Electric Mobility Europe

Research and Innovation Projects

In collaboration with the European Commission (EC) and the European Green Vehicles Initiative Association (EGVIA), 19 national and regional government-related organisations from Austria, Belarus, Catalonia (Spain), Denmark, Finland, Germany, Hungary, Israel, Italy, Piedmont (Italy), Poland, Spain, Sweden, The Netherlands and Turkey set up the ERA-NET Cofund initiative Electric Mobility Europe (EMEurope) running from 2016-2021.

Electric Mobility Europe

Co-funded by the Horizon 2020
Framework Programme of the European Union

Introduction

Building on the lessons learnt from the former ERA-NET Plus initiative Electromobility+, EMEurope is following the needs and demands of policy makers while at the same time considering those of stakeholders and the industry. EMEurope elaborates and expands the systematic and steady exchange of information and mutual learning process started in Electromobility+.

The underlying objective of EMEurope is to contribute to the breakthrough of electric mobility in Europe. This initiative addresses the need for integrated and ambitious actions across Europe to further advance the deployment of electric mobility through the coordination and joint financing of research, development, innovation and implementation activities. Its approach is based on the assumption that although many high quality activities are currently being carried out in Europe on the EU, national and regional levels, there is little coordination of the various efforts. The challenge is to avoid duplication of funding and investments while at the same time facilitating successful migration and integration of technologies which contribute to the advancement of electric mobility in Europe.

In order to overcome these challenges, EMEurope uses a two-track approach comprising:

EMEurope Call 2016, a co-funded, transnational call for proposals launched on 2 November 2016 and aimed at the selection and funding of innovative, transnational projects that demonstrate and validate solutions which have already reached sufficient maturity for deployment in the following **five key areas of electric mobility**:

1. **System Integration (transport, (sub)urban areas)**
2. **Urban Freight and City Logistics**
3. **Smart Mobility Concepts and ICT Applications**
4. **Public Transport**
5. **Consumer Behaviour and Societal Trends**

The countries and regions involved in EMEurope teamed up with the European Commission to pool round 23 million EUR for the coordinated funding of research and innovation (R&I) projects responding to the EMEurope Call 2016.

The EMEurope Call 2016 followed a two-step procedure with the submission of light proposals and evaluation by national experts in the first step and the submission of full proposals evaluated by an international peer review in the second step. Of the 33 consortia submitting proposals in the first step of the call, 22 received a positive evaluation and an invitation to submit a full proposal in step two. In the end, 14 proposals were selected for funding. After the cancellation of one project, 13 projects representing all five key areas will be funded throughout the term of EMEurope.

Policy Cooperation activities aim at the achievement of a stronger alignment of strategy and policy among the relevant stakeholders. These activities intend to support the development of electric mobility in a holistic way with three main tasks:

- Strengthening the knowledge base and preparation of further actions
- Improving and tuning framework conditions for electric mobility
- Establishing close contacts between policy-makers and stakeholders.

A successful development of electric mobility requires suitable, supportive and strongly tuned frame conditions, such as fiscal incentives or legal provisions. The mutual learning and exchange of information provide an essential basis for this development, contributing to the implementation of effective and maximally tuned national and regional provisions and laws.

The two main elements of EMEurope – the co-funded, transnational call for proposals and the policy cooperation – are not separate activities, but rather complementary and jointly-developed components of the same challenge aiming at:

- Accelerating the time to market for solutions for integrating electric mobility in Europe's (sub-)urban mobility systems
- Establishing and activating a stakeholder network for exchanging know-how and experiences on electric mobility solutions for European urban areas
- Linking policy, science and industry towards joint support of electric mobility in European urban areas
- Supporting industry, the service sector, policy makers, authorities and users in their efforts to provide innovative solutions for electric mobility in European urban areas
- Contributing to the achievement of the European White Paper objective to promote zero emission mobility in European cities.

Following this strategic two-track approach, EMEurope will link research, innovation and policy making through a new and effective level of cooperation on a European scale.

Further background information about the ERA-NET Cofund EMEurope and its activities can be found on the EMEurope website (**www.electricmobilityeurope.eu**).

eVolution2G-V2G

Innovative Vehicle to Grid model for electric mobility deployment in Europe

Vehicle to Grid model and prototype solution

In the last decade, consumer demand is shifting in favour of e-mobility, thanks to government support for electric vehicles (EV), investments in EV-charging infrastructure, purchase subsidies, tax exemptions, increase in OPEX of traditional private mobility, decrease of electric vehicles costs. On the other hand, automakers perceive e-mobility as essential for achieving compliance with emission, sustainability and fuel economy EU targets.

When a full deployment of electric vehicles will be in place, electric distribution networks will be deeply affected, trying to deal with increased energy consumptions and peak power requests. At the same time, the grid will deal with increasing inputs of distributed sources of renewables, with their intermittent and not completely foreseeable contributions. To address the growing mismatch between production and demand of energy, EVs will become an important actor of the future "Smart Grid" and electricity markets. In this scheme, electric vehicles will act as flexible distributed stationary accumulator, able to store and release electrical energy, to compensate peak production and to support and stabilize the distribution grids. This concept is called bidirectional power flow. Operating by dual functionality, the vehicle assumes a completely different value to cost ratio.

Fully in line with these prerogatives, the V2G project will test and validate this concept by combining:
– an electrical light quadricycle with an updated Battery Management System and a bi-directional battery charger able to interface in charge and discharge with the electricity network. The benefits of a light vehicle (circa -60 % in weight), for the V2G paradigm are the low consumption (circa -50 % in energy) and the appeal for wide spread in urban mobility. Two prototype vehicles will be developed and used in the pilot, for the two selected applications (residential and public charging infrastructure);

– solutions for V2G charging stations, both for domesticand public applications, taking into account current and future technical regulations and energy market development and possibilities;

– an Energy Management and Control System, coordinating the different stakeholders' needs/inputs and availability to participate in network balance and dispatching market.

The project is presented by a high-level, and well-balanced consortium of 4 companies (one Large Enterprise, two SMEs and one Research Center) from three different EU countries (Italy, Denmark and Germany), all with very high and complementary expertise and roles:
– one large Multi-utility (IREN) developing e-mobility services and V2G paradigm as a future, strategic business;

– one SME (MEC) with high R&D capacities, devoted to the development of the Green car, integration and testing;

– one SME (CTC) in charge of the development and testing of the BMS and charging systems;

– one Research Center (AAU) designing battery pack, assembling battery modules and BMS, validating and testing the final battery solution.

Project goals

To this end, the project will aim at achieving the following specific objectives:

1. To develop, test and optimize an integrated V2G solution;

2. To test the novel integrated solution in real simulated conditions;

3. To assess and evaluate the benefits and obstacles (at technical level) of integrating the needs and purposes of the involved stakeholders in the future dispatching market open to aggregated consumers, prosumer storages and production;

4. To assess the business potential of the novel V2G solution based on the evolving European EV market, with the aim of fostering market introduction;

5. To create awareness and communicate about the results of the project.

Partners

IREN, Piedmont

CTC cartech company GmbH, Germany

Aalborg University, Denmark

MECAPROM, Piedmont

Duration 24 months

EUFAL

Electric Urban Freight and Logistics

Knowledge and tools for electric vehicle fleets

The EUFAL project, standing for Electric Urban Freight and Logistics, aims at providing a platform of exchange as a decision support system for companies willing to integrate electric vehicles (EV) in commercial vehicle fleets.

The EUFAL platform will provide tools for companies at different stages of EV implementation: early planning of EV use, implementation of EV use, optimisation of the EV implementation. It will uptake and unite existing research results and technological developments of ongoing research projects (national, transnational, European) in commercial transport including fleet management and optimizing their composition.

The Challenge of EV Implementation

Although it is commonly believed that EVs are suited to perform last mile deliveries in particular in urban areas, only some companies make use of electric delivery vehicles. Up to now, electric vehicles have been considered as perfect substitutes of conventional vehicles. But there are still problems to be solved: difficulties to deal with the inter-day variability of tour-lengths, problems to integrate EVs into existing fleets and working forces, and missing own and reported experiences. The potential for electric vehicles is much greater if logistics concepts and the use of electric vehicles are jointly optimized taking into account the speciality of different spatial areas. EVs, integrated into mixed fleets, could be used in urban areas, while traditional vehicles could operate in surrounding areas. Alternatively, the use of micro-distribution centres in connection with urban distribution could be imagined.

