



Workshop 1 - Results:

**Accelerated electrification of road transportation and uniform payment solutions in the Nordic countries**

# Introduction

## Background

The Swedish Energy Agency and The Nordic Council of Ministers have a joint ambition to facilitate collaboration between market actors to contribute towards uniform payment solutions on Nordic level, improving today's customer experience, and accelerating the growth in electrification of transportation.

## Purpose

This document aims to give an overview of the results in the first workshop and therefore prepare you for the second workshop. The first workshop focused on understanding obstacles and challenges connected to the payment solutions for the EV charging market. Whilst the second workshop will focus on enablers, solutions and initiatives to develop a foundation for how EV drivers pay for charging their vehicles in the future.

In the first workshop 43 participants, with representation from all Nordic countries as well as of both the private and public sector, contributed to the results here within. If not else stated, the findings are generally shared by all represented parties.

## Statements

This is a summary of the first exercise in the workshop regarding eight different statements related to the public EV charging market. In this exercise you were asked to showcase your opinion from a scale from "I agree" to "I disagree" as well as discussing where a potential user would place themselves. Presented below are interesting aspects derived from the exercise.

- Regarding whether EV drivers should be willing to pay extra for a more convenient payment experience the opinion varies and there is no overall consensus.
- Interest organization and public sector agrees that a roaming standard is a convenient way forward and if so, the roaming standard should be on a European level.
- Participants agree that a CPO should provide several payment alternatives simultaneously at a charging station.
- The workshop participants believe that Plug & charge is one of the most convenient payment solutions for the EV driver.
- The majority believe RFID chips are difficult to use as a tourist, one of the reasons being the lead times to receive the physical tag.
- Most actors believe card terminals are convenient, but expensive. CPO:s have highlighted that card terminals are not economically viable for normal capacity charging (AC) at a specific charging point.
- Majority of participants do not believe a payment solution that requires an internet connection is inconvenient. However, interest organizations and the public sector are less in agreement that the requirement of internet connection is unproblematic than the private sector.

## Statements

This is a summary of the second and third exercise in the workshop regarding defining obstacles & challenges on the current EV charging market. In the workshop, both general and specific obstacles and challenges related to the eight different payment solutions was discussed. Presented below are interesting aspects derived from the exercise.

- Several participants see that there are too many solutions available on the Nordic market. At the same time, a legislation that favours specific technologies should be avoided as it drives costs for the end user and restricts innovation.
- The participants experienced that the market is fast-paced with a lot of different solutions and no clear direction. Among other things, participants highlighted that this results in reluctance to invest in new technologies.
- There is a lack of price transparency for the user when charging their EV.
- There is no consensus on which payment solutions are the best and there is a lack of collaboration between actors on the market. One limiting factor connected to collaboration is the reluctance to share data.
- In general, bigger companies tend to dominate the market due to high entry barriers for CPO:s, which can lead to higher prices for the EV driver.

## Obstacles and challenges

### Findings for CPO-specific app

- The use of an app is dependent on an internet connection, which can be an obstacle in rural areas.
- Might require that users obtain a lot of different CPO-specific apps to cover a broad area.

### Findings for Universal app

- The use of an app is dependent on an internet connection, which can be an obstacle in rural areas.
- CPOs/MSPs can not effectively communicate, influence and educate the customer, compared to a CPO-specific app.
- Difficulties regarding who will be the owner of the user data.
- Users can find it difficult to know who to contact if there are problems with charging their EV at a charging point.

### Findings for CPO-specific RFID chip (charging card/RFID tag)

- RFID chips can be difficult to use when travelling abroad.
- Might require that users obtain a lot of different RFID-chips to cover a broad area.
- It takes time, usually a couple of weeks, for the user to receive the physical tag.
- High administration costs.
- Potential security issues as RFID chips are easy to copy and/or hack.

- A payment solution that is difficult to combine with paying for parking. Both from a technical perspective and a financial perspective due to administrative costs.

### Findings for Universal RFID chip

- A universal solution is difficult to orchestrate with several actors.
- It takes time, usually a couple of weeks, for the user to receive the physical tag.
- High administration costs.
- It can be difficult to know where the RFID chip functions if roaming is not implemented.
- Difficulties regarding who will be the owner of the user data.
- Potential security issues as RFID chips are easy to copy and/or hack.
- A payment solution that is difficult to combine with paying for parking. Both from a technical perspective and a financial perspective due to administrative costs.

### Findings for Card terminal

- Several varying and strong opinions whether card terminals are a good payment solution for public EV charging or not.
- Card terminals are perceived as expensive to install on individual low capacity chargers.
- Difficult to gather user data as a CPO or MSP.
- Card terminals are expensive to retrofit to existing charging points.

### Findings for QR-code/web payments

- The use of a web payment is dependent on an internet connection, which can be an obstacle in rural areas.
- Generally considered a more time consuming payment solution that requires the user to write their credit card details in a website for each use.
- Physical hardware which can lead to security breaches. For example, scammers placing fake QR-codes over the original QR code.
- Online environment can lead to security breaches. For example, websites being copied or hacked.

### Findings SMS payments

- There is often a lack of price transparency, which makes it hard for the customer to know the pricing structure.
- Requires telephone network coverage.
- May need a phone number from a specific country when travelling cross-boarder
- Difficult to know who to complain to as user if something goes wrong with the payment. Including a sms service provider leads to more errors.
- The payment solution is considered expensive by CPOs, which increases costs for the end user.

## Findings Plug & charge

- The payment solution is missing a technological standard.
- Creates a lock-in effect, limiting the user to the car-manufacturers choice.
- Can be difficult to show the price information prior to charging the car.
- Expensive technological infrastructure.
- Needs to account for car sharing and when the car is used by multiple users.