

ENERGIE INTELLIGENT VERNETZEN!

SMART GRIDS



ENERGIE intelligent vernetzen!

Daran arbeiten wir.

www.smartgridssalzburg.at



SMARTGRIDS
Modellregion Salzburg



SIEMENS





Smart grids model region Salzburg

Implementation and experiences of controlled e-car charging

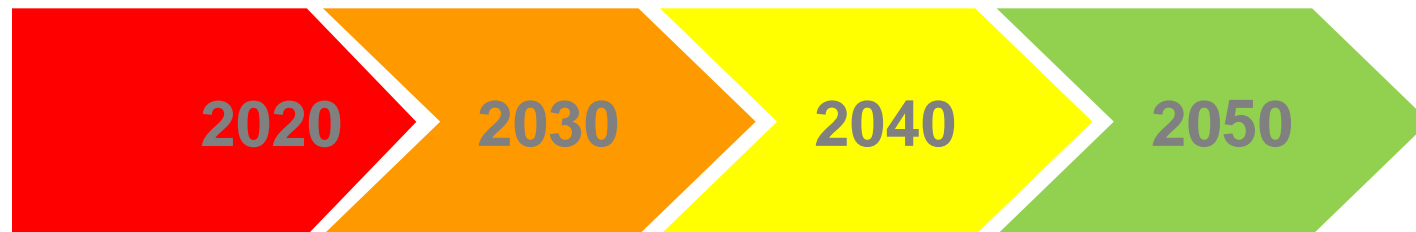


Salzburg 2050

zero-emissions. energy-independent. sustainable

- - 30% CO2-emissions
- + 50% renewables

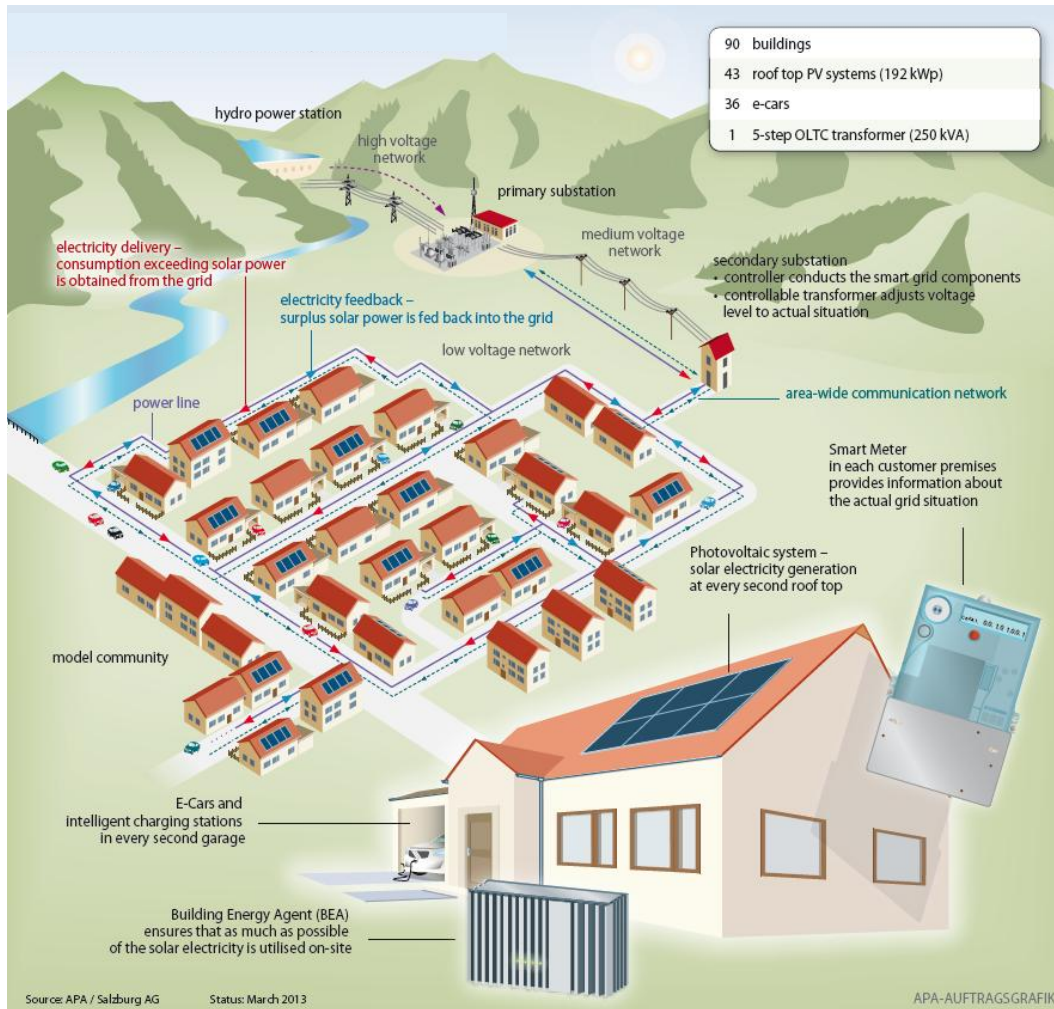
- - 75 % CO2-emissions
- + 80 % renewables



