

eCHARGE
4DRIVERS

D2.2

Accessibility requirements,
tariff schemes and incentives

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Authors	Jaume Roca (BSM), Jaume Mata (BSM), Àngel López
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Authorised by (Technical Coordinator)	Evangelos Karfopoulos	ICCS	03/12/2021
Authorised by (Quality Manager)	Alessandro Rinaldi	POLIBA	06/12/2021
Submitted by (Project Coordinator)	Angelos Amditis	ICCS	07/12/2021

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LIST OF ABBREVIATIONS AND ACRONYMS

Abbreviation	Meaning
UC	Use Case
WP	Work Package
BEV	Battery Electric Vehicle
PHEV	Plug-in Hybrid Electric Vehicle
WLTP	Worldwide Harmonised Light Vehicle Test Procedure
KPI	Key Performance Indicator
CP	Charging Point
CPO	Charging Point Operator
eMSP	electroMobility Service Provider
EV	Electric Vehicle
D	Deliverable
AC	Alternating Current
CAPEX	Capital Expenditure
CS	Charging Station
DC	Direct Current
DSO	Distribution System Operator
EVSE	Electric Vehicle Supply Equipment
FCEV	Fuel Cell Electric Vehicle
GHG	Greenhouse Gases
GUI	Graphical User Interface
ICE	Internal Combustion Engine
kWh	Kilowatt hour
LTZ	Limited Traffic Zone
MSP	Mobility Service Provider
OEM	Original Equipment Manufacturer
OPEX	Operational Expenditure
QR	Quick Response

RFID	Radio-frequency identification
TEN-T	Trans-European Network – Transport
V2G	Vehicle-to-Grid

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EXECUTIVE SUMMARY

Deliverable 2.2 is divided in three main sections. The first one aims to provide a set of requirements to ensure the accessibility and comfortable use of the charging infrastructures by all users paying special attention to users with impairments. In this respect, the accessibility requirements from the perspective of different stakeholders (OEM's, users, CPO's, regulatory authorities) have been analysed. From the OEM's perspective the cable management as well as the charging station location in respect to the parking bays are the most critical aspects to be considered in order to maximise the accessibility to a charging infrastructure. From the user perspective, the following compulsory requirements were identified:

- Ensure signs and other information consider users with impaired vision and who are colour blind by having a clear contrast between text and background and avoiding red/green colour combinations.
- Ensure installation avoids surface level differences and kerbs between the vehicle and the charging station.
- Lower the charger's concrete foundation to ground level to avoid surface level differences and so the screen, buttons and controls are at the appropriate height.
- Have the car park's paved area continue all the way to the charging station/concrete foundation.
- Have at least 90 cm of free space around the vehicle, both between parked vehicles and between vehicles and chargers. Do this by painting a buffer zone around the charging points.
- Place any signs with payment information so they are no more than 120 cm, but preferably 80–100 cm, above the surface of the parking space.
- Place collision barriers at a distance of at least 90 cm (preferably 120 cm) from each other so that the charging point can be accessed from a wheelchair.
- Placement of the collision barrier may not reduce access to charging outlets, screens, buttons and card/RFID readers.
- Maintain at least 90 cm of open area between any weather protection and the charger on the sides of the charger with this equipment.

Also, a benchmark on the current best practices towards accessibility of the project cities has been conducted.

Finally, the existing regulatory frameworks and directives at national and EU level were examined proving that there is a lack of specific accessibility requirements for the charging infrastructures. A few countries or cities have a specific regulation on measures to be considered when defining public charging points. The fact that in many countries EV charging stations are still scarce and do not have a high use rate, this problem has not been systematically addressed. Despite that, several cities have considered accessibility situations and have incorporated in their public tenders' measures to ease the access to charging points. Most of these requirements consider space around the parking space, eliminating surface level differences between the charging point and the parking space, ensuring that the display is at a correct height and avoiding unreadable colours for colour blind people among the most relevant.

The second and the third sections include an analysis on tariff structures and incentives schemes with the aim to provide support to any CPO, MSP or authority to define incentives or charging tariffs. For this project, this support will be used by some sites to test improvements in some tariffs as well as in the incentives provided. For this analysis several interviews have been conducted to relevant stakeholders from companies established in the project sites that cover CPO's, eMSP's, OEM's, Authorities and User Associations. The deliverable gathers the opinions and visions that these stakeholders have on tariff structures and business models as well as the best ways to incentivise the purchase and usage of an EV.

Regarding the incentive's schemes analysed in the Deliverable, the benchmark that was conducted concludes that most countries and cities apply factors to incentivise the purchase and use of EV's. These incentives are based mainly on purchase subsidies, on registration taxes, ownership tax, company tax and in some cases on a reduction of the VAT applied. Despite these are the general incentives mostly applied by states, some other measures have been taken by municipalities such as free kerbside parking, toll reduction or free access to limited traffic zones. According to the outputs from the interviews and from the revised literature, making incentives available at the time of purchase, appear to be an effective solution to increase EV market share. The current financial incentives should not be removed in the short-term to keep encouraging potential buyers. Another crucial incentive for buyers is the availability of charging infrastructure. Governments should expand the scale of charging points to increase density as a key measure to incentivise EV's.

Regarding tariff structures, in the analysed areas, these depend on several parameters such as subscriptions, type of chargers, average power, initial fees, location of the CP's, types of vehicles, time of the day in which the charging event takes place, minimum charges, and changes in tariffs according to certain thresholds. In some areas, tariffs respond to a need to facilitate and incentivise users to charge instead of generating high revenues to make profit from it. There is a high diversity of opinions on whether energy should be charged per time or per kWh. In any case, most of the accessory tariff parameters that are included aside from the *real* charging tariff are made to incentive the proper use of charging points. These stand for initial fees, minimum charges, charges for excess of time or energy and others such as differentiating the fee according to the time of the day.

Finally, all possible tariff structures have been defined through a generalized formula. This formula and the recommendations made, allows any MSP or CPO to explore different options to overcome the issues that might be affecting their current CP management strategy.

The final part of the deliverable shows different approaches that can be used by CPO's or eMSP's to modify user behaviour using several parameters included in a tariff structure. This will be used in WP5 in those sites participating in the demonstrations of new tariffs and incentives.

1 INTRODUCTION

1.1 Project introduction

eCharge4Drivers is an EU funded Horizon 2020 project running from June 2020 to May 2024 and deployed by a consortium of 32 partners. Charging an electric vehicle (EV) is still not as convenient as refuelling a conventional vehicle, potentially posing a barrier to increase the market uptake of EVs. eCharge4Drivers works to substantially improve the EV charging experience within cities and for long trips. The project will develop and demonstrate user-friendly charging stations and innovative charging solutions as well as smart charging services for the users. By capturing users' perceptions and expectations on the various charging options and their mobility and parking habits, eCharge4Drivers will organise demonstrations in 10 areas across Europe, including metropolitan areas and Trans-European Transport Network (TEN-T) corridors. Charging stations in these areas will offer user-friendly and convenient functionalities for EV drivers of passenger and light vehicles and motorcycles, such as direct payment methods and bigger, user-friendly displays. Using the knowledge generated, the project will also propose an EV Charging Location Planning Tool, fostering the broad implementation of charging infrastructure in Europe.

1.2 Purpose of the deliverable D2.2

The aim of this deliverable is to report the work performed under Task 2.1 'Enhanced access to the charging infrastructure' and T2.3 'Incentive schemes and tariff structures for the demonstrations. It describes the accessibility parameters and best practices in cities as well as the incentives and tariffs applied in cities and the recommendations issued to tackle different issues that MSP's and CPO's face.

1.2.1 Description Task 2.1: Enhanced access to the charging infrastructure

This section aims to provide guidelines to ensure the accessibility and comfortable use of the charging infrastructures by all users paying special attention to users with impairments. In this respect, the accessibility requirements from the perspective of different stakeholders (OEM's, users, CPO's, regulatory authorities) are analysed.

1.2.2 Description Task 2.3: Incentive schemes and tariff structures for the demonstrations

Tariffs and incentives are proposed for being implemented at demo sites as well as for any other MSP's at any city. The final output is a list of incentives that are proposed for each objective and a proposal on changes in tariff structures according to the issue to be tackled, ex. low use of the charging points, high rate of parked vehicles without charging, very high use of charging points, etc..

In task 2.3 several stakeholders from each area involved in the project have been interviewed with the aim of collecting the visions and opinions on incentives and tariff structures to be further developed within the project. Up to five stakeholder categories have been interviewed: Authorities, CPO's, MSP's, OEM's and user associations. A customized interview has been created for each category type with the aim to capture as much information as possible concerning tariff creation, costs, market regulation, incentives, business models and other relevant factors.

1.3 Intended audience

Based on the Grant Agreement, this deliverable D2.2 is public. It mainly refers to CPOs, MSPs or authorities to define incentives or charging tariffs and provides guidelines to improve the accessibility of their charging network..

1.4 Structure of the deliverable and its relations with other work packages/deliverables

This deliverable reports on one hand the accessibility requirements to charging stations and on the other a proposal on the tariffs and incentives that can be demonstrated in the demo sites

In the first section, the requirements from the perspective of different stakeholders (OEMs, users, CPOs, regulatory authorities) are analysed. More specifically,

- EU regulatory framework of directives towards accessibility is analysed identifying the lack of standardised guidelines for the e-mobility sector.
- OEM's perspective is considered in order to identify the design principles of charging station manufacturers as regards accessibility.
- The perspective of users with impairments is examined by conducting interviews with this category of users and reporting their suggestions and proposal from their real-life experience.
- and finally the best accessibility practices adopted by local CPOs/eMSPs or municipalities at pilot site level are collected via questionnaire.

The second section is devoted to incentive schemes. First, a benchmark on the different national and local incentives that are currently being applied in the project sites are shown. After that, the outputs from the interviewing process are summarized. This section provides all the insights from the interviewed stakeholders that can be used by demo-sites to apply new incentive schemes. The latter part shows a list of all incentive schemes that can be applied organized by type. Any authority will be able to use this section to find the best incentives according to the EV uptake of a country.

The third section is dedicated to tariff structures and follows a similar structure as the one adopted in the incentives section. In this case, the latter part of the section presents a generalized formulation of tariffs. The formula contains all parameters to define any tariff structure. Through this formulation and based on its parameters, several proposals are made to tackle the issues that may face MSP's when managing a charging service.

Relation with other work packages:

Inputs from:	<ul style="list-style-type: none"> • WP1 A priori user's concerns, expectations and perceptions <ul style="list-style-type: none"> • Task 1.2: the users' concerns and charging expectations as captured by the questionnaire surveys in T1.2 have been considered when defining accessibility requirements as well as for the tariffs and incentives
Outputs to:	<ul style="list-style-type: none"> • WP5 Demonstrations coordination and implementation <ul style="list-style-type: none"> • The accessibility requirements will be taken into account for the demonstrations • Proposals and recommendations on incentives and tariff structures will be used at some demo sites for testing

Table 1. Relation with other work packages

2 ACCESSIBILITY REQUIREMENTS

2.1 Existing regulatory frameworks and guidelines

The issue of services being accessible to people with disabilities has been addressed by a number of institutions around the world. In 2008, the United Nations adopted its Convention on the Rights of Persons with Disabilities¹ (UN Disability Rights Convention 2008).

The States parties shall take appropriate measures to promote and ensure the full and equal enjoyment of the following (and other) human rights and fundamental freedoms for people with disabilities:

1. Participation in cultural, political and public life
2. Work and employment
3. Rehabilitation and health care
4. Accessibility, personal mobility and independent living
5. Respect for privacy

Following the UN convention in 2010, the EC created the European Disability Strategy 2010-2020² providing general guidelines and action plans for member states. One output of this strategy was the European accessibility act³ that was presented in 2019. The European accessibility act provided DIRECTIVE (EU) 2019/882, which invites Member State Governments, OEMs and other stakeholders to reach consensus on viable market solutions to resolve disabled people's accessibility issues to products and services. Article 2 of the directive defines that one product category is "self-service terminals dedicated to the provision of services", which includes charging stations.

Finally, in 2015, the EC provided a proposal for a directive of the European Parliament and of the Council on the approximation of the laws, regulations and administrative provisions of the Member States as regards accessibility requirements for products and services⁴. Although there are references to the respected requirements for self-service terminals and, more specifically bank ATMs, there are no guidelines for charging stations.

Currently, the dominant directive is DIRECTIVE (EU) 2019/882. According to that directive, all products that are placed on the EU market after 28 June 2025 must be aligned with the guidelines provided.

After receiving thoroughly the feedback from all partners, the consensus was that the directives in each country are very general and do not specify the requirements for charging stations.

¹<https://www.un.org/development/desa/disabilities/convention-on-the-rights-of-persons-with-disabilities.html>

² <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0636:FIN:EN:PDF>

³ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019L0882&from=EN>

⁴ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=SWD:2015:0264:FIN>

2.2 OEM perspective

In order to better address the need for accessible charging stations, we have to list the functionalities of the stations along with the requirements set by the OEMs

2.2.1 High-level Functionalities

2.2.1.1 Charging Station

The Charging Stations (CS) need to be designed from a user-centric point of view and bearing in mind all the potential accessibility issues that appear to EV users. The following characteristics and functionalities are considered for the CS design:

- Barrier free Charging Stations
 - GUI height to be at the appropriate level or even adaptable (e.g.: lower height for users with reduced mobility)
 - Design of traffic related technical infrastructure in public space (DIN 18040-3)
 - Usage of charger on front or side
 - Steps-free accessibility
 - Inclination $\leq 3\%$, ramps $\leq 6\%$
 - Rest areas
- RFID reader or QR code or (ISO 15118) Plug & Charge to start charging easily
- Payment methods: Common payment methods should be supported by the CS, at least credit/debit cards.
- CS to communicate directly with the car and give green light when it is possible to charge. Then the user can know swiftly if it is possible to charge at a particular CP.
- Indication for knowing whether the CP is already booked, with a light/colour or acoustic signal etc.
- Labels that specify the available plug types at every CP.
- Type of CS:
 - DC fast charging and high-power charging of electric passenger and L3e vehicles
 - Bi-directional charging of EVs (only in Zellik)
 - Charging of Two-wheelers / Three-wheelers:

2.2.1.2 Cable management

- **Heavy cables:** Some users might not be able to lift the cables if they are too heavy. Therefore, it is essential that this potential limitation is considered when designing the cables and cable management.
- **Cable length:** EVs have charging inlets in different positions (front central, front left, rear left, rear right etc.) Hence, charging stations should be designed based on this particularity and the cable length should be calculated according to the different positions of the charging inlet.



Figure 1. Indicative EV cable examples

- **Cable reach with 3.5m standard:** Short cables with a convenient design and placement allow the different EV models to charge from different positions. Also, this option avoids the cable laying on the ground or at a low height.

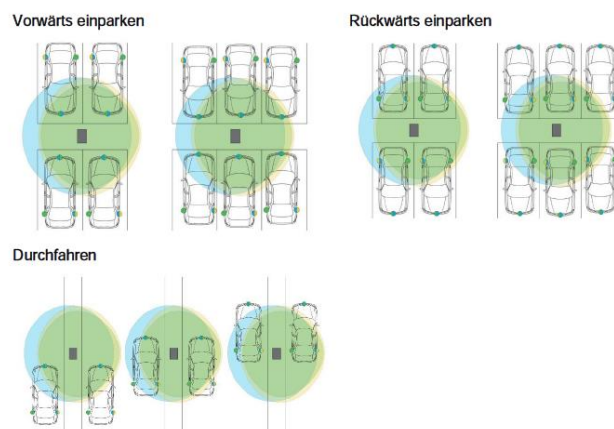


Figure 2. Indicative examples of charging station location for easier cable access

- **Up to 7 meters overlength cables:** Longer cables have better reach and accessibility, more independence regarding parking direction and the selection of the parking lot. However, this option sometimes leads to the cable laying on the ground or at a low height that could lead to tripping by people who walk near the CP. Besides, the cable is exposed to more damage if EVs roll over and it is also less manageable for the customers due to the extra length.

There are different options to handle the cable overlength, such as pulling, holding, rolling and springs.

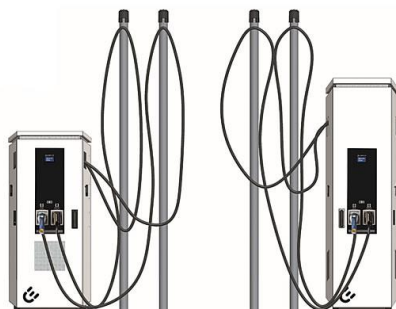


Figure 3. Long cable management

- **Hot cables:** Cables should not get too hot when being handled by the users. In the design phase, the exposure to the sun should be considered in order to avoid this type of problems.
- **Difference between high and low power systems**

2.2.1.3 Graphical User Interface (GUI)

- **Standard screen:** The GUI screen should show certain elements such as: occupancy status, availability to use, operational guidelines, charging options, tariffs, payment methods, time, etc.
- **Personalised screen once the user has signed in**
 - Price/Tariff: The tariff should be shown in the screen. The tariff can be different depending on the user, time of use, and the charging provider.
 - Charging methods and standards supported
 - Payment methods supported
 - Charging time
 - State of Charging

The above table represents the advice from the CharIN focus group Charging Infrastructure on what to show and what not on the charger's display.

2.3 User perspective

The user perspective is one of the most important if not the most important aspect when trying to identify technical requirements.

2.3.1 High level requirements

According to a recent study over creating accessible charging stations⁵ the initial planning of the charging station is very important. A proper location along with the necessary procurement and installation are key parameters. More specifically:

- The focus is to make the charger accessible when the vehicle is parked leaving a lot of space both next to and in front of the vehicle.
- In addition, there may not be any obstacles in the form of kerbs, differences in surface levels or collision barriers.

⁵ https://biofuelregion.se/wp-content/uploads/2019/08/Inkluderande-laddning_engelsk_version_1.0.pdf

- Finally, consider suitable locations in the car park. If possible, avoid installing the charging station in the car park's most attractive spaces. This reduces the risk of the space being used by drivers who do not need to charge. However, a location far from the entrance or service point reduces accessibility, so you must balance these conflicting needs.

2.3.2 Charger design

The charger design itself is also very important. Following proper specifications can fully facilitate disabled people in using the charging station. Some of the best practices indicated by users were the following:

- A crucial aspect is that the charging point and the screen are not placed so high that they are above shoulder height of a person in a wheelchair.
- The screen and the payment information should be clearly visible, especially by colour blind people and the charging handle should be operatable by one hand.
- Use chargers with maximum 2 charging points.
- Position the charging handle, screen and buttons accordingly so that they are aligned with collision barriers and weather protection.
- Set collision barriers that keep cars away from the charging station but at a distance that they do not block wheelchair users. (Figure 4)

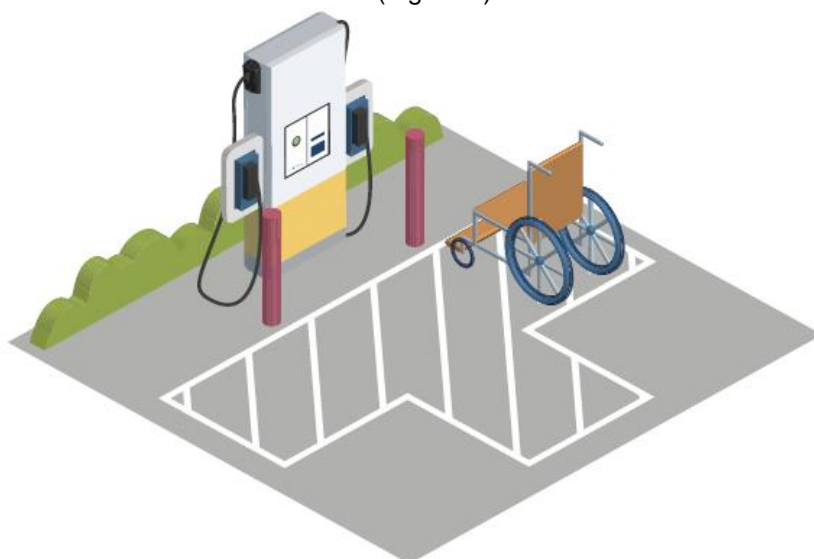


Figure 4. Collision barriers

2.3.3 Information signs

Another assisting factor would be the use of information signs on how to operate the charging station. The position of the signs should be optimal for seated and standing users and the instructions should be clear. A QR code should also be available there as a payment option. (Figure 5)

2.3.4 Charger topology

Below you may find a number of suggested charger topologies.

2.3.4.1 Centrally located charger

The centrally located charger topology can be used on a large surface (e.g.: shopping malls) with parking slots on the sides of the charging station (Figure 5).

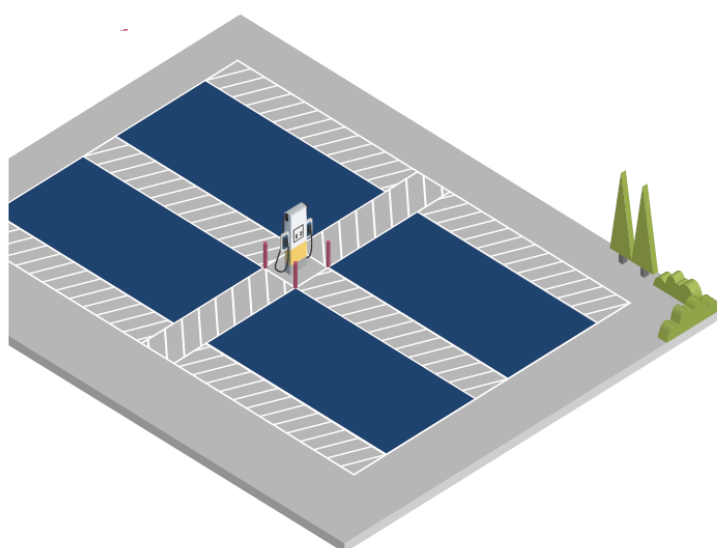


Figure 6. Centrally located charger



Figure 5. Information signs

2.3.4.2 Rapid chargers next to each other

This topology favours multiple chargers installed side by side with buffer zones which increase accessibility (Figure 7)

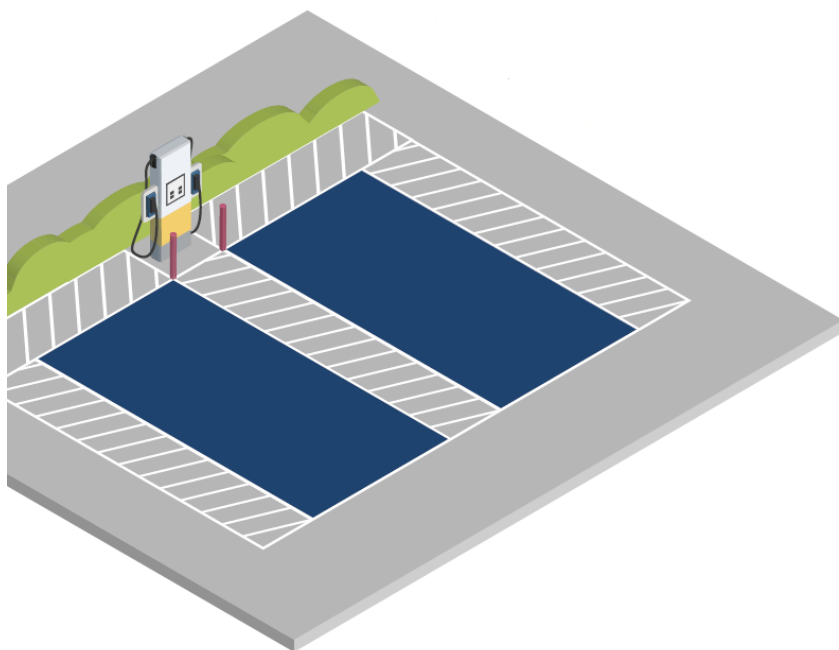


Figure 7. Rapid chargers next to each other

2.3.4.3 Slow and fast chargers

When installing slow and fast chargers, it is common to install many chargers in the same location. Options for creating extra wide spaces are often limited. But perhaps the outer parking spaces can be widened? It is important to remove as many obstacles as possible, such as different surface levels. (Figure 8)

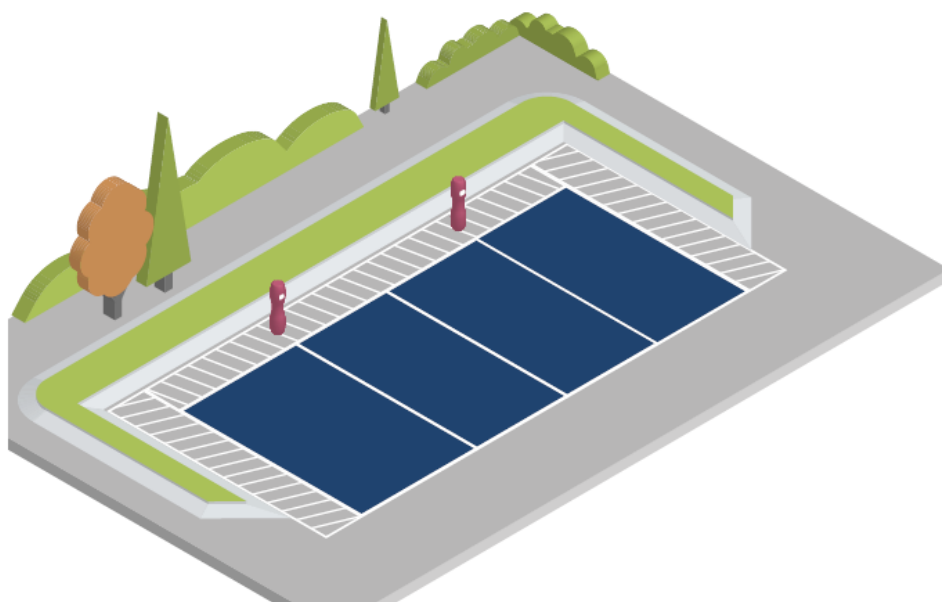


Figure 8. Slow and fast chargers

2.3.4.4 Petrol-like energy stations

On this topology the energy stations are positioned as petrol pumps. This can facilitate longer vehicles and vehicles with trailers (Figure 9).

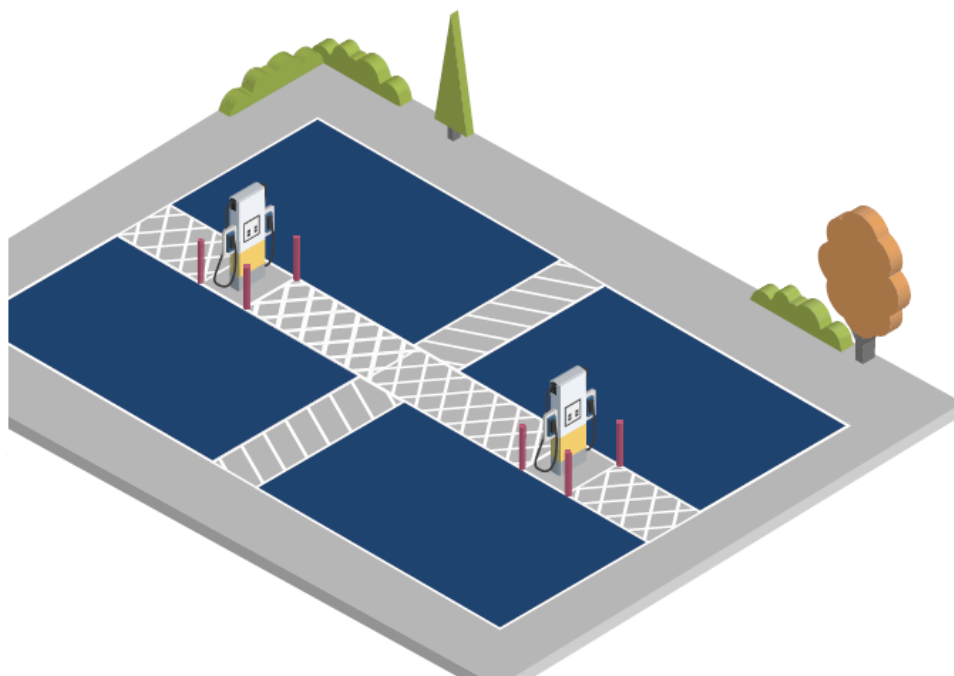


Figure 9. Petrol-like energy stations

2.3.5 Compulsory requirements

Finally, user feedback provided a few compulsory requirements that have to be met when installing charging points:

- Ensure signs and other information consider users with impaired vision and who are colour blind by having a clear contrast between text and background and avoiding red/green colour combinations.
- Ensure installation avoids surface level differences and kerbs between the vehicle and the charging station.
- Lower the charger's concrete foundation to ground level to avoid surface level differences and so the screen, buttons and controls are at the appropriate height.
- Have the car park's paved area continue all the way to the charging station/concrete foundation.
- Have at least 90 cm of free space around the vehicle, both between parked vehicles and between vehicles and chargers. Do this by painting a buffer zone around the charging points.
- Place any signs with payment information so they are no more than 120 cm, but preferably 80–100 cm, above the surface of the parking space.
- Place collision barriers at a distance of at least 90 cm (preferably 120 cm) from each other so that the charging point can be accessed from a wheelchair.
- Placement of the collision barrier may not reduce access to charging outlets, screens, buttons and card/RFID readers.
- Maintain at least 90 cm of open area between any weather protection and the charger on the sides of the charger with this equipment.

2.4 Best practices from eC4D pilot sites

Finally, we have accumulated feedback from site owners since they are a quite critical stakeholder. Questionnaires have been circulated between consortium partners so that they can provide their valuable input. The detailed responses per pilot site are included in the Annex 1. It should be noted that the information provided reflects the current practices adopted by local CPOs/eMSPs or at city level. The key outcomes of this short survey are summarized below:

1. How are parking spaces designed for people with special needs?

While Luxembourg and Turkey have national regulations that define the design of parking spaces for people with special needs, there is no relevant regulation in other pilot sites, i.e., Grenoble, Zellik and Barcelona. On every occasion, parking spots for disabled people are wider and there are slight differences on the ratio of parking spots for disabled people compared to the regular parking spots. In Greece, BFS is developing charging network in rest areas close to their gas stations, the covered areas of the car service stations are equipped with ramps for persons with moving disabilities, in order to provide access to all the areas of the station.

2. How do you decide where to provide parking spaces for people with different needs?

In Turkey and Luxembourg parking spaces for disabled people are placed close to entrances, exits and elevators. In Barcelona, for on-street parking, special parking places are set on demand of users aside from the right to park at the loading and unloading freight areas. Parking areas with chargers devoted to impaired people will be installed upon request of users. Finally, in Grenoble relevant parking spots are installed in stations where several charging points are installed, i.e., in particular in park and ride facilities. In Greece, there is no specific regulatory framework and the reserved parking spaces with people with impairments are provided according to the company's plan taking into account the available space of each station and the specific local characteristics.

3. Are the spaces that are equipped with electric charging station and that are reserved for people with special needs - exclusively for people with an electrical car or can people with an ICE car park themselves?

There are no such reserved spaces in almost all the pilots. In Grenoble, there are parking spaces with electric charging stations designed for people with limited mobility that are reserved only for electric cars. In Greece, there is no regulatory framework and the EV penetration is still low in the market, thus, the parking slots can also be used by people with moving disabilities using also ICE (petrol or thermal) cars.

4. How does the number of parking spaces that you provide for people with special needs compare to the number that should be provided for commuters, car sharing, etc.?

In Luxembourg, at least 5 % of the parking or parking spaces must be reserved for disabled persons for the first 100 spaces and at least one space for every additional 50 spaces. In Turkey one out of every 20 parking spaces must be reserved for the disabled people in public buildings and general parking lots. Also, for the on-street parking lots, 1/30 parking space is reserved for disabled vehicles. Finally, in Barcelona the ratio is 1 out of 33.

5. Do you have any special regulations regarding the access to charging stations for people with other types of disabilities (colour-blind people, deaf collectives)?

In Barcelona, the municipality has created an app (Smou) along with other information systems that are designed accordingly to facilitate people with disabilities. The brightness, the colours, the contrast on the app and the signs have been set to be readable by everyone. Also, no sound is used to guide users, hence deaf people would not be discriminated against. There are no such regulations or requirements yet in Grenoble, Luxembourg, Greece and Turkey.

3 INCENTIVES

This chapter focuses on the means that are used by authorities and other organizations to incentivize the purchase and usage of EV's, as well as the installation of charging infrastructure. The EV market is still in most countries at an initial stage. Despite several car manufacturers are now offering EV models, purchase costs are still higher than the combustion engine vehicles and consumers have fears regarding charging options. For this reason, not only authorities but also vehicle manufacturers are setting a wide variety of incentives to increase the number of EV running in the streets. Incentives are also set to facilitate the installation of charging points not only for private use but also for public access in city streets.

The first section of this chapter is devoted to list the incentives that are currently being applied at the different project sites. Each country sets its national incentives according to the different levels of maturity of the EV sector and the availability of funds.

The second section explores the opinions of several stakeholders (authorities, CPO's, MSP's, OEM's and user associations) regarding how to incentivise the purchase and usage of EV's as well as the charging infrastructure. This section collects the key ideas that were expressed by stakeholders during the interviews conducted.

The last section offers a summary of all possible incentives that can be applied by authorities and the impacts collected through their application. This section will be used for the demonstration phase (WP5) by all participating sites.

3.1 Incentives benchmark

As shown in this section the situation regarding incentives is varied among the different project sites. In Italy there are incentives in relation to the grams of CO₂ emissions per km. For electric vehicles with emissions between 0-20 g / km there is a contribution of up to 6,000 euros with scrapping, and in Apulia Region electric powered cars enjoy a five-year exemption of the car tax payment starting from the first registration. For hybrid vehicles with emissions between 21-60 g / km, a contribution of up to € 2,500 with scrapping and € 1,500 without scrapping is recognised.

In Spain there are incentives up to 7,000€ of direct subsidies for the purchase of an EV, and in the city of Barcelona EVs can park for free at the on-street parking areas and there is a reduction of 75% of the municipal vehicle tax.

In Luxembourg, there are incentives to purchase premium for purely electric vehicles of 3,000 euros, for models that have an electricity consumption of more than 18 kWh per 100 kilometres (WLTP) or 8,000 euros for models that have an electricity consumption less than 18 kWh per 100 kilometres. For larger BEVs with seven seats and only for households with at least five residents, the higher premium is also available independently of the WLTP consumption. The latter is intended as a social component of the subsidy programme to support families.

In Belgium there is a reimbursement of 15% of total expenses for purchase of electric quadri-, tri- and motorcycle both for businesses and particulars. Moreover, all the business types can benefit from 100% tax deduction on purchase of electric vehicles and 13.5% deduction on investments in charging infrastructure.

Also, in Greece there are incentives for private users. There is a subsidy 20% or up to 6.000€ for vehicles with retail values before taxes up to 30.000€, 15% or up to 6000€ for vehicles with retail values before Taxes higher than 30.000€.

In Turkey there is no actual incentives which is set by government, but ZES offer 10-20% discounts on the rates. A separate case is Grenoble which appears to have no specific incentives in the city.

In these European countries there are various incentives, sometimes not specific, but the incentives related with the CO2 emissions are very important to reduce environmental impact and to encourage users to purchase EVs. These types of incentives should be implemented in all European countries.

3.1.1 Incentive scheme in Barcelona

NATIONAL INCENTIVES:

- Up to 7,000€ of direct subsidies for the purchase of an EV (MOVES III plan)
- No registration tax for BEV
- Road tax exemption / reduction depending on local policies
- Toll exemption on regional highways for electric vehicles
- Free parking in selected cities
- Traffic lanes reserved for high occupancy circulation can be used only by the driver of BEV's
- Subsidies for private and public charging points

BARCELONA SPECIFIC INCENTIVES:

- EV's can park for free at the on-street parking areas (with the designated time limit)
- Reduction of 75% of the municipal vehicle tax
- Some tolls on the Barcelona highways are free for EV's
- Electric freight vehicles can park for an additional 30 minutes' at the loading and unloading areas in the city

3.1.2 Incentive scheme in Luxembourg

Luxembourg seeks a way out of the heavy congestion on the countries road network, with about 200.000 daily cross-border commuters in a country with about 600.000 residents, and has therefore introduced a free of charge public transport nation-wide.

NATIONAL INCENTIVES:

In May 2020, the Luxembourgish government had raised the purchase premium for purely electric vehicles from 5.000 to 8.000 euros as part of an aid programme to curb the effects of the Covid 19 pandemic being effective until 31.03.2021.

The government has recently reviewed and adapted its subsidy programme for EVs for another twelve months until 31 March 2022 to reflect environmental and social parameters. The purchase premium for pure electric cars is now from 1 April 2021 onward to be linked to the electricity consumption documented according to WLTP as registered by the carmaker. It is retaining this higher incentive of 8.000 euros, only for models that have an electricity consumption of less than 18 kWh per 100 kilometres. For electric cars that consume more, the amount of the bonus is capped at 3.000 euros.

The regulation foresees that purely electric vehicles with seven or more seats are to be subsidised with 8,000 euros, regardless of their electricity consumption, thereby taking the need for larger family cars into account. Applicants must be part of a household with at least five people.

For plug-in hybrids, subsidies will only be available until the end of the year if their CO2 emission is a maximum of 50g/km or less. The premium is lowered to 1,500 euros (previously 2,500 euros) until the end of this year. Therefore, the bonus will only be available for PHEVs purchased and registered between 1 April and 31 December 2021. In the case of BEVs, the new provisions apply to all vehicles

ordered between 1 April 2021 and 31 March 2022, and whose first entry into service takes place before the end of 2022.

Besides, a purchase subsidy is in place of up to 500€ for electric motorcycles and quadricycles.

- The tax for BEV (and FCEV) is reduced to the minimum CO₂ based tax of 30€ annually.
- The deductibility from corporate income of expenses related to the use of company cars is calculated on the basis of CO₂ emissions. This measure is in place to encourage to buy vehicles with zero or low emissions as a company car.
- Other EV-related incentives / benefits

To break the chicken-egg circle of future EVs to find a lack of charging options, in 2010, Luxembourg's government had entrusted the countries five DSOs to set up and operate the nationwide charging network "Chargy" as CPO. The CPO provides equal conditions to access the network to any MSP. While all MSPs pay the same energy price per kWh, a part of the Chargy network's cost is covered with low voltage grid fees, thus paid by all household electricity users. Thereby, end-user prices per kWh are fixed, stable, and below the price level for equivalent service in neighbouring countries while varying from one MSP to another.

