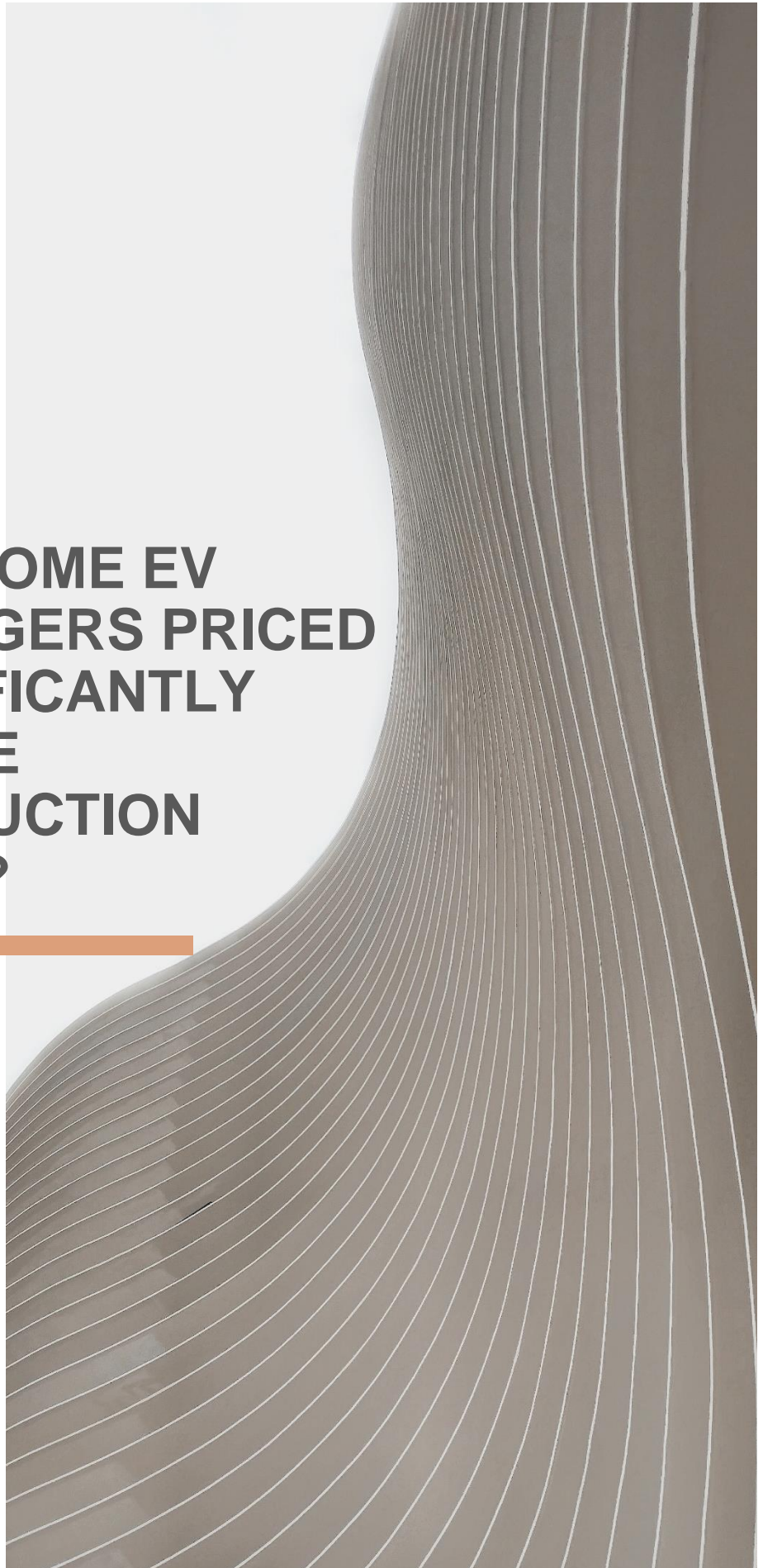
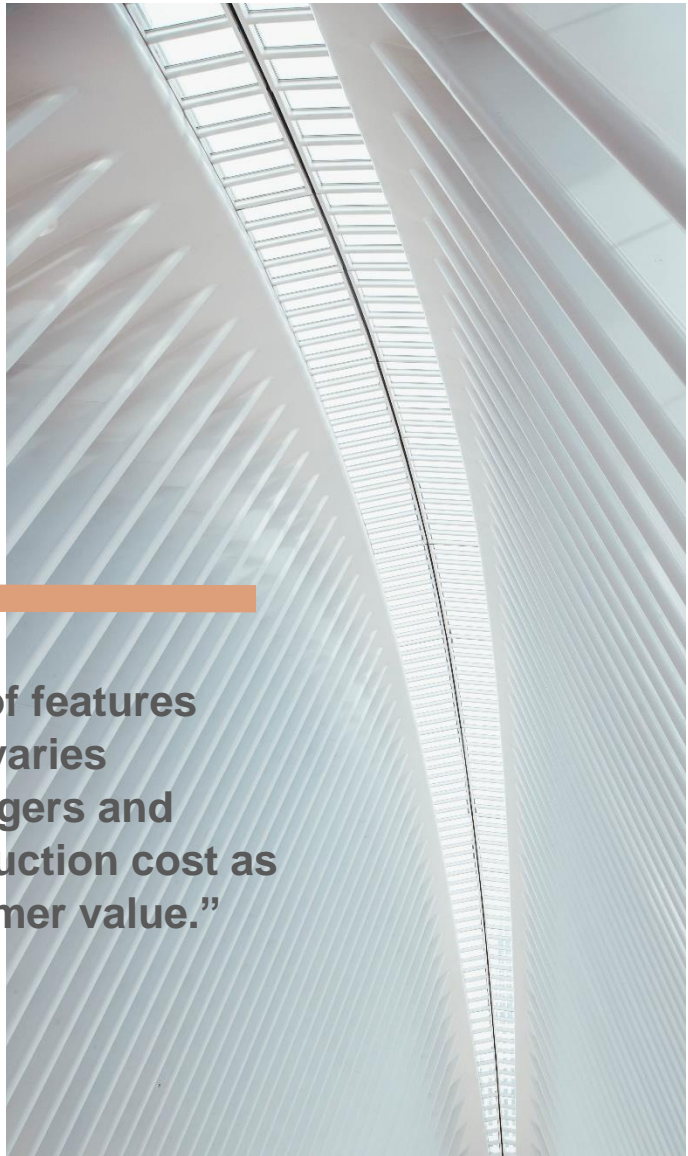




