PRESS SHEET

Milan, 3rd May 2021 - **The contents of the first ARERA survey of electric car charging systems**

Differences between the various charging devices

The 225 devices surveyed in 2020 cover a wide range of charging capacities, **from a minimum of 2 kW up to a maximum of 350 kW,** classified under 4 market segments:
"***Slow*** charging (95 devices), for chargers up to 7.4 kW;
"***Quick***" (98), for chargers up to 22 kW;
"***Fast***" (20), for chargers up to 50 kW;
"***Ultra-fast*** "(12), for chargers over 50 kW.

The market offering is therefore particularly rich in the ***Slow* and *Quick*** segments (i.e. up to 22 kW, utilising alternating current), **with a total of 193 devices (86% of the total).** This is where 78% of the companies under consideration are operating.
The situation is quite different for higher-power devices, where **only 9 companies are active *in the Fast segment and 6 in the Ultra-Fast*** segment, half of which only offer devices that supply direct current.
The products analysed cater for a wide range of needs: from those suitable for families or small businesses (often wall-mounted and with a single socket, commonly referred to as *wallboxes*), to those most appropriate for companies, businesses or public institutions (charging stations with two sockets and power no greater than 50 kW), up to much bulkier products especially suitable for installation along motorways or on major extra-urban traffic junctions (*Ultra-fast*).

Pricing of the equipment

In terms of purchase prices, the report identifies the primary cost factors, although this proved particularly complex due to the wide variety of products and the various commercial approaches companies have adopted.
For *Slow* charging devices (up to 7.4 kW) the average expenditure for the purchase and home installation of a *wallbox* is between a minimum of €900 and a maximum of €1,500, with an **approximate average value of €1,200 VAT-inclusive**.
There are also *low-cost* solutions that cost as little as €700, as well as "top of the range" solutions costing €1,700 or more, but the mid-range is centred around €1,200. It should be noted that several car manufacturers offer a combined car and *wallbox* product, with the charging device included "for free".

For ***Quick*** charging devices (up to 22 kW) the basic products (single socket, with a power of 11 kW and no authentication mechanism or internet connection) can have prices that are only slightly higher than those of the previous segment, **ranging from €700 to €1,300 + VAT.**
For a charging station with two sockets, each 22 kW, the typical prices (real retail prices) can instead vary **between €2,000 and €4,000 + VAT** (with basic functionality, prices can be reduced down to €800-1,000 + VAT).
The least expensive devices are those that can be used for free, open access charging and which therefore do not require authentication (physical or electronic) or an internet connection to handle payments. **The highest price range** (between €3,000 and €4,000 + VAT) is made up of devices complete with all features, such as RFID and internet connection, or with a SIM card in the device.

For ***Fast*-charging devices** (up to 50 kW), with a 22kW + 22kW alternating current twin-socket charging station, costs vary **between €7,000 and €9,000 + VAT**.
For **50 kW direct current devices**, costs range between **€22,000 and €29,000 + VAT**, but there are lower performing devices that are also interesting (such as *wallboxes* with a single 30 kW socket at €7,500 + VAT or 24 kW charging stations, whose prices can vary between €12,000 (single socket) and €19,000 + VAT).

Ultra-Fast devices (over 50 kW) are the most expensive**.**
For those **between 60 and 150 kW**, the provided prices only refer to 3 of the 6 total devices listed and vary **between €26,000 and €40,000 + VAT**, increasing with the power output.
For devices with power **between 150 and 350 kW**, the prices provided include 5 of the 8 total devices listed and vary **between €54,000 and €80,000 + VAT**, increasing with the power output.

In general, for the same maximum charging power, a large part of the final price is due to the components required for user interactions: displays, RFID/NFC chips, the possibility of control using mobile applications, etc.
For this reason, the outlay required to purchase a device designed to offer free, open access charging (for example at a supermarket car park), can be significantly lower (between 30% and 50%) than that required for purchasing a device designed to offer charging at a cost and to be included in an interoperable system.
An interesting index may be that of the **average unit cost** necessary to buy a charging device, which can vary greatly according to the size and technology, **between 36 and 580 euros for each kW**, and which also reflects the different performances of the devices considered in the study.

