e-MOTICON

e-MObility **T**ransnational strategy for an **I**nteroperable **CO**mmunity and **N**etworking in the Alpine Space.

Training « Definition of the number of necessary E-CS »

European Regional Development Fund

Short overview of the training contents

1. Introduction to the topic
    - Actors involved
    - Types of approaches
    - Parameters to be considered
    - Challenges
2. Presentation of different approaches
3. Summary

Introduction to the topic

There is a large amount of approaches on how to determine the necessary number of e-CS for a certain area.

This course aims to give an overview of whom to involve and what to consider when approaching the topic. Several practical examples – meant as first methodical notes on the determination of the quantity structure - will demonstrate the existing variety.

Introduction to the topic

Actors involved

This course aims to give an overview over the variety of existing approaches to determine the necessary number of e-CS for a certain area. Several practical examples – meant as first methodical notes on the determination of the quantity structure - will be presented to demonstrate the existing variety.

The concept for the charging infrastructure can be developed by the PA itself, but it is strongly advised to integrate external knowledge as well.

Actors to involve in the elaboration of the concept are:

- local and regional PAs
- external consultants
- energy provider
- citizens / future users
- potential operators of the charging infrastructure

The communication and the exchange of information among stakeholders are essential for a successful implementation.

Introduction to the topic

Types of approaches

The estimation of the number of E-CS needed depends on a variety of certain and uncertain factors and may differ from one location to another. Therefore, a variety of approaches exists. Literature often distinguishes between area-covering and demand-based approaches.

Area-covering approaches:

- More or less even spatial distribution of E-CS that (currently) exceeds the actual demand, but may incentivise the purchase of EVs („hen-egg-problem“)
- Focus on increasing the sense of security, not on real demand

Demand-based approaches:

- Provision of a adequate number of E-CS that covers the actual power demand for the charging of existing and future EVs

In the course of the development of the infrastructure, the approaches however tend to become indistinct, with demand-based approaches covering the respective areas and area-covering approaches being adapted to the actual demand registered.

Introduction to the topic

Parameters to be considered

The following overview gives a first idea of factors that might be considered in the elaboration of a charging infrastructure concept:

- ***Existing charging infrastructure***: How much? Where? What type (e.g. AC/DC)? Accessibility (private, public, semi-public)? Utilisation rate? What infrastructure is already planned in the near future?
- ***Existing and predicted electric cars***: How many electric cars currently? What percentage? Different scenarios for the future relying on estimation
- ***Structural data***: Number of inhabitants, population density, rural or urban areas, building density, demographical development
- ***Economic data***: Employment rate, important companies and industrial estates, inbound and outbound commuters, per capita income
- ***Touristic data***: Attractiveness of the region, tourist attractions, number of tourists, day visitors and overnight stays, hotels, gastronomy
- ***Transport and mobility data***: Modal split, public transport, registered cars, carsharing options, parking spots
- ***Energy infrastructure***: Power supply provider, grid operator

Introduction to the topic

Challenges

Models can only give a limited picture of reality. The (theoretic) estimation of the number of E-CS needed depends on a variety of certain and uncertain factors which means that errors may occur.

Factor relying on assumptions are e.g.

- future number of electric vehicles
- share of private/ semi-public / public chargings
- number of inhabitants / demographical development
- technological progress

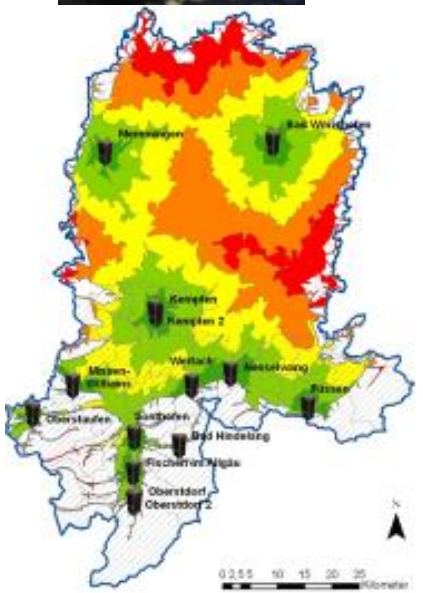
Depending on the time horizon considered (infrastructure for existing and/or future vehicles), the chosen parameters may have a great impact on the results. The risk can be minimized by calculating multiple scenarios. Furthermore, the concept should be updated and adapted to changed framework conditions regularly.

