

WHITE PAPER – Smart Charging Solution

Smart electric vehicle charging station management solution (Photovoltaic)

Problem to solve:

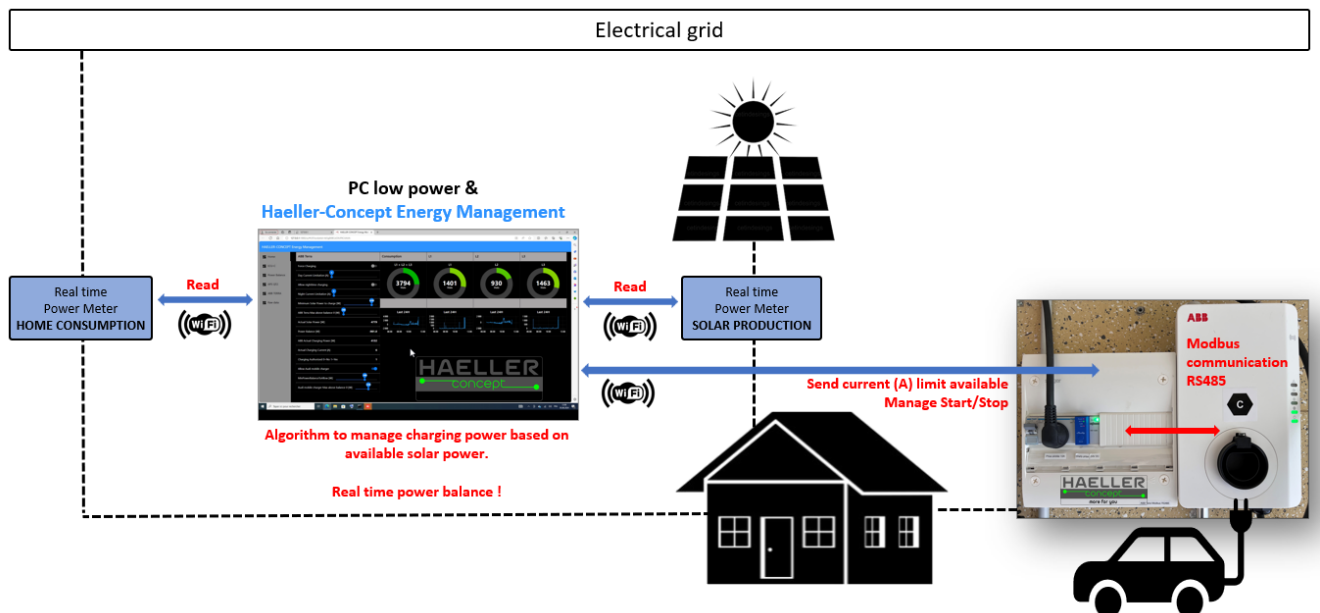
Minimizing grid energy import during the charging of an electric vehicle.

Smart solution:

Energy sensors measure in real time the power output of the home solar power plant. A software solution (HMI) controls the charging power of the electric vehicle charging station based on the available photovoltaic energy. This allows for minimizing the import of energy from the electrical grid and maximizing self-consumption, thereby reducing the potential use of gray energy. Ultimately, the consumer sees their electricity bills drastically reduced.

How it works:

The 'Haeller-Concept Energy Management' application is installed on a low-energy consumption PC and monitors in real time the available photovoltaic power and the building's real-time consumption. It is always thus possible to calculate the energy balance, and thus to distribute the surplus energy to the charging of the electric car. The system adjusts the charging power based on the available energy.



A WIFI / Modbus RS485 communication box allows real-time communication with the charging station and the application, enabling it to start, stop, and adjust the charging power. It is also possible to access the application from a smartphone or an external PC via a remote support application (for example, TeamViewer or AnyDesk).

Results:

The example below shows that it is possible to reduce energy import by more than 90% depending on the application settings. The user can determine from what power level the charge is allowed to start and what import power level is tolerated.

➔ Obviously, the solution can also be used to control other devices!

Fig. 1: Without energy management: Import 72%

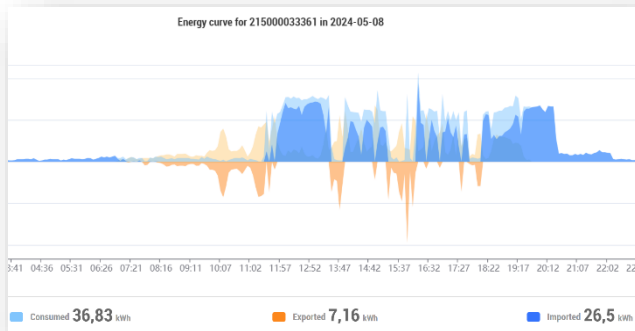
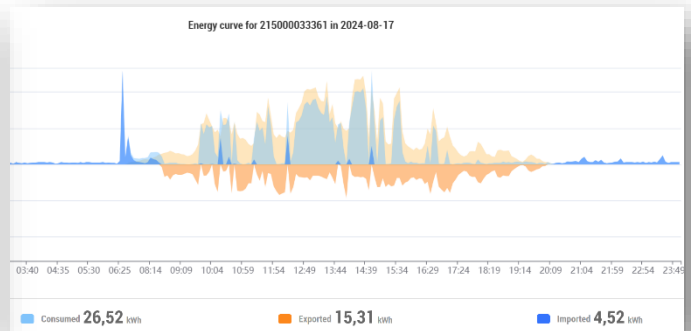


Fig. 2: With realtime energy management: Import 17%



User interface HMI:

Settings can be adjusted according to different needs. This allows for the avoidance of any energy import, or the tolerance of a certain amount of imported energy. Of course, the user can also choose to force charging at full power, or to prioritize charging during off-peak hours. The application also allows real-time monitoring of the building's consumption on each phase (L1, L2, L3 + Total), and visualization of the consumption and production history.

Fig. 3: Software interface



Benefits:

The advantage of this system is that it is low-cost and allows for significant energy savings with relatively simple means. It is an open system that can communicate with different technologies.