# ARE HOME EV CHARGERS PRICED SIGNIFICANTLY ABOVE PRODUCTION COST?

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**“The choice of features significantly varies between chargers and impacts production cost as well as customer value.”**

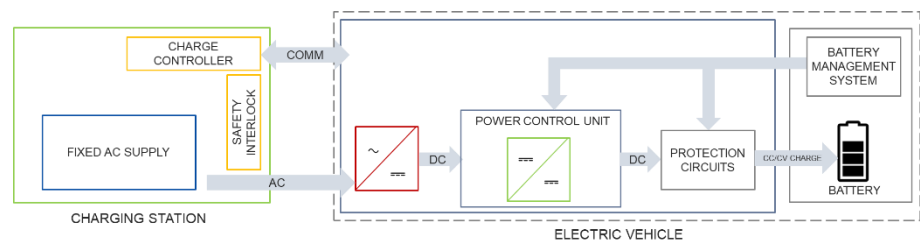
The rapid rise of electric vehicles has resulted in an equally large surge in the market for home electric vehicle (EV) chargers. Concurrently, the market for home EV chargers is relatively new and immature, arguably providing charger manufacturers with the opportunity to have high markups on their products. To investigate if these potential high markups exist, Fortos has conducted a product teardown and a bottom-up cost calculation of three popular home EV chargers.

