Smart Charging : Identifying Enedis role in the future of smart charging of electric vehicles.

Economic & Strategic assessment of B2B Smart Charging through value chain analysis.

CONTEXT

Achieving **net-zero within the road transport** by 2050 is a critical component of global efforts to address climate change by reducing greenhouse gas emissions. Road transport currently accounts for approximately 37% of global greenhouse gas emissions, and is projected to continue to increase without significant intervention. A major component of this transition is the **electrification of vehicles**, with the end of the production of thermal vehicles by 2035.

The rapid adoption of electric vehicles (EVs) is expected to have a significant impact on the electricity grid due to the **increased demand for electricity** for charging and the potential for localized network congestion. **Smart Charging** (SC) is one of the solutions through which the impact of EVs on the network can be mitigated.

How ? By **managing the timing and location** of EV charging to avoid local network congestion and reduce the overall impact on the network. In our study, we only consider a charging shift between peak and off-peak hours.

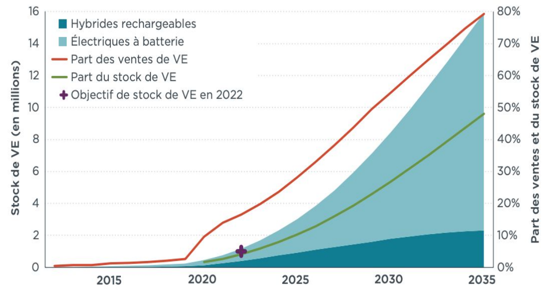
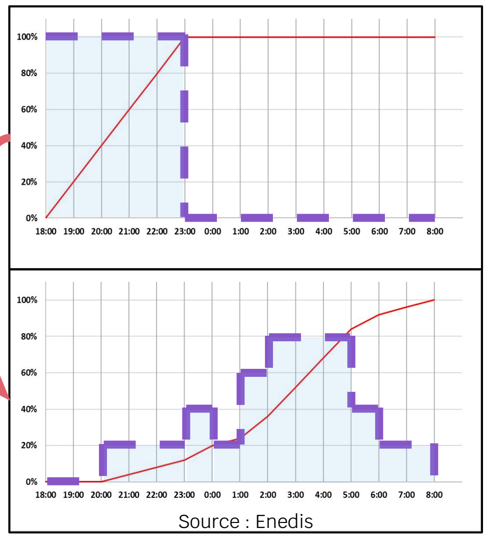
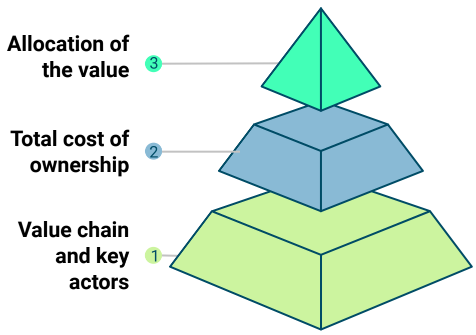


Figure 4. Parc de véhicules électriques en millions (axe gauche) et part des ventes de VE neufs et du parc électrique (axe droit) 2012-2035. Source : ICCT, 2021



Methodology



Following Michael E. Porter's definition, **value** is "the sum that customers are willing to pay what a firm offers them". In other words, the **firm's sales**.

Our methodology involves three steps. First, we describe the **value chain** itself and **key actors** of smart charging are identified and described to map the interactions and activities necessary in providing charging services to the end consumer.

Secondly, a model of the **total cost of ownership** of both smart and standard charging was created through aggregating the sum of all direct and indirect costs associated with owning, operating, and managing an EV-fleet. The TCO aims to take a **holistic point of view** to reflect the complete cost involved with companies' EV fleets. Finally, the value is allocated along the value chain by associating each spending to the actor that receives it. Through this methodology, we can compare two charging scenarios (with and without SC), thus providing a tool to **comprehensively understand** the costs and benefits associated with smart charging along the value chain.