3.1.3 Incentives in Zellik:

NATIONAL/REGIONAL INCENTIVE:

Governmental tender for installation of public charge points through whole Flanders on demand of EV drivers (in case of absence of public charge points in near neighbourhood and impossibility to install a private charge point). Winner of the tender: Allego. Charge points have a very low payback due to the low consumption. (Allego, 2021)

- Reimbursement of 15% of total expenses for purchase of electric quadri-, tri- and motorcycle both for businesses and particulars. (FOD Financien, 2021)
- All the businesses types can benefit from 100% tax deduction on purchase of electric vehicles and 13.5% deduction on investments in charging infrastructure. (FOD Financien, 2021)
- No registration and road taxes for electric vehicles in Flanders. (Vlaamse Overheid, 2021)

3.1.4 Incentive scheme in Bari, Apulia Region

Unlike other big Italian cities, the municipality of Bari does not provide any benefits for those who want to access the limited traffic zone (ZTL) with an electric or hybrid vehicle or to park for free in the public parking spaces. In Apulia region, the current incentives are the following:

Electric powered cars enjoy a five-year exemption of the car tax payment starting from the first registration. At the end of this period, an annual amount equal to one quarter of that of the corresponding petrol vehicles must be paid.

For the purchase of electric and plug-in hybrids cars that already benefit from the eco-bonus, an additional contribution of 2.000 € is provided (plus another 2.000€ granted by the seller) for the scrapping of an old car and € 1.000 (plus another 1.000€ from the dealership) without scrapping. Consequently, the eco-bonus and the measures of the Relaunch decree add up and significantly strengthen the support for low-emission cars: the overall incentive goes from 6.000 € to 10.000 € with scrapping and from 4.000 to 6.000 without, while for all plug-in hybrids and some full hybrid the contribution increases from the current 2.500 € to 6.500 € in the event of scrapping, and from 1,500€ to 3.500€ without scrapping.

NATIONAL INCENTIVES

- For electric vehicles with emissions between 0-20 g / km there is a contribution of up to 6.000 euros with scrapping
- For hybrid vehicles with emissions between 21-60 g / km, a contribution of up to € 2.500 with scrapping and € 1,500 without scrapping is recognized

Cost	CO2 emissions (g/km)	ECOBONUS		Country contribution	
		With Car scrapping	Without car scrapping	With Car scrapping	Without car scrapping
< 50.000 €	0-20	6.000 €	4.000 €	2.000 €	1.000 €
	21-60	2.500 €	1.500 €	2.000 €	1.000 €

Table 2. Incentives in Bari

3.1.5 Incentive scheme in Greece

NATIONAL INCENTIVES:

- From 1-1-2021 until 31-12-2022: free parking at city level for vehicles with zero emissions or <50gr CO2/gr
- Electric vehicles are excluded from the environmental fee (additionally to registration fee) imposed to conventional passenger and heavy vehicles, i.e. 3000€ for Euro 4 and 1000€ Euro5a
- Exemptions from income for expenses or concession of a vehicle of zero or < 50gr CO2/gr as well as for purchasing a charging infrastructure for private users and companies.
- Recent ministry decision FEK1221 B/30-3-2021 allows BEV and Hybrid EVs with CO2 emissions<140k/km and PHEVs with CO2 emissions<175g/km to enter controlled areas in the center of Attica prefecture.
- Private users: Incentive purchasing a new BEV and/or PHEV
 - Private users: subsidy 20% or up to 6.000€ for vehicles with retail values before Taxes up to 30.000€, 15% or up to 6.000€ for vehicles with retail values before Taxes higher than 30.000€.
 - Electric two-wheel motor: subsidy 20% up to 800€
 - Electric bicycle: subsidy 40% up to 800€
 - 1.000€ for replacing old vehicle
- Taxi drivers:
 - Subsidy 25% up to 8.000€ for purchasing or leasing BEV and 15% up to 5.500€ for purchasing PHEV.
 - Additional subsidy for replacing old vehicle 2.500€
- Companies or company cars:
 - 15% up to 5.500€ for purchasing or leasing BEV and 15% up to 4.000€ for purchasing PHEV.
 - Electric two-wheel motor: 20% up to 800€
 - Subsidy 1.000€ for replacing old vehicle
- Incentives for purchasing home charger: 500€

City emobility initiatives:

Some cities (e.g. Trikala): Installation of limited numbers of EVSE from municipalities offering charging facilities for free.

3.1.6 Incentive scheme in Turkey

NATIONAL INCENTIVES:

For the charging of EV's, there are no separate tariff or incentives which are defined by electricity markets regulatory authority. There were some tax benefits that has been provided for EV purchasing by government but by the beginning of 2021, this tax benefit has been limited. Unfortunately, there are no incentives set by government.

ZES is not providing incentives or discounts but for the corporate customers they are offering 10%-20% discounts in some cases. The current plan is upgrading our structure and provide this kind of incentives and discounts for our individual customers as well.

An also for the parking, if charging station is located inside shopping center car park or hotel, operator of this facilities may want to get extra fee for charging and this process is independent from ZES but for public places ZES is not reflecting any extra fees to users for parking.

3.1.7 Table of results

The following table compares the national and specific incentives in the various pilot sites:

SITES	SPECIFIC INCENTIVES	NATIONAL INCENTIVES
BARI	Electric powered cars enjoy a five-year exemption of the car tax payment starting from the first registration.	For electric vehicles with emissions between 0-20 g / km there is a contribution of up to 6.000 euros with scrapping
	For the purchase of electric and plug-in hybrids cars that already benefit from the eco-bonus, an additional contribution of 2.000 € is envisaged for the scrapping of an old car and 1.000 € without scrapping	For hybrid vehicles with emissions between 21-60 g / km, a contribution of up to € 2,500 with scrapping and € 1,500 without scrapping is recognized
BARCELONA	EV's can park for free at the on-street parking areas	Up to 7,000€ of direct subsidies for the purchase of an EV
	Reduction of 75% of the municipal vehicle tax	Subsidies for private and public charging points
	Some tolls in the Barcelona highways are free for EV's	Free parking in selected cities
	Electric freight vehicles can park for an additional 30' at the loading and unloading areas in the city	-
LUXEMBOURG	-	Purchase premium for purely electric vehicles of 3,000 or 8,000 euros depending on electricity consumption (WLTP).
	-	Subsidy is in place of up to 500€ for electric motorcycles and quadricycles.

ZELLIK		Reimbursement of 15% of total expenses for purchase of electric quadri-, tri- and motorcycle both for businesses and particulars
	-	All the businesses types can benefit from 100% tax deduction on purchase of electric vehicles and 13.5% deduction on investments in charging infrastructure
		No registration and road taxes for electric vehicles in Flanders
GREECE	-	Private users: Incentive purchasing a new BEV and/or PHEV
	-	Private users: subsidy 20% or up to 6.000€ for vehicles with retail values before Taxes up to 30.000€, 15% or up to 6000€ for vehicles with retail values before Taxes higher than 30.000€.
	-	Electric two-wheel motor: subsidy 20% up to 800€
	-	1000€ for replacing old vehicle
TURKEY	-	Unfortunately, there are no actual incentives which are set by government, but ZES offer %10-%20 discounts on the rates.
	-	for public places ZES does not impose any extra fees to users for parking

Table 3. Summary of incentives at all demosites

3.2 Summary of the conducted interviews: Incentives

With the aim of capturing different views on the best incentives to encourage the uptake of EV's, a set of interviews was conducted at each of the project sites. These interviews have been customized for the 5 interviewed groups. Authorities, CPO's, EMSP's, OEM's and user associations. The objective is to capture opinions of the different stakeholders on the incentives that are currently being applied as well as means that could be used to further incentives. Other aspects considered in the interviews has been the financial source of these incentives. Since the interviewed stakeholders cover most actors of the electromobility environment, the information captured is very valuable.

The full transcription of the interviews which includes the questionnaires made to each stakeholder type can be found at Annex 2. At the beginning of each site section, a short description of the stakeholders that were interviewed is described in order to provide the context of the interviewees.

3.2.1 Barcelona

BSM has conducted 11 interviews with different stakeholders at local and national level. These include 2 interviews to public authorities which are the municipalities of Madrid and Málaga in Spain. Also 3 interviews to CPO's, which include a car park company –SABA-, an SME that provides charging points and CP management software –eTecnica- and an oil distributor company that is now installing CP in their gas stations– Galp. Regarding MSP's, Iberdrola, one of the major electric utilities in Spain was also interviewed considering their role as both CPO and MSP. 3 OEM's were interviewed, these include a major vehicle manufacturer –SEAT-, and two electric charging points manufacturers –Circutor and Power electronics. Aside from these, two associations were interviewed, an EV user association –AUVE- and an association of companies for the promotion of the EV –AEDIVE-.

The two interviewed cities – Madrid and Málaga - have implemented similar incentives to promote the purchase and the usage of EV's in their cities. In both cities, the on-street parking is free of charge and municipal taxes are reduced or even suppressed for BEV's. In Málaga, EV's can park for free during the first 45 minutes in the municipal off-street car parks and in both cities EV's can access the city center without restrictions.

At national level, the Spanish government launched in April 2021 the MOVES III plan, which consists of subsidies to the purchase of EV's and charging points. The amounts vary from 2.500 to 5.000€ for the purchase of a PHEV, 4.500€ to 7.000€ for BEV.

According to AEDIVE, the association of companies for the development of the EV, some incentives that have been implemented by Spanish municipalities such as allowing circulation in bus lanes for EV's should not be extended in the future. An increase in the EV fleet could saturate the public transport network and have downside effects. These types of measures, according to AEDIVE, should only be placed during the early stages and be temporary. Also, other popular measures such as defining low emission zones in urban areas could help, according to AEDIVE, to generate an electric vehicle model. These should be created not only in the centre of cities but also in other city areas in order to keep incentivizing the usage of electric and hybrid vehicles.

The interviewed CPO's have other opinions regarding the incentives that best stimulate the market. In the opinion of eTecnica, every incentive should be promoted through a wide marketing campaign. Despite the fact that they agree with the national subsidies given to increase the purchase of EV's, they believe that a reduction in VAT would be more beneficial and easier for citizens to understand. Subsidies have always administrative issues that are time consuming. In their opinion, many of the current incentives are local and vary widely according to the municipality or the region. They support homogenising the incentives nationally so that citizens would have a better understanding of the benefits that they would obtain by switching to electric.

Iberdrola, one of the major utilities in Spain, which is a CPO but also an MSP, expressed the opinion that current incentives being applied in Spanish cities are well received by EV users. In their opinion, charging tariffs differences at different locations is not a good way to incentivise demand.

SEAT, a major Spanish vehicle manufacturer, said that the most important incentive to increase demand of EV's are subsidies. These have worked around Europe, countries that have applied subsidies show a strong and maintained positive trend and have the highest rates of EV penetration. Also, but less importantly, are the free permits to access low emission zones and discounts at car parks and tolls. Regarding costs of charging, in their opinion, do not set a downside. What EV drivers really value is the size and availability of the charging network.

From Circutor point of view, one of the biggest suppliers of charging points in Spain, one of the most important ways to incentivise the purchase of EV and try to equalize the price of these to internal combustion ones is by subsidizing. Also, regarding public tenders, companies are better valued if their vehicles are electric, hence incentivising the purchase of these vehicles. This is another way that governments have to incentivise the uptake of EV's. Lastly, Circutor believes that one of the major incentives that potential buyers can have is to have access to a large network of ultra-fast chargers.

The EV user association interviewed mentioned that tariff incentives are important. In their opinion, on-street charging should not be more expensive than diesel or gasoline (comparing the cost per km), since it reduces the attractiveness of EV's. Also, another important incentive, according to their opinion, is the availability of chargers in roads. Drivers need to have the possibility to charge their vehicles in roads in very short time and, for that reason, this association claims to have ultra-fast chargers. Another issue that came up is the need to enforce the correct usage of fast chargers. EV's that charge at low speeds should not be using fast chargers and give access to vehicles that are capable of fast charging.

3.2.2 Grenoble

GAM has conducted 5 interviews to different stakeholders. These include 3 interviews of public authorities in France: Bordeaux Métropole, which is the administrative urban area where the main city is Bordeaux; le Grand Lyon, its equivalent with the city of Lyon; and Ile de France Region (where Paris is located). 1 interview of an entity, acting both as CPO and MSP, was performed: Territoire d'Energies 38 (TE 38), which is the organizing authority for public electricity in Isère, the Department where Grenoble is located. At last, two EV user associations were interviewed altogether, FFAUVE and e-France Café.

Cities interviewed have diverse policies considering incentives. In Bordeaux, the public parking management offers a subscription at - 50% for "clean" vehicles, and "clean" vehicles are offered an hour and a half of free parking, but the Municipality communicates very little about this incentive. In Lyon, there is no subsidy for the purchase of an electric vehicle or the installation of charging stations on private property, contrary to other areas. The creation of a low emission zone is in progress, only for electric vehicles. In this context, the Metropolis provides assistance for professionals in the low emission zone perimeter who change vehicles. Also, incentives exist from semi-public operators: in underground public parking (LPA and co) where the delegates have created a recharging service, 20-25 places are free for charging (but not parking); pricing incentive also exist in relay car parks. As for Ile de France Region, it does not set up incentives for users, but through its subsidy program, it encourages local authorities to set up charging stations.

Territoire d'Energie 38 currently does not apply any incentive. However, an experimentation has taken place for 6 months in a city of the territory: parking was free in the whole city for users of the charging station. Another idea would be to allow free charge punctually, for example on mobility day.

The users' associations FFAUVE and e-France Café mention as possible incentives loyalty programmes and sponsorship. They agree to have high tariffs, provided that the stations are reliable. Tariffs should be incentive, functioning on levels, and in particular attractive by night. But people should charge mostly at home.

3.2.3 Luxembourg

Nexxtlab has conducted five interviews with different actors at the national level in the Grand-Duchy of Luxembourg. These include two interviews with public authorities, namely the Ministry of Energy and Spatial Planning (MEA) and the Luxembourg Regulatory Institute (ILR). Nexxtlab interviewed the operator of the national charging network "Chargy", represented by Creos Luxembourg S.A. in the category of the DSO. And PLUXX S.A. (Powerdale Luxembourg) was the only MSP taking part in the interviews. Last, but not least, the Automobile Club of Luxembourg (ACL) was available to represent the perspective of a user association.

Given the country's limited size and the limited number of potential candidates for such interviews, it was not possible to conduct significantly more interviews, as, e.g. an OEM, such as a manufacturer of charging products, is not present in the country. Several emails had been sent to reach out to further candidates but remained unanswered. Trying to help other partners in the consortium beyond Luxembourg, even renowned organisations to which contact was available refused to participate in interviews due to a lack of time or interest. On the other hand, the conducted interviews were of very high quality. Nexxtlab is thankful to the high-level representatives of the participating organisations who shared their perspectives on the targeted development of charging infrastructure in Luxembourg, focusing on the required incentives.

Incentives for electric vehicle adoption in general

To give some contextual background to the situation in Luxembourg: The Grand-Duchy seeks a way out of the heavy congestion on the countries road network, with about 200.000 daily cross-border commuters in a country with about 600.000 residents, and has therefore introduced a free of charge

public transport nation-wide and private electric vehicles can therefore be seen only as the “lesser evil” since they occupy as much space add to the congestion as do their conventionally fuelled alternatives.

In May 2020, the Luxembourgish government had raised the purchase premium for purely electric vehicles from 5.000 to 8.000 euros as part of an aid programme to curb the effects of the Covid 19 pandemic. Only recently the government has reviewed and adapted this subsidy programme for EVs for another twelve months until 31 March 2022 to reflect environmental and social parameters. The purchase premium for pure electric cars is now from 1 April 2021 onward to be linked to the electricity consumption documented according to WLTP as registered by the carmaker. It is retaining this higher incentive of 800 euros, only for models that have an electricity consumption of less than 18 kWh per 100 kilometres. For electric cars that consume more, the amount of the bonus is capped at 3.000 euros.

The regulation foresees that purely electric vehicles with seven or more seats are to be subsidised with 8,000 euros, regardless of their electricity consumption, thereby taking the need for larger family cars into account. Applicants must be part of a household with at least five people.

For plug-in hybrids, subsidies will only be available until the end of the year if their CO₂ emission is a maximum of 50g/km or less. The premium is lowered to 1.500 euros (previously 2.500 euros) until the end of this year. Therefore, the bonus will only be available for PHEVs purchased and registered between 1 April and 31 December 2021. In the case of BEVs, the new provisions apply to all vehicles ordered between 1 April 2021 and 31 March 2022, and whose first entry into service takes place before the end of 2022. Besides, a purchase subsidy is in place of up to 500€ for electric motorcycles and quadricycles.

The tax for BEV (and FECV) is reduced to the minimum CO₂ based tax of 30 € annually. The deductibility from corporate income of expenses related to the use of company cars is calculated on the basis of CO₂ emissions. This measure is in place to encourage to buy vehicles with zero or low emissions as a company car.

Incentives for electric vehicle charging

To break the chicken-egg circle of future EVs to find a lack of charging options, in 2010, Luxembourg's government had entrusted the countries five distribution system operators (DSOs) to set up and operate the nationwide charging network "Chargy" as CPO. The CPO provides equal conditions to access the network to any MSP. While all MSPs pay the same energy price per kWh, a part of the Chargy network's cost is covered with low voltage grid fees, thus paid by all household electricity users. Thereby, end-user prices per kWh are fixed, stable, and below the price level for equivalent service in neighbouring countries while varying from one MSP to another.

It may come as no surprise that the network is perceived very positively by users at this point, not only due to the affordable charging tariffs but moreover because Luxembourg has managed to build the second densest charging network in Europe after the Netherlands, with 34,5 charging points per 100 km of the road network⁶. The other side of that coin, a subsidy-distorted structure that makes it difficult for other investors to set up public charging infrastructure in Luxembourg, is a topic discussed in the interviews.

Beyond public charging infrastructure, a subsidy scheme is dedicated to the installation of charging points for private persons residing in single family houses (up to 750 – 1.250 EUR per charging station) and apartment buildings (1.250 – 1.650 EUR per charging station).

⁶ European Automobile Manufacturers' Association (ACEA), Brussels, 9 September 2021, available via <https://www.acea.auto/press-release/electric-cars-10-eu-countries-do-not-have-a-single-charging-point-per-100km-of-road/>

Moreover, according to the Ministry of Energy and Spatial Planning (MEA) an additional subsidy scheme is currently in preparation for charging points set up by companies, which are publicly available and for internal / restricted usage for employees or clients.

3.2.4 Zellik

VUB has conducted 6 interviews to authorities (Flemish ministry of mobility and public works and Brussels mobility), CPO (such as Certipower), 2 energy utilities (Sibelga, Luminus) and Swift (a fleet manager that owns EV's)

The recent Belgian policy shows a clear trend towards the switch from the internal combustion engine vehicles to the EVs. The policy measures in that direction that were identified from interviews are listed below:

- From 2026 all the company vehicles in Belgium will have to be 100% electric.
- Defined on a federal level, a minimum requirement of 22000 charging points is set for 2035. The deployment of these chargers is planned to take place partially on the on-street parking spots, but mainly, and as much as possible, on the off-street parking spot.
- By the end of 2030 all the diesel fuelled vehicles and by 2035 all the internal combustion engine vehicles, will be banned from Brussels.

Moreover, a number of incentives related to EVs and EV charging infrastructure were identified during the interviews. In Belgium, these incentives can be divided in federal and regional levels. The following federal level incentives are valid for whole Belgium:

- Yearly calls for governmentally subsidized projects (up to 20% of investment costs) for charging infrastructure outside the public domain (on some private properties) in order to limit the pressure on the public domain.
- Partially subsidized by EU – projects deployment of fast charging infrastructure through concessions on its installation on the main roads. The concessions indicate a reasonable (not precise) charging price. However, municipalities can put their own mark-up through the parking price and other additional costs or give additional incentives through the elimination of these additional costs for a charging EV.
- Reimbursement of 15% of total expenses for purchase of electric quadri-, tri- and motorcycle both for businesses and particulars.
- All the business types can benefit from 100% tax deduction on purchase of EVs and 13.5% deduction on investments in charging infrastructure.

The following incentives are valid only for Brussels Capital region:

- Concession on the installation of charging points in Brussels. According to the interviewed *Service public régional de Bruxelles* and *Sibelga*, the winner of the tender is *Total Energies*. The location for the installation of these chargers is based on the demands of the communal authorities and their citizens. The deployment of the charging points under the framework of this concession is to be finished by the end of 2021, while the number of charging points is expected to reach 600.

The following incentives are valid only for Flanders Region:

- Concession on the installation of public charge points in Flanders based on the demand of EV drivers (in case of absence of public charge points in adjacent neighbourhoods and impossibility to install a private charge point). The concession was given for deployment of 5000 charging points between 2016 and 2020 (without any financial incentive from the government to the private party). According to the interviewed *Flanders Ministry of Mobility and Public Works*, the tender was won by a CPO called *Allego*, which had put in place around 4500 chargers.

However, the installed charge points have a very low payback due to the low consumption caused by the low popularity of the chosen locations.

- No registration and road taxes for EVs in Flanders.

Furthermore, as concluded from the interviews with the public authorities, the financial part of the deployment of EV charging infrastructure will burden the private market. Thus, all the expenses related to the manufacturing, installation and maintenance of EV chargers are paid by the private companies. The interviewed CPOs and MSPs agree with the governmental position, regarding this as an opportunity to gain a market share. However, it is also important to mention that these companies are unsatisfied by the lack of legislation regarding the tariff structure (especially, when it concerns smart charging and V2G), due to which the market is not able to develop naturally and is missing the opportunities provided by the emerging technologies.

3.2.5 Bari

POLIBA has conducted 5 interviews to different stakeholders at local and national level. These include 3 interviews to the municipalities of Bari, and 1 to A.Q.P. Also 1 interview to a CPO and eMSP, that is EnelX that provides charging points and CP management software.

N. Interviews	Institution	Type of interviews
2	A.Q.P. - Acquedotto Pugliese	Public Authorities
1	Municipality of Bari	Public Authorities
1	EnelX	CPO
1	EnelX	MSP

Table 4. Interviews conducted in Bari

Public Authorities

The interviewed authority would like to implement incentives to promote the purchase and the usage of EV's in the city. In Bari, there are many on-street parking, that allow the charge for the EV. In the last year, many CPs have been installed.

From the interviews, incentive preferences have been reported. These preferences are:

- Subscriptions and discounts with the electric vehicle manufacturer.
- Reduced top-up prices in relation to the location of the stop in the city.
- Free access to electric vehicles in the LTZ.
- Using an app that allows you to view the columns of free recharges and possibility to book recharging.

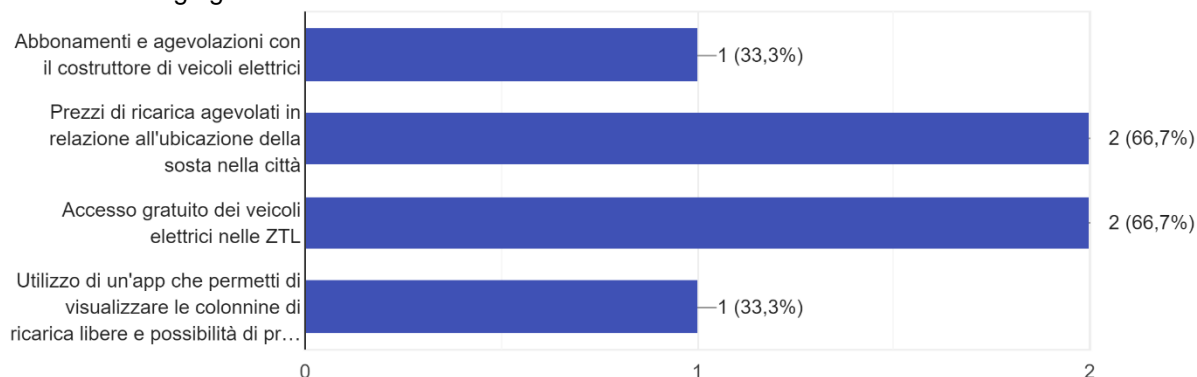


Figure 10. Graph of incentives preferences by Public Authorities in Italy

CPO and MSP by EnelX

EnelX is the main CPO and MSP in Bari to manage charging points. The investment of the recharging infrastructure (CAPEX) currently present, and the management of operating expenses (OPEX), are managed by private companies.

In the EnelX interview, the city of Bari has 69 charging stations, 35 of which are directly managed by EnelX. The typology of the electric columns is for BEV / PHEV cars. EnelX offers incentives such as discounted top-up prices. In the EnelX's interviews were found to be more suitable, facilitated top-up prices in relation to the location of the stop in the city. According to EnelX, municipal and metropolitan authorities should subsidize the installation of recharging points and management and maintenance costs.

From the CPO's interview it emerged that operating costs are undergoing a significant increase given the ever-increasing demand for electric charging, and the most impacting cost is that of installing a new charging infrastructure. Furthermore, from the interview, for EnelX it is important to adopt a broad incentive policy to encourage the use of electric vehicles and build a large number of charging stations. (Figure 11)

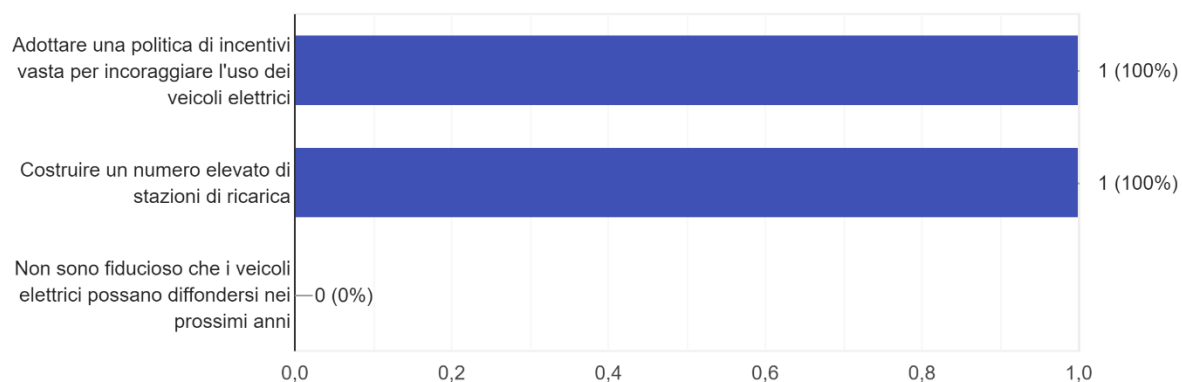


Figure 11. Graph of incentives preferences by CPO and MSP

3.2.6 Greece

ICCS has conducted interviews with CPOs/eMSPs which are significant e-mobility player in Greece representing a significant market share in the electromobility field. Since electromobility in Greece is in a premature phase, the interviews conducted were limited. Many CPOs/eMSPs were reluctant to participate in the interviews related to financial aspects while Municipalities are not yet ready to install and operate a wide public charging network due to the fact that the e-mobility regulatory framework is not yet completed.

The transport electrification effort in Greece has been trapped in the “chicken-and-egg” problem. The available EV market models were very limited and the EV manufacturers were conservative introducing EV models in the market due to their increased capital cost, especially during the financial crisis times in Greece, compared to the conventional ones as well as the lack of adequate public charging infrastructures to serve the charging energy needs of EV mobility. In parallel, EVSE vendors were reluctant to invest in charging infrastructures given that the EV market share has not reached the critical mass – the charging demand is not adequate to ensure a profitable and sustainable investment.

In 2020, the Greek government launched a new programme of incentives entitled “Kinoumai Hlektrika”⁷ aiming to promote e-mobility concept in Greece. This programme was quite successful resulted in the increase of the available models in the Greek automotive market. The subsidies for purchasing a new electric vehicle vary between 20%-40% of the capital cost depending on the vehicle type, which can be

⁷ More information is available online at <https://kinoumeilektrika.gov.gr/>

translated to an amount of 6000€ for passenger vehicles and 800€ for light EVs. Due to this, the EV sales were significantly increased, compared to the previous years, especially for the vehicle types L (e-bikes and e-scooters) and M. However, the EV market share is still low compared to other EU countries.

One of the most significant subsidies for the e-mobility businesses, as it was also mentioned by CPOs/eMSPs, was the deduction of the cost of purchasing a new charging infrastructure or purchasing/leasing an electric vehicle from the gross income by 150%. This incentive motivated many companies to modify their leasing plans towards the e-mobility transition and EVSE vendors to establish B2B agreements with facility operators to install charging infrastructures in semi-public places (open parking areas, malls, supermarkets, etc.)

At municipality level, from 01-01-2021 until 31-12-2022, the parking of vehicles with zero emissions or <50grCO₂/km is free in all controlled parking areas of the cities. Furthermore, a recent ministry decision FEK1221 B/30-3-2021 allows BEV and Hybrid EVs with CO₂ emissions<140k/km and PHEVs with CO₂ emissions<175g/km to enter controlled areas in the center of Attica prefecture. Furthermore, in many cities there are publicly available charging stations which can be used by EV users without being charged for the energy consumed while the parking has a cost depending on the popularity of the charging place.

The interviewed CPOs agreed that the national subsidies for the users for purchasing an electric vehicle and for the companies for the installation of new charging infrastructure are on the right way and are really important for promoting electromobility concept. However, subsidizing the CAPEX recharging cost is not enough, since the operational costs (i.e. leasing the area, grid connection costs, energy, etc) are high enough and if the occupancy rate of the charging station is quite low then the investment is not profitable. This is a problem that was reported by the interviewed CPOs due to the low maturity level of emobility in Greece. More specifically, it was also mentioned that in countries where the CAPEX of the charging infrastructures is only subsidised by national resources at an early e-mobility deployment stage, it is usually hindering upscaling and business expansion. It is necessary to ensure that the charging infrastructure deployed will be viable in the long term and will not rely on subsidies. In Greece where the EV maturity level is quite low, incentives for OPEX and CAPEX could be a tool for promoting electromobility. However, since the adopted emobility model in Greece is the one defined by the independent market concept, there is little to no room for subsidies. Benefits are derived through supply-demand process.

Spatial incentives where market conditions are not allowing the development of an adequate charging network, could be an effective solution.

3.2.7 Turkey

ZES has conducted 4 interviews. Two of these interviews were conducted with one OEM company (Vestel, one of Turkey's largest manufacturers of electronic products and producing AC and DC charging stations) and one EV user association. The other two interviews which were focusing on CPOs and eMSPs have been conducted with ZES employees. Apart from ZES, there are few CPO and eMSP companies in Turkey and initial plan were conducting of interviews with these companies. These companies can be considered as rivals of ZES in Turkish market and despite all our efforts, we could not convince the other CPO and eMSP companies to conduct this kind of interviews because of their commercial and confidential processes. Therefore, Since ZES is both CPO and eMSP in Turkey, we decided to conduct interviews with our own employees. In addition, since e-mobility in Turkey has not yet reached the desired maturity level, we could not find anyone to interview from local authorities or municipalities, even if we found we were not sure about getting answers to related questions.

For the charging of EVs, there is not any separate tariff or incentives which are defined by energy markets regulatory authority. And no incentives that are applied by local authorities or municipalities. There were some tax benefits that has been provided for EV purchasing by government but by the

beginning of 2021, this tax benefit has been limited. Unfortunately, there is no actual tariff and incentives which is set by government.

According to ZES which is a CPO but also an eMSP, state authorities have to apply enhanced incentives for the purchase of EVs and charging points. In line with the information received from the interviewee, there are no purchase subsidies and incentives which is applied for production or infrastructure. The state charges less tax on the purchase of some kind of electric vehicles than internal combustion vehicles. But even in this case, tax rates are extremely high compared with Europe. An interviewee has mentioned that there is not much convenience is provided in line with tax advantages and incentives. Additionally, he mentioned that according to the agreements they have with corporate customers, they provide different discounts independent of the number of charging transactions. From the CPO an eMSP perspective, interviewee has also mentioned that since CAPEX constitutes most of the expenses, it would be good for them to get subsidize for support on the infrastructure and device side.

VESTEL, one of the biggest electronic product manufacturer including AC and DC chargers, has already underlined the insufficient and weak incentive structure in Turkey, as stated by the CPO and eMSPS. Interviewee has mentioned that with the increasing rate of EVs in Turkey, incentives will be also increased. He stated that free charging points on some of the parking areas can be considered as one of the main incentives which is offered to users and also some EV distributors have stations where charging rates are discounted. He also clearly stated that as CP manufacturer, they are not managing or owning any CPs and not offering an incentive.

Similar with the other interviewees, the EV user association interviewed also mentioned that he is not happy that the incentive structure in Turkey is insufficient. He emphasized that incentives should be increased by both the state and local authorities and also new incentive and tariffs structures have to be applied to increase the EV penetration in Turkey. Also, he especially stated that it would be beneficial to examine the existing incentive structures which are currently applied in Europe and to implement them in Turkey as much as possible.

3.3 Generalized incentive schemes

To encourage EV adoption, countries have used different kind of incentives from both technology specific policies, such as subsidies to EV consumers, and technology neutral policies, such as emissions-based vehicle taxes. Such incentives are designed and implemented at different governance levels, from EU legislation that provides a framework promoting low-emission vehicles, through national measures such as introducing lower taxes for electric vehicles, to local incentives such as free inner-city parking and use of road lanes normally reserved for public transport. Basically, the incentives cover the processes related to the purchase of electric vehicles and the processes of the use of electric vehicles/charging sessions.

EV Incentives

There are different kind of financial incentives for EV purchasing which are applied in many EU countries and these incentives have strong effect on customer purchase decisions while they are planning to purchase an EV. Main financial incentives for EV purchasing are;

- **Purchase Subsidies**

In general, purchase subsidies are an incentive method applied in most European countries to attract the attention of users who are willing to buy electric vehicles. Different kind of purchase subsidies are determined for different engine and also vehicle types such as battery electric vehicles, plug-in electric vehicles, plug-in hybrid electric vehicles etc. The most important aspects taken into account when different level of purchase subsidies determined are;

- customer type (public, private, SMEs, municipality),
- weight of the vehicle (different purchase subsidies are available for heavy trucks and electric buses besides passenger vehicles),
- range of vehicle,

- CO2 emission value (especially PHEVs). for) criteria

Different levels of purchase subsidies are applied according to the different criteria mentioned above. For example, in Sweden, the purchase subsidy, which is set at the maximum level for a vehicle that emits 0 g of CO₂, decreases by a certain amount for each g of CO₂ emissions. Also, in some European countries such as Germany, purchase subsidies are provided for second-hand vehicles under a certain age and kilometer value, as well as new vehicles. In most European countries, these incentives are provided not only for purchasing an EV but also for leasing of electric vehicle.

Also, in addition to above incentives, some countries are providing extra financial assistance if users purchase a new electric vehicle or plug-in hybrid and at the same time they scrap an old diesel or gasoline vehicle. In this case, the age of the vehicle to be scrapped is the determining criterion for the subsidy to be given. Incentives such as Electric retrofit bonus (a maximum of €5000 is available to assist with the replacing of a heat engine with an electric engine) also available in France to reduce CO₂ emission with converting a polluting vehicle into a battery powered one.

- **Registration Tax Benefits**

Registration tax benefits are also one of the important incentives which is provided for EV adoption around Europe. This incentive is available in some of the European countries and in some countries rates are zero while in other European countries rates are under the baseline value of standard ICT vehicles. In such countries, the exact rate of registration tax is directly related with the CO₂ emission value of vehicle and if a vehicle is under the determined baseline value of CO₂ emission level, it can be granted from tax obligations. Also in some countries, electric and hybrid vehicles are exempt from motor tax for a few years after registration, and after that period taxes are around a below value of the standard rate.

- **Ownership Tax Benefits**

Similar with registration taxes, most of the European Countries provide ownership tax benefits for EVs. In most of the cases, tax reductions are available (CO₂ based taxes). Also countries such as Italy, electric vehicles are exempt from the annual ownership tax for a defined period of years from the date of their first registration and after this period, they benefit from a reduction of the tax rate applied to equivalent petrol vehicles in many regions.

- **Company Tax Benefits**

Companies pay reduced tax on EVs and according to CO₂ emission level, benefits are also available for plug in hybrid vehicles.

- **VAT Benefits**

There is no widespread incentive mechanism for VAT in Europe. Only in a few countries, company BEV's are exempt from VAT (eligible for pre-tax deduction).

- **Other Financial Benefits**

Apart from main incentives which are provided for EVs and PHEVs, there are also some local incentives such as free parking, parking discounts and bus lane use in some European countries. For example, in Spain, Toll exemption on regional highways for electric vehicles, free parking in selected cities and traffic lanes reserved for high occupancy circulation can be used only by the driver of BEV's are available.

In order to reduce the carbon emissions, it is known that the government supports the consumer with an incentive subsidy to increase the number of electric vehicles in the automobile industry. While the government usually provides a higher purchase subsidy (price discount, etc.) for the consumer to purchase a vehicle, the pure electric vehicle (EV) would be more attractive to consumers than the energy-saving ICE vehicle because of its higher energy-saving level. But the limited supporting infrastructure for the operation of the EV (e.g., charging stations, etc.) reduces the consumer's valuation on the pure EV.

Purchase subsidies have taken an important place but some researches have indicated that subsidies for the purchase of electric vehicles have little effect on GHG emissions and are much more expensive than other incentive measures that achieve the same results. If the goal is to obtain the greatest emissions reductions for the amounts spent, then subsidies for the purchase of electric vehicles are actually the least efficient, most expensive way to get there. On this point, tools like a tax on emissions or a carbon market create less distortion in the economy and are less expensive than providing generous subsidies to the purchase of electric vehicles.

Also another study suggests that ownership tax benefits, charger density, and income are key driving factors in all expanding EV markets. First, tax reductions, such as exemption from ownership, had a strong impact on the EV adoption, compared with purchase subsidies. Although tax benefits do not give consumers direct savings at the beginning, they will decrease the overall operating cost during the operating stage. It suggests that, in the short term, governments still should undertake a substantial part of the spending on EVs through incentives schemes and tax waivers to trigger the mass market adoption.

Country	Fuel	Purchase subsidies	Registration on tax benefits	Ownership tax benefits	Company tax benefits	VAT benefits
Austria	BEV					
Belgium	BEV					
France	BEV					
Germany	BEV					
Greece	BEV					
Italy	BEV					
Luxembourg	BEV					
Spain	BEV					

Table 5. Incentive schemes of different European countries

EV Charging Incentives

Apart from financial incentives which are provided for purchasing an EV, there are also some incentives for charging infrastructures. Although it is aimed to increase the number of electric vehicles with different incentive schemes, it is very difficult to ensure the acceptance of electric vehicles without a strong charging infrastructure. For this reason, infrastructure incentives are of critical importance for both companies and end users. Providing such incentives by state and local governments will encourage companies that provide charging infrastructure and will have a positive impact on the spread of electric vehicles.

There are different incentive and support mechanisms for charging station infrastructures in various European countries. These support mechanisms are similar for public and private charging stations in some countries. Also, different incentive mechanisms are available depending on whether the charging station is managed by public, private, local authorities or municipalities and whether the charging station is controllable or not. Also type (AC or DC) and output power of charger are important criteria to define incentive scheme.

Mainly, incentives for EV charging can be categorized as residential charging incentives and commercial charging incentives. Residential charging incentives are mainly related with private residents who are willing to install charging stations at their homes. Generally, the charging stations installed with the help of these incentives are only for private use. Commercial charging incentives apply to companies and public entities wishing to provide electric vehicle charging as a dedicated service (e.g., a municipality), additional service (e.g., supermarket car parks), or as a perk for employees (e.g., workplace charging).

