

FLEX!UM

POWERED BY ISKRAEMECO

Flexibility solution. Real-time
grid protection and predictive
load planning

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Grid stress from the energy transition



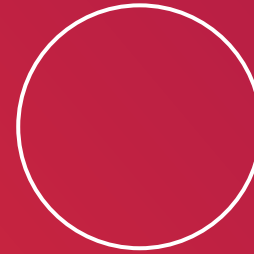
**Underutilised
capacity of
existing
infrastructure.**



**Lack of flexibility
tools**



**Congestion and
instability**



**Blocked
renewable
projects**



**Rising grid costs
and CAPEX**

Traditional ways to solve it

- Physical upgrade of infrastructure
- Tariff manipulation (time of use tariff).
- Regulations to limit new PV connections.
- Contracts with large industrial loads
- Stand alone load management systems.

Energy transition → DERs → Active consumers → **The traditional system no longer works!**



Not smart

Not dynamic

Not real-time

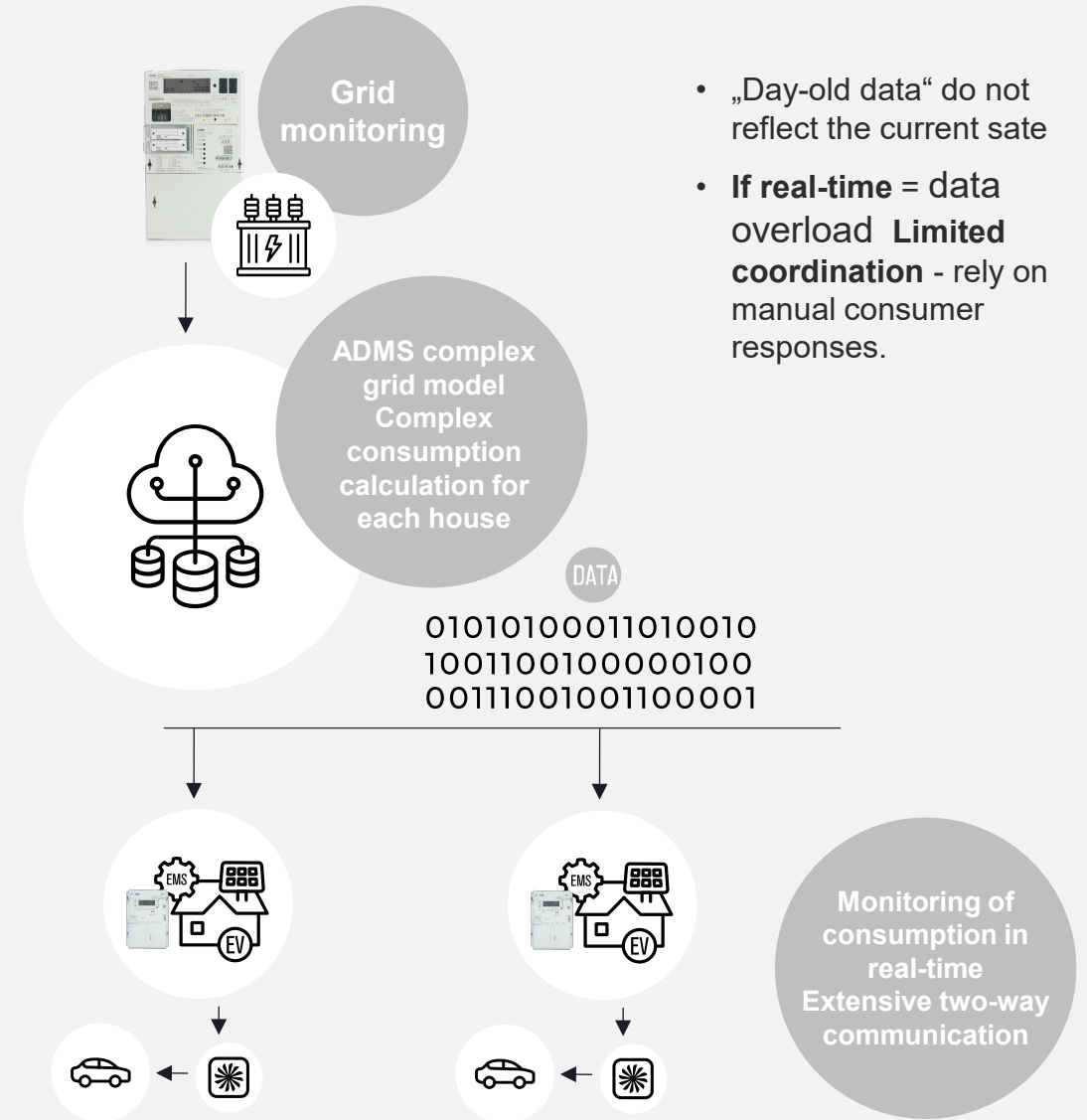
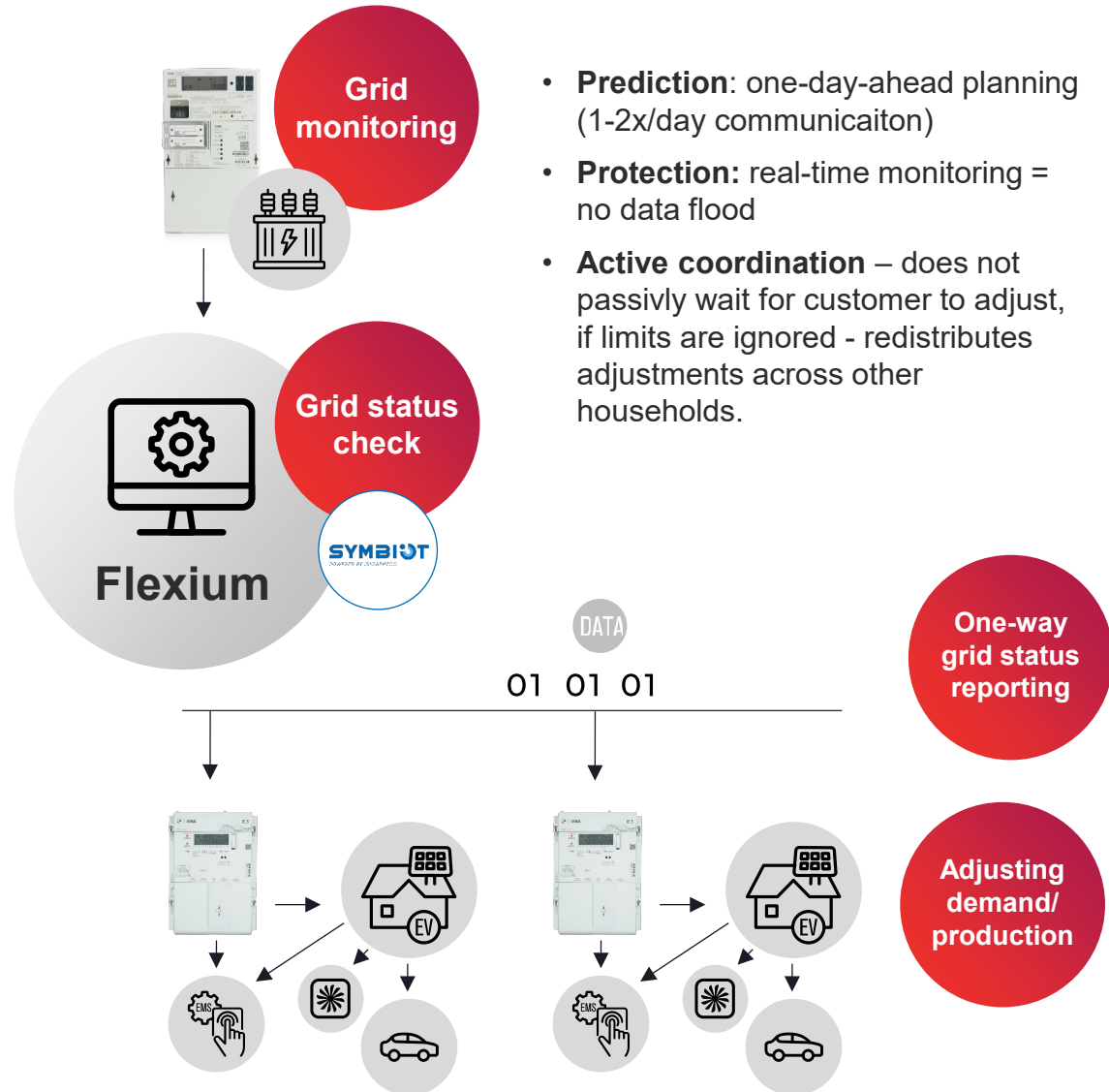
Not scalable