Infrastructure for electric vehicles in the Allgäu region

#germany #allgaeu #allgaeuerueberlandwerk #ac #touristsandcitizens

The energy provider Allgäuer Überlandwerk GmbH has been realizing a continuous row of projects in the sector of e-mobility since 2009

- "eE-Tour Allgäu" (2009-2011): focus on tourism and e-mobility
  - strong goal on acceptance and the build up of an e-mobility infrastructure in the Allgäu region
  - Major challenges: the lack of electrical cars from OEMs and the variety of different plugs for charging
- "econnect eE-Tour Allgäu" (2012-2015): focus on connecting the single systems of e-mobility via information and communication technologies
  - Major challenges: not standardized interfaces between the single systems, use of e-mobility in a real economic application (carsharing for students)
- "3connect" (2015-2019): focus on the interoperable connection between commercial e-mobility, agricultural e-mobility, grid and energy economics



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Infrastructure for electric vehicles in the Allgäu region

#germany #allgaeu #allgaeuerueberlandwerk #AC #touristsandcitizens

Parameters considered in the estimation of demand

Analysis of traffic flow data and tourism in the region

1. Evaluation of relevant statistical data
    - Number of commuters
    - Overnight stays of tourists
    - Arrival mode (car, train,...)
    - Average charging duration at E-CS
    - Average energy output
    - Chargings per day and per week at the individual E-CS
    - Chargings per E-CS during different seasons
    - Share of chargings of own respectively third party customers (roaming) at the individual E-CS
2. Elaboration of an evaluation matrix for the expansion of the public and semi-public charging infrastructure
3. Evaluation of the quality of the location and development of a weighting key

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Electromobility Concept Obere Lahnregion: EMOLA

#Germany #ObereLahnregion #EMOLA #NormalCharging #Inhabitants #IndustrialParks #Tourists

Content

- The electromobility concept was developed as a suitable planning foundation for electromobility in the Obere Lahnregion
- Next to the electrification of public transport and sustainable mobility in industrial parks (mobility management and charging infrastructure for companies) public charging infrastructure was the focus of this concept

Aim

- The aim was to find the suitable number of public charging spots in the district. The project considered the projected demand of E-CS in 2030 and the population in the municipalities

Focus

- The approach focusses on public charging infrastructure and not on private or semi-public charging infrastructure (e.g. supermarkets, parking lots)
- The share of private E-CS is considered by estimating the number of car owners for whom it will be possible to have charging infrastructure on their private property and for those who will be able to charge at their employers CS
- The focus was on normal charging stations and not fast charging stations

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Electromobility Concept Obere Lahnregion: EMOLA

#Germany #ObereLahnregion #EMOLA #NormalCharging #Inhabitants #IndustrialParks #Tourists

Parameters considered in the estimation of demand

- Existing road and public transport infrastructure
- Existing charging infrastructure
- Parking spots and shopping facilities
- Tourism and Hotels
- Commuter traffic
- Current and future population development
- Current and future (electro) car ownership
- Future carsharing

Following the estimation the individual spots were located with the help of experts (people and institutions who know the area well) and inhabitants.

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Comprehensive charging infrastructure in Carinthia

#Austria #Carinthia #CEMOBIL #Intelligent eCS #area-covering

Carinthia has with currently 546 charging points the largest number of charging points, compared to the other Austrian provinces. Both rural and urban areas equally are supplied with charging infrastructure. Fast charging infrastructure is also available at important points.

The focus was placed on an area-covering infrastructure, to increase the sense of security of EV drivers and thus incentivise the purchase of EVs („hen-egg-problem“).