Generally, for the commercial charging incentives, different levels of subsidies are available for the purchase and installation of DC and AC publicly accessible chargers. In many cases, amount of this subsidies are increasing if the installed charger is a DC charger and also increasing in parallel with the output power of charger as well. Especially Germany has powerful incentive scheme both on national and regional level in this regard. In Germany, individuals who drive company cars and charge them at home can benefit from a tax reduction that can be applied for during annual tax return calculations. Another tax exemption is also available to employees that charge their company car or private electric vehicle at work—the cost for charging at their employer's site is tax-free.

Apart from subsidies, tax exemptions are also put in practice in some European countries. For example, a tax reduction per kWh applies to companies that provide electric vehicle charging on a commercial basis in Denmark. In addition, refund mechanism can be another example for EV charging incentives.

Increasing rate of the charger infrastructures definitely will help to overcome barriers for EVs. It is necessary to give importance to the deployment and construct enough chargers which is a prerequisite for wide adoption all over the world. The mass deployment of EV charging infrastructure plays a crucial role in the accessibility of chargers and EV electricity demand. In line with some previous research results, tax reduction and chargers are the two critical factors that have made a big difference in EV markets among European countries.

Key factors

- Making incentives available at the time of purchase or shifting the incentives to vehicle purchasing tax exemptions or reductions of similar value, appear to be effective solutions.
- Existing financial incentives should not be removed in the short-term. Researches show that the tax exemption benefits is more effective than the purchase subsidies in the use phase of EVs. The governments still need to undertake the cost of EVs through incentive policies.
- The deployment of charging infrastructure is a prerequisite for mass market adoption. The governments should expand the scale of charging points to ramp up density and it is a key measure to popularize EVs. Incentives on EV charging infrastructure have critical effect in this regard. Also, non-financial incentive measures can promote the adoption of EVs by raising consumers' awareness of EVs.
- Incentives that have complex indexing of the incentive magnitude (incentives which are evaluating lots of points) can be hard to understand for both customers and sellers. All the incentives should be understandable and customer friendly. Simpler incentive programs, which are publicly posted on government websites and distributed to all stakeholders and customers, would help alleviate this issue.
- It may be important to encourage users that the incentives applied remain active for at least a few years instead of temporary processes.

4 TARIFFS

This chapter focuses on tariff structures applied by MSP's to the charging sessions. Tariff structures play a key role in incentivising demand and to achieve an efficient use of charging stations. In addition, tariff structures can change the behaviour of users and therefore the way in which charging points are used.

The first section of this chapter is devoted to list the tariffs that are currently being applied at the public accessed charging stations at the different project sites. This tariff benchmark shows how different tariffs are applied on the different demo sites and gives an idea of the diversity of options.

The second section explores the opinions of several stakeholders (authorities, CPO's, MSP's, OEM's and user associations) regarding how they set tariff structures and what parameters are considered for this purpose. This section collects the key ideas that were expressed by stakeholders during the interviews conducted.

The third section describes a formulation of a generalized tariff structure. Using this formulation any tariff structure can be defined by setting the right parameters. This formulation is then used in the last section to recommend different options to tackle the issues that can come up during the management of a EV charging service.

4.1 Tariffs benchmark

In this section, the tariff structures and prices of the charging stations is analysed for different demo sites. First, an overview of the parameters to create the tariffs are presented and then, we detail the different tariffs by charging stations in each demo sites.

As it can be observed in Table 6, most of the sites have different subscription plans for long-term users. The tariff of the service is also highly related to the type of charger. In some sites like Berlin or Turkey, at least in the analysed charging stations, the only parameter that varies the cost of the charge, is the type of charger and/or the average power. Slow charging is cheaper than fast charging and it is reflected in the analysis. In Barcelona and Greece, the price also depends on the location of the charging point. In Barcelona and Grenoble, there is a distinction between daytime and nighttime: in the first case the cost is higher and in the second one, there is an extra fee. In Greece, there is also an initial fee just to be connected to the service, meanwhile in Barcelona, a minimum charge is required. Just two of the cities have a threshold from which the price of the energy is higher. In Bari the limit is energy charged-wise and in Grenoble timewise. In Flanders, there is an extra fee if the electric vehicle is plugged when it is fully charged. Finally, Barcelona and Turkey offer a discount for subscribers and all users respectively.

tariffs depend on...	In...							
	Barcelona	Grenoble	Berlin	Luxembourg	Belgium (Flanders)	Bari	Greece	Turkey
Subscription								
Type of charger								
Average power								
Initial fee								
Location of the CP								
Type of vehicle								

Time of the day								
Cost (€/kWh or €/min)								
Minimum charge								
Energy threshold								
Time threshold								
Connection fee (when EV is fully charged)								
Discounts								

Table 6. Comparison of tariff structures parameters per demosite.

4.1.1 Barcelona tariff structure

- BSM

In Barcelona, BSM provides charging points for off-street parking lots and off-street parking lots. There are different types of subscriptions and tariffs depending on the frequency of use, type of vehicle and time during the day. Moreover, there is a minimum to charge.

- Off-street parking

Subscription Plan	Type of vehicle	Subscription fee (€/year)	Type of charger	Cost (€/kWh)		Min. Charge (€)	Discounts
				Day	Night		
Frequent particular	Car, Van	50	Normal charging	0,27	0,22	1,00	50% Discount on the first year for all the Subscription fees.
	LEV	25		0,27	0,22	0,20	
Frequent professional	Car, Van	100		0,27	0,22	1,00	
	LEV	45		0,27	0,22	0,20	
Sporadic user	Car, Van	0		0,35	0,30	1,50	
	LEV	0		0,35	0,30	0,30	

Table 7. Tariff structure in Barcelona for off-street charging points

- On-street parking

Subscription Plan	Type of vehicle	Subscription fee (€/year)	Type of charger	Cost (€/kWh)		Min. Charge (€)	Discounts
				Day	Night		
Frequent particular	Car, Van	50	Fast	0,40	0,35	2,50	50% Discount on the first year for all the Subscription fees.
	LEV	25	Normal	0,30	0,25	0,25	
Frequent professional	Car, Van	100	Fast	0,35	0,30	2,50	
	LEV	45	Normal	0,28	0,23	0,20	
Sporadic user	Car, Van	0	Fast	0,49	0,44	3,00	
	LEV	0	Normal	0,40	0,35	0,35	

Table 8. Tariff structure in Barcelona for on-street charging points

4.1.2 Grenoble tariff structure

In Grenoble, each zone has its own provider. The prices vary depending on the provider, average power and subscription plans.

- **E-born**

E-born is the charging points network in South-East of France. The tariffs of this company are as follows:

Average Power	Subscription Plan	Subscription fee (€/year)	Cost (€/kWh)	Evolution since 2018
Accelerated (22 kW)	Subscriber	12	0,264	+ 10 % + 2 € for the badge
	Non-subscriber	0	0,370	+ 8 %
Fast (>50 kW)	Subscriber	12	0,370	+ 8,8 % + 2 € for the badge
	Non-subscriber	0	0,489	+ 11 %
Unlimited	Subscriber	42(€/month)	Up to 250 kWh / month	+ 20 % registration 500 kWh / month in 2018

Table 9. Tariff structure for e-born

- **Révéo**

The charging points network in Occitanie Region is Révéo.

Average Power	Subscription Plan	Subscription fee (€/year)	Cost (€/h)	Time threshold	Evolution since 2018
Accelerated (22 kW)	Subscriber	12	1,5	After 1 hour, 0,025 €/min. free by night	Free charging period has been extended
	Non-subscriber	0	3	After 1 hour, 0,025 €/min. free by night	Free charging period has been extended
Fast (>50 kW)	Subscriber	12	4 €/15 min	After 15 min, 0,067 €/min	=
	Non-subscriber	0	2 €/15 min	After 15 min, 0,067 €/min	=

Table 10. Tariff structure for Révéo

- **Bluely**

Bluely is a car sharing EV network in Lyon urban area.

Average Power	Subscription Plan	Subscription fee (€/year)	Cost		Evolution since 2018
			Day	Night	
Slow (3kW)	Mandatory	15	2 €/30min	+ 6€	Big increase of tariffs in summer 2019, end of the service in September 2020

Table 11. Tariff structure for Bluely

- Izivia (Groupe EDF)

Izivia is the charging points network in Lyon urban area.

Average Power	Subscription Plan	Subscription fee (€/month)	Cost (€/h)		Time threshold	Evolution since 2018
			Day	Night		
Slow (7kW)	Subscriber	30	1	+3€	After 1h, 1,5 €/h	15 € registration fee Intermediary subscription 5 € / month
	Non-subscriber	0	3	+7€	After 1h, 4 €/h	
Accelerated (24kW)	Subscriber	30	2	+3€	After 1h, 2,5 €/h	
	Non-subscriber	0	4	+7€	After 1h, 6 €/h	
Fast (150kW)	Subscriber	30	0,3 €/kWh	-	After 45min., 1 €/min	
	Non-subscriber	0	0,5 €/kWh	-	After 45 min., 0,5 €/kWh	

Table 12. Tariff structure for Izivia

4.1.3 Berlin tariff structure

- Allego GmbH

Allego GmbH is the public charging station on behalf of the state of Berlin. The prices are determined by the amount of kilowatt hours charged. A standard charge (AC) is charged 0.41€ (including 19% VAT) per kilowatt hour. For a fast charge (DC and HPC) 50 kW to 350 kW it is 0.59 € (including 19% VAT) per kilowatt hour. However, retail prices may vary depending on MSPs or e-roaming platforms.

- E.ON Drive Infrastructure GmbH
- TEK Netz Europe GmbH. 32,8ct/kWh (AC)
- Comfortcharge GmbH

Pricing

- Prices at public charging stations vary widely. Charging is usually via app or charging card. There are tariffs from electricity suppliers, car manufacturers and roaming providers. Depending on the charging behavior, different tariffs are available. Fast charging of direct current is more expensive than with alternating current.
- The price of the charging process depends on the type of charging station.

Type of charging	Cost (€/kWh)
Standard charge AC	0,41
Fast charge (DC and HPC)	0,59

Table 13. Tariff fees for Allego

• Be emobil

The private provider be emobil offers around 240 charging stations in public spaces in the Berlin city area. The charging stations were installed by the operator Allego following a contract from the Berlin Senate Administration for Urban Development and The Environment. All be emobil charging columns are designed according to the Berlin standard, so they can be used with all electric vehicles and draw their electricity from renewable energies.

The charging stations of be emobil are mainly located in the city centre of Berlin. They can be used through the mobility service providers NewMotion and PlugSurfing. Before charging, drivers of electric vehicles must register with an RFID chip at the charging stations via a charging card.

The Be emobil charging stations enable AC charging with 3.5kW to 22kW, some of which also DC charging with up to 50kW. The price of the charging process depends on the type of charging station.

Type of charging	Average power	Cost (€/kWh)
Standard charge AC	(3,5 to 22kW)	0,39
Fast charge (DC and HPC)	Up to 50kW	0,59

Table 14. Tariff fees for Be emobil

• Vattenfall

Vattenfall is a private provider of charging stations. 105 public charging stations for electric cars from Vattenfall are located in Berlin, some of them in supermarket car parks and at petrol stations. All Vattenfall charging columns use green electricity from wind turbines for the charging process. You can use the stations with a personal Vattenfall charging card, which can be purchased from the provider.

Prices at the charging stations of their roaming partners may vary. The current prices for charging at the respective stations can be found in the Vattenfall InCharge app.

Type of charging	Cost (€/kWh)
Standard charge (AC)	0,39
Fast charge (DC and HPC)	0,59

Table 15. Tariff fees for Vattenfall

Others:

- ADAC e-Charge

Type of charging	Cost (€/kWh)	Time threshold
AC charging stations	0,29*	Blocking fee (after 4 hours of service life) 0.10 €/min., max. 12 €
AC charging stations	0,39*	
IonityCharging Stations	0,79*	
ADAC e-Charge Card	Free**	

*Incl. VAT, valid at all charging stations accessible with ADAC e-Charge.

** The first ADAC e-Charge Card is free of charge, each additional charging card costs 9.90 Euros incl. VAT

Table 16. Tariff fees for ADAC e-Charge

4.1.4 Luxembourg tariff structure

In Luxembourg, all tariff structures applied by MSP's use the energy parameter to charge their clients. Hence all tariffs are based on €/kWh. Most tariffs range from 0,24 €/kWh to 0,40 €/kWh.

4.1.5 Flanders tariff structure

In Flanders (Belgium) the tariffs come from a combination of four parameters:

- **Subscription** (€/year or month) Subscription fee that is charged yearly or monthly to access to the reduced tariffs.
- **Energy tariff** (€/kWh): The tariff paid per kWh charged
- **Connection fee** (€/minute): A per minute fee applied when an EV remains plugged in after it is fully charged.
- **Type of charging (AC or DC)**

There are different companies who provide charging services:

- BlueCorner

Type of charging	Subscription Plan	Subscription fee (€/year)	Cost (€/kWh)	Connection fee(€/min)
AC	Starter	0	0,40	0,01
	Fan	59	0,35	
	Addict	169	0,33	
DC	Starter	0	0,69	0,25
	Fan	59	0,60	
	Addict	169	0,56	

Table 17. Tariff fees for BlueCorner

- Plugsurfing

Type of charging	Subscription fee (€/month)	Cost (€/kWh)	Connection fee(€/min)
AC	7,99	0,32	None
DC	7,99	0,53	

Table 18. Tariff fees Plugsurfing

- Fastnet

Type of charging	Subscription Plan	Cost (€/kWh)	Connection fee(€/min)
AC	Guest	0,59	None
	Member	0,59	
	Gold member (11,99€/month)	0,35	

Table 19. Tariff fees Fastnet

- ZE-MO

Type of charging	Subscription Plan	Subscription fee (€/year)	Cost (€/kWh)	Connection fee(€/min)
AC (max. 22kW)	Basic	27	0,38	0,05
	Pro	56,05	0,33	
	SMS	-	1€/30min	
DC	Basic	27	0,66	0,25
	Pro	56,05	0,57	
	SMS	-	3€/30min	

Table 20. Tariff fees ZE-MO

4.1.6 Bari tariff structure

In Bari the tariffs depend on the subscription plan, the type of charger and an energy threshold for the monthly subscriptions.

- **Enel X**

Among the payment charging options in Bari, there is a subscription of about 25 euros per month, with an unlimited number of chargings. If you want to top up from home, there is a rental fee for an additional meter that costs an average of 60 euros per month which can be made out to a single user, or you can recharge the car through a normal power outlet, the costs of which will go into the electricity bill. More in detail, since ENEL X is main CPO and ESMP of the charging points in Bari, the following table reports the tariff structure by ENEL X.

Subscription Plan	Type of tariff	Type of charger	Cost (€/kWh)	Energy Threshold(€/min)
basic	according to consumption	plug Quick	0,45	
		plug Fast	0,50	
premium	On consumption with booking service (25€/year)	plug Quick	0,45	
		plug Fast	0,50	
flat small	Monthly fee with threshold (Booking Service included)		25 €/month for 60 kWh	After 60kWh, 0,417 €/kWh
flat large	Monthly fee with threshold (Booking Service included)		45 €/month for 120 kWh	After 120kWh, 0,375 €/kWh

Table 21. Tariff structure ENEL X

4.1.7 Greece tariff structure

In Greece, there are two charging providers that work in the urban context and one that focuses in the highways

- **Blink Charging Europe GR**

AD/DC at urban context.

Type of charger	Cost (€/kW) + VAT
AC	0,40

Table 22. Tariff fee for Blink Charging Europe GR

- FORTIZO

AC/DC at urban context.

Subscription Plan	Type of charger	Initial fee (€)	Location of the CP	Energy tariff (€/min)
None	AC	1-2	Parking and public places	0,02
		7,01 (fixed flat rate)	Hotels	0
		2,4	Marina	0,29 €/kWh
None	DC	2,5	Everywhere	0,25
Easy charge (payment/session)	AC	1		0,025
	DC	2,5		0,25
Fortizo plus (6€/month)	AC	0		0,025
	DC	0		0,22

*Some charging stations are offered free of charge after municipal or prefecture agreement.

Table 23. Tariff structure for FORTIZO

- BFS

Focusing on DC chargers for highways.

Type of charger	Initial fee (€)	Cost (€/min)
DC	2,5	0,25

Table 24. Tariff structure for BFS

4.1.8 Turkey tariff structure

In Turkey the tariff just depends on the type of charger and the average power, which is calculated by dividing the energy used by the total time spend in the station.

- ZES

ZES, is applying different tariffs for AC and DC charging and also for the different average power levels.

Type of charger	Average Power (kW)	Cost (TL/min)	Discounts
AC Type 2	Up to 7,4	0,22	The guest users will benefit 100TL from their sockets
	7,4 to 11	0,33	
	11 and above	0,44	
DC CCS ve CHAdeMO	Up to 50	1,50	

	50 to 90	2,25	The guest users will benefit 200TL from their sockets
	90 and above	3,00	

Table 25. Tariff structure for ZES

4.2 Summary of the conducted interviews: tariffs

This section gathers the most relevant aspects expressed by interviewees regarding tariff structures, cost structures, management of services and different issues that have an impact on the incomes generated by charging events. The summaries are organized by each type of stakeholder, since the interview questions have been customized according to each group.

4.2.1 Barcelona

4.2.1.1 Public authorities

In Málaga, their approach to have charging points in the city is different at on and off-street parking areas. The municipal off-street car parks have their own charging points, which are managed by the city council via the municipal services company whereas the on-street charging points are installed via 5-year concession. The municipality does not foresee to manage directly the on-street charging points. For this particular case, Málaga, has little margin to negotiate the tariffs applied in their city by the MSP, since the CPO of on-street chargers has the freedom to set their fares.

Aside from this, Málaga mentioned that ceasing the management of the on-street charging point network to a private company has led to a situation in which the municipality has very little information about the usage of their network and it is difficult to enforce drivers not complying with regulation. Currently the only way to enforce vehicles that park overtime at charging points is via police surveillance, and as stated by the city council, this is not a final solution, it needs to evolve.

In Madrid, all public charging points are installed through 3 types of legal procedures: 100% public (owned and managed by the city council), operationally ceased (capex paid by the municipality but managed via a concession) and through collaboration agreements (the council cedes the equipment and a private company installs it). In the first two models, 100% of the capital expenditure is done by the municipality. All the CPO that are operating in Madrid are having losses with their operation, but, despite of that, they are interested in maintaining their business in order to grow and gain visibility and clients for the future. These companies envisage that profitability is yet to come.

Madrid municipality prefers a tariff structure that incentivises the use of EV's even though these lead to company losses. Currently, their concessions are for a maximum of 4 years, even though, they are trying to extend this duration up to 8 years

4.2.1.2 CPO

The CPO's interviewed agree that authorities should finance or subsidize the capex to install charging points. *Galp* mentioned that authorities should subsidize both the capex and the opex, since a fast charging point can cost more than 100 thousand euros. Also, in Spain, the regulated costs to access the grid are too high, leaving a short margin to CPO's. The power costs have been recently lowered, which gives some profit margins to operators at early stages, but high costs of energy will impact the income statement once the number of charging events rises, reducing the competitiveness of the business.

For *eTecnica* subsidizing the Capex is also important to increase fast chargers' availability. Capex is divided, according to their experience, in 50% for the charger itself, 25% the connection to the grid and another 25% for other electric equipment. *eTecnica* does not support the opex subsidy due to the market distortion that could create.

All CPO's agree that current tariffs applied make this EV charging market non-profitable due to the low existing demand. *SABA*, which operates a large number of car parks, has mainly slow chargers, which supply little amount of energy having the charger occupied for long hours. Hence, the revenues for this charging events are very low. They think that despite that fast-chargers are much more expensive, it can be easier to reach the breakeven, since the amount of energy served is higher and the time needed is much lower. Therefore, if the demand is sufficient, these type of chargers could be profitable in shorter time. The objective of *Saba* is to reach a neutral point in revenues and costs in the short-term.

Other CPO's such as *Galp* or *Iberdrola* are currently not making any profit from their operations but their main interest is to set their companies in a competitive position for the future. The free competition is necessary for the development of the EV market, according to *Iberdrola's* opinion. Charging points should be managed and operated exclusively by private companies. Public administrations should be facilitators but not play a role as operators, as free competition creates the best opportunities for final

Saba is the owner of its charging points, but has ceded the management and operation to Endesa, a major Spanish utility. The most impacting costs they have are related with energy, both the power fee and the energy costs. Regulation has recently changed, and, while previously the highest cost was related to the fix power costs, now the latter have been reduced. Despite of that, the variable energy costs have risen, especially during daytime, when most of their clients charge their vehicles. *Saba* is now prioritising the simplicity of their tariffs because they feel that the market is still immature. The company is not introducing differences in their tariffs according to the time of the day.

Their revenues come only from tariff fees since they are not receiving any subsidies to cover opex costs. Their losses since the start of their operation of EV chargers have not been too high mainly due to the fact that capex was subsidized by national programs and opex is covered by *Endesa*. Regardless of that, their 2030 objective is to largely increase the number of charging stations which would require high investments. For that, they are seeking higher demand that would help cover operating costs and investments.

Currently they offer 3 different tariffs:

- 0.30€/kWh for preferent clients such as fleets
- 0.35€/kWh for *SABA* and *ENDESA* clients. Payment via the power supply invoice.
- 0.45€/kWh for non-clients. Payment via credit card

Tariff structures should incentivise the use of EV's according to *Galp*, *Iberdrola* but also, incentivise night charging and guaranteeing availability of the charging point.

Galp is currently planning their charging network and they estimate to have 10,000 charging points by 2030. Most of these charging stations would be installed in their gas stations mainly because they own them. The tariff structure is yet not fully planned (they are currently not operating any charging points) but they foresee that the fee would be charged per kWh and a fee per minute would be charged once the vehicles is fully charged. This fee would incentivise clients to remove their vehicles from unused charging points.

Galp is considering medium- and long-term investments with a horizon of 10 to 15 years. Their tariff structure plans include fee differentiation according to the time of the day. Planned revenues, in order to justify investments, take into consideration qualitative gains to compensate short-term losses.

Other CPO's, such as *eTecnic*, that operate on-street charging points, have coped the high fix term costs by connecting their charging stations to public lighting. During daytime the power that can be supplied is much higher than during night-time due to unused public lights. They also see the EV charging market immature, but with time, dynamic pricing will be usual. In their opinion, tariffs should be structured differently according type of charger. Low charging points should be charged per minutes, so as to enforce vehicles to remove it, and fast chargers should be charged per kWh.

4.2.1.3 OEM

Three different manufacturers were interviewed. Two of them are charging point and electric components manufacturers (Circutor and Power Electronics) and a vehicle manufacturer (SEAT)

Circutor, a major charging point provider, mentioned that the initial capital expenditure of charging points should be subsidized by the public authorities whereas the operational expenditure should be covered by tariffs and other sources of income. According to *Power Electronics* opinion, from a CPO perspective, charging tariffs should be regulated because only big utilities are capable of making profit. For that reason, it is convenient to subsidize a part of the operational costs, such as energy. For this company, electric vehicles are seen as a good option when charging costs are below 0.25€/kWh.

Seat mentioned that, currently, there are subsidies for the purchase of EV's and for home charging points but the main point of debate is how to finance the Capex of fast and ultra-fast charging stations. The main providers of funds to achieve profitability on this type of stations should be big utilities, the European commission, governments and also manufacturers. The costs of such stations should be lower in order to create a business model and boosting measures are definitely needed with funds such as the FEDER program. There must be a commitment from Europe to create more infrastructure, it cannot only be made by the private sector.

The clients of *Power electronics* are currently applying flat tariffs of 0,3-0,4€/kWh and are not charging for the parking spot. According to their opinion, the tariff structure should include a penalty for those clients remaining at the charging point once the recharge has finished, to increase availability. For this reason, they believe that vehicles should be charged for the occupation of a parking spot, hence charging per time instead of energy (kWh). This would increase availability of charging point since it would incentivise the use of the charging station for the proper time.

Circutor believes that users of the charging stations should be charged a tariff that includes the power of the charger (kW), the energy delivered (kWh) and the time. These three parameters should be included in the tariff, so that the user is incentivised to make the most efficient use of the charging station.

Regarding this topic, *Seat* mentioned that currently, the only incentive of a CPO to install charging points (fast) is that in the future, the high number of charging events will be a profitable business as petrol stations are today. There are very few companies that can afford such a long-term investment, since it is unknown at which point EV's will start to be predominant.

As for tariff structures, *Seat* expressed that fast chargers should apply a fee per minute of use and the home charger (slow charge) should be used during the night-time. Their proposal for car parks would be a subscription for a certain amount of energy. An example of other tariff structures is the Seat MO, the EV motorbike with a exchangeable battery that is charged through a leasing premium in which includes one battery swap per week.

Regarding the current profitability of charging points in Spain, *Circutor* mentioned the following statements for each charging option:

- For slow chargers, the Capex is lower than Opex and currently is starting to be profitable. The estimated return period is of 3 years. The 4th year should show a positive income statement.
- Fast chargers (50 kW) have a drawback in the energy fix term, which make it very difficult to redeem the investment even with a public subsidy of 30%.
- Ultra-fast chargers have a Capex which cannot be compared to the Opex and these types of stations are being used as attractor of clients to other businesses to justify such large investment.

Finally, as for the configuration of charging points *power electronics* mentioned that charging stations are designed according to the tariff structures to be applied but most of the stations they produce are

standard although these could be configured. Despite that their main clients are in the US, they also produce for other countries and except for the connectors, charging stations are the same and do not require special configurations.

4.2.1.4 Associations

Two associations have been interviewed. On one hand, the Companies Association for the Development of the EV (AEDIVE), which groups different companies to drive the development of the electric vehicle industry. On the other hand, the national user association of electric vehicles that gathers drivers of EV's in Spain.

According to AEDIVE's opinion regarding the public subsidies to the installation and operation of charging points, authorities should facilitate the creation of EV charging infrastructure, not invest on it. Hence, capex should not be covered by administrations. The interviewed EV User Association answered that administrations should incentivise EV's and promote their use. The lack of charging stations is a crucial factor that reduces the number of citizens that purchase an EV.

The EV User Association mentioned that they are aware that current tariffs are not covering the costs at the majority of charging stations, but large companies are investing in this sector. Despite of that, small companies have it difficult to wait long years for positive results and deal with the administration bureaucracy. Also, according to their opinion, tariffs should guarantee the availability of charging stations and new formulas should be tested to ensure that the right vehicles use charging spots the right amount of time. Tariff structures should also model de behaviour of users trying to find the right user for each type of charging station and time of the day.

Regarding the improvements in tariffs, the EV User Association mentioned that they agree with the current tariff structure being applied in Barcelona in which on-street chargers are more expensive than off-street ones. Despite of that, they mentioned that charging events at off street chargers should sell energy at cost price, to avoid the double business of charging for the parking spot and the charging session that pulls potential users away from these chargers.

4.2.2 Grenoble

In Bordeaux Métropole, charging infrastructures are under direct management. Therefore, investment and operational expenditure are managed by the local authority. For the moment, charging and parking are free, but a reflection is underway to set up a tariff structure. As recharging is free, there is no operating revenue, although there is a European subsidy (eco-city). The reflections should lead to a price schedule based on the duration (with nightly pricing) of charging depending on whether it is slow, accelerated or fast charging stations. In the long term, the service should be financially covered by user revenues, operation and investment included. However, given the nascent nature of this mode of motorization and the political support for its development, it seems logical that the local authority itself makes investments to launch the service and allow the transition.

In le Grand Lyon, the approach is different. Charging infrastructures are managed by a private operator (Izivia-Demeter) which has been selected through a call for private initiatives. Therefore, the local authority does not finance anything but creates favourable conditions; the investment (and the risk) is carried by the private sector. Tariff structures are implemented by the operator in a logic of incentive and economic profitability. For charging stations up to 24 kW, they are based on a monthly subscription and duration, for charging stations up to 150 kW, they combine energy consumption and duration.

Ile de France Region does not own any charging stations or operate them but it subsidizes public contractors to develop their network. Its policy aims to develop the network and bring consistency and reliability to the various existing networks. Its policy in favour of electromobility has three levers: subsidizing the installation of charging stations; labelling system for all charging stations accessible to the public 24 hours a day (private and public domain); establishment of a platform (<https://roulezbranchez.smartidf.services/>) on electromobility data (partners, aid, etc.). There were 4,000

charging points in 2019 in Ile de France and the objective is to reach 12,000 charging points in 2023. The goal of the subsidy program is to "prime the pump" while the charging service becomes economically viable. Therefore, applicants must have a development strategy and an economic model comprising tariff structures for an offer that meets medium-term needs. Thus the subsidy program is only spread over 3-5 years. In the medium term, a tariff structure should allow users to finance the OPEX service.

Territoire d'Energie 38 (TE38), as both MSP and CPO, operate charging stations included in the network "E-born", localized on 11 provinces. TE 38 is MSP on the province of Isère, operating 131 charging stations. Since August 2020, charging stations have been managed via a concession by Easy Charge (Vinci subsidiary company). Tariff structures are based on energy consumption; car park is not charged. Initially, in France, tariff structure based on kWh was forbidden; now, it is allowed and according to TE38, probably eMSPs will adopt more and more this kind of tariff structure. The concession, which lasts 8 years, foresees that TE38 covers a part of the operating deficit of the delegatee, on a regressive basis (75 % the 1st year, 50 % the 2nd year...), during 4 years: after 4 years, it is foreseen that incomes will cover OPEX. Regarding possible subsidies, as subscription to electricity supply is very expensive and sinks the economy of the system, a multi-sites subscription with a cumulated power on many charging stations would be very interesting. Also, according to TE38 interviewee, users should not cover completely OPEX service: other means, like advertisement, could be used.

As for the EV users' associations FFAUVE and e-France Café, as EVs charge at different powers, tariff structures based on duration are unfair. The fairest is kWh pricing. A possibility is to have time weighted by charging power, but the calculation is very complicated. A person who stays only to charge should pay per kWh; if he stays more, he should pay more. If he charges above 80 % of his battery, tariff should be higher: there should be an increasing tariff structure, functioning on levels, and explained on the charging stations. Tariff structure for fast charging stations could also be combined with parking price. More generally, for fast charging stations, the more the tariff is high, the more there is EV rotation, the more there is profitability. Nevertheless, external charging stations should be used for reinsurance usage or by people without parking space: people should charge mostly at home.

4.2.3 Luxembourg

The tariff structure applied on Luxembourg's national charging network, "Chargy", is defined by the MSPs that are all served equally by the CPO. The prices are equal on all AC charging points across the country and equal on all DC super-fast chargers, of which the first units have been commissioned only recently.

The currently lowest charging tariff in November 2021 was provided by Shell Recharge with 0.225 EUR/kWh for AC charging. This tariff currently still applies also for the DC super-fast chargers, even though the conditions had recently been adapted by the DSO.

4.2.3.1 Authorities

The two authorities interviewed are the Ministry of Energy and Spatial Planning (MEA) and the Luxembourg Regulatory Institute (ILR). The high-level representatives of these authorities were idea candidates for the interview as they are in charge of the targeted design of political incentive systems and regulatory framework conditions that will advance electromobility in this country.

Following the two interviews, whose interviewees both referred to the national charging infrastructure, the description has been compiled with input of the interviewees:

There are only nine public charging points dedicated to LEV's operated under bikestation.lu by a specialist bicycle shop. Busses are charged mainly in depots, operated by the bus companies, while there are approximately eight fast chargers, providing opportunity charging via pantograph at bus end halts in the public space.

Subject of the interview was the charging infrastructure for BEV and PHEV (passenger vehicles). There are approximately 1000 charging points for AC charging, (mainly operated within the “Chargy” network, with 22 kW per each CP) and around five DC charging points of 30 - 50 kW (mainly situated at supermarkets or car dealers), three super-fast chargers of the newly created “SuperChargy” network (remark by Nexxtlab in 11/2021: Meanwhile eight charging point of 150 – 300 kW are available within the “SuperChargy” network). The roll-out plan foresees to 88 charging points of 150 – 300 kW to be available on Luxembourg territory until 2023.

The distribution of the car parking spaces equipped with a charging point are: 406 on-street (Chargy), 400 at municipal facilities (Chargy), 86 on Park + Ride car parks (Chargy), 62 on private car parks (integrated into Chargy network via “Chargy OK”), and approximately 70 at shopping malls with the largest concentration of 54 slow chargers (3.7 kW each) in one recently commissioned shopping mall.

The CAPEX of the “Chargy” infrastructure is today financed with grid fees. This will be adjusted according to the requirements of the Electricity Directive EU 2019/944. Private investors shall be encouraged with subsidies which are foreseen in the near future. Also the operational expenditure (OPEX) of the charging infrastructure is still backed with grid fees, which will be adjusted according to above mentioned ED. OPEX need to be covered by CPO (charging tariff).

The authorities have no competence to decide the charging tariffs applied on the infrastructure. A fixed tariff per kWh hour, without any time-based component applies for the entire nation wide chargy network. The end user price depends on the MSP and ranges between 0.225 €/kWh and 0.40 €/kWh.

Depending on its location, parking tariffs may apply in addition (beyond competence of the CPO/MSP) and are paid separately. On the newly installed first Fast Chargers (≥ 160 kW, old-fashioned parking meters have been installed to prevent the permanent blocking of these charging points.

Ministry of Energy and Spatial Planning (MEA)

As summarized above, the Ministry of Energy and Spatial Planning (MEA) described the available incentives for electric vehicles and their recharging and concluded that CAPEX rather than OPEX of charging infrastructures should be subsidized. Still, attention needs to be paid to state aid guidelines, which are, for a good reason, monitored by the European Commission to avoid distortion among competing companies. A need for subsidies is seen in remote locations to provide an economic advantage over ICE cars and conventional fuels. The impact of OPEX on charging tariffs and on key parameters as availability and reliability is not negligible.

MEA is aware that today, CPOs cannot achieve profitability from operating charging points in Luxembourg.

The Chargy network's cost is covered with low voltage grid fees, thus paid by all household electricity users. Thereby, end-user prices are attractive, well below the price level for equivalent service in neighbouring countries. Any other commercial CPO could not compete with the price on the Chargy network. With the application of the EU directive, a level playing field must be established, allowing additional actors to offer their services.

Incentivizing to charge “off-peak” of the grid would be desirable. Profitability of charging infrastructure provided should be assured, i.e. by aiming for a reasonable utilization rate rather than high prices. The tariff structure must allow to cover OPEX.

An incentivisation of the use of EV's should assure that the latter are competitive with conventional fuels.

MEA's policy with regards to EV deployment is a proactive one. While, as previously mentioned, the Chargy network must be rendered compliant with the EU directive 2019/944, further initiatives are well under way to support a rapid EV adoption, aligned on the ambition to have 49 % of cars electric by 2030.

Subsidies for EVs and private charging points are available, supporting private investors and companies to set up charging points foreseen.

MEA's influence, as the national policymaker, is limited when it comes to decisions on the municipal level that, e.g. defining penalties for occupying the parking spaces reserved for EV charging.

Plausible future tariff structures and utilisation rates are considered to assure economic viability for relevant actors in the design of subsidy schemes by MEA.

Luxembourg Regulatory Institute (ILR)

As summarized above, the Luxembourg Regulatory Institute (ILR) described the available incentives for electric vehicles and their recharging and concluded that CAPEX of charging infrastructures should be subsidized.

The state could finance grid connection and civil works beyond the project "Chargy" (and SuperChargy), aligned on anticipated future needs to replace conventional fuels and allowing competition among CPOs, ending the quasi-monopoly situation in which Chargy is operated today, financed by LV-grid tariffs. The need for incentives is derived from the fact that amortization periods are otherwise far too long compared to the current development cycles.

The ILR points out that until today, no subsidies are available for public CPs. Also, access to public land should be given to CPOs, in analogy to Telcos (for installation of antennas) or the local free newspaper "l'essentiel"). A suggestion was made, with a charter to be ratified by MSPs and CPOs. The signatories receive access to public land if respecting an upper price limit for their service offering. Interoperability/integration "Chargy OK" and 100% renewable electricity would be mandatory.

The ILR is aware that today, CPOs cannot achieve profitability from operating charging points in Luxembourg in a setup where Chargy is financed with LV-grid fees. A level playing field is needed.

Charging tariffs must cover OPEX. Different CPO tariff components should be passed through to end-user via MSP and possibly roaming platforms to achieve steering mechanism (e.g. time components).

The ILR suggest that a tariff structure should assure the availability of charging stations with the following elements:

- Maintenance cost must be covered so that reliability and technical availability is ensured.
- A time limit is judged reasonable at higher charging speeds (DC charging) to utilise the CP effectively.

A tariff structure could also include elements that aim at altering the behaviour of drivers:

- A time component in the charging price could help to avoid unnecessary CP-occupation, particularly by PHEV.
- Charging during off-peak hours to circumvent unnecessary need for grid extension.

The ILR see the application of smart charging not in public space, where lower charging rates should be favoured and applied in larger numbers.

In general, EVs should be incentivised to provide the least cost option compared to conventional fuels while bearing in mind that motorised individual mobility must be less attractive than (e-)bikes or other forms of light mobility or public transport.

4.2.3.2 CPO's

The only major CPO within the Grand Duchy of Luxembourg is "Chargy", formed by the five distribution system operators (DSO) of the country, represented by the most important one, Creos Luxembourg SA. They are tasked with operating the national charging network for BEV and PHEV (passenger vehicles) that also includes "SuperChargy", providing super-fast charging on the same territory.

Other CPOs were not interviewed, as the only other relevant player in that category, Tesla, operating his closed network with one charging site in the country, was not available for an interview.

The Chargy network includes 406 CPs on-street, 400 at municipal facilities, 86 on Park + Ride car parks and moreover integrates 62 on private car parks (linked to their backend and marked "Chargy OK"). All charging stations provide up to 22 kW AC charging with two outlets per each station. Often more than one station (up to 30) is available at a charging site. Eight charging point of 150 – 300 kW are available within the "SuperChargy" network as of today. The roll-out plan foresees to 88 super-fast charging points (36 on highways, other 52 on heavily frequented corridors) on Luxembourg territory until 2023. The geographic area covered is the entire country (see geoportail.lu).

The charging service is offered via MSPs to the driver. While MSPs are provided with the same price per kWh by the DSO, their end-user tariffs vary significantly with their expected margin. Parking fees may apply, depending on location and municipality, own the place.

Chargy provided an insight into the cost structure, stating that 60% of the CAPEX account for civil works, 30% for equipment and 10% for the grid connection. Within the OPEX, only the DSO pays the maintenance cost and the grid fee, whereas the electricity is paid from the MSP directly to the physical energy supplier.

The CPO suggests that DSOs should set up CPs, and CAPEX should be financed with grid fees, as there is no viable business plan for AC charging. Only DC charging could be offered in analogy to conventional petrol station. OPEX, however, should be covered by the charging tariffs. With the currently applied charging tariffs, a private charging station operator cannot operate profitably and therefore be interested in settling in Luxembourg. This applies at least for AC charging, possibly DC charging could allow for a viable business case. The utilisation rate is most likely to drop if the charging tariffs are higher, aiming for profit, which means entering a vicious circle.

