»[13]. Once one experienced the gross time needed from door to door he or she will probably agree.

3.3 Time

The e2wheel may be faster than the car at least up to distances of 15 - 20 km. But even if not the travel is from door to door without wasted extra time of getting to the car, cueing at traffic lights, driving occasionally or permanent deviations, searching for parking space and finally walking a couple of hundred meters to the office. With a bike the time spent is the time used. That is another aspect that makes cyclists happier communters than automobilists.

3.4 Comfort

Travelling by car is usually considered comfortable. You do not have to sweat, fight for a seat, pray for a bus to come or have to behave. No rain, no noise, no smell gets into it. It is actually so comfortable, that people prefer it to faster, cleaner, cheaper, easier, calmer ways to travel. The own private rolling living room.

The definition of comfort shifts lately, though. Some want to work on their way to the office, read their mails e.g. Others might want to use the travel time to exercise. Or they enjoy the fresh air.

In Germany less young people every year get a driving licence. Being connected has a higher priority, as soon as mobility needs can be satisfied without driving yourself.

The e2c measures include bike bridges to cross obstacles and avoid car traffic. Bridges are not only safer and cleaner to ride on; they might radiate an attraction on their own, so e2wheelers take the bridge despite the extra distance they might have to travel.

3.5 Health

Many studies show the positive effect of daily cycling. It is a truth too simple to discuss it any further.

3.6 Costs

As we mentioned before Copenhagen does a lot to proof their strategy right. They even calculated the value of cycling to the city. Every cycled kilometer earns the city 1,34 Danish Krones (0,18 €), every kilometer by car costs 5,64 DKK (0,76 €). An analysis of the Danish data, that included accidents, climate change, health, and travel time, produced general costs of 0,08 € vs. 0,50 € per km[14].

Another financial aspect is bicycle theft. Whereever police paid more attention to parked bicycles[15], the number of refound stolen bicycles rose and the number of thefts decreased. This communal effort and the successful police work and people to use their bikes more. The facilities to lock e2wheels to – or even in – had been increased. This further encourages to spent three or four times as much on an e2wheel than a normal bike would cost.

4 Project Modules

4.1 Research

The project gathers information of various kinds to develop a universal view on the topic. In the first phase a meta-study compiles experiences about use cases and strategies of cities to expand the share of non-fossile traffic. These factors might be vehicle types as well as the design of bike lanes, incentives for buyers, facilities granted by local authorities, or else.

Secondly we started to interview several experts on e2wheeled mobility to question how can we make people take an e2wheel to work. Depending on the interviewee‘s background these measures might regard e.g. safety, comfort, health or speed. This process is still ongoing, its results may be published in EVS 30.

These findings are evaluated by field research in several cities that qualify as appropriate examples. Many towns in Europe already implemented strategies to increase cycling. The BSM will examine both bike-friendly places like Münster or Potsdam as well as car-focused places.

The BSM aims to add the essential users‘ perspective to the discourse. This view upon road design or charging points will question the practical impact.

4.2 Campaigns

The results of e2c will be published in several media such as the project‘s websites[16], flyers and other material. Main focus here will be to compile a manual, that helps local authorities to find solutions for their special mobility concepts. This online guide and/or handbook will give examples and arguments drafted from former experiences.

During the campaign we will develop motives and claims for roll-ups and posters. These motives may be further used by both BSM as head management and the German Federal Ministery für Enviroment as the project‘s sponsor. The claims under «3» illustrate the main targets of e2c.

The project will be promoted by BSM in the yearly industrial fairs «Hannover Messe», «eMove 360» (formerly «eCarTec») in Munich and «Eltefa» in Stuttgart, and many other occasions.

4.3 Workshops and Conferences

The various concepts and proposals are discussed in workshops and one or two larger conferences. The invitations will go to people representing all stakeholders like police, planing authorities, manufacturers and dealers, rental services, cyclist, car-driver and pedestrian associations, politicians and scientists.

The results of these events will constitute the topics, demandments and arguments, that will be used in the final manual. The participants of these events will contribute to many cities‘ efforts to increase the share of e2wheel commuting.

