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Cleaner and better transport in cities

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CIVITAS INSIGHT

E-mobility: Make it happen through SUMPs!

Cities play a key role in promoting electric vehicles. Ideally, they would blend a structured and effective e-mobility strategy with a Sustainable Urban Mobility Plan, helping to improve air quality and reduce noise, energy and car dependency.

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E-mobility and its integration in Sustainable Energy Action Plans and Sustainable Urban Mobility Plans

The transport sector consumes approximately 30 percent of energy in the European Union - of which cars, trucks and light vehicles are responsible for 80 percent[1]. Electric vehicles (EVs) will play an important role in increasing energy-efficiency and reducing emissions. The goals in the EU's Transport White Paper include having CO_2-neutral logistics in cities by 2030, and phasing out conventionally fuelled vehicles in cities by 2050. The EU's directive on introducing alternative fuels infrastructure supports these targets[2].

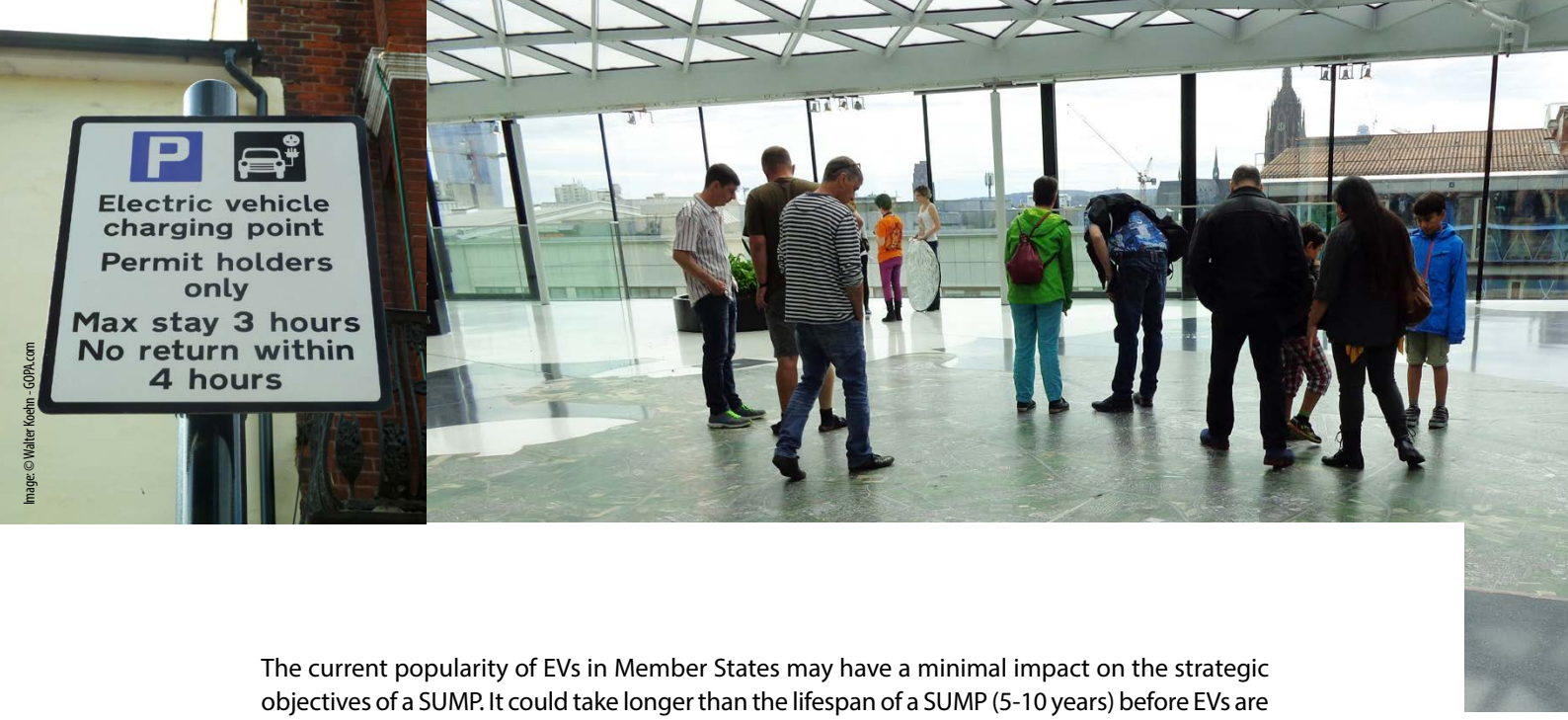
European cities and regions have a key role in promoting electric mobility (e-mobility). Due to the available range of EVs and the potential of urban fleets in organisations, the introduction of EVs will primarily take place in urban areas. To support this, the charging infrastructure needs to be further developed.