Standby Power Consumption

In the perspective of sustainability, another relevant factor is the ***standby*** power consumption of devices. About 1 in 3 devices constantly consume between 20 and 30 W and 80% of devices consume no more than 30 W. **Only 1 in 5 devices are found to have negligible consumption** (less than 5 W).
If we consider that each W of electricity consumption in *standby* corresponds to an annual energy consumption of 8.76 kWh, the installation of 10,000 *Slow* or *Quick* charging devices (with an average *standby* consumption value of approximately 12 W) would now involve more than 1 GWh of annual *standby*, while as many *Fast* or *Ultra-Fast* devices would consume 5.25 GWh per year**.**
Consequently, **consistent with the electric vehicle deployment scenarios presented in the PNIEC** (The National Plan for Energy and Climate), if a private-public charging network consisting of at least 3 million devices of the *Slow* or *Quick* type and about 10,000 of the *Fast* and *Ultra-Fast type* is developed, **the *stand-by* consumption could** — without the advent of new high-efficiency technologies — **reach about 300-350 GWh per year**, thus by 2030 accounting for over 3% of the estimated energy required to power the 6 million vehicles in circulation.

Vehicle-to-grid, smart features and sustainability

In order to enable electricity grid and vehicle interaction capabilities, i.e. those where the latter can offer balancing or reserve services to the system (*Vehicle-to-Grid, V-to-G*), which are therefore one of the ways in which "*smart charging*" can be implemented, it is essential that the device at least has the ability to "modulate" the current during charging. This **capability is present in two out of three of the *Slow* and *Quick*** devices (segments dominated by alternating current) and in almost half of the *Fast* and *Ultra-Fast* devices, which are therefore already capable of modulating one-way energy flows (from the grid to the vehicle battery, V1G). However, the report reveals that for various reasons the ability for these devices to manage bidirectional energy flows (i.e. from the battery to the grid as well, V2G) is still a long way off.

ARERA's report also analysed the '*smart*' characteristics of the charging devices, i.e. their ability to interact digitally with an external party, to transmit data relating to the amount of energy exchanged with the vehicle and to implement commands given by that external party to modulate the current during charging and thus to offer V-to-G type services.
In 2020, **only one-third of the devices examined were found to have these *smart*** features: (35% in the *Slow, Quick* and *Fast segments and 42%* in the *Ultra-Fast* segment), but the situation is improving rapidly, thanks in particular to ARERA's stimulus measures to develop new technical regulations and the launch of a trial to encourage charging in private locations from 3rd May.

The ARERA Trial from 1st July

The survey also features some key points in relation to **ARERA's trial to encourage charging** in residential locations which will **allow free increases in power availability (up to 6 kW)** in time slots during the night or on holidays for low voltage customers (resolution 541/2020/R/eel, https://www.arera.it/it/docs/20/541-20.htm), from 1st July.

Those who use charging devices (*wallboxes*) that comply with particular technical requirements defined by ARERA may apply - by **submitting a request to the GSE** (Gestore dei Servizi Energetici) **- from 3rd May onwards.**

In a typical Italian home (equipped with a mains connection and single-phase electrical system) the **standard available power is 3.3 kW;** to be able to go beyond this threshold at any time of the day, it is usually necessary to request a change in the supply contract, paying a fixed annual fee for each additional kW for which availability is requested.

Even though since 2017 ARERA has already made this increase in power for domestic customers an easier and less expensive operation than it was previously (more info by clicking here), thanks to *smart meters* and new *intelligent wallboxes* and without contractual changes, joining to the trial allows more power to be available during the night and on holidays, when the electricity grid is least in use.

Depending on specific circumstances, **savings estimates (compared to an increase in power at all hours of the day, every day) can vary between 60 and 200 euro per year.**

In conclusion

The market for EV charging devices exhibits **particularly dynamic competition** in the segments characterized by **medium and low charging powers**, dominated by alternating current devices, which are particularly appealing for the *consumer* market (single homes or condominiums), for the small business (e.g. professional offices, garages), for corporate fleets and for most Ho-Re-Ca[1] and modern retail markets.

It is precisely these devices that will be used to equip the vast majority (well over 90%) of the charging points our country will install in the next ten years.

The situation is different in the market segments dedicated to fast and, above all, ultra-fast charging points, where a much smaller number of companies are operating (less than 50% of those present in the previous sectors).

The possibilities of communication and interaction between vehicles and electrical infrastructures (*Vehicle to Grid*) are at the forefront of the *smart charging* policies that ARERA have been promoting for some time now, but it will still take a while to be able to fully exploit them in contexts larger than trial applications: even if for the first V1G applications it may only be a matter of a few months, for the much more expensive V2G applications the time frame is definitely a few years.

➔ Link to the full report in Italian:
https://www.arera.it/allegati/pubblicazioni/210503_dispositivi_ricarica.pdf

[1] Acronyms for *Hotel, Restaurant, Café*