

Intelligent management of AC charging infrastructure



KEBA

Automation by innovation.

KEBA Energy Automation GmbH



Christian Peer, CEO

E-Mobility



Leading manufacturer for charging infrastructure

Heating control



Maximum energy efficiency for heat pumps and biomass heating systems

Wind



Expert for Pitch systems and Azimut systems for more than 25 years

KEBA eMobility

Consistent, Convenient, and climate neutral.

A leading manufacturer for charging infrastructure



Made in Austria/ Linz

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Automation by innovation.

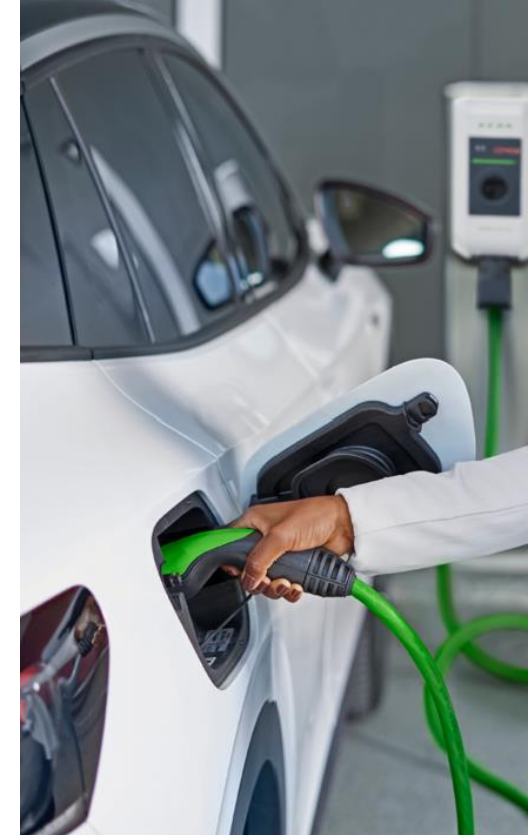
Exploring Current Issues and Unknown factors

- Grid Connection of Buildings is often **insufficient**
- Number of required future charge points is **unclear**
- Mix of **AC** and **HP Charging is needed**
- When starting your journey, (all) vehicles should be **charged** if previously connected for charging
- Charging based on own supplier contract purchased power is typically most **cost efficient**
- **Challenges** of transformer **replacement** :Transformer change is very expensive – waiting time up to 2 years



Current Landscape and preconditions

- **Number of electric vehicles (BEV)** on our roads is constantly **increasing**.
- As vehicles remain parked for extended periods (e.g., at work or at home), **leveraging low-power charging** proves cost-effective while preserving vehicle batteries and easing the strain on the power grid.
- **Challenges in Infrastructure Expansion:**
Energy suppliers face significant costs in expanding the distribution network, struggling to match the pace of this demand surge.
- **Essential Need for Intelligent Management:**
To prevent strain on existing connections and ensure adequate infrastructure, implementing intelligent charging management becomes crucial.

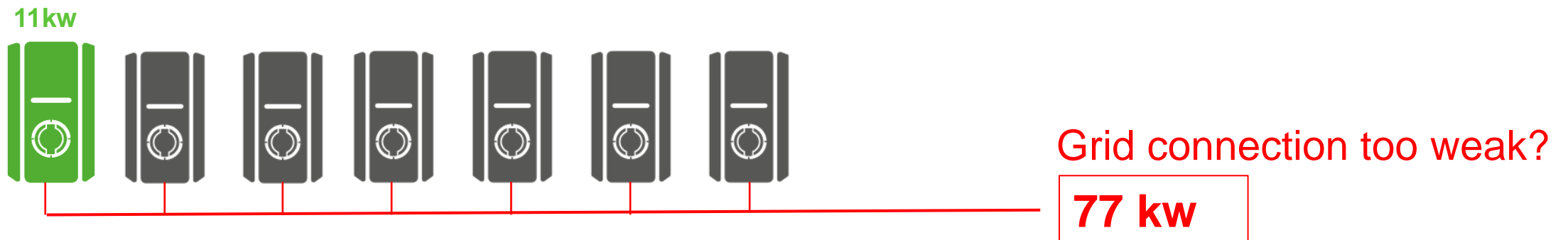


Management of charging infrastructure

Resource Constraints: Electricity resources are limited, particularly concerning the establishment of ever growing number of charging points.

Increasing Load Demand: Each additional charging station raises the connected load, making the rising energy demands clearly visible.

Potential Limitations: In a worst-case scenario, delivering 100% energy requirement to individual charge points could limit or hinder charging for additional vehicles.



