Driving future mobility

FIER Automotive & Mobility

Final report E-route du Soleil

July 2020

This research 'E-Route du Soleil' was commissioned by the Ministry of Infrastructure and Water Management in 2020.
FIER would like to thank the following people from the support team of the Ministry of Infrastructure and Water Management for the assignment and the pleasant cooperation:

- Anneke Bosma
- Evelien Korbee
- Gerben Passier
- Hielke Schurer

In addition, we would like to thank the EV riders who have shared their experiences with us for their input.

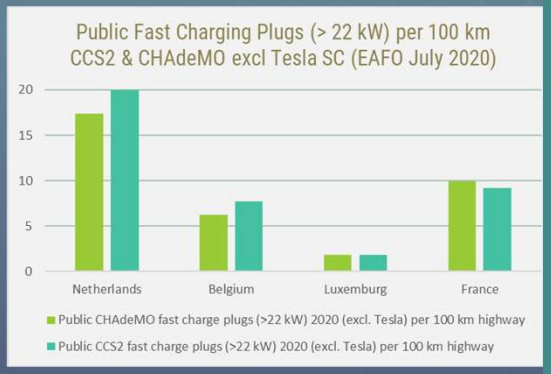
http://www.fier.net/eroutedusoleil

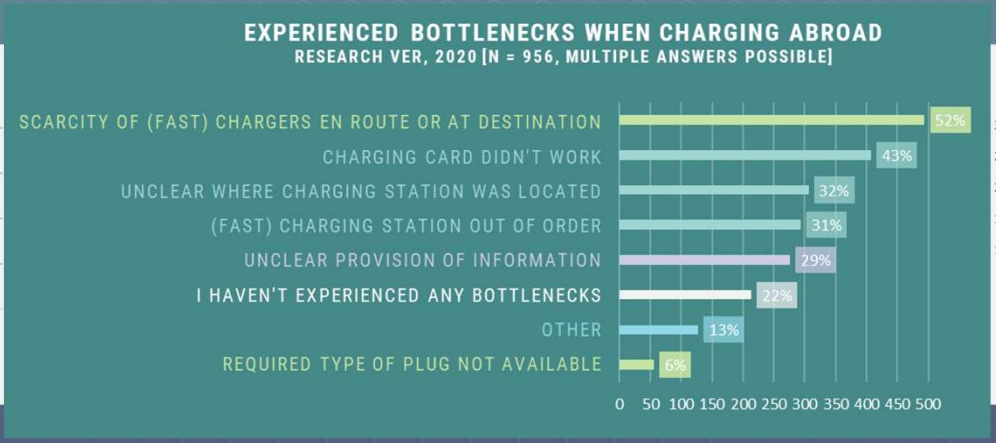
Content

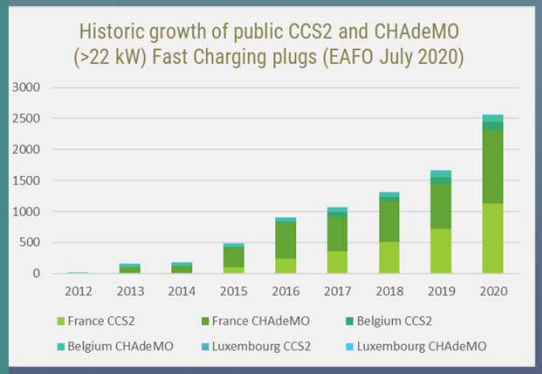
- Management Summary
- Research approach
- Simulation E-route du Soleil
- Bottlenecks, conclusions and recommendations
- Research model other countries / corridors

Management summary - introduction

The Ministry of I&W commissioned FIER to carry out research into the user experiences of EV drivers abroad as input for policymakers. As a case study, the focus was on the corridor from the Netherlands to the South of France, the so-called 'E-Route du Soleil'. This research has led to the definition of bottlenecks/challenges that can be addressed policy-wise in order to improve the relevant user experiences.







The information in this report is partly based on the results of the 'National Charging Survey 2020', an initiative of the Dutch Electric Drivers Association (VER) and ELaadNL with experiences of more than 1,800 Dutch EV drivers. Qualitative research has been carried out on respondents from this survey with international experience in EV driving. The findings were further substantiated and expanded with desk research, including statistics from the EAFO portal (www.eafo.eu). The results shown are based on experiences of all EV drivers and where relevant also divided into non-Tesla and Tesla drivers (with a dedicated private network of Tesla Superchargers making the user experience significantly different from other EV drivers).

Management summary - Public Charging Objectives

Ensure sufficient coverage

NL	10,7 Public Fast Charging Points per 100 km
B	7,0 Public Fast Charging Points per 100 km
L	1,0 Public Fast Charging Points per 100 km
F	0,6 Public Fast Charging Points per 100 km

Public Fast Charging Point:
Power > 22 kW and only CCS2 and CHAdeMO
Source: www.eafo.eu (July 2020)

Thresholds: >10 | 5 - 10 | 0 - 5

Seamless Charging

Consumer-centric focus is needed to ensure:

- cross-border interoperability
- roaming & activation
- appropriate assistance

Payment

Ensure:

- clear charging cost
- contract-less charging

Facilities

Ensure:

- minimum safety & hygiene
- availability of food/drink/leisure services

The colors by region on the maps show the combined results per KPI (Charging infra coverage, Seamless charging, Payment and Facilities).
In a green region, an EV rider is satisfied, yellow leaves room for improvement and orange means that an EV rider faces considerable challenges.

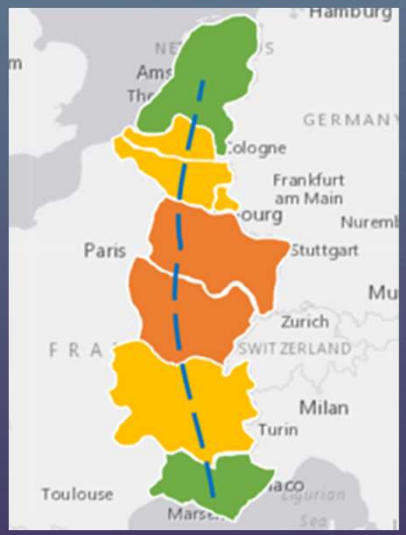
Management summary - Policy recommendations

Ensure sufficient coverage

NL	10,7 Public Fast Charging Points per 100 km
B	7,0 Public Fast Charging Points per 100 km
L	1,0 Public Fast Charging Points per 100 km
F	0,6 Public Fast Charging Points per 100 km

Public Fast Charging Point:
Power > 22 kW and only CCS2 and CHAdeMO
Source: www.eafo.eu (July 2020)

Thresholds: >10 | 5 - 10 | 0 - 5



Recommendations for the density of recharging stations

- Policy recommendations should aim to make it as easy as possible for EV drivers to recharge while travelling. Not only should national guidelines and targets be considered, but within countries sufficient coverage should be ensured in specific regions of importance for transit traffic. These are, in any case, the important defined corridors, including the Urban TEN-T network.
- Reconsider the definition of relevant KPIs, not only for a country as a whole 'number of motorways per 100 km of motorway', but more regionally on the important corridors.
- Examine the possibility of providing investment support from the EU (such as CEF/TEN-T) not only at the national level, but also at the regional level, so that such regional KPIs can be met.
- Define KPIs that are relevant for all EV drivers, regardless of what kind of plug they need to use for fast charging (e.g. CCS or CHAdeMO). Such KPIs, complemented by satisfaction surveys among EV drivers, should be regularly reassessed so that they can be managed.
- There should be a good ratio between the distance of fast charging locations and the number of fast charging points per location. The capacity of the electricity grid (and the associated operational costs) should also be taken into account during planning and realisation. Very busy times (such as black Saturdays, winter sports) must also be considered, where the need for fast charging is many times greater than the rest of the year. There is also the question of how the operating costs can be covered during the quiet moments of the year and whether the government can support this. This could, for example, be solved in a concession model, in which both highs and lows in exploitation are covered, just as for example in public transport, whereby the government can also better steer on the KPIs to be realised.

Management summary - Policy recommendations

Recommendations for the convenience of recharging

- The EU should provide European roaming to create a European market for EV charging infrastructure. This means promoting an open and independent charging interface protocol and removing local obstacles (functional, technical, fiscal or legal) to EV roaming. In this context, the work of the EVRoaming4EU project and the forthcoming recommendations of the EVRoaming Foundation could be closely examined.
- Streamline the various initiatives and arrive at an (open) European standard for necessary protocols for data exchange for the purpose of the charging process. A solution would be to streamline commercial initiatives such as Hubject and Gireve with government initiatives such as IDACS, whereby, among other things, the use of a chosen European standard protocol becomes mandatory for (public) charging infrastructure.
- Based on best practices in the EU and worldwide, the European Commission should instruct national governments to organise cross-network compatibility.
- Within Europe, High Power Chargers (150 kW and higher) in particular should be promoted in the field of rapid chargers. 50 kW DC chargers are no longer sufficient to meet the needs of EV drivers.

Seamless Charging

Consumer-centric focus is needed to ensure:

- cross-border interoperability
- roaming & activation
- appropriate assistance

Management summary - Policy recommendations

Payment

Ensure:

- clear charging cost
- contract-less charging

Recommendations for recharging rates and invoicing

- All charging prices should be easily available and accessible to all consumers in the EU. Ideally, consumers should know the quantity, speed and price before recharging and should not have to face additional MSP or CPO surcharges on top of the (advertised) price afterwards.
- Ad hoc prices should be published by CPOs and MSPs with a standardised protocol (e.g. OCPI) to an easily and freely accessible open data hub (such as a European and/or national access point).
- Create a standardised way of pricing to consumers: price per kWh with an optional but fixed amount for the session.
- The prices of public chargers should be non-discriminatory for all makes and types of vehicles, in particular for public chargers that are (partly) publicly financed.
- It should be mandatory for CPOs to connect all their public chargers in the EU to roaming platforms, so that all means of payment offer access to the public chargers. The eMSP offering their (payment) services will tend to contract with as many CPOs as possible to provide the best service to consumers, making their service more attractive. This will allow consumers to charge at all public charge points in the EU with just one subscription (one RFID card), rather than needing many different subscriptions for different charge points. Regulating roaming charges could also be a step towards a consumer-friendly market comparable to the telecoms sector.
- Speed up the process towards price transparency. Especially those countries that already have many EV drivers should take the lead in this so that a mature and open market emerges. This can be started, for example, to have Belgium and France join the EV Roaming Foundation.

Management summary - Policy recommendations

Recommendations for facilities at fast charging locations

- Provide sufficient and good facilities at the fast charging stations, with sufficient distraction and opportunities for eating and drinking and to relax during a charging session. It is also important to ensure a safe environment with sufficient lighting and hygiene.
- Provide the correct and sufficient information about the recharging infrastructure, such as an unambiguous charging card on a single website and smartphone app, in which everything is visible. Think also of one central collection point of information such as a European Access Point, which is fed with information from all countries in the same way (such as from National Access Points). Relevant information can, for example, be displayed on a European website such as EAFO (www.eafo.eu).
- A good example of facilities are the so-called "Autohof" sites in Germany. The Autohof is always located at a motorway exit at a maximum distance of 1 kilometre and often contains one or more restaurants, fast food, leisure facilities, repair facilities and in many cases a hotel. This concept fits in seamlessly with the charging profiles of the cross-border EV driver outlined in this report and can serve as an example for a solution.