There are two main tools available for developing local strategies that integrate e-mobility: Sustainable Energy Action Plans (SEAPs) and Sustainable Urban Mobility Plans (SUMPs). A SEAP is a key document within the Covenant of Mayors[3] in which cities define activities and measures for reducing CO_2 by 2020 according to given targets. On the other hand, since 2005 EU projects have considered SUMPs and they are now an essential part of European policy.

In the 2013 Urban Mobility Package communication SUMPs are identified as an enabler for cities to introduce urban mobility measures in a cost-effective way. It also encourages Member States to actively promote SUMPs and introduce frameworks that allow local authorities to implement local urban mobility strategies successfully. SUMPs define a set of interrelated measures designed to satisfy the mobility needs of people and businesses, today and tomorrow. They involve an integrated planning approach and address all modes of transport in cities and their surrounding areas. The Commission recognises SUMPs as a central element of transport planning in cities. The EU has undertaken continuous efforts to promote SUMP practices and to improve their quality.

SEAPs and SUMPs are local initiatives with common aspects when it comes to introducing EVs: they could address the same schemes and stakeholders or consider the same measures such as public procurement. Furthermore, cities can consider the SEAP greenhouse gas (GHG) transport targets and baseline emissions inventories when developing a SUMP. The SUMP carbon assessment tools can also integrate in the urban energy models used in SEAPs.

1 Covenant of Mayors. How to develop a Sustainable Energy Action Plan, accessed July 06, 2016, http://www.covenantofmayors.eu/IMG/pdf/SEAP_guidebook_Part_I.pdf
2 Directive 2014/94/EU, requiring that Members States take actions to establish, by November 2016, national policy frameworks indicating the number of publicly accessible recharging points that will be in place by the end 2020, so electric vehicles can circulate; at least in urban, suburban agglomerations and other densely populated areas.
3 The Covenant of Mayors is a European cooperation movement involving local and regional authorities. Signatories of the Covenant of Mayors voluntarily commit to increasing energy efficiency and the use of renewable energy sources on their territories. By their commitment, they support the European Union 20 percent CO_2 reduction objective to be reached by 2020.



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The current popularity of EVs in Member States may have a minimal impact on the strategic objectives of a SUMP. It could take longer than the lifespan of a SUMP (5-10 years) before EVs are adopted widely in European countries. Moreover, some of the operational goals for e-mobility, such as the local grid capacity and use, are still difficult to relate to SUMP targets. Nevertheless, a state-of-the-art SUMP that, together with other measures, considers the introduction of e-mobility could help to achieve the EU-driven SUMP objectives related to improving air quality and energy efficiency and reducing GHG emissions.

Several European cities and regions have participated in different national or EU-funded pilots and have made resources available to test and expand EV technology. They have also incorporated EVs in their own fleets and introduced measures to allow their private use and purchase. Cities and regions are also investing in public charging infrastructure. In several cases, they are supporting associated services and collaborating in maintaining the infrastructure. Therefore, e-mobility is increasingly part of existing local strategies when it comes to mobility, energy and air quality.

For SUMPs in particular, integrating e-mobility should result in a sub-plan or sub-strategy that strengthens its role as part of a multimodal system. There are four main elements in the planning cycle of a SUMP that cities should consider in this integration:

- **Involving stakeholders**: A SUMP is equipped to look at multilevel governance and at reaching out to citizens. However, the dialogue with vehicle manufacturers and utility companies is more complex and does not necessarily sit in the framework of a SUMP.

- **Defining visions and objectives**: Defining common targets and priorities in a consultation process will help to set the milestones and goals to which e-mobility will contribute. Having a consensus on these will also allow to reinforce the cooperation between different stakeholders and will further facilitate assigning responsibilities and funding to the different implemented measures.

- **Developing an effective package of measures**: EVs are part of a mobility system, and a plan for their expansion should never be a stand-alone measure. However, defining how e-mobility will be part of an effective package of measures could be a complex exercise for local authorities, with many questions arising. For example: How can we balance the promotion of EVs as a collective mode vs. private ownership? How do we prioritise and fund the infrastructure and the procurement of vehicles? Which other measures should be included in "the package" to maximise the expansion of EVs (e.g. access restrictions or preferential parking)?

