



Fleet managers guidebook

Purchase of electric cars & chargers

PROMOTING
pro **EME**
ELECTRIC MOBILITY EUROPE



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

- Introduction
- Ambition
- Discover the EV
- Charging the EV
- Emissions
- Costs comparison

Are you ready for an EV?

The negative impact mobility has on the environment is becoming an increasingly bigger problem. This is mainly because of the polluting character of the fossil fuel car. By switching to a much cleaner, less polluting alternative, this impact can be limited.

As a fleet manager you have the possibility to make the transition to EVs for a substantial amount of daily commuters. By making this choice you are limiting the negative environmental impact of the company, with the possible additional benefits of an improved company image and possible cost savings.

This guide is for anyone that is responsible for the operation and purchasing of vehicles for the company fleet and is considering to switch to electric cars. On the following pages, you will be introduced to some of the market's vehicles and the most important aspects of charging an EV. In addition, you will be introduced to some of the points that you should be aware of when implementing this new form of mobility.

Before starting the entire process, it is crucial to determine your own and the company's ambition. To make your ambition a bit more tangible it might be a good idea to use goals, for example in the form of emission free kilometres. Both financial and marketing aspects can also be a very good motivation to switch to a greener form of transport. Another important factor is to spread this ambition. Where did this motivation initially start? And are there any key players that share your ambition? Answering the most important questions about the underlying motivation for the transition is a key aspect to make it a success.

Benefits of the electric car

Your everyday life becomes easier and more comfortable with an electric car. Here are some of the benefits:

- Several companies report greater driving pleasure among employees
- You can charge the car at night and avoid the trip to the gas station.
- Less noise and pollution.
- Less operation and maintenance costs

Test drive the electric car

As a fleet manager you can be an ambassador for electric mobility. However, without any experience with electric cars, it might be very difficult to convince yourself and your peers about the advantage of an EV. Attaining some experience in an electric car might therefore be a very important first step. During the process it will also be very helpful to let your peers have a go in an EV to convince them.

A bigger investment, but lower operation costs

Electric cars are usually more expensive to buy than comparable models on gasoline and diesel, and in most cases, you also must invest in charging infrastructure for your company. On the other hand, the running costs are lower, as electricity is cheaper than other fuels and requires less maintenance. See calculation example on page 11 on the economy of an electric car.

Protect the climate and the environment

Throughout its lifetime, an electric car is better for the climate and the environment than conventional fossil vehicles:

- Fewer CO₂ emissions contribute to less global warming.
- No local emissions of NO_x and particles improve air quality.
- Less noise improves local public health.
- See the calculation example on page 10 about the emissions that an electric car saves.

Upgrade your company profile with Corporate Social Responsibility

Green driving is a solid contribution to optimizing your company's profile in responsible operations. With a defined CSR strategy, you meet the future requirements for green and responsible task performance.

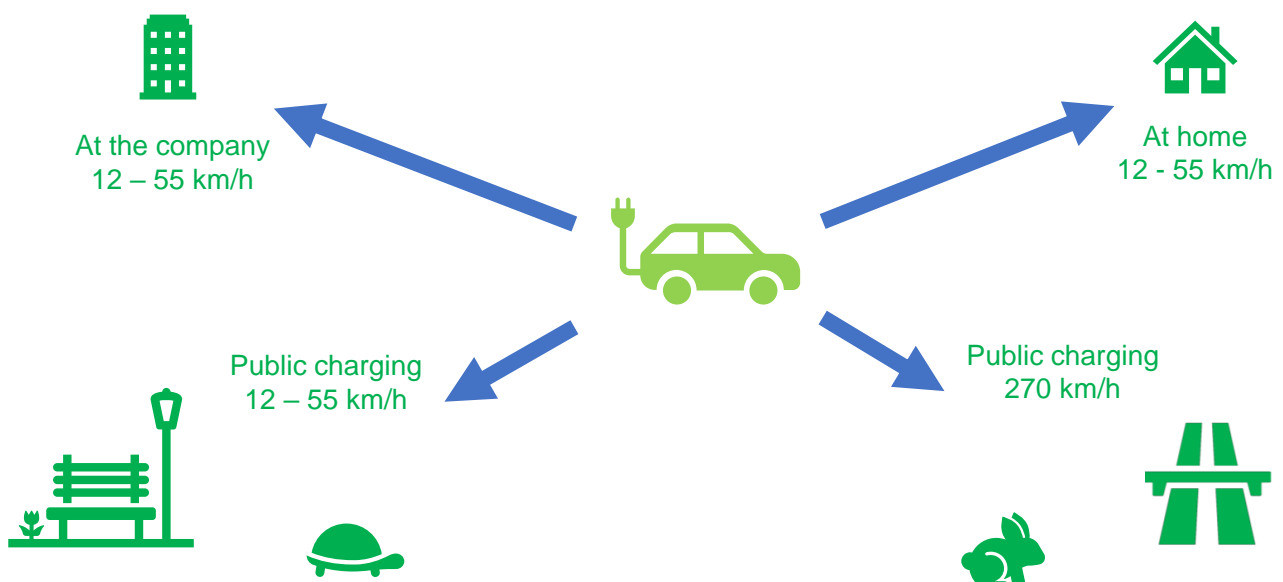
Therefore, it is important to consider electric cars as an active part of your marketing and at the same time ensure that you are competitive in the future.