Our main findings are that:

- Home EV chargers are priced significantly above their production cost
- Home EV chargers consist mainly of commodity and standard electrical components
- There is a large variation in size and weight of chargers indicating there is room for optimizing product design
- The choice of features significantly varies between chargers and impacts production cost as well as customer value
- The packaging can greatly be improved in terms of volume, which would lead to lower CO2 footprint and shipping costs

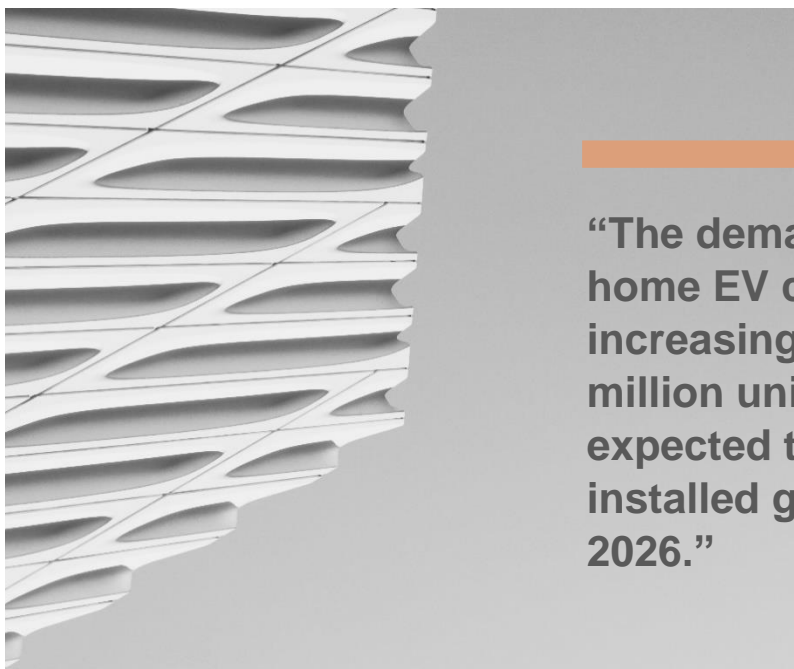
## EXPLORING THE BOOMING MARKET OF HOME EV CHARGERS AND the science behind charging EVs

As sales of electric cars continue to grow, the demand for home EV chargers is increasing, where 35 million units are expected to be installed globally by 2026<sup>1</sup>. Home EV chargers are typically AC (Alternating Current) chargers, which essentially is a power switch that enables a car to draw more power compared to a standard home power outlet. However, EVs generally run on DC (Direct Current) power and the conversion from AC to DC is not done by an AC charger, but inside of the EV using a converter. This means that a charger technically does not charge an EV's battery but rather safely supplies electricity to an onboard charging system, which in turn charges the car's battery.



AC charging configuration

Currently there is a plethora of actors in the home EV charger market; everything from established OEMs starting to manufacture chargers to EV charging start-ups, offering a wide range of products and features. Some examples are AC chargers with a power output of 3,7-22 kW (charging a 60-kWh battery in 16 hours down to 3 hours) and with prices typically ranging from 5 500 SEK to 20 000 SEK. Generally, cheaper chargers tend to have lower power output and fewer smart features. However, there are newer recently released chargers on the cheaper spectrum that can deliver 22 kW and have smart functionalities. Pricing also varies depending on brand and the most expensive chargers typically have two outlets.



**“The demand for home EV chargers is increasing, where 35 million units are expected to be installed globally by 2026.”**

<sup>1</sup> Carey & Lienert, As EVs go mainstream, a rush for share of home charger market. Jul 2022

## Cost analysis of three different charger brands

Given the high price variance and substantial growth of the market with its significant number of actors, Fortos view is that the market for home EV chargers is immature. Furthermore, to increase the number of home EV chargers most EU countries deploy incentive schemes to lessen the cost of purchasing and installing chargers. Sweden for example employs a green technology subsidy consisting of a tax reduction equal to 50% of the cost for work and material<sup>2</sup>. Consequently, the combination of governmental subsidies and market immaturity have provided manufacturers with an opportunity to place a significant price premium on their chargers. The question is then if manufacturers have seized this opportunity or if current prices accurately represent the costs of producing a home EV charger.



To answer this question Fortos performed a product teardown and bottom-up cost calculation of three different chargers from different brands.