The Implementation of the EUFAL Platform: demonstration and early stakeholder engagement

Projects in the field of electric mobility in commercial transport have shown that there is a lack of information for decision makers and fleet managers concerning technical possibilities and costs of EVs. EUFAL closes this gap by means of providing and demonstrating the platform of exchange and involving stakeholders right from the outset of the project. For this experienced EV users and developers of EV business models will be addressed. Developed tools for the platform of exchange will include the next stage development of the routes optimisation platform DYNATOP. It will showcase a multi-purpose city logistics system which is both economically and environmentally sustainable based on the use of EVs supported by ICT optimisation tools. The project will analyse the status of EV implementation in cities based on examples. The demonstration and evaluation of the implementation and application of electric mobility includes urban freight and city logistics in several countries. Environmental impacts of EVs in city deliveries and expectations for battery charging infrastructure development

will be analysed. Use patterns of corporate fleets will be analysed and EV potentials identified. National framework and business environment for EV deployment in urban commercial transport will be assessed.

The Added Value: “everything from a single scientifically proved source” on EV implementation in commercial vehicle fleets

EUFAL is the first user-friendly web-based open source platform of knowledge exchange providing all available data centrally. This supports a more accurate and cost-efficient implementation of EV in commercial vehicle fleets in Europe. This top-down-information-providing-online tool will also offer access to planning tools for optimal fleet composition, planning urban micro-hub solutions, a long-lasting experts network for further consultancy and other. The added value is the „everything from a single scientifically proved source“-approach. EUFAL will support companies with information for EV implementations at the best level. The platform of exchange will allow companies to handle the implementation of EVs in mixed fleets and multi-level distribution concepts. The project will test and validate the joint optimisation of existing vehicle technologies and new concepts of logistics organisation in urban and suburban environments. Necessary development of vehicle technology will be analysed.

Integrating project partners from Germany, Austria, Denmark, Poland, and Turkey, the project will contribute to the transfer of knowledge on electric mobility between stakeholders and countries.

Project goals

EUFAL results will play a key role in the European research focus for electric mobility in urban and suburban freight and city logistics and create a significant leverage effect on the implementation of EV in fleets until 2020 and beyond.

By providing scientifically proved policy support to identify the most appropriate measures (regulations, incentives, etc.) for urban and governmental, regional and urban authorities, one of the largest leverage effects in boosting the implementation of EV in European cities is guaranteed.

Partners

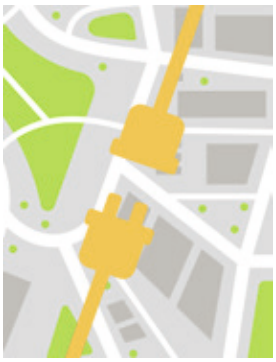
- DLR Institute of Transport Research, Germany
- AIT Austrian Institute of Technology GmbH, Austria
- Borusan Lojistik Dagitim, Depolama, Tasimacilik ve Ticaret A.S., Turkey
- Copenhagen Electric, Denmark
- DTU Management Engineering, Denmark
- eM-Pro Elektromobilität GmbH, Germany
- Maritime University of Szczecin, Poland

www.eufal-project.eu

Duration 30 months

ELECTRIC TRAVELLING

Platform to support the implementation of electromobility in Smart Cities based on ICT applications



Electromobility in Smart Cities based on ICT applications

Electric Travelling is intended to ease the implementation and further development of electromobility (e-mobility) in urban and suburban areas. The project results will provide adequate Information and Communication Technology (ICT) tools to identify smart e-mobility solutions adapted to specific urban or suburban areas and will ease the introduction of electric vehicles (EVs) and the required charging stations in the existing transport infrastructure.

The project will assist travelers in choosing the travel mode (including EVs) and route (by using ICT applications) and will support local authorities in the definition of appropriate directions for the development of e-mobility.

The final product of the project (ETSys) will include the following integrated modules:

ETPlanner: a door-to-door travel planner with routing optimiser (including greener criteria to minimize environmental impact) ready for EVs and directed to promote this travel mode, includes daily travel chain optimization method and advanced heuristic approach to allow local authorities to prioritize areas of e-mobility in the city. The multimodal travel planner will allow to collect data from users' queries.

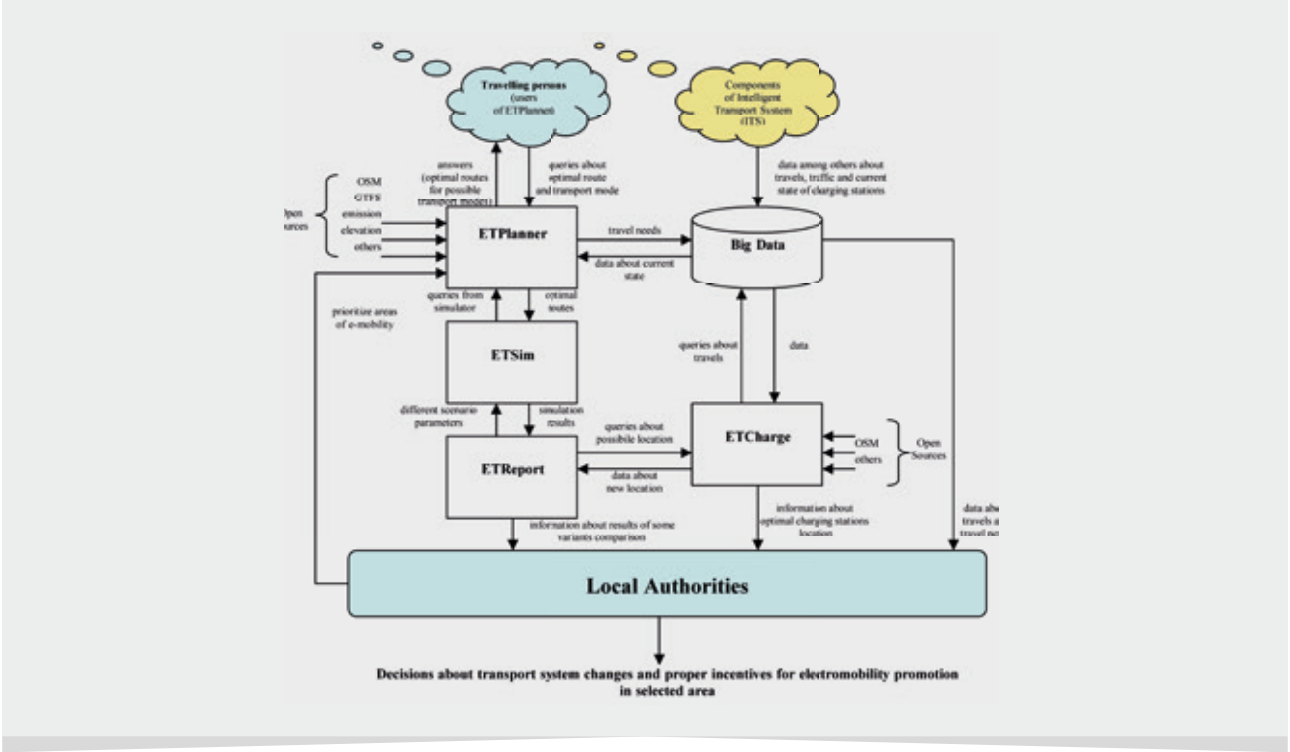
ETCharge: includes optimal multi-criteria allocation algorithm of charging stations. This module will allow to support charging infrastructure planning in cities by estimating current demand of charging stations and forecasting future demands.

ETSim: multi-agent simulator which will allow to simulate travelling people on selected area (based on ETPlanner). Simulation results will be compared for different scenarios (current state, new charging points' locations from ETCharge and several incentives).

ETReport: reporting module addresses for local authorities presenting results of simulation. It can serve as a guide suggesting how to develop the transport system to achieve faster steps in the introduction of EVs in the city or in increasing their number.

The project aims at developing and improve a complex ICT system (ETSys) to ease the implementation and for further development of electromobility (e-mobility) in urban and suburban areas based on two very innovative points:

From a micro perspective, the extension of current routing algorithms and travel planning tools with the focus on e-mobility. This will include, among others, the possibility to prioritize areas of e-mobility using a heuristic approach in relation to the road network of the city, daily activity chain optimization algorithm and it will be opened for independent Information Technology Services (ITS) input information. These elements will result on ETPlanner being more "electric vehicle



user" friendly and in a long term perspective to produce a faster growing in the number of "electric vehicle users" in cities.