- **Evaluation**: A SUMP needs further steps to ensure that it will enable the expansion of e-mobility. A SUMP should not only consider introducing EVs and charging infrastructure in urban areas, but also their effect on the mobility behaviour of citizens.

CIVITAS cities are taking e-mobility measures that link closely to all aspects of the energy-saving measures mentioned in the SEAP guidelines[4]. These include:

- **Reducing the need for transport**: There are e-mobility solutions in shared-mobility measures, which not only changes how people fuel and drive vehicles, but also the entire transport model.

- **Increasing the attractiveness of alternative transport**: Electric bicycles keep older people cycling, and allow people to cycle longer distances, and over difficult terrain.

- **Reducing municipal and private vehicle fleet emissions**: Using hybrid or fully electric vehicles in public fleets can help reduce the energy footprint of the transport sector. The electricity is stored in batteries that recharge by either plugging the car to the electrical grid, or producing the electricity on-board. Cities can recharge fully electric public transport vehicles with renewable electricity.

- **Making travel by car less attractive (including parking strategies)**: There are many links between parking and e-mobility policies. Managing parking effectively can help with the expansion of e-mobility. Current approaches look at combining and enhancing existing technologies and systems, such as in Nordic countries where facilities pre-heat motors.

The fundamental problem with widely introduced on-street and roadside EV chargers is that they can be visually intrusive. At a time when many cities are banning parking meters and are moving to discrete and non-material solutions like mobile phone payments, 1.5-metre poles can look out of place. More discrete solutions are available, such as integrating chargers into the pavement. However, water and moving vehicles can damage them.

In 2011, the UK Department for Transport published a strategy document on plug–in vehicle infrastructure[5]. This predicts that most EV owners will recharge their cars at home or workplace. Therefore, an extensive public on-street recharging network could be under-utilised and uneconomic. Instead, cities should install charging points in key destinations where consumers need them, such as supermarkets, shopping centres and car parks, together with a focused amount of on-street infrastructure, particularly for residents without off-street parking.

4 Ibid footnote 01
5 Making the Connection: The Plug-In-Vehicle Infrastructure Strategy, accessed July 11, 2016, https://www.gov.uk/government/publications/making-the-connection-the-plug-in-vehicle-infrastructure-strategy

CIVITAS supports the integration of e-mobility in SUMPs

Increasing the use of clean and energy-efficient vehicles and enhancing their integration into the urban transport planning are crucial to reducing local air and noise pollution. These measures also curb GHG emissions, contribute to the health of citizens and decrease the dependence on fossil fuels. The CIVITAS Initiative's Thematic Groups on Clean Fuels and Vehicles[6] and Integrated Planning[7] provide a number of resources, such as training manuals, guidance material, policy recommendations, and learning opportunities such as trainings, study tours or workshops. The group allows members to get in contact with city officials and experts involved in examples of best practice. This CIVITAS Insight is complementary to the CIVITAS Insight "E-mobility: From strategy to legislation".[8]

CIVITAS PLUS II | Stuttgart (Germany): Implementation of a strategic campaign for e-mobility

In its sustainable mobility action plan, Stuttgart's goal is to provide citizens with a higher quality of life by reducing pollution, noise, congestion and stress.

There are nine fields of action with concrete measures in the plan, with e-mobility a key element. The plan includes incentives such as free parking for EVs at all public parking spaces. To allow people and businesses to take advantage of this, the city provides a special permit for battery electric cars and plug-in hybrids. Stuttgart will also start a project for cleaner city logistics, where it will test last-mile deliveries with light electric vehicles and cargo bikes. The city administration also leads by example by increasingly using EVs in the city´s fleet, and it is creating a fund to finance the additional costs of EVs. The public transport operator has also increased its use of hybrid-electric buses in public transport, with 18 already in use.

Stuttgart is also making its taxis electric with the help of the GuEST[9] project, which tests electric taxis on the road. From 2016, Stuttgart will develop an action plan for the expansion of electric taxis, with benefits for purchasing electric taxis and quick-charging infrastructure exclusively for taxis.[10]

CIVITAS PLUS II | Aachen (Germany): Dynamic regional SUMP

The current German approach to land-use does not include references to e-mobility, and municipalities do not link building permits to mobility or e-mobility measures. Aachen is trying to approach the issue differently. It developed a clean-air plan for RWTH Aachen University's Melaten campus, including measures to support sustainable mobility, and e-mobility in particular. The area will include electric car sharing stations, and a rental scheme and charging stations for electric bicycles.

