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solutions**

E-Mobility Solutions

Infrastructure for Clean Vehicles



**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.

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Aims

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In brief

When countries plan to introduce alternative fuels for vehicles, this also usually involves building additional infrastructure such as CNG refuelling stations, or electric vehicle (EV) charging stations. By providing support for installing of refuelling/charging stations, a city can reduce the barriers for adopting alternative fuels/energy carriers.

Examples

A city can install its own charging facilities or provide the necessary land. Several cities in Europe foster the adoption of electric vehicles by supporting the installation of charging facilities. Rotterdam (Netherlands), for instance, offered subsidies for charging stations and installed charging facilities on public ground. London (UK) has done the same. CNG infrastructure for buses can be shared with private vehicles and municipal fleets under some conditions. Closely cooperating with electricity suppliers or car dealers can speed up the installation of recharging/refuelling facilities. Stockholm (Sweden) and Lille (France) had similar experiences with biogas fuel stations.

Results

A network of refuelling or charging infrastructure is essential for using alternative fuels. It can reduce the anxiety of potential EV users who worry about how far they can travel, and thus positively influence purchasing decisions.

In brief

Examples

Results

Technical & financial considerations

To plan a charging network, the current and future demand needs to be assessed first. The assessment considers local market size forecasts for different fuels/technologies, vehicle developments (e.g. in terms of range), different usage models and target groups. Studies show that private EV users usually charge their vehicle at home or at work. However, logistic companies, taxi operators and public transport operators have specific requirements, which should be accounted for by involving them in the needs assessment. Even though some operators might install their own private charging infrastructure, they might need space in the public area provided by the city.

Rapid direct current (DC) charging stations should be mainly built in public parking lots, on streets, and in other public places. Conventional alternative current (AC) charging stations should be installed in the parking lots of residential areas, business buildings, enterprises and public institutions. AC charging stations have significantly lower investment costs compared to DC charging stations.

The most fundamental need of consumers who intend to buy EVs is not only that charging infrastructure is available, but also that is also compatible to their EV. The harmonisation and interoperability of charging facilities has different dimensions:

- The physical format of the socket and the plug at the vehicle and the charging station
- The digital communication protocol between the battery management system of the car and the charger (proper communication with the battery's power level ensures safe charging.)
- Financial interoperability between different charging station providers, in terms of payment and membership ID system
- Harmonised information – Real-time information about the location and availability of all charging stations is provided to the user (e.g. via integration on an IT platform).

The planning of EV charging stations, should fully consider the current status of regional power transmission and distribution networks, as charging stations can have a strong effect on the local electricity grid. Supply security of CNG or biogas is needed to for a reliable operation of gas refuelling infrastructure.

Technical & financial considerations

Policy/legislation

In general, a city can steer the installation of charging infrastructure by allocating or leasing reasonably priced land to charging infrastructure providers and by linking subsidies for charging infrastructure to the adherence of the municipal charging infrastructure plan. Besides subsidies and favourable tax policies, cities need to establish a supportive regulative framework and should enhance the cooperation among relevant stakeholders, such as property management authorities, electricity and/or fuel providers and charging infrastructure operators. The requirement of building permits for on-street charging points can ensure that they do not obstruct traffic (both motorised and non-motorised) or rescue routes, and guarantee the location is accessible and in line with the development plan. To ensure that public charging stations are accessible for charging, parking needs to be restricted to EVs with an active charging process. The municipal traffic office has to install no-parking signs.

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Private or state-owned companies or individual vehicle owners usually install and operate charging infrastructure. However, there is still a limited interest in EV charging infrastructure by private stakeholders because of the low number of EVs. As EV charging infrastructure costs are high and business models for providing public charging infrastructure are often not yet profitable, cities need to actively promote the installation of charging infrastructure. Besides subsidies and favourable tax policies, cities need to establish a supportive regulative framework and should enhance the cooperation among relevant stakeholders such as property management authorities, electricity providers and charging infrastructure operators.

Many cities around the world support the use of clean vehicles by ensuring that respective charging / refuelling infrastructure is available. Their experience can be transferred to other cities taking local context conditions into account. The willingness of the private sector to invest in refuelling/charging infrastructure depends, among others, on the number of clean vehicles in operation. National incentives and regulations for the market development of clean vehicles and respective infrastructure can act as supportive factors. The CO₂ mitigation potential of CNG or electric vehicles compared to diesel or petrol vehicles depend on the gas supply structure (e.g. transport energy,

Policy/legislation

Institutions

leakage, share of biogas) and on GHG intensity of the electricity mix (e.g. influenced by share of renewable and carbon intensive fossil sources) respectively. However, benefits to the urban environment and public health from the reduction of local air pollutants from vehicle tail-pipe emissions are independent from the location and thus transferable across cities and countries.

Context

In the Netherlands, the national government provides strong fiscal incentives for EVs. The city of Rotterdam is the second largest in the Netherlands, with about 620,000 inhabitants. The city aims to reduce its CO₂ emissions by 50% by 2025 compared to 1990 levels and to improve the local air quality. To achieve this, the city among others strongly supports the use of EVs.

In action

Rotterdam provides support for the initial installation of public and private charging stations. Companies or individual owners of EVs usually parked on private grounds can receive a subsidy of up to €1000 for the installation of a charging station on their property. If they use renewable electricity, the city also reimburses the energy costs during the first year. EV owners without private parking facilities can apply to have a public charging station provided by the municipality in close vicinity. To foster the installation of charging facilities in parking garages, the city published a manual providing guidance on charging infrastructure installation in car parks.

Results

Rotterdam was the first city in the Netherlands that started installing charging infrastructure in 2011. At the end of 2014, 1,367 charging points were already established in the greater Rotterdam area. The city plans to increase its charging network even further. In cooperation with municipalities in the surrounding areas, Rotterdam plans to install additional 4,000 charging points in the region, of which 1,800 will be located in the city.

Case Study: Developing EV Charging Infrastructure in Rotterdam (Netherlands)

Results



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More Information

Implementing
Partners



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