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- 50 public charging stations for e-vehicles have been set up in total
- 2 quick charger (1 reserved only for e-Taxi)
- Smart intelligent technology
- Free use! An ID-card is only required
- Two interconnected plug-in locations per parking space (1 Mennekes socket and 1 CEE socket)
- 3,7 – 50 kW

Comprehensive charging infrastructure in Carinthia

#Austria #Carinthia #CEMOBIL #Intelligent eCS #area-covering

<u>Parameters considered in the estimation of demand</u>

Area-covering approach = installation of e-CS at

- public places with high frequency

  e.g. central station, city centre, airport, Park&Ride, University ...

- popular places, destinations or institutions

  e.g. Lido, indoor pool, museum, shopping center,…

All charging points can be easily found via the charging spot locator at www.cemobil.eu

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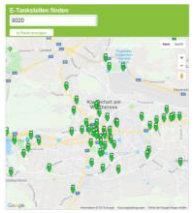

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Demand-based approach – French model

#France #AuvergneRhône-Alpes #SYANE #normalandhighspeedeCS #citizens

Background Auvergne Rhône-Alpes:

The car: the dominant mode of transport

- 80%: the rate of use of vehicles in travel
- 640: the number of vehicles per 1,000 inhabitants (national average: 482)
- + 2%: the annual increase in traffic

Territorial and environmental issues

- a growing distance from home to work (20 km)
- localized problems of air quality resulting in an atmospheric air protection plan

In this context, the SYANE project was defined following feasibility studies conducted in 2014 and validated by a Steering Committee composed by various public authorities.

Demand-based approach – French model

#France #AuvergneRhône-Alpes #SYANE #normalandhighspeedeCS #citizens

Parameters included in the estimation of demand:

- number of electric vehicles
- number of owners of 2 vehicles, with a private garage, driving less than 200 km/day
- progressive equipment hypothesis in 5 years
- rate of 60 % of fast and 40 % of normal eCS
- rate of 10 or 15 % of the total number of chargings at public eCS

Involvement of electric vehicles owners and inhabitants through questionnaires.

Demand-based approach – French model

#France #AuvergneRhône-Alpes #SYANE #normalandhighspeedeCS #citizens

These studies have shown the interest and high expectations of publics authorities in terms of information and support for the installation of charging infrastructure on their territory.

The diagnosis of the territory also revealed that Haute-Savoie was a department with high potential, particularly conducive to electro-mobility given the dynamism of its population, the high rate of household equipment in vehicles, a distance average home-work compatible with the use of the electric vehicle. A growing use of electric vehicles :

- 350 full electric vehicles in circulation at the end of 2013 in Haute-Savoie
- 1,750 electric and rechargeable hybrids vehicles in circulation at the end of 2017 in Haute-Savoie
- an estimate of 23,000 refillable vehicles in 2030 in Haute-Savoie

Demand-based approach – French model

#France #AuvergneRhône-Alpes #SYANE #normalandhighspeedeCS #citizens

Today the SYANE network with around 150 eCS (90% accelerated and 10% rapid charge) is part of eborn network.

By 2019: 700 eCS within the regional eborn network (5 eCS joined networks - www.eborn.fr).

Today part of the electricity is coming from renewable energy.

By 2020 all the electricity will come from renewable energy.