From a macro perspective, the final integrated ETSys will include current, verified elements extended with new several modules that will allow: the optimal allocation of charging stations related to many parameters, the analysis of emissions in detail and the comparison of scenarios (ETCharge, ETSim, ETReport). It will become a powerful tool to support the resolution of decision-making problems for local authorities (infrastructure managers, public authorities etc.). Tools as BIG DATA and Life Cycle Assessment (LCA) will be implemented to understand daily travel patterns and their day-to-day fluctuations, including electric vehicles, multi-agent simulation and scenario comparison). The implemented functions will provide a guide in the development of a proper strategy in the design and implementation of the charging infrastructure.

The project product will be implemented in three cities (in the Netherlands, Hungary and Poland). Implementation process will include also case study to identify smart e-mobility solutions adapted to specific urban or suburban areas, including real data about transport network, the different transport means' schedules and costs, local incentives, etc. The **Electric Travelling** project has mainly contributes to the Key Area "Smart Mobility concepts and ICT applications" (KA 3). Furthermore it contributes to Key Areas "System integration" (KA 1) and "Consumer behaviour and societal trends" (KA 5) from the Electric Mobility Europe Call 2016.

Project goals

The project results will provide adequate ICT tools to identify smart e-mobility solutions adapted to specific urban or suburban areas and will ease theintroduction of electric vehicles (EVs) and the required charging stations in the existing transport infrastructure. **Electric Travelling** will assist travellers in choosing the travel mode (includes EVs) and route (by using ICT applications) and will support local authorities in the definition of appropriate directions for the development of e-mobility.

Partners

SAITEC.S.A., Spain

Budapest University of Technology and Economics, Hungary

Delft University of Technology, Netherlands

Factor Ideas Integral Services, S.L, Spain

Over Morgen B.V., Netherlands

Silesian University of Technology, Poland

www.electrictravelling.com

Duration 30 months

eMaaS

Electric Mobility as a Service

SMEs Boosting Shared Electric Mobility in Europe

Who are we?

We are European mobility SMEs from Austria (Move About Austria GmbH), Germany (Urban Software Institute GmbH), Hungary (the urban institute Hungary Zrt.), the Netherlands (EMobilityToolbox B.V.) and Sweden (Move About AB) supported by the University of Twente from the Netherlands. We are all working towards making eco-friendly mobility more accessible. Now, we join forces for this project to increase the adoption of electric vehicles.

What is the project?

Our project Electric Mobility as a Service (eMaaS) combines highly innovative technology and new business models to create the conditions for large scale adoption of Electric Vehicles (EV). We can achieve this by enabling sharing of EVs, thus optimizing their utilization and reducing cost. This combination will make EVs functionally and cost equivalent to Internal Combustion Engine Vehicles (ICEV) by replacing individual ownership of vehicles with shared EVs which are utilized on-demand, as a service. „Sharing“ will become the underlying principle of enterprise mobility. In addition, we connect EV sharing services to other eco-friendly modes of mobility. Finally, we put our users at the centre and work towards easily accessible solutions.

What is the core of the project?

The largest phase of the eMaaS project are the pilots. They aim to demonstrate and commercially scale up in each partner country. The pilots are tailored to the local conditions and the existing partner systems as well as the fleets and city transport policies and needs.

In Sweden we will implement and test the solution in two city clusters focusing on municipalities and corporate fleets. The Mobility on Demand programs of the clusters will be linked to the overall solution. The first corporate cluster is around Gothenburg, Westcoast and Stockholm region. The second one is a cluster of the municipalities Lund, Tranås, Varberg, Trollhättan, Mölndal and Knivsta.

The eMaaS solution makes EV sharing in **Austria** more accessible and support multi-modal integration. The main task is to expand the current EV fleet of local partners by encouraging a wider use of electric vehicles.

Testing and rolling-out new functionalities in practice is the main objective in the **Netherlands**. We want to unite the fragmented e-mobility solutions by offering bikes as well as cars and public transport options. Thereby, we want to increase the attractiveness of eco-friendly mobility.

In **Hungary** eMaaS will enable the local fleet of the city of Zalaegerszeg to share EVs. The cloud-based solution will be adapted for the specific needs in Hungary. They will develop a localization toolkit for local markets. Therefore, they enable the solution to be used in other countries as well.

The four pilots are supported by the University of Twente, who focus on creating a user friendly design of the solution and define measurements for evaluation.

What is new?

To achieve our goal of increasing the adoption of electric vehicles, we use the combined knowledge of our partners to analyse and demonstrate a cloud-based solution running on an open urban platform. This kind of platforms allows with its interface architecture the addition of legacy systems and thus enables corporate fleets to offer sharing schemes. This will include EV fleet management applications that both enable sharing of EVs between fleet users and provide a range of fleet management functions. Including real-time routing, scheduling, operator matchmaking maintenance planning and billing. We integrate with our solution advanced vehicle telemetry to provide real-time accurate battery usage, location and routing.

We will also innovate the business model to allow EVs to directly compete with ICEV and offer attractive mobility solutions. The toolkit is a comprehensive suite of cloud based fleet management applications that allows existing SME providers of EV fleets (current EV fleet market is dominated by SMEs) to enjoy the same management functions as existing large scale ICEV fleets and thus reducing operational costs and providing equivalent service performance. Finally, the pilots showcase is the ability to offer similar eMaaS services across the EU, due to the common solution, creating further scale and supporting international fleets & journeys.

Partners

- Urban Software Institute GmbH, Germany
- EMobilityToolbox B.V., Netherlands
- Move About AB, Sweden
- Move About Austria GmbH, Austria
- the urban institute Hungary Zrt., Hungary
- University of Twente, Netherlands

www.emaas.eu

Duration 30 months

EMWF

Electric Mobility Without Frontiers

Interconnecting E-Mobility stakeholders across Europe

A changing landscape

Due to increasingly obvious ecological and economic reasons the number of electric vehicles (EVs) in our cities is growing exponentially. This aids greatly in reducing the amount of both particulate and noise pollution and constitutes a necessary step in lowering humanity‘s carbon footprint.

However, the rising demand for adequate supporting infrastructure is becoming a real challenge for city officials. Especially in densely packed areas without individual parking spots for residents, access to public charging infrastructure will make or break the long term success of electric mobility in Europe.

As electric mobility transitions from an emergent stage into mass-market adoption, customer friendliness and a positive end-user experience become increasingly important to secure a sustainable mobility future. In order to achieve this, it is imperative to improve the availability of information to drivers, making it accurate, useful and available in real time.

Not only EV drivers profit from access to data of charge station usage. Other stakeholders like grid operators, energy retailers and municipalities are just a few examples of entities which can benefit from detailed information of EV charging and parking, energy usage at charging stations and a good measure of the traffic situation at any given time. The project Electric Mobility Without Frontiers (EMWF) main goal is to tackle the challenges laid out ahead. By providing a flexible and interoperable system to collect, bundle and distribute relevant information, the EMWF consortium will develop, implement and demonstrate a future proof system for smart city integration.

Borderless connectivity

The EMWF project aims to deliver a wide variety of results centred on the acquisition, transmission and distribution of charge date of electric vehicles. At the core of the project lies the implementation of pilot sites in all participating countries: Finland, Germany, The Netherlands and Spain. At these sites, charging poles will be upgraded with camera-based sensor technology to provide accurate data on the availability of charging opportunities, independent of the chargers plug status.

The information from the charging poles and sensors are transmitted to a data platform which enables third parties access to the data, based on commercial agreements between market players. From here, the data is accessible e.g. by navigation service providers, to display on smart phones and navigation systems as well as add their own additional services, like occupation prediction at the users time of arrival. By basing the system on open protocols and a market efficient approach, EMWF aims to create a precinct for smart city architecture.

In addition to the practical implementation of the system described above, the EMWF project will conduct research in various fields surrounding the charging of electric vehicles.

These include but are not limited to:

- The analysis of usage frequency and intensity of charging infrastructure to provide valuable information for grid operators and charge point operators
- Including regular parking spots in navigation software to allow users to plan their trip through the city efficiently
- Integrating existing park guidance systems for a whlesome parking and charging information system
- Providing information for municipalities about parking space usage in their traffic systems, as well as identifying cases of EV-Parking misuse
- Simulating the impact of implementing the system described above into an agent-based model

Charging forward

By enabling EV-Drivers access to high quality charging information, EMWF intends to improve the customer experience. At the same time, by guiding users to charging spots efficiently, the system is designed to reduce traffic in congested cities and allow more cars to operate per charger within a given city.

