The Consumer Voice in Europe

MAKING ELECTRIC CARS CONVENIENT

BEUC recommendations

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EC register for interest representatives: identification number 9505781573-45

Co-funded by the European Union

Ref: BEUC-X-2019-032 - 10/05/2019

Why it matters to consumers

Electric vehicles are gaining momentum in Europe. Carmakers plan to significantly expand their market offer in the next few years. Consumers have a lot to gain from a transition to electric vehicles for their quality of life, health and even wallets. Particularly in urban areas dwellers can benefit from less pollution. But for this to succeed, we need consumers to embark on this journey. And the indispensable factor here is that consumer needs and expectations must be addressed with urgency on issues such as range anxiety, easy charging and battery durability.

Summary

This paper investigates how to make the shift to electric cars convenient for consumers. Consumer groups recommend the EU and national authorities to take the following actions:

- Accelerate the roll-out of fast and normal power charging stations along highways, in urban areas and in private buildings.
- Enable payment by debit card in all publicly available charging stations and cash when possible.
- Maintain and swiftly repair publicly available charging infrastructure in case of failure.
- Ensure that charging tariffs are easily understandable and comparable. As we do now at petrol stations, users should pay on the basis of how much they have charged their car.
- Provide reliable information to consumers about the location and real-time availability of publicly accessible charging stations.
- Make consumers aware of the technical characteristics of their vehicles (such as real driving range and charging capacity).
- Develop new eco-design requirements so that electric car batteries are durable, repairable and recyclable.

Introduction

Electromobility is finally gaining more momentum in Europe. All major car makers plan to introduce new models on the market. Optimistic announcements are finally starting to translate to a real offer for European consumers who still today face a much too limited choice[1].

Certainly, the fact that the EU recently agreed on new CO2 emissions targets for both 2025 and 2030, already pushes car manufacturers to invest in e-mobility. These legal deadlines, the never-ending dieselgate scandal, competitive pressure from China, and Europeans' growing awareness of climate change and the health effects of air pollution together form a strong incentive for car makers to innovate.

For consumers, this progress towards a more diversified and increasingly affordable market offer for battery electric vehicles is good news. Besides being better for the climate and air quality, research conducted by consumer groups across the EU shows that battery electric cars should soon enable drivers to save money. In some countries, this is already the case today[2]. Yet, the uptake and a move from a niche to a mass market will only happen if all conditions are met from the outset to make electric driving a handy option for people's daily lives. If this is not the case, the risk is that consumers will not trust e-mobility. The transition to zero-emission mobility could be significantly delayed as a result.

Often-quoted hurdles such as range limitations, lack of charging infrastructure, bad customer experience with charging operators or concerns regarding battery durability might not have held back those already convinced of electric driving. Yet we must make sure we answer these issues now to ensure the transition will be successful to reaching a broader audience. Without addressing those questions, we might significantly delay investments from everyday consumers who do not care about the type of engine but only want to move from point A to point B seamlessly and safely.

This paper investigates some of these concrete consumer concerns about e-mobility issues and includes BEUC's proposals to address them.

1. Ensure the availability and user-friendliness of charging infrastructure

After a *higher purchase price*, the *lack of available recharging infrastructure* is the second biggest hurdle for consumers to opt for an electric car today[3]. However, EV users also regularly complain to consumer organisations about the lack of transparency and fairness of charging tariffs and payment difficulties at charging stations. Too often, charging point operators do not provide payment options other than their own membership card or Smartphone app. As a result, those travelling long distances will need to own different cards and apps to be able to charge everywhere in the network. Another concern often raised is the poor maintenance of the publicly accessible charging network with stations badly functioning or not functioning at all.

