



Pilot Panel: ELSA Use Cases

Presenter: Massimo Bertoncini, Engineering

Moderator: Ludwig Karg, B.A.U.M. Consult GmbH

Panellists:

- Ella Etienne, Green Soluce
- Sarah O'Connell, UTRCI
- Massimo Cresta, ASM Terni
- Thomas Eberl, egrid
- Anica Berthold, RWTH Aachen
- Petar Mihaylov, Nissan

Use cases: We need to Stack Services

Services for Building & District



**Decreasing costs
and increasing
self-consumption**



Services for The Grid

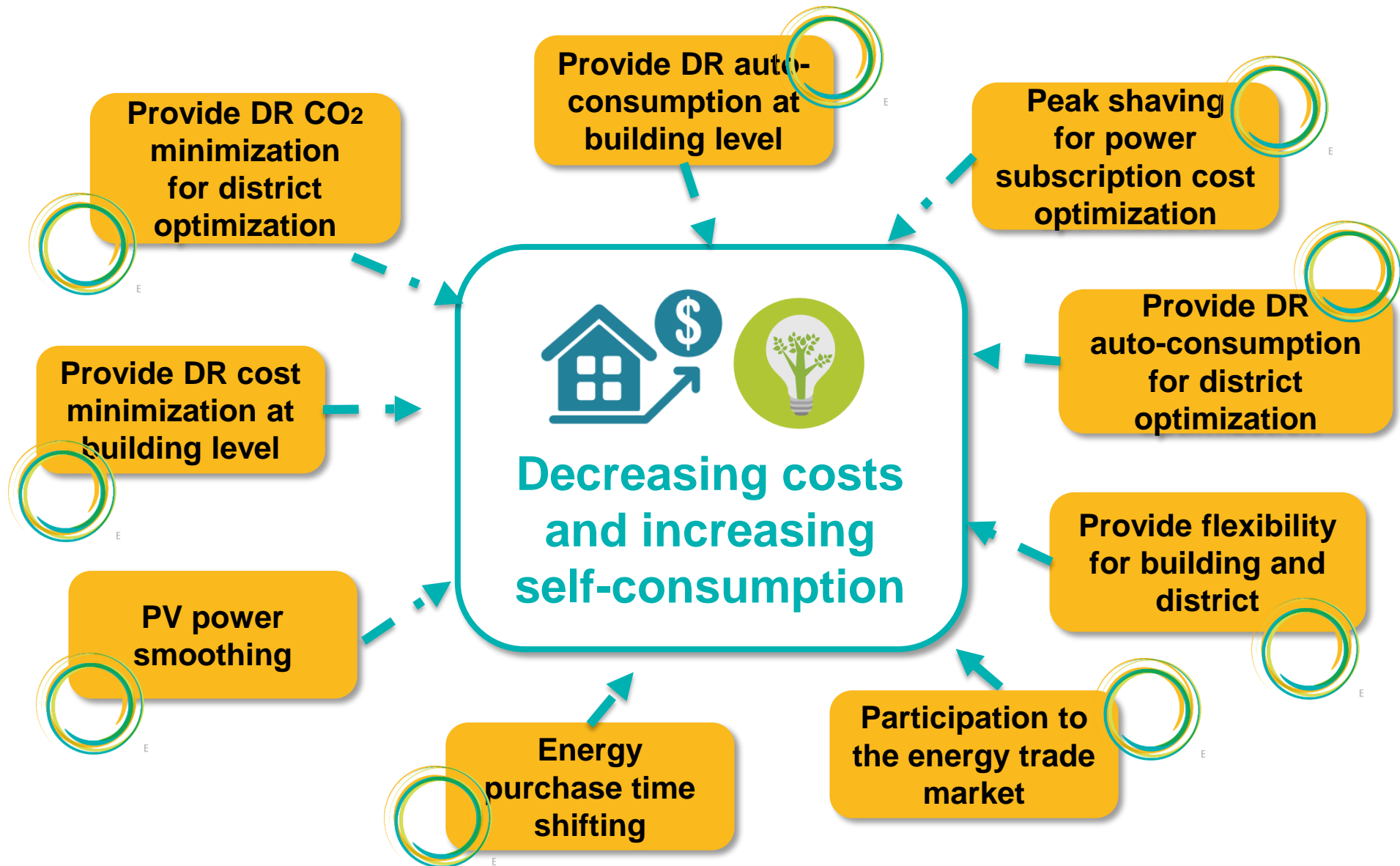