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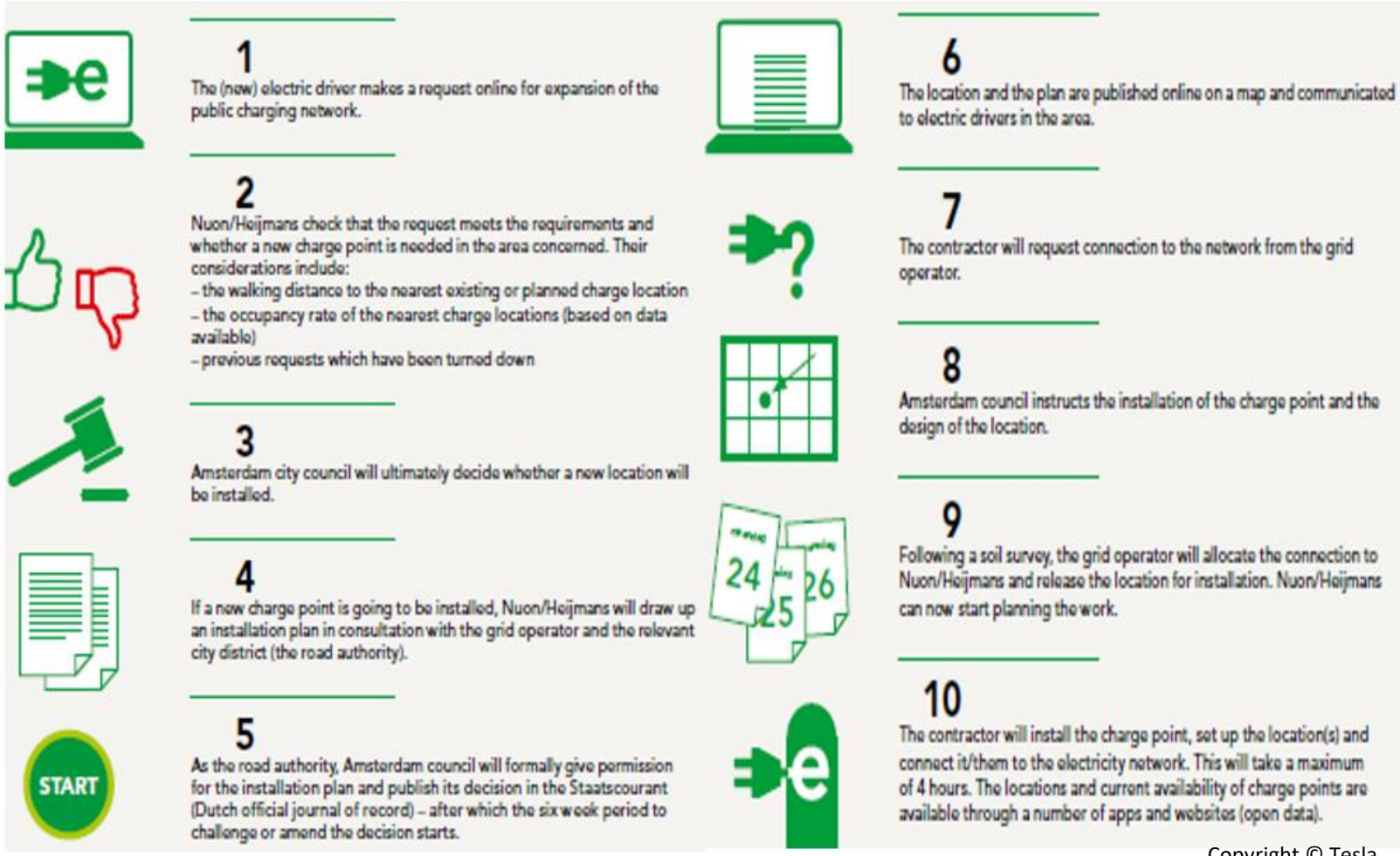
Demand-based approach – Amsterdam model

#Amsterdam #Rome #Torino #AC #citizens

Demand-based public charging roll-out was firstly adopted by Amsterdam and replicated in Italy by **Torino** and **Rome**.

In short, if you live in the city center and buy an **Electric Vehicle (EV)**, without your own parking spot, you can request to have public parking and charging near your apartment.

Installation following actual EV-owner demand rather than randomly deploying charging points and hoping for usage is way more efficient:



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Demand-based approach – Amsterdam model

#Amsterdam #Rome #Torino #AC #citizens

- **For EV user**: residents will have charging solutions near their home, making the transition to owning an EV possible. The parking is not personal/private but exclusive for EV owners, and this represents a tremendous non-economic incentive.
- **For the city**: no parking space is lost and parking revenues are maintained. Reliable charging options enables a fast EV adoption and ultimately emission reduction.
- **For the operator**: profitable business case through high utilization rate from day one.
- **For utilities**: slow charging offers a scalable solution almost everywhere.

This system is a best practice and has proven a successful in Dutch cities since it both enabled a consistent growth of charging points and an high utilization rate, fostering EVs uptake.

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Further information:

https://issuu.com/gemeenteamsterdam/docs/plan_amsterdam_the_electric_city

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Project Website: http://www.alpine-space.eu/projects/e-moticon/en/home