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Driver and Barriers to electric bus deployment



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Driver and Barriers to electric bus deployment

The eBussed Thematic Working Group 1 has addressed the task of identifying possible Drivers and Barriers (B&D) to introducing electric buses in a specific region.

This article summarises the methodological work carried out, the results of a field-interview, the systematization of identified B&D by category, with some conclusions and future steps.

The first step undertaken to identify and describe possible Barriers and Drivers to e-bus deployment was to define each of the 2 subjects. A **driver** (also known as an enabler)¹ is an element (such as a policy or an action) that can help transit agencies and governments initiate, continue, or expand their fleet of e-buses. **Barriers**¹ are obstacles or circumstances that can prevent transit agencies and/or governments from initiating, continuing, or expanding their fleet of e-buses.

During the TWG1 discussion, it was noted that barriers could also be seen as opportunities if two basic questions are considered in sequence:

- What barriers does a city face when planning and implementing the adoption of electric buses?
- What actions can urban leaders take to address these barriers and accelerate the e-deployment process?

It was also recognised that not all barriers are there to stay. Some barriers are persistent, in a lesser or more degree, throughout all stages of deployment (e.g. range limitation, flexibility in re-routing) whereas others are particularly acute challenges at specific stages (e.g. lack of initial data, limited reference cases from similar conditions) but bound to be overcome or delimited afterwards.

Another important point is that some factors can be perceived as both barriers and drivers. Some examples have been given to that effect:

- Availability of capital subsidies
- Electricity costs
- Fleet diversification
- Social perception
- Political attitudes

¹ World Resource Institute: "Barriers to Adopting Electric Buses", 2019

Recognised barriers are viewed also as an opportunity to experience cross-fertilisation. Earmarking those barriers of major relevance or concern are expected to help, in fact, in identifying relevant experiences (more or less successful) and documenting them in each region within the present project. The exchange (cross-fertilisation) of such experiences, in turn, can inject useful inputs in the formulation of an effective Action Plan for the deployment or consolidation of an e-bus system in a nearer future in any single region. In other words, when barriers are being read in a positive manner and not merely as obstacles, this approach opens the way to identifying possible parallel solutions at hand. Solutions can thus be reported as experiences documented by each eBussed partner (so called “Good practices”). Once a more or less articulated list of drivers and barriers is drawn, the question of how to classify those drivers and barriers using suitable criteria arises.

Based on a thorough review of the literature and field-analytical reports and studies and TWG discussions, the following categories for classifying drivers and barriers have been chosen due to their applicability to both concepts, drivers and barriers.

- Political
- Social
- Economic
- Technological
- Service Management
- Environmental



Interreg Europe on the way to greener future? Photo by Ivo Tartaglia.

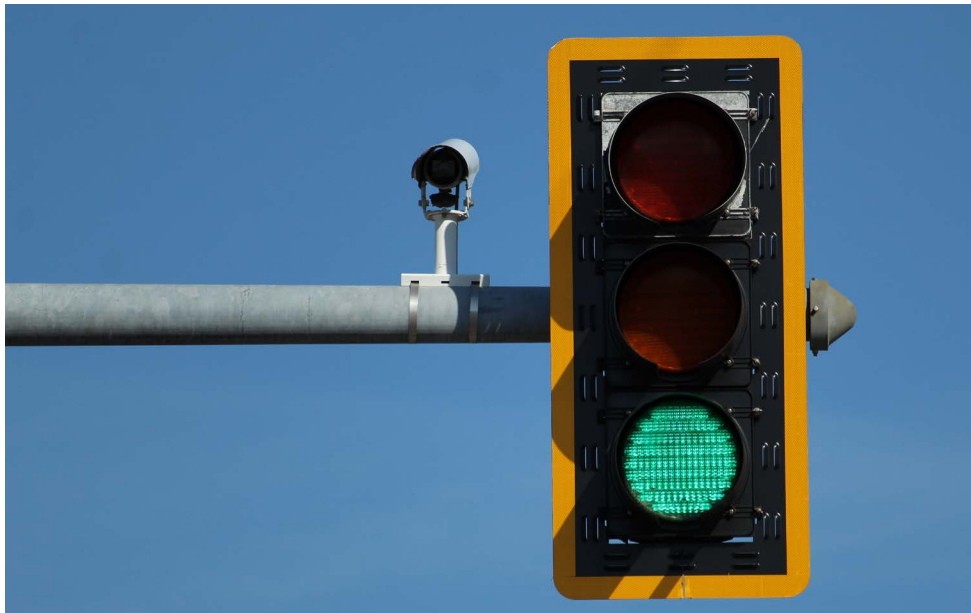
Work progress and results

The initial work resulted in two draft spreadsheets capitalizing upon the indications of the initial project workshop in Turku in November 2019, the Status Quo report jointly prepared by the two Dutch partners and similar reports which followed from the other

partners, plus inputs from various other sources: technical reports, project publications, articles etc. A shared depository named Knowledge Pool (link to the Google Docs [spreadsheet](#)) was arranged to that effect.