[1] https://www.beuc.eu/publications/beuc-x-2017-119_sma_availability_and_affordability_of_zevs_interim_report.pdf
[2] https://www.beuc.eu/publications/beuc-x-2018-113_when_will_electric_cars_be_an_affordable_option_for_european_consumers_-_a5_format.pdf
[3] https://www.transportenvironment.org/press/forty-percent-europeans-say-next-car-they-buy-likely-be-electric-poll

The main message to consumers should be that technology does not matter. It must be likewise easy and convenient if not even more convenient to run an electric car than a car with a combustion engine. The possible upcoming revision of the 2014 directive on the deployment of alternative fuels infrastructure[4] (hereafter referred to as 'AFI directive') provides an opportunity to address these issues. Below we outline how this could be integrated into the directive.

Box 1: How does the charging of electric cars differ from the refuelling of conventional cars?

For most electric car users, between 80 and 90% of the charging will be done either at home during the night or at work during the day. In these moments, normal-power recharging stations (between 3,7 and 22 kW/h) will be sufficient as the car will be parked for several hours in a row and daily trips rarely exceed a few dozen kilometres per day.

For long-distance travels along highways and main roads, high-power charging stations (also called fast and ultra-fast chargers) will be needed for users to be able to recharge their batteries much faster. High-power chargers are the ones able to deliver a power of above 50 kW/h. On highways, many charging point operators now roll-out ultra-fast charging stations of minimum 100 kW/h which can restore most of your driving range within 30 minutes. However, in this case, charging up to 100% will not always be the most efficient option. Because charging from 80 to 100% generally takes much more time as the battery's cells are limited in terms of their capacity to take in power. Unlike conventional cars where drivers are inclined to refill their tanks completely, the most efficient scenario for electric cars is to stop the charge when the battery is between 80 and 90%.

Increase the coverage of rapid and normal-power recharging infrastructure

The AFI directive recommends the "*average number of recharging points* [to be] *equivalent to at least one recharging point per 10 cars"*. There are significant disparities across Europe and within Member States. Consequently, not all consumers have the same realistic chances in a European Single Market to switch to an electric vehicle if they wish to do so.

As the EV market expands, there is certainly a need to go beyond this very broad objective and define more precisely what kind of charging infrastructure is needed and where it should be rolled-out. Increasing the coverage of (ultra-)fast charging stations along highways and main roads as well as making normal-power charging stations in urban areas more frequent will be of pivotal importance.

Better charging options must be created for those drivers who do not have access to a private parking place at home or at the workplace. Very often there is no parking space next to or within a building where to install a charging point. Furthermore, people who rent an apartment often report difficulties to find an agreement with landlords or employees with employers on the installation of a charging station.

Until the roll-out and operation of charging infrastructure becomes a profitable business, public authorities should continue funding the deployment of charging stations in public spaces. This is especially the case in locations which are less attractive for private operators but are nevertheless important to cover to ensure a certain density and to respond to range anxiety.

[4] Directive 2014/94/EU of 22 October 2014 on the deployment of alternative fuels infrastructure.

BEUC's recommendations to the European Commission and Member States:

- **Introduce binding objectives for publicly accessible infrastructure:** Make infrastructure deployment targets legally binding in the revision of the AFI directive. Include specific deployment targets for urban/suburban areas.
- **Roll-out of charging infrastructure at home/workplace:** the recently adopted EU directive on the energy performance of buildings1 includes measures to ensure that buildings parking spaces are progressively equipped with recharging points. Member States should facilitate permits and approval procedures for the deployment of recharging points in buildings as well as in the streets when there is no private parking place (see box about the French and Spanish "right to the plug" and the Amsterdam "on-demand roll-out").
- **Public funding**: Increase EU funding for the roll-out of fast and ultra-fast charging infrastructure along highways and major roads, especially in those countries where coverage is currently low, as well as normal-power recharging stations in urban areas.

Box 2: Member States and/or cities' best practices

The French and Spanish 'right to the plug'

In France and in Spain, users of electric cars who live in an apartment in a residence building enjoy a so-called 'right to the plug'. This right facilitates the installation of a charging station in the parking lot of the building by easing and streamlining the approval procedures.