Grid operators will be given valuable information about theusage of charge poles within their area, both in the planning phase and in operative usage. This will allow the strained grids to be planned and even managed more readily, as integrating smart charging is taken into consideration for the entire project. City administrators and planners can use the results to create fully integrated concepts for electric mobility in their municipalities, or apply them to an existing concept, optimizing the usage of key resources in the creation of smart city traffic systems: roads, chargers and parking spaces. The open market approach championed by the EMWF consortium allows other market players to bud in and offer new services and ideas as the vision of smart cities manifests into a European reality.

Project goals

Improving usability of charging infrastructure for EV Drivers by improving data quality. Providing services for additional Stakeholder in the E-Mobility market.

Partners

- smartlab innovations GmbH, Germany
- ElaadNL, Netherlands
- Electromaps, Spain – Catalonia Region
- Parking Energy, Finland
- Stadtwerke Aachen AG, Germany
- Technical University Eindhoven, Netherlands
- Wellness Telecom, Spain
- S O NAH UG, Germany

emwf-project.eu

Duration 30 months

OSCD

Orchestrating
Smart Charging
in mass Deployment

A better EV charging environment and a balanced grid

The goal of the Orchestrating Smart Charging in mass Deployment (OSCD) project is to enable mass EV deployment in the most economical way by sustaining grid services and utilizing renewable energy by orchestrating smart charging leading to grid stability and reduced CO_2 emissions. On the basis of the OSCD project, DSOs will have access to tools and grid-services enabling new and disruptive business models for e-mobility parties through which they can improve and influence the charging process to reduce grid expansion costs – creating benefits for the economy and society.

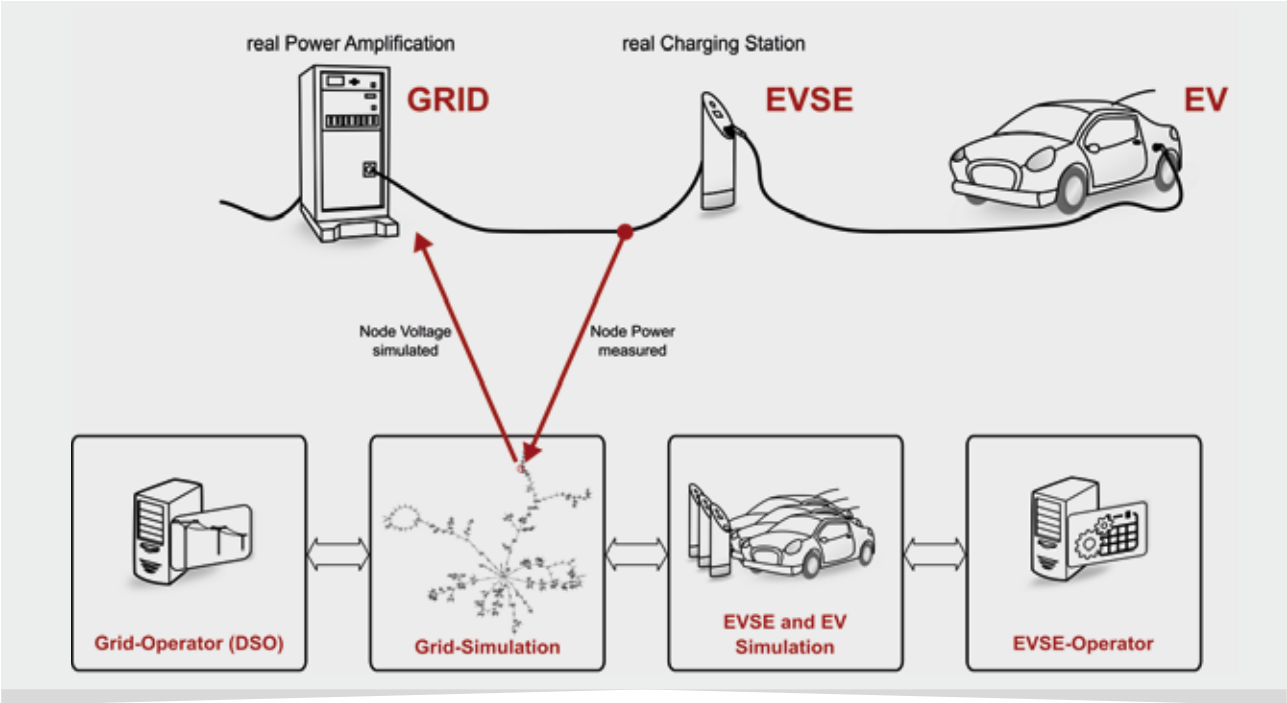
The emergence of electric driving and sustainable charging is an essential component in Europe's shift to a low-carbon economy. Last year, the European Commission published a strategy for low-emission mobility. Here it states that "Europe needs to accelerate the transition towards low- and zero-emission vehicles".

In this project we want to unleash the power of flexibility towards all the requesters of flexibility. We research the hypothesis that the (aggregated) EVs can deliver (almost) all the requested flexibility (proven by simulation). Furthermore we provide the necessary developments in 'equipment' for that. And we visualize and explain the challenges and the solutions in different 'grid-constellations'. The developments will include that the different systems will get information about the amount of energy existing in real time and control the usage using smart charging algorithms in a way that satisfies the different flexibility requesters and the EV users.

The plan includes innovative ways to better understand the situation specific challenges in an integrated way, taking into account the grid complexity, better analyse the situation based on real and simulated data.

We combine an academic and operational approach, leading to innovative, disruptive and advanced practical solutions that will improve existing protocols and enables the orchestrating of various interfaces and transactions. A better EV charging environment and a balanced grid are the results.

In the project, we plan to orchestrate the various interfaces and protocols and create a solution that will enable to balance the electricity network capabilities and the EV charging/ driver needs. The capabilities and experiences of the different involved parties are complementary. Product developers like Driivz and EBG-Compleo develop and operate state-of-the-art products and have an enormous amount of practical experience and a good vision on new emerging technologies. TU Delft is experienced



in the field of algorithm development, specific on multi-actor-optimization algorithms and has performed and access to a large scale of academia research in the field of electromobility and smart grids. In this way TU Delft has access to a great amount of scientific research and experience in applying that information. AIT is equipped with sophisticated laboratory / simulation facilities to in-depth further explore the impact of EV on the (low voltage) grids. These facilities are needed to learn about the impact and measures to integrate the uptake of electromobility in the most efficient way. ElaadNL, active in experimental research with a lot of bottom up knowledge on charging infrastructure, smart grids and smart charging, excelling in knowledge about EV and demand response related protocols is in the position to tie the core competences of the different involved parties together, seamlessly complementing each other in the work at hand.

The project combines several applications of smart charging together leading to grid benefits and making smart charging economically interesting for implementation, increasing the benefits of charging for the EV owner thus encouraging EV ownership and increasing the penetration of EV globally. Orchestration of Smart Charging is necessary to enable mass deployment of EV. The further development of (local) 'grid services' will put the EV in the position to 'solve' the DSOs (future) congestion challenge. Summarised, the result of the project will be 'a better EV charging environment and a balanced grid'.

Project goals

Demonstrate an integrated pilot system in which the aligned, harmonised protocols providing sophisticated smart charging (smart charging 2.0) are demonstrated and can be implemented in real-life products.

Partners

- ElaadNL, Netherlands
- Austrian Institute of Technology, Austria
- Delft University of Technology, Netherlands
- Driivz, Israel
- EBG compleo GmbH, Germany

Duration 30 months

COSTART

A Comprehensive Strategy to AcceleRate the integration of electric buses into existing public Transport systems

COSTART mitigates barriers for integration of electric-buses into existing public transport systems

The COSTART-project, a comprehensive approach for integration of electric buses into existing public transport systems, with partners from the Netherlands, Sweden, Turkey and Germany, addresses concrete research issues on two different levels, namely:

1. Theory

Component, Vehicle & Fleet simulations with specified configuration parameters concerning e. g. bus type, on-board components like Heating, Ventilation and Air Conditioning (HVAC) and battery size under consideration of operating requirements and environmental conditions.

2. Practice

Decision Tool (DT) development with guidelines, supporting the decision-making process on business and social economics levels under consideration of a comprehensive socio-technical analysis. Thus, COSTART responds to both vehicle engineering issues, as well as operations and management.