- - 50% CO2-emissions
- + 65% renewables

- zero-emissions
- energy-independent
- sustainable

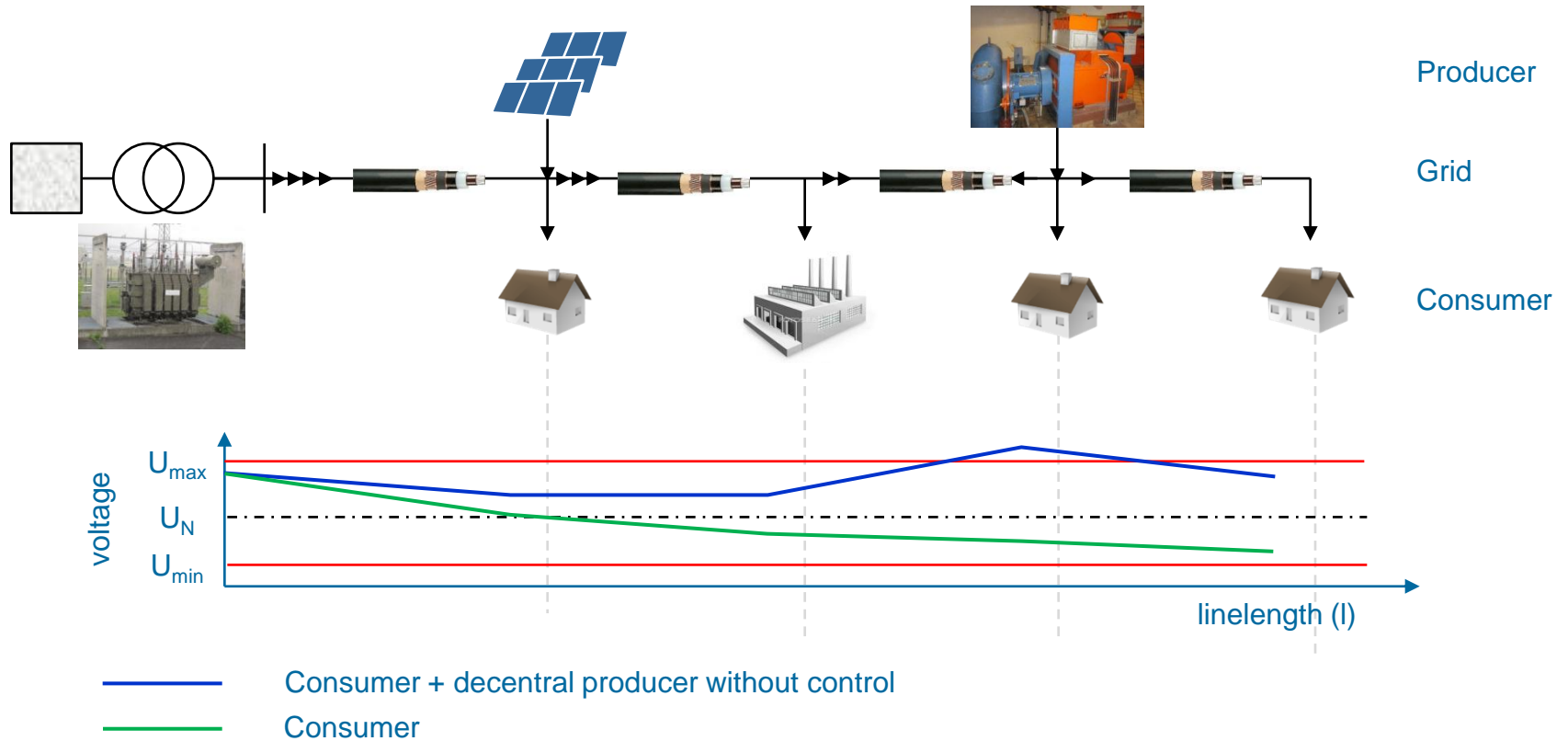
Smart Grids Model Community Köstendorf



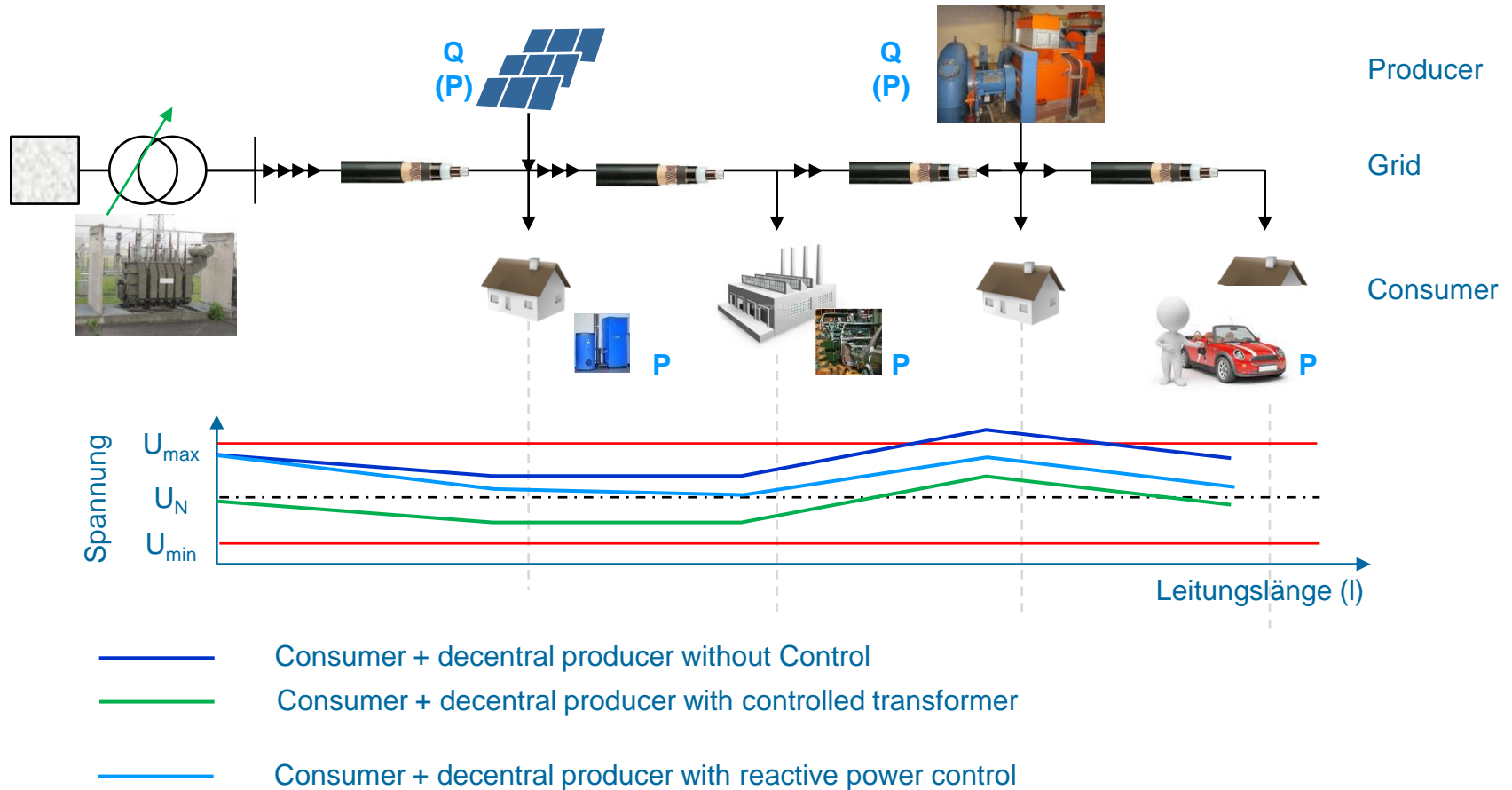
In a dedicated demo area supplied by a 250 kVA secondary substation:

- PV system at every second roof top
- Electric vehicle in every second garage
- Field test of an integrated smart grid solution for low voltage grids
- “anticipating the future”
- funded by Austrian Climate and Energy Fund & Province of Salzburg