In Amsterdam: 'on demand' roll out of recharging point

Users of electric cars living or working in Amsterdam, can make request to have a public charging station installed near their home/workplace. The conditions for this request to be approved are that the applicant does not own a private parking space and does not have access to a charging station within a radius of 300 metres around his/her home. Provided these conditions are met, the municipality and the charging point operator look for an appropriate public parking space within the designated area and have a specified time to answer the request. Once installed, the charging point is of course open to everybody, not only to the people making the request.

Ensuring the interoperability of charging stations and seamless payment solutions

The 2014 AFI directive requires that *"recharging points accessible to the public shall also provide for the possibility for electric vehicle users to recharge on an ad hoc basis without entering into a contract with the electricity supplier or operator concerned".*

Many charging point operators do not provide this possibility to EV drivers. Very often, to be able to use a publicly accessible charging station, an EV driver must sign up for a

contract with its operator. The consumer will be asked to confirm his/her identity via a Smartphone app or a contactless card (the so-called "RFID card"). As a result, consumers travelling long distance will probably need an array of apps and/or cards to be able to use the charging network everywhere. Only by transforming today's patchwork-like situation into a unified refuelling system can people's primary concerns – range anxiety and doubts regarding availability of charging infrastructure – be addressed. People driving cars running on petrol can use every petrol station. This logic should be the same for electric drivers.

BEUC's recommendation to the European Commission:

Article 4.9 of the AFI directive should be properly enforced. If needed, it could be revised to indicate clearly that ad-hoc payment via readily available debit cards and by cash when possible should be accepted by all recharging points accessible to the public.

Maintenance of charging points

EV users complain regularly about charging stations' maintenance problems. It occurs frequently that charging stations malfunction and remain inoperable for a long time. Test drives conducted by specialised magazines/websites also report the unreliability of some publicly accessible charging stations. There is often too much uncertainty about the power which will be delivered and hence the charging time[5]. It can lead to significant delays. This can be a hurdle to long-distance travel, especially since the EV fast-charging infrastructure is still very patchy. This is particularly frustrating since many of these publicly accessible charging points have been completely or partially funded by public authorities: users deserve a better service and a quick reaction in case of malfunctioning.

BEUC's recommendations to the European Commission, Member States and regional/local public authorities:

- Public tenders for the roll-out of publicly accessible recharging infrastructure shall systematically include an obligation of maintenance (and repair in a reasonable time) of the network by the provider/operator, accompanied by deterrent sanctions in case of non-compliance.
- Define who is responsible for customer support when a public charging station malfunctions. This responsibility must include clear information to drivers about the nearest functional alternative.

Fair roaming fees

To make charging infrastructure interoperable, the operators of charging points often conclude roaming agreements. These make it possible for the customer of one operator to access the infrastructure of another operator while travelling. In exchange for this service the customer usually pays a roaming fee. This means a higher price is levied when charging

[5] https://www.automobile-propre.com/essai-hyundai-kona-64-kwh-bordeaux-marseille-par-les-nationales/

using the network of a partner of one's usual provider. Of course, roaming increases the user-friendliness of the charging network as it allows drivers to use more charging stations. However, it also means consumers might have to pay different prices at the same charging station depending on the contractual arrangements between their usual and other providers. It is therefore important to monitor the development of roaming charges and make sure that they are truly reflective of the costs and are not discriminatory.

BEUC's recommendation to the European Commission and Member States:

Regulators should closely monitor the development of roaming charges and make sure they are cost-reflective and are not discriminatory. There should not be any extra charges for cross-border roaming agreements.

2. Improve consumer information about electric vehicles

Make charging tariffs fair, transparent and comparable

Currently, EV users lack information about the way charging tariffs at publicly accessible stations are established. Our Austrian member AK Wien recently conducted a market analysis of more than 4000 public charging stations in Austria. They found huge differences between tariffs with the most expensive one being 2,5 times costlier than the most affordable one[6] . Their research demonstrated that not only were prices very different but above all that any comparison between these different offers was virtually impossible, thus making it very difficult for consumers to pick the offer which best suits their needs.