**Optimizing local
grid operation**

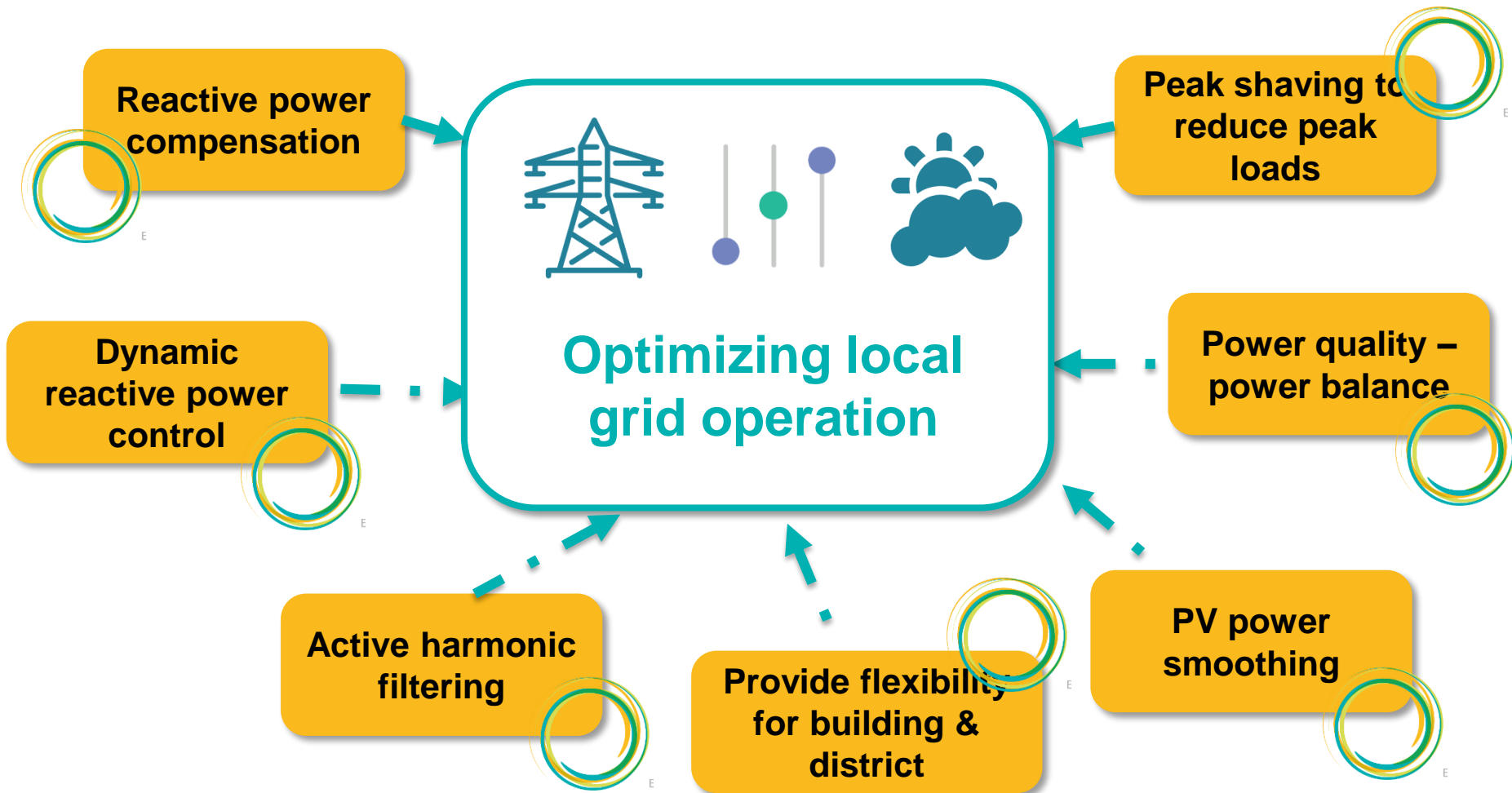


**Maintaining stability
of electricity system**

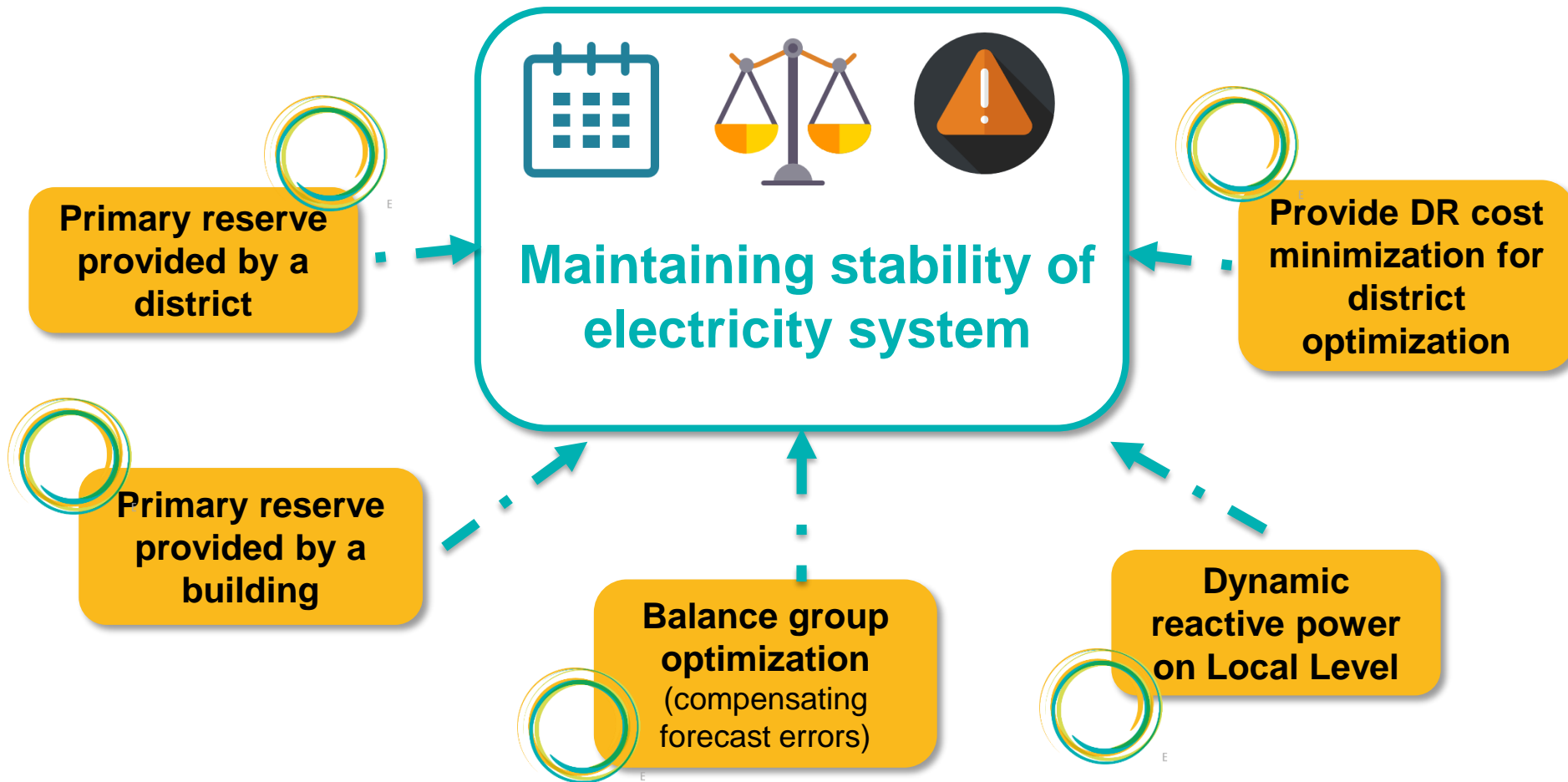
Use cases for Building and District Level