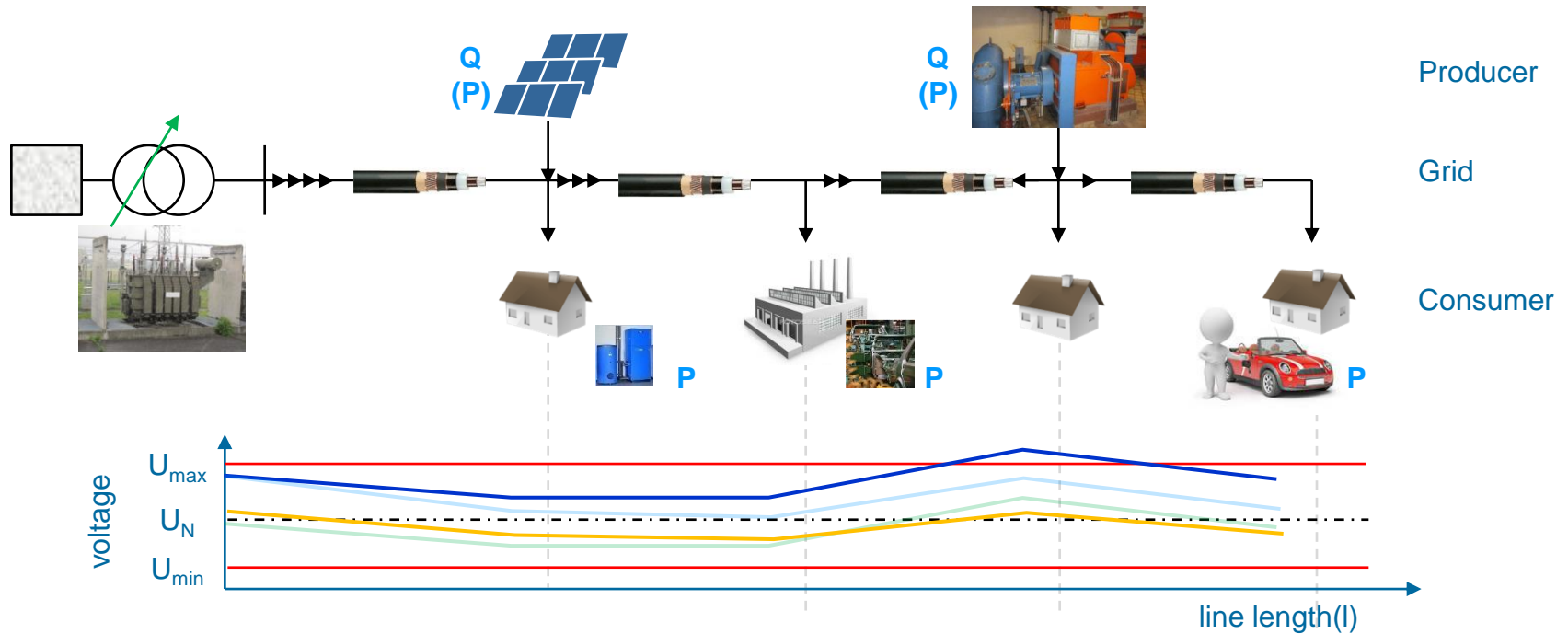
Integration of renewable energy



Integration of renewable energy

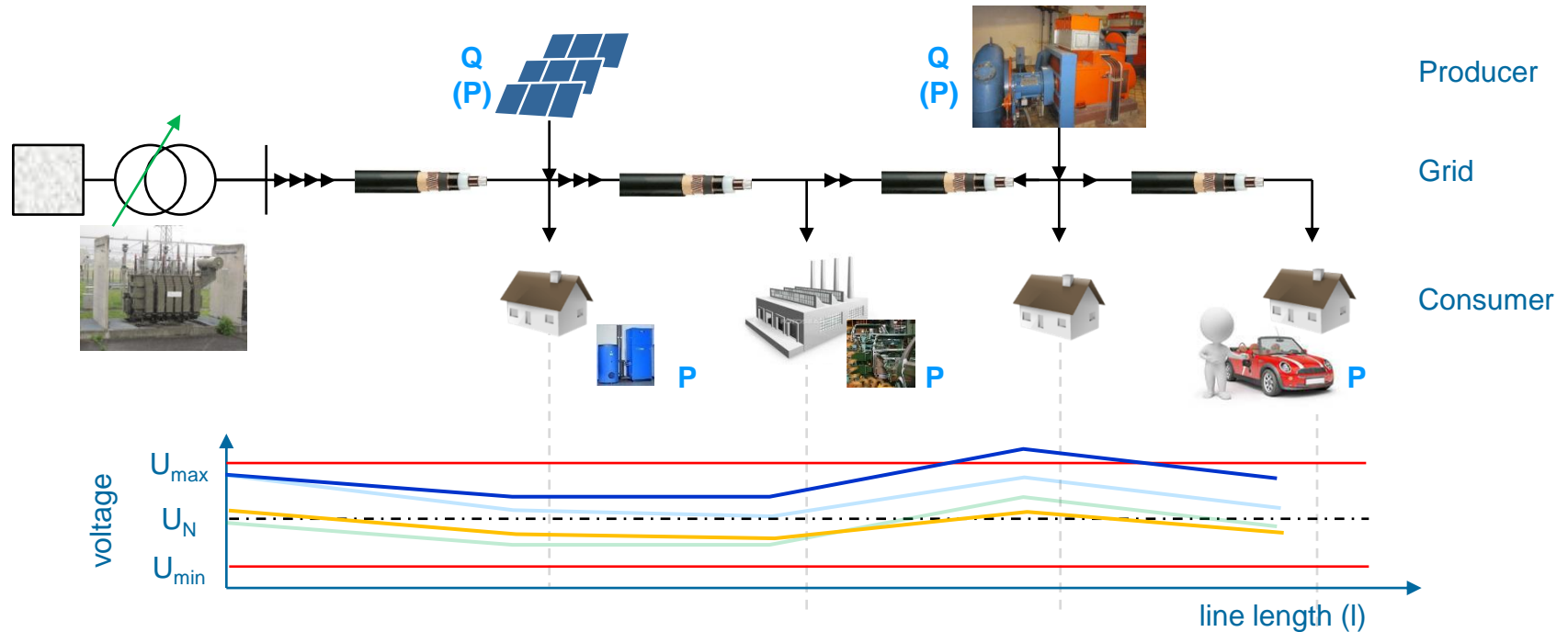


Integration of renewable energy



- Consumer + decentral producer without Control
- Consumer + decentral producer with Control in Transformer
- Consumer + decentral producer with Control of reactive power
- Consumer + decentral producer with control in transformer and control of reactive power