Facilities

Ensure:
- minimum safety & hygiene
- availability of food/drink/leisure services

Route du Soleil

Final report

Research approach

Case study Route du Soleil

1. Collect data
2. Analysis + review
3. Reporting

Action plan follow-up

1. Analysis of research methodologies
2. Design and choice format
3. Elaborate format in reporting

Research approach case study E Route du Soleil

Desk research / qualitative interviews:

- Own input / rides FIER colleagues and EV riders from direct network
- Input relevant initiatives / organizations like IDACS, Benelux agreements, Elaadnl, NKL, ANWB
- Blogs, video reports EV drivers (list I and W, input VER, internet search)
- Simulation e-route du Soleil best-selling models
- Results Flash poll VER
- National Research Charging Infrastructure 2020, VER and Elaadnl

Review bottlenecks:

- **National survey VER:** list of contact details of EV drivers who want to share experiences international driving; 4 open questions sent to 70 EV drivers who were willing to share experiences.
  15 EV drivers have shared experiences based on relevant questions.

Research approach


Charging at Home


Private charging in public area


Charging and parking at night


Transit (rapid) charging

Charging profiles:

- Charging pattern
- Preferred charging speed
- Business model
- Location
- Responsible organisation
- Type of charger / socket


Public recreational


Charging and parking daytime


Charging at the office


Charging and sleeping

Relevant charging profiles for international EV travel

Research approach

Analysis availability of charging points for charging profiles

Typology: Transit (rapid) charging (AC> 22 kW; DC >50 kW)

EV-drivers with longer distances to travel are willing to stop and charge at easy to find locations were rapid charging is available. A stop of maximum 30 minutes at a rapid charging station is what they are willing to do. They expect to have a significant amount of extra range when they leave these locations. Speed of charge (and no waiting time) is very important for this typology and price of charging is up to the market but must be transparent.

Typology: Charging while staying overnight (AC < 22 kW)

EV-driver to charge at locations where they stay overnight. This is the case when they stay in a hotel or a holiday house for recreation or business. Situation in this location normally is the same as at home. They charge during the night and speed of charging thus is not a very big issue. Price of charging is up to the stakeholder and can be either a commercial price or service from the location (see also different price offers of WIFI at these overnight locations).

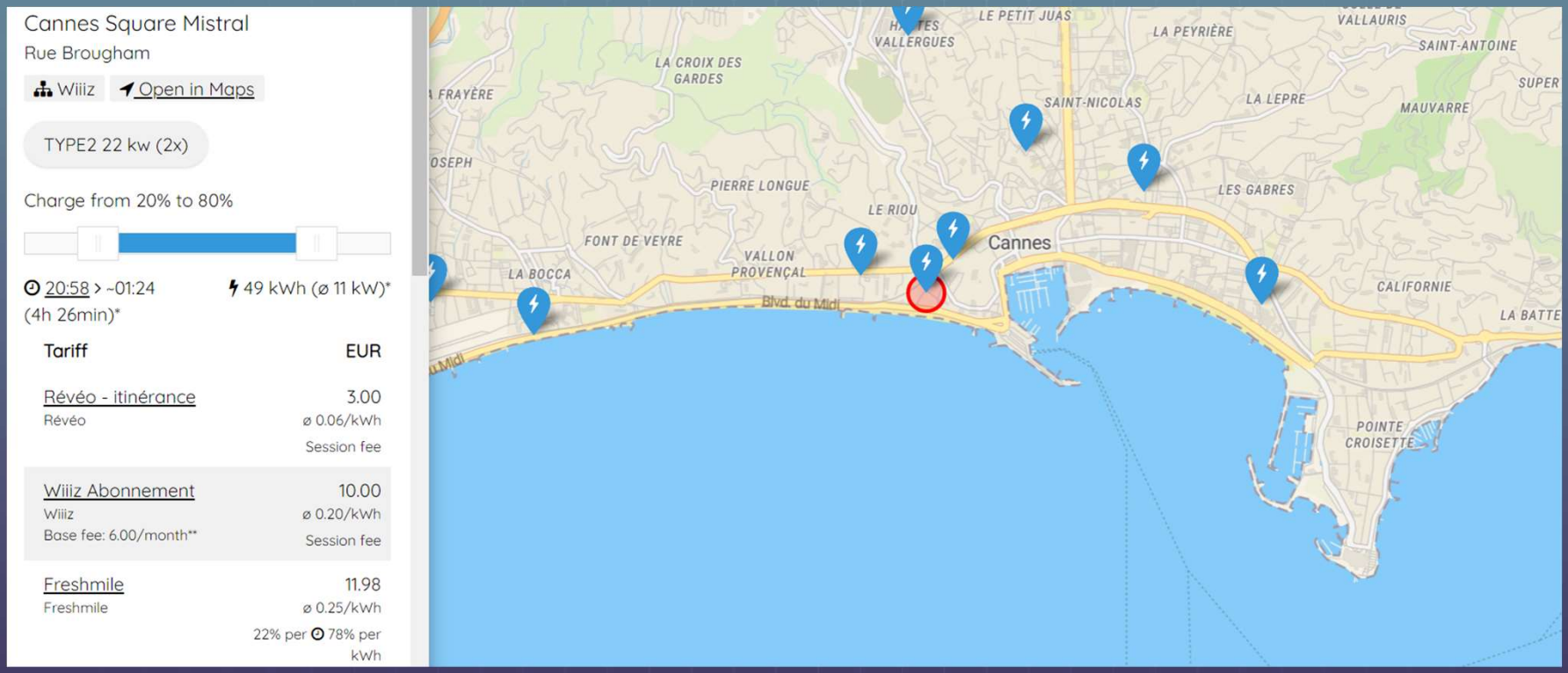
Typology: Charging at public (recreational) locations (AC => 22 kW or DC > 50 kW)

EV-drivers use the possibilities to charge wherever this is possible. Also while they are shopping or visiting touristic recreational areas. An important issue for this typology is speed of charging and price. When charging at public (recreational) locations is to slow or to expensive it will not be used. It is up to the stakeholders of the public (recreational) locations which speed and price they want to offer their customers.

Research approach

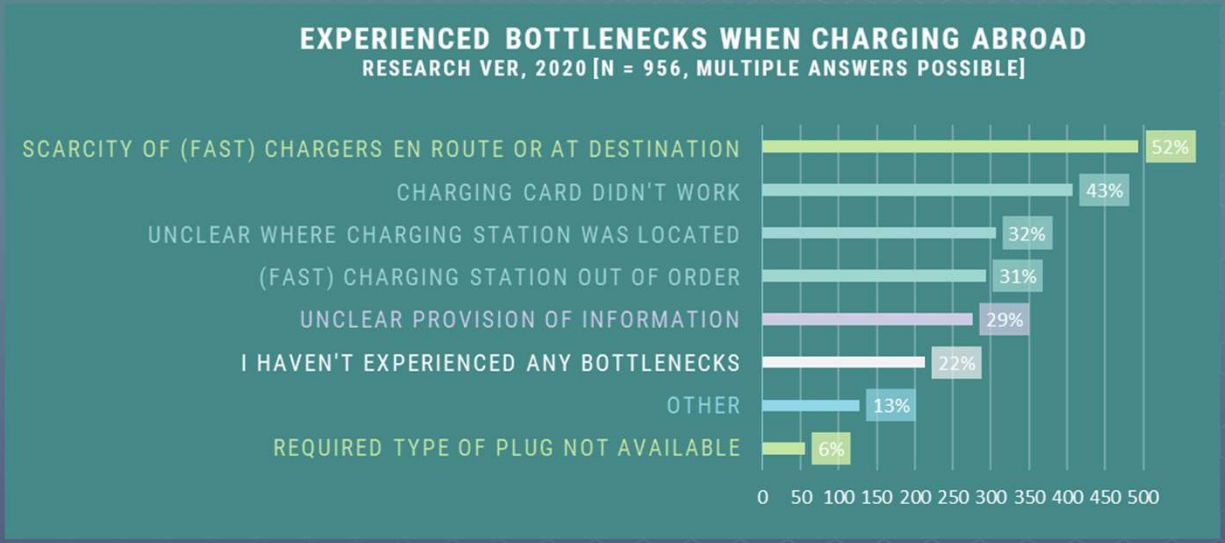
Analysis availability of charging points for charging profiles

The different apps and websites often show different charging locations.
Selections are therefore made - for the different charging speeds - from multiple sources (e.g. EAFO (Eco-movement), Chargemap, A Better Route Planner, Newmotion, Chargeprice) to obtain as complete a picture as possible.



Research approach - Results survey EV drivers

Source: National Charging Infrastructure Survey 2020, VER, eLaadNL



Main bottlenecks from the survey:

- 52% see as a bottleneck that there are too few (fast) chargers on the road or at the destination
- 43% have experienced problems with a charge card that does not work abroad
- 32% encountered the problem it was unclear where the charging station was located
- 31% reported a faulty (fast) charging station as a problem
- 29% indicated that there was no clear information available

Research approach - Review of bottlenecks at EV drivers

1

Driving the route - recharging points

What is the experience with the number of charge points/charging posts on the route?

Think, among other things, of the degree of coverage, findability and accessibility of the charging points.

2

The recharging process - recharging

What is the experience with the recharging process at recharging points along the route?

Think of activating the charging point (is this easy or not), required user apps, user accounts or credit card for activating the charge point, adequate charging speeds and capable assistance in case of charge point error messages.

3

Charging rates - invoicing

What is the experience with regard to charging and invoicing?

Are the tariffs transparent or, on the contrary, only transparent afterwards, price differences between various charging points, do they usually have to be paid per KWh or per minute?

4

Facilities and other

At recharging locations, are there sufficient facilities for eating, drinking and leisure services, among other things, and are these safe and hygienic? What do you think are the most important recommendations and/or tips to make electric driving and recharging easier and more accessible within the EU?

Simulation E-Route du Soleil

En route from Amsterdam to Cannes

Research on travel time and costs on the way from Amsterdam to Cannes in the South of France, via the 'Route du Soleil'. Starting point: driving the route with the two best-selling Battery Electric Vehicles (BEVs) of the Netherlands:

- Hyundai Kona Electric 64 kWh
- Tesla Model 3 Long Range AWD 72,5 kWh

Both electric cars, which symbolise major differences...