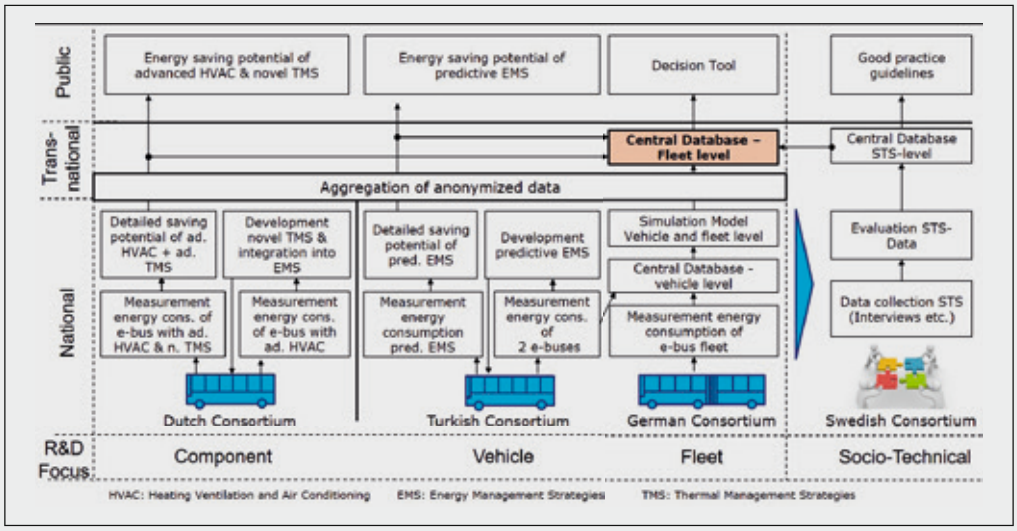
The Dutch focus on the application of components like advanced HVAC-systems in electric buses to meet passenger comfort requirements. By the development of advanced so-called Thermal Management Systems (TMS) based on the vehicles' Energy Management System (EMS), the benefits of next generation technologies will be identified.

Next to this, the Turkish partners analyse on-board data of two e-buses operating in an urban public transport fleet. This vehicle level will address parameters like temperature, slope of roads and vehicle speed. The e-bus EMS is considered to be a technical system operated by e-bus driver. This technical system involves electrical traction system with regenerative braking capability, power electronic architecture, HVAC system and other auxiliary loads.

The German partners implement a vehicle & fleet level analysis in terms of grid-to-wheel energy consumption investigation for driving and climate control of an e-bus fleet. Based on the measurements in three countries, they will be able to develop and verify a transnational and transferable model that covers a high variation in bus configurations, strategies and requirements. The Swedish partners in the City of Malmö will engage in a strategic change from biogas buses to e-buses in urban public transport. Various technical solutions are planned, but the first step will be to select end stations charging for two routes.

On the COSTART transnational level, a Central Data Management System (CDMS) will be installed in order to merge aggregated data from the Dutch, Turkish and German measurements. Based on the CDMA, vehicle simulations will be conducted. Such simulations determine important operating data of the e-bus such as energy consumption for driving, the HVAC-System and e-bus configuration interdependence, further boundary conditions and charging strategy. The local charging strategy may differs between cities. Hence, vehicle simulations can cover different charging strategies, and allow for knowledge transfer in an applicable way. These results are considered as the transnational quantitative outcome of the project consortium. The

Conceot piczure of COSTART e-Bus



novel combination of technical simulation and analysis of specified routes of bus operations are the basis for the development of a DT. The main goal is to determine important operating parameters of e-buses for PT fleet optimisation, especially during an inevitable transition period going from conventional to electric buses.

In a transport policy context, the Swedish partners apply a socio-technical systems analysis with a focus on crucial policy and ownership adaptations, stakeholder engagement, planning, contracting and operating practices in order to derive guidelines for future large-scale implementations. The socio-technical systems analysis contains basically three governance policy levels: strategy, tactics and operations. A core methodology here is process evaluation. By following the various steps in in planning and operation, analyses will "tell the story" of e-bus testing and implementation in order for followers to gain experience. After integration of the policy analysis data, the DT will be finalised by the development of assessment models, intended to increase transparency of operating costs, increase awareness of social economics benefits, point out traps and pitfalls, and show influences of costs on the decision-making process in strategic questions.

Project goals

- Development of an applicable system to understand the introduction of new technologies like electromobility (here e-busses), embracing with technical as well as governance aspects
- Creation of a European central data management system (CDMS) of e-bus application under real fleet operation as a basis for a Decision Tool to identify the optimal vehicle and fleet management

Partners

Lund University, Sweden

Aachener Straßenbahn und Energieversorgungs AG, Germany

Bozankaya Otomotiv Makina İmalat İthalat ve İhracat A.Ş, Turkey

Fachhochschule Aachen, Germany

Fontys University of Applied Sciences, Netherlands

Skånetrafiken, Sweden

Swedish Bus and Coach Federation, Sweden

TU Eindhoven, Netherlands

VDL Enabling Transport Solution BV, Netherlands

Associate partners

Molde University College, Norway

Nobina Europe AB, Sweden

Sileo GmbH, Germany

Duration 30 months

CYB

Cloud Your Bus

Live e-Bus and Charge Point data for Operational Excellence

The Goal of “Cloud Your Bus” (CYB) is to create a data hub that provides live e-Bus and charge point data to OEMs, bus operators, charging infrastructure providers and operational planning solutions, with the aim to create operational excellence in zero emission bus operations. When different actors in the ecosystem are connected and agree to share data for the collective optimisation of the system, great efficiency gains can be realised in terms of costs, risks and time.

Such a platform is no luxury, but a key requirement to make the transition from fossil fuelled to zero emission buses economically viable for bus operators. Why? Because the operational uncertainty in zero emission bus operations is a factor higher than in fossil fuelled operations:

- From single tank to multiple daily charging cycles per bus
- From predictable energy usage to non-linear usage patterns
- From static line planning to dynamic line and charge planning
- From low operational risk to higher operational vulnerability

Buying extra assets to comply with concession requirements is very costly and hence new, cross-actor innovations are required to allow zero emission concessions to become profitable and reliable.

The CYB platform is addressing a number of critical business questions related to the above:

- How do I ensure that I can plan and monitor across different e-Bus makes and models using live battery data (State-of-Charge, Range, energy usage)?
- How do I get access to bus, battery and charging data sets as well as exception alerts that are needed for tactical and operational planning?
- How can I extend the range of my zero emission bus fleet? What constitutes an optimal drive style and how can I instruct drivers to drive more energy efficiently?
- How should I schedule charging during day and during in-night depot for various lines – can we plan smarter and more economically making use of real time road traffic, battery, other data?
- Batteries are costly and are a key factor for sustainable and long-term e-Bus deployment. Therefore, the use of the batteries needs to comply with warranty terms and conditions for use. How can I best manage compliance with OEM restrictions?
- How many e-Buses, and in what battery pack configurations, do I need for a certain line/route and/or concession?

To address these questions the CYB platform will cater for:

- Streaming a set of standardised BMS/e-Bus data across different bus types within the context of emerging standards like ITxPT.

Photo from Transdev zero-emission bus depot at Schiphol, The Netherlands.

- Integrating live charge point data in operational planning, integrating the latest OCPP/OCPI protocols.
- Influencing drivers to adopt the lowest possible energy profile by providing real-time feedback on drive style, specifically tailored to electric buses, while driving.
- Adapting line and charge planning in virtual real-time by monitoring set line/charge schedules and performing dynamic re-planning in case of exceptions.
- Monitoring life-time battery state-of-health by evaluating degradation patterns based on driving and charging patterns. Ensuring that buses are used in conformity with warranty conditions and ensure proactive alerting if this is not the case.
- Optimising the fleet asset base per concession area by developing energy models based on actual energy usage for different road segments, ambient temperature, load, drive style, traffic intensity.

The Cloud Your Bus project brings together different actors across (ITxPT compliant) gateways (Owasys), Telematics and Data Hub services (Sycada), energy modelling (TU/e) and tactical and operational scenario planning (Icron Technologies). We expect to collect data from more than 100 e-Buses of different brands and from different charging locations, covering both normal and fast charging, during the CYB project.

Project goals

1. Reducing the risks and costs of zero-emission bus operations
2. Accelerating the overall transition from fossil fuel to zero-emission bus operations

Partners

- Sycada, Netherlands
- TU/e, Netherlands
- ICRON Technologies, Turkey
- Owasys, Spain

www.cloudyourbus.com

Duration 30 months

Validation of a fully mechanically integrated electric traction system

EU cities suffer from road congestion, poor air quality and noise. Transport was responsible for 23 % of 2014 EU-28 GHG (Green House Gas) emissions and urban transport for approx. 25 % of CO_2 emissions. The 2011 White Paper calls at achieving CO_2-free transport in major urban centres, by reducing GHGs of at least 20 % by 2030. EU transport also heavily depends on oil (94 % of energy needs in 2010); with oil becoming scarcer, EU goal is to halve the use of internal combustion engine (ICE) vehicles in urban transport by 2030. Achievement of these goals requires, inter alia, a broad use of electric technologies for smaller, lighter and more specialised road passenger transport. Consolidated solutions for e-bus systems already exist today in EU cities, including full electric battery mini/midi vehicles, but efficiency and costs are not yet at the level expected for large public and private fleet investments.