Does the EV fit in your company?

Already there are many different EVs which all have a different range and a different charging speed. Moreover, the charging speed is very dependent of the kind of charging station the car is charged on. The charging speed and range of a car are important factors in the debate whether an EV is operationally attainable in your life. In the following section, the practical differences between the various ways of charging and between some popular models will be discussed.

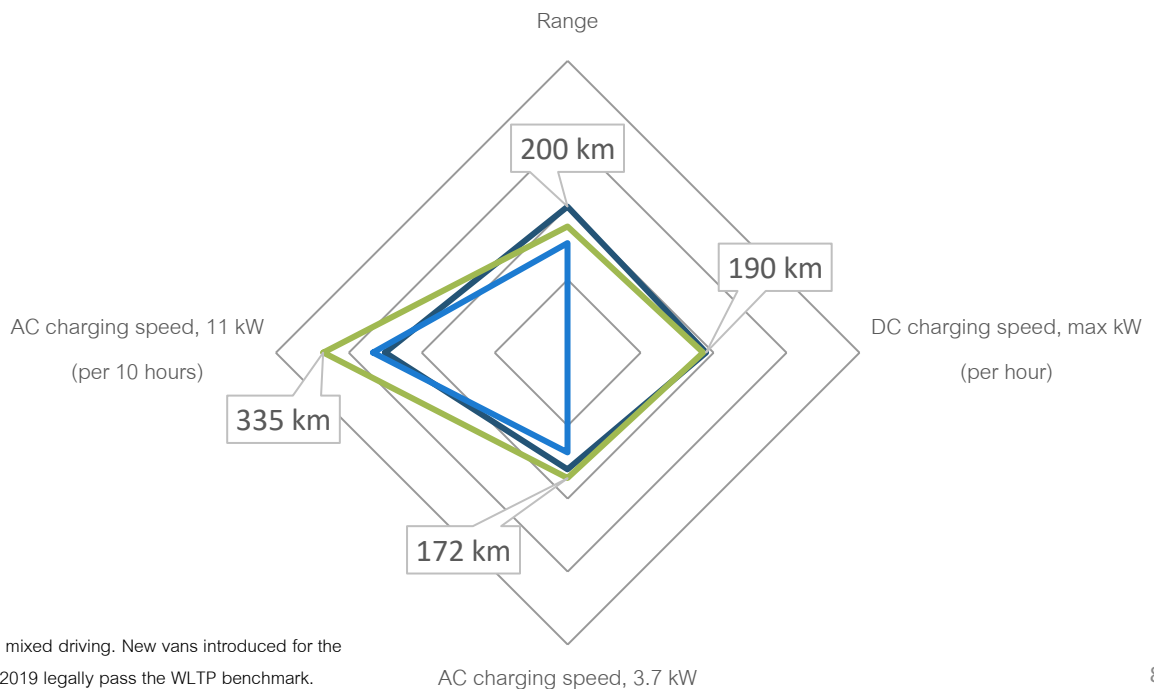
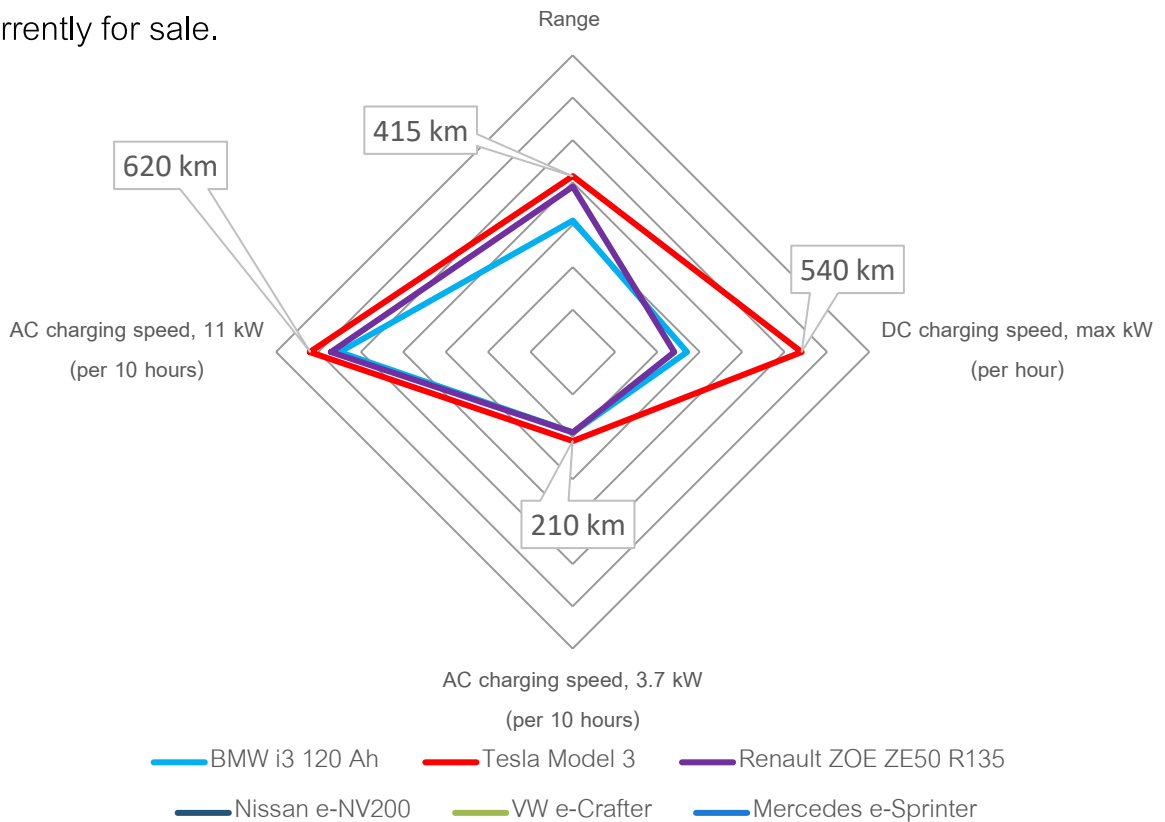
Different forms of charging