Integration of renewable energy



- Consumer + decentral producer without Control
- Consumer + decentral producer with Control in Transformer
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- Consumer + decentral producer with control in transformer and control of reactive power

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Monitoring Smart Meter
as „eyes in the grid“

36 e-cars + controllable charging stations

i-MiEV:
0 – 8 – 12 – 16 Ampere

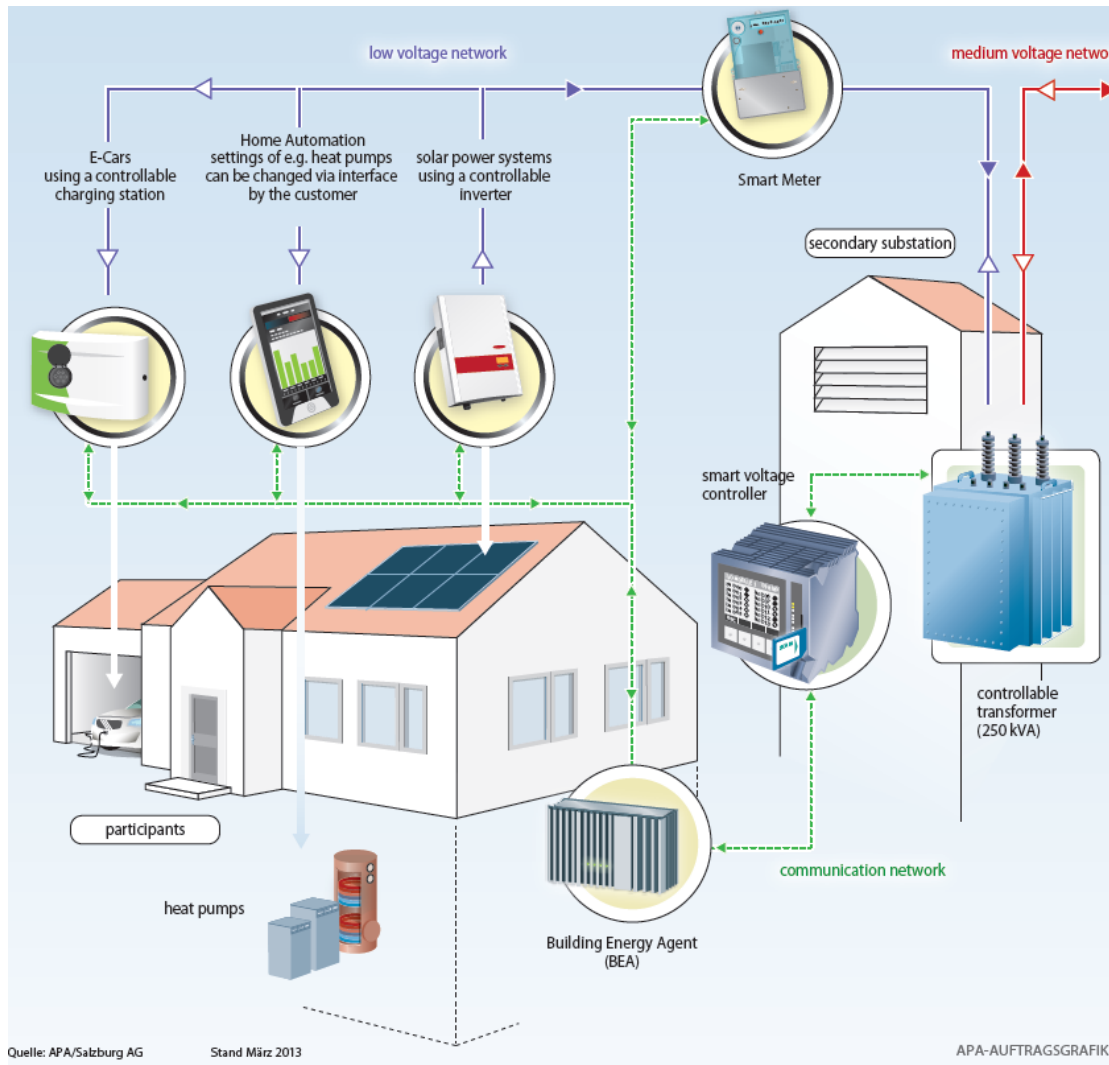
43 pv-systems (193 kWp) +

41 use a controllable solar inverter
active- and reactive-powercontrol

Building Energy Agent (BEA)

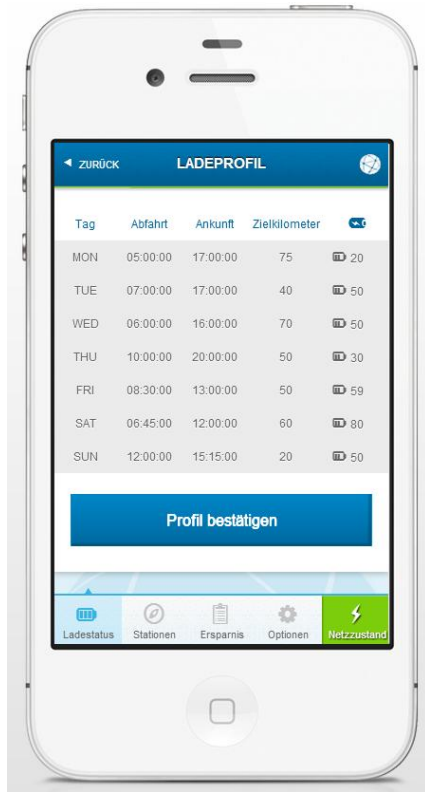
decentralised optimisation

OLTC transformer
250 kVA, 5 taps



The **Smart Low Voltage Grid Controller** keeps the overview (using **smart meters**) and conducts the orchestra of smart grid components (**PV-inverters, e-car charging stations**) ensuring a harmonic ensemble (smooth operation of the low voltage grid).