The structure available in the research document Barriers to adopting electric buses (link to website World Resource Institute's [website](#)) published by World Resource Institute in 2019 was also considered. The common undertaking made was to arrive at a final “compact” structure of an analytical framework for Drivers & Barriers. One second step was to link up the two elaborated spreadsheets with the more compact matrix indicated in wrirosscities.org Report (see Fig. 1).

A partnership workshop on the theme of drivers and barriers was held in spring 2020 where the results of the analytical work carried out was presented to the participants and an on-the-spot evaluation of drivers and barriers relevance was carried out through an online survey.



A driver of a barrier? Photo by Elioped Suarez / Unsplash

Results

The following results were obtained.

Drivers

- If grid capacity is a barrier to the e-bus deployment, it can act as a driver for improvements to the grid. However, it was discussed that this is less likely to be a barrier in smaller cities with a small number of buses, and even less if these buses are charged overnight at the depot.

- Covid-19 was mentioned as a driver. Fewer people are using larger means of public transport, but what sounds like a paradox can be explained as follows: before the crisis small electric buses have been acquired for short lines on the islands because of the high costs. For the city, larger buses would have been needed, but not immediately. The health emergency was seen as a chance to convince people of the electric mode of transport by using the small buses in the city now.

Feedbacks regarding which Drivers could be taken as most important within each category were:

Political

This driver is related to how hard you want something. Two approaches were recognised; bottom-up and top-down, but ultimately the main Driver is government support (either national or regional).

Explanation: in Hungary, the government funds the change toward ebusses. Then municipalities proceed with the energy transition and carry out the switch to ebusses. In the Netherlands, the initiative did come at the private level, as a pilot. The government came along, made it its strategy and makes it happening now at the regional level; the implementation is done by private parties.

Social

The main driver for this category is “health benefits and climate impacts”, with a link to government policies.

Economic

Main driver is an in-depth overall analysis of the cost of ebusses compared to diesel busses, including external economies. Cost-benefit analysis is useful to that effect.

Technological

The most important aspect is related to energy.

The case of using renewable energy for lower global emissions (CO₂) was considered. In some cases reduction of local emissions (NO_x) is a driver that is counterbalanced by the fact that an e-bus is no better for the global climate than a diesel bus when it runs on electricity produced from burning coal.

Barriers

Feedbacks regarding which Barriers could be taken as most important within each category were the following.

Political

To identify satisfactorily the cost implications and limitations of ebusses versus diesel busses.

Social

Regarding passengers and citizens, if in medium-sized cities there is a lack

of space, residents will not be happy with the amount of space that electrical facilities demand compared to the amount of space that diesel buses take up. Experienced space can be a big issue.

Economic

New ways of procurement mean more stakeholders to deal with. This takes more time and effort to agree.

Another note is that for the same capacity of passengers and the length of their journey, more e-busses are needed than diesel busses as the range of diesel busses is higher. So with more costs and the same incomes, the ratio seems out of proportion.

Technological

There is some hesitance toward standardization when the technology is simply the one developed and preferred inside each region. Such an attitude can backfire, while competition can help the e-bus/diesel competition.

A couple of more recommendations are worth mentioning

- Try to logically link up Barriers with Drivers, by looking at a Driver as a possible answer to a corresponding Barrier.
- Include also COVID, as a “super-barrier”. The mobility scenario is changing fast and this will impact on electric public transport, too.



COVID-19 is changing the future of public transport. It is seen as both a driver and a "super-barrier". Photo by Darren Viollet / Unsplash

Further progress

An updated version of the drivers and barriers spreadsheets was prepared, including the results of the drivers and barriers scoring in the online survey and additional drivers and barriers indicated by participants to the workshop online survey.

A number in each cell of the spreadsheet indicated the scoring attributed to each specific drivers and barriers in each category.

The final drivers and barriers spreadsheet versions are available on request.

Conclusion

The basket of drivers and barriers identified and classified can help to earmark drivers and barriers most pertinent or relevant in a specific region. Such a process can be facilitated by assessing the level of readiness of the region to the e-bus deployment. Such assessment is possible by adopting a check-list of indicators matching the categories listed above. The exercise, which TWG1 carried out in late 2020, shows many innovative features, which will be the content of a future thematic article.

Once the readiness level of a region has been established, further progress can be made, by carrying out a Risk and Opportunity analysis of the various actions planned. This may soon become the content of useful complementary activity in drivers and barriers analysis.

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For more information on the contents of this article and supporting documentation, please contact: ebussed@provincia.livorno.it

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eBussed project supports regions in the transition towards low-carbon mobility and more efficient public transport in Europe by promoting the use of e-buses.