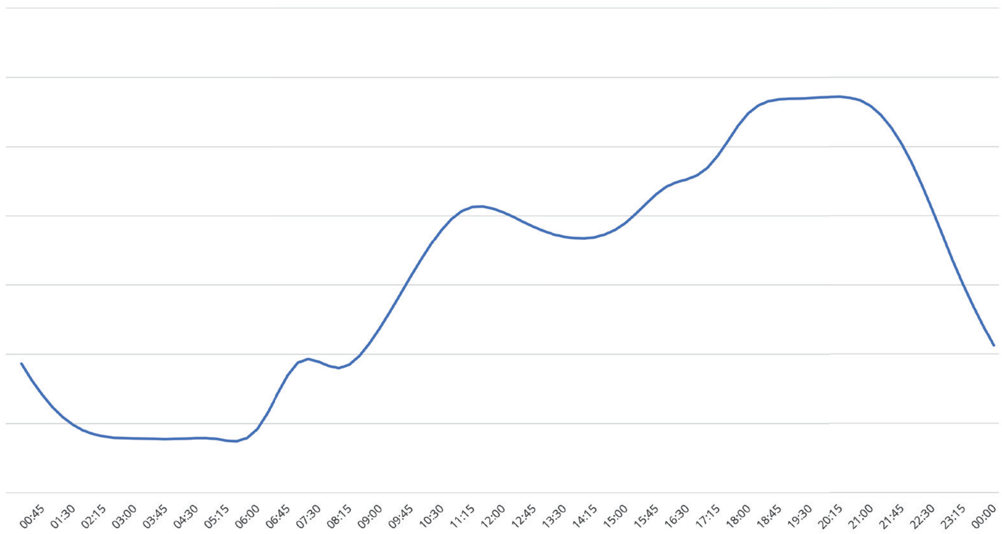
Peak Shaving

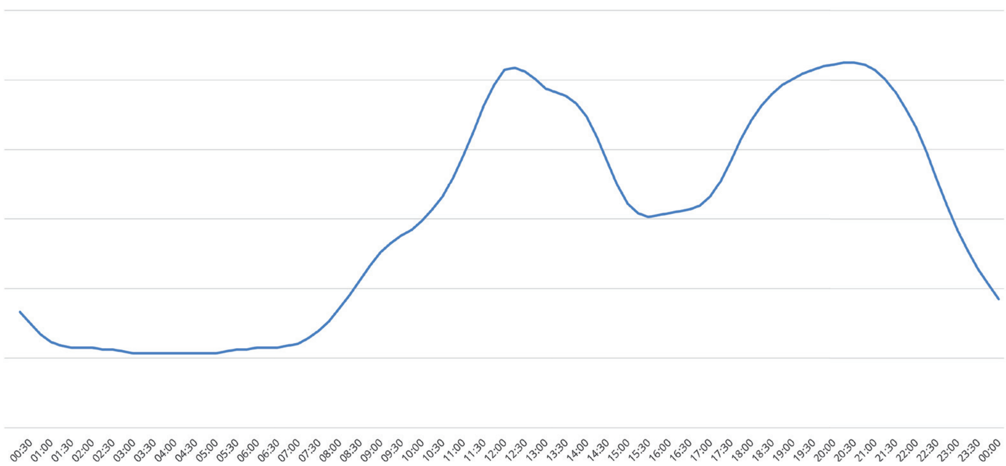
Capping peak loads at the grid connection point

Our energy infrastructure is a very fragile and sophisticated system. It must be ensured at all times that sufficient energy is available to meet demand. We as users must not be affected by this, because who wants to think about whether to take a shower or put a pizza in the oven? To enable planners to respond to the volatile demand, standard load profiles for various consumer groups have been created based on a multitude of data from trade associations and network operators. This makes it possible to estimate the energy and power demand relatively well and cover it by means of the available power plants.