It is expected that around 90% of the charging will happen at home[7] and will thus be integrated as part of "normal" electricity supply contracts. Consumers must nevertheless have access to reliable and easily understandable information about the price they will be charged when using a public charging station. Currently, this is made extremely difficult by the patchwork of offers and tariffs currently available: some charging points operators propose monthly subscriptions while others prefer pay-as-you-go options or session-based rates. Several offer a combination of these different offers[8]. In addition to being unclear, this variation in tariffs does not lead to a fair treatment between consumers. For instance, in the case of a *fixed rate session fee*, some users will be able to charge a greater amount of power than others although their vehicles will be plugged in for the same duration of time. This is due to the differences in vehicles technology: some electric models accept greater amounts of power than others and are therefore able to charge more rapidly.

It is important that consumers have access to clear, comparable and fair tariffs as the AFI directive normally requires. By default, the metric used to set the tariff at a charging station should be the amount of power one charges in his/her car (indicated as price per kWh charged). This should ensure comparability for consumers. This power-based tariffs could

[6] https://www.arbeiterkammer.at/interessenvertretung/wirtschaft/energiepolitik/AK_Studie_E-Mobilitaet_August_2018.pdf

[7] https://www.transportenvironment.org/sites/te/files/Charging%20Infrastructure%20Report_September%202018_FINAL.pdf

[8] https://www.automobile-propre.com/dossiers/cout-prix-recharge-voiture-electrique/

be complemented with a time fee where necessary. For instance, at a fast-charging station or in a city centre, there could be a 'time penalty' by way of additional payment once the EV is sufficiently charged to encourage turnover and increase the availability of charging stations[9].

BEUC's recommendation to the European Commission and Member States:

Article 4.10 of the AFI directive should be revised to indicate that, by default, charging tariffs should be based on the amount of power charged, expressed in price/KWh.

Make charging infrastructure safe and convenient

An often-heard complaint is that the charging stations do not instil a sense of safety and convenience in its users. For instance, signs are sometimes missing, the station is not lit in the evening or located at the hedge of a petrol station and are not protected in case of inclement weather. This does not make the charging experience an inviting one. Also, specific attention should be paid to consumers with reduced mobility to ensure they also have access to charging stations.

BEUC's recommendations to the European Commission, national authorities and charging points operators:

- Clearly indicate the location of charging stations along highways/public roads using easily identifiable and visible signs.
- Charging operators should design their station through the lens of public safety and consumer convenience, with a specific attention to consumers with reduced mobility.

[9] For instance, Tesla uses an "idle fee" in its superchargers network once the charge is "nearly complete": *"for every additional minute a car remains connected to the Supercharger, it will incur an idle fee. If the car is moved within 5 minutes, the fee is waived. Idle fees apply when a Supercharger station is at least 50% full, and double when the station is 100% full."*

Provide real time information about the location and availability of charging stations

To be able to travel long-distance with electric cars, consumers need to know where to find the charging stations during their trip. They also need to be sure that charging stations will be available by the time they get there and that they will not have to wait too long until another EV user has finished charging his/her vehicle. Article 7 of the AFI directive foresees that *Member States should make information on the geographic location of recharging points accessible to the public where available. Information on real-time accessibility as well as historical and real-time charging information may be included where available*.

Box 3: The Norwegian database on charging infrastructure

Norway developed an open, publicly owned database that allows everyone to build services using standardised data free of charge[10]. The Norwegian EV association operates this database which collects information from EV users and charging points operators. The data is made available free of charge and market players are free to develop services on this basis.

BEUC's recommendations to the European Commission, Member States and private operators:

- Make data about the location, real-time occupation and use of all charging stations available. Explore the possibility of providing funding to set up an open and publicly owned database on the location, characteristics and real-time availability of publicly accessible charging stations.