To accomplish this, the city is testing a change to its policy where one permit is required for one building - defining, among others, the required number of parking spaces. The permit will apply to clusters of buildings, and include mobility management and e-mobility measures. In this approach, transport nodes connecting different mobility options backed up with a sufficient energy supply become more important. More residential and low-density areas require a different approach, with a focus on private charging in houses, and measures to promote private ownership of electric bicycles.[11]

6 CIVITAS Initiative – Thematic Group on Clean Fuels and Vehicles, accessed July 06, 2016, http://civitas.eu/TG/clean-fuels-and-vehicles
7 CIVITAS Initiative – Thematic Group on Integrated Planning, accessed July 06, 2016, http://civitas.eu/TG/integrated-planning
8 CIVITAS Insight 13 - E-mobility: From strategy to legislation, accessed July 06, 2016, http://www.civitas.eu/content/civitas-insight-13-e-mobility-strategy-legislation
9 Project website: GuEST – Gemeinschaftsprojekt Nutzungsuntersuchungen von Elektrotaxis in Stuttgart, accessed July 27, 2016, http://www.projekt-guest.de/ (available in German only)
10 Implementation of a strategic campaign for electro-mobility, CIVITAS Initiative, accessed July 06, 2016, http://civitas.eu/content/implementation-strategic-campaign-electro-mobility
11 Dynamic Regional SUMP, CIVITAS Initiative, accessed July 06, 2016, http://civitas.eu/content/dynamic-regional-sump

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CIVITAS PLUS II | Koprivnica (Croatia): Development and adoption SUMP

As the winner of the 2008 European Mobility Week Award and the 2013 ManagEnergy Award[12], the city is a true sustainable development champion. Koprivnica is a partner city in the CIVITAS DYN@MO project, combining efforts in the field of SUMPs and e-mobility - the latter demonstrated by Koprivnica developing an electric car sharing system and introducing low-emission public transport vehicles.

Koprivnica's SUMP vision and action plan included the Zero CO_2 Campus[13], rental bicycles, electric bicycles, an e-car sharing scheme and the procurement of e-buses. The electric car sharing scheme includes five fast EV chargers to charge six electric cars and two hybrid vehicles for 200 potential users. The measure was locally co-funded and has the potential to be replicated by other cities. The system should reduce operating costs by 24 percent and cut CO_2 by 27 percent. Koprivnica also purchased two domestically manufactured and fully electric 14-seater buses that can travel up to 140 km and recharge using fast-charging technology.[14]

Advanced policies and strategic frameworks to enhance the uptake of e-mobility

Next to best practices existing in CIVITAS cities, there is lots of activity in Europe related to researching and expanding e-mobility by a number of EU-funded projects: This includes:

ELIPTIC project

The ELIPTIC project focuses on using existing electric public transport systems (including light rail, metro, tram and trolleybus systems) for multimodal mobility approaches in urban and sub-urban areas. By integrating existing electric public transport infrastructure for multi-purpose use, it demonstrates that the further take-up of EVs can be cost-efficient. The project addresses all modes of electric public transport. This project's consortium - pioneering operators and authorities for metro, light rail, tram, and trolleybus systems – reflects this. Leading universities, networks and industry representatives support the project, resulting in a group that includes all key organisations responsible for electric public transport.[15]

FREVUE project

The FREVUE project supports the introduction of electric freight vehicles by demonstrating and evaluating innovative urban logistics solutions in eight of Europe's largest cities. City logistics has great potential for reducing emissions and can contribute to the uptake of EVs. It can also introduce new concepts and business models. Despite this potential and strong policy support, using EVs in the logistics sector has been constrained by a number of barriers, including high investment costs; limitations with respect to range, payload and volume; and charging constraints.[16]

ZeEUS project

ZeEUS is a project that extends fully electric solutions to core parts of urban bus networks. ZeEUS is testing innovative electric bus technologies with different charging infrastructure solutions in 10 demonstration sites across Europe.[17]