Different charging connectors for different EV's

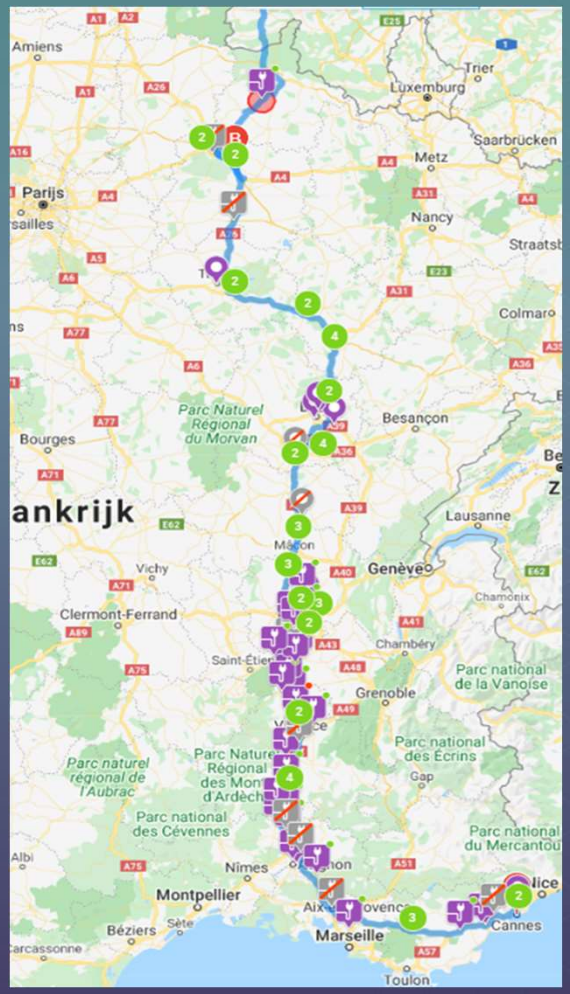
In Europe, the standard prescribed in the AFI Directive for the charging connector on fast chargers is CCS2 (Combined Charging System 2). Not all EVs use the same type of plug yet, but almost all new models are now supplied with the CCS2 connector. Renault had already switched to CCS2 and even where Nissan was one of the few still supplying CHAdeMO with the LEAF, the new officially announced Nissan Ariya will also be supplied with CCS2 instead of CHAdeMO in Europe.

Different fast-charging connectors for three very common models:

- Nissan LEAF: CHAdeMO
- Hyundai Kona Electric: CCS2
- Tesla Model 3 (EU): CCS2

In addition to the public charging stations, each Tesla also has access to the private Tesla Supercharger network. The Tesla Superchargers have both a Tesla specific plug (Model S and X) and a CCS2 plug in Europe (Model 3 and Y), however these are not accessible for other EV's with CCS2 connectors such as a Hyundai Kona.

E-Route du Soleil



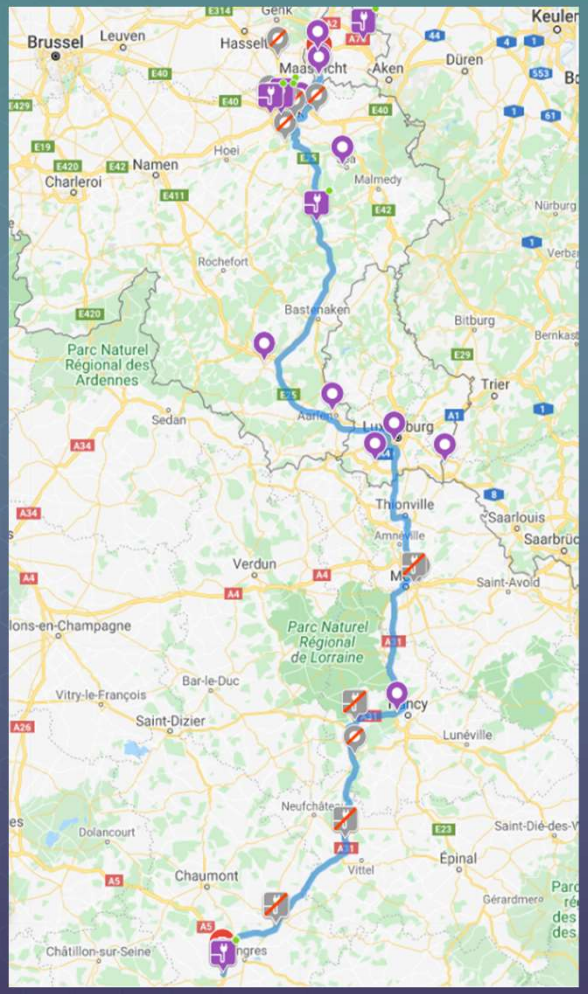
The Western route. Source: ChargeMap

Determining the route: From Amsterdam to Cannes

Western or Eastern route?

Determine most logical route, in order of priority:

- What is the total expected travel time including recharging?
- Are there enough recharging points on the route? (risk avoidance due to possible malfunctions and/or high traffic)
- How many charging stations are available in a location? (preferably 4 or more fast chargers in one location than 1 separate charger)
- What is the available recharging power? (minimum 50 kW, higher is better)
- Which means of payment can I use and how much does it cost to recharge?



The Eastern route. Source: ChargeMap

Difference in travel time (Western route)