Provide clear information about the range and charging capacity of electric vehicles

The **driving range** of electric vehicles varies greatly depending on the model and battery power. Today, most car manufacturers plan the launch of vehicles with ranges comprised between 300 and 500 km under the new WLTP test cycle. WLTP improves the assessment of the driving range for EVs, leading to more realistic values. However, although closer to reality than the old NEDC test, WLTP remains a laboratory test which cannot reflect all driving conditions and usage. It is therefore crucial to inform consumers properly about the real driving range of their vehicles, under different driving modes and usages.

Another key element of information is the **recharging capacity of electric vehicles**. Not all vehicles on the market today accept fast or ultra-fast charging (100 to 350 KWh). This means that the promise often made by charging point operators of being able to charge 80% of a vehicle's battery in less than 30 minutes only stands true for some models which can accept high power recharging.

[10] https://info.nobil.no/eng

Other elements, such as weather conditions, the chemical composition of batteries or the temperature of the battery can affect the speed of the recharge. As a result, electric cars never charge at the maximum speed for the whole duration of the charge, and the intensity of the power varies greatly while the vehicle is plugged in. From a consumer perspective, what matters most therefore is not the maximum but the **average charging speed**: or to say it differently: the time the user needs on average to charge a battery from 10% to 90%.

BEUC proposal:

- **Revise the car labelling directive** and provide consumers with clear information about the real driving range of their electric vehicle depending on the usage (urban, suburban, highways) as well as the average charging speed of their vehicle.
- **Use the EU fuel labelling for road vehicles** in order to indicate the maximum charge power the vehicle can accept on the recharger's cap. Every charging station should indicate which power it delivers.

3. Battery durability and sustainability

One factor of uncertainty for consumers is that it is very difficult to anticipate the costs of replacing a battery. These can be significant and can hinder the large-scale uptake of EVs. Like any battery, EV batteries will indeed lose some of their capacity over time and mileage. Even if anecdotal evidence indicates that EV batteries generally last longer than car experts' expectations, the EV market is still limited and the oldest electric cars on the road today are only 8-10 years old. Thus, real world battery lifetimes are not yet fully known. A replacement battery for a 2020 C Segment electric car is estimated to cost upward of €5,000, which would significantly affect the lifetime total cost of ownership.

To keep the total cost of ownership of electric cars under control and reduce their environmental and carbon footprint, it is important to:

- Maximise the durability of batteries, such as requiring that they are able to perform a minimum number of charging cycles. There are also concerns that fast and ultra-fast charging (above 50 or 100 KW/h) can accelerate the ageing of EV batteries. Likewise, Vehicle to Grid (V2G) applications – by which the electricity stored in an electric vehicle battery is sent back on the grid for demand-response services – could also contribute to shorten a battery's lifetime. The impact of such uses should therefore be well assessed to ensure their harmful effects are mitigated as much as possible and consumers are well informed about the risks involved.
- Make repair and upgrade of EV batteries possible. Batteries should be easily upgradable, both from an environmental and consumer point of view. When a car battery starts losing capacity it might in many cases be sufficient to replace a few cells. This is likely to be less expensive and resource intensive. As electric cars are much more software-dependent than conventional vehicles, software obsolescence

should be prevented. The impact of software updates on battery lifetime should be covered, as well as the availability of software updates.

- Improve batteries' energy efficiency. The possibility to set minimum energy efficiency requirements should be looked into, as it is better for both consumer's wallet and the environment.
- Develop second life applications for used batteries and introduce recyclability criteria. The re-use of EV batteries as stationary energy storage units can greatly extend the lifespan and hence reduce the costs of batteries for consumers.
- Improve batteries' recyclability. Recycling valuable battery content (such as cobalt and lithium) can greatly reduce their environmental impact. Criteria for recycling and disassembly criteria should be introduced to help develop this practice.
- Offer longer commercial guarantees. Many car manufacturers already offer battery warranties covering 160 000km or 8 years, which is the average life-time mileage of a petrol car in Europe. If this were to become standard practice in the industry, an important trust issue could easily be solved.

This publication is part of an activity which has received funding under an operating grant from the European Union's Consumer Programme (2014-2020).

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