In this example the different speeds between the various ways of charging is shown. Keep in mind that the higher charging speeds at home are less common, as this requires a bigger investment, which might not always be worth it.



Comparison

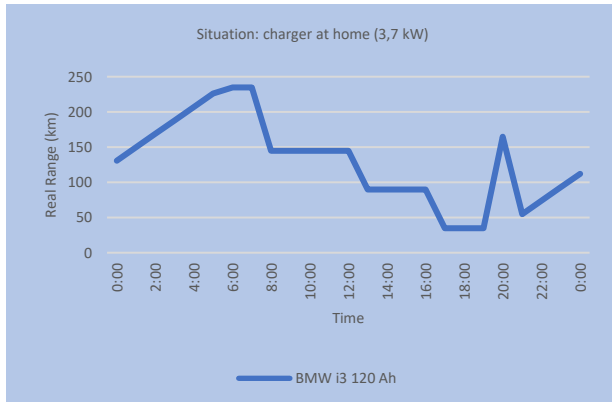
Below you can find a comparison of the charging speeds and range of three common passenger EVs and three common commercial EVs currently for sale.



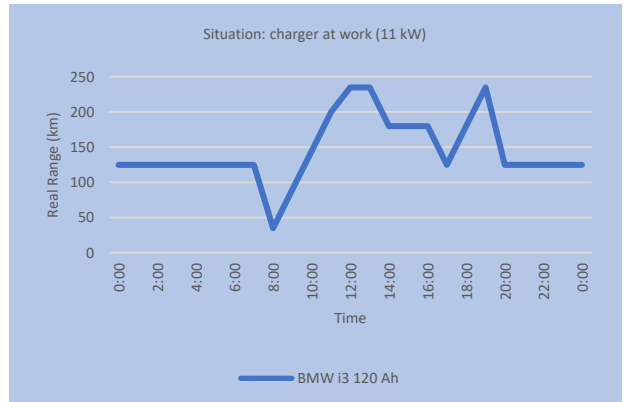
* Range based on mixed driving. New vans introduced for the first time after 1/9/2019 legally pass the WLTP benchmark.
 NEDC: New European Driving Cycle / WLTP: World Harmonized Light Duty Vehicles Test Procedure.

Examples of a day with a BMW i3 120 Ah

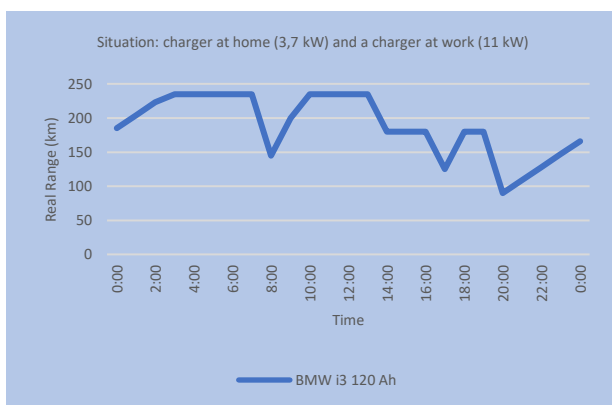
The range and charging time of an EV might not always make it an option for your operations. Below various situations with different chargers and varying driving patterns can be found. Making a personal variation on this, possibly with help of a professional, can be very helpful to assess the attainability.



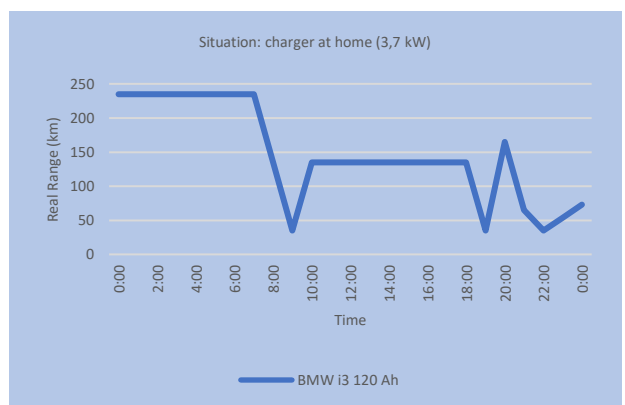
Time	Event
7:00	Departure to office (90 km)
13:00	Departure to appointment (55 km)
16:00	Return to office (55 km)
19:00	Public fast charging, then returning home (90 km)
21:00	Arrival at home, start charging



Time	Event
7:00	Departure to office (90 km)
8:00	Arrival at office, start charging
13:00	Departure to appointment (55 km)
16:00	Return to office (55 km)
17:00	Arrival at office, start charging
19:00	Return to home (90 km)



Time	Event
7:00	Departure to work (90 km)
8:00	Arrival at work, start charging
13:00	Departure to appointment (55 km)
16:00	Return to office (55 km)
17:00	Arrival at office, start charging
19:00	Return home (90 km)
20:00	Arrival at home, start charging