17 h 18 min

13 h 17 min
1415 km

4 h
7 charges

Charging only with CCS2 chargers

14 h 34 min

12 h 44 ...
1355 km

1 h 50 min
6 charges

Charging at Tesla Superchargers and other CCS2 chargers

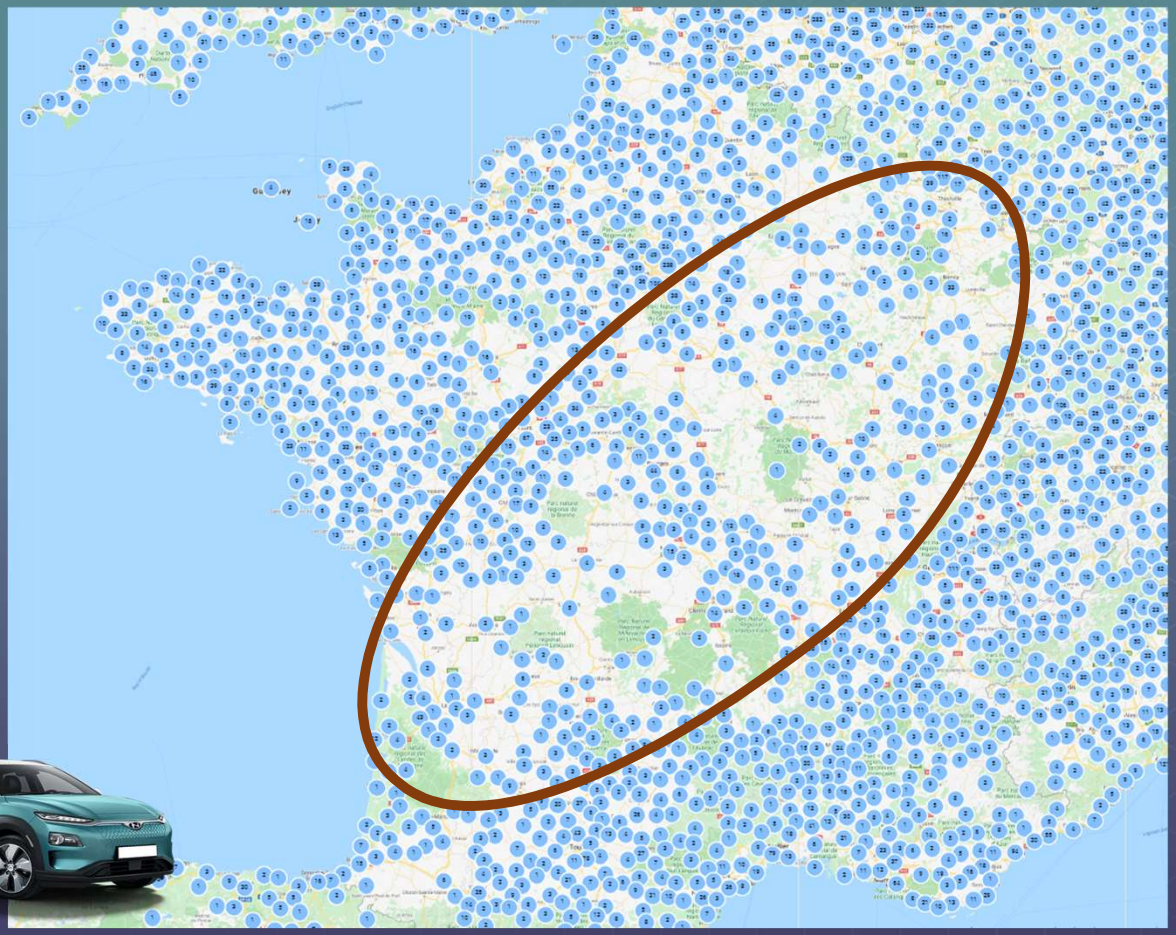
15 h 9 min

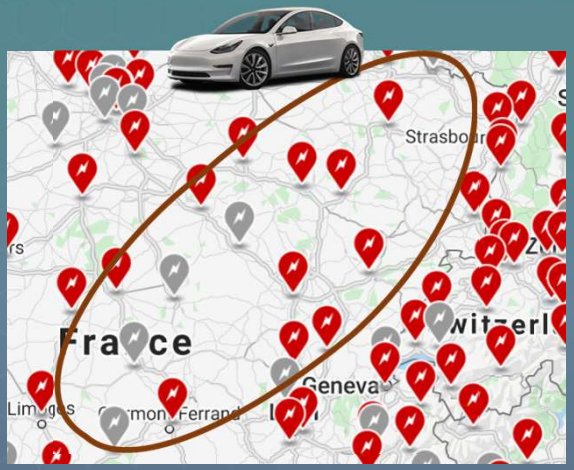
13 h 3 min
1366 km

2 h 5 min
6 charges

Charging only at Tesla Superchargers

France's public charging stations mapped



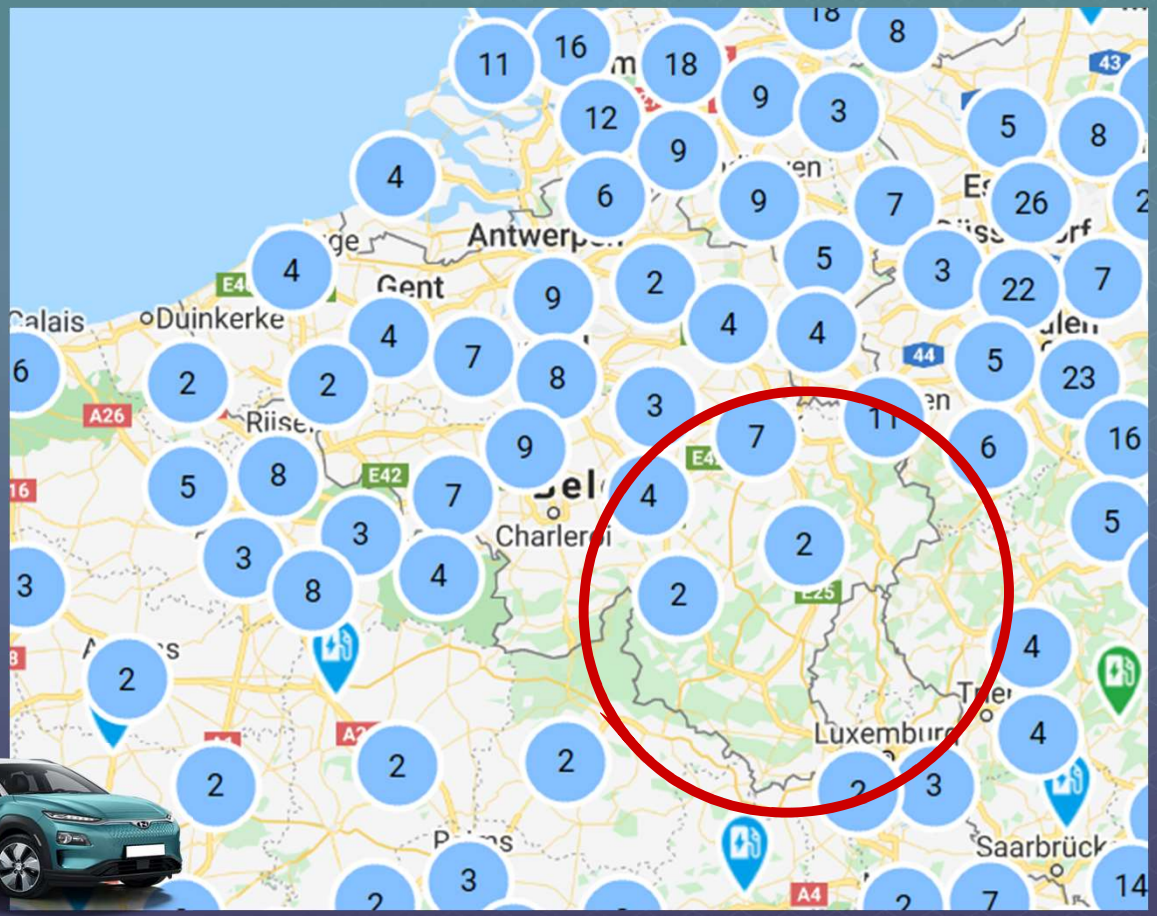


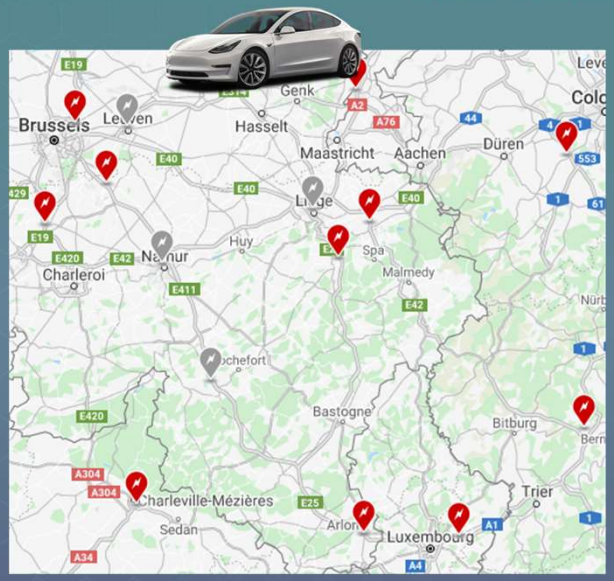
Left: In a part of France through which the 'Route du Soleil' passes through, the number of public charging points is still very low.

Public charging stations in France (13-05-2020)

Source: www.eafo.eu / Eco-Movement

On their way to France, people travel through Belgium





Left: Also in the Ardennes (Belgium), one has to plan the route well. Allego and Fastned have announced 1 and 2 fast charging locations between Liège and Luxembourg.

Above: Tesla also does not have fast chargers in the heart of the Ardennes, but has 2 new locations planned for 2020 between Brussels and Luxembourg.

Public charging stations in Belgium >=50kW (19-06-2020)

Source: www.eafo.eu / Eco-Movement

Bottlenecks I Driving the route - charging points

Charging points

- Too few charging points both on the road and at final destination
- Charging points not discoverable
  - figuring out your route with suitable charging points before you travel (multiple apps required) takes a long time
  - Charge point on the map, but it turns out it's not there
  - Charge point exists but is not shown on the map (or on one app but not on the other)
- Charging points not available
  - not open / behind fence (opening hours and access)
  - not the right plug
  - not working (not operational, malfunctioning)
- Occupied
  - by charging EV
  - by non-charging EV
  - by Plug-In Hybrid (charging slowly)
  - by non-EV (ICE'ing)

Experiences EV drivers

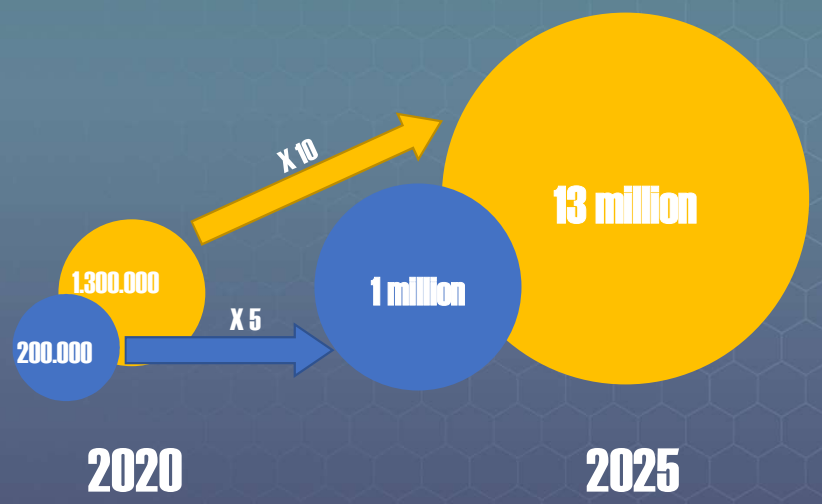
- 4 out of 8 have experienced problems with the availability of fast chargers on the route. Big difference between Tesla (hardly any problems) and other vehicles (5 out of 10 with problems). Caused by, among other things.:
  - Due to two technical incidents, 189 DC chargers of IZIVIA Corri-Door (type EVtronic/EVbox) have not been operational since the beginning of this year. Still unclear when these chargers will be replaced.
  - In northern and central France, the disappearance of these chargers means that people are almost entirely dependent on Ionity chargers, which means that there is insufficient cover.

>10 | 5 - 10 | 0 - 5

Thresholds public fast chargers (> 22 kW) per 100 km highway. On the left excluding Tesla Superchargers, on the right including Tesla Superchargers and CCS.
In a green region, an EV-driver is satisfied, yellow leaves room for improvement and orange means an EV-driver faces great challenges.

EU Green Deal Sustainable Mobility

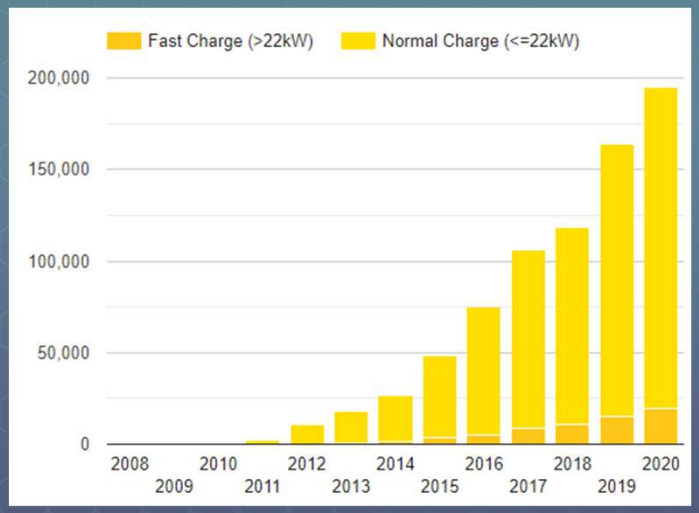
EU Plugin electric vehicle and charge points now and the EU Green Deal 2025 targets



Public recharging points

Plugin Electric Vehicles

Current situation (until July 2020)

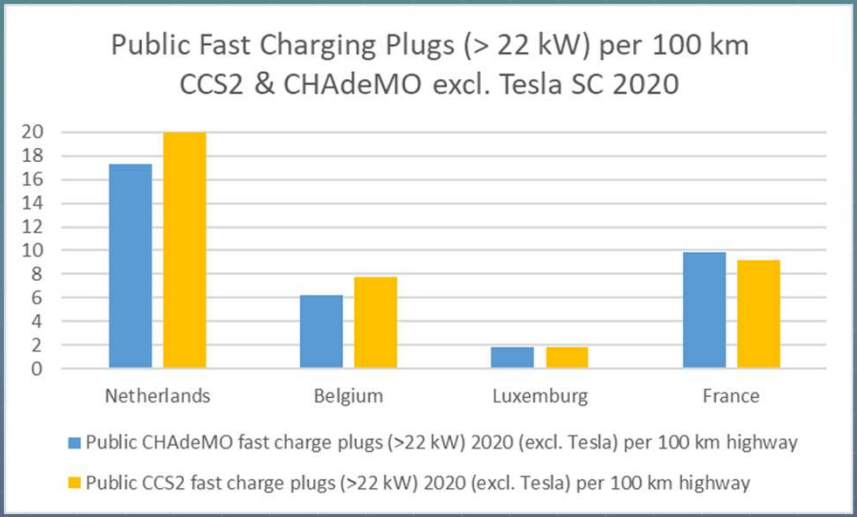


Source: European Alternative Fuels Observatory (EAFO), July 2020

Total fast chargers EU (>22 kW): 19.543
Total normal chargers EU: 175.318

Relevant KPIs regarding the amount of charging points

Fast Charging Plugs (>22 kW) non-Tesla



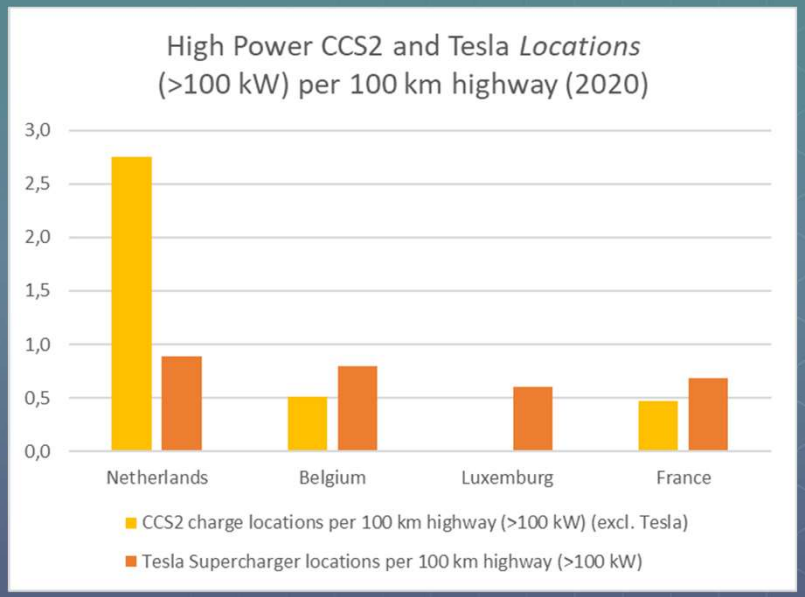
Source: European Alternative Fuels Observatory (EAFO), July 2020

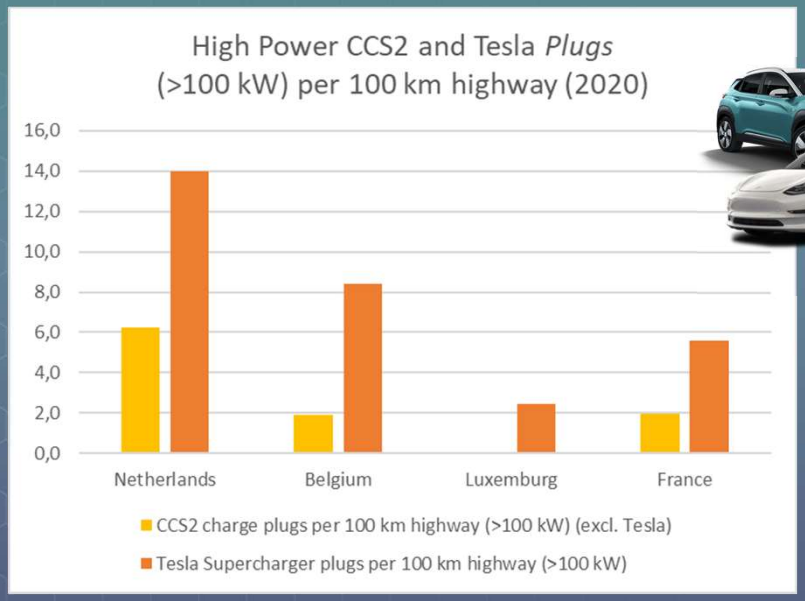
	Netherlands	Belgium	Luxemburg	France
Public CHAdeMO fast charge plugs (>22 kW) 2020 (excl. Tesla)	570	111	4	1175
Public CCS2 fast charge plugs (>22 kW) 2020 (excl. Tesla)	617	137	3	1104
Kilometer highway	3055	1763	165	11618
Public CHAdeMO fast charge plugs (>22 kW) 2020 (excl. Tesla) per 100 km highway	17,3	6,2	1,8	9,9
Public CCS2 fast charge plugs (>22 kW) 2020 (excl. Tesla) per 100 km highway	20,0	7,7	1,8	9,2

- The Netherlands has on average twice as many fast chargers per km of motorway across the country as Belgium and France.
- Within the previously mentioned regions of the Ardennes and north-eastern France, the average is still much lower.