Load management – is crucial

Managing demands of EV Charging:

- Utilization Of Existing Capacity: Prioritizing economic efficiency drives the preference for maximizing existing available energy capacity.
- Uncertainty in available power capacity: Predicting the available electricity from the building connection is challenging.

Effects of Energy Peaks:

- Energy peaks cause demands: Additional equipment ex. larger transformers for grid connection.
- Escalating Electricity Costs: Surges in electricity prices lead to larger expenses.
- Costs Incurred by Providers: Utility providers bear costs to compensate for energy peaks, “crucial for grid stability.”

Advantages of load management

Load management enables the optimal distribution of the available power to all connected charging points. This means that peak loads can be avoided.

Objective of Load Management:

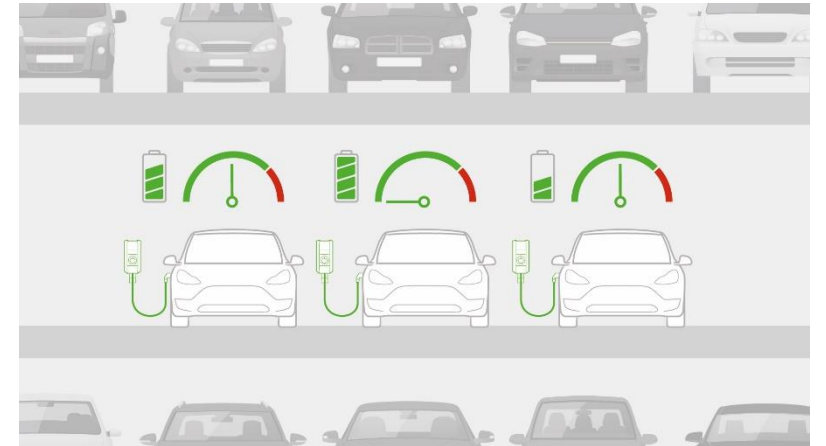
- Building an Intelligent Grid: Creating an intelligent electricity grid involves integrating advanced control technology into the existing infrastructure.
- Optimizing Power Distribution: Optimally distribute the available power and ensure that demand peaks in the grid are avoided
- Enhancing Grid Stability: Load management improves grid stability, enhancing reliability and functionality.
- Efficient Resource Utilization: Ensures efficient utilization of available resources, minimizing waste and enhancing sustainability.

Solution: Management of charging infrastructure

Options: Master/client setup or central controller

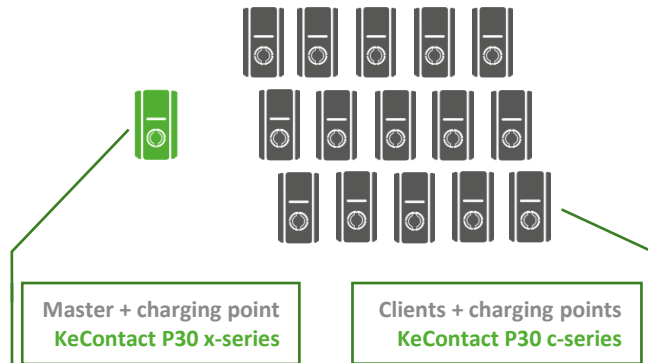
Intelligent load management is easy to implement with the KeContact charging infrastructure:

- **Load management in a master/client network**
KeContact P30 x-series as master:
up to **15x** KeContact P30 c-series
(= charging network with up to 16 wallboxes)
- **Load management with a central controller**
KeContact M20 Charging Management Controller as master:
 - up to **200x** KeContact P30 c-series



