



E-Mobility Solutions

Electric vehicles in municipal fleets



**Wuppertal
Institut**

UN HABITAT
FOR A BETTER URBAN FUTURE



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Urban Electric Mobility Initiative (UEMI) was initiated by UN-Habitat and the SOLUTIONS project and launched at the UN Climate Summit in September 2014 in New York.

UEMI aims to help phasing out conventionally fueled vehicles and increase the share of electric vehicles (2-,3- and 4-wheelers) in the total volume of individual motorized transport in cities to at least 30% by 2030. The UEMI is an active partnership that aims to track international action in the area of electric mobility and initiates local actions. The UEMI delivers tools and guidelines, generates synergies between e-mobility programmes and supports local implementation actions in Africa, Asia, Europe and Latin America.

SOLUTIONS aims to support the exchange on innovative and green urban mobility solutions between cities from Europe, Africa, Asia and Latin America. The network builds on the SOLUTIONS project and brings together a wealth of experience and technical knowledge from international organisations, consultants, cities, and experts involved in transport issues and solutions.

The overall objective is to make a substantial contribution to the uptake of innovative and green urban mobility solutions across the world by facilitating dialogue and exchange, promoting successful policy, providing guidance and tailored advice to city officials, fostering future cooperation on research, development and innovation.

SOLUTIONS_UEMI supports urban mobility implementation actions that contribute to the Paris Agreement and the New Urban Agenda.

Sustainable energy and mobility can make positive contributions to a number of policy objectives, nationally and locally. In particular in cities there is a great potential to create synergies between for example safety, air quality, productivity, access and climate change mitigation. A UEMI resource centre will provide opportunities for direct collaboration on projects focusing on sustainable urban mobility and the role e-mobility can play in it. The UEMI will pool expertise, facilitate exchange and initiate implementation oriented actions.

UN-Habitat, the Wuppertal Institute & Climate Action Implementation Facility jointly host the resource centre for the Urban Electric Mobility Initiative, aiming to bridge the gap between urban energy and transport and boosting sustainable transport and urban e-mobility.

UEMI

Solutions

Aims

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In brief

Gasoline- or diesel-powered vehicles cause severe problems. They pollute the air, emit greenhouse gases, produce noise and consume increasingly expensive fossil fuels. Electric vehicles (EVs) are a promising alternative that can address these problems and contribute to a sustainable transport system.

Municipalities can encourage the use of cleaner vehicles through the way they manage their own fleets, specifically by introducing clean vehicles in the fleets of the municipality and municipal enterprises. This requires energy efficiency and environmental performance to be considered for vehicle purchases.

Examples

Cities can use electric vehicles (EVs) for collecting waste, cleaning streets and other local authority services. Vehicles in these fleets are very suitable for battery-electric drive systems because their operational range is usually limited and many of them are running on fixed routes. Furthermore, these vehicles are often parked in larger vehicle depots, so that charging infrastructure can be concentrated. Energy savings and emission reductions of EVs are particularly high in driving cycles with frequent stops and short distances.

Results

EVs offer several advantages compared to gasoline or diesel vehicles:

- Zero exhaust emissions – EVs do not produce any exhaust emissions during operation
- Reduced noise pollution – As EVs generate no propulsion noise, these vehicles are very silent at low speeds (usually below 30 km/h).
- Increased independence from fossil fuels – A variety of resources can produce electricity, including renewable sources (solar, wind, geothermal heat, water).
- Reduced greenhouse gas emissions – EVs can help mitigate the effects of climate change. This potential is highest if the electricity comes from renewable sources.

By increasing the number of EVs in its fleet, a municipality can serve as role model for private enterprises, and by demonstrating the applicability of clean vehicles, the city can share its experience with new vehicle technologies. Besides reducing emissions, the operation of cleaner vehicles can also result in long-term cost savings.

In brief

Examples

Results

Technical & financial considerations

Despite subsidies, investment costs for EVs can be higher than for conventional vehicles. However, due to lower operating and maintenance costs, the total costs of ownership can be lower than for conventional vehicles. If electricity from city-owned renewable energy systems is used, economic and environmental benefits are even higher. The number of available EV types and models is rapidly increasing, however for special purpose vehicles, it might be necessary to convert from a combustion engine to an electric drive system or coordinate with manufacturers for custom-built vehicles. To select the optimal technology in terms of drive system (e.g. hybrid vs. all-electric), battery size and charging strategy municipalities must consider the operation purpose, the vehicle type and typical usage patterns.

As a first step, a city should analyse its existing fleet according to driving distances, the times when the vehicles are not being used, and operational purposes. Based on this, cities can identify vehicles that are suitable to be substituted with electric ones, and charging infrastructure requirements. External experts can assist municipal fleet managers in this task and provide detailed planning and cost comparisons of different vehicles. Existing fleet management systems and routing might need to be adapted to account for charging requirements. Ideally, drivers and service staff should receive training to ensure they can properly handle the EVs. Cities can also cooperate with carsharing companies or leasing companies to reduce procurement and maintenance costs. Electric vehicles used by the municipality can be made available during weekends or evenings to municipal employees or the public (e.g. in carsharing schemes) to promote EVs among the public.

Policy/legislation

Municipal procurement guidelines may oblige departments and municipal enterprises to purchase fuel-efficient, low-emission vehicles. Especially where municipal enterprises operate local public transport, waste collection or street cleaning services, procurement guidelines are applied to large vehicle fleets. An accounting system structured so that long-term savings remain with the investing department can increase the ambition to use clean and fuel-efficient vehicles. This is especially important, as investment costs for fuel-efficient or alternatively fuelled vehicles can be higher than for conventional vehicles. To avoid investment costs, alternatively, municipalities can substitute their vehicles for alternatively fuelled carsharing vehicles.

Technical & financial considerations

Policy/legislation

Context

The city of Rotterdam is the second largest city in the Netherlands and has about 620,000 inhabitants. The city set a target to achieve a 25% share of electric or hybrid electric vehicles in the municipal fleet by 2014 to be a role model for inhabitants and other cities.

In action

The city, in cooperation with two private companies - a local energy supplier and a grid operator - launched a trial with a total of 75 EVs and plug-in EVs and 100 drivers in 2012 and 2013. The city used the cars in the carpool of the companies and the municipality. These consisted mainly of passenger cars and light delivery vehicles. Rotterdam also installed 120 charging stations. The trial monitored the technical performance of the vehicles, and conducted surveys with the test drivers. The project was promoted at events, through brochures and a dedicated website. The city shared the lessons it learned with other professional fleet owners. Based on the experience during the trial, Rotterdam concluded that fully electric vehicles could replace 60 per cent of the cars owned by the city. The two local energy suppliers who participated in the trial had larger range requirements, thus only 18 and 27 per cent of their fleet were suitable to be replaced by EVs.

Results

Rotterdam says that the EVs drove more than 700,000 kilometres during the trial. This cut the amount of CO₂ the city's vehicles emitted by 67%, particulate matter emissions by 10%. The trial also meant that the city completely stopped emitting NO_x. This calculation considered well-to-wheel emissions and the Dutch energy mix. During the trial, the city gained extensive knowledge regarding the use of EVs, safety, energy consumption, impact on the environment and effects on the electricity grid.

Case Study: Rotterdam's Municipal EV fleet (Netherlands)

In action

Results



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More Information

Implementing
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