Relevant KPIs regarding the amount of charging points

High power chargers (> 100 kW) per 100 km highway



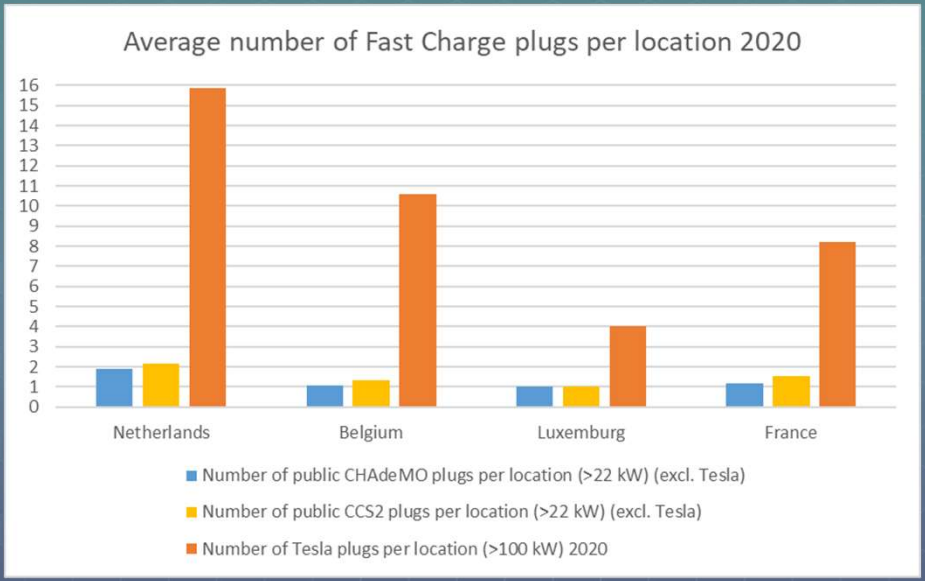


Source: European Alternative Fuels Observatory (EAFO), July 2020

- More and more BEVs can load quickly at a minimum of 100 kW (peak), some already at 250 kW (peak)
- Faster fast charging can significantly reduce overall travel time, leading to higher adoption of electric cars
- CHAdeMO is not included in these graphs, because outside the Netherlands in particular there are hardly to none >100 kW CHAdeMO chargers. Given the developments around CCS2 in Europe, it is obvious that the number of CCS2 High Power Chargers will increase and that CHAdeMO will be phased out gradually.

Relevant KPIs regarding the amount of charging points

Average number of charging plugs per location



Source: European Alternative Fuels Observatory (EAFO), July 2020

	Netherlands	Belgium	Luxemburg	France
Number of public CHAdeMO plugs per location (>22 kW) (excl. Tesla)	1,9	1,1	1,0	1,2
Number of public CCS2 plugs per location (>22 kW) (excl. Tesla)	2,2	1,4	1,0	1,5
Number of Tesla plugs per location (>100 kW) 2020	15,9	10,6	4,0	8,2

- A higher number of chargers available per charging location, provides a better travel experience for the EV driver: less chance of all chargers being occupied and less risk of that one charger not working.
- For reference: the number of Tesla Superchargers per location is significantly higher and makes travel easier.
- In the Netherlands, the average number of chargers per location is higher than in the other countries.

Conclusions & recommendations I density charging points

Conclusions Charging Points

- Belgium, (Ardennes) and north-eastern France are still challenging to travel with an EV. The density of the fast charger network is too low to provide sufficient security. In Belgium, the number of CCS and Chademo fast chargers is generally relatively low (7.7 CCS, 6.2 Chademo fast chargers per 100 km). In France, the average for CCS and Chademo is reasonable with 9 to 10 fast chargers per 100 km, but much lower in the middle part of the country indicated (estimate of 3 per 100 km). In the Netherlands, an average of 18.7 rapid chargers per 100 km are available.
- The network of the Tesla SuperChargers is also less well covered in these two regions. BE: 8 Tesla SC / 100 km, FR 6 Tesla SC per 100 km (estimated 3 SC per 100 km in the indicated middle of the country) compared to NL 14 Tesla SC per 100 km..
- The problem of too few chargers is (temporarily) aggravated in France by the fact that the EV-box (EV-tronic) chargers in the Corri-door network are out of order.
- The number of fast charging points per location is also very important for the EV driver to have a good travel experience. Multiple fast chargers at one location (as is especially the case with Ionity and Tesla), reduces the risk of the charger(s) being occupied and/or the only charger present not working, which can cause a major problem for an EV driver.

What is already being done to resolve the bottlenecks?

- The AFID Directive lays down guidelines for the fast charging network within EU Member States, based on the number of fast chargers in relation to the total number of km of motorways. On average, Belgium and France appear to comply with the Directive. However, in this case, this does not mean that regional problems of coverage are visible and solved.
- To optimise the findability of charging infrastructure, the EC issued a PSA call in 2018, which led to the European project ID & Data Collection for Sustainable Fuels in Europe (IDACS), of which the Netherlands is the initiator. In this project, 15 countries are making efforts to access information, such as prices, location and availability of charging infrastructure and refuelling points for alternative fuels, via national access points. This will require unique identification codes for the charging infrastructure to enable roaming and data sharing for international payments, for example. The project has the potential to lead to European regulation in the coming years.
- Support plan of the French car industry: accelerated construction of 100,000 loading bays in 2021 instead of 2022 (FR has 35,000 by mid-2020). An additional budget of 100 million euros will be made available to support the construction of public and private charging points. The French authorities are calling for 300 to 500 fast charging stations on the motorways to be set up by the end of 2021, with a minimum of ten vehicles per charging station. This would double the number of fast chargers available, making it more or less the same as the current fast charging network in the Netherlands.

Conclusions & recommendations I density charging points

Policy recommendations

- Policy recommendations should be aimed at making recharging when travelling as easy as possible for the EV driver. Not only should national guidelines and targets be taken into account, but also, within countries, ensure sufficient coverage in specific regions that are important for transit traffic. In any case, these are the important defined corridors, including the Urban TEN-T network.
- Re-examine the definition of relevant KPIs, not only for a country as a whole 'number of fast chargers per 100 km of motorway', but more regionally on the major corridors.
- Explore the possibility of providing EU investment support (such as CEF/TEN-T) not only at country level, but at regional level to meet such regional KPIs.
- Define KPIs that are relevant for all EV drivers, regardless of what kind of plug they need to use to fast charge (e.g. CCS or CHAdeMO). Such KPIs, complemented by satisfaction surveys among EV drivers, should be regularly re-evaluated so that they can be managed.
- There should be a good ratio between the distance between fast charging locations and the number of fast charging points per location. The capacity of the electricity grid (and the associated operational costs) must also be taken into account during planning and realisation. Very busy times (such as black Saturdays, winter sports) should also be taken into account, where the need for fast charging is many times higher than the rest of the year. There is also the question of how the operating costs can be covered during the quiet moments of the year and whether the government can support this. This could, for example, be solved in a concession model, in which both highs and lows in exploitation are covered, just as for example in public transport, in which the government could also better manage the KPIs to be realised.

Charging and charging rates E-Route du Soleil with the Kona

E-Route Du Soleil (Kona): Amsterdam - Cannes (via Reims)

Hyundai Kona Electric	Battery usable:	64,0	kWh						
Waypoint	**Arrival SoC**	**Depart SoC**	**kWh charged**	**Charge duration**	**Distance**	**Drive duration**	**Cost New Motion**	**Cost Maingau**	**Cost KiWhi**
Dam, Amsterdam		99%			254 km	2 h 41 min			
Le Roeulx / Thieu North [Ionity]	25%	82%	36,48	34 min	219 km	2 h 11 min	€ 29,18	€ 14,59	
Aire de Reims Champagne Sud [KiWhi] *	15%	84%	44,16	1 h 8 min	208 km	1 h 45 min			€ 7,50
Langres Perrogney [Ionity]	10%	71%	39,04	34 min	111 km	53 min	€ 30,84	€ 15,62	
Macon Saint-Albain [Ionity]	14%	76%	39,68	35 min	82 km	50 min	€ 31,35	€ 15,87	
Rue Ravat [CNR] †	50%	58%	5,12	8 min	149 km	1 h 23 min	€ 0,88		
IONITY Aire de Montélimar Ouest [Ionity]	10%	81%	45,44	41 min	207 km	1 h 47 min	€ 35,90	€ 18,18	
Cambarette Nord [Ionity]	10%	49%	24,96	20 min	123 km	1 h 8 min	€ 19,72	€ 9,98	
Palais des Festivals, Boulevard de la Croisette, Cannes	10%								
17 h 18 min			**234,88**	**4 h**	**1415 km**	**13 h 17 min**	**€ 82,62**		

17 h 18 min

13 h 17 min
1415 km

4 h
7 charges

Hyundai Kona:
Charging only at non-Tesla CCS2 chargers

Charging and charging rates E-Route du Soleil with the Model 3

E-Route Du Soleil (Tesla SC & CCS): Amsterdam - Cannes (via Reims)

Tesla Model 3 Long Range AWD	Battery usable:	72,5	kWh						
Waypoint	Arrival SoC	Depart SoC	kWh Charged	Charge duration	Distance	Drive duration	Cost New Motion	Cost Maingau	Cost Tesla
Dam, Amsterdam		99%			237 km	2 h 34 min			
Nivelles-Sud, Belgium [Tesla]	38%	68%	21,8	12 min	211 km	2 h 13 min			€ 6,09
Aire de Reims-Champagne-Sud, France [Tesla]	10%	79%	50,0	28 min	208 km	1 h 44 min			€ 12,01
Langres Perrogney [Ionity]	10%	64%	39,2	16 min	174 km	1 h 28 min	€ 30,93	€ 15,66	
Macon Saint-Albain [Ionity]	10%	78%	49,3	23 min	231 km	2 h 5 min	€ 38,95	€ 19,72	
IONITY Aire de Montélimar Ouest [Ionity]	10%	82%	52,2	26 min	232 km	1 h 57 min	€ 41,24	€ 20,88	
Vidauban Sud [Ionity]	10%	28%	13,1	5 min	64 km	40 min	€ 10,31	€ 5,22	
Festival Palace, Cannes	10%								
14 h 34 min			**225,5**	**1 h 50 min**	**1355 km**	**12 h 44 min**		**€ 79,58**	

