

From a diesel bus fleet to an electric bus fleet

Aachen, Germany



In brief

Aachen's public transport operator ASEAG tested different innovative environmentally friendly drive concepts for its buses on suitability for the public transport. In particular this included measurements of fuel consumption and noises. Due to the negative results of hybrid buses, light buses were purchased. An articulated hybrid bus was also converted to be fully electric.

Context

Aachen is the most western city in Germany, located in North Rhine-Westphalia, close to the borders of Belgium and the Netherlands. The city of Aachen, with its 250,000 inhabitants, unites tradition with progress.

A cooperative approach in Clean Air Planning and SUMP has been established and is the basis for a vision of a city with a smart and emission free mobility and high quality of life. The mobility department of the City of Aachen has a long tradition in sustainable mobility planning. Over the years the following measures have been successfully implemented: traffic calming, parking zones, parking guidance system, pedestrian zones, extension of the cycling network, and improvement of public transport.

In action

The local transport company ASEAG tested and purchased hybrid buses, converted one hybrid bus to a fully electric bus and purchased five lightweight buses. An important factor of the successful deployment of electric buses on the streets of Aachen was the charging infrastructure. The activities focused on the integration of buses with modern and alternative drive systems towards a clean fleet in public transport. With the help of the DYN@MO project, it was possible to implement market research to define the most sustainable drive systems for buses. Aachen's local public transport operator, ASEAG, in collaboration with the RWTH Aachen, conducted several fuel consumption measurements as well as noise and vibration measurements on hybrid buses. Additionally, passengers of hybrid buses were asked about their awareness and acceptance of the new technology in buses. An articulated hybrid test vehicle was purchased and converted into the nation-wide first articulated fully electric powered bus. Furthermore, ASEAG and RWTH Aachen tested lightweight buses (9 tons in comparison to conventional diesel bus with a weight of 11.6 tons) as another efficient bus concept alternatively to conventional diesel buses. After the positive measurements in the cost-benefit analysis, a purchasing decision was made by the City of Aachen in favor of lightweight buses and electric buses.

In January 2016, five new lightweight buses were introduced into the public fleet and the potential of fuel savings was confirmed during the first months of operation within the DYN@MO project. Furthermore, the decision to buy 15 new electric buses was made. Hence, the first ten buses would be purchased in 2017 (and five more in 2018). The topic

“electromobility” became very important in local policies and the political attractiveness of that theme grew steadily during the project.

Results

- 5 hybrid buses tested
- Comparison of the suitability of hybrid and electric vehicles
- Tender for further renewal of the public transport fleet
- fully electric articulated bus and 5 lightweight buses put into daily operation
- Valuable experience with battery systems and electric drive concepts for buses
- Electric bus cut emissions as follows: NOx: -0.241g/l; PM: -0.0027g/l;
- CO2: -2,138g/l compared to Euro 6 diesel bus
 - electric and lightweight buses achieved good results and the lightweight buses positive cost-benefit-ratios
- Awareness campaigns for the public
- Training for drivers and employees
- Integration of low emission vehicles (hybrid-, fully electric- and lightweight) into ASEAG’s marketing strategy, with objective to inform its citizens/customers

Challenges, opportunities and transferability

“Aachen has the perfect conditions to be a European model city for electromobility. Based on the excellent knowhow in the universities, innovative spin-offs and a cooperative planning culture, we are able to develop, produce and use electromobility in Aachen.” – **Marcel Philipp, Mayor of the City of Aachen.**

When trying to adopt new technologies, testing new technologies (in the local context) is an essential component of the implementation process as it can help ascertain whether adjustments need to be made prior to a larger-scale or more permanent implementation and the results should be communicated to the public. Future outlook includes ordering of 15 additional pure electric buses by ASEAG, and by that - a big step has been taken towards a complete conversion of the diesel bus fleet.

In depth

For more information regarding this good practice:

- <http://civitas.eu/content/integration-hybrid-buses-towards-clean-fleet-public-transport>
- http://civitas.eu/sites/default/files/dynmo_final_brochure.pdf

Contact Person:

Uwe Ratz, ASEAG,
uwe.ratz@aseag.de