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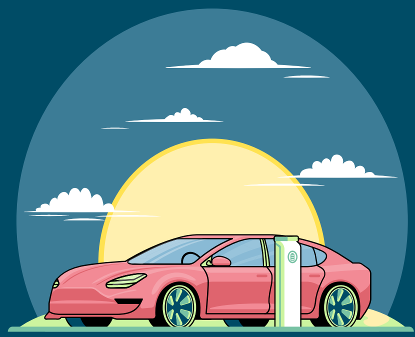
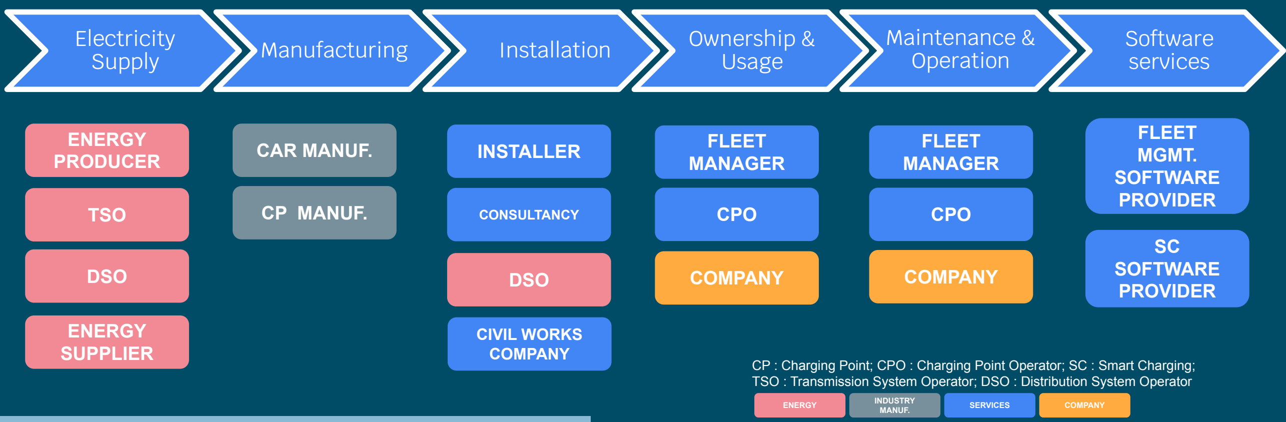
DATA AND ASSUMPTIONS

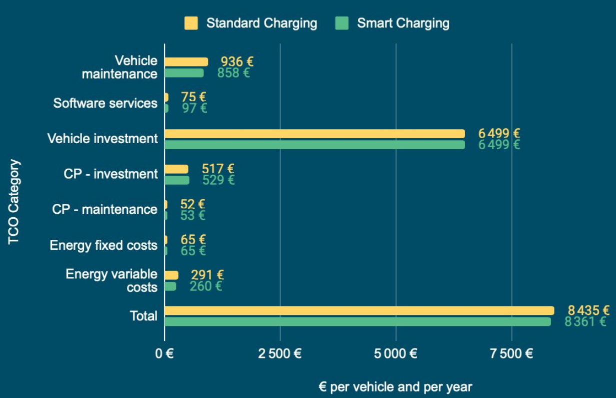


The ambition of this study has been to generate results of **immediate relevance** in France. Consequently the TCO-model has been built on data reflecting the current situation of smart charging in France. The result of this study is based through online accessible data categorised under different assumptions. These assumptions are derived from different scenarios with the objective to illuminate the impact of the variability of uncertain parameters. Through the construction of an interactive tool the scenarios as well as the data can be challenged and modified as the model is created through a **parametric structure**.

VALUE CHAIN



RESULTS AND ANALYSIS



The findings of this study indicates that the main driver of avoided cost in smart charging is the **impact on battery** (Smart charging increases its lifetime). The **energy variable costs** also decrease. However, the difference between smart charging and non-smart charging is marginal yielding small gains for the company (relative to the whole costs). Thus, this small increase will only provide a **small incentive** to adopt this technology for companies. Cost increases associated with smart Charging are mainly driven by additional **software services.**

Nevertheless, these new services constitutes a new potentially profitable market within the Value Chain of EV charging, thus a significant business opportunity for new and old actors to differentiate their offerings. However, the current high additional costs of SC services act as a barrier to adoption. However, **future market conditions** (high energy price, pressure on the network through EV increasing penetration, policy incentives) may favor the adoption of smart charging.

Public authorities is anticipated to play a critical role in the deployment of smart charging. Indeed, as our results show the State does not have any direct financial interests in such an implementation. However, SC has other positive externalities: **Social** (reducing the cost of electricity) & **Environmental** (extending lifetime of EVs). Thus, to address the high cost of smart charging software and promote its adoption, **State subsidies and incentives** (such as direct financial support, tax incentives, R&D collaborations) constitutes feasible ways to incentivise a rapid deployment of Smart Charging for EV-fleets.

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