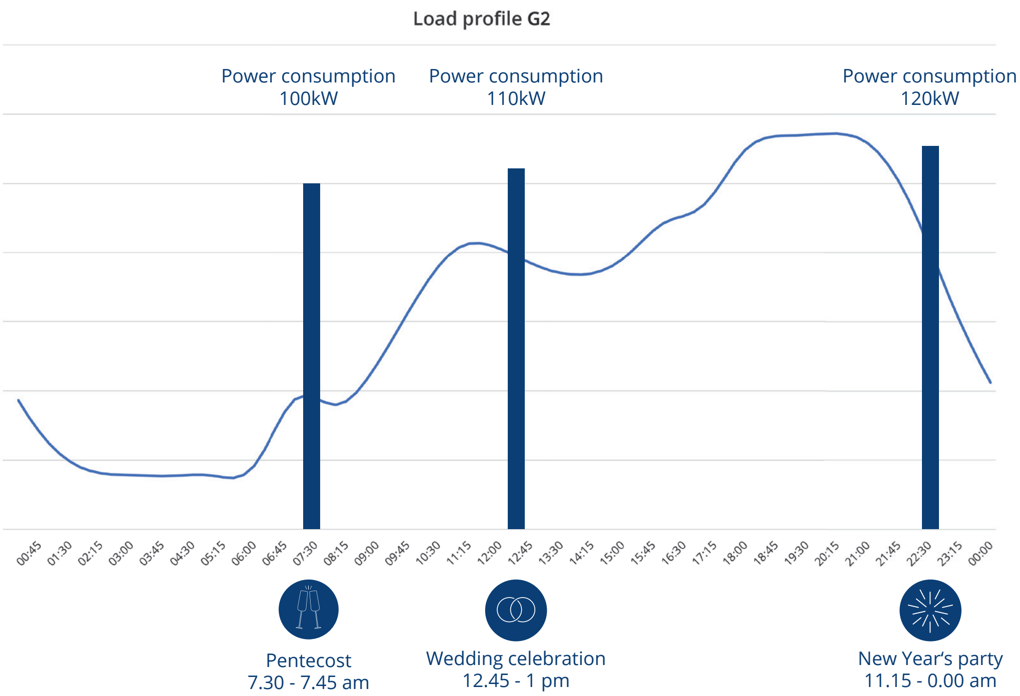
Load profile G2



Load profile G6



Due to their large number of consumers, hotels, supermarkets and DIY stores have a high electricity demand. This can be completely or partially covered by using a photovoltaic system with electricity storage. This reduces the electricity demand from the grid and lowers CO_2 emissions. But these institutions also have other problems: due to the high number of consumption points, the base load that these consumers permanently draw from the grid is very high. In addition, spikes in consumption can occur as a result of people switching on or temporarily operating other high loads. In order to be able to serve these consumption spikes or peak loads, capacities must be kept available in the infrastructure for our energy network.

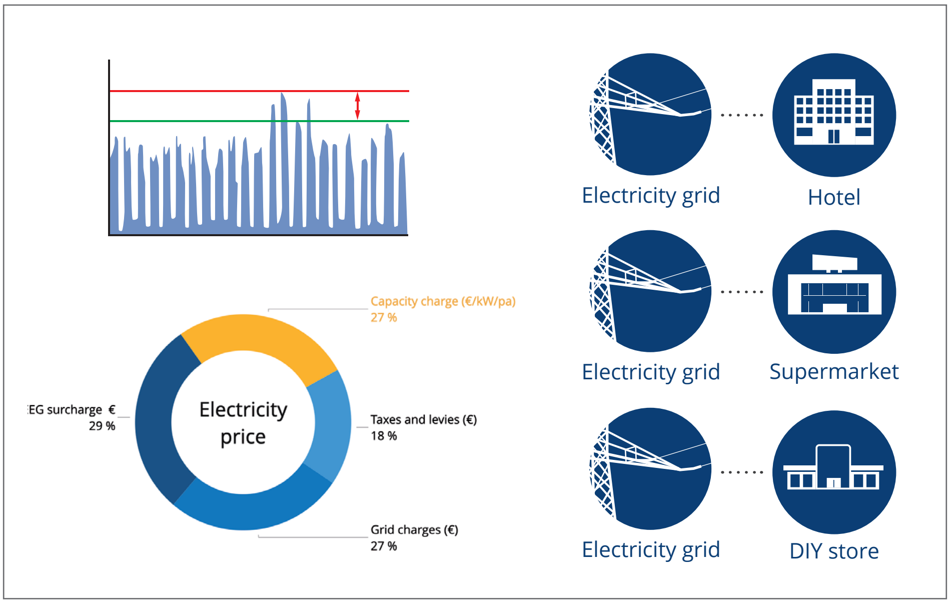


Annual average = 100 kW > Costs for hotelier at a performance price of €102 per kW/year = €11,200.

This in turn has to be paid by the consumers through a separate fee in the form of a capacity charge. Depending on the region and grid operator, this capacity charge ranges between €40 and €180 per kilowatt (kW) provided. This capacity charge can very quickly become a high proportion of the total electricity costs.

Example

Power provision:	180 kW
Capacity charge:	€85 per kW
Costs for providing power:	€15.300 pa



For hotels, supermarkets and DIY stores, the development of our mobility in the form of e-mobility is becoming increasingly important.