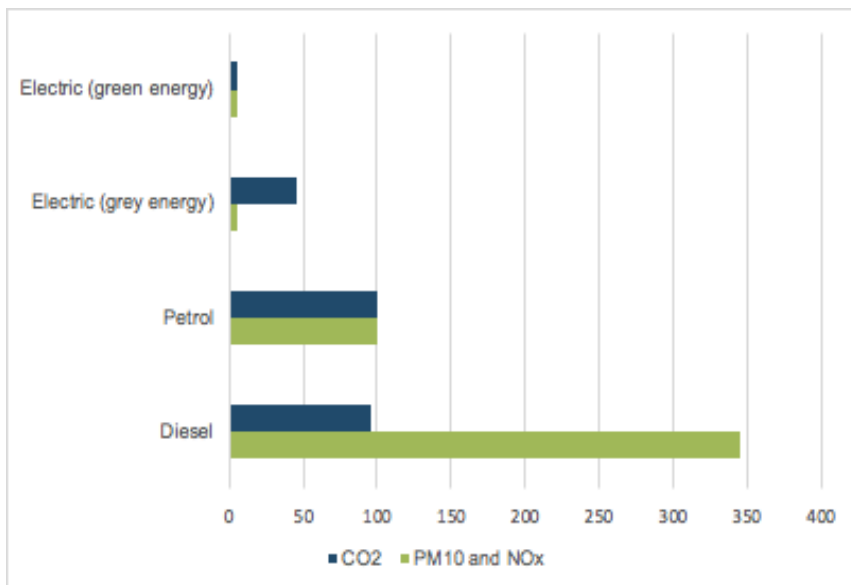


Time	Event
7:00	Departure to appointment (230 km)
9:00	Fast charging
10:00	Arrival at appointment
18:00	Returning home (230 km)
19:00	Fast charging
22:00	Arrival home, start charging (3,7 kW)

The electric car saves your environment

There are both climate and environmental benefits to having an electric car over a comparable fossil car. For example, there is no local emission of the harmful NOx particles. This makes the electric car an attractive choice in urban areas where air pollution and noise are more intense.

The index below shows the relative impact of the different types of fuel on both the environment and public health. Carbon dioxide (CO2) has an impact on the environment and particulate matters (PM) and nitric oxide (NOx) both have an influence on public health. The impact has been compared to the impact of a petrol-powered vehicle, which has been valued at **100** in this graph.



Source: <https://www.natuurenmilieu.nl/wp-content/uploads/2017/02/NM-Brandstofranking-personenautos.pdf>

What are the costs of an EV

Comparing an EV with a diesel/gasoline car, is like comparing an energy efficient A++ refrigerator with a less efficient C refrigerator. The A++ is more expensive to purchase but is cheaper in the long run because of the lower 'operational' costs. These operational costs of a vehicle are:

- Energy (diesel/gasoline vs. electricity)
- Road tax
- Maintenance
- Benefit in Kind

Because of this, we have made an overview of the total costs of ownership for three variants of the Volkswagen Golf; a petrol version, a diesel version and an electric version. The overview has been made from a *business* perspective. The relevant benefit in kind numbers have also been added.

Making a TCO is a key parameter for assessing whether the electric car is cheaper to operate than fossil cars. By checking the following factors, a more reliable calculation can be made for the total cost of ownership of the fleet, either by yourself or by a professional.

Therefore, you should know:

- Every vehicle's daily driving needs.
- Each vehicle's annual distance traveled.
- Each vehicle's annual fuel consumption.

Depreciation (ownership)

