



**ENSTO**

Five ways to considerably  
lower OPEX costs for  
EV charging networks

May 2016

**Better life.**  
With electricity.

**According to a recent study, the OPEX cost of EV charging infrastructure can be 80% of the total lifetime cost of EV charging infrastructure over 10 years. EV infrastructure owners should focus more on OPEX to make EV charging business profitable and/or minimize cost.**

### **THE PITFALL OF FOCUSING ONLY ON CAPEX**

The EV infrastructure roll out boom is just around the corner, and several entities (utilities, cities, business parks, parking operators etc.) are starting to build EV charging infrastructure. They are also building new business models around electric vehicles and EV users. Many of these entities will start to evaluate different EV charger providers. They typically find that standardisation in Europe is fairly well defined and technical requirements can be sent to charger manufacturers.

These requirements normally include acronyms, like RFID, NFC, OCPP, RCD, Mode 3/ Type 2 and IK/IP class. Some differences in vendors' technical specifications exist, but it might be difficult for the buyer to decide what is important and what is not. Offers are then asked from selected vendors. Since many of the components

in a charger are specified by standards, it might be difficult to find differences between different chargers. So, the logical step is to compare prices. Soon, many buyers are in a situation where the comparison is mainly based on EV charger prices.

### **SEE THE FOREST FROM THE TREES**

According to a study, up to 80% of an EV charger's lifetime costs are related to OPEX, not CAPEX. The cost is highest with poor quality EV chargers in public use. This is too large a proportion of the total cost to overlook in terms of business case and vendor selection. The study includes OPEX cost for electricity connection, maintenance and data connection, but not the costs associated with commercial back end systems and help desks. Help desk costs increase in correlation with poor quality EV infrastructure, and this has a brutal impact on the service provider's brand and user experience.

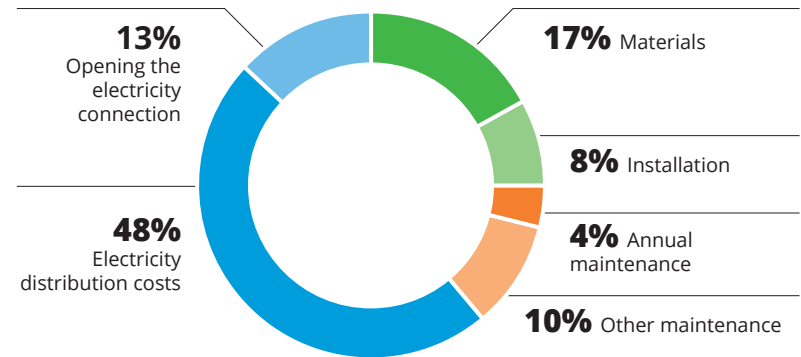
**"UP TO 80%**  
OF AN EV CHARGER'S LIFETIME  
COSTS ARE RELATED TO OPEX."

**LOW QUALITY CHARGERS NEED MORE UNPLANNED MAINTENANCE**

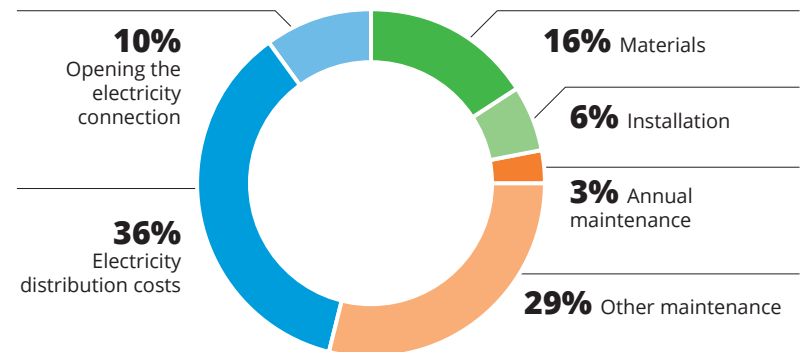
Unplanned, extra maintenance costs may be a substantial additional OPEX cost. These costs include site visits to replace faulty components, boot the EV controller and reconnect the EV charger to the data network. **According to the study, the cost difference between a high quality and low quality EV charger over 10 years may be €9,000 per EV charger.** This cost difference clearly offsets any possible CAPEX benefits from a cheaper EV charger.