This has two aspects

1. By enabling customers to charge e-vehicles on site (e.g. during their stay or when shopping), the customer service can be improved and thus the customer loyalty can be enhanced. This in turn can generate higher sales.
2. These additional consumers create additional demand on the connected load and further power peaks at the grid connection. This adversely affects the energy costs and increasing capacity charges, or creates the need to further expand the grid connection, which can quickly incur considerable costs.

Example – Costs for providing more power to 5 charging stations

Current grid connection power:	180 kW
Current capacity charge:	€85 per kW
Costs for providing power:	€15.300 pa

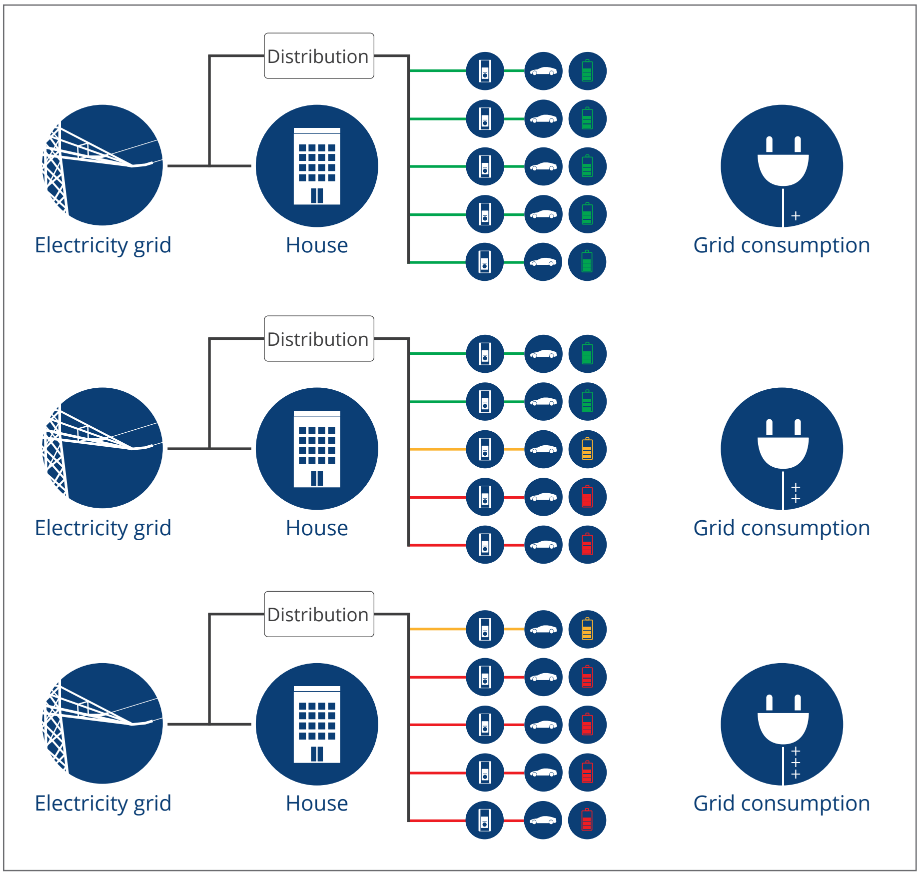
5 charging stations, each with 22 kW charging power

5 x 22kW = 110kW

The assumed simultaneity factor according to DIN VDE 0100-722 corresponds to factor 1

New grid connection power: 110kW + 180kW = 290kW

Costs for providing power: €24,650 pa Additional costs due to e-charging infrastructure: €9,350 pa