The CPO, therefore, has made several statements in the interview as to what elements a tariff structure should entail. Two factors can support the availability of accessible charging stations: firstly, maintenance needs must be met and, in the case of DC fast charging, higher tariffs apply when cars stay longer than needed for recharging. Smart charging and incentives provided for charging during off-peak hours are seen as a means of changing user behaviour in the desired way. Setting up such incentive schemes is seen as challenging to implement.

The CPO owns the charging infrastructure and finances the depreciation and installation costs with LV-grid tariffs. Preventive maintenance costs, curative maintenance costs are paid with OPEX through charging tariffs.

Among the CAPEX, the cost for civil works, depending on site-specific conditions, and installation cost in large structures (e.g. Park + Ride car parks) are most important and most difficult to anticipate. The CPO does not generate any income at the moment, and a payback calculation is not provided. Moreover, a payback is uncertain if not paid with LV-grid fees, which the CPO must change to comply with the EU directive.

4.2.3.3 MSP's

Several MSPs provide charging services on the Chargy network within the Grand Duchy of Luxembourg. Some of them have contracts with the DSO; others use e-Roaming platforms Gireve or Hubeject. There are international companies among the MSPs such as Shell Recharge (NewMotion), Plugsurfing and Chargemap, and local players such as Enovos Luxembourg and PLUXX SA (Powerdale Luxembourg).

The latter was available for an interview, while at Enovos, none of the contacted persons declared willing to participate in the interview.

Regarding required subsidies, PLUXX stated that a global approach would be needed, which a “global” sponsor would coordinate at least in the initiation phase. Such an approach would lead to a unified infrastructure, whose setup would be guided by requirements for open access for MSPs and users. In such a setting, the CAPEX should be backed with subsidies. Once the market is settled, subsidies should become obsolete. DSOs should be in charge of the CPs, as they are part of the infrastructure, and this party should be tasked with assuring availability and service quality from A to Z (maintenance, help desk, etc.). Regarding a potential OPEX subsidisation, the MSP clearly stated that maintaining a smart infrastructure should be worth financial support (obligation maintenance contract).

“Charge@home” and “Charge on the go” should be harmonized and provided with a straightforward solution (app). And AC charging options should generally be provided where people spend 30 minutes or longer. DC charging will provide a more viable business case but should not be considered every day’s charging station. Authorities should provide rules for the targeted development of the fast-charging infrastructure. Moreover, future development must include driverless vehicles according to the visionary statement of Pluxx.

There was no straight denial to the question of whether a private charging point operator could currently make a profit. Profitability could be attainable in attractive locations, e.g., commercial areas linked to other activities, e.g. shopping in a mall. High prices of parking spaces, however, might still render such business cases difficult. Prices for charging should not be higher than twice the residential electricity price, and slow charging should be the most commonly used option.

The MSP has made several statements in the interview as to what elements a tariff structure should entail: The tariff structure should allow for the availability of the infrastructure and the quality of the charging experience. Frequent users could be supported with favourable prices, assuming they have limited options to charge their vehicle. Dynamic pricing, including incentivized off-peak charging, should influence user behaviour. Therefore, participation in smart charging experimentations should be encouraged through tariff incentives.

The tariff structure should support a double objective: Firstly, supporting the shift from individual motorized mobility to other modes of transport (mobility as a service, free public transport) and secondly lower cost as conventional fuel cars.

Seeking to maximize income, the MSP indicates three elements that could make up viable business cases, linked to the location attractiveness, cross-selling opportunities (where users spend above 30 minutes...) and linked to a targeted grid regulation.

4.2.3.4 User association

There is no dedicated EV user association in the country. Automobile Club of Luxembourg (ACL), an association with 190,000 members, which, according to its statement, covers all modes of mobility, qualified as an ideal candidate in this category. No fleet manager was available to take part in the interviews.

The ACL, as association and service provider, covers all types of vehicles in the Grand-Duchy with its resources and serves its members anywhere in Europe, with partner organisations. For ACL, it is difficult to say in what percentage their users access different charging stations, while home charging is generally encouraged. The ACL is very well informed of the available subsidies that support EV adoption beyond the national subsidy schemes, complemented by some municipalities and is also aware of the subsidy-distorted public charging infrastructure in the country, where Chargy is operated without competition. According to the user’s association, CAPEX in charging infrastructure should be subsidized, making maintenance an obligation, while OPEX should be covered by the charging tariffs. Incentives for private company charging infrastructure is announced which is appreciated by the ACL.

While, from a user's (associations) point of view, low charging tariffs are appreciated, it is also clear that no private charging station operator can operate profitably due to a missing level playing field.

The user association has made several statements in the interview as to what elements a tariff structure should entail.

According to the ACL, attention needs to be paid to the application of non-discriminatory rules that assure the availability of charging points. Favouring users that most use charging points is a possible way to support users who do not have access to a private charging point and thus (have to) use a public charging point frequently. Generally, incentives should assure that EVs are the least cost option compared to other fuels.

Charging options that aim to alter the user's behaviour were discussed, such as charging during off-peak hours and related smart charging options. The ACL agreed to their application where applicable, e.g. on P+R car parks, while compatibility is not seen with all Charge sites depending on the utilization and certainly not with fast charging ("SuperChargy").

An interesting statement had been made regarding a harmonization of charging tariffs, where, according to ACL, we should follow the standard applied for petrol and diesel in Luxembourg, which is sold at the same price across the country by all providers. The use of super-fast chargers as an everyday charging option should be discouraged.

While, as mentioned before, the user's association has little to criticize the current charging tariffs, ACL suggested a particular improvement: A tariff per kWh, which, for the fast chargers, switches to a time-based tariff, once a high state of charge, e.g. 80% is reached (battery almost fully charged).

4.2.4 Zellik

4.2.4.1 Public authorities

In Flanders, as well as in Brussels Capital Region, the public authorities have organized tenders for the concession for the deployment of the on-street EV charging infrastructure. The conditions of the assignments given by these two regional governments were quite similar.

The total term of the concession is 10 years, with initially foreseen term of 2 years for the deployment of the infrastructure (with an option to extend it for 1 year). The installed charging points should not exceed the power of 22kW. The location of infrastructure is based on the principle that the charger follows the car, meaning that the CPO can install the chargers on demand of the EV (100% electric vehicle) users or municipalities. Another opportunity to install extra chargers is if a charger on a location is oversaturated with demand.

In total, the EV charging infrastructure foreseen by these tenders is getting close to 600 public chargers in Brussels by the end of 2021, while in Flanders this number has reached 4500. The installation of all these chargers is fully financed by CPOs that won the tenders (Total Energies in Brussels; Allego in Flanders).

Concerning the tariff structure, the tariff is based on the bids (within predefined limits) made during the tendering process by the CPOs. The tariffs are calculated by the means of a formula, flattening the energy prices, and the main condition of the public authorities was that the tariff should remain 'reasonable'. After the concessions are given to the CPOs, the public authorities have no influence on tariffs anymore.

The parking fees for the parking spots dedicated to EV charging are currently strongly dependent on the municipality. For instance, in Brussels, there are penalties in place for the non-electric vehicles

occupying the parking spots intended for EV charging. Also, during the day-hours, the EVs can stay on the public parking spots dedicated for EV charging for a duration of 4,5 hours. The EV has to be plugged in and charging. This time is, on average, presumably sufficient to give the EV a decent level of charge. Staying parked for more than 4,5 hours induces a penalty. The charging status of the parked and plugged-in EV is defined by making use of interconnection with a CPO platform and the platform of Parking Brussels.

4.2.4.2 CPO and CPO/MSP

The interviewed CPOs have several opinions regarding the current deployment of the EV charging infrastructure and tariffication schemes in Belgium. For instance, the ex-representative of Total Energies (now CEO of Certipower) claims that the existing fiscal benefits is a sufficient stimulus for private companies to develop the EV charging infrastructure, so there is no extra need for CAPEX or OPEX subsidies. The companies themselves are interested in these investments, in order to gain a bigger market share. At the same time, the representative of Luminus affirms that the governmental subsidies on CAPEX for the deployment of the EV charging infrastructure would accelerate and facilitate the electrification of the transport.

Currently, the governmental concessions for the deployment of the EV charging infrastructure in Belgium do not imply any financial contribution from the public authorities and all the expenses are on the shoulders of the private companies. At the same time, these concessions oblige the tender-winner-CPOs to install the charging points in certain locations where it is sometimes not economically viable, leading to revenue losses for the CPOs. The choice of unpopular locations is considered to be a big failure of the latest concession of the Flemish government, while the Brussels' concession shows better results due to the high density of the population, business and commercial infrastructure, etc. In places where there is sufficient demand for charging (e.g. big cities, main roads, malls etc.) the CPOs are able to generate profits even now, considering the current limited number of EVs present on the roads. Furthermore, as the number of EVs is going to increase, these profits would grow as well.

Thus, according to the interviewed CPOs, it would be more beneficial to deregulate the EV charging market and let the private companies choose the locations and tariffs, following the revenue generation principles, that in their turn are highly dependent on the customer preferences (concerning the necessity of chargers in certain locations, willingness to pay, etc.).

Another concern of the interviewed CPOs is related to the lack of tariff regulations for the emerging opportunities on the market (e.g. there are no regulations for Smart Charging and V2G tariffication, while these technologies can be very beneficial for consumers, DSOs and energy market as a whole). In order to incentivize the user to use the technology there should be some beneficial customer-friendly tariffs in place, which are not present due the limited flexibility in the charging tariffs regulations.

Concerning the final charging tariffs for the EV users, the Belgian CPOs do not provide the direct charging services and work through the MSPs. For instance, Total Energies (CPO that won the concession in Brussels) is in partnership with the local and international MSPs like Blue Corner, New Motion, Plugsurfing, MainGau and other. Generally, the typical EV charging tariff structure in Belgium consists of the following parts:

Subscription fee (€/year or month): subscription fee that is charged yearly or monthly to access to the reduced tariffs. (Type 1: basic; Type 2: advanced)

Energy tariff (€/kWh): the tariff paid per kWh charged.

Connection fee (€/minute): a per minute fee applied when an EV remains plugged in after it is fully charged.

The examples of the EV charging tariffs in Belgium are shown on Table 26:

Tariff type		Tariff examples				
		Blue Corner			Plugsurfing	Luminus
Subscription fee	Type	-	1	2	7,99 €/month	-
	Fee	-	59 €/year	169 €/year		
Energy tariff	Normal (AC)	0,40 €/kWh	0,35 €/kWh	0,33 €/kWh	0,32 €/kWh	0,31 €/kWh
	Fast (DC)	0,69 €/kWh	0,60 €/kWh	0,56 €/kWh	0,53 €/kWh	0,35 €/kWh + 0,20 €/minute
Connection fee	Normal (AC)	0.01 €/min.			-	-
	Fast (DC)	0.25 €/min.				

Table 26. Examples of EV charging tariffs in Belgium (Blue Corner, 2021; Plugsurfing, 2021; Luminus, 2021)

4.2.5 Bari

4.2.5.1 Public Authorities

The municipality of Bari does not plan to directly manage the charging stations on the road. Bari cannot negotiate the rates charged in its city by the MSP, as the CPO sets its own rates.

From the interviews to the Municipality of Bari, a private charging station manager can profit and therefore may be interested in investing to charging infrastructure with the tariffs in force in the city. The public authorities believe that a tariff structure should make it possible to finance the management and maintenance service by users.

From the interviews, the public authorities have given concession spaces on the street to be used as recharging points. Consequently, the manager will have the right to apply the appropriate tariffs in relation to market demand. In the event of unauthorized occupation of the charging stand or prolonged stops of non-electric vehicles, there may be a forced removal in order to free the column and make it usable for users of electric vehicles.

From the interviews, for investments in the short, medium and long term, public administrations consider the cost-benefit ratio that the investment can bring, with an eye to the eco-sustainability of the intervention.

4.2.5.2 CPO and MSP by EnelX

From the interview with the CPO and MSP (ENELX), it can be deduced that the CAPEX structure has a good percentage impact on the final tariff structure but the OPEX structure has a fair percentage impact on the final tariff structure.

According to the interview with the CPO and MSP, with the tariffs in force in Bari, a private charging station manager can profit and therefore may be interested in investing. It is important to have a broad incentive policy to encourage the use of electric vehicles. As CPO and MSP, EnelX is willing to enter into concession contracts, based on business opportunities. Furthermore, EnelX is willing to partially bear the CAPEX costs (connection to the electricity grid, civil works, equipment, etc.), to ensure greater

diffusion of the electricity infrastructure, in relation to business opportunities. From the interview, the cost that changes most rapidly are the cost of energy.

The final rate can consist of a minimum basic cost, a differentiation of the rate based on the day / night, concessions for frequency of use and prices for different types of vehicle. Furthermore, the market trend of electricity demand is considered.

Now the rates applied in Bari by EnelX are:

- € 0.01/ minute and € 0.38 / Kwh for (AC Type 3A - 3.7 kw and AC Type 2 - 20.4 kw)
- € 0.01 / minute and € 0.44 / Kwh for (60 kw DC Combo; 60 kw DC ChaDeMo; 43 kw AC Type 2)

4.2.6 Greece

4.2.6.1 Public authorities

The charging network at on and off-street public parking areas is very limited due to the fact that the e-mobility maturity level in Greece is low and the charging needs are rather low. There are a few charging infrastructures either as municipal initiative to introduce e-mobility concept to the local community or as a donation from private companies (ex. In Trikala) offering the charging as a free of charge service.

The majority of the CPOs operating at municipality level are offering services mainly in semi-public areas based on B2B contracts with the facility operators. This business activity is not profitable due to the low charging demand; however, they are interested in entering the e-mobility market at early stage, gain market visibility and market share for the short-term horizon.

4.2.6.2 CPO/MSP

The CPO's interviewed agree that authorities should finance or subsidize the capex concerning the purchase of a charging station, however, this is not enough especially at the early stage of e-mobility deployment. They stated that in countries where the CAPEX of the charging infrastructures is only subsidised by national resources at an early e-mobility deployment stage, it is usually hindering upscaling and business expansion. The OPEX cost of managing a charging network (ex. leasing area, grid connection costs, energy, etc) are quite high. Thus, subsidies for the operational costs are needed mainly for the long-term planning and development of the charging network. EUNICE stated that Capex incentives are more relevant for home charging, OPEX ones for Semi-public and CAPEX/OPEX for public charging network.

With the current volume of EVs / percentage of usage of charging stations, sustainability of investments can only be achieved via subsidies. Otherwise, the charging prices should be highly increased to make the investment sustainable. In Greece, investing in charging infrastructure is not profitable at this moment but it builds the company's market share of the future since e-mobility market is for sure an emerging one.

Different tariff structures are adopted by CPOs in Greece dictated mainly by the charging technology and the spatial conditions. In general, there are three dimensions defining the tariff structure: a fixed cost, an energy base tariff and a time-based price. Fixed and energy tariffs are the major mechanisms. Time-based tariffs consider the parking time in order to avoid over-parking periods and increase the usability of a charging infrastructure by many EV users. FORTIZO adopts either an energy-based profile or a time based profile depending on the charging location, while EVblink adopts only an energy based tariff scheme (0.40 EUR/kWh plus VAT 24%).

In case of Fortizo, for regular customers, large discounts are foreseen given that the charging sessions will be prepaid within a valid time period -3 months. There are no incentives for taxi drivers. Different price schemes are adopted comprising a fixed cost and an energy based or tariff-based cost. Fortizo disagrees with the adoption of different prices per vehicle type or scalable prices since where these

were experimented no tangible conclusions were drawn. Fortizo also offers a booking service which is free but there are some usage constraints such as minimum charging time per reservation and maximum charging time for efficient exploitation of the charging infrastructure.

In case of EVblink, custom pricing is offered for fleet members and large companies.

It was also mentioned the importance of adopting peak/off-peak tariffication. Even though the regulatory framework in Greece foresees the possibility of deploying off-peak tariffs to incentivize demand shifting to grid valley hours where energy is cheaper, this opportunity is not offered to the CPOs/eMSPs by the energy suppliers. Off-peak tariffication would allow for more competitive charging contracts.

4.2.7 Turkey

4.2.7.1 CPO and eMSP

An interviewed CPO&eMSP employee from ZES mentioned that it is important to get support from authorities for subsidizing of CAPEX to install new charging station. He stated that since the costs of the installation of charging points are quite high (especially for DC charging points), subsidizing of CAPEX costs have to be considered in near future. According to him, with the aim of having a faster charging network and also providing faster stations and ability to have long trips to their end users, DC charger investments have critical importance.

Interviewee has also mentioned that It is necessary to ensure that the stations are not used unnecessarily. He thinks that the tariffs should be arranged based on this situation. In his opinion, a certain occupation fee can be offered when the stations are outside of their usage periods.

When the question was asked about his opinion about tariff structure should favour any kind of options or not, he mentioned that with the increasing number of electric vehicles in Turkey, the number of users is also increasing. Considering that domestically produced electric vehicles and different brands/models will enter the market next year, they think that investors can make a profit.

He also stated that as ZES they invest most of our charging locations and related infrastructures by themselves. Thus, they cover the CAPEX costs. However, he stated that they also provide partnerships with our customers who want to be direct investors, if agreed on commercial terms. Additionally, he stated that usage revenues from public networks and corporate customers and AC/DC charger sales are our revenue sources.

On that point when the question was asked about the most rapidly changing cost on their side his answer was related with the volatility of exchange rate. According to him, the highly volatile exchange rate in Turkey affects operational expenses seriously. For this reason, all of the costs that change depending on the exchange rate can be defined as the costs that have the most critical impact for their business at this point. At this time, they do not consider to be funded by users. However, according to him, OPEX expenses can be considered within the current tariff structure. He also gave information about their existing applied tariff structure:

- For AC Type 2 sockets, prices are 0,22 TL/min up to 7,4 kW, 0,33 TL/min between 7,4 kW to 11 kW and for above 11 kW price is 0,44 TL/min. And they are applying different tariffs for DC CCS&CHAdemo sockets and also different prices for average power up to 50 kW, 50 kW – 90 kW and above 90 kW. In addition, their guest users (non registered users) pay an extra 100 TL for the use of AC sockets and an extra 200 TL for the use of DC sockets.

Also, he thinks that the implementation of per-minute pricing is appropriate. But differently, tariffs based on fixed fee + consumption (kWh) + minute fee, fixed fee + minute fee or only consumption (kWh) can be applied. In addition to this information, he also stated that parking fee is not collected locally and it is taken by the location owner according to the preferences of some businesses (hotel, parking lot, etc.) with charging stations and most of the time there is no charge.

4.2.7.2 OEM

The interviewee from OEM company has stated that a good tariff structure should focus on the benefits of both operators and users. According to his perspective, one of the most critical point is that a tariff structure should favour of the change the behaviour of drivers and incentivize the use of EV's from this statement.

When we asked about the fees that can be applied to charging events when designing charging points at a cost level, he mentioned that they are not considering this situation while they are designing their charging points. He stated that, talking about fees, this may change according to the customer profile and charging use case but as far as he knows even high-end users check the fees and cost levels. Finally, when we asked their plans about the short- and long-term investments and planned tariff structure, they were not preferring to give information about what tariff structure and fees are they planning to have in order to plan their short and long term investments according to company policies.

Interviewee also stated the importance of smart charging. According to him, smart charging will be an important option to avoiding grid related problems and with the implementation of the V1G or V2G solutions EVs may not overload or destabilize the grid. He also mentioned that it should be encouraged in future scenario, but also the term "sustainability" should be emphasised.

4.2.7.3 User association

Interviewed User association representative has mentioned that a tariff structure should favour different kind of options which can be beneficial for end users. He thinks that giving guarantee of the availability of charging stations to users is one of the most critical issue. According to him, the tariff structure should support this, and necessary steps should be taken to eliminate grievances. Considering that electric vehicles will bring an additional load on the grid, "Incentivize charging during off-peak hours" is also a critical issue that should be given importance. Also related with the subsidizing of CAPEX recharging points and cost of OPEX energy he thinks that CAPEX expenses have the biggest share of the pie. For this reason, giving support for CAPEX will relieve sector stakeholders. Additionally, according to him, It is not necessary to subsidize the cost of implementing charging points as well as the energy by public authorities for the current process, but some work can be done to ensure interest in the sector and to encourage users in emobility.

Interviewee has stated that currently the charging costs are a bit high, and he is expecting to have more appropriate tariff mechanism in near future with the help of technological development in sector. He also stated that considering the sharp increase of the number of electric vehicles in the future, a dynamic tariff structure might be more profitable for both companies, utilities and users. At this stage, he definitely thinks that tariff structures should encourage emobility.

4.3 Generalized tariff structures

Tariff structures define and model the behaviour of charging station users as well as define the main source of income for eMSP's. Despite the fact that in some areas tariff structures are simple due to a low development of EV sector or due to a specific willingness of keeping it simple to users, these can have a large impact in the habits of users and influence the way in which these behave. For this reason, tariff structures play a crucial role in the charging ecosystem.

This chapter defines a generalized formula in which any tariff structure can be built upon. The aim is that any tariff structure defined by CPO's or eMSP's can be formulated using the model presented in this chapter. Even though CPO's and eMSP's might have different approaches to define their tariff structures both will be built using the same model. Whereas CPO's might directly follow their costs to define their tariffs, eMSP's might be more interested in defining a structure of tariffs that increase the use of charging points, incentivise a certain behaviour and be attractive to users.

The methodology followed to define the formulation is mainly the definition and combination of all values that intervene in a tariff. This has been done considering all the tariff structures present at the project sites as well as in other countries. Once the parameters and the factors have been defined, a formulation with the sum of the expressions that consider all parameters that can be included in a tariff is done. The formulation has been tested with some tariffs applied in the project sites to ensure that all situations can be defined with it. An example is shown in Table 27.

Generalized formulation

Any charging event can occur under a subscription contract or without it. In the latter case, the subscription costs are zero, so the first generalized formulation considers a subscription. Any subscription can depend on:

- Type of vehicle (which can include motorbikes, vehicles, freight vehicles, etc)
- Type of user (which can be any classification such as taxi drivers, freight drivers (any professional user) and regular users)
- Modality: flat rate or a tariff that depends on the use

Subscriptions are usually on an annual basis but could be any time period, and also can include a registration fee. So, the subscription cost can be written as follows:

$$C_i^c = A_i Y + b_i$$

C: Contract cost

A: temporary cost of the subscription (annual...)

Y: Number of years, months, etc

b: registration fee

Therefore, for a certain contract i that depends on the type of vehicle, type of user and the modality, there will be different temporary costs and registration fees.

For the case in which the subscription includes a flat rate modality, this includes a certain amount of energy or time to charge regardless of the final use. If the charging time or energy is above the maximum described at the subscription, an additional tariff may be charged. This can be expressed:

$$S = T_{s,i} \cdot \max(0, kwh - kwh_{plan})$$

The additional tariff is only charged if the amount of energy used is higher than the planned in the subscription. This formula can also be expressed using a time variable instead of energy, which could also occur:

$$S = T_{s,i} \cdot \max(0, t - t_{plan})$$

In the case in which no flat rate applies, the tariff applied will depend on each charging session j , considering the following parameters:

- Power of the station (AC/DC)
- Location of the charging point (on-street, off-street in car parks, etc)
- Initial time (this is important if different rates apply according to the time of the day)

Each of these parameters set different values that will be used to calculate the final tariff. The variables that are used to calculate the tariff are:

- duration of the charging session (time): d_s
- Amount of energy charged (energy): e_s
- duration of the stay at the charging point: d_e ($d_e \geq d_s$)

Therefore, for each contract i and each charging session j any tariff can be expressed as:

$$C_{i,j}^s = C_{i,j}^{cs} + T_{i,j}^f + \underbrace{m_{i,j} \cdot \max[(d_s - f_d), 0]}_{\text{Cost per time (duration of session)}} + \underbrace{n_{i,j} \cdot \max[(e_s - f_e), 0]}_{\text{Cost per energy (energy charged)}} + \underbrace{p_{i,j} \cdot \max[(d_e - f_p), 0]}_{\text{Cost of parking (time parked)}} + T_{i,j}^{excess}(t, e)$$

$C_{i,j}^{cs}$ is a booking fee that may be charged when booking. In most areas this value is zero but a booking fee could be charged to give more value to this option. By imposing a small fee on this concept, booking option might be better used by users.

$T_{i,j}^f$ is the minimum charging that some eMSP apply to their clients. The minimum charge can be applied using a time or energy variable. This parameter is applied to increase the efficiency of use of the CP's.

$m_{i,j} \cdot \max[(d_s - f_d), 0]$ where m is the value that determines the cost of the charging session that depends on the time duration. It is expressed in *price/amount of time* (cost/time). In most of the cases that a charging session is charged using the time variable the metric used is a minute (€/min). This value m is then multiplied by an expression that considers the duration of the session considering that if there is a minimum stay (f_d) this must be subtracted from the duration of the session. The minimum charge is applied by some eMSP's to ensure the efficient use of the charging stations. So, if the time of the session (d_s) is shorter than the minimum stay (f_d), then the value of this expression is zero. The minimum cost will be applied regardless of the charging session duration.

$n_{i,j} \cdot \max[(e_s - f_e), 0]$ where n is the value that determines the cost of the charging session that depends on the amount of energy charged. It is expressed in *price/amount of energy charged* (cost/energy). In this case, the variable (e_s) represents the amount of energy charged in the session. In case the eMSP sets a minimum energy to be charged (f_e), this must be deducted in order to calculate the cost.

Finally, there could be an additional charge regarding the parking time (d_e). As well as for the previous expressions, a minimum parking stay could be charged (f_p).

Some eMSP's may as well charge if the duration of the session or the energy charged exceeds of certain values ($T_{i,j}^{excess}(t, e)$). In this case, there would be an additional expression that would consider a different cost (time or energy) that would be charged.

In addition, in some cases, an eMSP charges its clients using an energy metric at the beginning of the charge until a certain amount of energy has been reached (or a percentage of the battery is reached i.e. 80%). After that, the client is charged using a time metric. In such cases, there would be a limit of energy (e_s) to be charged with an energy tariff. After that, the expression of cost per time m would apply.

The following table shows some of the tariff structures currently being applied at the project sites expressed using the parameters described in the generalized formulation. This shows that any tariff structure can be built using these parameters.

	Parameters of the tariff structures	Barcelona	Grenoble	Berlin	Belgium (Flanders)	Bari	Greece	Turkey
Subscription	Parameters on which the tariff is based	Car, off street, day-time	22KW Révéo	Standard charge AC	Bluecorner AC (fan subscription)	Enel X (flat small)	Fortizo (DC, no subscription)	AC (up to 7,4kW)
	A_i	50€/year	12€/year		59€/year			
	b_i							
	kwh_{plan}					60kWh/month		
	t_{plan}							
Tariff	$C_{i,j}^{cs}$							
	$T_{i,j}^f$	1,00€			0,01€		2,5€	
	$m_{i,j}$		1,5€/h				0,25€/min	0,22TL/min
	f_d							
	$n_{i,j}$	0,27€/kwh		0,41€/kWh	0,35€/kWh			
	f_e	3,7kwh						
	$p_{i,j}$	3,5€/h						
	f_p							
	$T_{i,j}^{excess}(t, e)$		After 1 hour 0,025€/min			0,417€/kWh		

Table 27. Example of tariff definition through defined parameters

4.4 Proposals and recommendations on tariffs

This final chapter will define different situations that eMSP's and CPO's might face during the operation of a charging network. The aim is to propose different ways to tackle these situations by changing, deleting or adding the parameters that define a tariff structure. This information will be used to test new tariff schemes in the demonstrator phase (WP5).

Several situations are described and proposals for each of the variables is made in order to reduce the effects

- **Low use of the charging points.** Some areas present a low use of charging points. This situation can be caused by several factors that not only include the number of EV's in the area but also the location, the type of charger, and the tariff. A research must be conducted and in case tariffs are part of the reasons for lower use of a CP network, the following solutions could be applied.

	Parameter	Solution proposal
Subscription	A_i	Possible reduction of prices or temporary promotions
	b_i	
	kwh_{plan}	Temporary increase of the energy flat rate if applicable. Increase of the kWh or time given to charge for the same price

	t_{plan}	
Tariff	$C_{i,j}^{cs}$	
	$T_{i,j}^f$	If initial tariff is too large, this could be reduced (if this is the cause of low use). PHEV could start charging if the initial fee is reduced (in case the MSP is willing to have this type of client)
	$m_{i,j}$	Reduce temporarily the fee
	f_d	
	$n_{i,j}$	Reduce temporarily the fee
	f_e	
	$p_{i,j}$	Not charging the parking space or providing some free of charge minutes.
	f_p	
	$T_{i,j}^{excess}(t, e)$	

Table 28. Proposals to cope with low use of charging points

- **High rate of parked vehicles without charging** (after a charging session). This is one of the major concerns of MSP's. Having vehicles occupying a charger after the charging session has finished prevents other vehicle to charge and reduces the number of charges, reducing the income for the MSP. Some sites are already applying measures that reduce this risk.

	Parameter	Solution proposal
Subscription	A_i	
	b_i	
	kwh_{plan}	
	t_{plan}	
Tariff	$C_{i,j}^{cs}$	
	$T_{i,j}^f$	
	$m_{i,j}$	Increase the cost (if time tariff applies) after a certain amount of time (according to the charging station type)
	f_d	
	$n_{i,j}$	Increase the cost (if energy tariff applies) after a certain amount of time (according to the charging station type)
	f_e	
	$p_{i,j}$	Increase the cost of parking spaces after a certain amount of time.
	f_p	
	$T_{i,j}^{excess}(t, e)$	After a certain amount of time, increase the charging costs (energy, time)

Table 29. Proposal to reduce vehicles parked after charging session

- **High rate of no show of booked charging sessions.** In areas where booking options exist, having a high-rate of no shows could reduce the efficiency of the system. Some areas, like Barcelona, limit de possibility to further book a CP to those users who do not attend their bookings.

	Parameter	Solution proposal
Subscription	A_i	
	b_i	
	kwh_{plan}	
	t_{plan}	

Tariff	$C_{i,j}^{cs}$	Place a cost for booking which only will be charged if user does not start the session. This would reduce the number of users making bookings that are unsure they will be able to attend.
	$T_{i,j}^f$	
	$m_{i,j}$	
	f_d	
	$n_{i,j}$	
	f_e	
	$p_{i,j}$	
	f_p	
	$T_{i,j}^{excess}(t, e)$	

Table 30. Proposal to reduce no shows at bookings

- **Very high use of charging points** (low availability). Some areas, with a reduced number of CP's or with very high number of EV's can face situations in which CP's have very high demand. In such cases, the easy solution is to increase the number of CP's, but actions can be taken to increase even further the efficiency of a CP. It is not always possible to increase CP's in the most demanded locations. Some solutions might come from distributing the charging events along the entire day and night-time.

	Parameter	Solution proposal
Subscription	A_i	
	b_i	
	kwh_{plan}	
	t_{plan}	
Tariff	$C_{i,j}^{cs}$	
	$T_{i,j}^f$	
	$m_{i,j}$	Set a reduced cost at night time to help distribute the charging events
	f_d	
	$n_{i,j}$	Set a reduced cost at night time to help distribute the charging events
	f_e	
	$p_{i,j}$	Reduce or eliminate parking costs at low-use times
	f_p	
	$T_{i,j}^{excess}(t, e)$	

Table 31. Proposal for high use charging points

- **High use of PHEV of the charging points.** Some areas ban PHEV from their charging points since these vehicles have the option to run using their thermal engine whereas BEV do not. In the case in which a charging network allows PHEV but prefers a low usage of these type of vehicles to keep the availability to BEV users some actions can be taken.

Despite some charging networks ban PHEV, in reality it is difficult to enforce misuse of CP's. Hence, these actions can be taken also to reduce the number of charging events to PHEV's.

	Parameter	Solution proposal
Subscription	A_i	Ban subscriptions to PHEV

	b_i	
	kwh_{plan}	
	t_{plan}	
Tariff	$C_{i,j}^{CS}$	Increase the booking cost for PHEV
	$T_{i,j}^f$	Increase the minimum charge to a threshold in which small PHEV batteries pay above the energy charged.
	$m_{i,j}$	
	f_d	
	$n_{i,j}$	
	f_e	
	$p_{i,j}$	
	f_p	
	$T_{i,j}^{excess}(t, e)$	

Table 32. Proposal to reduce number of PHEV in CP's

- **Short use** (short amount of time, little energy charged) **of the charging stations**. This could happen if PHEV charge at CP's. Also, misuse from BEV that for any reason remain short times at the charging stations.

	Parameter	Solution proposal
Subscription	A_i	
	b_i	
	kwh_{plan}	
	t_{plan}	
Tariff	$C_{i,j}^{CS}$	
	$T_{i,j}^f$	Set or increase the minimum charging to incentivise a better use of charging points.
	$m_{i,j}$	
	f_d	
	$n_{i,j}$	
	f_e	
	$p_{i,j}$	
	f_p	
	$T_{i,j}^{excess}(t, e)$	

Table 33. Proposal for short time use of CP's

- **Long use of slow chargers at car parks** (longer than required). Slow charging requires an amount of hours that can range from 8 to 12, but could be even higher for bigger batteries. In such cases, users leave vehicles for long time at car parks (or on-street if such a charger is located in a public space). Since long times are required, user can be tempted to leave their vehicles longer than required since these type of charges usually happen overnight. To reduce this situation, some actions can be taken.

	Parameter	Solution proposal
Subscription	A_i	
	b_i	
	kwh_{plan}	

	t_{plan}	
Tariff	$C_{i,j}^{cs}$	
	$T_{i,j}^f$	
	$m_{i,j}$	
	f_d	
	$n_{i,j}$	
	f_e	
	$p_{i,j}$	Apply a fee for the parking space after a reasonable amount of time
	f_p	
	$T_{i,j}^{excess}(t, e)$	Increase the charging costs after 10-12 hours (or different amount of time) of connection to the charging point.

Table 34. Proposal for long use of chargers

5 CONCLUSIONS

Deliverable 2.2 offers a general approach to define the accessibility requirements that should be considered by any company or authority when defining publicly accessible charging stations on one hand, and a vision of the opinions of several stakeholders regarding tariff structures and incentive schemes.

Regarding the accessibility requirements, not many countries or cities have a specific regulation on measures to be considered when defining public charging points. The fact that in many countries EV charging stations are still scarce and do not have a high use rate, this problem has not been systematically addressed. Despite that, several cities have considered accessibility situations and have incorporated in their public tenders' measures to ease the access to charging points. Most of these requirements consider space around the parking space, eliminating surface level differences between the charging point and the parking space, ensuring that the display is at a correct height and avoiding unreadable colours for colour blind people among the most relevant.

Regarding the incentive's schemes analysed in the Deliverable, the benchmark that was conducted concludes that most countries and cities apply factors to incentivise the purchase and use of EV's. These incentives are based mainly on purchase subsidies, on registration taxes, ownership tax, company tax and in some cases on a reduction of the VAT applied. Despite these are the general incentives mostly applied by states, some other measures have been taken by municipalities such as free kerbside parking, toll reduction or free access to limited traffic zones.

According to the outputs from the interviews and from the revised literature, making incentives available at the time of purchase, appear to be an effective solution to increase EV market share. The current financial incentives should not be removed in the short-term to keep encouraging potential buyers. Another crucial incentive for buyers is the availability of charging infrastructure. Governments should expand the scale of charging points to increase density as a key measure to incentivise EV's.

The incentives presented in this Deliverable can be used by project sites for the WP5 demonstrations. Some sites will participate at demonstration the impacts of incentives not only in the purchase of EV's but also in the use of public charging points.

Regarding tariff structures, in the analysed areas, these depend on several parameters such as subscriptions, type of chargers, average power, initial fees, location of the CP's, types of vehicles, time of the day in which the charging event takes place, minimum charges, and changes in tariffs according to certain thresholds. As has been documented, in some areas tariffs respond to a need to facilitate and incentivise users to charge instead of generating high revenues to make profit from it. There is a high diversity of opinions on whether energy should be charged per time or per kWh. In any case, most of the accessory tariff parameters that are included aside from the *real* charging tariff are made to incentivise the proper use of charging points. These stand for initial fees, minimum charges, charges for excess of time or energy and others such as differentiating the fee according to the time of the day.

As shown in the last section of the Deliverable, all possible tariff structures have been defined through a generalized formula. This formula and the recommendations made, allows any MSP or CPO to explore different options to overcome the issues that might be affecting their current CP management strategy. As many of the interviewed stakeholders mentioned, current tariffs do not provide sufficient revenues to make a positive business model, it is time to gain users and to offer a competitive service. The recommended actions are in line of overcoming problems and making the most of the current CP networks.

6 ANNEX 1 SURVEYS FOR THE ACCESSIBILITY REQUIREMENTS

6.1 Barcelona

1. How are parking spaces designed for people with special needs?

At this moment, there is not a special design for users with special needs. All car parks have a minimum ratio of special parking places of 1 every 33 regular parking spots. These special parking places are wider than the regular ones.

2. How do you decide where to provide parking spaces for people with different needs?

As mentioned in the previous question, all car parks are obliged to have a minimum of 1 special parking place every 33, so that any car park must comply with these regulations regardless of the location and the demand. For on-street parking, special parking places are set on demand of users aside from the right to park at the loading and unloading freight areas. Parking areas with chargers devoted to impaired people will be installed upon request of users.

3. Are the spaces that are equipped with electric charging station and that are reserved for people with special needs - exclusively for people with an electrical car or can people with thermal car park themselves?

At this moment, since there are no requests from users with special needs, there are no special parking places with a charger. At this moment, if all parking places with special needs were full, thermal vehicles would be allowed to park, but this is a non-existent situation at this moment.

4. How does the number of parking spaces that you provide for people with special needs compare to the number that should be provided for commuters, car sharing, etc.

1 out of 33 in car parks

5. Do you have any special regulations regarding the access to charging stations for people with other types of disabilities (colour-blind people, deaf collectives)?

The app and other information systems are designed with the requirements set by the Barcelona municipality. All colours (from the app and the signs) are designed to be read by anyone. The brightness, the colours, the contrast have been set to be readable to anyone. Also, no sound is used to guide users (neither the charging point, the signs or the app), hence deaf people would not be discriminated.

Aside from the answers, I would also like to point out that to increase accessibility to the on-street charging points, some measures have been implemented. First, the cables used to charge have been enlarged from 4 to 6 meters. Also, in order to prevent having part of this cable on the ground – which could cause accidents to pedestrians- retractable systems for the cable have been installed. Aside from that, charging points always have two parking places which are separated by certain distance in order to give more space for disabled people.



Figure 12. Charging point with a retractable cable with 6m length.

6.2 Grenoble

1. How are parking spaces designed for people with special needs?

While Luxembourg and Turkey have national regulations that define the design of parking spaces for people with special needs, there is no relevant regulation in Grenoble and Barcelona. For the moment, current charging stations are not designed for people with special needs. Nevertheless, in each future station containing several charging points to be installed late 2021 and early 2022, one parking space will be designed for people with limited mobility.