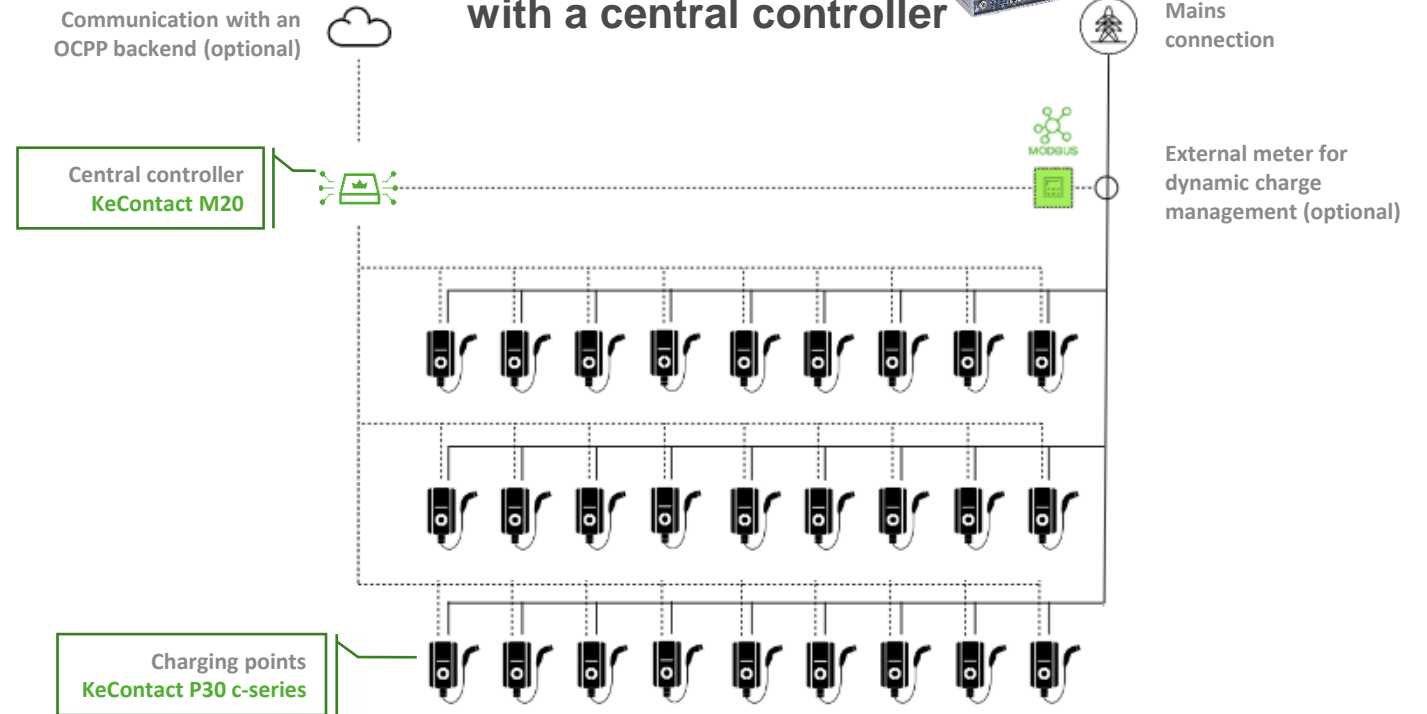
Management of charging infrastructures

Load management in a master/client network



- Easy installation
- No additional hardware necessary (except LAN switch)
- Connection to OCPP backend possible
- Dynamic load management with external meter possible (e.g. for house connection monitoring)
- **Max. 15 + 1 charging points in a network**

Load management with a central controller

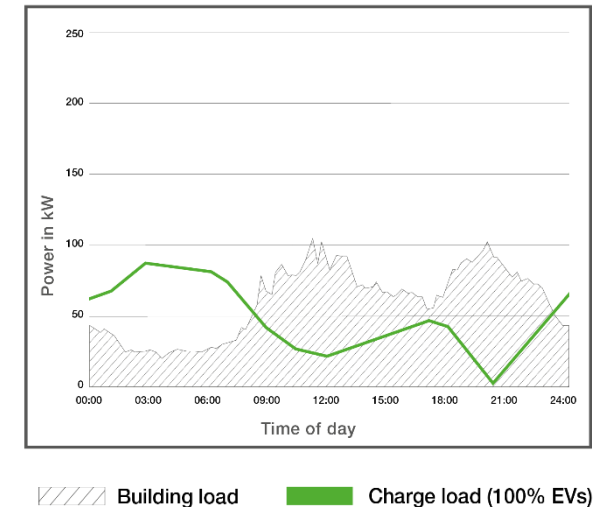


- Convenient configuration of all charging points via the central webinterface of the KeContact M20
- **Up to 200 charging points in one network, arbitrarily grouped in up to 15 clusters**

Management of charging infrastructures

- With **dynamic load management**, the **actual power consumption both of the charging stations and of all other consumers** behind this metering point is measured by means of an external meter.
- This allows a **maximization of the charging power** available for the vehicles without the risk of overloading the house connection, e.g. due to increasing loads in another area.
- In the configuration menu of the webinterface, **TCP house connection monitoring** can be activated and the meter used can be selected.