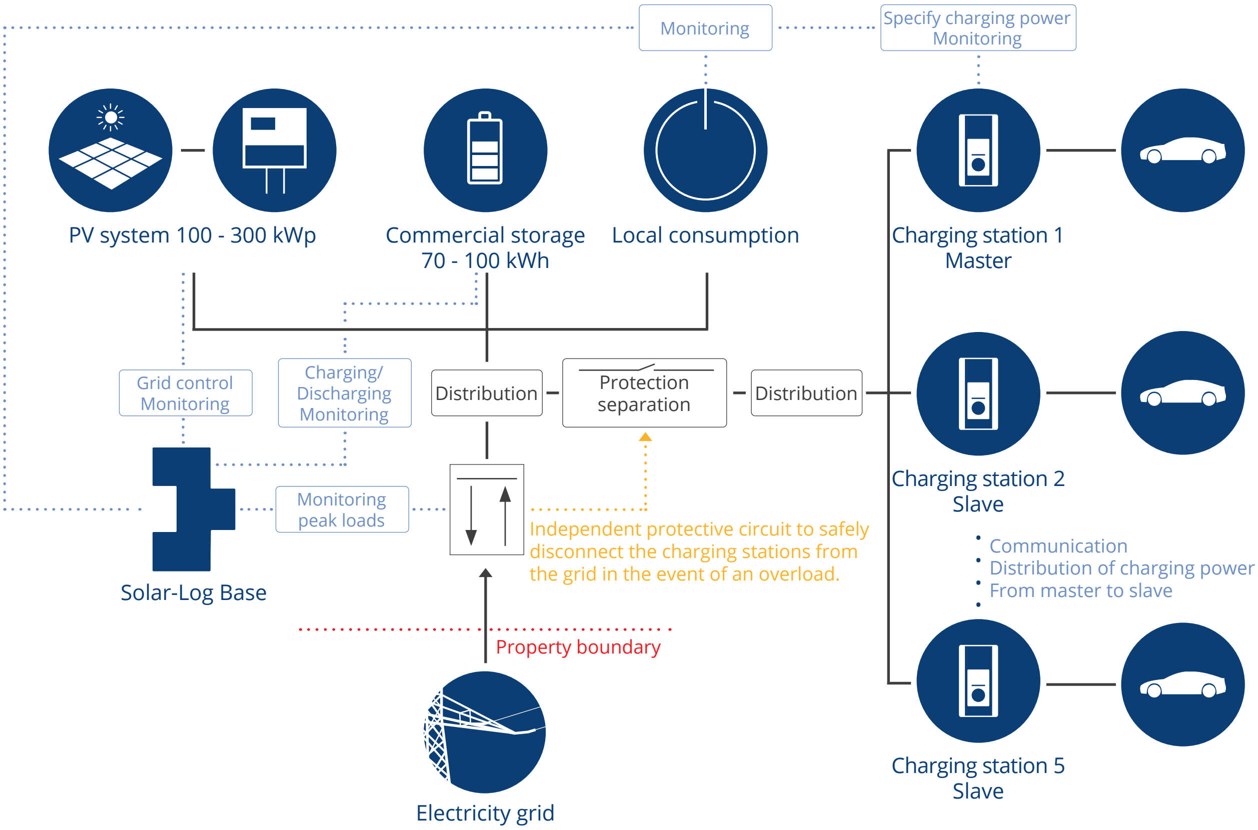
The simultaneity factor of 1 required by the standards is problematic in this analysis. This assumes that in extreme cases all charging stations are operated at maximum power. However, this case is hardly achievable in reality, as the charging stations will be charging at different powers at all times and charging will not always take place at all charging stations.

But the power of the sun in the form of a photovoltaic installation (PV system) can also help here! By using a PV system in conjunction with a large storage unit and a clever control system, the connected load at the grid interconnection point can be reduced. Solar-Log has developed a solution that makes this possible: our already existing high compatibility with various components on the market enables us to regulate a large number of components with one another. This is particularly true for PV systems and the inverters installed in them.

By using the Solar-Log control system for peak shaving and load management, the PV system can be used in conjunction with a qualified* commercial storage unit to reduce the connected load at the grid connection point and continue using sustainable energy for e-mobility.

Using the Solar-Log Base enables users to not only monitor their PV systems or realise a grid-compliant connection to the medium-voltage grid; with the new control system, they can also include an e-charging infrastructure and a commercial storage unit in the intelligent load management.

Is it worthwhile?



Let's assume that the user succeeds in reducing the connected load by 60 kW by using the Solar-Log control system.

What effects would this have?

1. The power actually required from the grid is reduced, which provides active relief in the grid and helps everyone to ensure a stable energy infrastructure
2. 60 kW less power demand also means a reduced capacity charge: in our case: 60 kW * €85/kW/pa = €5,100 per annum
3. By using an intelligent control system, the simultaneity factor of "1" may be reduced according to DIN VDE 0100-722, e.g. to 0.75, since it is assumed that only 75% of the maximum power is consumed simultaneously.

Result from our example

110 kW connected load for the e-charging infrastructure with simultaneity factor 0.75 ▯ 82.5 kW maximum connected load

Reduction of the total connected load by 60 kW → 202.5 kW new maximum grid connection power.

New capacity charge: €17,212 pa

Savings compared with before: €7,438 pa

Advantages at a glance

A solution for monitoring grid connection and peak shaving/load management

High compatibility with PV inverter systems for maximum flexibility

Clever control for making maximum use of the PV energy and reducing the grid connection power

Clever cost savings and increased convenience for your customers

You actively support both the energy transition and the energy grid