E-Route Du Soleil (Tesla SC only): Amsterdam - Cannes (via Reims)

Tesla Model 3 Long Range AWD	Battery usable:	72,5	kWh				
Waypoint	Arrival SoC	Depart SoC	kWh Charged	Charge duration	Distance	Drive duration	Cost Tesla
Dam, Amsterdam		99%			237 km	2 h 34 min	
Nivelles-Sud, Belgium [Tesla]	38%	68%	21,8	12 min	211 km	2 h 13 min	€ 6,09
Aire de Reims-Champagne-Sud, France [Tesla]	10%	65%	39,9	21 min	170 km	1 h 27 min	€ 9,57
Aire de Châteauvillain - Val Marnay, France [Tesla]	10%	80%	50,8	29 min	222 km	1 h 54 min	€ 12,18
Mâcon, France [Tesla]	10%	38%	20,3	11 min	100 km	1 h 6 min	€ 4,87
Vienne, France [Tesla]	10%	66%	40,6	22 min	184 km	1 h 39 min	€ 9,74
Orange, France [Tesla]	10%	85%	54,4	32 min	244 km	2 h 8 min	€ 13,05
Festival Palace, Cannes	10%						
15 h 9 min			**227,7**	**2 h 5 min**	**1366 km**	**13 h 3 min**	**€ 55,51**

14 h 34 min

12 h 44 ... 1355 km

1 h 50 min 6 charges

Charging at Tesla Superchargers and other CCS2 chargers

15 h 9 min

13 h 3 min 1366 km

2 h 5 min 6 charges

Charging only at Tesla Superchargers

E-Route du Soleil wrap-up travel time and expenses

	Drive duration	Charge duration	Charges	Total duration
CCS Hyundai Kona Electric 64 kWh	13h 17m	4h 1m	7 x	17h 17m
Tesla SC Only Model 3 LR AWD	13h 3m	2h 6m	6 x	15h 9m
Tesla SC & CCS Model 3 LR AWD	12h 44m	1h 50m	6 x	14h 34m
CHAdeMO Nissan Leaf 40 kWh	16h 12m	6h 40m	12 x	22h 52m
Type2-AC 43kW Renault ZOÉ Q90 40 kWh	16h 28m	7h 59m	14 x	24h 27m

	Most expensive	Least expensive
CCS Hyundai Kona Electric	€ 155,37	€ 86,62
Tesla SC Only Model 3 LR AWD	€ 55,51	€ 55,51
Tesla SC & CCS Model 3 LR AWD	€ 139,52	€ 79,58

Travel Duration

The duration of the trip is mainly determined by the type of BEV:

- How big is the range? This depends in particular on the capacity of the battery pack. Apart from large SUVs, the consumption of the other BEVs does not differ that much.
- Where can one recharge? A Tesla Supercharger can only be used by a Tesla and not by any other BEV, whereas a Tesla can also charge at any other fast charging station. The more chargers available, the easier and more efficient the journey can be planned.
- How fast can one recharge?

Travel expenses

Travel expenses are determined in particular by:

- kWh consumption per kilometre
- The type of BEV. With a Tesla one can recharge relatively cheaply at the Tesla Superchargers and the whole trip with a total of € 55.51 is the cheapest.
- Which charging card is used? Large price differences for e.g. quick chargers between, for example, NewMotion and Maingau*.
- The travel time can become so long with certain types of BEVs (small range, slow loading) that one should actually book an overnight stay halfway through. This leads to extra travel costs.

* Maingau tariffs will rise significantly from September 1st, 2020

Bottlenecks I The charging process - recharging

Recharging / charging process

- Activating charging point is not possible
  - Charge card doesn't function (technical issue)
  - Interoperability malfunction (roaming issue)
  - App doesn't function
  - Can't pay (with creditcard, charge card, app or SMS)
  - Cannot reach the site because the post has been placed incorrectly, inconveniently at an angle, etc.
  - Activation only works after call with operator, who triggers a manual activation and deactivation
  - Only allowed to recharge when you register as a member / create an account
- No assistence
  - Contact information missing
  - Help not available
  - Help is available, but have not enough knowledge to solve the issue
  - Language: only French or German speaking assistance available
- Recharging takes too long
  - Charging speed too low (too low power)
  - Too many EVs recharging at the same time
  - Too big a distance from the highway (detour)
  - Charger stops for no apparent reason (without you noticing), then charging stops getting activated.

Experiences EV drivers

- Big difference between Tesla and others: Tesla without problems when only using Tesla SC. With other brands (and also with Tesla when not using Tesla SC) especially difficulties with different cards and apps to start public charging as soon as you leave the Netherlands are experienced (4 out of 10 experienced difficulties).
- Technical problem only with the already mentioned Corri-Door chargers
- Quote: It takes too long: Half of the charge points worked reasonably well, but it takes almost an hour for 70% charging with the 50kW chargers and then you can go on for only a little while. Waited 2 hours in one place for a charger to free up and our own charging session.

In a green region, an EV-driver is satisfied, yellow leaves room for improvement and orange means an EV-driver faces great challenges.

Conclusions and recommendations | Charging process

Conclusions charging process

- Activate: There is a big difference in the charging process between Tesla Superchargers and other charging stations. With Tesla the charging process is started automatically when the connector is plugged in. With other charging stations it is often hoping if the RFID card or app works and if the charging starts.
- Assistance: poorly accessible by telephone (especially in evening hours) and often only speaking French.
- Charging speed: this depends on the power of the charger, but also on the local situation with or without several EV's charging at the same time. Both at Tesla and other DC fast charging locations with multiple chargers, charging can be slower when there is a lot of load when charging multiple EVs at the same time. However, much more modern EV's can now charge with at least 100 kW and charging on the common 50 kW DC chargers causes a much longer travel time in transit compared to the High Power Chargers of Ionity, Allego, Fastned and Tesla, among others.

What is already being done to resolve the bottlenecks?

- Initiatives to improve the start-up processes have already been initiated in several places in Europe such as EVroaming4eu, standardisation of protocols through OCPI and collaboration between the eMSPs in platforms such as eVIolin, Hubject and Gireve.
- IDACS is a cooperation between 15 EU countries with the aim of setting up a structure with National Access Points that provide information about the charging infrastructure. This initiative arose from the EC's desire to create a system of open data (static and dynamic data) that is easily accessible to stakeholders and EV drivers. Themes such as interoperability, price visibility and availability of the right charging infrastructure are on the agenda at IDACS.

Conclusions and recommendations | Charging process

Policy recommendations

- The EU should provide European roaming to create a European market for EV charging infrastructure. This means promoting an open and independent charging interface protocol and removing local obstacles (functional, technical, fiscal or legal) to EV roaming. In this context, the work of the EVRoaming4EU project and the forthcoming recommendations of the EVRoaming Foundation could be closely examined.
- Streamline the various initiatives and arrive at an (open) European standard for necessary protocols for data exchange for the purpose of the charging process. A solution would be to streamline commercial initiatives such as Hubject and Gireve with government initiatives such as IDACS, whereby, among other things, the use of a chosen European standard protocol becomes mandatory for (public) charging infrastructure.
- Based on best practices in the EU and worldwide, the European Commission should instruct national governments to organise cross-network compatibility.
- Within Europe, High Power Chargers (150 kW and higher) in particular should be promoted in the field of rapid chargers. 50 kW DC chargers are no longer sufficient to meet the needs of EV drivers.

In the news – charging rates

No more cheap IONITY shops: Maingau is now also raising prices

by Franziska Albrecht on 08/20/2020

The company Maingau Energie is now also raising the prices for the shop properly. IONITY GmbH

In February, the charging station operator IONITY adjusted its tariff structure and increased the charging prices to 79 cents per kilowatt hour. Customers with a separate charging contract were able to escape the price increase and recharge their batteries at lower rates. Now charging card provider Maingau Energie has also increased its prices.

From September 1, 2020, **Maingau customers** will no longer be able to charge their electric cars for the usual 35 cents per kilowatt hour within Germany. The energy supplier announced this by email. E-autoblogger and automotive expert Ove Kröger posted the message on the social platform Twitter. According to this, the new single electricity charging price is 37.04 cents per kilowatt hour for AC charging stations, 46.79 cents per kilowatt hour for DC charging and 73.11 cents per kilowatt hour for **filling up** with **IONITY charging stations** .

IONITY increases electric vehicle charging prices 500% starting January 31

Charles Benoit - Jan. 17th 2020 2:49 pm ET

JuicePass Unlimited 30 gives you access to more than **30,000 charging points** in Europe at a cost of just **30 euro** for **30 days**.

Choose JuicePass Unlimited 30, move freely with your electric vehicle across Europe and fill up on kWh for **30 days for only € 30**. You will have access, without limits, wherever you want, to all the over **30.000 charging points accessible** through JuicePass app.

From today, and until July 7 2020, subscribe the offer directly from the JuicePass App to recharge your vehicle without kWh limits from 1 to 31 July 2020 included, at an initial fee of 30 € including VAT *.

For all the charging sessions occurred until June 30 2020 and starting from August 1 2020, the pay per use rate will be applied.

For more details, see the **JuicePass App**[1].

[1] To subscribe JuicePass Unlimited 30, access the Profiles section directly in the app and select the Private Profile. You'll see the tariff plan among those available. If you still don't have an active Private Profile, subscribe JuicePass Unlimited 30, enter a payment method and you're ready to recharge.

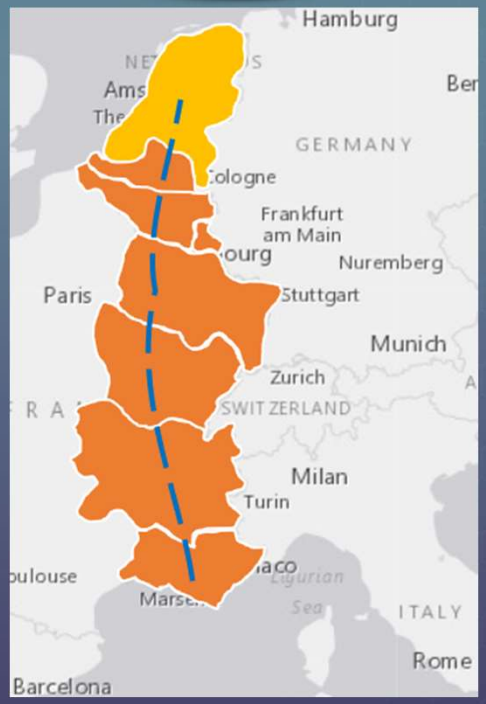
* The fee does not include the penalty for plug occupancy after 30 minutes following the completion of the charging session, equal to 0,09 €/min for AC plugs and 0,18 €/min for DC plugs.

JuicePass App

In the month of July 2020: unlimited fast charging in Europe for only €30,-

partners such as Shell Recharge, Allego and Ionity.

Bottlenecks I Charging rates – invoicing



Charging rates and invoicing

Price aren't clear!