Use cases for Local Grid Level

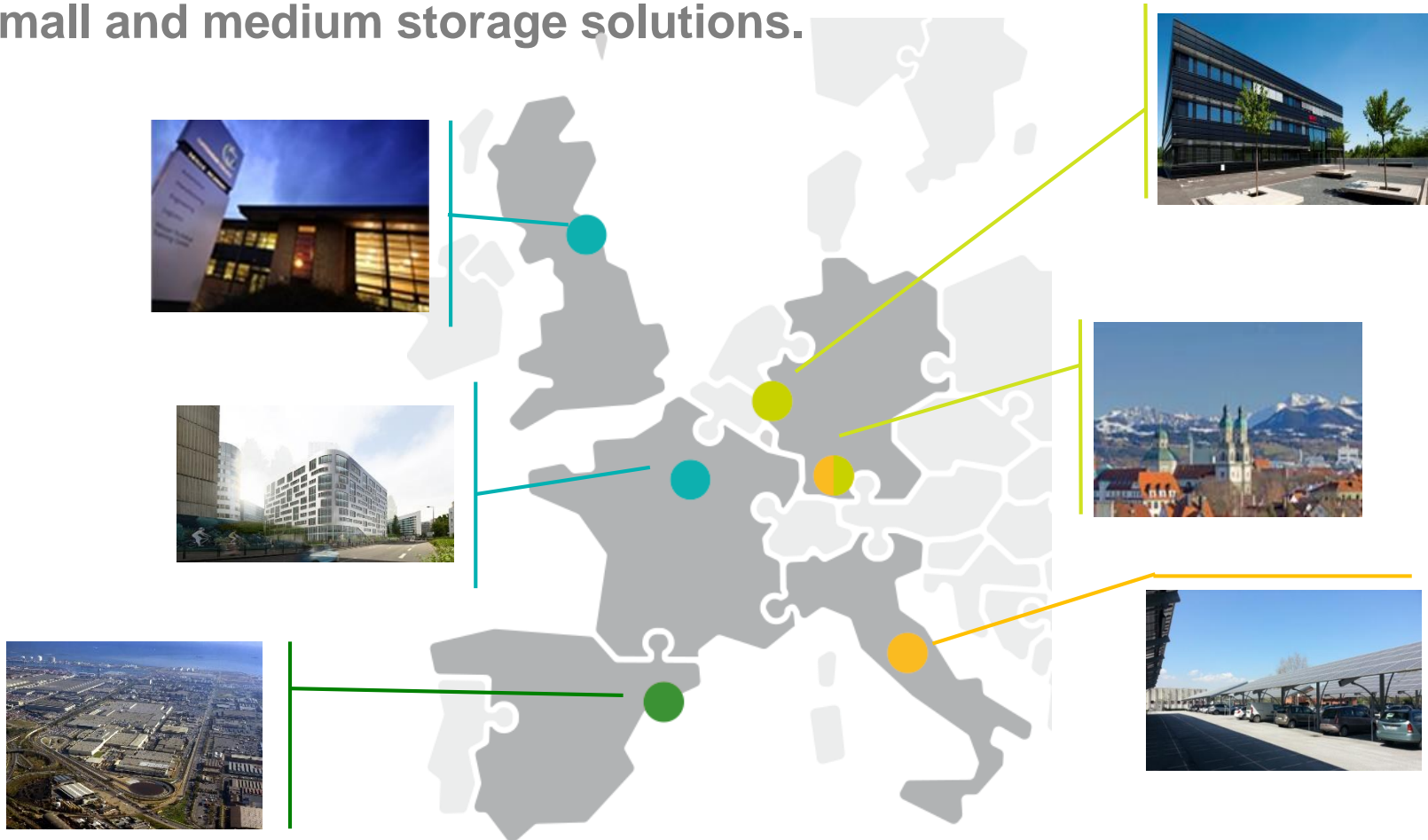


Use cases for Transmission Grid Level



Pilot Installations

Pilots resemble all important use cases for small and medium storage solutions.



ELSA Services for Europe



Provide DR auto-consumption for district optimization
Provide DR auto-consumption at building level
Energy purchase time shifting
Peak shaving for power subscription cost optimization
Provide DR CO₂ minimization for district optimization
Primary reserve
Power quality – power balance
Dynamic reactive power control
Reactive power compensation
Power quality – active harmonic filtering
Participation to the energy trade market
Balance group optimization
Provide DR cost minimization for district optimization
Provide DR cost minimization at building level
PV power smoothing
Provide flexibility for building and district
Peak shaving cons. to reduce peak loads in peak hour
Request and delivery of Peak Shaving service
District provides primary reserve
DSO manages reactive power compensation



ELSA Pilot Site Aachen



- A district represented by the multi-disciplinary research institution of RWTH Aachen University.
- Three buildings and a Wind Turbine equipped with a Battery to optimize the power consumption.

Representative: Anica Berthold, RWTH Aachen

E.ON Energy Research Center



goal	Optimize power consumption on the campus of the E.ON ERC
setting	<ul style="list-style-type: none">• 3 buildings (main building, test hall, sense building)• small wind turbine
trial	<ul style="list-style-type: none"># Provide DR auto-consumption for district optimization# Provide DR cost minimization for district optimization# Provide DR CO₂ minimization for district optimization
challenges	<ul style="list-style-type: none">○ Aggregation of the flexibility○ Communication infrastructure○ Control algorithms



- 25% of the city's electricity demand covered by RES
- 240 kWp PV farm plus battery storage to supply district with office buildings and warehouses