Expensive

Flexium

VS

other flexibility solutions



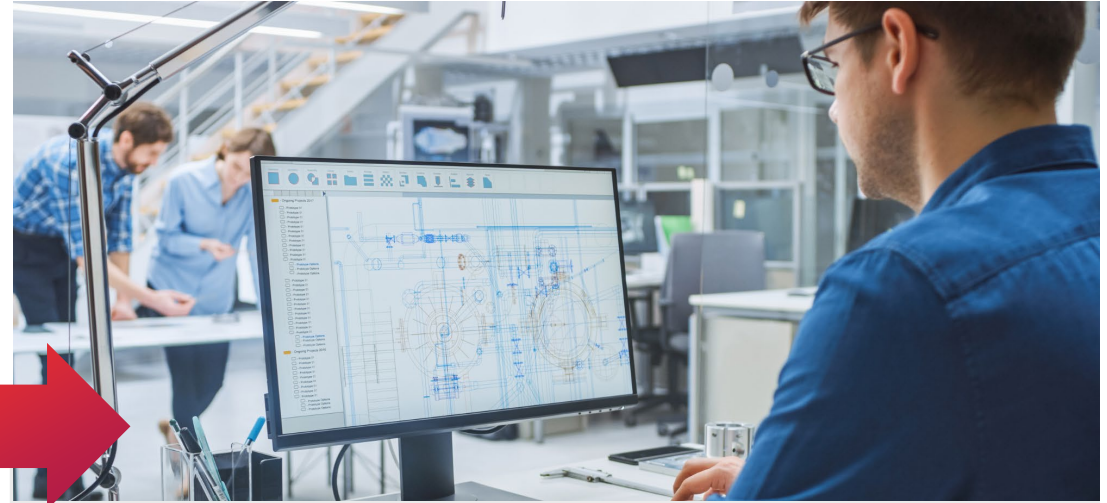


Grid capacity utilisation strategies



TRADITIONAL:

- Tariff manipulation (time of use tariff).
- Block new PV connections.
- Physical upgrade of infrastructure.
- Contracts with large industrial loads.
- Stand alone load management systems & ripple control“.



FLEXiUM:

- Upgrades existing assets with intelligent, software-based control.
- **Prevention** - day-ahead planning of demand and generation, enabling grid operators to instruct devices to use the grid in the most optimal way based on forecasts.
- **Protection** is a reactive mechanism that functions in real time. It ensures the grid remains within operational limits by observing live data and responding to anomalies such as overloads or overvoltages. Delivering power constraints to device management systems.



Our promise



Protection

- **Protection from overload, overvoltage, and congestion.** Continuously monitoring grid conditions (voltage, power quality), generating **capacity events/ power constraints**, setting dynamic per-household import/export power (kW) limits, and adjusting operation of key devices (PV, EV chargers) in real-time.

Prevention

- Integrating multiple inputs, such as **grid flexibility forecasts from authorities for balancing services, power generation forecasts, and power demand forecasts** to calculate the optimal utilization of smart devices. The result is a detailed utilization plan for the following day, tailored to each device's capabilities and the grid's needs.



How does „FLEXiUM protection“ works?

1. Monitor the grid conditions

- Real-time grid monitoring via smart meters capturing **voltage and power flow**, data at the critical points of the distribution network (transformer, end of LV feeders and other).

2. Generate capacity event

- Based on monitored real-time data FLEXiUM generates capacity event toward smart meters equipped EDGE EMS (or external EMS via P1.)