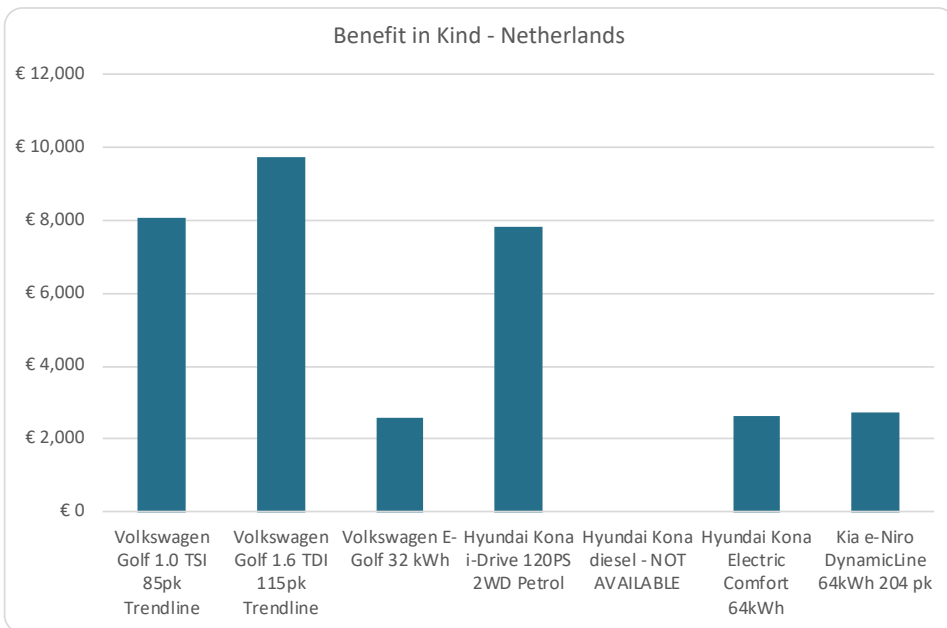
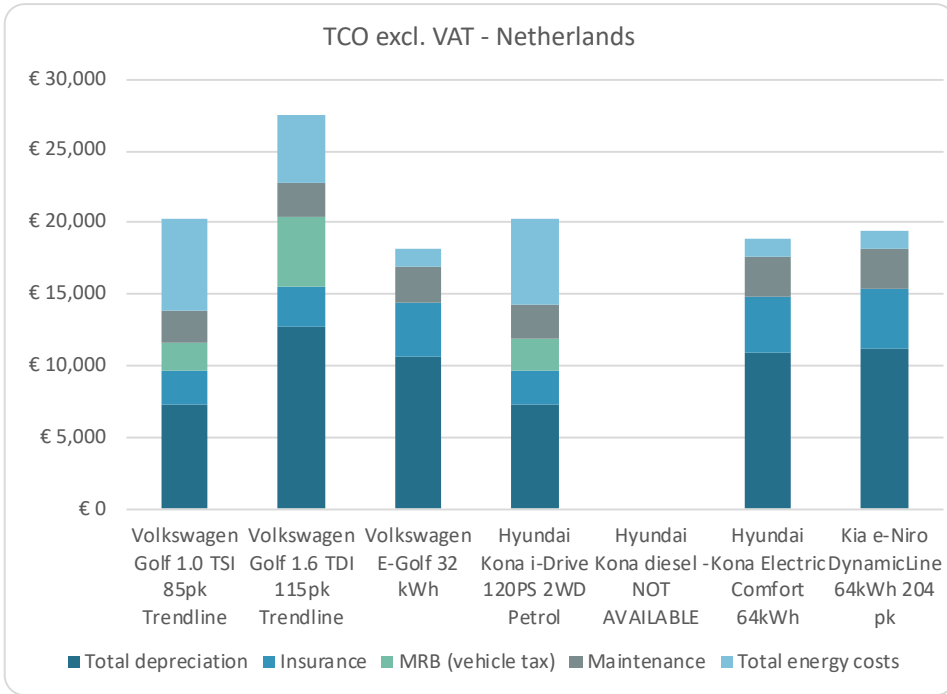
The residual value (value of the car when you sell it) is unknown at the point of purchase. Therefore calculations about depreciation are often made on historic data and future expectations. Where there used to be a pessimistic scenario for residual value of BEVs, there is now a growing market of second hand BEVs. These prices of the BEV's are actually more positive than earlier thought → in most cases the relative depreciation of a BEV is now even lower than a diesel! Therefore, do not be too pessimistic about the residual value of the BEV in your calculations!

Leasing

When you are going to lease the vehicle, it is easy to have one cost item combining depreciation with all operational costs (except energy costs), in an operational leasing structure. It is however very worthwhile to compare several leasing contracts, since differences in costs and terms can be quite significant.