4 Content of EVS-Poster

The EVS30-poster will feature some controversial claims, that define and prioritize the further content. Each of the following topics will highlight some of the before stated correlations.

4.1 «No Time For Cars»

Most commuters would most probably be faster by e2wheels than by car. The average driving speed already range around 25 km/h, traffic jams or walks to and from parking places not included. e2c will show, that it may be faster and healthier to hurry up on a vehicle that is not forced to stop every few hundred meters.

Taking the bike is better for everybody else anyway. In a lot of respects investments in infrastructure for e2wheel might pay off a lot sooner than additional motorway lanes. Exclusive bike streets, extra speed lanes, charging points at prominent sites, attractive bike-only bridges might sound like stealing from motorized traffic. But it is actually «giving» to all of us.

The BSM recommends to calculate the effects of investments into traffic infarstructure the way Copenhagen does it. In e2c these positions will be listed and assessed to pro-bike strategies.

In Section 2 we have discussed several aspects derived by the experiences of various cities. We will deepen that insights to be presented at EVS 30.

4.2 32 km/h for Pedelecs - «The American Way Of Drive»

The two ‹European› categories of pedelecs are limited to a. 25 and b. 45 km/h max. speed. So either they are as fast a good cyclists, or as little motorbikes, i.e. too slow to make people want to drive them resp. too fast to be controlled. One single category with a maximum speed of 32 km/h like in the U.S. (20 mph) might be a better choice[17]. The electric «support» enhances continously with the driver‘s cycling speed; existing pedelecs reach 25 km/h very soon, but are hard to accelerate any further.

More than 32 km/h is not really necessary, the legal and technical requirements get less confusing, the design of bike lanes will be easier.

This measure is probably the most popular one. Everybody using bicycle or pedelec agrees.

4.3 55 km/h for eScooters – «Swim With The Current»

Electric motorbikes and -scooters, that are limited to 45 km/h, should be allowed to go 55 km/h. They would not be considered as moving obstacles, which endangers this was of travelling even more.

4.4 The Idaho-Stopp – «Cyclists Die On Green»

As shown in cap. 3.1. people prefer a bike, if it was safe, and cycling gets safer by other bikes. Safety is a big issue. Heavy accidents of cyclists are mainly caused by cars. Statistically it is more dangerous for them to go straight on on green lights than it is on red[18]. Eventually some car drivers taking right or left turns may cross their way without watching. Very rarely cyclists cause crashes by deliberately ignoring the traffic lights and crossing on red. They pay maximum attention.

Cyclist and pedestrians should take red lights as stop-signs. They have to stop, but may continue if possible. This «Idaho-Stop» was implemented in the US-State in 2008. In 2014 Paris installed signs on traffic light posts to allow bikers to go straight and/or turn right on red. The cities of Nantes, Bordeaux and Strasbourg followed, and since then all had less accidents.

Red lights are for cars to wait for green light. Everybody else may go on.

4.5 Free Bikes «Give to Get»

The precautions necessary to protect e2wheels from being stolen are challenging. For bicycles two different locks are usually safe enough, but being worth up to ten times more a pedelec deserves proper places to park, garages and/or smart devices. In e2c we recommend competitive and effective solutions.

The trend to share expensive gadgets grows continiously. Free floating offers like «Emio» and «Coup» are successful in Berlin. A similar service with pedelecs could increase visibility, and more e2wheels will prompt better infrastructure, which eventually convinces more people to use them.

One of the best ways to get more people change for e2wheels might be to give them away for free. Compared to what authorities spend to promote electric driving, the expenses for free bikes would be marginal.

4.6 e2wheel-Highways «Must See – From Up There»

The expenses reserved for car infrastrucure, for tunnels and bridges, highway-crossings e.a. consume a vast part of public budgets. If only fractions of this sums went into 2wheel-bridges, the money would be spend much more useful.

The variety of possible e2wheel-lanes is vast. Most convenient are lanes without crossing and broad enough to allow for different speeds. «Bike Roads» that do not exclude cars explicitely are a good start. «Fast Lanes» along rivers and railroad tracks, through parks or forgotten backyard areas will draw people to use them. But the «Cykelslange» in Copenhagen crossing parts of the haven, or Eindhoven «Hovenring» elevated above the crossing of eight-track motorways might make you take the bike only to get up there.