2. How do you decide where to provide parking spaces for people with different needs?

In stations where several charging points are installed, ie in particular in park and ride facilities.

3. Are the spaces that are equipped with electric charging station and that are reserved for people with special needs - exclusively for people with an electrical car or can people with thermal car park themselves?

Some spaces equipped with electric charging stations are designed for people with limited mobility, ie these spaces are accessible to those people but are not reserved to them. On the contrary, only electric cars (used by ordinary people or people with limited mobility) can use these spaces for charging (thermal cars are not allowed).

4. How does the number of parking spaces that you provide for people with special needs compare to the number that should be provided for commuters, car sharing, etc.

I'm not sure to understand the question.

The number of parking spaces adapted to people with limited mobility (for electric cars) will be much lower than the overall parking spaces in charging stations.

5. Do you have any special regulations regarding the access to charging stations for people with other types of disabilities (colour-blind people, deaf collectives)?

All new charging points to be installed have dimensions which allow to identify them from far away and to be accessible by people with limited mobility (the height of plugs is between 900 and 1300 mm). 2 LED indicator lights indicate their status (green: available; blue: charging; red: unavailable).

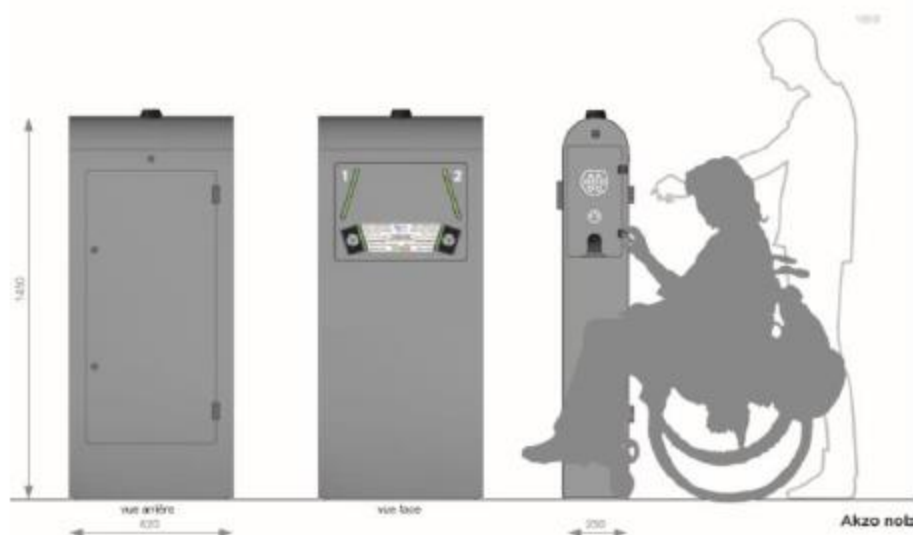




Figure 13. Images of the height needed for the display of CP for disabled people.

6.3 Luxembourg

1. How are parking spaces designed for people with special needs?

There is a national regulation from 2001 that describes the requirements for parking spaces designed for people with special needs, this legislation will be modified presumably by the end of this year.

Requirements (translated from the law):

(2) Parking spaces or parking places for disabled persons shall be at least 350 cm wide. They shall be marked on the ground and with a pictogram sign.

(3)

- Parking meters and ticket dispensers shall be placed in the direct vicinity of parking spaces or parking places for disabled persons.

- The controls of parking meters, ticket dispensers and automatic pay stations shall be installed at a height of not less than 85 cm and not more than 110 cm.

2. How do you decide where to provide parking spaces for people with different needs?

The before mentioned law:

(1) In the vicinity of entrances or exits to the places referred to in Article 1, at least 5 % of the parking or parking spaces shall be reserved for disabled persons for the first 100 spaces and at least one space for every additional 50 spaces.

3. Are the spaces that are equipped with electric charging station and that are reserved for people with special needs - exclusively for people with an electrical car or can people with thermal car park themselves?

All currently existing public charging stations in Luxembourg are not marked or reserved for people with impairments. On all existing parking spaces that have a charging point (not for people with special needs), thermal cars are not allowed to park.

4. How does the number of parking spaces that you provide for people with special needs compare to the number that should be provided for commuters, car sharing, etc.

See the same law.

(1) In the vicinity of entrances or exits to the places referred to in Article 1, at least 5 % of the parking or parking spaces shall be reserved for disabled persons for the first 100 spaces and at least one space for every additional 50 spaces.

5. Do you have any special regulations regarding the access to charging stations for people with other types of disabilities (colour-blind people, deaf collectives) ?

Such charging stations do not exist at this moment, nor does a regulation.

6.4 Zellik

1. How are parking spaces designed for people with special needs?

They are in a private domain and do not need to follow public rules. They were designed to according to standard practices for regular parking spots

2. How do you decide where to provide parking spaces for people with different needs?

I refer to my prior answer

3. Are the spaces that are equipped with electric charging station and that are reserved for people with special needs - exclusively for people with an electrical car or can people with thermal car park themselves?

I refer to my previous answer. Places will be reserved exclusively for EVs

4. How does the number of parking spaces that you provide for people with special needs compare to the number that should be provided for commuters, car sharing, etc.

I refer to my prior answer

5. Do you have any special regulations regarding the access to charging stations for people with other types of disabilities (colour-blind people, deaf collectives)?

No

6.5 Turkey

1. How are parking spaces designed for people with special needs?

According to current regulation, one out of every 20 parking spaces must be reserved for the disabled people by placing a disabled sign. These parking spaces are slightly larger than standard parking spaces. Arrangements for disabled parking spaces in on-street parking lots are made on the basis of traffic safety.

2. How do you decide where to provide parking spaces for people with different needs?

These parking spaces are located closest to the entrances, exits and elevators of the parking lots.

3. Are the spaces that are equipped with electric charging station and that are reserved for people with special needs - exclusively for people with an electrical car or can people with thermal car park themselves?

There is no parking space with EV charger which is only special for disabled people.

4. How does the number of parking spaces that you provide for people with special needs compare to the number that should be provided for commuters, car sharing, etc.

As I mentioned, according to current regulation, one out of every 20 parking spaces must be reserved for the disabled people in public buildings and general parking lots. Also, for the on-street parking lots, 1/30 parking space is reserved for disabled vehicles.

5. Do you have any special regulations regarding the access to charging stations for people with other types of disabilities (colour-blind people, deaf collectives)?

Unfortunately, answer is no for now. But with the increasing number of EVs and charging stations in near future, this kind of special regulations can be put in practice.

6.6 Greece

1. How are parking spaces designed for people with special needs?

Following the local regulations all the covered areas of the car service stations are equipped with ramps for persons with moving disabilities, in order to provide access to all the areas of the station. Finally, spaces for people with disabilities are reserved in some stations with specific marking and color.

2. How do you decide where to provide parking spaces for people with different needs?

No specific regulatory framework is established yet. Thus, the reserved parking spaces with people with disabilities are provided according to the company's plan taking into account the available space of each station and the specific local characteristics.

3. Are the spaces that are equipped with electric charging station and that are reserved for people with special needs - exclusively for people with an electrical car or can people with thermal car park themselves?

For now, as there is no regulatory framework and the EV penetration is still low in the market, the parking slots can also be used by people with moving disabilities using also thermal cars. Nevertheless, as the EV market is expected to grow in the next years, it is anticipated that those parking slots will be used only by EV users.

4. How does the number of parking spaces that you provide for people with special needs compare to the number that should be provided for commuters, car sharing, etc. ?

No parking spaces are provided for other special group of users.

5. Do you have any special regulations regarding the access to charging stations for people with other types of disabilities (colorblind people, deaf collectives) ?

No regulatory framework established for car charging points, regarding the access for people with other types of disabilities

7 ANNEX 2: TRANSCRIPTION OF THE INTERVIEWS

7.1 Barcelona

7.1.1 CPO

7.1.1.1 AEDIVE

Created in April 2010, AEDIVE is a non-profit Business Association for the Development and Promotion of Electric Mobility, a Group of Innovative Companies that brings together the entire electric vehicle value chain. Their purpose is the management, representation, defense and coordination of the common interests of their members in the sectors related to the entire Electric Mobility value chain.

- **What incentives apply in your city? What incentives do you offer?**

There are incentives such as scrapping per km in the Community of Madrid, to eliminate the private vehicle and give away a bonus of X km to use in the sharing companies.

Non-economic privileges or incentives such as traveling on a BUS lane should not be extended in the future because an increase in the electric mobile park could saturate the public transport network and that's not the idea. These incentives must be used as a Shuttle and have a temporality.

The Low Emission Zones will be applied in 149 municipalities where 80% of the population live, the model for using the ZBE will have to be defined. They should be large areas made up by crowns and not just the nutshell (the walnut of the city) and it should be a priority for VE and evaluate considering ECO. In this way, helping to generate an electric model must be assisted by public authorities and vehicle manufacturers.

Regardless of where you are located, you have to seek a homogenization of incentives by the state because we have differences between cities, provinces or communities. In this way, objectives must be aligned.

- **Do you think that the authorities should subsidize the installation of CAPEX charging points or the cost of OPEX (energy, maintenance, etc ...)?**

The CAPEX is high due to the equipment itself, but the higher cost is given by the connections to the distribution network because the implementation costs can be diverted. At a legal level, infrastructures of more than 250kW have been converted and promoted into roaming public charge. The RD only paid for power when used, and barriers were removed. The problem that exists is from the regulatory point where there are obstacles. Administrations must facilitate, they must not make investments

For OPEX there are fixed costs that do not depend on the user, around 30-40% in terms of power. And variable costs such as energy and customer service + parking costs in some cases.

- **Do you think a fee structure should favor any of the following statements?**

Regarding the final price of the user, it is said that the citizen must be educated with price signals and not with free services.

- **Fees that apply to recharging**

- a) **Recharge or minimum amount (if applicable, what does it include? For example, time, energy ...).**

Depending on the type of recharge, an opportunity charge must be more expensive than the linked one, the opportunity charge must be used to charge the necessary unlike the linked one.

KEY IDEAS:

The load reservation shouldn't be a necessary format for the opportunity load since the arrival time is theoretical, but not real, and this type of loads are used to load what is necessary quickly, therefore it must be reduced to the maximum the possibility of system saturation.

7.1.1.2 ETECNIC

ETECNIC mobility electric, S.R.L. is constituted in October 2015 in Tarragona with the function of developing and marketing a computer program own management of recharging points of electric vehicles, at the same time as self-branded recharging equipment is placed on the market and maintained and managed. To do this, a team of 3 computer engineers, 2 electrical engineers, 1 manager, 1 commercial, 1 director of marketing and strategy and an administrative is created. The programme developed should enable intelligent recharge management by managing electricity in two directions (from grid to vehicle and from vehicle to grid) by allowing vehicles to release or obtain energy from recharge points as needed at the time, allowing the management of recharges through mobile applications and placing the electric vehicle as the energy centre of houses and buildings, helping to save on electricity consumption and increasing the energy efficiency of buildings (increasing electricity consumption in hours with less grid consumption or in time zones where more electricity is generated from renewable sources).

- **What incentives apply in your city? What incentives do you offer?**

All incentives must be accompanied by a very strong communication campaign. The most important incentive with the MOVES plan is direct aid in the acquisition of the vehicle itself. He would like to see a reduction in VAT.

It is believed that all the advantages at the time of use are very diverse depending on their geolocation and for this reason it would be interesting to homogenize them with a communication campaign that reaches people.

For instance, a communication plan with a reduced VAT of 10% is very easy to understand.

- **Do you think that the authorities should subsidize the installation of CAPEX recharging points or the cost of OPEX (energy, maintenance, etc.)?**

Because of the high initial investment of a charging point, it should be subsidized in order to encourage its installation. The CAPEX includes the whole part of the project, bureaucracy, installation, network connection and project management. The CAPEX of the recharging point is divided by 50% the charger, 25% connection to the network and the rest belongs to the electrical installation and painting.

The best aid is the PIRVEC model where the governmental institutions subsidize the 100% of the CAPEX and it is destined to public companies or municipalities. It is a very targeted aid with a very clear intention to cover territory.

The subsidy of the operation will distort the market as it would feed the non-continuous improvement.

11% of people were using more than 3 public chargers regularly.

- **Do you think that with the rates that apply in your city, a private charging station operator can make a profit and therefore interest in settling there?**

Except for key locations such as major urban logistics areas, close to major city stations, or coastal areas with major tourist attractions, the business is totally in deficit. Today an electric line is no business. The interest they have in setting up is as a marketing strategy to be able to attract customers in 80% of their business which is the bound recharge.

- **As a CPO, do you own the recharge points, do you act in concession or not? CAPEX costs are covered?**

The recharging points they install are from a third party, either the city council or a private individual, and they act as managers through the contract of the ACM (Catalan Association of Municipalities and Counties).

ACM has been the key to success. Apart from targeted aid, the possibility for councils to make a purchase through a quick framework agreement, no longer just for loaders but also for vehicles. Through the ACM where a global tender is held where they have different lots of vehicles, lots of motorcycles, lots of police vehicles; all in a sustainable mobility format and also lots of recharging infrastructure (points, projects) and also their management. This prevents a contract that has been held for more than a year from having to be tendered.

- **Operating costs (ask if they are tangible costs or not): energy cost, term cost of energy, parking cost, recharge point depreciation, installation cost, preventive maintenance cost, corrective maintenance cost and space.**

The fixed term power acts as a brutal barrier, and to cross it, they linked the recharging point in a public lighting box that could give 63 A where during the daytime bands could give the full amperage as the lighting did not work and during the night limit the charger with a slow charge. The average cost of OPEX is € 1,100 per year per recharge point with 24/7 user management and Telecare included. When the market is more mature, it will be possible to make a dynamism in the rates and with the branches of artificial intelligence the application itself will suggest where and when to recharge. Today, almost every costs goes to the operating part, but at a time when the market is mature with high competitiveness, the operating part will reach 30% of the purchase price.

- **Rates that apply to the top-up.**

It is believed that a tariff structure should be designed according to its purpose:

- *Slow-loading or opportunity infrastructure should be charged by minute.*
- *En route charging, fast and super-fast charging network, should be charged by kWh.*

How can a private company access in a public location?

The legal part is that the company requests the transfer of a public space to carry out an economic activity and this should initiate a process of consultation by the city council in public to see if there are others interested. At the time when there are other interested parties you have to make a contest that can be of the duration that the city council wants by paying a fee or some project improvements make a decision of who is the best possible winner for that contest.

The optimal duration is 10 years, which is the fairest way to balance the process to minimize risk of errors in estimates or amortize equipment without subsidy.

7.1.1.3 GALP

GALP is an oil company that is currently betting on the transformation towards electro mobility. One of their main strengths is that they are not limited in the electro mobility business, but they bet on the coexistence of different forms of energy, as in the future could be the hydrogen.

- **What incentives apply in your city? What incentives do you offer?**

In Madrid, there are advantages such as being able to travel on the BUS/VAO lane, free parking, being able to move around the central Madrid area or being exempt from payment of road tax, despite the fact that the interviewee are complementary measures.

- **Do you think that the authorities should subsidize the installation of CAPEX recharging points or the cost of OPEX (energy, maintenance, etc.)?**

To be competitive in the market would require aid/subsidies to generate a competitive market in the context of supply-demand. It would be necessary to encourage the sale of the electric vehicle, since the great difference between the electric vehicle and the combustion vehicle lies in the price difference where most of the subsidies should go in order to increase demand.

At present, few citizens are considering the purchase of an electric vehicle unless they have a charging station at their place of work and residence. What would help encourage the purchase of the electric vehicle would be to have a powerful public electrical infrastructure.

Regarding whether the authorities should subsidize CAPEX or OPEX, the interviewee points out that it should be a mix of the two since, for example, in the case of a super-fast charging point, CAPEX is very important (€100,000).

With regard to OPEX, the whole structure of regulated costs (tolls) is too high leaving little room for operators and this has the opposite effect. Moreover, it is true that the decrease in the price of the term power has been a measure that has allowed operators to relieve themselves in the early stages of the implementation of recharging points, but once the volume of demand increases the high toll in terms of energy will make the business no longer competitive.

- **Do you think that with the rates that apply in your city, a private charging station operator can make a profit and therefore interest in settling there?**

Currently it does not make a profit, but basically the interest lies in positioning in the market in the future.

- **Do you think that a tariff structure should favour any of the following statements?**

- *Ensure availability of charging stations.*
- *Encourage the use of electric vehicles.*

- **Do you think that a tariff structure should allow users to fund the OPEX service?**

This should be the case in the future, but due to the low margin and tolls to be paid this does not happen.

- **As a CPO, do you own the recharge points, do you act in concession or not? CAPEX costs are covered?**

Currently, they do not have any operational charging points, but by 2030 they have an estimate of 10,000 points of super-fast charging. Currently it is considered that their recharging points are

located in their refuelling stations so that the ground would be theirs. At present, it is very difficult for the initial investment to be profitable, so qualitative gains are expected.

- **Operating result: Estimated return on investment period.**

Currently, the result for the year is negative.

- **If negative, how is the loss compensated?**

In all scenarios, losses would be offset by qualitative gains such as the relationship to an isolated restaurant.

- **Rates that apply to the top-up.**

Currently, as they do not have any operational charging points, they do not currently have an established tariff structure. But according to different scenarios contemplated in the Business Plan is contemplated to charge:

- *A price rate €/kWh.*
- *A fee of €/min to start charging when the vehicle recharge has been completed. This fee will be charged for parking to promote the rotation of vehicles in recharge.*

- **With regard to short-term investments, does it plan them on the basis of current revenues (rates)? What do you consider when planning a short-term investment?**

With reference to planned income, qualitative gains justifying short-term losses and they are taken into account in order to justify the investment.

- **With regard to medium- and long-term investments, what tariff and tariff (revenue) structure do you plan to have to plan these investments?**

For medium- and long-term investments are considered horizons of 10-15 years where the price of electricity is considered constant. In reference to the tariff structure different Business Plan have been made with different hypotheses such as hourly discrimination. With reference to planned income, qualitative gains justifying short-term losses and this gains are taken into account in order to justify the investment.

7.1.1.4 IBERDROLA

Iberdrola is a Spanish multinational electric utility company based in Bilbao, Spain. Iberdrola has a workforce of around 34,000 employees serving around 31.67 million customers. Subsidiaries include Scottish Power (United Kingdom) and a significant part of Avangrid (United States), amongst others. In 2013, the largest shareholder of the company was Qatar Investment Holding. Other significant shareholders included Norges Bank, Kutxabank and Bankia.

Iberdrola, a global energy company, is the second biggest producer of wind power after Ørsted (company) by revenue and market capitalisation. They are the world's third electricity utility by market capitalisation. They have subsidiaries in numerous countries, mainly in Spain, United Kingdom (Scottish Power), USA (AVANGRID), Brazil (Neoenergia), Mexico, Germany, Portugal, Italy and France.

- **What incentives apply in your city? What incentives do you offer?**

- *Vehicle manufacturer offering discounts or free refills (tesla).*

- *The parking offers recharging at a lower price or a lower parking fee to charge and promote the use of electric vehicles.*

Users appreciate advantages or incentives such as free movement, free parking and privileges in various services. The price range is not usually the main incentive factor today.

- **Do you think that the authorities should subsidize the installation of CAPEX charging points or the cost of OPEX (energy, maintenance, etc.)?**

If there is no more infrastructure, it is because some bureaucratic and management barriers persist in the projects that block the current investment drive. The willingness and financial capacity of Iberdrola is sufficient. The model that interests us the most are tenders because public space has legal treatment. We believe that the role of city councils is to facilitate public spaces and that of promoters is to manage the service. There is a fee in tenders for the use of public land.

Apart from that, it is true that companies appreciate public aid for investment in infrastructures because they improve the associated business plans that are long-term.

- **Do you think that with the rates that apply in your city, a private charging station operator can have a profit and therefore interest in settling there?**

Free competition is necessary for the development of the electric vehicle market. Charging points must be operated and managed exclusively by private operators. The role of public administrations must be a facilitator and promoter of the system, in this way free competition creates the best opportunities for end users.

It is difficult for MSPs without a network to be able to locate themselves in a market to compete with prices equal to the MSPs offered by a network and other services. (The ElectroMaps model for example) → Should have agreements with car manufacturers or invest in a network.

- **Do you think a fee structure should favour any of the following statements?**

- *Encourage the use of electric vehicles.*
- *Encourage charging during off-peak hours.*

Link rates to other services, from electricity rates to agreements and agreements with complementary companies such as Ecootra or Zity. Thus, reward loyalty. The role of the MsP is to leverage its diversified business to have a strong fee structure, attractive to users.

- **Do you think that a tariff structure should allow users to finance the OPEX service?**

We could even reach a flat rate would be proposed, to centralize all consumption, from domestic to vehicle charge with a fixed monthly price.

- **Do you think that participation in smart charging experiments should be encouraged through financial incentives?**

There are solutions, such as Wallbox Quasar, that allow bidirectional uploads. The vehicle could be used as a battery and supplied to the home (Vehicle -to-home). In addition, to also injecting into the distribution network itself, logistically this is possible but there are no regulations that currently regulate it (Vehicle -to- grid).

- **As a CPO, do you own the charging points, do you act in concession or not? that is, are the CAPEX costs covered?**

Our bet and vision is long-term. We invest in infrastructure and recharging solutions to promote the electrification of transport and we propose the integration of these services with other solutions in homes and companies to advance and thus achieve the great objectives of decarbonisation and efficiency through electrification with renewable energies.

- **What is the cost most striking? What is the fastest changing cost? What is the most difficult cost on which to anticipate the evolutions?**

It would be interesting, and we are asking for it, that the costs of connections and network extension were recognized costs for the regulated system. That these costs were assumed by the distributors can be a good way to reduce the investment associated with the infrastructure. As an investment, only the costs of connection, installation and operation would be assumed.

- **Operating income: Do you sell through tariffs or do you have subsidies or other sources of income?**

Service revenue comes from prices paid by customers.

- **Export result: Estimate of return on investment period.**

The return period is around 10 years.

- **If negative, how is the loss compensated?**

It is important to have a long-term overview of the entire infrastructure. There are points with a lot of use and others with less. And the use of public infrastructure is increasing as the number of vehicles increases.

- **Rates that apply to recharging.**

Currently our rates are for supplied energy and the rate is differentiated in alternating recharging (normal recharging) and continuous recharging (fast or ultra-fast recharging).

The trend is to apply flat rates or integrated rates with other solutions and services and consumption such as domestic and vehicle charging at home and outside it, solar self-consumption or energy management.

- **If you manage points on the road, how is parking regulated? Is the property owned by the company or is it under concession?**

The public land acts by tender, therefore, an annual fee will be paid to get a performance from that square. The recharge manager manages the recharge service. The City Council must regulate the time and parking fee.

- **Regarding short-term investments, do you plan them considering current income (fees)? What do you consider when planning a short-term investment?**

The answer in "As a CPO, do you own the charging points, do you act in concession or not? that is, are the CAPEX costs covered?" applies.

KEY IDEAS

Our policy is to work together and actively collaborate with EV manufacturers, with agreements that make the offer of electric mobility more attractive to users.

7.1.1.5 SABA

Saba is a leading industrial operator in the development of solutions in the field of urban mobility, specializing in the management of car parks. The company operates with an industrial vision in all areas of the car park sector and has excellent locations, the result of a policy of selective growth to ensure the highest standards of quality, innovation and experience. All this under the guiding axis of customer service as a central pillar, the differentiating factor of Saba.

- **Do you think that with the rates that apply in your city, a private charging station operator can make a profit and therefore interest in settling there?**

Apparently with the current rate and low existing demand, the business is currently in deficit. Tariffs could be maintained as long as energy sales exceed a threshold that would cover both OPEX and CAPEX costs. Current demand is a long way from that.

It is believed that fast recharging points, although both direct and investment costs are higher, can be amortized faster because the supply and quantity is larger.

OBJECTIVE: to reach a neutral point.

- **As a CPO, do you own the recharge points, do you act in concession or not? CAPEX costs are covered?**

They own 100% of all the recharging points and have chosen ENDESA to carry out the operation.

- **What is the most impressive cost? What is the fastest changing cost? What is the most difficult cost on which to anticipate the evolutions?**

The agreement they have with ENDESA, 24/7 customer service is derived from an ENDESA customer service centre and the cost of maintenance and interventions as well.

In terms of costs, the most sensitive are those related to energy, both the term power and the term variable energy. Before the new tariff change decree came out, the term that most penalized was the power term, they had it more or less resolved as the infrastructure was connected to the car park's electric connection, it was limited as they could only connect few points and limits growth.

From now on, their entire project and if the CTE of 2.5 - 5% of places has to be met, they will have to go to independent connections where the estimated CAPEX should be multiplied by 1.3. Currently, the power term is lower but with very different hourly rates where daytime hours are penalized a lot (where most customers use). They currently prioritize the simplicity of tariffs as the market does not mature in the face of losing due to the type of electricity tariff.

- **Operating income: Do you sell through tariffs or do you have subsidies or other sources of income?**

Only from the sale through rates.

- **Result of the exploitation: Estimation of the return on investment period.**

The aim is to neutralize the investment that state aid has helped you with regard to CAPEX and the fact that OPEX is managed by ENDESA means that the losses are not currently exorbitant.

Objective 2030: greater volume of places where a very high investment will have to be made (new commitment, ...) where they want to expect to have enough demand to cover the expenses and the CAPEX.

- **Fees that apply to recharging.**

- 0.30 €/kWh: For preferred customers such as large fleets.
- 0.35 €/kWh: For SABA or ENDESA customers. Payment on the house light bill.
- 0.45 €/kWh: For foreigners. Payment in VISA.

- **With regard to medium- and long-term investments, what tariff and tariff (revenue) structure do you plan to have to plan these investments?**

The rate between 0.40-0.50 € is in this environment and understanding that everyone has a similar profitability to theirs, their projections go through two concepts:

- *Vehicle upgrades and loading are performed at a higher speed. Expected to charge at 5-6 kWh on a 5-8 years horizon view. In car parks it is equivalent to the length of stay.*
- *The number of refills per recharge point will be higher (higher demand). Currently, the average is 0.5 hours a day and so that they have no losses, it should be around 4 hours a day.*

KEY INFORMATION

- *Important issue in the management of points. When there is a high demand it should be think how "forces" a customer who has finished recharging to move the vehicle. In principle, the solution would be with penalties. The main handicap will be during the night.*
- *Urban mobility business where most customers are rotating. They very clearly fragment the market according to their needs:*
 - ✓ *SUBSCRIBER: car permanently. Slow charger has its demand met by replacing the home charger.*
 - ✓ *ROTATION: more costs to assess the penetration of your services. Semi-fast chargers. Up to 22 kW. Average stay between 2-3 hours. Ideal time to provide the service.*
 - ✓ *FAST CHARGING: Replacement of a fast charger on the road. Market are stays of 30 minutes, example: Taxi driver or breakfast.*

SABA-ENDESA RELATIONSHIP

The recharging infrastructure is from SABA (100% of CAPEX). They held a competition to find a company that operated with maximum rates and trade agreements to favour our customers, for example fleets.

ENDESA can be with them for a long time or little, they do not close the doors in the future to be themselves who manage their own points. They have opted for this formula that allows them to promote this product through ENDESA.

7.1.2 Authorities

7.1.2.1 Madrid authority

Juan Azcárate is the deputy director general of energy and climate change of the Madrid city council. Currently, there are 59 charging points in Madrid that respond to various public / private management schemes. In most of them, they are private entities that manage operating expenses, although the EMT (a public company that belongs to the city council) operates 7 public access fast charging points.

- **What incentives apply in your city? What incentives do you offer?**

TARIFF

- *Parking of a zero-emission vehicle is exempt from any fee and bureaucracy in the regulated parking service.*
- *Exemption of the mechanical traction tax (fiscal advantage)*

NON-TARIFF

- *Free access in restricted areas, for instance, Madrid city centre.*

- **Do you think that the authorities should subsidize the installation of CAPEX charging points or the cost of OPEX (energy, maintenance, etc.)?**

All the formulas have been contemplated, whether they are totally public charging points or through concessions or collaboration agreements with a partial or total subsidy of CAPEX. Currently in Madrid, there are the following structures:

- **100% Public:** CAPEX in charge of the city council.
- **Cession of the operation:** CAPEX is supported by the city council.
- **Collaboration agreement:** The city council assigns the recharging equipment and the installation cost to the private sector.

- **Do you think that with the rates that apply in your city, a private charging station operator can have a profit and therefore interest in settling there?**

All the managing operators of the recharging points have assumed the losses that it entails. Despite this, they are interested in settling in to take advantage of the market gap in electro mobility.

- **Do you think a fee structure should favour any of the following statements?**

- *Encourage the use of electric vehicles*

- **Operating costs (identify whether they are tangible costs or not): energy cost, energy term cost, parking cost, charge point depreciation, installation cost, preventive maintenance cost, corrective maintenance cost and space.**

- *Energy term cost: Tangible in non-isolated places, such as gas stations or supermarkets.*

- **What is the most impressive cost? What is the fastest changing cost? What is the most difficult cost on which to anticipate the evolutions?**

In reference to costs, the power term was highlighted, which in isolated structures can entail a significant extra cost, install a new connection, etc. Another important cost is corrective maintenance due to vandalism or poor installation care.

- **If they do not manage directly, but have given space in concession on the road to be exploited as a recharging point:**

- **Conditions of the assignment. How many years?**

4 years. Try to extend it to 8 years, which is when the equipment has a zero residual cost.

- **Can it influence the rates that the charging point administrator will apply?**

KWh ceiling rate.

KEY IDEAS

There are four types of points of more than 50 Kw according management scheme:

- **Public 100%** where CAPEX is in charge of the city council (environmental area) and OPEX is carried out by the EMT. Example: a hub with 4 chargers located in Plaza Colón.
- **Those in which the exploitation is transferred.** This group is made up of 24 charging points, 12 are managed by REPSOL and 12 by GIC. In this typology, CAPEX is borne by the city council and OPEX is borne by the service management company. The assignment formula is carried out through a collaboration agreement.
- **Charging points cooperation agreements.** In this formula, all those who want and have the ownership of a public access land are presented and the city council decides to whom it is given by geolocation and certain quality criteria. The council is in charge of part of the CAPEX (transfer of the recharging equipment) but the installation (CAPEX) and the OPEX are the responsibility of the land owner. These cooperation agreements have a duration of 4 years from when the point is operational. Perhaps, this is a weakness and for this reason we want to try to extend it to 8 years, which is when the equipment has a residual cost of 0. This formula allows the council to maintain ownership of the recharging point.
- **Private** where both CAPEX and OPEX are borne by the company or individual who owns the facility.

In reference to costs, the power term was highlighted, which in isolated structures can entail a significant extra cost, install a new connection, etc. Another important cost is corrective maintenance due to vandalism or poor installation care.

In addition, one of the weaknesses that exist in Madrid is the non-unification of charging point applications. As an idea, Mr. Azcarate proposed that payment at the recharging points can be made by credit card, exemplifying it with the London Underground where you can enter it directly by passing the card applying the most beneficial rate for each individual.

7.1.2.2 Málaga authority

Alfonso Palacios Carrasco works in the area of Urban Innovation and Digitization at Malaga City Council.

- **What incentives apply in your city? What incentives do you offer?**

- *Discount on road tax*
- *Specific places in the city for VE*
- *First 45min in free underground parking*
- *Regulated surface parking is free except those that are 30 minutes*
- *Access to the downtown area without restrictions*

- **Do you think that the authorities should subsidize the installation of CAPEX recharging points or the cost of OPEX (energy, maintenance, etc.)?**

The interviewee believes that the city council should not be the manager of direct charging points, but rather a regulator. It is carried out under tender and concessions of 5 years are granted with the possibility of another 5 years.

- **Do you think that with the rates that apply in your city, a private charging station operator can make a profit and therefore interest in settling there?**

The on-street charging points are focused on the visitor or rental vehicles, since they are also fast charging points.

- **Do you think that a tariff structure should allow users to finance the OPEX service?**

It is up to the managers to profit from their concession.

- **What is your policy regarding the development of electric vehicles: is it an incentive or “wait and see”?**

The investment that was made in Malaga was large, 60 million euros. A continuity in public policies must be followed to be able to monitor evolution.

- **If they do not manage directly, but have given concession space on the road to be exploited as a recharging point:**

- **Conditions of the assignment. How many years?**

5+5 years.

- **Can you influence the rates that the charging point administrator will apply?**

Depends on CPO.

- **Are there any and, if so, what are the current measures in place to impose penalties for occupying parking spaces dedicated to charge?**

Currently, it can only be supervised on-site by the police. There must be a mechanical team. The closest measure will be to install signs that control the parking / charging time but it cannot be the final solution.

- **What are the main obstacles you face in imposing these measures?**

By handing over management to the CPO, data and information are lost in order to carry out a more exhaustive regulation and control.

- **Are there any and, if so, what are the measures you have to ensure that the electric vehicle does not stay longer than necessary?**

They do not currently exist.

- **What are the obstacles related to that?**

Assigning the concession to the CPO obliges you to negotiate the transfer of information with them.

- **In case you experience difficulties related to the above questions, what / who, in your opinion, could help you address these issues?**

Development of Smart Cities with complete monitoring of recharges from a control centre.

- **As for short-term investments, do you plan them considering current income (fees)? What do you consider when planning a short-term investment?**

Currently, Next Generation or European funds have always been used to promote EV in Malaga, it is possible that it will continue to be done.

7.1.3 OEM

7.1.3.1 Circutor – Circontrol

Company born in 1997, with half of its turnover coming from sales abroad, whose presence exceeds 50 countries. With two business activities: Mobility (global solutions for efficient parking) and eMobility (charging solutions for electric vehicles). In the most recent year for which data were available, based on the entire volume of charging points sold, 53% were less than 7 kW, 37% were points between 8 and 22 kW, 7% belonged to the ranged from 30 to 50 kW and the rest were over 50 kW.

- **What incentives apply in your city? What incentives do you offer?**

Mr. Hinojo states that the most important thing are the subsidies from the state to equate the cost of both types of vehicle (electric and combustion) and subsidizing at the same time to install the charging infrastructure.

The incentives do not always come from the government but for example in Dubai they are the own brands of high end cars, there is an infrastructure of chargers in hotels where you can recharge for free and certain bonuses in them.

In general, most of the measures that are currently being applied will be temporary, such as the permit to travel on the bus lane, as when a large volume of vehicles can be reached and can no longer be an advantage.

As for companies, certain municipal tenders give you a higher score depending on the degree of electrification of your fleet and therefore you are more likely to win it. This is in addition to the fact that electric fleets are becoming profitable if they are recharged at valley rates (which can be 10 times lower than the peak rate) as in the case of Amazon.

Other non-monetary benefits would be low cost or even free parking or parking in prime locations such as the port of Bergen, Norway.

It is noteworthy that for a certain sector of society the social prestige of the ecological movement and many of the rewards received for having an electric vehicle, can offset the extra cost it has with respect to the combustion vehicle.

Finally, one of the biggest incentives that can exist when buying an electric vehicle is the existence of a powerful ultra-fast charging infrastructure.

- **How are you conditioned by the rates that can be applied to charging events when designing charging points at the cost level?**

50 kW charger, must pay per kW, per kWh and per time. It's not the same as a 50 kW car arriving as a 150 kW one because you have stress on the net. And a fourth, a high fine for the use of the recharging point when it exceeds 30 minutes when 80% of the battery is charged or when the time that the user has previously set has elapsed.

- **Do you customize the charging points according to the country to which you sell? If it does, how does it do it?**

BILLING PER KWH REALLY CHARGED CONTINUOUSLY

In Germany is already established "ichreich" is a standard they have made (PTB standard) that they already have the 50 kW in the approval phase and is a cloud that really pays what you have recharged and have a cybersecurity protocol which it does not allow counter manipulation by anyone. It also allows the user to consult online what they have recharged and verify that the amount charged is actually the real one.

In terms of CPO, losses are 5% (in AC) thanks to resonant wave technology.

- **Regarding medium and long-term investments, what rate structure and rates (income) do you plan to have to plan these investments?**

INVESTMENT AT 10 YEARS

Slower loading CAPEX lower than OPEX. It is now starting to be profitable where the payback period is estimated at 3 years where the 4th should already have a positive income statement.

Infinite CAPEX superfast load with respect to OPEX where it must be used as a customer collector for a main business so that it makes sense to make this investment

The problem for the 50 kW chargers in Spain basically lies in the high power term where with subsidies of 30% it is very difficult to pay it off and without it, it makes no sense to talk about payback.

Recharging stations with 2 chargers of 350 kW and 4 of 175 kW with the transformation centre plus all the necessary infrastructure, the CAPEX climbs to € 300,000 without taking into account the land where to carry out the installation. If it were a 2 MW power plant, the investment would reach € 500,000. Currently, this investment will have to be repaid through an attached business, such as attracting customers to a restaurant.

ENCOURAGE THE INSTALLATION OF CHARGING POINTS ON PUBLIC ROADS

To encourage the installation of recharging points, administrations could apply the one-stop shop, that is, to facilitate all the bureaucracy that exists behind each of the recharging points. Other than that, according to Mr. Hinojo the term power will be eliminated as it is unsustainable but the real problem that the administrations have at the time of eliminating it are all the canons derived from transmitting the current that come from past times. It should be noted that without affecting CAPEX, energy costs are rising to € 0.50 / kWh.

DECARBONIZATION OF EUROPE

If Europe wants to go from 35% to 72% of ER in a period of time, the tax system must be rethought when we have 72%, the current 100 will be different from the 100 of 72.

Electric cars and smart charging are currently needed, but in the future of B2G, and those that generate electricity through renewable energy will have to be encouraged. In the future, it does not matter whether the electricity will be used for domestic use or for recharging electric vehicles, but the tax system must go directly to replace the collection of oil taxes.

If Europe wants to decarbonise, the cost is an ultra-fast charging infrastructure without which the electric car cannot exist. Little is known about it today, but a key idea in promoting the electric vehicle is the roaming referred to at charging points that will facilitate cross-border travel across Europe. In conclusion,

one of the best incentives to buy an electric vehicle lies in the infrastructure, a single app or card to be able to recharge the vehicle wherever you want.

7.1.3.2 Power electronics

Power Electronics is a Spanish multinational with more than 3,000 employees and a presence in more than 50 countries, a leader in power electronics that focuses its activity on developing energy for a sustainable world.

Its commitment to the environment, together with its firm vocation of service and development in R&D make it a leader in the change from fossil to renewable energies with its four divisions; solar, storage, industrial and electric mobility, where it currently develops products for charging infrastructures for all types of electric vehicles.

- **Do you think that the authorities should subsidize the installation of CAPEX charging points or the cost of OPEX (energy, maintenance, etc.)?**

From the point of view of the CPO, it is necessary to regulate the price of recharging since, except for the large electricity companies, it is not very profitable. For this reason, it is convenient to play with the price of energy or subsidize part of the OPEX.

According to Power electronic, for the electric car to be attractive, the price of energy should not exceed € 0.25 / kWh.

