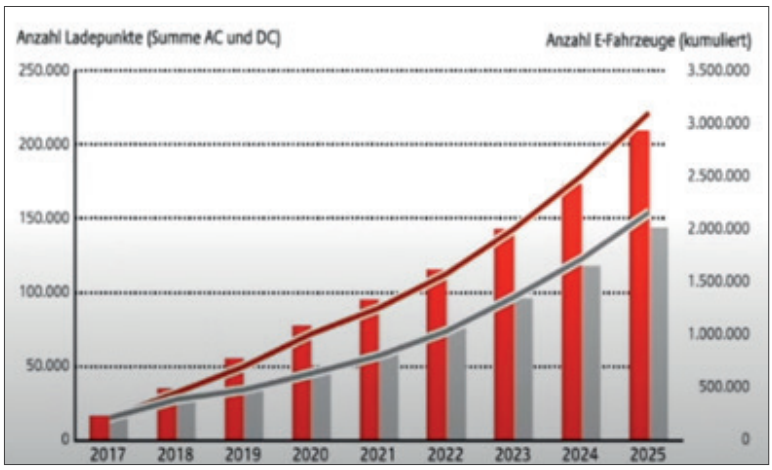
# Home Energy Management System (HEMS) with the “EisBär”

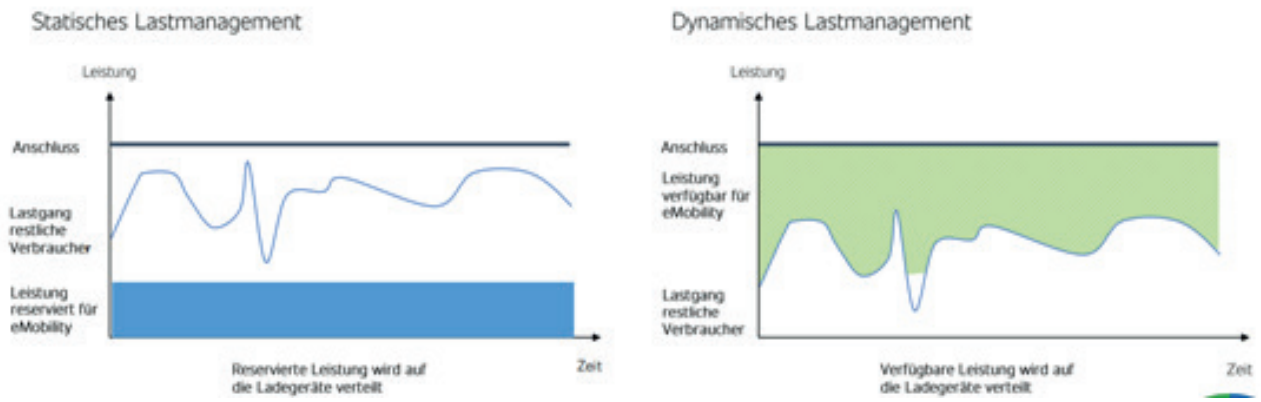
***With the rise of electric mobility over the last few years, it is now becoming increasingly imminent to also consider charging points for electric vehicles in the Home Energy Management System (HEMS) in the Smart Home. How can the energy that is produced in-house be used most effectively in the Smart Home? “Of course, this has to be made convenient for the users”, explains Rene Rieck. “With our software-hardware package “EisBär HEMS”, a fully operational energy management system is available, we can immediately start with it.”***

*Rene Rieck*

EisBär HEMS is therefore a system for efficiently distributing, storing and using energy. All generators such as the PV system and all consumers (heat pump, electric car, electricity storage and household appliances) are coordinated by EisBär’s algorithms in such a way that electricity costs are minimised and independence from the energy supplier is increased. By efficiently sharing the available energy, the EisBär HEMS, enables a comfortable lifestyle and automatic energy savings.
To achieve this, the devices are connected via KNX. For example, solar energy storage can be used. Via meters, it is known how much power is drawn from the grid or from the PV system. Then the power is distributed to where it is needed. In addition, the data of the PV system, the batteries, the electricity, water and gas supply are being visualised. Cloud computing services can even be used to incorporate AI to make predictions.
EisBär HEMS makes surpluses visible and signals them so that certain devices can be started via KNX, such as electrically charging a boiler or switching on charging stations. Then, for example, the charging stations can use the maximum current without overloading the mains connection. The EisBär HEMS controller thus calculates the energy still available and prioritises which consumers receive how much energy. The user can also change the prioritisations at any time, for example according to season or if life circumstances change. The HEMS then performs the calculations according to the newly set prioritisations.
The controller itself fits on a DIN rail. Via a CIM module, it is even possible to exchange the data with the energy supplier and to integrate a demand response. This would also make it possible to react to changing rates in the future. In addition to KNX-Secure, the HEMS controller type AM-EIS-400-47 also has a Modbus interface if there are corresponding systems in the home.
In addition, Alexander Maier offers the 10-inch touch panel “AM-EIS-360-70”, which displays the energy consumption and from which it can be controlled. It signals, for example, whether energy is available to start other devices that are not yet integrated into KNX and therefore cannot be started fully automatically.




*The number of charging points will increase significantly. Therefore, they must be integrated into the home energy management system. The “EisBär” system from Alexander Maier GmbH offers one possibility for this purpose.*




*omparison of dynamic and static load management. The State of Charge (SOC) is plotted on the y-axis and the charging time in percent on the x-axis. In the static case (left) it can be seen that in 65 percent of the time the car is charged to 80 percent. So the charging time to charge the remaining 20 per cent is considerable. In the dynamic case (right), the charging power drops very sharply as of 80 percent. From that point on, the system has the option of making the electricity that is available again to other devices in the building.*

The software can also be accessed via a browser, so it is possible to see how the electricity is currently being distributed, whether and how much electricity is currently being drawn from the energy supplier, whether the house is currently operating self-sufficiently and whether it is even possible to feed the self-generated energy into the grid.

## The integration of the charging poles

How will the charging poles be integrated? In principle, there are two different methods: Via static or via dynamic load management. In the static case, a certain amount of power is reserved for the charging stations in question. Of this power, which can be made available via the domestic connection, the PV system and the storage unit, the consumers in the house only get the remaining power. This is why, in Rene Rieck's view, dynamic load management is preferable, because then no fixed share of power is reserved from the start for the charging stations, i.e. blocked for the rest of the home. Now the energy available from all parts of the building (domestic connection, PV system, energy storage) is considered. The energy that the household currently needs is subtracted from this. The remaining energy can be given to charging poles and household appliances or, if necessary, used to recharge the storage battery.

In the static case, the car is therefore supplied with the allocated power at the charging pole. If it's only a matter of one charging point in the house, that may be no problem. But what happens if a second resident wants to charge their car at a second charging pole? Or when the washing machine is unexpectedly switched on? Then it may even trigger the domestic connection fuse. "That is exactly why energy management exists, precisely to efficiently distribute the energy that is available," says Rene Rieck. Then, for example, the washing machine can start at the right time. In this way, the domestic fuse is not overloaded and the energy generated by the PV system is used optimally, i.e. in the way that is most convenient and cheapest for the occupants of the home.

Rene Rieck, Global Product Marketing Manager at Alexander Maier GmbH: "In this Babylon of systems, EisBär Software forms the link between the most diverse technologies of automation technology, the IoT world and people."


*This is how the optimisation of self-consumption works via the EisBär HEMS (Home Energy Management System) from Alexander Maier GmbH.*