**COST BREAKDOWNS FOR HIGH AND LOW QUALITY EV CHARGERS**

High quality commercial AC quick charger with high usage



Lower quality commercial AC quick charger with high usage



Source: Tero Haahtela: Commercial AC charging station life cycle costs and quality requirements, Aalto University 2015



1

2

## Five ways to considerably lower OPEX for EV charging networks

### **FACTORY COMMISSIONING LOWERS INSTALLATION COSTS**

Installing EV chargers is not very widespread expertise in many European countries. In fact, electricians install and commission most EV chargers. Electricians might not be skilled at installing proper data connections and connecting EV chargers to the cloud or servers. Sometimes it takes several site visits and calls to connect an EV charger properly through firewalls with a proper IP address to the back end system.

To overcome this cost factor, Ensto offers factory commissioning for its EV chargers with a preconfigured mobile data connection. The electrician can connect power to the charger and it connects automatically to the back end system. This service substantially reduces installation costs and time for each EV charger.

### **PREVENTIVE MAINTENANCE**

Most EV charger manufacturers use high quality industrial components in their EV chargers. However, EV chargers are often located in harsh environmental conditions and are not used properly. This can cause components to break. They then need to be replaced. Normally this involves two expensive site visits by an electrician. The first is to identify the problem, and the second is to replace the faulty component.

Ensto offers its customers a spare parts service where, for a modest start up fee, and a monthly fee, spare parts kits may be ordered and stored close to the charger, or even in electricians' service vehicles. This service reduces OPEX and increases EV charger uptime. This also has a high impact on end user customer satisfaction.





3

4

5

### **LOCATE EV CHARGERS CAREFULLY**

The electricity connection to a charger is clearly the biggest OPEX cost item, especially if the EV charger has a dedicated electricity connection. The electricity connection cost may be reduced by locating EV chargers where the electricity connection is already available e.g. from a building. The cost of consumed electricity is substantially lower than the connection fees of many distribution network operators.

### **LOWER THE OPEX COST BY UTILIZING LOAD MANAGEMENT FUNCTIONALITY**

With load management, EV chargers' maximum loads can be controlled during peak sessions, and this lowers connection fees and peak tariffs. It is quite common to find that an EV charger network has been planned for maximum load e.g. five dual chargers with 22 kW Type 2 sockets. However, you hardly ever need maximum power from all your sockets at the same time as electric vehicles have various charging requirements. In fact, only a few EV's today require the maximum 22 kW charging power.

Ensto's cloud-based load management application means EV charger loads can be controlled to provide maximum end user benefits and substantially lower electricity connection costs.

### **REMOTE MANAGEMENT**

Remote management of EV chargers improves EV charger uptime and usability, and significantly reduces OPEX cost. All public and semi-public EV chargers should have a data connection and be connected to a back end system. Ensto can remotely monitor, fix, update, report and perform preventive maintenance on EV chargers, without expensive site visits.

## DO YOU WANT TO REDUCE YOUR OPEX COSTS?

Before you start investing in your EV infrastructure, contact Ensto and we will help you reduce your costs substantially, improve your business case and secure you as a high quality player in the market.

### ABOUT THE STUDY

Ensto assigned Aalto University to make a life cycle cost model for EV charging infrastructure. Special attention was paid to OPEX-related costs, as these have a substantial impact on the business case of the EV charging infrastructure owner.

The study was conducted in November and December 2015 by interviewing EV infrastructure owners in Austria, Finland, Norway, Sweden and UK. The interviewed companies own/control over 1000 EV chargers and offer both commercial and free EV charging to their customers.

The logo for Ensto, consisting of the word "ENSTO" in a bold, blue, sans-serif font.A large graphic on the right side of the page, featuring a large dark blue diamond shape overlapping a light blue diamond shape, with a smaller green diamond shape positioned between them. The background is a solid light blue color.

**Ensto** is a leading expert in developing and manufacturing high quality charging products and services for electric vehicles, with operations in over 20 countries. Our focus is to support the development of sustainable electric mobility with energy efficient services and reliable, Smart Grid friendly products.

[www.ensto.com](http://www.ensto.com)

**AALTO UNIVERSITY** has six schools with nearly 20,000 students and 4,500 employees, over 400 of whom are professors. There are a wide variety of bachelor's and master's degrees awarded at Aalto University, and doctoral programmes in all its fields of study.

[www.aalto.fi/en/](http://www.aalto.fi/en/)