12 ManagEnergy Award 2013, accessed July 27, 2016, http://www.managenergy.net/koprivnica_2013_me_award_winner.html#.V5itFDXG-A0
13 A major landmark in Koprivnica's history is the development of a new University Campus for 5,000 students. The vision is to achieve with intelligent mobility measures a zero CO_2 mission campus with cutting edge mobility services, such as a virtual mobility centre, campus bicycles electric vehicles and - demand responsive public transport services. The result will be a mobility plan for the campus and pilot services, such as an electric vehicle infrastructure for bikes and other electric vehicles. See also: Zero CO_2 University Campus, CIVITAS Initiative, accessed July 27, 2016, http://www.civitas.eu/fr/content/zero-co2-university-campus
14 Development and adoption of sustainable Urban Mobility Plan, CIVITAS Initiative, accessed July 06, 2016, http://civitas.eu/content/development-and-adoption-sustainable-urban-mobility-plan
15 ELIPTIC project, accessed July 06, 2016, http://www.eliptic-project.eu/
16 FREVUE project, accessed July 06, 2016, http://frevue.eu/about-us/why-frevue/
17 ZeEUS project, accessed July 06, 2016, http://zeeus.eu/

Rotterdam (Netherlands) | Ambitious e-mobility strategy

Rotterdam established an ambitious programme on sustainability and climate change from 2010 to 2014. Its goals were to reduce carbon emissions by half; be prepared for the consequences of climate change; and improve air quality and reduce noise. The municipality invested EUR 26 million in 10 key tasks, of which stimulating sustainable mobility and transport was one. This investment generated EUR 400 million in private and public sustainable investments in the city. Three different aspects were within this one task:

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- Clean transport for both passengers and goods. Rotterdam constructed cycle paths and parking facilities for bicycles, implemented a dynamic traffic management system and introduced measures for more efficient inner-city logistics. In addition, the strategy encouraged more sustainable inland and ocean shipping.

- Cleaner, quieter vehicles. The aim was to make the city vehicle fleet more sustainable by introducing electric and hybrid vehicles. Moreover, the city promoted purchasing and using electric bicycles and scooters; set EV charging infrastructure; and together with private partners established innovative electric transport projects.

- Introducing other alternative fuels - in particular biodiesel for lorries

Rotterdam launched an initiative where several public and private organisations worked together to open an electric transport centre to allow business and potential EVs users to get information on EVs and to test the vehicles. The city aimed to actively support the construction of charging infrastructure, for example, by co-financing the first 1,000 charging points. The aim was also to ensure that at least 25 percent of the city's fleet comprised electric or hybrid vehicles. The city met and exceeded the two last objectives: at end of 2014, the city established 1,367 charging points in the greater Rotterdam area, and 27 percent of the city's fleet was electric.

The growth of Rotterdam's charging infrastructure was swift. By the end of 2011 Rotterdam installed its – and the Netherlands'- first EV charging station. By the end of 2012, Rotterdam constructed 100 stations. The 14 surrounding cities also benefited, with a charging network of 1,650 charging points established in the region by the end of 2014. This allows people commuting to Rotterdam to have access to sustainable driving options. The expansion is thanks to three important factors: car manufacturers progressively introduced EV models at better prices; the national government issued tax incentives; and the local government introduced and expanded the necessary infrastructure and communication. [18]

18 Rotterdam Climate Initiative, accessed July 06, 2016, http://www.rotterdamclimateinitiative.nl/UK

Wolfsburg (Germany) | Creating a backbone for a sustainable e-mobility strategy

The region of Wolfsburg created a public-private partnership between the city of Wolfsburg and Volkswagen AG, focusing on the automotive industry and research. In its most advanced tests, the partnership developed e-mobility solutions supported by user-friendly wireless online services on a digital platform. The region is also introducing charging infrastructure that provides fast charging with direct currents. The handling and use of the system is identical at each location and delivers charging at publicly accessible points.

Wolfsburg also created the Wolfsburg Mobility Centre to integrate e-mobility into conventional traffic by offering services like electric car sharing, electric bicycle rental, citywide charging infrastructure, co-working spaces, conference facilities, and an integrated mobility card. The Mobility Centre also provides in depth information about e-mobility.

E-mobility and SUMPs: European cities will have to prepare for the future

The above-mentioned good practices show that SUMPs and e-mobility strategies are deeply integrated. Cities can go one step further and look into concepts that include e-mobility in urban planning processes, so that new and redeveloped city neighbourhoods are equipped from the start with charging infrastructure (as in Aachen, above), electric car sharing and electric bicycles. In addition, installing off-street charging infrastructure, and combining off-street parking and charging are future developments to pursue.

Image: © Carlos Gorao - GOPA.com

Several CIVITAS cities say that it is difficult to follow and predict the evolution set in motion by "going electric". The private sector is buying more EVs to move people and goods. E-mobility brings innovative industries, and research and development to the city. But going further and considering e-mobility in land-use planning might need a change in national and local regulatory frameworks. Moreover, cities will need to involve new partners from the energy sector (for example, the municipal energy supplier or grid manager).

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