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e-car charging app

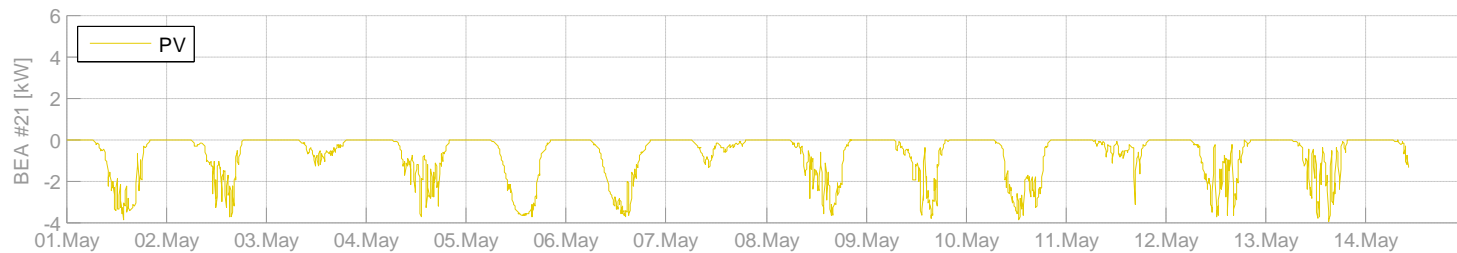
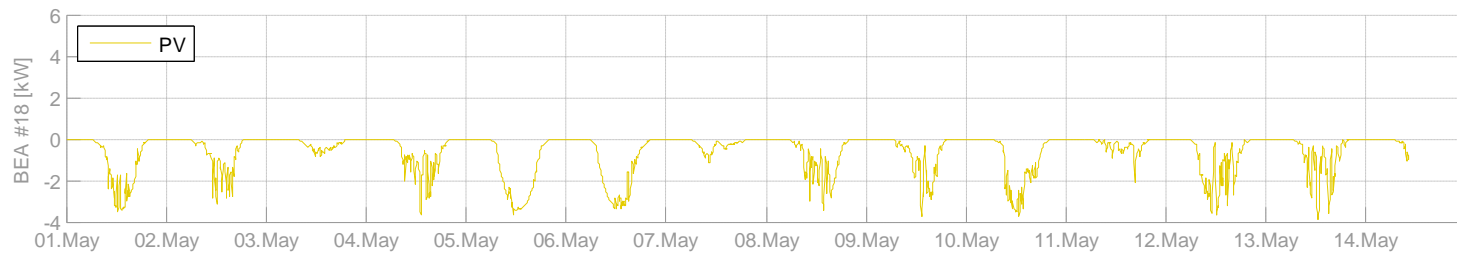
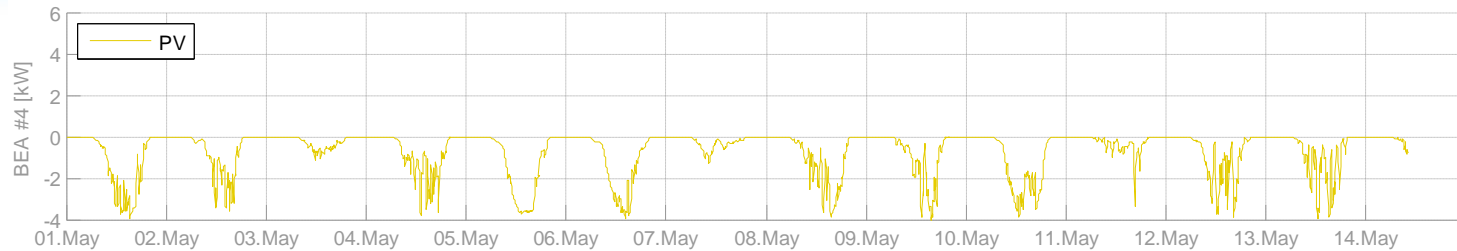


smart e-car charging station



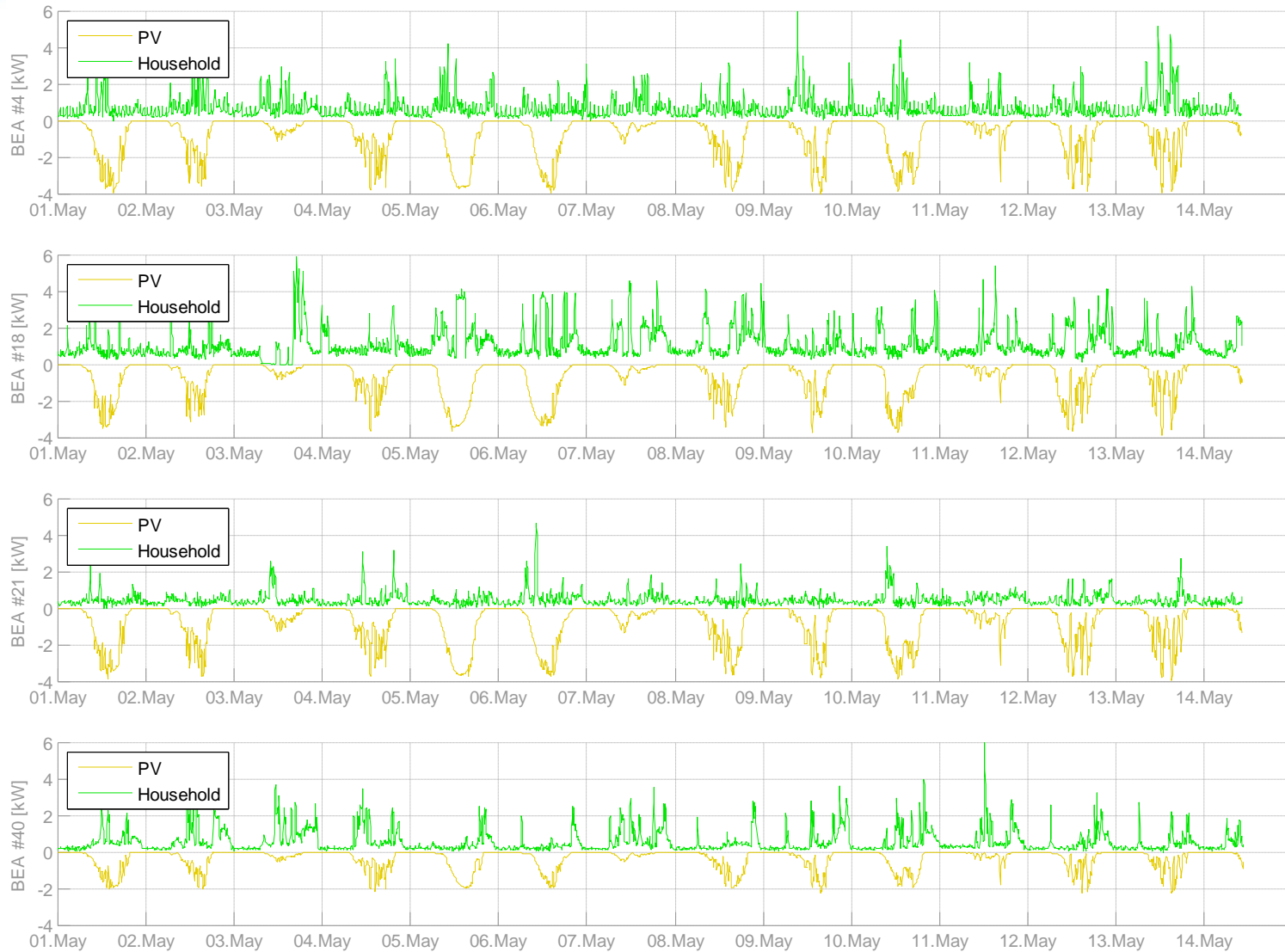
Smart LV Grid Controller

Controlled e-car charging



source: Roman Schwalbe, AIT
Markus Radauer, 2014

Controlled e-car charging



source: Roman Schwalbe, AIT
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Salzburg AG