- **Do you think that with the rates that apply in your city, a private charging station operator can have a profit and therefore interest in settling there?**

The market has to be regulated. In order to have a profitable business, the operators/charge managers business have to sell the recharge between € 0.50 - € 0.80 / kWh, this causes it to be equal to the price of the thermal vehicle and it does not have sense the electric vehicle.

The final price of the energy of an eMsP is very high due to the fact that they have to pay OPEX, CAPEX, terms of power, bidding of land and get profit.

The kit of the question falls on capillarity, it is not the same to sell to two clients than many since the price will be very high and it will not be competitive.

- **Do you think a fee structure should favour any of the following statements?**

- *Guarantee the availability of charging stations.*
- *Incentivize charging during off-peak hours.*

- **Do you think that a tariff structure should allow users to finance the OPEX service?**

A penalty system must be set up so that when a customer finishes recharging, they free the charger for future customers. For this purpose, they believe that it should be paid by space occupation and time and not by kWh. Society would accept it better because paying for parking is integrated in it. The price of parking would be increased and it would cause the charging point to be released once it is finished.

Its customers are charging at a flat rate price of € 0.30-0.40 / kWh and are now considering penalizing the occupation of the square.

- **How is it conditioned by the rates that can be applied to charging events when designing charging points at the cost level?**

It is totally dependent, but in general the battery pack is standard and if they ask for some specificity they can do it. Regarding the configuration of sale prices, it is carried out by the charge managers themselves from the back office.

They also offer the possibility of obtaining energy from the plug through renewables and having storage. It is an option that is gaining momentum since there are operators such as gas stations that want to install a 100 kW point and the contracted power is for auxiliary services (25-30 kW). In order to achieve his objective, this client must choose this option. In addition, when the network is demanded (many vehicles are going to load) this system protects the network itself.

- **Do you customize the charging points according to the country to which you sell? If it does, how does it do it?**

The company's main market is currently the United States. At the level of personalization there is no difference, but it does have to comply with regulations. Throughout America they work with a different voltage range and the approval is carried out with the UL standard and in the rest of the world with the IEC. The main difference lies in the plugs.

- **What percentage of points sold includes means of payment integrated into the infrastructure?**

They can include it using a pedestal next to a POS system. They use it to unify different charging points with a single payment point. But currently it is not very common.

TECHNICAL NOTES

Solution to the problem of when a vehicle is connected in AC and does not allow you to connect in DC. This must happen due to the contracted power limitation. The solution would be to install a rack of batteries that would be charged overnight from the same charging point and there you would have the 54 kW that two users could charge simultaneously at any given time.

INVESTMENTS

Currently, their clients make staggered investments, where they look for spaces that are large enough and with enough available energy to do business in the future. They offer them a flexible structure that as demand increases, they offer them a greater number of posts and hoses.

7.1.3.3 SEAT

SEAT S.A. is a Spanish car manufacturer, which sells its vehicles under the SEAT and Cupra brands. It was founded on 9 May 1950, by the Instituto Nacional de Industria (INI), a Spanish state-owned industrial holding company. It quickly became the largest supplier of cars in Spain. In 1986, after 36 years being publicly listed as an independent automaker, the Spanish government sold SEAT to the Volkswagen Group of which it remains a wholly owned subsidiary.

The headquarters of SEAT S.A. are located at the company's industrial complex in Martorell near Barcelona. In 2020, annual production was above the 468,000 units, with more than 427,000 cars sold in just one year, exported to over 75 countries worldwide.

- **What incentives apply in your city? What incentives do you offer?**

In the following order of priority, the electric vehicle is powered by:

1. *The pure subsidy of the electric vehicle has worked around Europe to launch and promote its use. It can be seen how the countries where the strategies outlined have followed a regular and sustained trend over time are the ones that currently have the most penetration of electric vehicles in their mobile fleet.*
2. *Access permits to low emission zones.*
3. *Parking rate discounts, tolls.*

The cost of recharging does not change the user's expectations at all, but they expect enough sufficient charging infrastructure. Once you buy a vehicle at an interesting price, you hope that in the long run the costs of recharging will fall over time.

- **Do you think that the authorities should subsidize the installation of CAPEX charging points or the cost of OPEX?**

We have subsidies for vehicles purchase, linked charging point, the point of discussion is how to finance the CAPEX of fast and ultra-fast charging. Where the actors should be the electricity company, the European commission, governments and even manufacturers. These costs have to be profitable and right now they are not, that is why a boost is needed from the European Commission such as the ERDF funds.

There must be a commitment from Europe to create and benefit infrastructure to grow, this investment cannot come entirely privately. Short-term profitability does not currently exist. Investment from Europe must come from both vehicle manufacturers and infrastructure.

- **Do you think that with the rates that apply in your city, a private charging station operator can have a profit and therefore interest in settling there? (to increase competition)**

The incentives that promote the installation of a private charge operator is that when the full implementation of the EV is real, these operators will have great benefits as now the gas stations.

The cost associated with fast charging has to be profitable, therefore optimizing the charges is necessary.

Few stakeholders can currently bet on a long race, but whoever has sufficient funds or necessary aid will be able to win the race and stay in the market.

- **Do you think a fee structure should favor any of the following statements?**

The strategy depends on the type of recharge and location.

The fast recharge will be by minutes. With a price of convenience that you are willing to pay, although this is not a typical charging model.

The linked point at home should be done by fees or at night as this is slow. This charging model is the one that should be used most of the time.

Half-linked models, such as car parks, a subscription could be defined with a minimum of kWh during a determined period of flat rate.

Seat MO, the motorcycle with removable and interchangeable battery, works as a Premium lease where there is an additional flat rate plus with battery swapping once a week and a fixed cost per battery change (€ 5).

- *Guarantee the availability of charging stations*
- *It favors users who use charging points the most*
- *Change the behavior of drivers*
- *Encourage the use of electric vehicles*
- *Encourage charging during off-peak hours*
- *Maximize revenue (business opportunities)*

- **Do you think that a tariff structure should allow users to finance the OPEX service?**

It depends on the supply and demand model that exists, there will be models such as the Seat that includes a scooter, motorcycle and car in the form of a direct offer of urban mobility and others such as those of the marketers that will simply offer price packs in which the expenses are included of the house and the private vehicle.

There is room for everyone, and there must be an interoperability fabric across the country. In this way, the agreements between the firms will be able to work and generate the best opportunities for the end customer.

- **Do you think that participation in smart charging experiments should be encouraged through financial incentives?**

The agreements with CPO in the case of manufacturers like us maintain an interesting offer for the client, these for their part must participate in some way in a platform similar to Roaming, where technologies such as Plug & Charge have a place, and improve this service.

Solutions such as Vehicle-to-grid or Smart Charging, if they have an economic incentive behind them, they will work. In the case of vehicle-to-grid, it is not so advanced and in Spain it is not currently possible, only vehicle-to-home.

- **How is it conditioned by the rates that can be applied to charging events when designing charging points at the cost level?**

Once the agreements are established, the free market would define the packages of offers that each one takes. Trade agreements must be facilitated and interoperability in the country is needed.

7.1.4 Users

7.1.4.1 AUVE

The Association of Users of Electric Vehicles or AUVE, is a national non-profit association made up of users and those interested in electric vehicles. This association was born out of the need to promote electric mobility through public charging infrastructure and government incentives.

- **What incentives apply in your city? What incentives do you offer?**

Recharge should be paid, but close to the cost price, without exceeding the price of the gasoline or the diesel. Municipalities and public services should take advantage of public funding to lower this price and place in the lower-middle range of prices.

The location of charging points on roads is necessary, in addition, they should be fast of more than 100 Kw focusing on the charging time according to the vehicle's load and check that the slow-charging vehicle does not use a fast charger.

Charging points are necessary, both in parking and on the street, so that potential users lose the fear to purchase an electric vehicle.

- **Do you think that the authorities should subsidize the installation of CAPEX recharging points or the cost of OPEX (energy, maintenance, etc.)?**

The Administration is the guarantor of people's health, therefore, it should encourage electric charging and promote the use of electric vehicles. The lack of a network is a determining factor in buying a vehicle. Reliable agreements should be sought on the maintenance of charging points, municipalities with private companies or private users in order to have the monitoring of the points and thus they can always be operational.

- **Do you think that with the rates that apply in your city, a private charging station operator can make a profit and therefore interest in settling there? (to increase competition)**

The interviewee thinks it is in deficit, but at the business level there are large companies that are investing a lot of money in this since they know that this is the future, it is difficult for the small businessman to face the bureaucratic obstacles of the public administration.

- **Do you think a fee structure should favour any of the following statements?**

Ensuring the availability of charging stations is key, it is mandatory to find a formula so that only the user who needs it can charge for as long as it takes. Thus, the rate structure must affect the behaviour of the driver, seeking a balance between the price of electricity and power. In addition, avoid that cars with lower power can make use of high-powered chargers and thus prevent possible saturation or misuse of the system.

Moreover, off-peak hours should be encouraged.

- **Do you agree that public authorities should subsidize the cost of setting up charging points in addition to energy?**

Yes, they should.

- **What improvements to the rate structure would you suggest to meet your needs?**

The rate structure should be similar to that of tolls, charge based on use. With a minimum base rate to incentivize the user and increase it depending on whether he demands more energy.

Payment facilities even more if they are large consumers.

The surface cargo prices are higher and the interviewee agrees on that. Charging inside a car park should be at cost price, avoiding double business that drives away potential customers.

There is no direct relationship between the price and the amount of load, low power vehicles (3-4 kW) are penalized compared to those capable of charging at high power (50 kW).

- **Do you think there are incentives for the use of public charging stations?**

Working with the public administration should be necessary to lower prices.

KEY IDEAS:

There are many charging points that are damaged and some for a long time.

7.2 Grenoble-Alpes Métropole

7.2.1 CPO and MSP

7.2.1.1 Territoire d'Energie 38 (TE 38)

The networks are the property of the local authorities. To help them cope with the administrative and technical complexity of public energy distribution and to ensure the conservation and enhancement of this heritage, TE38 was created in 1994. It gradually broadened its areas of intervention and became the organizing authority for public electricity and gas distribution services for its member municipalities. Today, TE38 brings together 457 municipalities, 12 inter-municipal cooperation establishments, including the Department. In 2018, TE 38 inaugurates "eborn", the charging network for electric cars in Isère, comprising today 131 terminals. The interviewee is Julien Clot-Goudart, Head of Department Energy Transition (Chef de Service Transition Energétique).

- **What incentives apply in your city? What incentives do you offer?**

There is no incentive applied currently. However, an experimentation has taken place for 6 months in a city of the territory: parking was free in the whole city for users of the charging station. Other idea: free charge punctually, for example on mobility day.

- **Do you think that the authorities should subsidize the installation of CAPEX charging points or the cost of OPEX (energy, maintenance, etc ...)?**

Subsidies already exist: reduction rates on electrical connection to connect charging stations, and national financial aids (ADVENIR) to finance charging stations.

However, subscription to electricity supply is very expensive and sinks the economy of the system: a multi-sites subscription with a cumulated power on many charging stations would be very interesting.

- **Do you think that with the rates that apply in your city, a private charging station operator can have profit and therefore interest in settling there?**

Probably yes, private charging station operators could have interest if they install 50 or 100 kW stations. Private offer visibility is diffuse but there is much to do.

- **Do you think a fee structure should favor any of the following statements?**

- *Guarantee the availability of charging stations: availability of charging stations is very important, independently from tariff structure*
- *Favor the users that most use charging points: users who cannot charge at home or on their company site could benefit from special fee*
- *Change the behaviour of drivers: linked to the statement below*
- *Incentivize the use of EV's: the tariff structure should make EV less expensive than a conventional car*

- **Do you think that a tariff structure should allow to finance OPEX service by users?**

Users should not cover completely OPEX service: other means, like advertisement, could be used.

- **Do you think participation in smart charging experimentations should be encouraged through tariff incentives?**

Yes. An experimentation with photovoltaics shade structure is taken place in Hautes Alpes province.

7.2.2 Authorities

7.2.2.1 Bordeaux metropole authority

History:

- 2015: The City of Bordeaux sets up fast charging stations (40 kw).
- 2016: The Metropolis takes the competence for electric mobility and takes over the management of fast charging stations and shows the desire to set a network in the territory and the generators of flows.
- 2020: recovery of the 170 slow charging points (3 kw) of the BluCub service which will be retrofitted by the Boloré company.
- Since March 2021, the Métropole de Bordeaux has been implementing its strategy with this recovered heritage to which are added the 235 charging stations (7 kw) in public car parks (including park and ride facilities).

The interviewees are Pierre Brebinaud, Responsible for the parking mission, new uses of the automobile and logistics, and Thibaut Baladon, urban logistics and electric mobility project manager.

- **What incentives apply in your city? What incentives do you offer?**

- *The public parking management offers a subscription at - 50% for clean vehicles.*
- *The City of Bordeaux offers clean vehicles 1h30 of free parking but communicates very little about this incentive.*

- **Do you think that the authorities should subsidize the installation of CAPEX charging points or the cost of OPEX (energy, maintenance, etc.)?**

In Bordeaux, legal reading interprets the recharging service for electric vehicles as a SPIC. As such, the service should be financially covered by user revenues, operation and investment included. Discussions are currently focused on what the revenue should cover: operation, investment, depreciation, HR resources in charge of the service (2 FTE), etc.

However, given the nascent nature of this mode of motorization and the political support for its development, it seems logical that the local authority itself makes investments to launch the service and allow the transition.

- **Do you think that with the rates that apply in your city, a private charging station operator can have a profit and therefore interest in settling there? (to increase competition)**

Ultimately, a private offer could replace the public service. The public authorities may be responsible for continuing to network the territory. Today, the challenge for local authorities is to support the private sector to equip themselves, a bit like what happens in the energy renovation of buildings.

- **Do you think a fee structure should favour any of the following statements?**

- *Guarantee the availability of charging stations: yes*
- *Favor the users that most use charging points: not for the moment*
- *Change the behaviour of drivers: indirectly yes*

- *Incentivize the use of EV's: yes*
- *Incentivize charging during off-peak hours: yes, through night tariff*
- *Maximize income (business opportunities): yes*
- **Do you think that a tariff structure should allow to finance OPEX service by users?**
Yes, the theoretical objective of the tariff structure could be to finance the operation, or even the investment, by the users.
- **Do you think participation in smart charging experimentations should be encouraged through tariff incentives?**
In Bordeaux, the equipment used is V-tronic brand and allows for a limited power demand because the charging point allows energy to be stored. These charging points also make it possible to reduce the power if two vehicles are charging at the same time. These experiments are not necessarily funded by pricing incentives.
- **What is your policy regarding EV development: is it incentive or "wait-and-see"?**
Incentive, as evidenced by the free charge for charging and parking.
- **Do you own the charging points; do you act under a concession or not? ie do you cover CAPEX costs?**
We own the charging stations. We cover CAPEX costs as it is a direct management.
- **What is the most impacting cost? What is the most rapidly changing cost? What is the most difficult cost on which anticipating evolutions?**
The investment costs are the most impacting, especially for the first intervention which requires sometimes very expensive public works.
With an aging heritage, maintenance costs tend to increase.
- **Operating income: Do you sell through tariffs or do you have subsidies or other sources of income?**
As recharging is free, there is no operating revenue, however there is a European subsidy (eco-city).
- **Export result: Time of PayBack point estimate**
 - *10 years for fast charging stations.*
 - *For slow charging stations, no interest.*
 - *The other investments will be cheaper because the public space is already developed.*
- **Tariffs that apply to recharging**
Today the charge is free.
The reflections should lead to a price schedule based on the duration (with nightly pricing) of charging depending on whether it is slow, accelerated or fast charging stations.
 - a) **Minimum recharge or cost:** *No.*

- b) **Tariff related to minutes or energy charged:** *Price per hour.*
 - c) **Differentiation of the tariff in day / night hours or other time slots:** *Nightly rate.*
 - d) **Payment for frequency of use, or for other reasons (taxis, freight fleets):** *No subscription.*
 - e) **Different prices by type of vehicle or by amount of energy recharged (plug-in hybrids, ...):** *No.*
- **If they manage points on the road, how is parking regulated? Is the property owned by the company or is it under a concession?**

Parking is free today.

7.2.2.2 Grand Lyon authority

History:

- 2017: launch of a call for private initiatives.

Prior study to estimate the metropolitan area's needs for 2020-2021 only in public spaces: estimated need of 900 charging points for 1.4 million inhabitants. Izivia-Demeter is selected and a framework occupancy agreement for the public domain is put in place in consultation with the municipalities for 700 charging points (200 already existing with the CNR network, car parks under construction and various private initiatives). This is a classic agreement: 1 minimum station per municipality, occupancy fee with fixed and variable part (classic agreement for commercial services in Lyon), duration of 15 years. Grand Lyon is committed to supporting public space works, to liaise with the ABFs.

- 2019: start of intervention.
- 2020: Bluely stop adds 100 charging points retroceded to the Metropolis.

Today the project is very advanced.

All the municipalities were consulted and the deployment concerns 70 stations.

- Beginning of 2022: target of 200 stations (900 charging points).

The interviewee is Keroum Slimani, Project Manager Mobility, Service urban mobility.

• **What incentives apply in your city? What incentives do you offer?**

No subsidy for the purchase of an electric vehicle or the installation of charging stations on private property.

Low emission zone in progress but only for electric vehicles. In this context the Metropolis provides assistance for professionals in the low emission zone perimeter who change vehicles.

Offers exist from semi-public operators: underground public parking (LPA and co) where the delegates have created a recharging service. 20-25 free charging places but not parking, pricing incentive also in relay car parks.

• **Do you think that the authorities should subsidize the installation of CAPEX recharging points or the cost of OPEX (energy, maintenance, etc.)?**

In Lyon, the vision is that the local authority creates favorable conditions for a private intervention.

• **Do you think that with the rates that apply in your city, a private charging station operator can make a profit and therefore interest in settling there? (to increase competition)**

Yes, there is an economic model for Izivia: pricing by time spent for less powerful stations and by energy for the most powerful.

• **Do you think that a tariff structure should favor any of the following statements?**

- *Guarantee the availability of charging stations: Yes.*
- *Favor the users that most use charging points: Not for the moment.*
- *Change the behaviour of drivers: Indirectly yes.*
- *Incentivize the use of EV's: Yes.*
- *Incentivize charging during off-peak hours: Yes, through night tariff.*
- *Maximize income (business opportunities): Yes.*

- **Do you think that a tariff structure should allow users to finance the OPEX service?**

Yes.

- **What is your policy regarding the development of electric vehicles: is it an incentive or “wait and see”? (Or direct involvement acting as a CPO? Or through a concession?)**

“Wait-and-see”. Greater Lyon does not invest any euro in the development of electromobility.

- **Tariffs that apply to recharging.**

a) **Minimum recharge or cost (if applies, what does it include? i.e. time, energy...):** *No.*

b) **Tariff related to minutes or energy charged:** *It depends on the charging points. Minute for slow (<150 kw) and energy for rapids).*

c) **Differentiation of the tariff in day / night hours or other time slots:** *Nightly rate for subscribers.*

d) **Payment for frequency of use, or for other reasons (taxis, freight fleets):** *Subscription.*

e) **Different prices by type of vehicle or by amount of energy recharged (plug-in hybrids...):** *No.*

- **If they manage points on the road, how is parking regulated?**

Parking is free.

7.2.2.3 Ile de France region

Ile de France Region does not own any charging stations or operate them, but **subsidizes public contractors** to develop their network. Its policy aims to develop the network and bring consistency and reliability to the various existing networks.

Its policy in favor of electromobility has three levers:

- Subsidizing the installation of charging stations because recharging is the most important lever to encourage the switch to electricity: logic of reinsurance, and to serve populations near places of life and employment. It is in this logic that the Region took up the subject as a funder.
- Labeling system for all charging stations accessible to the public 24 hours a day (private and public domain).
- The establishment of a platform <https://roulezbranchez.smartidf.services/> on electromobility data (partners, aid, etc.), desire to develop open data, in particular on the operation of charging stations.

There were 4,000 charging points in 2019 in Ile de France and the objective is to reach 12,000 charging points in 2023. To have access to the subsidy, local authorities or public structures are required to have a strategy in place in electromobility and in particular in terms of tariff structure.

The interviewee is Margot Clavel, Project Manager poles and roads, Transport Direction, Ile de France Region.

- **What incentives apply in your city? What incentives do you offer?**

The Region does not set up incentives for users, but through the subsidy program, it encourages local authorities to set up charging stations.

- **Do you think that the authorities should subsidize the installation of CAPEX recharging points or the cost of OPEX (energy, maintenance, etc.)?**

The goal of the subsidy program is to "prime the pump" while the charging service becomes economically viable. Therefore, applicants must have a development strategy and an economic model for an offer that meets medium-term needs. Thus the subsidy program is only spread over 3-5 years.

- **Do you think that with the rates that apply in your city, a private charging station operator can make a profit and therefore interest in settling there? (to increase competition)**

Electromobility will have a balanced economic model. Pricing can remain reasonable because the balance will be based on the volume of charges. It will take longer for the investment.

- **Do you think that a tariff structure should favor any of the following statements?**

- *Guarantee the availability of charging stations: Yes.*
- *Incentivize the use of EV's: Yes.*
- *Maximize income (business opportunities): Yes, the price list must ultimately allow for an economic balance.*

- **Do you think that a tariff structure should allow users to finance the OPEX service?**

Yes, in the medium term.

- **What is your policy regarding the development of electric vehicles: is it an incentive or “wait and see”? (Or direct involvement acting as a CPO? Or through a concession?)**

Encourage the equipping of car-dependent households in Ile-de-France with electric vehicles. The establishment of charging stations in public spaces helps meet the needs of households living in apartment blocks.

- **If they do not manage directly but have ceded concession space on the road to be exploited as a recharging point. Conditions of the assignment. How many years?**

The Region is not the contracting authority but supports the competent local authorities in the deployment of charging stations.

- **Can you have any influence on the rates that the charging point manager will apply?**

Not directly, but via the subsidy program and the electromobility label, the Region can influence the choices made by a local authority.

- **Are there any and if, yes, what are the current measures that are in place to impose the penalties for occupying the parking spaces dedicated to charging?**

No, this is not the responsibility of the Region.

- **What are the main obstacles you face in imposing these measures?**

Not competence of the Region.

- **Are there any and if, yes, what are the measures that you have in place to guarantee that the EV doesn't stay for longer than it is needed?**

The tariff structure may encourage limiting the duration of parking. SIPEREC, for example, fights against suction cup vehicles with a tariff structure based on charging time and not on the power delivered.

7.2.3 Users

7.2.3.1 Fédération Française des Utilisateurs de Véhicules Electriques (FFAUVE) and e-France Café

FFAUVE and e-France Café are EV users' associations at national level.

Interviewees are Stéphane Semeria, FFAUVE President, and Sébastien Gall, e-France Café President.

- **What incentives apply in your city? What incentives do you offer?**

They are associations at national level, they are not competent to provide any incentive.

Possible incentives: loyalty programmes, sponsorship.

Agree to have high tariffs, provided that the stations are reliable. Tariffs should be incentive, functioning on levels. But people should charge mostly at home. Tariffs should be attractive by night.

- **Do you think that the authorities should subsidize the installation of CAPEX charging points or the cost of OPEX (energy, maintenance, etc.)?**

ADVENIR (national programme) already helps to finance CAPEX recharging points. Public authorities should finance where private sector does not invest, ie places where there is not much traffic (privates go to where there is much traffic, like motorway service stations).

- **Do you think that with the rates that apply in your city, a private charging station operator can have a profit and therefore interest in settling there? (to increase competition)**

Yes, why not. Free charge is declining. Pricing should go gradually, as EV number increase.

- **Do you think a fee structure should favour any of the following statements?**

- Incentivize the use of EV's: Yes.
- Incentivize charging during off-peak hours: Yes.

- **Which improvements in tariff structure would you suggest to fit your needs?**

EVs charge at different powers: tariff structures based on duration are unfair. The fairest is kWh pricing. A possibility is to have time weighted by charging power, but the calculation is very complicated. A person who stays only to charge should pay per kWh; if he stays more, he should pay more. If he charges above 80% of his battery, tariff should be higher => there should be an increasing tariff structure, functioning on levels, and explained on the charging stations.

Tariff structure for fast charging stations could be combined with parking price.

More generally, for fast charging stations, the more the tariff is high, the more there is EV rotation, the more there is profitability.

7.3 Berlin

7.3.1 Authorities

7.3.1.1 Berlin authority

By the end of 2020, approximately there are 1650 charging points in Berlin of different types:

- Mixed approach: municipality owns the infrastructure a contracted private company operates but municipality pays a flat rate in concept of the operative expenditures (around 1000 charging points):
 - o 35 BEV/PHEV less than 7 kW
 - o 1045 HGV between 8 and 2 kW.
 - o 20 HGV more than 50 kW.
- Third party CPO are also allowed to operate infrastructure if they have signed a public contract for third party operators (around 250 charging points).
- Operators on publicly-accessible private ground (private parking places at POI's, shops, garages etc.) (around 400 CP charging points)

In addition, it is not necessary to pay for the parking spot used when charging, but a time frame for using the parking lot is limited to 4 hours from 08:00 (AM) to 18:00 (PM) only for charging the car. During the time period from 18:00 (PM) to 08:00 (AM) there is no limit for using the parking lot.

- **Do you think that the authorities should subsidize the installation of CAPEX recharging points or the cost of OPEX energy?**

There is no easy answer to this question. It depends on the framework conditions and where the charging infrastructure is located.

In case that market penetration of EV is still too weak and the municipality needs to incentivize EV purchase, it might be necessary to support the installation of charging infrastructure by subsidizing CAPEX or directly investing in public charging infrastructure. Moreover, it might be necessary to subsidize OPEX as long as the infrastructure is not self-sustaining.

A second motivation could be that authorities want to provide a critical charging infrastructure as a basis for vehicle charging because private invest is too weak or locations are important to create equal prerequisites also in landscapes/districts with few households and low demand. Here OPEX and CAPEX can be subsidized. One example could be the new Federal Fast Charging Law here in Germany.

- **Do you think that with the rates that apply in your city, a private charging station operator can have profit and therefore interest in settling there? (in order to increase competition)**

Yes.

- **Do you think that a tariff structure should favor any of the following statements?**

- *Guarantee the availability of charging stations.*
- *Incentivize charging during off-peak hours.*

- **Do you think that a tariff structure should allow to finance OPEX service by users?**

Yes.

- **Do you think participation in smart charging experimentations should be encouraged through tariff incentives?**

Yes.

- **What is your policy regarding EV development: is it incentive or “wait-and-see”? (or direct implication acting as a CPO? Or through a concession?)**

It is twofold. Supporting the mode change in favour of public transport and slow modes and support the substitution of combustion-engine driven vehicles in favour of EVs. At the moment, incentivizing EV market penetration by investing in public charging infrastructure and subsidizing EV purchase as well as private charging infrastructure. Substituting the municipal fleet.

Mixed approach s.a.

- **Conditions of the assignment. How many years?**

Seven to eight years

- **Are there any and if, yes, what are the current measures that are in place to impose the penalties for occupying the parking spaces dedicated to charging?**

Ticket or removal; in future detection systems.

- **What are the main obstacles you face in imposing these measures?**

Lack of personnel, missing legal framework for the implementation of automated parking surveillance.

- **Are there any and if, yes, what are the measures that you have in place to guarantee that the EV doesn't stay for longer than it is needed?**

Direct surveillance by municipal personnel only.

- **What are the obstacles linked to that?**

Lack of personnel, missing legal framework for the implementation of automated parking surveillance.

- **In case you experience difficulties linked to the questions above, what/who in your opinion could help you with addressing these issues?**

Changing the European and national frameworks (esp. to create the prerequisites for automated parking surveillance)

- **Regarding the short term investments, do you plan these considering the current incomes (tariffs)? What do you consider when planning short term investment?**

This is becoming more and more important.

- **Regarding the medium and long term investments, what tariff structure and fees (incomes) are you planning to have in order to plan these investments?**

It is the other way around. Tariffs of the public infrastructure are market oriented. Otherwise we would change the market. As a result, the tariffs determine how much infrastructure we can finance based on the income and how much infrastructure has to be financed using other resources.

7.4 Luxembourg

7.4.1 Authorities

7.4.1.1 Ministry of Energy and Spatial Planning

The ministry of Energy and Spatial Planning currently manages approximately 1.000 CP's between 8 and 22kW and 5 fast charger, having 88 in planning phase. The number of parking spaces with a charging point is defined in the following table:

Charge point for:	Number of car parking spaces	Number of LEV parking spaces
On-street	406 (Chargy in 2020)	
Municipal facilities	400 (Chargy)	
Public/private car parks	86 (Chargy P+R) 62 (Chargy OK on private)	9 (bikestation.lu)
Shopping malls	Approx 70 (54 Auchan, 6 City Concord, 4 Belle Etoile, 2 Pallcenter)	

- **Is the investment (CAPEX) done by the municipality, private investor or a PPP?**

The CAPEX of the "Chargy" infrastructure is today financed with grid fees. This will be adjusted according to the requirements of the Electricity Directive EU 2019/944. Private investors shall be encouraged with subsidies which are foreseen in the near future.

- **Who manages de operational expenditure (OPEX) of the charging infrastructure?**

Still backed with grid fees, will be adjusted according to ED EU 2019/944, OPEX need to be covered by CPO (charging tariff).

- **Do you have competence in the decision of tariffs applied to energy charged?**

No

- **State the tariff structure applied in your city/region. Is it necessary to pay for the parking spot used when charging?**

A fixed tariff per kWh hour, without any time-based component applies for the entire nation wide charge network. The end user price depends on the MSP and ranges between 0.24 €/kWh and 0.40 €/kWh.

Depending on its location, parking tariffs may apply in addition (beyond competence of the CPO/MSP) and are paid separately. On the newly installed first Fast Chargers (≥ 160 kW, old-fashioned parking meters have been installed to prevent the permanent blocking of these charging points.

- **What incentives are applied in the Grand-Duchy of Luxembourg?**

EV Purchase Subsidies

In May 2020, the Luxembourgish government had raised the purchase premium for purely electric vehicles from 5,000 to 8,000 euros as part of an aid programme to curb the effects of the Covid 19 pandemic being effective until 31.03.2021.

The government has recently reviewed and adapted its subsidy programme for EVs for another twelve months until 31 March 2022 to reflect environmental and social parameters. The purchase premium for pure electric cars is now from 1 April 2021 onward to be linked to the electricity consumption documented according to WLTP as registered by the carmaker. It is retaining this higher incentive of 800 euros, only for models that have an electricity consumption of less than 18 kWh per 100 kilometres. For electric cars that consume more, the amount of the bonus is capped at 3,000 euros.

The regulation foresees that purely electric vehicles with seven or more seats are to be subsidised with 8,000 euros, regardless of their electricity consumption, thereby taking the need for larger family cars into account. Applicants must be part of a household with at least five people.

For plug-in hybrids, subsidies will only be available until the end of the year if their CO₂ emission is a maximum of 50g/km or less. The premium is lowered to 1,500 euros (previously 2,500 euros) until the end of this year. Therefore, the bonus will only be available for PHEVs purchased and registered between 1 April and 31 December 2021. In the case of BEVs, the new provisions apply to all vehicles ordered between 1 April 2021 and 31 March 2022, and whose first entry into service takes place before the end of 2022.

EV Ownership Tax Benefits

The tax for BEV (and FECV) is reduced to the minimum CO₂ based tax. of 30€ annually.

Company Tax Benefits for EVs

The deductibility from corporate income of expenses related to the use of company cars is calculated on the basis of CO₂ emissions. This measure is in place to encourage to buy vehicles with zero or low emissions as a company car.

Other EV-related incentives / benefits

To break the chicken-egg circle of future EVs to find a lack of charging options, in 2010, Luxembourg's government had entrusted the countries five DSOs to set up and operate the nationwide charging network "Chargy" as CPO. The CPO provides equal conditions to access the network to any MSP. While all MSPs pay the same energy price per kWh, a part of the Chargy network's cost is covered with low voltage grid fees, thus paid by all household electricity

users. Thereby, end-user prices per kWh are fixed, stable, and below the price level for equivalent service in neighbouring countries while varying from one MSP to another.

LEVs

A purchase subsidy is in place of up to 500€ for electric motorcycles and quadricycles.

EV Charging points

A subsidy scheme is dedicated to the installation of charging points for private persons residing in single family houses (up to 750 – 1250 EUR per charging station) and apartment buildings (1250 – 1650 EUR per charging station).

An additional subsidy scheme is currently in preparation for charging points set up by companies, which are publicly available and for internal / restricted usage for employees or clients.

- **Do you think that the authorities should subsidize the CAPEX of installation of recharging points or the cost of OPEX (energy, maintenance, etc.)?**

See European Directive: Rather CAPEX (state aide guidelines) but not always sufficient, particularly in more remote areas to provide economic advantage over ICE cars / conventional fuels. Still the impact of OPEX is not negligible.

- **Do you think that with the rates that apply in your city, a private charging station operator can have profit and therefore interest in settling there? (in order to increase competition)...**

Today, CPOs cannot achieve mustbility from operating charging points in Luxembourg.

The Chargy network's cost is covered with low voltage grid fees, thus paid by all household electricity users. Thereby, end-user prices are attractive, well below the price level for equivalent service in neighbouring countries.

Any other commercial CPO could not compete with the price on the Chargy network. With the application of the EU directive, a level playing field must be established, allowing additional actors to offer their services

- **Do you think that a tariff structure should favor any of the following statements?**
 - *Guarantee the availability of charging stations:* What seems a good idea, might be difficult to implement given todays constellation (CPO-MSP).
 - *Favor the users that most use charging points:* No reason identified from policy point of view.
 - *Change the behavior of drivers:* Possibly connected to smart charging, but difficult to apply based on existing tariff structure.
 - *Incentivize the use of EV's:* EVs must be competitive with conventional fuels.
 - *Incentivize charging during off-peak hours:* Incentivizing to charge "off-peak" of the grid would be desirable.
 - *Maximize income (business opportunities):* Profitability should be assured, i.e. by aiming for a good utilization rate rather than high prices.

- **Do you think that a tariff structure should allow to finance OPEX service by users?**

The tariff structure must allow to cover OPEX.

- **Do you think participation in smart charging experimentations should be encouraged through tariff incentives?**

To be answered by CPO, difficult to implement, must be discrimination free

- **What is your policy regarding EV development: is it incentive or “wait-and-see”? (or direct implication acting as a CPO? Or through a concession?)**

To break the chicken-egg circle of future EVs to find a lack of charging options, back in 2010, Luxembourg's government had entrusted the countries five DSOs to set up and operate the nationwide charging network "Chargy" as CPO. The CPO provides equal conditions to access the network to any MSP. While all MSPs pay the same energy price per kWh, a part of the Chargy network's cost is covered with low voltage grid fees, thus paid by all household electricity users. Thereby, end-user prices per kWh are fixed, stable, and below the price level for equivalent service in neighbouring countries while varying from one MSP to another.

While, as previously mentioned, the chargy network must be rendered compliant with the EU directive 2019/944, further initiatives are well under way to support a rapid EV adoption, aligned on the ambition to have 49 % of cars electric by 2030.

Subsidies, for EVs, and for private charging points available

Support of private investors and companies to set up charging points foreseen.

- **Are there any and if, yes, what are the current measures that are in place to impose the penalties for occupying the parking spaces dedicated to charging?**

Different between communes

- **What are the main obstacles you face in imposing these measures?**

To be imposed by municipality

- **Are there any and if, yes, what are the measures that you have in place to guarantee that the EV doesn't stay for longer than it is needed?**

No tariff-based incentives

- **What are the obstacles linked to that?**

Difficult to implement between CPO and MSP

- **In case you experience difficulties linked to the questions above, what/who in your opinion could help you with addressing these issues?**

Municipalities

- **Regarding the short-term investments, do you plan these considering the current incomes (tariffs)? What do you consider when planning short term investment?**

7.4.1.2 Luxembourg institute of regulation (ILR)

- **What incentives are applied in Luxembourg? And what is missing:**

No subsidies available for public CPs

Access to public land (as for example granted to telcos for antenna or the local free newspaper "l'essentiel")

- **Do you think that the authorities should subsidize the CAPEX of installation of recharging points or the cost of OPEX (energy, maintenance, etc.)?**

CAPEX: necessity. Grid connection and civil works could be publicly financed beyond project Chargy / SuperChargy aligned on anticipated future needs to replace conventional fuels and allow competition among CPOs (end monopoly situation).

Amortization period too long for current development cycles

OPEX: reduction of fees?

- **Do you think that with the rates that apply in your country, a private charging station operator can have profit and therefore interest in settling there? (in order to increase competition)...**

Non given today with current situation (Chargy financed with grid fees), a level playing field is needed.

- **Do you think that a tariff structure should favor any of the following statements?**

Guarantee the availability of charging stations: Maintenance cost must be covered so that reliability and technical availability is ensured. A time limit would make sense at higher charging speeds (DC charging) to lead to an effective utilization of the CP.

Favor the users that most use charging points: No, why?

Change the behavior of drivers: Smart charging + gamification as foreseen in the eCharge4Drivers demonstration of Nexxtlab, a time component in the charging price could help to avoid unnecessary CP-occupation, particularly by PHEV

Incentivize the use of EV's: Electricity must be the least cost option compared to conventional fuels while bearing in mind that motorized individual mobility must be less attractive than (e-) bikes or other forms of light mobility or public transport

Incentivize charging during off-peak hours: Smart Charging to circumvent unnecessary need for grid extension.

Maximize income (business opportunities): objective to allow income generation, supported by policy (freeing occupied CPs)

→ Suggestion: A Charta to be ratified by MSPs and CPOs. The signatories receive access to public land if respecting an upper price limit for their service offering, interoperability / integration “Chargy OK” as well as 100% renewable electricity would be mandatory)

- **Do you think that a tariff structure should allow to finance OPEX service by users?**

OPEX must be covered with tariffs.

Different CPO tariff components must be passed through to end user via MSP and possibly roaming platforms to achieve steering mechanism (time components...)

- **Do you think participation in smart charging experimentations should be encouraged through tariff incentives? (optional question)**

Not in public space, where smaller charging rates should be favored and applied in larger numbers.

- **What is your policy regarding EV development: is it incentive or “wait-and-see”? (or direct implication acting as a CPO? Or through a concession?)**

Partially proactive, while revealing gaps: See above missing incentives and a clear positioning towards favouring public transport and light mobility.

Municipalities are not incentivised to allow slow charging opportunities

DC Charging: Missing incentives that would allow level playing field that can assure growth of EV Charging deployment beyond Chargy

Investors require clarity with regards to metering standards and billing process.

- **Are there any and if, yes, what are the current measures that are in place to impose the penalties for occupying the parking spaces dedicated to charging?**

CPO could introduce time component; municipalities have authority to regulate parking space occupation

- **What are the main obstacles you face in imposing these measures?**

No legal competence at ILR

- **Are there any and if, yes, what are the measures that you have in place to guarantee that the EV doesn’t stay for longer than it is needed?**

Time tariff + removal of cars that occupy the CP

- **What are the obstacles linked to that?**

No legal competence at ILR → must be regulated with StVO

- **In case you experience difficulties linked to the questions above, what/who in your opinion could help you with addressing these issues?**

Overarching coordination missing.