Dynamic Load Management

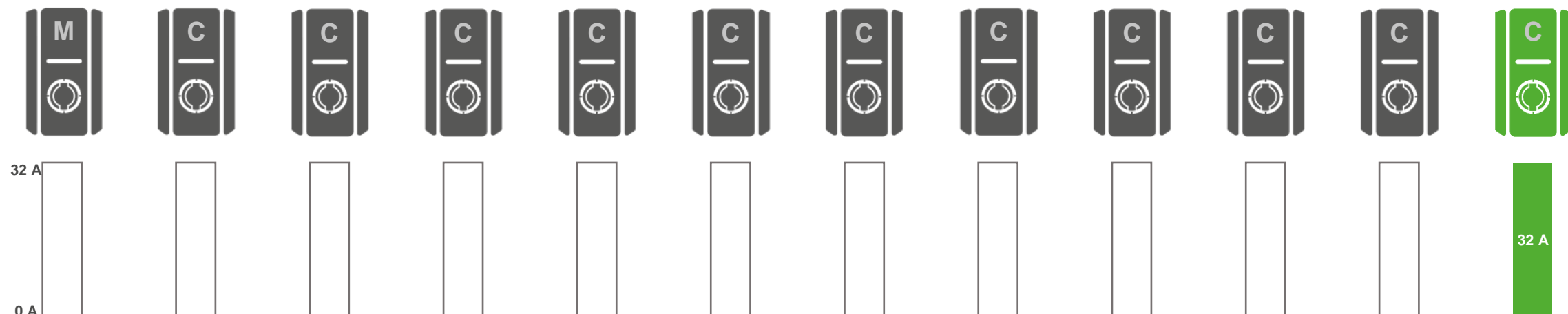


Load management in a master/client network


Examples of load management scenarios – 1/6




Master/client network with 12 charging stations, max. current for the entire system: 60 A (static), minimum charging current: 6 A



- 1 active charging station.
- Charging starts with the connected vehicle with the maximum charging current of the station (in this example 32 A, i.e. 22 kW).
- Load management is not yet active, since the maximum current in the overall system has not yet been reached.

 Charging station WITHOUT connected vehicle

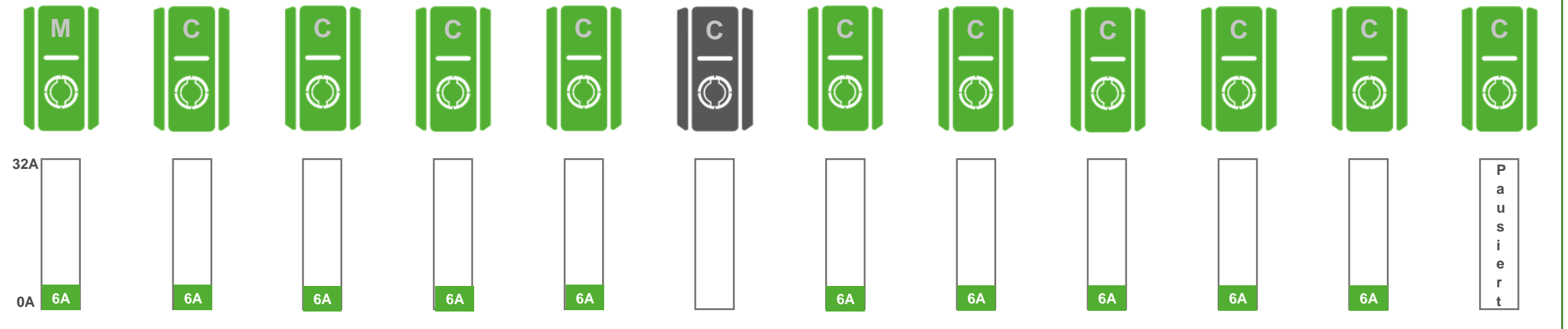
 Charging station WITH connected vehicle

Lastmanagement im Master/Client Verbund


Beispiele für Lastmanagement-Szenarien – 3/6




Master/Client-Verbund mit 12 Ladestationen, max. Strom für Gesamtsystem: 60A (statisch), minimaler Ladestrom: 6A



- 11 aktive Ladestationen, Lastmanagement ist aktiv.
- Die verfügbare Leistung wird gleichmäßig auf alle aktiven Ladestationen verteilt, da dabei aber der minimale Ladestrom von 6A unterschritten wird ($60A / 11 = 5,45A$), muss ein Fahrzeug pausiert werden.
- Das Fahrzeug das bereits am längsten lädt wird für maximal 15 Minuten pausiert.

 Ladestation OHNE
angeschlossenem Fahrzeug

 Ladestation MIT
angeschlossenem Fahrzeug

Load management with KEBA KeContact products

Recap of the advantages



Optimal use and distribution of available power

- Optimal and flexible use of available power
- Dynamic load management with external energy meter or with an OCPP backend

Central control and monitoring

- Convenient management of up to 200 KeContact c-series wallboxes
- Simple, central management of RFID cards & rights
- A single central communication point for integration into external ecosystems (OCPP) incl. integrated LTE modem and external antenna

Advantages:

- Cost savings in electrical installation – use existing power distribution systems
- Scalable: Increase number of chargepoints when needed
- Offline mode: Even if the internet connection is interrupted, load management is possible without restrictions and billing data is stored temporarily



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