- Is there free charging?
- Uncertainty price strategy in the future (see Ionity as an example, Maingau as second example)
- Tesla as a case (risk of becoming more expensive in the coming years)
- Price per unit of time extremely high, with fast charging, the charging speed of the car is difficult to estimate, which has an impact on the price.
- Price per session makes people want to use the session up to 100%, so the DC charger is kept occupied for far too long (above 80% SoC the charging speed drops significantly).
- Price differences are too big (DC fast charge tariffs range from free to €0.80 per kWh or more). More regulation should be put in place (e.g. telecoms and roaming, preferably one contract for the whole of Europe with the same tariff everywhere: one for slow charging and one for fast charging).

Experiences EV drivers

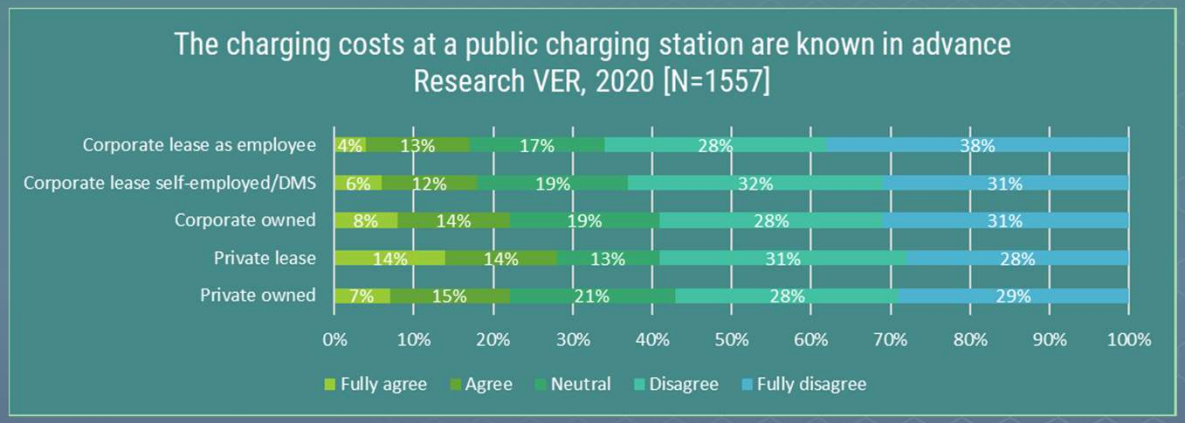
- Tesla drivers indicate that they have full insight into the costs per kWh at Tesla chargers (usually € 0.25 - 0.33) and after the session the total amount is visible on the screen, with invoicing automatically via credit card.
- The non-Tesla EV drivers have limited insight in tariffs, 5 out of 10 don't pay much attention because they are happy they can recharge. 1 out of 10 will find out which charging card can be used to charge at a lower rate.
- Quote: Each provider uses its own rates, which are usually not indicated at the charge points (only sometimes on the providers' own apps). The rate charged at a charge point therefore depends on the app or charge card used.

- Which charge card is used at the fast charger?
  - For non-Tesla superchargers (such as Ionity or CNR), the rate depends on the CPO and the charge card
  - With most charging cards one pays the CPO rate plus a small surcharge (per kWh, session, and/or time)
  - Price differences can be significant:

	Most expensive	Least expensive
CCS Hyundai Kona Electric	€ 155,37	€ 86,62
Tesla SC Only Model 3 LR AWD	€ 55,51	€ 55,51
Tesla SC & CCS Model 3 LR AWD	€ 139,52	€ 79,58

In a green region, an EV-driver is satisfied, yellow leaves room for improvement and orange means an EV-driver faces great challenges.

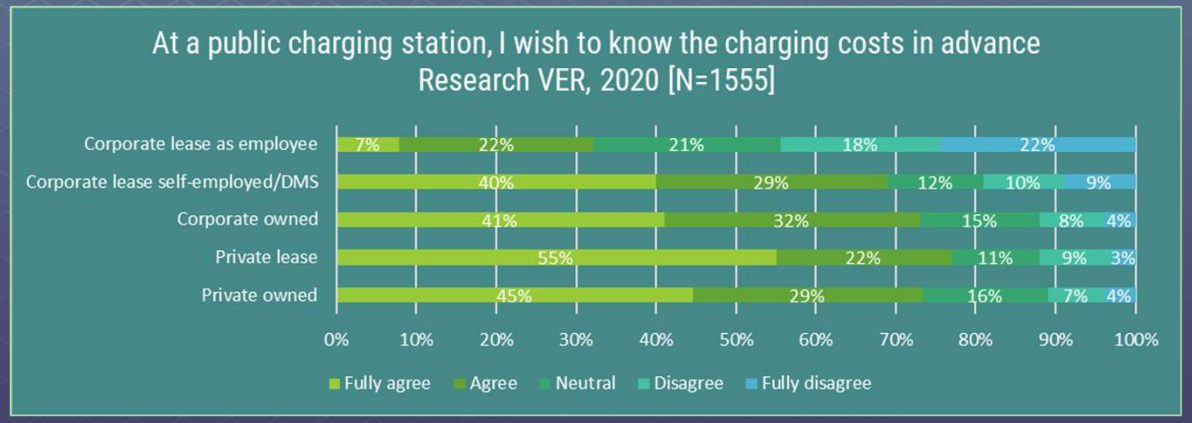
Price transparency



Source: National Survey Charging infrastructure 2020, VER, ELaadNL

Approximately 60% of all EV drivers do not know in advance what the cost of the charging session at a public charging station will be, regardless of whether it is a corporate lease driver or an EV driver with a private car.

More than 70% of EV drivers driving a private car want to know in advance what the charging costs will be. With corporate drivers such as self-employed/DMS or corporate owned, this is about the same. Only with corporate lease drivers who are employees it is somewhat lower, at 40%.



Source: National Survey Charging infrastructure 2020, VER, ELaadNL

Conclusies en aanbevelingen | Laadtarieven - facturatie

Conclusions charging rates - Invoicing

- There is a big difference between Tesla and other EV experiences in terms of price transparency and the cost of charging. With Tesla super chargers the price level and the actual costs per session are visible at the moment of charging. With the other EV's there is little or no clarity about the prices and the actual costs are often only shown on the invoice afterwards.
- A second difference is the level of costs. Tesla Superchargers always charges kWh and there is a price range between €0.27 and €0.33 per kWh. With the other charging stations, the costs are always a combination of the price charged by the operator of the charging station (CPO) and the charge card used. The costs are not always just based on kWh and can vary between €0.27 and even €0.84 per kWh plus costs per session and/or costs based on time.
- For (international) EV drivers who charge a lot at high speeds, electric driving becomes unattractive due to the high costs of fast charging.
- Some car manufacturers want to set up their own charging network (similar to Tesla), or differentiate in price on the Ionity network they partly own, by charging drivers of their own brands less than those who are not affiliated. Possible monopoly formation can lead to vendor lock-in, which can have a detrimental effect on the EV driver.

What is already in progress to resolve the bottlenecks?

- The EC wants to enforce transparency in prices by requiring that an (ad hoc) price must always be clearly visible at a charging station. An ad hoc price is the price a consumer has to pay per kWh as a passer-by (and therefore without membership with one of the eMSPs). It should preferably also be possible to pay without a membership, i.e. with a credit card, bank card or bank app.
- IDACS also aims to improve price transparency by making ad hoc price per charge point data available via the National Access Points of the 15 involved countries.

Conclusies en aanbevelingen | Laadtarieven - facturatie

Policy recommendations

- All charging prices should be easily available and accessible to all consumers in the EU. Ideally, consumers should know the quantity, speed and price before recharging and should not have to face additional MSP or CPO surcharges on top of the (advertised) price afterwards.
- Ad hoc prices should be published by CPOs and MSPs with a standardised protocol (e.g. OCPI) to an easily and freely accessible open data hub (such as a European and/or national access point).
- Create a standardised way of pricing to consumers: price per kWh with an optional but fixed amount for the session.
- The prices of public chargers should be non-discriminatory for all makes and types of vehicles, in particular for public chargers that are (partly) publicly financed.
- It should be mandatory for CPOs to connect all their public chargers in the EU to roaming platforms, so that all means of payment offer access to the public chargers. The eMSP offering their (payment) services will tend to contract with as many CPOs as possible to provide the best service to consumers, making their service more attractive. This will allow consumers to charge at all public charge points in the EU with just one subscription (one RFID card), rather than needing many different subscriptions for different charge points. Regulating roaming charges could also be a step towards a consumer-friendly market comparable to the telecoms sector.
- Speed up the process towards price transparency. Especially those countries that already have many EV drivers should take the lead in this so that a mature and open market emerges. This can be started, for example, to have Belgium and France join the EV Roaming Foundation.

Charging / charging rates - issues and tariffs

Country	Type of charging	Location	Vehicle	Charging date	kWh	Chargingc osts (EUR)	Price per kWh	Transacti oncosts	Cost per minute	VAT	Time (min)	Speed of charging kW	CPO	MSP	Remarks
Belgium	DC fast	Kortrijk	Hyundai Ioniq	9-6-2019	18	10,26	0,57	0,29		2,22	24	45,00	Allego	NewMotion	
Belgium	AC slow	Brussel	Kia Niro	13-6-2019	29,36	2,06	0,07	0,29		0,49	250	7,05	BlueCorner	NewMotion	
Belgium	DC fast	Rumst	Nissan leaf	4-1-2020	28,2	16,07	0,570	0,29		3,44	36	47,00	Allego	NewMotion	
France	DC fast	Saulces Monclin	Kia Niro	28-7-2019	4,9	2,09	0,427	0,29		0,48	7	42,00	Corri-Door	NewMotion	Session stopped due to technical problems
France	DC fast	Saulces Monclin	Kia Niro	28-7-2019	2,9	1,43	0,493	0,29		0,34	4	43,50	Corri-Door	NewMotion	Session stopped due to technical problems
France	DC fast	Saulces Monclin	Kia Niro	28-7-2019	1,7	0,99	0,582	0,29		0,26	2	51,00	Corri-Door	NewMotion	Session stopped due to technical problems
France	DC fast	Keskastel	Kia Niro	29-7-2019	12,46	4,73	0,380	0,29		1	19	39,35	Corri-Door	NewMotion	
France	AC slow	Saint Lary Soulan	Kia Niro	29-7-2019	0,01	1,71	171	0,29		0,4	2	0,30	Reveo Haute Pyrenees	NewMotion	Session stopped due to technical problems
France	AC slow	Saint Lary Soulan	Kia Niro	29-7-2019	6,89	3,2	0,464	0,29		0,7	73	5,66	Reveo Haute Pyrenees	NewMotion	
France	DC fast	Darvault	Kia Niro	10-8-2019	44,39	6,33	0,143	0,29		1,32	60	44,39	Ionity	NewMotion	
France	DC fast	Vrigny	Kia Niro	11-8-2019	12,04	6,33	0,526	0,29		1,32	15	48,16	Ionity	NewMotion	
Lux	AC slow	Dommeldange	Kia Niro	15-2-2020	32,4	5,03	0,155	0,3		0,91	276	7,04	Chargy	NewMotion	
Lux	AC slow	Dommeldange	Kia Niro	16-2-2020	18,5	2,87	0,155	0,3		0,54	155	7,16	Chargy	NewMotion	