- Regarding the short term investments, do you plan these considering the current incomes (tariffs)? What do you consider when planning short term investment?

Not applicable

Regarding the medium and long term investments, what tariff structure and fees (incomes) are you planning to have in order to plan these investments? *Not applicable*

7.4.2 Charging Point Operator

7.4.2.1 Creos Luxembourg S.A. in their role of the CPO of “Chargy”

Chargy is a CPO that covers countrywide charging points. The following table shows the number of parking spaces with a charging point operated by Chargy:

Charge point for:	Number of car parking spaces	Number of LEV parking spaces
On-street	406 (Chargy in 2020)	
Municipal facilities	400 (Chargy)	
Public/private car parks	86 (Chargy P+R) 62 (Chargy OK on private)	
Shopping malls	-	
Other: P+R	398 DC fast charging: 88 (36 on highways), rest on heavily frequented corridors	

- **Tariff structure applied to their charging points by eMsP. Is parking charged at any of the sites?**

Fixed price in ct/kWh towards MSP, parking cost depending on location/municipality

- **Structure (in percentage) of the CAPEX:**

(land, electric network connection, civil works, equipment, etc) 10% grid connection, 60% civil works, 30% equipment

- **Structure in percentage of the OPEX:**

energy consumption (fixed term), energy, maintenance of installations, communications, client enquiries, financial expenditures, public loans, etc): only E-mob grid fee is handled by physical energy supplier and paid by MSP

- **What incentives are applied in your country? / What incentives do you provide?**

See interviews with authorities

- **Do you think that the authorities should subsidize the CAPEX of installation of recharging points or the cost of OPEX (energy, maintenance, etc.)?**

DSO should set up CPs, and CAPEX financed with grid fees. There is no viable business plan for AC charging. Only DC charging could work as conventional petrol station.

- **Do you think that with the rates that apply in your city, a private charging station operator can have profit and therefore interest in settling there? (in order to increase competition)...**

Not with AC charging at current prices, if prices would be higher, utilization rate will drop further (devils circle)...

DC charging possibly

- **Do you think that a tariff structure should favor any of the following statements?**
 - **Guarantee the availability of charging stations:** *maintenance needs must be met, at DC charging higher tariffs could apply when cars stay longer than needed*
 - **Favor the users that most use charging points:** *No*
 - **Change the behavior of drivers:** *Smart charging, a change of behavior would be desired*
 - **Incentivize the use of EV's:** *should be competitive compared to ICE*
 - **Incentivize charging during off-peak hours:** *see smart charging*
 - **Maximize income (business opportunities):** *If a higher utilization rate could be achieved, yes. Avoid constraints for user.*

- **Do you think that a tariff structure should allow to finance OPEX service by users?**

OPEX must be covered with tariffs.

- **Do you think participation in smart charging experimentations should be encouraged through tariff incentives? (optional question)**

Difficult to implement, but desirable

- **As a CPO, do you own the charging points, do you act under a concession or not? ie do you cover CAPEX costs?**

We own the CPs.

- **Operating costs (ask if they are tangible costs or not):**

energy cost, power term cost, parking cost, charging point depreciation, installation cost, preventive maintenance cost, curative maintenance cost, and space.

Only charging point depreciation, installation cost is paid with grid fees

(preventive maintenance cost, curative maintenance cost paid with OPEX)

- **What is the most impacting cost? What is the most rapidly changing cost? What is the most difficult cost on which anticipating evolutions?**

Civil works, depending on conditions on site, installation in case of large structure (P+R)

- **Operating income: Do you sell through tariffs or do you have subsidies or other sources of income?**

No income

- **Export result: Time of PayBack point estimate**

Not available, payback very uncertain if not paid with grid fees

- **If negative, how is the loss offset?**

No answer

- **Tariffs that apply to recharging (you can ask if they have any restrictions when placing them) [make a list of the tariff structure]**

- **Minimum recharge or cost (if applies, what does it include? i.e. time, energy...).**

No min

- **Tariff related to minutes or energy charged**

no

- **Differentiation of the tariff in day / night hours or other time slots.**

no

- **Payment for frequency of use, or for other reasons (taxis, freight fleets).**

no

- **Different prices by type of vehicle or by amount of energy recharged (plug-in hybrids, ...)**

no

- **If they manage points on the road, how is parking regulated? Is the property owned by the company or is it under a concession?**

municipalities

- **Regarding the short term investments, do you plan these considering the current incomes (tariffs)? What do you consider when planning short term investment?**

no

- **Regarding the medium and long term investments, what tariff structure and fees (incomes) are you planning to have in order to plan these investments?**

no

7.4.3 Mobility Service provider

7.4.3.1 PLUXX S.A. (Powerdale Luxembourg)

Pluxx is an EMSP that has 620 CP (8-22kW) and 88 fast chargers. The number of parking spaces with a charging point is mentioned in the following table:

Charge point for:	Number of car parking spaces	Number of LEV parking spaces
On-street	400	
Municipal facilities		
Public/private car parks		
Shopping malls		
Other...	398	
	Fast charging: 88 (36 on highways), rest on heavily frequented corridors	

- **Geographic area where service is provided:**

Luxembourg

- **Applied tariff structure to final users. Is car park charged?**

Depending on parking operator

- **Applied tariff structure of the CPO which is connected to MSP:**

0.32 EUR / kWh

- **What incentives are applied in your country? / What incentives do you provide?**

See interviews with authorities

- **Do you think that the authorities should subsidize the CAPEX of installation of recharging points or the cost of OPEX (energy, maintenance, etc.)?**

With the objective of having a unified infrastructure, a global approach is needed which maybe coordinated by a "global" sponsor at least in the initiation phase / ramp up. A centralized approach should also be used to set guiding requirements, open access for MSPs and users to harmonize the way that the infrastructure can be accessed.

After market is settled, subsidies should not be needed any more.

Charge@home and charge on the go should be harmonized and provided with one simple solution (app).

AC charging at stable rate advantageous, places where people spend > 30 minutes, people should be able to charge.

DSOs should be in charge of the CPs, as they are part of the infrastructure and take care of the availability and service quality from A to Z (maintenance, help desk...).

DC charging will provide a more viable business case, should not be the everyday's charging station. Authorities should provide rules for a targeted development of the fast charging infrastructure.

A future development must include driverless vehicles.

- **Do you think that with the rates that apply in your city, a private charging station operator can have profit and therefore interest in settling there? (in order to increase competition)...**

To be evaluated. Possibly viable in attractive areas e.g. in commercial areas with link to other activity, e.g. shopping in a mall. The high prices of parking spaces can render the business case difficult.

Prices for charging should not be higher than twice the residential electricity price.

Slow charging should be the most used option.

- **Do you think that a tariff structure should favor any of the following statements?**

- **Guarantee the availability of charging stations:**

Yes (quality, price and service) should be supported

- **Favor the users that most use charging points:**

A frequent user could have limited options to charge his EV, and therefore could be supported with favorable prices.

- **Change the behavior of drivers:**

Dynamic pricing should impact the user behavior.

- **Incentivize the use of EV's: A double objective should be supported:**

1. Shift from individual motorized mobility to other modes of transport (mobility as a service, free public transport...), 2. Lower cost as conventional fuel cars

- **Incentivize charging during off-peak hours:**

Yes, see above, dynamic pricing

- **Maximize income (business opportunities):**

1. Location, 2. Cross-selling (where I spend 30 minutes...), 3. Regulate grid

- **Do you think that a tariff structure should allow to finance OPEX service by users?**

Also maintaining a smart infrastructure should be worth financial support. (obligation maintenance contract)

- **Do you think participation in smart charging experimentations should be encouraged through tariff incentives? (optional question)**

Yes, 100%! Dynamic pricing.

7.4.4 User association

7.4.4.1 Automobile Club Luxembourg (ACL)

- **What group of users do you represent? (general EV's, freight, taxis, etc)**

All vehicles

- **What geographic area do you cover in your association?**

Grand-Duchy of Luxembourg, and anywhere in Europe, with partners

- **In what percentage are you users of the following (public) charging stations?**

Home charging encouraged, difficult to answer.

Charge point for:	<7kW	8-22kW	30-50kW	>50kW
LEV-motorcycle	x			
BEV/PHEV	x	x (mainly Chargy)	x (5 CPs in the country)	x ("SuperChargy" rollout started recently)
HGV				
BUS	Non			
Other...				

- **In which areas do the users of your association charge? (in percentage)**

No own records, see Chargy.

- **What incentives are applied in your GD Lux? / What incentives do you provide?**

Subsidies by state and additionally by some municipalities

- **Do you think that the authorities should subsidize the CAPEX of installation of recharging points or the cost of OPEX (energy, maintenance, etc.)?**

Charging tariffs on Chargy without competition, incentives for private terminals announced (CAPEX yes, maintenance obligation), OPEX no

- **Do you think that with the rates that apply in your city, a private charging station operator can have profit and therefore interest in settling there? (in order to increase competition)...**

A clear no, due to Chargy, missing level playing field

- **Do you think that a tariff structure should favor any of the following statements?**

- **Guarantee the availability of charging stations**

attention, non-discriminatory rules needed

- **Favor the users that most use charging points**

This could be a good idea if users are favoured who have no access to a private charging point and thus (have to) use a public charging point frequently.

- **Change the behaviour of drivers**

Yes, encourage smart charging

- **Incentivize the use of EV's**

EVs should be the least cost option

- **Incentivize charging during off-peak hours**

Yes, on P+R, not compatible with all Chargy depending on utilisation, and certainly not compatible with fast charging (SuperChargy).

- **Maximize income (business opportunities)**

We should follow the standard applied for petrol and diesel in Luxembourg, which is sold at the same price across the country.

The use of super chargers as everyday charging option should be discouraged.

- **Do you think that a tariff structure should allow to finance OPEX service by users?**

Yes, incl. maintenance

- **Do you think participation in smart charging experimentations should be encouraged through tariff incentives? (optional question)**

Yes

- **Do you feel that charging cost and tariff structure are appropriate for your (user association) needs?**

Yes, for the Chargy network from a user's perspective.

- **Which improvements in tariff structure would you suggest to fit you needs?**

A tariff per kWh which, for the fast chargers, switches to a time-based tariff, once a high state of charge, e.g. 80% is reached (battery close to full)

- **Do you think there are incentives to the use of public charging stations?**

There are indeed, on the Chargy network.

7.5 Belgium (Zellik)

7.5.1 Authorities

7.5.1.1 Flemish ministry of mobility and public works

Flemish Ministry of Mobility and Public Works is a Belgian regional public authority responsible for safe, smart and sustainable mobility and for an adequate road and (air)port infrastructure in Flanders region.

- **What EV charging incentives are applied in Flanders? What incentives are provided by Flemish ministry of mobility and public works?**
 - *Concession for deployment of 5000 charging points between 2016-2020 via tender (without any financial incentive from the government to the private party). The tender was won by a CPO called Allego, which has finally put in place around 4500 chargers.*
 - *Yearly calls for governmentally subsidized (up to 20% of investment costs) projects for charging infrastructure outside the public domain (on some private properties) in order to limit the pressure on the public domain.*
 - *Partially subsidized by EU – projects deployment of fast charging infrastructure through concessions on its installation on the main roads.*
 - *The concessions indicate a reasonable (not precise) charging price. However, municipalities can put their own mark-up through the parking price and other additional costs, or give additional incentive through the elimination of these additional costs for a charging EV.*
- **Do you think that the authorities should subsidize the initial investment (CAPEX) and OPEX (energy costs, etc.) related to the EV charging infrastructure?**
 - *The initial position of Flemish government was not to subsidize the EV charging infrastructure and leave it up to the private market. The decision was reasoned by the zero – emission purchase premium when purchasing an EV. Thus, the Flemish government has considered this premium as a sufficient stimulus for the growth of the number of EVs.*
 - *However, the uptake of EVs took longer than expected. Therefore, the Flemish government considers to incentivize the participants of EV charging market in a more direct manner (through subsidies on investment costs for semi-public charging infrastructure, specific conditions for concession agreements etc.) in order to organize a sufficient compensation for the private parties participating on the market. (these measures are not yet concretized)*
- **Do you think that with the EV charging tariffs currently applied in Flanders, a private CPO is able to generate profits?**

It is possible, but strongly dependent of the other factors apart of tariffs. For instance, one of these factors is the location of the charge points. In bigger cities where there are many cases of electrification of niche fleets (e.g. carsharing companies), there are sufficient examples of private CPOs that generate profits. At the same time, in smaller towns the people living in Flanders typically own a private home, giving an opportunity to install private residential chargers. This, quite obviously, reduces the profitability of CPOs in these locations.

- **What are, according to you, are the most important goals (see the following list) the EV charging tariff structure should aim at?**

- ***Guarantee the availability of charging stations***

Yes. Chargers should be available for the customers, however, the measures like connection tariffs or high charging tariffs should be reasonable.

- ***Favor the users that most use charging points***

No. Basic ad-hoc charging tariffs should be equal for everybody who want to use it without any discrimination.

- ***Change the behavior of EV drivers***

Charging market is private market, thus the Flemish government is not willing to get directly involved into the setting of tariffs structure in order to change the behavior of EV drivers. Of course, energy tariffs in the future could be set depending on for instance the availability of renewable energy.

- ***Maximize revenues***

The tariffs should at least take into account the business cases of market participants. The Flemish government is not planning to participate directly into the market, however, the EV charging market participants should be, at least, profitable in order to have sufficient stimulus.

- **Are there any current measures that are in place to impose the penalties for occupying the parking spaces dedicated to charging? What are the main obstacles you face in imposing these measures?**

Currently, there are no penalties for EVs occupying the parking spots dedicated for charging, but not charging at the moment. The main obstacle is having no traffic signs that indicate that an EV should be connected when it is parked on this particular parking spot. However, there are penalties for non – electric vehicles occupying the parking spot dedicated for charging.

- **Are there any measures that you have in place to guarantee that the EV does not stay plugged-in longer than it is needed?**

The only current measure in place is the connection tariffs issued by some MSP for staying plugged in after the EV is fully charged. For the public charging infrastructure deployed through the tenders, Flemish government does not apply a connection tariff.

- ***What are the obstacles linked to that?***

As it is already mentioned, the traffic signs stating that the EV parked on this particular charging spot should be connected, otherwise would get a penalty, are not in place yet.

- **Does Flemish ministry of mobility and public works act as a CPO, directly managing the charge points?**

No. Flemish government participates in EV charging market only indirectly (e.g. through concessions).

- Does Flemish ministry of mobility and public works provide any concession space on the roads to be exploited for EV charging needs?

Yes.

- **Could you elaborate on the conditions of the assignment? How many years?**

The concession is provided by a DSO, afterwards there are price offers of private parties. The DSO chooses the best offer, and the chosen company wins the tender. The duration of agreement is 10 years, with the possibility of price adaptation (e.g. due to indexation).

- **Does Flemish ministry of mobility and public works have any influence on the tariffs that the CPO will apply?**

Not specifically. The main rule of tariffication is that the tariffs should be reasonable. However, there are no precise limits or definitions. Of course, the proposed tariffs are taken into account in the tender procedure.

7.5.1.2 Sibelga

Sibelga is the sole distribution system operator (DSO) for electricity and natural gas for the 19 municipalities of the Brussels-Capital Region, distributing energy comes via a network of cables and pipes. Maintaining and expanding this network in the long term is one of Sibelga's tasks. Furthermore, Sibelga is responsible for the meter reading, for the validation and for the management of the consumption data.

- **What EV charging incentives are applied in Brussels? What incentives are provided by Sibelga?**

- *Sibelga is facilitating the introduction of EV charging infrastructure, translating the requirements of regional public authorities to the communal needs.*
- *Sibelga prepares and coordinates the EV charging infrastructure tenders and their deployment plans, based on the objectives set by the regional public authorities.*

- **Do you think that the authorities should subsidize the initial investment (CAPEX) and OPEX (energy costs, etc.) related to the EV charging infrastructure?**

The deployment and maintenance of EV charging infrastructure is fully on the costs of the private market. Sibelga's participation in the deployment of EV charging infrastructure in Brussels implies only the use of its technical and communication expertise.

- **Do you think that with the EV charging tariffs currently applied in Brussels, a private CPO is able to generate profits?**

Taking into consideration the evolution of the consumption of EV chargers in Brussels, the current business model of the CPOs in Brussels is going a right path to eventually become profitable. For instance, the tender received by Total Energies is for the term of 10 years, where 3-4 last years of the tender are foreseen to bring profits.

- **What are, according to you, are the most important goals (see the following list) the EV charging tariff structure should aim at?**

The main aim of the tariff structure on Brussels is to make the public EV charging available for an average EV user, that has no opportunity to install a private charge point. This is the main reason for granting the concessions and creating a transparent model with the reasonable tariffs (0,25 – 0,30 €/kWh for the AC charger with the power level of 7,4 – 11 kW).

- **Are there any current measures that are in place to impose the penalties for occupying the parking spaces dedicated to charging?**

All the EVs that are charging do not have to pay for the parking spot. During the day-hours if the parked vehicle is not electric or the parked EV is not charging, its owner gets a penalty 15 minutes after the end of charging process. The charging status of the parked and plugged-in EV is defined by making use of the interconnection with a CPO platform and the platform of Parking Brussels.

- **Are there any measures that are in place in Brussels to guarantee that the EV does not stay plugged-in longer than it is needed?**

See previous question.

- **Does Sibelga act as a CPO, directly managing the charge points?**

No, but it could have been the case if there would be no offer from the private market.

- **Does Sibelga provide any concession space on the roads to be exploited for EV charging needs?**

Sibelga is an intermediary agent facilitating the transition of the requirements of public authorities to the communal needs and private market. Thus, Sibelga does indeed participate into the tendering and concession process for EV charging infrastructure in Brussels.

- **Could you elaborate on the conditions of the assignment? How many years?**

The tender for EV charging infrastructure in Brussels is won by Total Energies. The term of the tender is 10 years. There are certain conditions related to the location, availability and type of chargers. Moreover, Sibelga plays a role into the definition of the MSPs, that can have contracts with the CPO that won the tender. Finally, there are space restrictions that a charge point can occupy on a sidewalk.

- **Does Sibelga have any influence on the tariffs that the CPO will apply?**

The idea was to create a reasonable charging tariff for relatively slow chargers, where 30 minutes of charging would allow to drive the EV for an average distance driven by an average Brussels citizen during one day. However, after the concession is given, the CPO decides about the tariffs, within the boundaries predefined into the contract.

7.5.1.3 Service public régional de Bruxelles (SPRB): Brussels Mobility

Service public régional de Bruxelles (SPRB): Brussels Mobility is coordinating traffic lights and traffic information, spreading road salt, asphaltting, designing cycle paths, managing taxis. This board is also responsible for major infrastructure works, the layout of public spaces and new public transport lines and it is responsible for the maintenance and safety of the roads. Brussels Mobility offers new global and future-oriented strategies for sustainable mobility.

- **What EV charging incentives are applied in Brussels? What incentives are provided by Service public régional de Bruxelles (SPRB)?**

The incentives of public authorities related to EVs and EV charging infrastructure can be divided on federal and regional levels. The following federal level incentives are valid for whole Belgium (including Brussels, Flanders and Wallonia):

- *From 2026 all the company vehicles in Belgium will have to be 100% electric.*
- *Tax deduction for private charging infrastructure in Belgium (this incentive is less impactful for Brussels, since the majority of the population living into the city does not have access to a private parking spot).*
- *Defined on a federal level minimum requirement of 22000 charging points by 2035. The deployment of these chargers is planned to be partially on the on-street parking spots, but mainly, and as much as possible, on the off-street parking spots.*

The following incentives are valid only for Brussels Capital region:

- *Concession for the installation of charging points in Brussels. The winner of the tender is Total Energies. The location for the installation of these chargers is based on the demands of communal authorities and citizens. The deployment of the charging points under the framework of this concession is to be finished in the end of 2021, while the number of charging points is expected to reach 600.*
- *By the end of 2030 all the diesel fuelled vehicles and by 2035 all the internal combustion engine vehicles will be banned from Brussels.*
- **Do you think that the authorities should subsidize the initial investment (CAPEX) and OPEX (energy costs, etc.) related to the EV charging infrastructure?**

SPRB financially intervenes at a very small level, being signage on the parking spots and sign posts. That is all that SPRB invests, except of HR that keep track of the projects. Thus, basically, all the expenses are on the shoulders of the private companies (e.g. CPOs).

This strategy of private financing was chosen since the motorization rate in Brussels is below one household out of two. Meaning, that there are more people that do not own a car, than ones who own a car. Thus, SPRB was not intending to put these expenses on the shoulders of a majority of tax payers who do not own a car.

- **Do you think that with the EV charging tariffs currently applied in Brussels, a private CPO is able to generate profits?**

In general, the private CPOs are not making any significant profits in Brussels yet. For instance, Total Energies, that won the concession in Brussels couple of years ago, has recently won the similar tender in Antwerp. They are investing in changes they have to make for future as a petrol company, but this is a bet for the moment. Especially in Brussels, where EV adoption was a bit late and EV charging remains a relatively small market, the current profitability of the CPOs business model is very doubtful.

- **What are, according to you, are the most important goals (see the following list) the EV charging tariff structure should aim at?**

- ***Guarantee the availability of charging stations.***

CPO sets the charging tariff and SPBR gives a regulation about the parking. Thus, the availability of charging stations is guaranteed by the parking regulations and not by the tariff structure.

- ***Favor the users that most use charging points.***

SPRB does not regulate on how the tariff is developed, the prices are generally regulated by the market. However, during the tendering process, SPRB sets certain limits, within which a CPO is able to favor the most active users.

- ***Maximize revenues.***

For the moment, in order to attract more people to using EVs, CPO would use the lower pricing. Afterwards, there could be an evolution of the prices, which will be also influenced by a higher competition on the market, since there are appearing more and more CPOs and MSPs. Thus, the key trend right now is not the maximization of revenues, but the acceleration of user transition to the EVs.

- **Are there any current measures that are in place to impose the penalties for occupying the parking spaces dedicated to charging?**

In Brussels, there are penalties in place for the non-electric vehicles occupying the parking spots intended for EV charging. Also, for EVs occupying these charging spots, there is a certain limit of time, after which they are presumably fully charged and have to leave (see question 6).

- **Are there any measures that are in place in Brussels to guarantee that the EV does not stay plugged-in longer than it is needed?**

During the day-hours in Brussels, the EVs can stay on the public parking spots dedicated for EV charging during 4,5 hours. The EV has to be plugged in and charging. This time is, on average, presumably sufficient to give the EV a descent level of charge. Staying parked for more than 4,5 hours causes a penalty.

- **Does Service public régional de Bruxelles act as a CPO, directly managing the charge points?**

No.

- **Does Service public régional de Bruxelles provide any concession space on the roads to be exploited for EV charging needs?**

Yes.

- ***Could you elaborate on the conditions of the assignment? How many years?***

The concession on the installation of EV chargers in Brussels is given to the CPO called Total Energies. The total term of the concession is 10 years, with initial foreseen term of 2 years for the deployment of the infrastructure (eventually added 1 year to this term, what was also foreseen by the contract). This final term of 3 years for the deployment of the infrastructure will be reached by the end of 2021, and there remain 7 years for its operation. The installed charging points should not exceed the power of 22kW. There is also a condition for the first 100 locations of chargers, decided upon

the consultation with 19 municipalities of Brussels. The rest of infrastructure is based on the principle is that the charger follows the car, meaning that the CPO can install the chargers on demand of the EV (100% electric vehicle) users or municipalities. Another opportunity to install extra chargers is if a charger on a location is oversaturated with demand. An interesting development that SPRB has noticed, is that there was a very strong positive evolution of the demand for Plug-in Hybrid vehicles (which do not satisfy the condition of being 100% electric). However, the users of Plug-in hybrids did not realize that they do not satisfy the conditions and demanded for the installation of chargers in their neighbourhood. Thus, unfortunately, SPRB had to directly refuse all these important demands. However, the solution to that was to redirect these demands to the municipality, which in its turn, can send a demand for the installation of chargers on the location where it deems to be necessary. In total, the EV charging infrastructure foreseen by this tender is getting close to 600 public chargers in Brussels by the end of 2021.

- ***Does Service public régional de Bruxelles have any influence on the tariffs that the CPO will apply?***

The tariff is based on the bids made during the tendering process by the CPO. Basically, the tariff is made up by the means of a formula, flattening the energy prices. After the concession is given to the CPO, SPRB has no influence on tariffs anymore.

7.5.2 CPO and CPO/MSP

7.5.2.1 Certipower (ex-employee of total energies)

Certipower is a new Flemish CPO founded in 2020 by a number of driven entrepreneurs, each with experience in a separate field. Geert De Groote (the interviewee) is the ex-employee of Total Energies, being the main CPO in Brussels Capital Region. Moreover, Geert has been active in the energy world for 20 years and since 2015 in the world of sustainable fuels.

- **Could you indicate EV charging incentives that are applied in Flanders?**

- *Concession on the installation and operation of charging points in the public space won by Allego (organized by government in Flanders through Fluvius (DSO)) in Flanders. Total won the concession on the installation and operation of charging points in the public space in Brussels.*
- *Federal government of Belgium (of which Flanders is a part) if fiscally stimulating the installation of charging infrastructure and the use of EV vehicles for companies.*

- **Does Certipower provide any innovative EV charging incentives itself?**

Not yet.

- **Do you think that the public authorities should subsidize the CAPEX (initial investments) or OPEX (energy, management, maintenance costs etc.) of EV charging infrastructure?**

Fiscal stimulation mentioned in the previous question is sufficient, so currently there is no extra need for CAPEX or OPEX subsidies in Flanders.

- **Do you think that with the current charging tariffs applied in Flanders, a private CPO/MSP is able to generate profits?**

The concessions for the installation of public chargers in Flanders obliges the CPOs that won the concession to install the charging points in certain locations where it is sometimes not economically viable, leading to revenue losses for the CPO. However, in places where there is sufficient demand for charging (e.g. big cities, main roads, malls etc.) the CPOs are able to generate profits even now, considering the current limited number of EVs present on the roads. Furthermore, as the number of EVs is going to increase, these profits would grow as well. However, the important thing to retain is that the chargers need to be placed in locations where it would be economically viable, and currently the choice of unpopular locations (in order to have a widespread network of EV chargers) is considered to be a big failure of the latest concession of the Flemish government. It would be more beneficial to deregulate the EV charging market and let the private companies choose the locations and tariffs following the revenue generation principles, that in their turn are highly dependent on the customer preferences (concerning the necessity of chargers in certain locations, willingness to pay, etc.).

- **Do you think that EV charging tariff structure should favor any of the following statements?**

- **Guarantee the availability of charging stations:**

The availability of the station is important, but it should not be related to the tariff structure.

- **Favor the users that most use charging points:**

Yes, but there is currently too little flexibility in the charging tariffs regulations defined in the concession contracts in order to make this kind of differentiation.

- **Change the behavior of drivers:**

This question can be related to Smart Charging technology, which is beneficial for DSOs and the energy market. However, in order to incentivize the user to use the technology there should be some beneficial customer-friendly tariffs in place, which are, again, not present due to too little flexibility in the charging tariffs regulations defined in the concession contracts.

- **Incentivize charging during off-peak hours:**

The answer is related to the previous question, and indeed, it is not possible to the present tariff regulations.

- **Maximize income (business opportunities):**

Maximize the profits is the type of society we live in, but we need to find equilibrium between the profit maximization and the access to chargers. A balance needs to be found between the current overregulated market and the complete absence of any kind of regulation. There should be some governmental regulations related to tariffs and implementation.

- **Do you think that the tariff structure should at least allow to cover OPEX?**

Yes, it is a healthy principle of a business that the OPEX is covered.

- **Do the CPOs in Flanders generally own the charging points or act under a concession?**

From the CPOs in Flanders, there is only one significant company in the public space – Allego. They own their charging infrastructure and received a right to operate it for the next 8 or 10 years. After that period the concessor (the authority that granted the concession) has two options: they can ask Allego to take the infrastructure away or leave it there and make a new contract with the existing or a new operator.

- **Could you estimate the average payback period of initial investments in EV charging infrastructure?**

Initially, more than 10 years. However, due to the rising number of EVs on the roads, the payback period is becoming shorter than the expected 10 years for good locations.

- **If the operating income is negative, how do these companies offset the loss?**

The companies typically find new investors (either public through IPO (e.g. Fastned, EVBox) or funded by private investors).

- **Could you name the main OPEX of management of EV charging infrastructure?**

- **What is the most impactful cost?**

Distribution costs and taxes on electricity distribution, maintenance of the chargers, electricity commodity costs, software for the operation of EV charging infrastructure, (not OPEX: depreciation of chargers).

- **What is the most rapidly changing cost?**

Electricity commodity price (there are market forecasts present), electricity distribution tariffs and taxes.

- **Which cost is the most difficult in terms of anticipating its evolution?**

Electricity distribution tariffs and taxes, dependent on government decision.

- **Could you please indicate the Certipower's main revenue streams?**

At the moment, the main source of revenue of Certipower is the sales of EV chargers. However, the company intends to develop itself in the CPO field. Certipower does not get any subsidies, except of the fact that the charging infrastructure would be fiscally interesting for its clients (if the charging infrastructure on the company site is be available to public, it can be fiscally deductible for 200%. For private households, the purchase and installation of non-public charger can be reimbursed by 45% (up to 1500€) through the reduction of personal income taxes).

- **Could you please elaborate on the tariff structure applied to the public EV charging?**

- **Is there a fixed minimum level of recharging?**

In the public space in Brussels (the PitPoint/Total concession): There is a minimum amount of 5 kWh that can be charged. Fast plug in and out without a bill is possible when there is less than 0,5 kWh charged.

- **Is tariff related to minutes or energy charged?**

In the public space in Brussels (the PitPoint/Total concession): For the CPO the tariff is always related to energy charged, but the MSP can send bill to the customers related to plugged in minutes.

- **Is there a differentiation of the tariff in day/night hours or other time slots?**

In the public space in Brussels (the PitPoint/Total concession): Not at the moment.

- **Are there any discounts or special offers for special users, such as taxis, freight fleets, carsharing companies?**

In the public space in Brussels (the PitPoint/Total concession): Not at the moment.

- **Is there any differentiation of charging prices dependent on the type of vehicle (plug-in hybrids, motorcycle etc.) or amount of energy charged?**

In the public space in Brussels (the PitPoint/Total concession): No.

- **Are there any official restrictions in placing certain tariffs?**

In the public space in Brussels (the PitPoint/Total concession): The tariff that the CPO should charge is the tariff communicated to the CPO when concession was won. However, there is a price revision formula (e.g. if electricity price doubles, the charging price has to adjust; if the inflation reaches 100%, the charging price has to adjust etc.).

- **Could you please elaborate on how parking for EV charging needs is regulated?**

You have two types of roads in Belgium: regional and municipal. On the regional roads in order to take some parking spaces (for instance equip it with EV chargers and book them for EV-charging use only), you have to have the approval of the region (Flanders, Brussels, Wallonia). On the municipal roads, you have to get an approval from municipality, which differ strongly in their decisions (e.g. one municipality grants the parking slots for free, another puts a fee on it, the third does not give its approval etc.).

7.5.2.2 Luminus

Luminus is one of the main Belgian energy market players, being energy producer and supplier. Moreover, Luminus participates in the EV charging market both by playing CPO and MSP roles.

- **How do you classify these services/process in the order of importance?**

(5-Very important 4- Mildly important 3- Just ok 2- Don't Care 1- Least considered)

- a) **Subsidized price or even free top-up.** 5 (everything that helps diminishing the base investment is welcome)
- b) **Recharge price at a lower cost in association with purchases at certain establishments.** 1
- c) **Parking that offers lower parking fee to charging.** 4
- d) **Location of recharging points in the best parking spaces?** 4
- e) **Location of points on the road on main roads, connection, etc.?)** 4

- **Which one is of the highest values for you, as an MSP?**

- a) **Possibility to charge everywhere. (A universal Badge for all charging stations)**
- b) *Possibility to charge at lowest price*
- c) *Possibility to charge green/renewable power*

- **Do you think that public authorities should subsidize the installation of CAPEX recharging points or the cost of OPEX energy?**

CAPEX should be subsidized.

- **Do you think that with the rates that apply in your city, a private CPO can have profit?**

It depends mainly on the location and usage, but if these 2 factors are reunited profit is possible. As far as Brussels is concerned we have highly profitable cp (eg DC charger on commercial area) other will never make money.

- **Do you think that a tariff structure should favor any of the following?**

- a) *Guarantee the availability of charging stations* Y
- b) *Favor the frequent users of the charging points. (Loyalty scheme)* Y
- c) *Change the behavior of drivers* Y
- d) *Incentivize the use of EV's* Y
- e) *Incentivize charging during off-peak hours* Y
- f) *Maximize income (business opportunities)* Y

- **Do you think that a tariff structure should allow to finance CAPEX by users?**

Yes.

- **Do you think participation in smart charging experimentations should be encouraged through tariff incentives?**

Yes.

- **What is the most impacting cost for you? What is the most rapidly changing cost? What is the most difficult cost on which anticipating evolutions?**

- *Most Impacting: Connection to grid, civil works*
- *Most Changing: -*
- *Most difficult to anticipate evolution: Energy (cfr: taxation strategy)*

- **Operating income: Do you sell through tariffs or do you have subsidies or other sources of income?**

Some subsidized CAPEX cost for DC chargers.

- **What are the Tariffs that you apply?**

- a) *Minimum recharge. **No***
- b) *Tariff related to minutes or energy charged*
- **CPO:**
 - a) *AC: Average 0,35€/kWh*
 - b) *DC: Average 0,35€/kWh + Parking time 0,20€/min*
- **MSP: 0,01€ fee per kWh**
 - a) *Differentiation of the tariff in day / night hours or other time slots. **No***
 - b) *Payment for frequency of use, or for other reasons (taxis, freight fleets). **No***
 - c) *Different prices by type of vehicle or by amount of energy recharged (plug-in hybrids, ...) **No***

7.5.3 Fleet manager

7.5.3.1 Swift

Swift is a fleet manager company active in Belgium, that has fully switched to the electric mobility.

- **How do you classify these services/process in the order of importance?**

(5-Very important 4- Mildly important 3- Just ok 2- Don't Care 1- Least considered)

- **Recharge price at a lower cost in association with purchases at certain establishments.** 3
- **Subsidized price or even free top-up.** 4
- **Parking that offers lower parking fee to charging.** 2
- **Location of recharging points in the best parking spaces?** 1
- **Location of points on the road on main roads, connection, etc.?)** 5
- **Which one is of the highest values for you?**
 - a) *Possibility to charge everywhere. (A universal Badge for all charging stations)* **MOST Important (5)**
 - b) *Possibility to charge at lowest price* **Third Most Important (3)**
 - c) *Possibility to charge green/renewable power* **Second Most Important (4)**
- **Do you think that the authorities should subsidize the installation of CAPEX recharging points or the cost of OPEX energy?**

In my opinion the government should in first instance support the CAPEX investment (installation of more charging point) in order to boost electromobility but public authorities should somehow also control/watch tariffication of public charging points to avoid exaggerations.
- **Do you think that with the rates that apply in your city, a private CPO can have profit?**

One has to find a good compromise between charging points availability and enough speed of charging. People would then be ready to pay somehow more for a fast charge which would make the business of a private CPO profitable.
- **Do you think that a tariff structure should favor any of the following?**
 - a) **Guarantee the availability of charging stations** Yes
 - b) **Change the behaviour of drivers** Yes
 - c) **Incentivize the use of EV's** No
 - d) **Incentivize charging during off-peak hours** Yes
 - e) **Maximize income (business opportunities)** Not applicable to SWIFT
- **Do you think that a tariff structure should allow to finance OPEX service by users?**

Yes.

- **Do you think participation in smart charging experimentations should be encouraged through tariff incentives?**

Yes, depending on location of the charging point (if people have to wait in the middle of nowhere, they won't be keen to participate to any experimentation).

- **Do you agree that public authorities should subsidize the cost of implementing charging points as well as the energy?**

I think public authorities should subsidize charging points but they should especially also subsidize local energy production infrastructure (solar panels) to ensure vehicles drive with green energy.

- **Do you feel that charging cost and tariff structure are appropriate for your needs at SWIFT?**

At Swift our electricity price is currently satisfactory (of course this can change with the time and potential new taxes) but I am concerned about some public tariffs. (subject to fluctuation)

- **Which improvements in tariff structure would you suggest to fit your needs?**

I think homogenisation of tariff structure is the most important improvement to bring (reduce the fluctuation as much as possible).

- **Do you think there are incentives to the use of public charging stations?**

The biggest incentive for me is the availability of charging points and the speed of charge.

7.6 Bari

7.6.1 CPO and MSP

7.6.1.1 EnelX

EnelX is a company with very solid roots in the energy sector and a strategy aimed at innovation, sustainability and digitalization. It offers intelligent, fast and intuitive technologies to allow our customers to live and manage their businesses in a simpler and more sustainable way.

Furthermore, EnelX creates innovative solutions for people, companies and cities that can facilitate the transition towards sustainable use of energy: intelligent lighting systems, electric mobility and fast charging services, tools for energy management and systems in homes, buildings and cities, and software to control the exchange of energy in distributed self-generation systems.

Currently in the city of Bari there are 69 charging points of which 35 belong to EnelX all located on street. These points can be divided according to power: less than 7 kW, between 8 and 22 kW, between 22 and 50 kW; and 50 kW.

The rates are € 0.01 / minute and € 0.38 / kWh for AC Type 3A - 3.7 kw and AC Type 2 - 20.4 kw; and at € 0.01 / minute and € 0.44 / kWh for the 60 kw DC Combo; 60 kw DC ChaDeMo; 43 kw AC Type 2.

- **What incentives would you suggest to encourage the use of electric vehicles?**

Discounted charging prices, with a widespread structure of the charging infrastructure.

- **Do you think municipal and metropolitan authorities should subsidize the installation of charging points?**

Yes, we think that municipal and metropolitan authorities should subsidize the installation of charging points.

- **Do you think municipal and metropolitan authorities should subsidize management and maintenance costs?**

Yes, we think that municipal and metropolitan authorities should subsidize management and maintenance costs.

- **Do you think that with the rates in force in your city, a private charging station operator can profit and therefore may be interested in investing?**

Yes, we think that with the rates in force in your city, a private charging station operator can profit and therefore may be interested in investing.

- **Which statements should be among the first to encourage the use of electric vehicles?**

- *Guarantee capillary availability of the charging points.*
- *Maximize business opportunities.*

- **Do you think that a tariff structure should allow users to finance the OPEX service (management, maintenance)?**

Yes, we think that a tariff structure should allow users to finance the OPEX service.

- **What is your position on the diffusion of electric vehicles?**

- *Adopt a broad incentive policy to encourage the use of electric vehicles.*
- *Build a large number of charging stations.*

- **As a CPO are you willing to enter into concession contracts?**

Yes, but it depends on the business opportunities.