5 Conclusion

The BSM will show what measures are to be taken to successfully reduce traffic emissions by increasing electric driving on two wheels. The best practice of Copenhagen and other cities serves as example in general, but also delivers a lot of good solutions in detail. With e2c the BSM wants to communicate this as widespread as possible.

Driving a pedelec is described like cycling with build-in wind from behind. e2c is part of this wind. Using electric cars is already a good way to avoid emissions. Riding e2wheels is even better.

References

[1] «Modal Split» percentage of people or trips or distances or km per head travelled with a particular type of transportation. - For the use in this paper the exact definition is not relevant.

[2] e.g. report on Reuters.com: «Germany‘s Stuttgart set to ban some diesel cars from city center» (Feb 21st, 2017 by Michaela Rehle, http://www.reuters.com/article/us-germany-autos-diesel-idUSKBN16028H)

[3] e.g. Health an Enviroment Alliance (HEAL) in Joint Statement (June 27th, 2017, http://www.env-health.org/resources/position-papers/article/health-professional-societies-send)

[4] see cap. 3.2 „Speed“

[5] see *http://www.bsm-ev.de* for further details

[6] see report on resp. Study of Stanford Calming Technology Lab «Cyclists are less stressed» (*http://www.telegraph.co.uk/men/active/recreational-cycling/11603491/Cyclists-are-40-per-cent-less-stressed-than-other-commuters.html*)

[7] see *http://www.cycling-embassy.dk/wp-content/uploads/2017/07/Velo-city_handout.pdf*

[8] see *http://www.iamsterdam.com/en/plan-your-trip/getting-around/cycling/amsterdam-cycling-history*

[9] see last complete issue on 2014 *http://kk.sites.itera.dk/apps/kk_pub2/pdf/1382_FvvnTRBSlZ.pdf*

[10] http://copenhagenize.eu/index/

[11] «Towards New Urban Mobility» The case of Landon and Berlin, LSECities & InnoZ GmbH, London/Berlin 2015 (https://files.lsecities.net/files/2015/09/New-Urban-Mobility-London-and-Berlin.pdf)

[12] report on resp.Study of TU Dresden see *http://magazine.moovel.com/2015/12/07/stadtverkehr-challenge-fahrrad-auto-oepnv/*

[13] see [7]

[14] «Transport transitions in Copenhagen: Comparing the cost of cars and bicycles» by Stefan Gössling (Lund University Kopenhagen) and Andy S. Choi (University of Queensland), in Ecological Economics, Volume 113, May 2015, Pages 106-113

[15] as in Potsdam: *http://www.mobil-potsdam.de/de/fahrrad/fahrradparken/*

[16] see *http://jimdo.electwocity.de*

[17] «GoPedelec», a manual by the GoPedelec Consortium under lead of extraenergy.org, Wien 2012 (http://www.gopedelec.eu)

[18] «Radfahrer 2015», Report of the Polizeipräsident Berlin (http://www.berlin.de/polizei/_assets/aufgaben/anlagen-verkehrssicherheit/radfahrer2015.pdf)

Authors

Matthias Breust, born June 7th 1966 in Bad Oeynhausen (Germany). Lawyer and journalist. Since 2011 he handles vast parts of the BSM‘s public relations such as the website, printed information and promotion material as well as event management and other services. Beside his law firm he ran a staff magazine («Kutscher») for a public transport company (BT Berlin Transport GmbH). He rides bike and e-scooter in Berlin on a daily basis.

Thomic Ruschmeyer, born in Hamburg in June 14th 1959. Traffic sociologist. Ruschmeyer examed on «Technological Significance of Bicycles and their Development». In 1989 he co-founded the «Bundesverband Solare Mobilität e.V.» as nationwide association of regional solar mobility clubs and presided the BSM ever since. Among chairs in various advisory boards of fairs, awards and conferences, he represents civic and environmental organisations in the Infrastructure panel of the National Platform Electromobility («NPE»).