Understanding Electromobility
Facts and Challenges

sm@rtCEM

Facts and challenges about electric vehicles (EV)

Recently, EVs have shown huge growth in demand and increased production. In 2012-2013 many types of EV car models were launched onto the market. This was not only by known EV car makers such as Tesla, but also by mainstream, traditional car makers such as BMW, Renault, Honda, Toyota, Nissan and many others.

Growing from current levels in Belgium, for example, it is estimated that electric cars will represent around 7% of total new car registrations by 2020. This situation is likely to be reflected in most European countries.

New mobility trends

At the same time, the world is facing one of the toughest ever experienced economical periods which, together with urbanisation and sustainability trends, will shape mobility in the coming years.

Car ownership rates are low among younger target groups and they are expected to fall further, as it will be easier for younger users to choose the most suitable means of transportation. This is becoming a clear and emerging trend beyond this segment of users, as costs of mobility have become an issue for many people.

New mobility ecosystems, such as vehicle sharing models and other solutions like e-bikes, electric 2-3 wheelers, are also emerging in densely populated cities. They will contribute to a cleaner and more convenient way of getting around.

Technology advancements

Nevertheless, the new mobility trends will not necessarily mean higher demand for electric vehicles, unless those vehicles can adapt to the consumers' needs. Nowadays consumers expect a charging time for electric vehicles that is similar to refuelling a traditional car at a petrol station.

Fortunately, technologies of EVs such as charging standards, their processes, and vehicle-to-infrastructure connectors are quickly evolving and will continue to do so during the coming years, such as battery leasing / switching schemes which will allow fast battery swapping. With such schemes users would not require longer charging times compared to refilling a gasoline-powered car.

CO2 reduction

Global CO_2 emissions have been steadily increasing over the last decades making environmental sustainability a major area of interest. Figures from numerous studies, including the International Energy Agency and European Commission, show that about 25% of CO_2 global emissions are generated by transportation systems and 75% of these emissions are due specifically to road transport.

The use of EVs instead of vehicles with internal combustion engines may considerably reduce CO_2 emissions worldwide over next years. EVs are expected to have 50-75% lower emissions than regular vehicles by 2050, if recharged using renewable resources.

The cost of recharging an electric car

The cost of electricity and the efficiency of the vehicle (i.e. how much electricity is used to travel 100 miles) must be known to calculate the cost per mile of a fully electric vehicle.

If electricity costs about $0.11 per kWh and vehicle consumes about 34 kWh to travel 100 miles, the cost per mile is about $0.04.

If electricity costs $0.11 per kWh, charging a fully electric vehicle with a 24 kWh battery to cover 70-mile will cost about $2.64 to reach a full charge. This cost is about the same as operating an average central air conditioner for about 6 hours.

Some car manufactures estimate that a 5-year operating EV will cost $1,800 versus $6,000 for a gasoline car in the US.

Uptake of electromobility today

EVs still represent a very small niche market which is dominated by low-performance light electric vehicles for specific uses.

According to predictions from the European Automobile Manufacturers Association (ACEA) the market share for new electrically chargeable automobiles will be in the range of 2 to 8% by 2020 to 2025.

How smartCEM addresses these facts and challenges

Through the smartCEM (Smart Connected Electro Mobility) project, four cities and regions (Barcelona, Gipuzkoa-San Sebastian, Newcastle and Reggio Emilia) have come together to jointly demonstrate that ICT solutions can play a major role in addressing shortcomings of electromobility, improving public acceptance of EVs and responding to new mobility trends.

Technology advancements

smartCEM optimises five traditional ICT services for the needs of electrical vehicle drivers.

EV Navigation displays the route adding charging points and estimation of battery range based on driver's driving style.

EV Efficient Driving evaluates the driver's driving style and provides him or her advice on how to maximise driving efficiency and eco-driving-style.

EV Trip Management extends the user's travel options by adding EV car-sharing as part of the public transport offer, while EV Vehicle Sharing Management makes it easier to use electrical vehicles by giving the possibility to book them from smartphone or web portal.

Finally, EV Charging Station Management gathers up and presents a consistent, unified structure for the identification and localisation data of all charging stations available in smartCEM pilot sites.

New mobility trends

BARCELONA: an innovative open vehicle sharing approach that combines several smartCEM services to increase vehicle sharing in urban mobility.

GIPUZKOA: public transport and car-sharing cooperative approach, where car-sharing schemes are adapted in order to facilitate common user approaches and integration to the public transport regional system.

NEWCASTLE: a mature electric mobility organisation (vehicles & infrastructure) where the main focus is the business viability of existing systems.

REGGIO EMILIA: a public approach, which combines cars and van for light goods in order to be used by city staff.

CO₂ reduction and uptake of electromobility today

smartCEM's main objective is to apply additional services to existing electromobility demonstration projects around Europe. In systems like car-sharing, public transport or freight distribution the project aims to optimise the performance, increase public awareness and acceptance, and increase the confidence of the end user about EVs. The ultimate aim is to increase the take-up of such systems and services. It is important for this work to be carried out on a pan-European level as electromobility initiatives, until now, have been largely carried out at a regional level where even national governments have often deferred the electromobility demonstration to regional and city authorities.

smartCEM aims to promote electromobility as a new mobility standard across Europe based on the knowledge, experience and best practice in participating pilot sites. The consortium aims to facilitate the emergence of an electric vehicle-lead market in Europe by coordinating regional efforts and thus creating the crucial momentum needed to attract world leading companies into those regions as well as sending a signal to consumers that electromobility is a transport system of the future.

The resulting higher uptake of electromobility will have significant influence on CO₂ reduction.
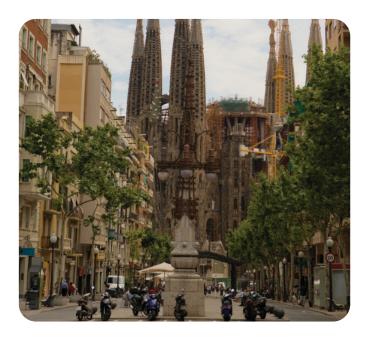
The Pilot Sites

Barcelona

Barcelona is characterised by a large number of motorcycles and scooters, with more than 300,000 Powered Two Wheelers registered in the city. The Barcelona pilot site in the smartCEM project is thus based on electric scooters and runs an advanced open sharing service. There are 50 electric scooters available and 141 charging locations.

Gipuzkoa - San Sebastian

Gipuzkoa – the site of the San Sebastian pilot project uses two bus routes in San Sebastian covered by a hybrid bus (Man Lion´s City) with an efficient driving application in order to contribute to an optimized electromobility in urban areas. The site also implements the EV sharing application in order to promote greener private mobility and reduce the number of cars on the streets.

Newcastle

Newcastle is a key pilot project where to implement smartCEM services, as the North East region has more than 1,000 charging points. The Newcastle pilot site in smartCEM involves compact urban electric cars and implements the eco-driving interface of smartCEM into these vehicles. There are 44 electric cars and 535 charging points available.

Reggio Emilia

Reggio Emilia pilot site provides the possibility to evaluate the potential of transportation provided to Municipality employees by means of a fleet of electric vehicles. This pilot site focuses on the integration of smartCEM services on the Municipality fleet of electric vehicles for supporting route guidance, efficient driving and to introduce a monitoring platform. 10 electric vehicles will be involved in Reggio Emilia pilot site.