- **Are you willing to partially bear the CAPEX costs (connection to the electricity grid, civil works, equipment, etc.), to ensure a greater diffusion of the electricity infrastructure?**

Yes, but it depends on the business opportunities.

- **Do you think the operating costs are sustainable (cost of energy, cost of the power supply terminal, cost of parking, cost of installation, cost of ordinary and extraordinary maintenance)?**

Operating costs are undergoing a significant increase given the ever increasing demand for electric charging.

- **What cost do you think has the most impact?**

The most impacting cost is that of installing a new charging infrastructure.

- **What is the fastest changing cost?**

The cost that changes most rapidly is the cost of energy

- **What is the cost for which it is more difficult to anticipate changes?**

It is difficult to anticipate developments.

- **What tariffs do you think can be applied to the top-up?**

- *Cost of electric charging, with a minimum basic cost.*
- *Differentiation of the tariff based on the hours of the day / night.*
- *Discounted rates based on frequency of use.*

- **Regarding short, medium and long term investments in electro-mobility, what do you consider when planning this investment?**

The market trend is considered, especially the trend in electricity demand.

7.6.2 Authorities

The municipality of Bari does not have charging stations in its work areas. In addition, the public administration is renovating the fleet of public vehicles. But for the couple of A.Q.P. interviews, they have recharging points in their work areas.

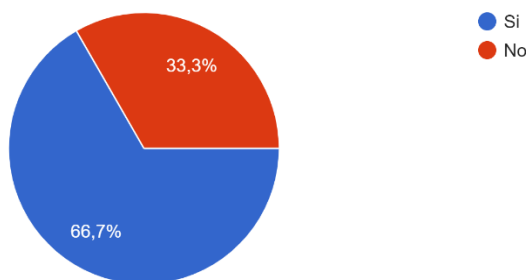


Figure 14. Graph of charging point in work area

From the interviews is emerged that the management of charging points is equally divided into:

1. Direct management of recharging points (The public authority owns chargers and manages the infrastructure and decides the rates).
2. Concession (The public body grants public space to a CPO to manage a recharging point).
3. Direct management through private charging points within the company.

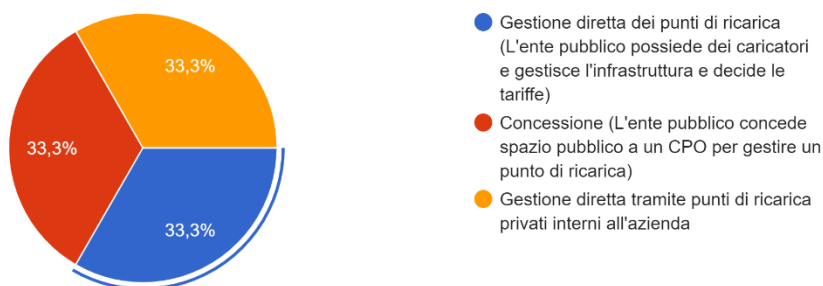


Figure 15. Graph of manage points

A similar situation of parity emerged from the interviews about the type of vehicle used. But Municipality of Bari haven't owned electric vehicles.

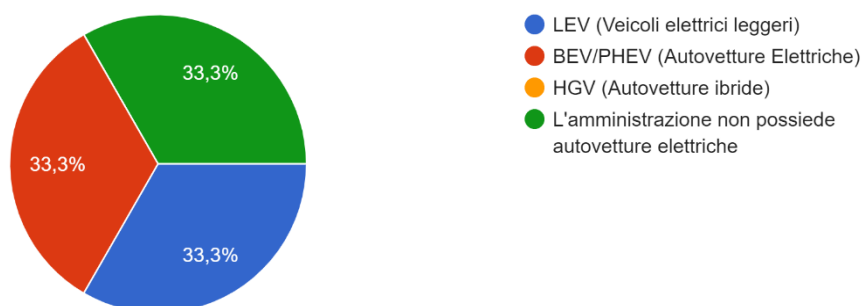


Figure 16. Graph of type of vehicles used

From the interviews, for BEV / PHEV (Electric Cars) the power of the recharging points used is divided as follows:

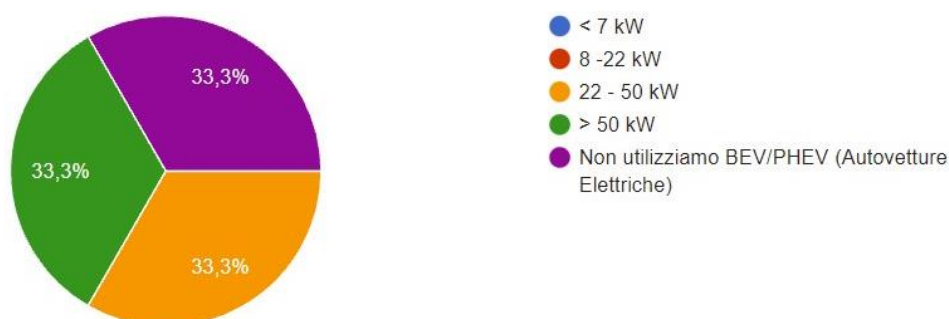


Figure 17. Graph of power of charging points

From the interviews, it is clear that the location of the private car charging points is divided by AQP into private areas while for the municipality of Bari the car charging points are absent.

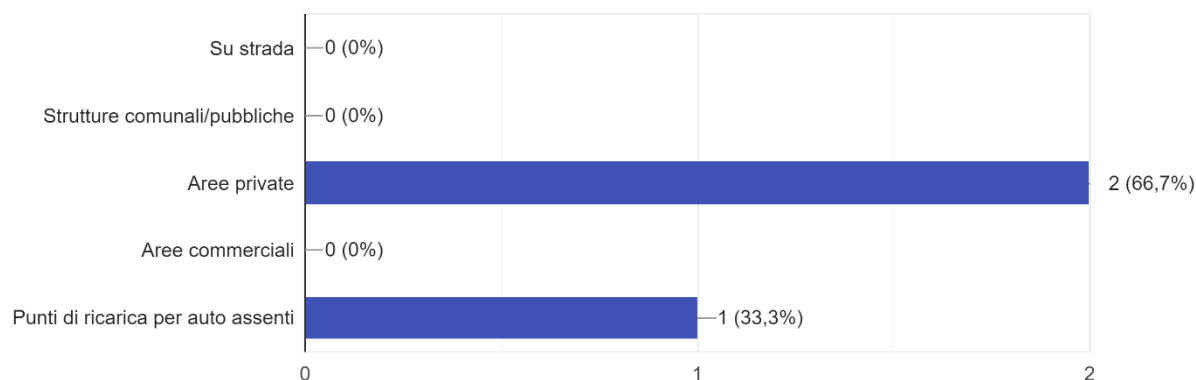


Figure 18. Graph of location of charging points

Also from the AQP interview, they have 10 LEV light vehicle charging points located in private areas.

7.6.2.1 Municipality of Bari

The municipality of Bari does not have any recharging points and they cooperate with CPO through public land concession. In addition, the municipality does not own any type of electric vehicles.

- **Are you aware of the current incentives applied in your city? What incentives would you suggest to encourage the use of electric vehicles?**

The incentives are entrusted to CPOs external to the public body.

- **Which incentives are best suited to your needs?**

- *Subscriptions and discounts with the electric vehicle manufacturer.*
- *Free access of electric vehicles in the LTZ.*

- *Use of an app that allows you to view the free charging columns and the possibility of booking by time slots.*
- **Do you think municipal and metropolitan authorities should subsidize the installation of charging points?**
Yes, we think that municipal and metropolitan authorities should subsidize the installation of charging points.
- **Do you think municipal and metropolitan authorities should subsidize management and maintenance costs?**
Yes, we think that municipal and metropolitan authorities should subsidize management and maintenance costs.
- **Do you think that with the tariffs in force in your city, a private charging station operator can profit and therefore may be interested in investing?**
Yes, we think that with the tariffs in force in your city, a private charging station operator can profit and therefore may be interested in investing.
- **Which statements should be among the first to be favored to encourage the use of electric vehicles?**
 - *Guarantee the capillary availability of the charging stations in the area*
 - *Change driver behavior, driving style, sustainability education*
 - *Encourage charging during off-peak hours*
- **Do you think that a tariff structure should make it possible to finance the management and maintenance service by users?**
Yes, we think that a tariff structure should make it possible to finance the management and maintenance service by users.
- **What is your position on the development of electric vehicles?**
Adopt a broad incentive policy to encourage the use of electric vehicles.
Build a large number of charging stations.
- **In the last few years, have you sold spaces of your property under concession on the road to be used as recharging points?**
Yes, in the last few years, we have sold spaces of our property under concession on the road to be used as recharging points.
- **In the event of unauthorized occupation of the charging area, are measures envisaged to impose penalties for the occupation of the parking areas dedicated to charging?**
Yes, in the event of unauthorized occupation of the charging area, there are measures envisaged to impose penalties for the occupation of the parking areas dedicated to charging.

- **What are the main obstacles you might encounter in imposing the measures referred to in the previous question?**

The obstacles could be one could be prolonged stops of non-electric or unauthorized vehicles that could involve a forced removal in order to free the column and make it usable by citizens.

- **Regarding short, medium and long term investments in electro-mobility, what do you consider when planning this investment?**

We consider the market trend, the opportunities to evolve the mobility of the city into a more eco-sustainable one.

7.6.2.2 A.Q.P. Acquedotto Pugliese - (g. Mastrodonato)

A.Q.P. have 10 LEV and 2 BEV/PHEV private charging points direct managed by a division of the company.

- **Are you aware of the current incentives applied in your city? What incentives would you suggest to encourage the use of electric vehicles?**

No. It would be enough, as an incentive, to increase the charging points.

- **Which incentives are best suited to your needs?**

- *Facilitated top-up prices in relation to the location of the stop in the city*
- *Free access of electric vehicles in the LTZ*

- **Do you think municipal and metropolitan authorities should subsidize the installation of charging points?**

Yes, we think that municipal and metropolitan authorities should subsidize the installation of charging points.

- **Do you think municipal and metropolitan authorities should subsidize management and maintenance costs?**

Yes, we think that municipal and metropolitan authorities should subsidize management and maintenance costs.

- **Do you think that with the tariffs in force in your city, a private charging station operator can profit and therefore may be interested in investing?**

Yes, we think that with the tariffs in force in your city, a private charging station operator can profit and therefore may be interested in investing.

- **Which statements should be among the first to be favored to encourage the use of electric vehicles?**

- *Guarantee the capillary availability of the charging stations in the area.*
- *Change driver behavior, driving style, sustainability education.*

- **Do you think that a tariff structure should make it possible to finance the management and maintenance service by users?**

Yes, we think that a tariff structure should make it possible to finance the management and maintenance service by users.

- **What is your position on the development of electric vehicles?**

- *Adopt a broad incentive policy to encourage the use of electric vehicles.*
- *Advertising intended as information and dissemination of the product.*

- **In the last few years, have you sold spaces of your property under concession on the road to be used as recharging points?**

No, in the last few years, we haven't sold spaces of our property under concession on the road to be used as recharging points.

- **In the event of unauthorized occupation of the charging area, are measures envisaged to impose penalties for the occupation of the parking areas dedicated to charging?**

Yes, in the event of unauthorized occupation of the charging area, there are measures envisaged to impose penalties for the occupation of the parking areas dedicated to charging.

- **What are the main obstacles you might encounter in imposing the measures referred to in the previous question?**

The obstacles could be one could be prolonged stops of non-electric or unauthorized vehicles that could involve a forced removal in order to free the column and make it usable by citizens.

- **Regarding short, medium and long term investments in electro-mobility, what do you consider when planning this investment?**

I certainly consider that electro-mobility will be the future of sustainable mobility, but alas it is still far away.

7.6.2.3 A.Q.P. Acquedotto Pugliese - (s. Monno)

A.Q.P. have 10 LEV and 3 BEV/PHEV private charging points direct managed by themselves.

- **Are you aware of the current incentives applied in your city? What incentives would you suggest to encourage the use of electric vehicles?**

I would suggest discounted rates to encourage the use of electric vehicles.

- **Which incentives are best suited to your needs?**

Facilitated top-up prices in relation to the location of the stop in the city

- **Do you think municipal and metropolitan authorities should subsidize the installation of charging points?**

Yes, we think that municipal and metropolitan authorities should subsidize the installation of charging points.

- **Do you think municipal and metropolitan authorities should subsidize management and maintenance costs?**

Yes, we think that municipal and metropolitan authorities should subsidize management and maintenance costs.

- **Do you think that with the tariffs in force in your city, a private charging station operator can profit and therefore may be interested in investing?**

Yes, we think that with the tariffs in force in your city, a private charging station operator can profit and therefore may be interested in investing.

- **Which statements should be among the first to be favored to encourage the use of electric vehicles?**

Encourage users who use recharging points the most with dedicated discount formulas

- **Do you think that a tariff structure should make it possible to finance the management and maintenance service by users?**

Yes, we think that a tariff structure should make it possible to finance the management and maintenance service by users.

- **What is your position on the development of electric vehicles?**

Adopt a broad incentive policy to encourage the use of electric vehicles

- **In the last few years, have you sold spaces of your property under concession on the road to be used as recharging points?**

No, in the last few years, we haven't sold spaces of our property under concession on the road to be used as recharging points.

- **In the event of unauthorized occupation of the charging area, are measures envisaged to impose penalties for the occupation of the parking areas dedicated to charging?**

No in the event of unauthorized occupation of the charging area, there aren't measures envisaged to impose penalties for the occupation of the parking areas dedicated to charging.

- **What are the main obstacles you might encounter in imposing the measures referred to in the previous question?**

The obstacles could be one could be prolonged stops of non-electric or unauthorized vehicles that could involve a forced removal in order to free the column and make it usable by citizens.

- **Regarding short, medium and long term investments in electro-mobility, what do you consider when planning this investment?**

I consider the real use of the means.

7.7 Greece

7.7.1 CPO and eMSP

7.7.1.1 FORTIZO

Fortizo is a private company that has been developing its charging network since 2013. FORTIZO is offering a wide range of charging technologies for home, commercial or public applications across the country.

- **What incentives apply in your city? What incentives do you offer?**

Two major incentives are highlighted during the interview: a) For CPOs, the cost of purchasing a new charging infrastructure is deduced from the gross income by 150% and b) For EV users, incentives for purchasing new EV.

Energy suppliers are not supporting off-peak energy tariffs, so there is no motivation for eMSP/CPOs to offer price incentives for EV charging during off-peak hours. In some EU countries, (ex. Germany) off-peak energy prices are available.

For frequent customers, Fortizo offers a discount on the charging cost up to 46% for non-home charging sessions. Such an incentive is crucial for areas where there is lack of private charging places and the need for public charging infrastructure is increased.

Fortizo offers CPO services to local authorities in Greece, where public charging is offered as a free of charge service while parking might have a cost depending on the popularity of the charging place.

Fortizo has also bi-lateral agreements with supermarkets and hotels offering also CPO services to them. Supermarkets and hotels might operate as Sub-CPOs offering special charging prices, ex. In supermarkets, charging service is free of charge by providing the retail receipt.

- **Do you think that the authorities should subsidize the installation of CAPEX charging points or the cost of OPEX (energy, maintenance, etc ...)?**

This is a compound question. For the CPO's perspective, subsidies and most preferably for the OPEX costs (i.e. leasing area, grid connection costs, energy, etc.) are needed mainly for the long-term planning and development of the charging network.

Generally speaking, in countries where the CAPEX of the charging infrastructures is only subsidised by national resources at an early e-mobility deployment stage, it is usually hindering upscaling and business expansion. We need to ensure that the charging infrastructure deployed will be viable in the long term and will not rely on subsidies.

In Greece where the EV maturity level is quite low, incentives for OPEX and CAPEX could be a tool for promoting electromobility. However, since the adopted emobility model in Greece is the one defined by the independent market concept, there is little to no room for subsidies. Benefits are derived through supply-demand process.

Spatial incentives where market conditions are not allowing the development of an adequate charging network, could be an effective solution.

- **Do you think that with the rates that apply in your city, a private charging station operator can have profit and therefore interest in settling there? (in order to increase competition)**

No, the e-mobility maturity level in Greece is low and the charging needs are rather low. Home / private charging is the basic one and the need for public charging is very limited at this moment.

With the current volume of EVs / percentage of usage of charging stations, sustainability of investments can only be achieved via subsidies. Otherwise, the charging prices should be increased to make the investment sustainable.

In Greece, investing in charging infrastructure is not profitable at this moment but it builds the company's market share of the future since emobility market is for sure an emerging one.

- **Do you think that a tariff structure should favor any of the following statements?**

- *Guarantee the availability of charging stations (valid)*
- *Favor the users that most use charging points (valid)*
- *Change the behaviour of drivers (it depends. Tariff structure may not affect the technology selection of the user, AC or DC technology, but may affect the temporal dimension of charging, ex. Charging during off-peak hours)*
- *Incentivize the use of EV's (subsidies for EV users)*
- *Incentivize charging during off-peak hours (yes, but in Greece there is the regulatory framework for off-peak prices but this is not transferred to the commercial energy contracts provided by energy suppliers)*
- *Maximize income (business opportunities) (valid)*

Apart from tariffs, time constraints are also applicable for specific cases:

- *In Olympia Odos, which is the motorway which connects Elefsina to Patras, the DC charging has a max allowable duration of 45 minutes. – Average parking time is MSS is approximately 20 minutes.*
- *In case of no B2C contract, the use of credit card for ad-hoc payment is a solution but increases the charging cost due to credit card fees. The use of cryptocurrencies could be an option in the future, as it could alleviate such fees in certain cases.*

- **Do you think that a tariff structure should allow to finance OPEX service by users?**

Fortizo offers booking service via its mobile app but it is free of charge. The usage rate of the booking service is quite low and there is no time restriction at this moment. There is only one constraint, booking time cannot be lower than an hour.

- **Do you think participation in smart charging experimentations should be encouraged through tariff incentives?**

- *There is no practical experience in smart charging at commercial sector since emobility adoption rates are relatively low in Greece.*
- *In general, some smart charging concept could be realised via price-based mechanisms.*

- **As a CPO, do you own the charging points, do you act under a concession or not? le do you cover CAPEX costs?**

Fortizo has its own charging network but it also offers CPO services to municipalities organizations and companies without having the ownership of the charging network.

- **Operating costs (ask if they are tangible costs or not): energy cost, power term cost, parking cost, charging point depreciation, installation cost, preventive maintenance cost, curative maintenance cost, and space.**

Parking costs and charging point depreciation are not tangible costs.

- **What is the most impacting cost? What is the most rapidly changing cost? What is the most difficult cost on which anticipating evolutions?**

- *CPO's OPEX when you are offering CPO services without owning the charging network. In case of charging network ownership, CAPEX is the most crucial one.*

- *In some cases, the grid connection cost can be high especially for new connections and DC chargers.*

- **Operating income: Do you sell through tariffs or do you have subsidies or other sources of income?**

- *Fixed and energy tariffs are the major mechanisms.*

- *Price incentives are offered to regular customers.*

- **Tariffs that apply to recharging (you can ask if they have any restrictions when placing them)**

- *Minimum recharge. (min charging time per session for reservation, maximum charging time for more efficient exploitation of the charging infrastructures)*

- *Tariff related to minutes or energy charged (time and energy prices are considered)*

- *Differentiation of the tariff in day / night hours or other time slots. (such contracts are not offered by the energy suppliers)*

- *Payment for frequency of use, or for other reasons (taxis, freight fleets). (there are large discounts for regular customers given that the charging sessions will be prepaid within a valid time period -3 months- there are no incentives for taxi drivers)*

- *Different prices by type of vehicle or by amount of energy recharged (plug-in hybrids, ...) (disagree with different prices by type of vehicle, scalable energy prices were experimented in a pilot but no tangible conclusions were drawn)*

- **If they manage points on the road, how is parking regulated? Is the property owned by the company or is it under a concession?**

- *You are not allowed to rent a public / on-street parking place by the current regulatory framework.*

- *In private parking, sensors or other barriers are used for tracking or preventing unauthorised parking.*

- *For public parking spaces, it is under the responsibility of the municipality to penalise the improper use of parking space of a charging infrastructure.*

- **Regarding the short term investments, do you plan these considering the current incomes (tariffs)? What do you consider when planning short term investment?**
 - *The short-term charging network planning is conducted considering the current tariffs.*

- **Regarding the medium and long term investments, what tariff structure and fees (incomes) are you planning to have in order to plan these investments?**
 - *It is highly dependent on the foreseen usage rate and the competition level.*

7.7.1.2 Eunice Energy Group

Eunice Energy Group and Blink Charging establish a Joint Venture to target European Electric Vehicle (EV) Charging Market. On **March 2019, Blink Charging and the Eunice Energy Group** established a **Joint Venture** to target **European Electric Vehicle (EV) Charging Market** starting from Greece. Blink Charging Europe Ltd. ("Blink Europe"), the JV entity, was formed with the purpose of leveraging Blink's EV products, network, technology, and experience within the EV charging space alongside Eunice's position and financial abilities to expand the charging infrastructure in Greece and other European countries.

- **What incentives are applied in your city? What incentives do you provide?**

Some public charging points are free of charge for the moment.

- **Do you think that the authorities should subsidize the installation of CAPEX recharging points or the cost of OPEX energy?**

CAPEX incentives is more relevant for home charging, OPEX for semi public, CAPEX & OPEX for public.

- **Do you think that with the rates that apply in your city, a private charging station operator can have profit and therefore interest in settling there?**

With the current rates it might take 5-7 years to payback the investment, just from charging fees.

- **Do you think that a tariff structure should favor any of the following statements?**

- *Guarantee the availability of charging stations* No
- *Favor the users that most use charging points* No
- *Change the behaviour of drivers* Yes
- *Incentivize the use of EV's* No
- *Incentivize charging during off-peak hours* Yes
- *Maximize income (business opportunities)* Yes

- **Do you think that a tariff structure should allow to finance OPEX service by users?**

It could be beneficial.

- **Do you think participation in smart charging experimentations should be encouraged through tariff incentives?**

Yes.

7.7.1.3 EVBlink

In Greece, EVBlink holds across Greece more than 200 spots, 40 more spots are installed in private areas from commercial charging needs.

- **Applied tariff structure to final users. Is car park charged?**

Our company has applied tariff scheme per energy (kWh) and not per time. Our platform can support both payment schemes, but we believe charge per energy is something better for the EV driver as he pays as far as he receives energy.

- **Applied tariff structure of the CPO which is connected to**

Blink Hellas is both CPO and EMSP so not tariff is included.

- **Structure (in percentage) of the CAPEX (hardware, software, communication systems, other)**

Hardware is the vast majority especially when infrastructure is included in the works made.

- **Structure (in percentage) of OPEX (energy, installation maintenance, communications, client enquiries, management, financial expenditures, etc)**

Technical maintenance and client satisfaction are maybe the most important parts. Also energy is a big part of the costs.

- **Tariff structure applied to their charging points by eMsP. Is parking charged at any of the sites?**

Our company has applied tariff scheme per energy (kWh) and not per time. Blink Hellas is both CPO and EMSP so not tariff is included.

- **Structure (in percentage) of the CAPEX (land, electric network connection, civil works, equipment, etc)**

Civil works and electric network connections are very important in terms of costs. Time delays on electrical connections is also a matter that should become easier.

- **Structure in percentage of the OPEX: energy consumption (fixed term), energy, maintenance of installations, communications, client enquiries, financial expenditures, public loans, etc)**

Technical maintenance and client satisfaction are maybe the most important parts. Also energy is a big part of the costs.

- **What incentives are applied in your city? What incentives do you provide?**

In Greece, a quite important development has been noticed on e-mobility policy over the last months. In these policy measures, a mix of fiscal and non-fiscal incentives has been announced. More specifically, some of the major incentives can be summarized below:

- *Fiscal incentive on buying a new BEV. This incentive depends on the type of car and can be much greater for commercial uses, such as TAXI drivers.*
- *Fiscal incentive on buying EV charger for home applications. This subsidy is around 500 EUR and can easily help the increase of home charging spots.*
- *Incentives on EV parking. In cities, such as Athens, EV drivers can have access in the center while at the same time they can park for free in some of the most traffic-intense*

spots. That is something critical especially for cities like Athens, where traffic create massive problems in daily move.

- *Tax reductions are also occurred for companies that install publicly available charging spots in their places. This reduction can be greater when 100% RES are used for feeding these EV spots.*

- **Do you think that the authorities should subsidize the installation of CAPEX recharging points or the cost of OPEX energy?**

This is a political decision that is highly affected from other very important factors, such as economy. Therefore, we can declare that CAPEX is the biggest part of the investment, as except from the charger itself, there is a great cost that is related to the infrastructure that needs to be created alongside the unit.

- **Do you think that with the rates that apply in your city, a private charging station operator can have profit and therefore interest in settling there?**

EV market across the Europe, and especially in virgin markets like Greece, is a long term investment. In this spectrum, the operator should know that this investment will have profit after some years. For this reason, it is highly important not only to install units but to keep it operating for many years also.

- **Do you think that a tariff structure should favor any of the following statements?**

- *Guarantee the availability of charging stations - YES*
- *Favor the users that most use charging points - YES*
- *Change the behaviour of drivers - YES*
- *Incentivize the use of EV's - No*
- *Incentivize charging during off-peak hours - YES*
- *Maximize income (business opportunities) - No*

- **Do you think that a tariff structure should allow to finance OPEX service by users?**

I think not. We should see the entire investment in a long view and not with today numbers only.

- **Do you think participation in smart charging experimentations should be encouraged through tariff incentives?**

I agree. Smart charging can create new options and provide solutions in EV charging.

- **As a CPO, do you own the charging points, do you act under a concession or not? ie do you cover CAPEX costs?**

Our company provides a total solution where the equipment is covered by us. Our aim is to give a turn key solution and provide the service of EV charging to the end user (EV driver)

- **Operating costs (ask if they are tangible costs or not): energy cost, power term cost, parking cost, charging point depreciation, installation cost, preventive maintenance cost, curative maintenance cost, and space.**

Operation cost will be defined by the time. The more time you have the units installed the more data and experience you collect. We are really sure that we will be ready to be there for a long period of time.

- **What is the most impacting cost? What is the most rapidly changing cost? What is the most difficult cost on which anticipating evolutions?**

Infrastructure cost is the most difficult. It is also the most variant as it may vary from area to area due to factors such as grid connectivity and availability in the area.

- **Operating income: Do you sell through tariffs or do you have subsidies or other sources of income?**

We sell energy to the EV drivers and this is the source of income for our investment.

- **Export result: Time of PayBack point estimate**

Long time investment.

- **If negative, how is the loss offset?**

Can not be announced in that stage.

- **Tariffs that apply to recharging.**

a) Minimum recharge.

Currently not offered.

b) Tariff related to minutes or energy charged

Only in energy. Currently this cost is at 0.40 EUR/kWh plus VAT (24%)

c) Differentiation of the tariff in day / night hours or other time slots.

Currently the same one.

d) Payment for frequency of use, or for other reasons (taxis, freight fleets).

We offer custom pricing for fleet members and large companies. This is applicable in their private stations too.

e) Different prices by type of vehicle or by amount of energy recharged (plug-in hybrids, ...)

Currently not offered.

- **If they manage points on the road, how is parking regulated? Is the property owned by the company or is it under a concession?**

Installing a charger on a road, requires permit from the local relevant authority. In this spectrum, local municipality or other authority gives as the right to install the unit, under the official decision that has been taken by the local council. In this way, a charger can be installed and the parking areas are offered for EV services.

- **Regarding the short term investments, do you plan these considering the current incomes (tariffs)? What do you consider when planning short term investment?**

Our commercial policy is really user-focused. In this way, we are able to invest even in areas where not great income will be produced today. We foresee that the long time investment is something that should afford this type of installations. In this way, we can install a charger even in a place where a small amount of EV drivers are already there. We want to keep the drivers as satisfied as we can.

- **Regarding the medium and long term investments, what tariff structure and fees (incomes) are you planning to have in order to plan these investments?**

We are not ready to announce yet. We believe the competition and the market rules will define the result.

7.7.2 Municipalities

We have communicated with municipalities and the feedback was that their activities concerning the development of public charging infrastructures are very limited. At city level, there are some initiatives by the private sector where the charging process is free mainly to promote the mobility concept. The current maturity level of mobility in Greece is rather low so the public charging network (at public places) is too limited. Thus, municipalities could not provide answers to this questionnaire.

7.8 Turkey

7.8.1 CPO and EMSP

7.8.1.1 ZES

As of 2018, Zorlu Enerji has now grouped its new generation of technological operations under the ZES brand. With ZES brand, the company aims to accelerate popularization of electric vehicles and to facilitate the travels of electric vehicle owners in Turkey with several rapid charging stations commissioned in city roads and highways. In addition to rapid charging services offered in public areas, the company also provides charging station commissioning at homes and at businesses based on user demand. ZES aims to increase its charging station network and to make electric vehicles available throughout Turkey.

- **What incentives apply in your city? What incentives do you offer?**

The state charges less tax on the purchase of electric vehicles than internal combustion vehicles. But even in this case, tax rates are extremely high comparing with Europe. There are no other incentives of subsidize mechanism which are applying by state or local authorities. Unfortunately, not much convenience is provided in line with tax advantages and incentives. On their side, according to the agreements they have with corporate customers, we provide different discounts independent of the number of charging transactions.

- **Tariff structure applied to their charging points by eMsP. Is parking charge at any of the sites?**

For AC Type 2 sockets, prices are 0,22 TL/min up to 7,4 kW, 0,33 TL/min between 7,4 kW to 11 kW and for above 11 kW price is 0,44 TL/min. And we are applying different tariffs for DC CCS&CHAdEMO sockets and we are applying different prices for average power up to 50 kW, 50 kW – 90 kW and above 90 kW. In addition, our guest users pay an extra 100 TL for the use of AC sockets and an extra 200 TL for the use of DC sockets. For the second question, he said that parking fee is not collected locally. It is taken by the location owner according to the preferences of some businesses (hotel, parking lot, etc.) with charging stations and most of the time there is no charge.

- **Do you think that the authorities should subsidize the installation of CAPEX charging points or the cost of OPEX (energy, maintenance, etc ...)?**

There are different cost items in the installation and operation of the charging station. However, since CAPEX constitutes most of the expenses, it would be good for them to provide support on the infrastructure and device side.

- **Do you think that with the rates that apply in your city, a private charging station operator can have profit and therefore interest in settling there? (In order to increase competition)**

With the increasing number of electric vehicles in Turkey, the number of users is also increasing. Considering that domestically produced electric vehicles and different brands/models will enter the market next year, we think that investors can make a profit.

- **Do you think a fee structure should favor any of the following statements?**

It is necessary to ensure that the stations are not used unnecessarily. We think that the tariffs should be arranged based on this situation. A certain occupation fee can be offered when the stations are outside of their usage periods and new users can be prevented from being victimized.

- **Do you think that a tariff structure should allow to finance OPEX service by users?**

At this time, they do not consider it to be funded by users. However, OPEX expenses can be considered within the current tariff structure.

- **Do you think participation in smart charging experimentations should be encouraged through tariff incentives?**

Smart charging concepts will be more important in near future and it has to be encouraged with some incentives. Especially in order to eliminate grid congestion problems, suitable tariffs to be applied together with dynamic pricing can be preferred.

- **As a CPO, do you own the charging points, do you act under a concession or not? do you cover CAPEX costs?**

They invest most of our locations ourselves. Thus, they cover the CAPEX costs. However, they also provide partnerships with their customers who want to be direct investors, if agreed on commercial terms.

- **Operating costs (ask if they are tangible costs or not): energy cost, power term cost, parking cost, charging point depreciation, installation cost, preventive maintenance cost, curative maintenance cost, and space**

In general, they can define the main operating expenses as energy, breakdown/maintenance, and rental expenses of the relevant location.

- **What is the most impacting cost? What is the most rapidly changing cost? What is the most difficult cost on which anticipating evolutions?**

The highly volatile exchange rate in Turkey affects operational expenses seriously. For this reason, all of the costs that change depending on the exchange rate can be defined as the costs that have the most critical impact for us at this point.

- **Operating income: Do you sell through tariffs or do you have subsidies or other sources of income**

Basically; Usage revenues from public networks and corporate customers and AC/DC charger sales are our revenue sources.

- **Export result: Time of PayBack point estimate**

In the next 5 years, depending on the increasing number of vehicles and users. If negative, how is the loss offset?

- **Tariffs that apply to recharging**

Overall, they think the per-minute pricing is appropriate. But differently, tariffs based on fixed fee + consumption (kWh) + minute fee, fixed fee + minute fee or only consumption (kWh) can be applied.

- **If they manage points on the road, how is parking regulated? Is the property owned by the company or is it under a concession?**

They said that the charging units are located at the safe and suitable points of the facility recommended by the location provider, and the ownership of the charging units belongs to the operator.

- **Regarding the short-term investments, do you plan these considering the current incomes (tariffs)? What do you consider when planning short-term investment?**

Since this information is considered as business secret from their side, they were not willingly to provide any information even as percentage.

- **Regarding the medium and long-term investments, what tariff structure and fees (incomes) are you planning to have in order to plan these investments?**

Since this information is considered as business secret from their side, they were not willingly to provide any information even as percentage.

7.8.2 OEM

7.8.2.1 VESTEL

Vestel Group is a multi-industry manufacturer, which operates in electronics, household appliances, mobile technologies, charging stations, LED lighting and defence. Testimony to the global importance of across multiple technology sectors, Vestel is not only thriving at home in Turkey with its 12 companies, but also through a further 14 businesses that have been set up in various other parts of the world. Vestel is manufacturing both AC and DC fast chargers with different ranges of output powers.

Approximately % 95 of chargers can be considered as normal / fast charger and only % 5 ultra fast. They could not give exact percentage for normal and fast separately, but by the beginning of 2021, installation of DC fast chargers will have increased by CPOs so it means that they'll also produce more and sell more.

- **What incentives apply in your city? What incentives do you provide?**

Unfortunately, there are not so much incentives are applied, but in parallel with the increasing rate of EVs in Turkey, incentives will be also increased. For now, as far as they know, free charging points on some of the parking areas can be considered as one of the main incentives, which is offered to users. Some EV distributors have stations where charging rates are discounted. As CP manufacturer, they are not managing or owning any CPs and not offering an incentive.

- **Do you think that the authorities should subsidize the installation of CAPEX recharging points or the cost of OPEX energy?**

Installation of CAPEX recharging points will increase the number of charging stations and decrease range anxiety for the drivers. Also OPEX will support the increasing the number of EVs and provide sustainable operational expenses for CPOs with low rates.

- **Do you think that with the rates that apply in your city, a private charging station operator can have profit and therefore interest in settling there? (In order to increase competition)**

As of today, number of EVs is very low. By the end of 2020, there were around 26 million registered ICE vehicle while the registered number for EVs were around 3000. But we are expecting to have a sharp increase in number of EVs by 2024. But in any case, according to the number of charging points invested, ROI may take long time.

- **Do you think that a tariff structure should favor any of the following statements?**

Most of this items seem important and a for a user oriented powerfull tariff structure, nearly all of these items should be included. But from their perspective, a tariff structure especially should favour Change the behaviour of drivers and Incentivize the use of EV's from this statements.

- **Do you think that a tariff structure should allow financing OPEX service by users?**

They think this is needed to guarantee the QoS for long term.

- **Do you think participation in smart charging experimentations should be encouraged through tariff incentives?**

Smart charging will be an important option to avoiding grid related problems, with the implementation of the V1G solutions EVs may not overload or destabilize the grid, definitely it should be encouraged in future scenario, but also the term "sustainability" should be emphasised.

- **How is it condition by the rates that can be applied to charging events when designing charging points at the cost level?**

Actually, they are not considered this situation while they are designing their charging points. About fees, this may change according to the customer profile and charging use case but as far as they see even high end users checks the fees and cost levels.

- **Do you customize charging points depending on the country you are selling to? If you do so, how do you do it?**

They are customizing charging points according to the country or customer requirements but most of these customizations are configuration options and can be changed also on site.

- **What percentage of points sold include means of payment embedded in the infrastructure?**

All of their shipments are without credit card payment unit. For DC charging stations, they have started integration of credit card payment modules per new requests.

- **Regarding the short-term investments, do you plan these considering the current incomes (tariffs)? What do you consider when planning short-term investment?**

Unfortunately, due to company policy, they could not give a detailed answer to this question. But they stated that, they are closely following the EV development process in Turkey and they take their steps accordingly

- **Regarding the medium and long-term investments, what tariff structure and fees, (incomes) are you planning to have in order to plan these investments?**

Unfortunately, due to company policy, they could not give a detailed answer to this question. But they stated that, they are closely following the EV development process in Turkey and they take their steps accordingly

7.8.3 Users

7.8.3.1 EV enthusiast

There is no official user association in Turkey. Because of this issue, we've decided to conduct an interview with an e-mobility enthusiast who is known in the Turkish e-mobility sector and takes part in the activities of Turkish EV&PHEV association

- **What incentives apply in your city? What incentives do you provide?**

There are some tax incentives for electric vehicle purchases. Other than that, unfortunately, there is no serious incentive. Turkey is currently not at a sufficient level in terms of incentives. Since they do not have a structure to provide incentives, they do not take any steps in this regard.

- **Do you think that the authorities should subsidize the installation of CAPEX recharging points or the cost of OPEX energy?**

According to interviewee, CAPEX expenses have the biggest share of the pie. For this reason, giving support for CAPEX will relieve sector stakeholders.

- **Do you think that with the rates that apply in your city, a private charging station operator can have profit and therefore interest in settling there? (In order to increase competition)**

They could not say anything clear about the current structure, but with the increase in the number of electric vehicles, the interest in the sector will also increase and operators will increase the competition in this regard.

- **Do you think that a tariff structure should favor any of the following statements?**

"Guarantee the availability of charging stations" is the most critical issue. Definitely, the tariff structure should support this, and steps should be taken to eliminate grievances. Considering that electric vehicles will bring an additional load on the grid, "Incentivize charging during off-peak hours" is also an issue that should be given importance.

- **Do you think that a tariff structure should allow financing OPEX service by users?**

OPEX expenses should be included in the current tariff.

- **Do you think participation in smart charging experimentations should be encouraged through tariff incentives?**

Increasing in electric vehicles will put a serious burden on grid operators. At this point, smart charging methods will have critical importance in the future. Although not now, smart charging should be made attractive with tariff incentives in the future.

- **Do you agree that public authorities should subsidize the cost of implementing charging points as well as the energy?**

It is not necessary for the current process, but some work can be done to ensure interest in the sector and to encourage users in emobility.

- **Do you feel that charging cost and tariff structure are appropriate for your (user association) needs?**

Currently, the charging costs are a bit high but in parallel with the development in the sector, the optimization in the systems will reach a certain level and the current tariffs will be more appropriate.

- **Which improvements in tariff structure would you suggest to fit your needs?**

Considering the increase in electric vehicles in the future, a dynamic tariff structure may be more profitable for both companies and users. At this stage tariff structures should encourage mobility.

- **Do you think there are incentives to the use of public charging stations?**

Frankly, there is no clear incentive that he knows so far.

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