Main goal of E-TRACT is to validate a fully mechanically integrated electric traction system, as scalable solution for electrifying light duty vehicles (1.5-4.2 t), with a focus on minibuses (max. 20 seats) as concrete prime market mover.

The project will reach its goal via a set of specific objectives:

- To develop, test and optimize a fully mechanically integrated electric traction system, as intrinsically scalable solution for electrifying minibus and light duty vehicles (1.5 - 4.2 tons curb weight). The traction system includes a mechanical axle and an electrical power unit, suitable for installation as rear axle to set a pure battery powered as well as a plug-in “through-the-road” hybrid vehicle. The integrated electric traction system embeds a high speed motor coupled with a multi-ratio transmission unit, able to delivery at least 4000 Nm torque at the wheel axle. The transmission group includes two secondary shafts operating a dual-cam drum and sleeves controlled by a single electric actuator for transforming the input torque to the output shaft by the gear ratios and the differential gear set. The power unit provides torque and power delivery to the drive shafts at the differential gear set output and is mechanically supported on the chassis and suspension system;

- To integrate the electrified axle unit into a demonstrator minibus (up to 4.2 tons, 20 seats and 60 – 80 Km range), propelled by a lithium battery system;

- To perform the qualification tests to prove the real conversion efficiency of the innovative E-TRACT solution on a demo minibus, on regulatory cycles (New European Driving Cycle (NEDC) and the Worldwide harmonized Light vehicles Test Procedure (WLTP) Standards) as well as real driving cycles, including urban and suburban paths available by the end users involved in the project Main targets include: 25 % climbing at full load, 0-50 km/h in 5 sec. and 100 km/h max. speed. Moreover, the adoption of multiple gear ratios will allow 95 % efficiency, avoiding low speed and low load motor output (35–50 %), extending the vehicle range autonomy and/or reducing battery energy content and cost (-50 %). The embedded transmission system also performs relevant safety functionalities, as Electronic Parking Brake and Hill Holder, avoiding added components and costs, simultaneously locking a couple of gears. The E-TRACT solution goes well beyond the state of the art due to superior output torque and power density, despite reduced room, and advanced drivability behaviors.

All components will be integrated into a demonstrator minibus, and tested on rolls and real driving cycles, including urban and suburban paths made available by the end users in the project. A full techno-economic assessment and business plan will assess industrial feasibility, market potential and investment rentability. A series of pre-commercial activities will prepare for market introduction.

Partners

Mecaprom VPS Italia Srl, Piedmont

Automotive Research & Development Institute BOSMAL Ltd, Poland

IMECAR ELEKTRONIK, Turkey

Duration 24 months

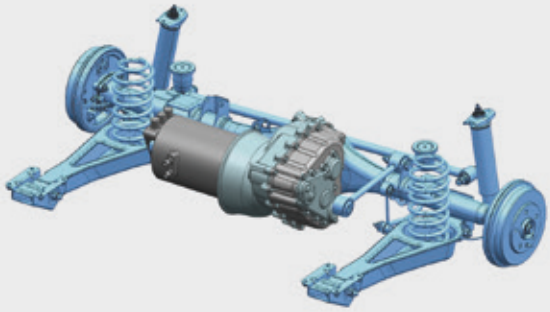
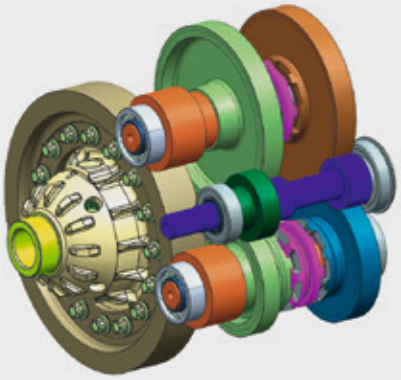
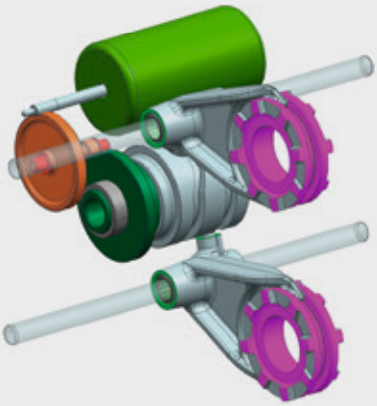


Fig. 1: E-TRACT prototype (Source: MECAPROM)





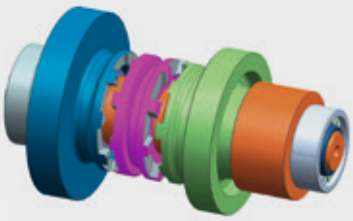


Fig. 2-4: Schematic of the transmission group (Source: MECAPROM)

PLATON

Planning Process and Tool for Step-by-Step Conversion of the Conventional or Mixed Bus Fleet to a 100 % Electric Bus Fleet

Conversion support from Conventional to Electric Bus Fleet

The main objective of the PLATON project is to define a planning process for conversion of a given diesel or mixed bus fleet to a 100 % electric bus fleet and to implement this process into a web-based software tool. Due to the complexity of this task, the planning process is based on basic methods (e. g. simulation, charging infrastructure optimization, vehicle scheduling optimization) which contain all the expert knowledge and experience required. At a given investment budget and the defined optimization target (e. g. replace the maximum passenger x km by electric buses, maximum number of electric buses or minimum CO_2 emission) the planning process delivers a list of recommendations concerning all relevant aspects.

Firstly, relevant real life cases and requirements will be collected from electric bus manufacturers (including variability of bus models, electrical power storage devices and power charging systems, bus mechanical specificity, etc.) and public transport operators (including characteristics of bus fleets and routes, operating and management cost of buses etc.). Based on the results, the input data, constraints and output data for the planning process and basic methods will be determined. The complex scientific part of the project concerns the mathematical modelling of the physical devices and the whole transportation system optimal design, as well as the improvement and efficiency increase of existing basic methods using computer science algorithms. Advanced mathematical models of important components (including the drivetrain, the air-conditioning and the different charging and discharging behaviours of energy storages - lithium batteries and supercapacitors - as well as their aging) will be elaborated.

The process of converting the current fleet of diesel buses, gasoline buses, hybrid and fully electric buses to a whole fleet of fully electric buses over a longer period of time deals with the tasks of fleet sizing and takes into account user requirements and local features. The supporting tool based on the algorithm developed by the consortium will help fleet operators to schedule and optimise the process of fleet exchange, in a manner adapted to local conditions. Such a holistic approach can help to take advantage of the introduction of new electric technologies by avoiding mistakes that could have happened if the fleet replacement will be carried out without any plan. The outcome of the PLATON project will be an innovative solution which is a key to allow operators and public transport agencies to achieve a better performance for the whole transport system and to attain a greater part of the market share.

In a fully electric bus system everything is connected with everything. A smaller battery capacity requires more charging spots and more charging operations. A bigger battery capacity instead is more expensive, needs more space and has a higher weight; however, less charging spots are necessary. In order to find the optimal solution several runs of the basic methods (simulation, charging infrastructure optimization, vehicle scheduling optimization) with varying parameters are

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Electric bus parking in a Pantograph charging station in Montreal, Canada

required that have to be manually altered. Unfortunately, both optimization methods are described by non-polynomial-hard problems. Therefore, an integrated optimization method which takes into account all aspects seems to be barely controllable not to speak of the runtime. The way out proposed here is to develop a planning process which calls the mentioned basic methods with varying parameters and intelligently adjusts the parameters for the next method call. The planning process not only comprises basic method calls but branches, iterations as well as other constructs too. Therefore, the PLATON planning process implemented into a web application will contain all required expert knowledge and experience. Depending on the budget available over a period of time and the defined optimization goal the planning process would deliver a list of recommendations concerning all relevant aspects (e.g. purchasing buses with certain capabilities, building the charging infrastructure, vehicle scheduling). Accordingly, a complete conversion of the current bus fleet can be planned over a longer period of time.

Project goals

The expected impact of the project is a more reliable and therefore faster conversion of conventional buses to electric buses and therefore an acceleration of environment and climate protection. The bus manufacturer can offer the tool to increase the level of sales of electric buses, however, operators and consultants of public transportation can easily analyse different ways to conduct the conversion to 100 % electric fleet by using the tool.