Representative: Massimo Cresta, ASM Terni

ASM Terni



goal	Mitigate and smooth the fluctuating power output generated by a PV farm to follow DSO demands.
setting	<ul style="list-style-type: none">• District with office buildings and warehouses along a low voltage branch owned by ASM Terni• Nearby plane field PV 240 kWp connected to low voltage• Flexible loads: E-Vehicle charging spots• Non flexible loads. buildings lightening and air conditioning• Battery. 96 KWh, 18 / 72 kW charge / discharge
trial	<ul style="list-style-type: none"># Peak shaving for power subscription cost optimization# Providing primary reserve# Managing power quality# Reactive power control and compensation
challenges	<ul style="list-style-type: none">○ Consume energy where it is produced (km0 – cost effectiveness)○ Reduce disruptions in the low voltage network (quality of service)○ Increase the sustainability in the energy management (less impact)



- Existing residential area with six multi-family houses (81 apartments)
- solar panels on 3 houses plus district storage system for direct consumption

Representative: Thomas Eberl, egrid applications & consulting GmbH

City of Kempten i. Allgäu



goal	Maximize a district's auto-consumption while mitigating and smoothing the fluctuating power generated by roof top PV
setting	<ul style="list-style-type: none">• 37,1 kWp PV• No flexible loads• Battery in substation: 66 kWh, 18 / 72 kW max charge / discharge
trial	<ul style="list-style-type: none"># Increasing self-consumption# Providing primary reserve# PV-power smoothing# DSO manages the Reactive Power Compensation# Balance group optimization# Participation to energy trade market
challenges	<ul style="list-style-type: none">○ Legal restrictions in cooperation of owners and DSO○ Fitting battery system in substation building○ Safety level and users' anxiety

ELSA Pilot Site Gateshead College



- Skills Academy for Sustainable Manufacturing and Innovation (SASMI), a 5.700 m2 training centre
- photovoltaic roof top system with 50 kWp plus battery system
- energy management system connected to the existing building management system

Representative: Sarah O'Connell, UTRCI

Gateshead College

Skills Academy for Sustainable Manufacturing and Innovation (SASMI)



goal	Optimise building flexibility to provide services to the grid Develop training to support deployment of distributed storage
setting	<ul style="list-style-type: none"> • Sensors, meters & BMS • Flexible loads: HVAC, door curtain • Non flexible loads: lighting, equipment, plug loads • Battery: 48 kWh, 9 / 36 kW max charge / discharge
trial	<ul style="list-style-type: none"> # Peak shaving # Energy purchase (load) time shifting # DR: Cost minimisation # DR: Auto consumption # DR: Flexibility
challenges	<ul style="list-style-type: none"> ○ Optimised co-ordination & scheduling of multiple sources ○ Smart grid enabled ICT platform integration

ELSA Pilot Site Paris



- 10 floor office building in la Défense, an important business area of Paris
- Sustainable and innovative solutions at the core of the project

Representative: Ella Etienne, Green Soluce

Ampere Building, Paris



goal	Proof potential of batteries for self-consumption and grid services
setting	<ul style="list-style-type: none">• Currently in the final phase of construction by SOGEPROM
trial	<ul style="list-style-type: none"># Demand response to maximize auto-consumption at building level# Peak shaving for power subscription cost optimization on building and district level# Providing flexibility for building and district
challenges	<ul style="list-style-type: none">○ Satisfy the stringent safety and security specifications in critical office environment○ Optimise user comfort at all times○ Highlight benefits for a real estate investor

NISSAN



- 100 000 m² manufacturing plant with an annual energy consumption of more than 100 000 MWh
- 300 kWp PV parking system plus 1000 kWh battery storage for optimisation of the factory lighting

Representative: Petar Mihaylov, Nissan

Nissan Barcelona Plant



goal	Optimise use of PV power for building lighting
setting	<ul style="list-style-type: none">• Battery: 42 Nissan EV battery packs (1,000 kWh total capacity)
trial	<ul style="list-style-type: none"># Energy purchase time shifting (Arbitrage) to minimize the cost of the electricity consumption of part of the factory lighting# Peak shaving will be tested to lower the power subscription cost# PV power smooting will be tested targeting 0% loss of the Photovoltaic production# System will not respond to signals of external actors but apply charge/discharge algorithms in an autonomous way
challenges	<ul style="list-style-type: none">○ The regulation in Spain is not very clear regarding the use of battery storage. Possible penalties and fees.

Contact:

Ludwig Karg
B.A.U.M. Consult GmbH
l.karg@baumgroup.de



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UNIVERSITY**