Charging rates - differences in price structure and tariffs

Country	Network	Own Prices without subscriptions	Plugsurfing prices	Chargemap prices	New Motion prices
FR	Izivia	1€/5min (no contract)	0.29€/min + 0.79€/session	0.247€/min + 1.452€/session	-
FR	Move in pure	5€/45min	0.15€/min	5.5€/charge + 0.24€/min after 30min of charge	0.154€/min
FR	Freshmile	0.19€/kWh + 0.22€/min	VARIABLE 0.035€/min + 0.28€/kWh 0.046€/min	0.19€/kWh + 0.22€/min	-
BE	Allego	0.325€/kWh (billed to the EMSP)	Variable (11kW) 0.32€/kWh; 0.39€/kWh	0.433€/kWh (11kW, 22kW)	0.34€/kWh
BE	Blue corner	0.40€/kWh (AC) + 0.01€/min if charge completed and vehicle still plugged	0.48€/kWh after 8h adding 0.011€/min after 20h 0.48€/kWh (3.7kW, 11kW)	-	0.4€/kWh + 0.5€/session + 0.01€/min (11kW)
BE	EV Box	Not available	0.36€/kWh	-	0.35€/kWh (11kW)
BE	Last mile Solutions	Not available	1 station for free	Variable Free 0.333€/kWh (22kW) 0.466€/kWh + 0.666€/session (11kW)	0.34€/kWh (11kW) 0.48€/kWh (3.7kW)
LU	Chargy	Not available	0.27€/kWh (22kW)	0.268€/kWh (22kW)	0.18€/kWh (22kW)
NL	Allego	<u>Variable</u> 0.37€/kWh | 1.20€/hour | 0.39€/kWh	0.37€/kWh	0.407€/kWh	0.34€/KWh
NL	EV Box	Not available	<u>Variable</u> 0.36€/kWh | 0.37€/kWh | 0.29€/kWh	-	0.34€/KWh
NL	LastMile Solutions	Not available	0.67€/session + 0.39€/kWh	0.426€/kWh + 0.333€/session	0.34€/KWh
NL	Pitpoint	<u>Variable</u> 0.33€/kWh | 0.32€/kWh | 0.66€/kWh	-	-	0.34€/KWh
NL	Vattenfall	<u>Variable</u> 0.3388€/kWh	-	-	0.34€/KWh

Bottlenecks I Facilities and other

Accessibility and facilities

- Accessibility: navigation or apps with real time data regarding occupation of the charging points is not available.
- More DC chargers required at 1 location, with higher charging speed (50 kW by now too low)
- Payment by bank card or credit card must be possible when travelling
- Sometimes no or poor facilities at the charging location :
  - uncomfortable, messy, unsafe (sometimes unsafe in places where you don't like to be)
  - no restroom
  - no restaurant
  - No other facilities (playground, table, etc.)

Experiences EV drivers

Some quotes:

- *Integration with the navigation apps is poor. You have to change your route, but your navigation app does not adapt. While driving you will need 2 to 4 different apps to find and navigate all chargers.*
- *The fact that you have to become a member of a local provider in order to load, including providing bank details etc. takes a lot of time and hassle. Sometimes with the risk that you automatically remain a member and must unsubscribe.*
- *Sometimes you may need a specific app to recharge, but foreigners can't download it from their app store.*
- *Charging points at more locations. Preferably at restaurants, shopping malls, hotels, with good coffee and toilets, and at parks, forests or sport/recreation locations, so you can take a walk for example..*
- *Please indicate clearly on signs, just like petrol stations: Distance to first and next charging location.*
- *Uncertainty as to whether charging points are available at hotels (e.g. booking.com indicates it, but hotel does not have one).*
- *Location of charging is so far away that you have to look for a special activity on site.*
- *At the destination (hotel, appartment) there are so few chargers that it is uncertain whether you will be able to charge.*
- *Charger reservation at hotel is not possible (you would like to if you book your overnight stay)*

In a green region, an EV-driver is satisfied, yellow leaves room for improvement and orange means an EV-driver faces great challenges.

Conclusions and recommendations I Facilities - other

Conclusions facilities

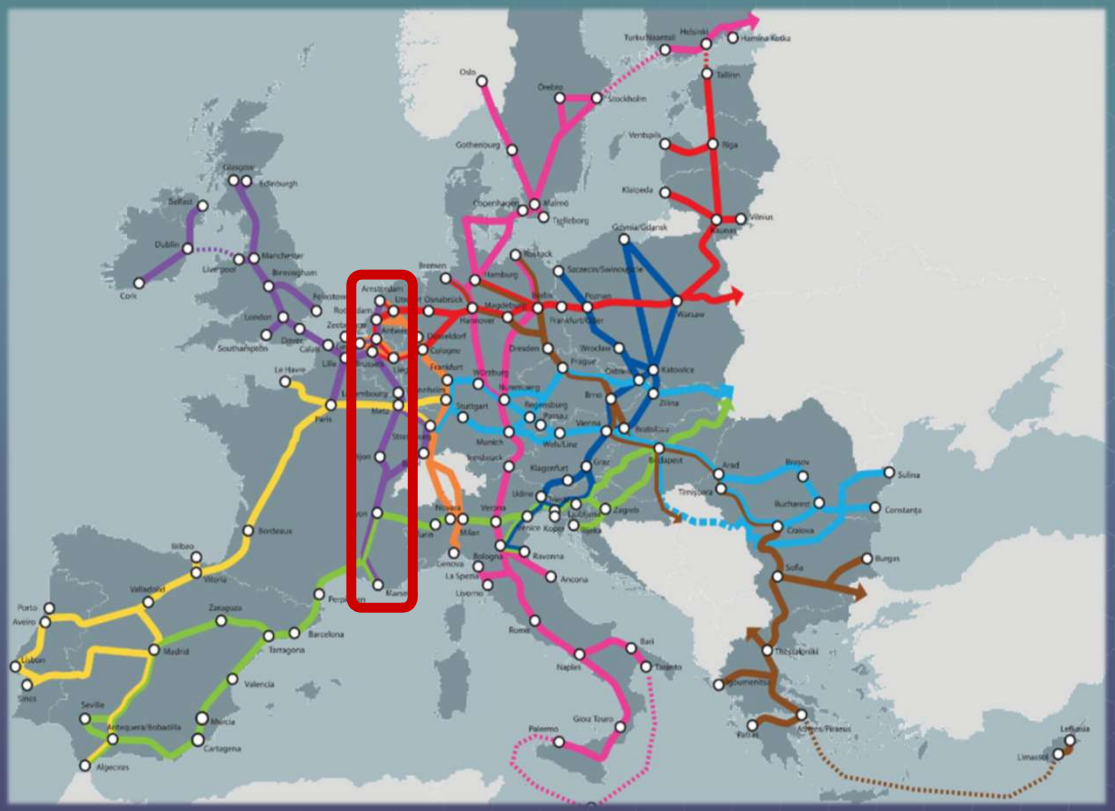
- In general, it can be concluded that EV drivers are moderately satisfied with the facilities available at the fast charging stations. There is too little distraction and too little opportunity to relax during a charging session. It is also important to ensure a safe environment with sufficient lighting and hygiene.
- Information about the charging infrastructure is also too low. No uniform charging map in which everything is visible, but multiple apps / maps are required.

Policy recommendations

- A good example of facilities are the so-called "Autohof" locations in Germany. The Autohof is always located at a motorway exit at a maximum distance of 1 kilometre and often contains one or more restaurants, fast food, leisure facilities, repair facilities and in many cases a hotel. This concept fits in seamlessly with the charging profiles of the cross-border EV driver outlined in this report and can serve as an example for a possible solution.

Autohof Bergler, Windischeschenbach, Germany

Research approach for other European corridors



All Urban TEN-T corridors

'Route du Soleil' corridor

In this study, we highlighted one of the major Urban TEN-T corridors in Europe, the E-Route du Soleil.

Within Europe, there are several corridors that are increasingly important for EV drivers (see map on the left).

We recommend analysing the other routes in the same way, according to the framework presented, with the aim of identifying the challenges for EV drivers and steering them towards unambiguous European KPIs, which should in any case be achieved on the corridors. On the following pages, we will examine the research model that can be applied here.

A full study can be chosen, especially when information is scarce, or a quick scan for corridors/countries where certain preliminary studies have already been carried out and where those results can be used.

Research approach for other European corridors

Other countries (for other corridor routes) may choose to carry out only one or more phases of the research model below. For example, when surveys and/or interviews have already been carried out, but these still need to be complemented by desk research and developed into an interim or final report.

	Phase 1	Phase 2			Phase 3	Phase 4
Steps	1. Desk Research	2A. Survey	2B. Webinar	2C. In-depth interviews	3. Elaboration	4. Advice and handover
Activities	Consult the Internet Consult internal sources	Carry out a survey among EV drivers in cooperation with the relevant country. For example: BEM eMobilität in Germany, Avere France in France	As a follow-up step to the survey, in a Webinar with up to 10 people, the bottlenecks of a particular country / route can be explored in more detail	In in-depth interviews, or even expert interviews, specific topics are discussed in more depth which serve as a quality check and substantiation of the survey and webinar data	Analyse and elaborate qualitative and quantitative information per bottleneck	Drafting concept advice Review concept with client Delivery of final advice
Results	Mapping the charging infrastructure and experiences of the country / route concerned	Quantifiable opinions of a representative target group on charging infrastructure, charging process and rates	Qualitative information about the experiences of EV drivers	In-depth expertise information, advice and opinions on the charging infrastructure on the route	Recommendations and potential deployment strategy known	Provide advice, deployment strategy for charging infrastructure and associated infographics

Research approach for other European corridors

QuickScan - gives quick insight into:

- most important opportunities
- bottlenecks
- possibilities for improvement

QuickScan quantitative

- Bottlenecks are known
- Statistical testing for similarities
- Carrying out a survey in conjunction with the "VER" of the country concerned.

QuickScan qualitative

- The bottlenecks are not yet known
- Creating a clear picture of improvement potential
- Conducting an in-depth / expert interview and / or a webinar

FIER Automotive & Mobility

E Route du Soleil

About FIER and the authors

FIER finds itself in a dynamic market of mobility and transport. In it, we move in a very broad spectrum of perspectives, focused on sustainability and innovation. By initiating, developing and managing FIER's projects, we achieve a solid impact in making mobility more sustainable, and make our contribution to the fight against climate change. What makes FIER unique is that we know the market like no other and can stimulate innovation in the right way. As FIER, we see that we have a responsibility to work together with others to promote more sustainable mobility. Our stakeholders see us as the club to work with, that is decisive and knows how to strike the right chord through the right combination of scientific knowledge and pragmatic experience - "FIER get's the job done".
We achieve this by combining our business-economic and technical-industrial knowledge and expertise, both in projects and in research, together with the European Commission, national and regional government agencies, universities and colleges, OEMs and other SMEs. Together, the authors of this report have more than 25 years of experience in sustainable transport and mobility, energy, renewable fuels and infrastructure, hydrogen and charging infrastructure.

Edwin Bestebreurtje
ebestebreurtje@fier.net
+31 6 1310 5753

Floris Jousma
fjousma@fier.net
+31 6 101 966 21

David Bruil
dbruil@fier.net
+31 6 14735204

http://www.fier.net/eroutedusoleil

Contact details

www.fier.net
@FIERAutomotive
FIER Automotive

Join us in accelerating the transition to e-Mobility!

Driving future mobility