Partners

- Institut f. Automation und Kommunikation e.V. Magdeburg, Germany
- Effiziente.st Energie- und Umweltconsulting e.U., Austria
- Joint Institute of Mechanical Engineering, National Academy of Sciences of Belarus, Belarus
- Open Joint Stock Company «BELKOMMUNMASH», Belarus
- Silesian University of Technology, Poland
- United Institute of Informatics Problems, National Academy of Sciences of Belarus, Belarus

Duration 30 months

Trolley 2.0

Trolley Systems

4 Smart Cities

trolley:2.0 for smart cities

Trolleybus systems for smart cities!

Trolleybus systems provide modern zero-emission public transport for urban areas and even though related infrastructure costs are still high compared to standard diesel bus lines, trolley buses already perform much better than diesel buses concerning environmental aspects and under certain context conditions, e. g. for high capacity public transport systems, also already in an economic way. Taking this into account, the next step is to implement battery systems into the trolley buses to achieve a partial independence from the catenary and thus an even better performance in terms of economy. Since batteries need to be recharged, carry a large amount of energy and fast charging proved not to be the proper recharging method under the given conditions, it is worth to prospect the characteristics and performance of battery supported trolley buses and in-motion charging concepts. These are able to recharge the battery while operating under the catenary as well as to pass catenary gaps in the inner cities. In-motion charging is advantageous over fast charging as it may result in a larger amount of energy transferred to the battery and in a longer battery life due to the lower charging current. Furthermore, charging the batteries in motion eliminates charging stops and related waiting times leading to a gain in productivity. The main scope of the Trolley 2.0 project is to prove that battery supported trolley buses are a way forward towards electric public trans port systems in European cities and therefore nine partners from public transport, industry and research will demonstrate the new charging approach in-motion charging, that allows off-wire operation in remote sections of the networks in four EMEurope partner country cities. These demonstrations will be evaluated and new innovations for smart trolley grids will be demonstrated, e. g. new composite bus frames, automated wiring technology or multipurpose charging stations based on existing DC infrastructure from trolley networks. Trolley 2.0 will develop tools, guidelines and recommendations for the design and operation of battery supported trolley bus services under different context conditions as well as for the development of smart trolley grids becoming a charging backbone for new electro mobility services in cities.

Trolley 2.0 focuses on the improvement of public transport which is already today the number one congestion killer in urban areas and electric public transport has a high potential to also reduce CO_2 and other transport related emissions, e.g. particulate matters or noise. With Trolley 2.0, the efficiency of battery supported trolley buses will be increased by using in motion charging to increase the ability to operate beyond the limits of the catenary infrastructure. The will enable trolley bus cities to provide direct connections from remote areas which are operated by diesel buses today. Since battery supported trolley buses will be able to pass catenary gaps, off-wire sections will be possible e. g. in the inner cities. Furthermore, the project goal of using the existing trolley grid as a DC charging backbone for electric vehicles will lead to new combined electro mobility services for smart cities.

© Solaris

In conclusion, Trolley 2.0 will support efficient public transport, flexible operation and simplified extension of trolley bus networks as well as combined use of the existing trolley grid infrastructure for further electrification of mobility in cities. New solutions like smart trolley grid management, incorporation of renewable energy sources (RES) into the grid and innovative bi-directional stationary energy storage concepts will help to create smart trolley grids making trolleybus systems the most energy-efficient and green systems in Europe. Finally, the trolleybus grid could also become a direct driver for the deployment of other e-vehicles in trolleybus cities by using the DC backbone for charging. Trolley 2.0 solutions will extremely simplify the operation of trolleybuses with in-motion charging and may help to give this well-established technology a new push for both, cities with trolley buses (ca. 350 all over the world) and those without them, as potential recipients for Trolley 2.0 solutions. The project will set-up a Trolley 2.0 User Forum that enables continuous learning and knowledge exchange and will lead to impact through replication and market uptake of Trolley 2.0 project solutions.

Project goals

The project aims to improve the efficiency of public transport based on battery supported trolley buses and to integrate electro mobility services based on a smart trolley grid as backbone for charging solutions in a smart city.

Partners

- trolleymotion, Austria
- Barnimer Busgesellschaft mbH, Germany
- evopro Group, Hungary
- Power Research Electronics BV, The Netherlands
- Szegedi Közlekedési Kft., Hungary
- Szegedi Tudomànyegyetem, Hungary
- Technical University of Delft, The Netherlands
- Technische Universität Dresden, Germany
- University of Gdansk, Faculty of Economics, Poland

www.trolleymotion.eu/trolley2-0

Duration 30 months

evRoaming4EU

evRoaming for electric mobility in Europe

Realising cross-border charging in Europe

In recent years, the market for electric vehicles (EV) and EV charging infrastructure has grown dramatically. However, in the European Union (EU), the absence of widely adopted protocols and standards for interoperability and roaming for EV charging stations has severely hindered the development of cross-border travel. Present solutions have a national scope at best and new products and services are often limited to specific regions or countries.

The project evRoaming4EU consortium is composed of partners from four EU countries in order to address this lack of interoperability. The main objective of the project is to facilitate roaming services for charging electric vehicles and provide transparent information to consumers about charging locations and prices of charging in Europe, by making use of the open independent Open Charge Point Interface (OCPI) protocol. The ultimate goal is to allow any EV driver to charge at any charging station in the EU.

Pilots

A key part of the project involves regional and transnational pilots, aimed at addressing and resolving functional, technical, legal, and fiscal obstacles, thereby promoting the creation of one European market for EV drivers and related products and services.

Four regions in four different countries will implement the pilots:

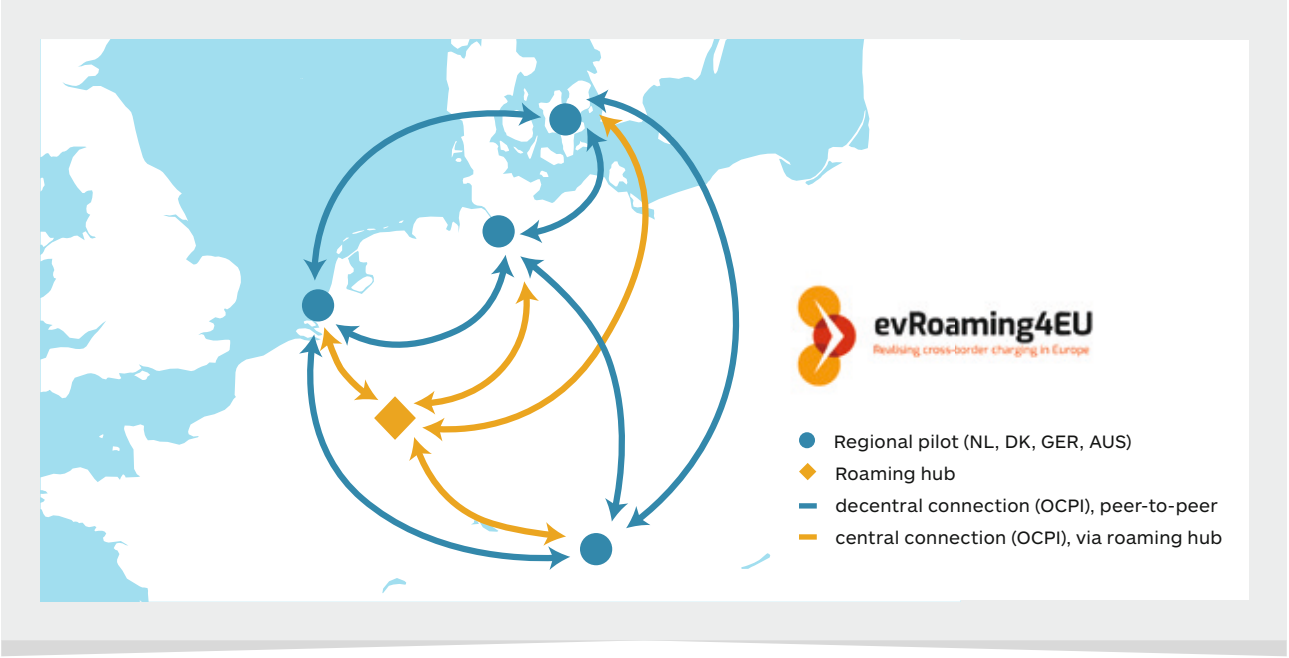
- Germany (Hamburg)
- Austria (Vienna)
- Denmark (Greater Copenhagen)
- The Netherlands (Provinces of North-Holland, Flevoland and Utrecht)

With these pilots completed successfully, 'local' obstacles (functional, technical, fiscal or legal) concerning EV-Roaming will be removed: EV drivers will be able to charge their vehicle in other countries, will be invoiced correctly and have potentially access to services

Protocol development

The project builds on an OCPI protocol. OCPI is an independent and open protocol that supports the involved parties to connect via roaming hubs, but also allows decentral (peer-to-peer) connections. By not being tied to one specific roaming operator, OCPI moves competition towards products and services and away from closed consortia and protocol choices.