Salzburg Wohnbau

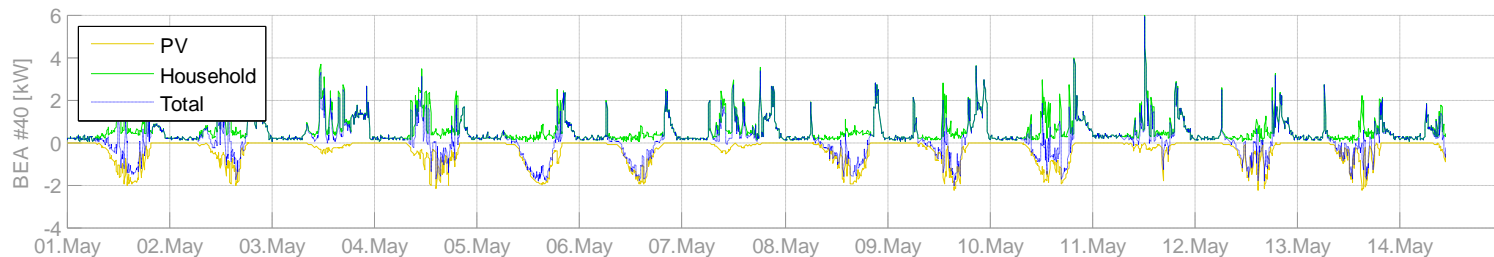
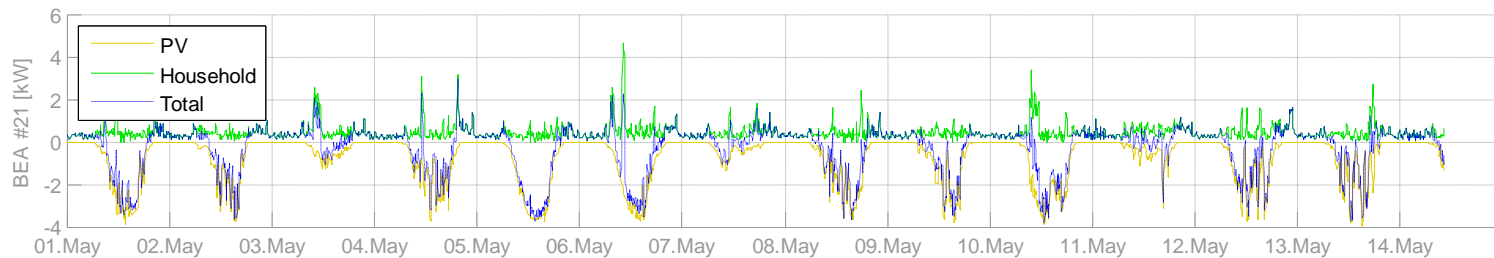
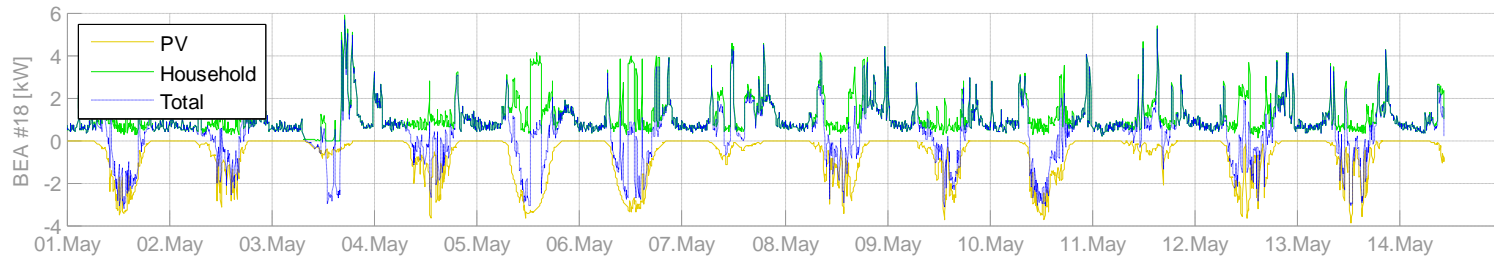
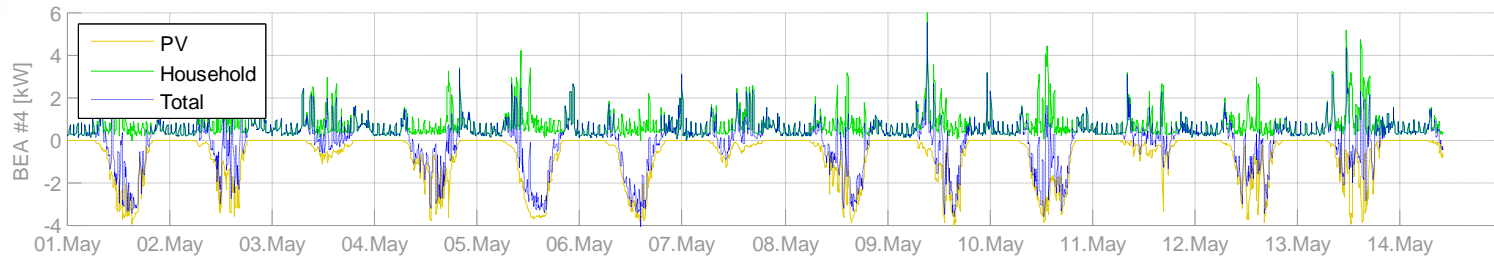
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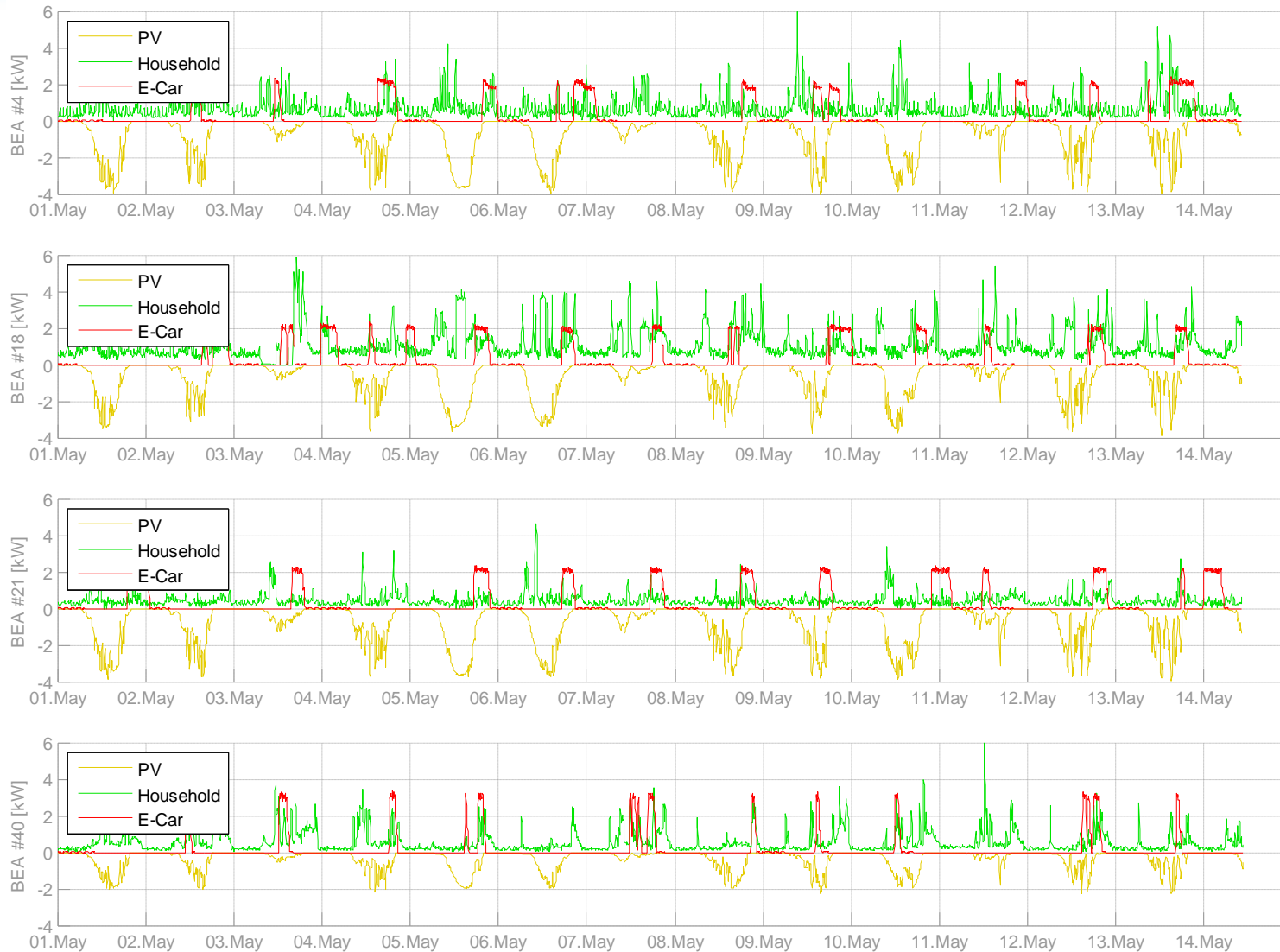
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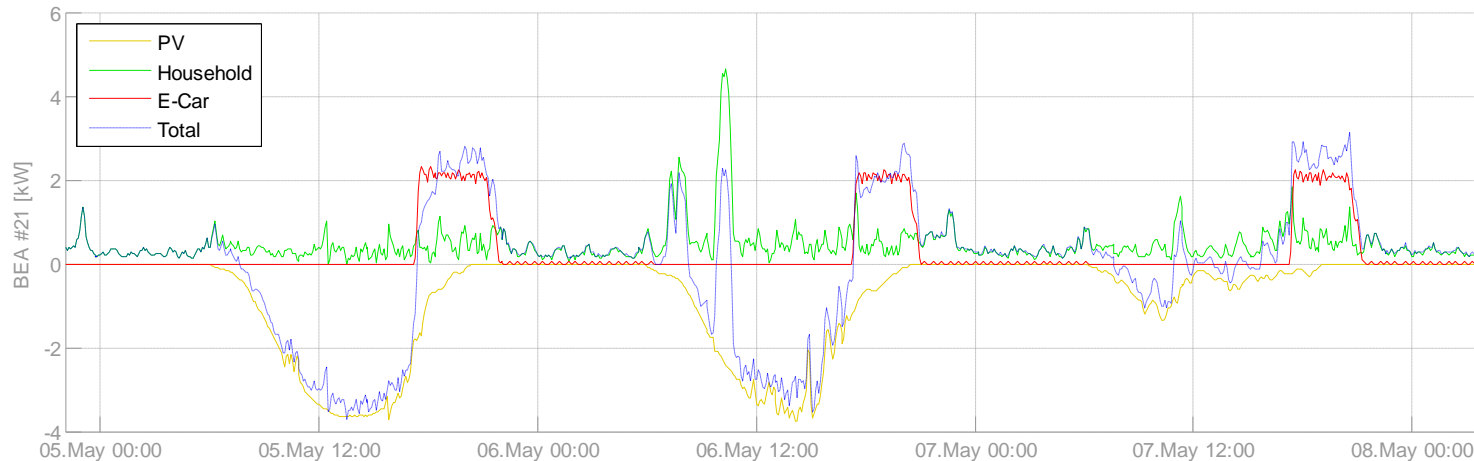