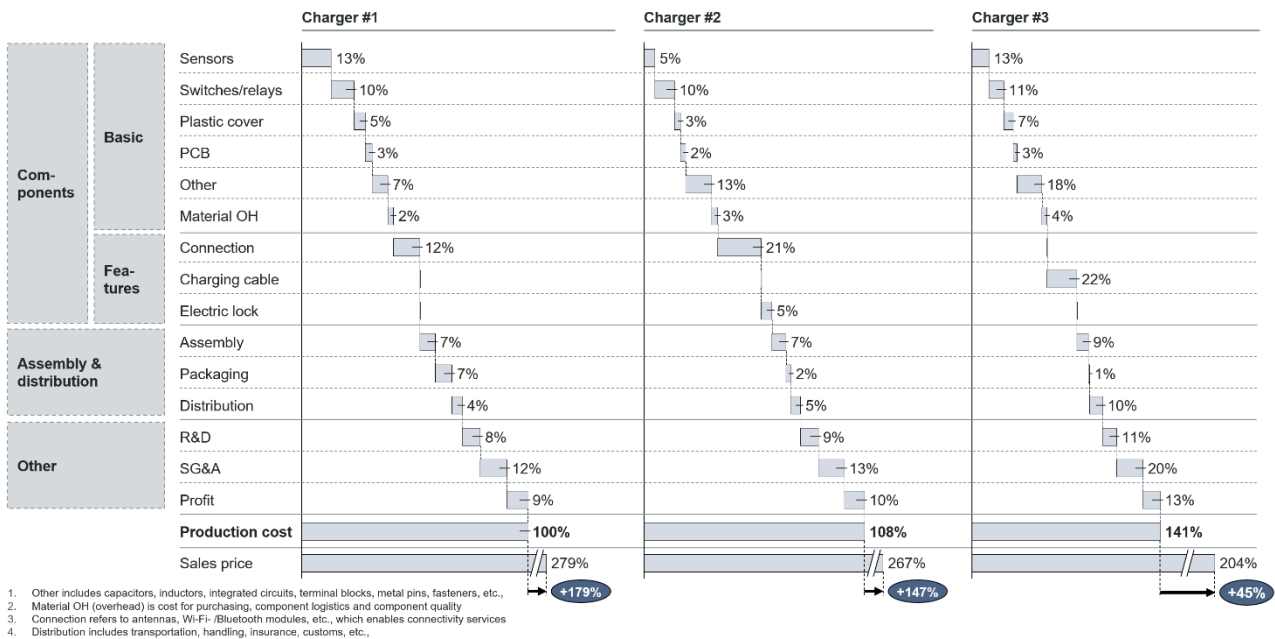
### Methodology for calculating production cost of home EV chargers

1. The chargers were disassembled, and each component was identified
2. Quotes for each type of component were requested from websites selling electrical components
3. Material overhead (cost for purchasing, component logistics, quality, etc.,) was estimated by benchmarking similar companies

<sup>2</sup> Skatteverket, Grön Teknik. Retrieved Feb 2023

4. Assembly cost was estimated by estimating labour, machine, tooling and over-head cost for assembling a charger
5. Distribution, R&D (Research & Development), SG&A (Sales, General & Administration) and Profit were estimated by benchmarking similar companies

OVERVIEW OF THE BOTTOM-UP COST CALCULATION OF THE THREE SELECTED HOME EV CHARGERS



**Based on the teardown and the bottom-up cost calculation, the following finds were made**

- Home EV chargers are priced significantly above their production cost
- Home EV chargers consist mainly of commodity and standard electrical components
- There is a large variation in size and weight of chargers indicating there is room for optimizing product design
- The choice of features significantly varies between features and impacts the production cost as well as customer value
- The packaging can greatly be improved in terms of volume, which would lead to lower CO2 footprint and shipping costs

CONCLUSION

# Lower prices and advanced features on the horizon



In conclusion, the bottom-up cost calculation supported the hypothesis that home EV chargers are priced significantly above their sales price. As a home EV charger is a simple product that could be seen as a commodity there is a strong likelihood of price decreases as the market matures. This conclusion is reinforced by the emergence of newer models offering 22 kW power output and smart features on the lower side of the price spectrum.

Going forward with a decrease in pricing manufacturers of home EV chargers will likely compete for premium pricing by offering more advanced smart features, such as better apps, active load balancing, bidirectional charging (vehicle-to-grid and/or vehicle-to-home support), automatic vehicle authentication via plug-and-charge, and payment systems enabling the owner to sell charging services to other EVs when the charger is not in use.



**“manufacturers of home EV chargers will likely compete for premium pricing by offering more advanced smart features”**

WANT TO KNOW MORE?

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