OCPI kicked off in the Netherlands in 2014 as a market initiative in order to not be dependent on proprietary roaming hubs. Today, it has already been prototyped in multiple countries (Netherlands, Belgium, Germany and France). It is used by approximately 27 operators and service providers. It defines a set of services for communication between charge point operators and all kinds of service providers to support roaming (access to charge stations between different service providers and charge point operators), supports the exchange of charging station information (i.e. location, availability and tariffs) and supports remote access to charging stations. As part of this project, the existing OCPI protocol will be further developed to support the above objectives.



Support activities

In order for all users to implement and use OCPI in an efficient and sustainable manner, a mature Support & Maintenance organization will be delivered during the project. Further, an academic study will be conducted to investigate the possibilities for harmonization of existing (proprietary) roaming protocols in order to further stimulate interoperability. The study will provide options and recommendations and a roadmap for future harmonization. Finally, the project will have a strong focus on high-impact communication and media attention around the success of the regional and transnational pilots, with dedicated events. Thereby role-modelling the success of the EV-Roaming pilots using the open roaming protocol OCPI, stimulating the development of new products and services, and promoting the further rollout of the roaming best practices that have been demonstrated.

Impact

This project realizes an essential precondition for a mature European market for EV charging infrastructure. EV drivers will be able to travel across Europe without obstacles and have access to services and information (locations, availability, tariffs) for their charging needs. It has positive impact on energy efficiency, use of renewable energy and therefore on climate ambitions. Cost of access to the EV charging market will be reduced, competition will move towards services instead of protocols and this provides a fertile ground for innovation and job creation. This project offers the EMEurope initiative an excellent opportunity to make the necessary step towards growth.

Project goals

The main goal of evRoaming4EU is to realize an efficient EU market for charging, with easy and seamless access to information, maps, payment, and connected services also when crossing commercial or geographic borders. Providing such a standardized and interoperable information landscape for consumers, is an essential precondition for further mainstreaming of electric mobility in Europe.

Partners

- NKL – The Netherlands Knowledge Platform for Public Charging Infrastructure, Netherlands
- Copenhagen Electric (CPH-E), Denmark
- E.ON Denmark A/S, Denmark
- ENIO GmbH, Austria
- MRA-Electric (Provinces of North Holland, Flevoland, Utrecht) , Netherlands
- Smartlab Innovationsgesellschaft mbH, Germany
- Stromnetz Hamburg GmbH, Germany
- TU/e - Eindhoven University of Technology, Netherlands

www.evroaming4.eu

Duration 24 months

proEME

Promoting Electric Mobility in Urban Europe

Supporting stakeholders in decision-making concerning electric mobility in Europe

The scientific project

proEME supports the development of electric mobility in urban Europe. The scientific objectives of the project are focused on creating the critical mass of electric mobility communities in order to analyse and accelerate electric vehicles (EV)-markets in Europe. The project stimulates capacity building by activating those who make the decisions on mobility and transport related to EVs, to create multiplier effects and to reach out to mobility consumers, directly via an automobile club pilot and the internet. Through direct contact with stakeholders the authenticity of the scientific analysis will be increased. In addition, proEME advances the understanding of decision making of mobility consumers, private and used car customers, fleet managers, dealers, leasing companies, manufacturers and authorities for green public procurement, and shows how new mobility trends can be used to deliver win-win-situations for electric mobility. Analysis, dissemination and exchange of results within the new established international network of stakeholders and policy makers will boost policy support and expand the scientific findings of electric mobility. Therefore, proEME will advance scientific knowledge, create critical masses in selected regions and provide blueprints on how to accelerate the uptake of EVs best.

The methodology

The methodological approach of the project is the comprehensive analysis of the key areas of electric mobility in order to highlight the possibilities of integrating electric mobility in Europe which might accelerate market uptake. proEME is organized in a matrix of actions and applications.

proEME follows four lines of actions:

1. Data and Policy Analysis: All activities in the project target the enhancement of baseline knowledge in order to support informed decisions and to ensure a full assessment for proEME tools. proEME provides summaries of cutting-edge knowledge of the EV landscape (policy and market).

2. Decision Support: proEME develops essential and new decision support tools and instruments for calculating/comparing of EVs' purchase prices and the Total Cost of Ownership as well as business case potentials of companies and policies in order to support the deployment process and the upscaling of the EV-market.

3. Cooperating with practitioners: proEME holds workshops to analyse user cases, inform key market actors and build capacities to create multiplier effects. The project addresses cities & municipalities, dealers, leasing companies, manufacturers, fleet managers & operators (goods and public transport) as well as consumers via the members of automobile clubs. This allows extending the database for the calculation within the proEME tools.

4. Round Tables: proEME organises round tables to disseminate the scientific findings to foster national and regional policies and strategies for supporting electric mobility.

proEME covers four fields of applications: (1) New and second hand EVs, (2) LEVs (Light Electric Vehicles) and New Mobility, (3) E-Busses and (4) E-Logistics. The applications reflect the specific research topics in the focus of regional/national funding organisations.

The collaboration

To achieve the scientific objectives of the project, a strong European cooperation is necessary. proEME quick-starts with an already operational and experienced network of practitioners (EV-communities). proEME builds upon the achievements in EU projects like I-CVUE, EAFO portal, FREVUE, GREAT, ZeEUS as well as Task 27 "E-Logistic vehicles" and 33 "E-Busses" of the IEA HEV TCP. proEME will link to EUFAL which is another project related to electric mobility in commercial transport in the ERA-NET Call Electric Mobility Europe (EMEurope) in order to create synergy effects. Links will be established to the project proEME, in order to further increase the understanding of decision making of fleet managers. Exchange of knowledge and experience as well as joint dissemination activities are planned. The project brings established collaborations with committed fleets, umbrella organisations, cities and municipalities. Furthermore, proEME provides decision support tools and technologies with proven concepts successfully applied in I-CVUE fleet mentoring. proEME will enhance and disseminate them in pilots on the EAFO- and RACC-portal.

Getting involved

proEME is looking for automobile clubs, dealers, leasing companies, fleets managers & operators, industry partners, manufactures as well as decision/policy makers from cities and municipalities to maximise the reach and impact of the scientific project. Several stakeholders are already going to support the approach. Furthermore, the framework developed during the project will continue providing users decision support.

If you are interested in understanding the benefits of EVs for several use cases, please visit the project website **www.pro-eme.eu** and find a list of local contacts.

Project goals

The main goal of the project is to increase the uptake of e-mobility in Europe by building capacities, networks and tools to reach decision makers and contribute to positive investment decisions for EVs i.e. LEVs, e-busses, e-trucks and plugin cars. The approaches and decision support tools developed shall serve as blueprints for further development of the EV-market and expand the scientific findings of electric mobility.

Partners

- Deutsches Zentrum für Luft- und Raumfahrt e.V.(German Aerospace Center), Germany
- AUTOMOBIL CLUB ASSISTENCIA SA, Catalonia
- CHALMERS UNIVERSITY OF TECHNOLOGY, Sweden
- Copenhagen Electric, Denmark
- FIER Automotive, Netherlands
- Hungarian Electromobility Association, Hungary
- Kommunen in der Metropolregion Hannover Braunschweig Göttingen Wolfsburg e.V., Germany
- National Academy of Sciences of Belarus Center for System Analysis and Strategic Research, Belarus
- Robert Bosch GmbH, Germany
- University of Twente, Netherlands
- VTT Technical Research Centre of Finland, Finland

www.pro-eme.eu

Duration 30 months

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TÜV Rheinland Consulting GmbH
Research Management
Am Grauen Stein
D-51105 Köln
Phone +49 221 806 4142
Fax +49 221 806 3496

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For further information in the EMEurope project please contact
TÜV Rheinland Consulting GmbH
Research Management
Dr. Marcia Giacomini (Coordinator)
Am Grauen Stein
D-51105 Köln
Phone +49 221 806 4142
Fax +49 221 806 3496

For more information visit
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