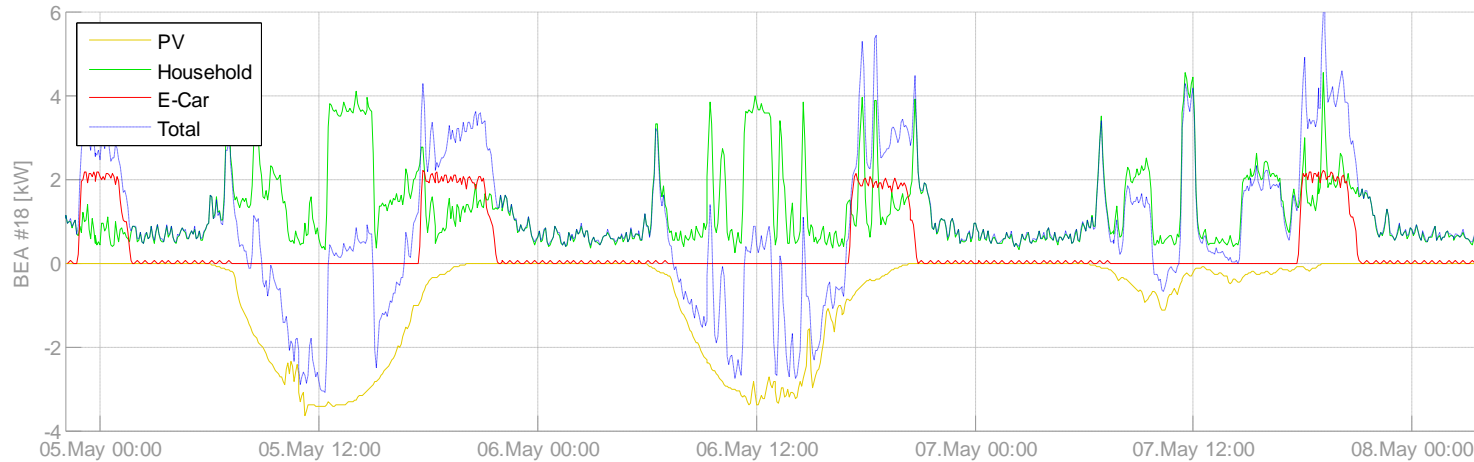
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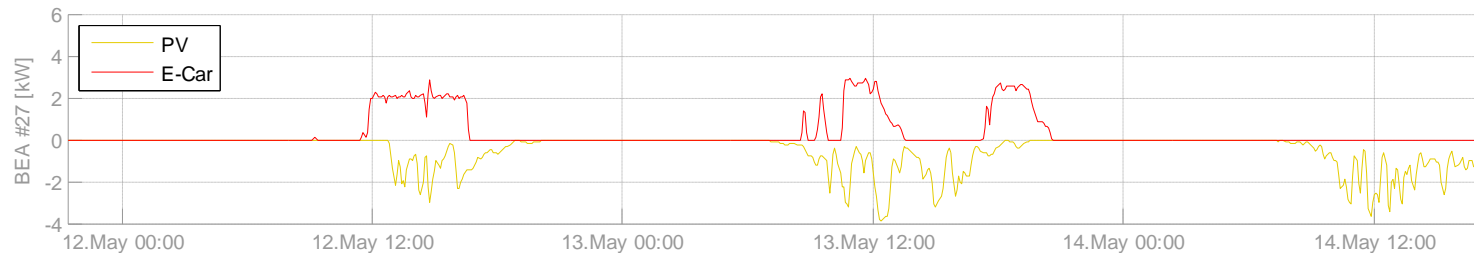
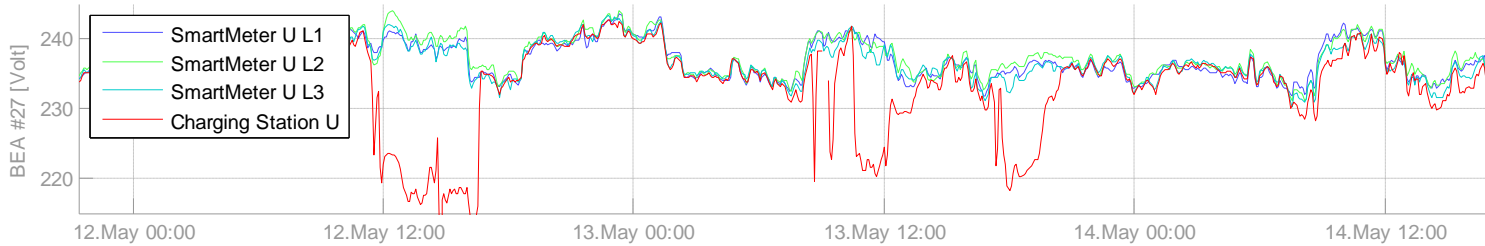
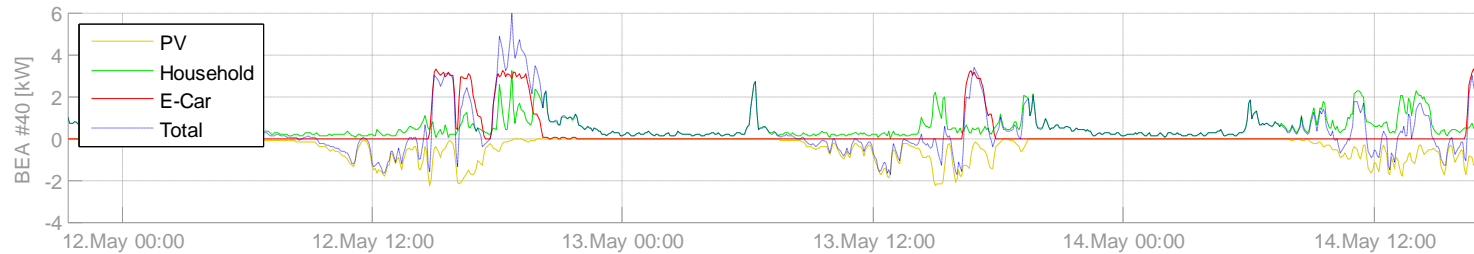
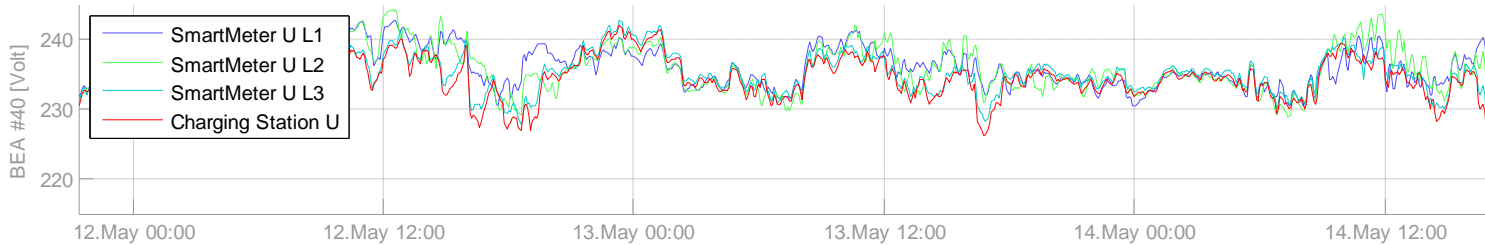
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Key findings and conclusion



- Smart technologies offer a huge potential to integrate renewable energy and e-mobility into the existing grids and resolve the challenges of the future
- single phase charging systems put more stress on grids than necessary
- demand side management using e-car's is possible and necessary
- A standardisation of components, interfaces and protocols is necessary for a large scale implementation



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