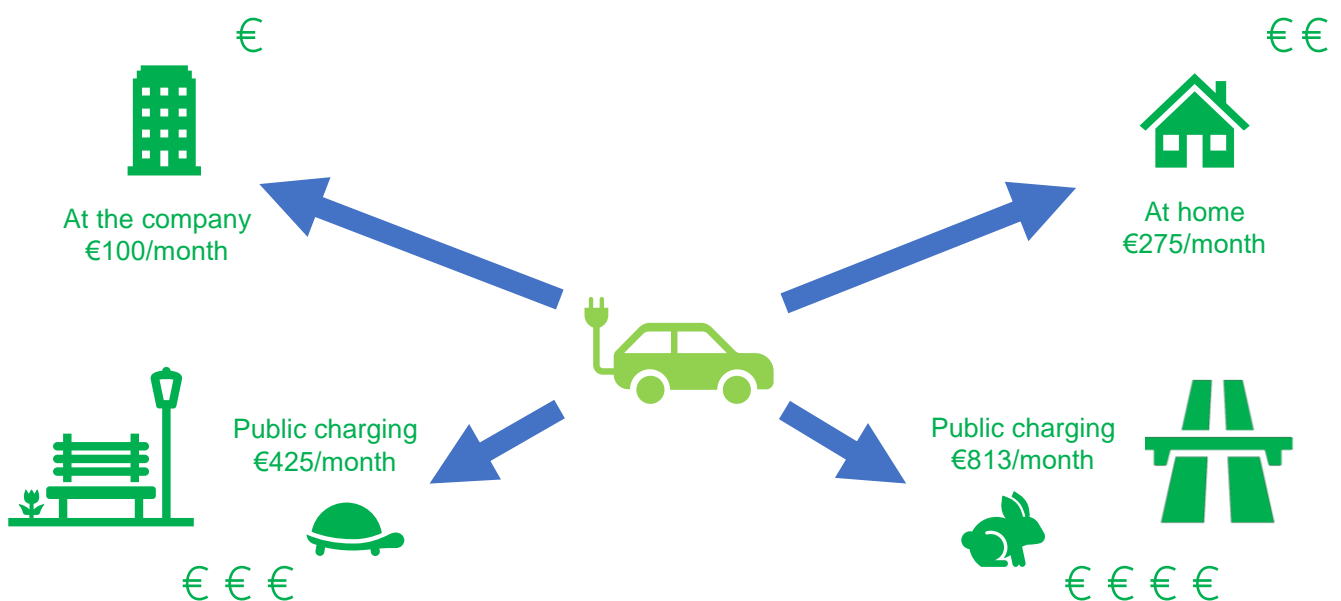
Total cost of ownership in the Netherlands

Based on 15.000 km/year for 4 years.



The previous calculation with regards to energy costs have been made assuming that half of the charged electricity was done at a home, and the other half at the office. It has a big impact on where you charge the vehicle.

- Charging at the office: Energy at company buildings is often purchased in bigger amounts and are subject to different tax regulations and can therefore have a very low price per kW.
- Charging at home: Charging at home is possible at the regular consumer energy price.
- Public charging: Charging in public is a bit more expensive as you often have to deal with service costs.
- Fast public charging: Because of the more expensive infrastructure and the service costs involved, fast charging is relatively very expensive.



Based on Dutch energy prices and 1.250 km/month

Charging at the office

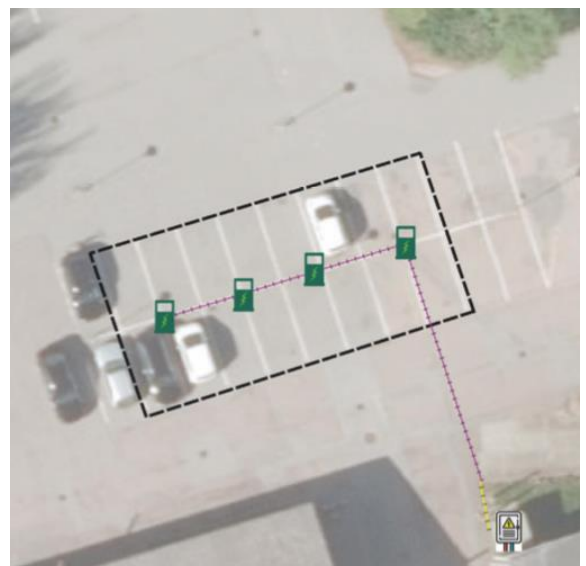
When you are going to realise charging infrastructure at the company's location, the electricity supplier could recommend a higher grid capacity. This is an expression of how much power your connection is designed to draw from the main outlet.

The final energy capacity is recommended based on the total electricity consumption for your company's fleet of electric cars and the energy usage of the rest of your building.

Charging as a service / owning charging points?

You can either choose to buy your own charging stations or rent / lease through a so-called charging operator. If you choose the solution through a charging operator, a professional operation of the charging station and a number of services can be included - for example individual payment solutions and reimbursement of electricity tax. If you choose to buy and own the charging station without the involvement of a charging operator, it may be cheaper on the long run.

Example of a project area with the establishment of eight charging points on four stands in an already existing parking area.



Consulting a professional about your transition to a zero-emission fleet can be very helpful. A consultant will be able to help you on any topic, from giving advice on infrastructure to calculating the TCO of the fleet.

This guidebook has been made as part of the proEME initiative.

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