

Is public transport ready for the electric bus?

To put a stop to the rising particulate and NOx emissions in cities, the Dutch government has decided that by 2025, all new public transport buses must run emission-free. Last weekend, Eindhoven introduced 43 new electric buses to their transport system; three buses failed. The electric future seems nearby. But are we

ready to run our transport system completely electric?

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Consequences for bus operators

One obvious consequence for operators is that they are forced to invest in emission-free buses. If they don't meet government requirements, they are excluded from competing in tenders that grant them the right to operate. But regulation isn't the only reason for the rising popularity of electric buses. Compared to Diesel buses, the electric bus is emission-free, low on maintenance and great for your corporate image. Over the last four years, however, the number of electric buses in Dutch public transport has stayed the exact same: one percent. Following the Netherlands Enterprise Agency, out of the 4,946 public transport buses registered in 2016, only 52 are electrically powered. In 2017 this percentage will grow towards 3 percent.

Why are still so few buses electrically powered?

One of the setbacks of the electric revolution is the large investment that comes with buying an electric bus; they are twice the costs of a diesel bus. Because carrier companies do not have any guarantees about their future concession rights, such a long-term investment can constitute a potential financial risk. Local governments determine the tender requirements and decide on the winner of the concession. A concession gives a bus operator the sole right to provide public transport on a certain area or route for a limited period of time. For operators, the electric investment can be risky because concessions run from 2 to 8 years while it takes 6 to 10 years before an electric bus starts returning on its investment. This means that, sometimes, costs of electric buses are too high to be profitable within one concession period. It is therefore financially safer to deploy Diesel buses that are already bringing in money.

Range anxiety & maintenance

If an operator does decide to invest in an electric bus, he is faced with some operational challenges. First of all, the limited battery capacity is very unpredictable due to external influences that constantly affect the energy usage. This way, different types of weather, traffic and driver behaviour all influence the energy level and make it hard to match it to the remaining range of the vehicle. Here, we also need to remember that the same battery that powers the motor is also responsible for heating, intercom, wipers, etc. This combination results in a large variation of energy consumption and thus, vehicle range. This lack of insight in range leads to a fear of running out of battery before reaching the destination. This fear is also called range anxiety.

A second challenge is maintenance. The advantage of an electric motor is that it is made up of less moving parts than a diesel motor and thus requires less maintenance work. The drawback is that once something does break, its battery requires electrical expertise and expensive maintenance. A specialized mechanic needs to come in, detect the problem, order new parts from the manufacturer and come back in again to do the actual work on the bus..

How can operators make it work financially?

To bear the costs of electric buses, the crux is to run the operation in such a way that it eliminates range anxiety and optimizes the overall operation. Electrically driven kilometres compared to kilometres driven by diesel buses, are much cheaper. To speed up your profits then, it is important that electrical buses fully utilize their battery potential and that, like any other bus, they are deployed to their maximum capacity. This sounds simple but proves difficult. Freek Dielissen, CEO of ViriCiti, a Dutch start-up specialized in monitoring electric buses, explains the problem:

“Bus batteries are affected differently in every situation. The energy use of an electric bus is therefore lower on a sunny day in spring carrying few passengers and higher on a cold day in winter while carrying a heavy load. But how much it differs exactly is hard to predict. This is why buses are often conservatively scheduled and after usage of only two-thirds of their battery are plugged back in. This way, more buses are deployed than necessary. Through real-time monitoring of the state of charge, buses can utilize up to 95% of their battery and operators can their schedules with a smaller fleet”.

— Freek Dielissen, CEO ViriCiti

Higher uptime

In considering all the costs of a bus and ways to save on them, solving range anxiety is only part of the solution. Data insights can be deployed in other fields as well, such as in maintenance. By looking at the battery data, technical problems can be detected on the computer, saving on any costs for a mechanic. Also, routine maintenance can be standardized and planned at any convenient time, outside of schedules. Being able to predict the average lifespan of your bus parts, pro-active maintenance can help you preventing unnecessary damage from wear.

The electric future depends on data-insights

Following recent climate objectives, the future of public transport in The Netherlands is dependent on the progression of the electric bus. For the past four years, the percentage of electric buses in Dutch public transport has been stuck at 1 percent, in 2017 this will go up to 3 percent. With this, it seems that the foundation for the electric bus has been created. However, running some electric buses as an addition to your diesel fleet, is much different than the other way around. The challenge of running a full electric transport system can be met, but only when data insights are being used. It is crucial to provide planners and operators with data insights to get visuals as handholds in any planning situation. If data insights are ignored in deploying electric vehicles, operators will not gain the benefits that make the vehicles attractive to them in the first place. Financial returns are gained only when electric buses run efficiently and data-insights in range, operations and maintenance are the only ways to do so successfully.

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Note to editors, not for publication.

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ABOUT VIRICITI

ViriCiti, founded in 2012, offers a cloud-based monitoring system to improve electric vehicle operations. ViriCiti believes that online energy management is the missing link to full adoption of electric city buses and trucks. By monitoring and analyzing data from electric vehicles up to millisecond level, real-time information on the use, condition and performance of the vehicle can be provided. With these insights, electric city buses and trucks run further, more reliable and at lower cost.



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