3. Calculate power export/import limits

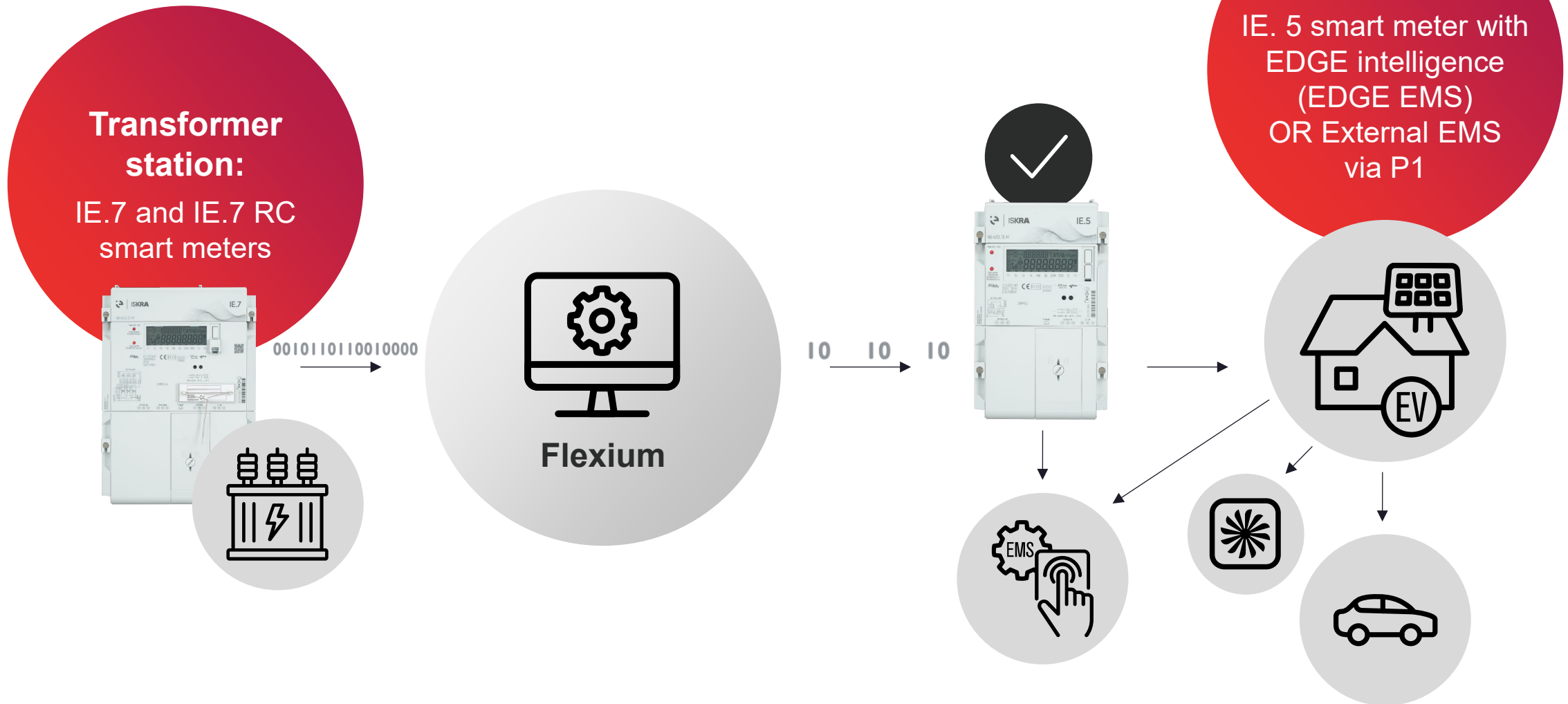
- Capacity event (information about the grid status & flexibility need) - received by smart meter and then used for calculation of power limits for export and imports that are sent to flexible loads (PV, EV, BEES, HVAC).

4. Adjust devices

- Meters with EDGE EMS automatically coordinate optimal operation of local flexible devices (PV inverter, EV charger, battery, HVAC) within import/export power limits.



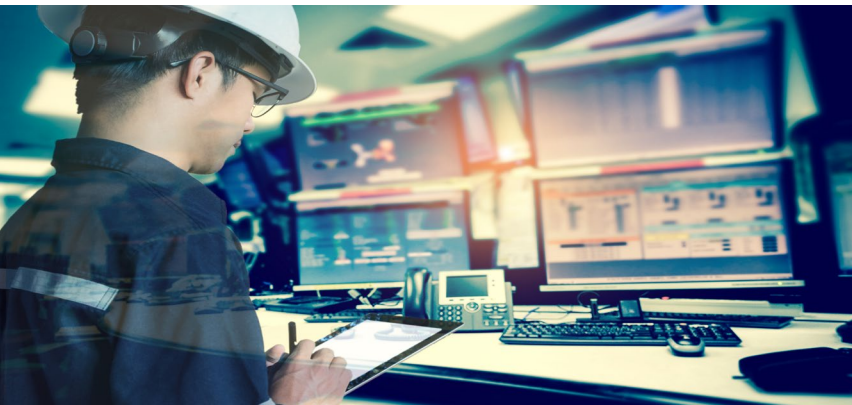
Solution architecture





How does „FLEXiUM prevention“ works?

For prevention, **linear programming** is employed. This method integrates multiple inputs:



The result is a detailed utilization plan for the following day, tailored to each device's capabilities and the grid's needs.

FLEXiUM benefits



Low-CAPEX alternative

Flexium replaces costly, long grid upgrades with software-based control. It runs on existing AMI; meters are upgraded via firmware, no new hardware needed.



Smart

Generates specific capacity event and per-home import/export kW limits.



Dynamic

Imports/exports limits adapted to the grid current loads, not fixed time blocks.



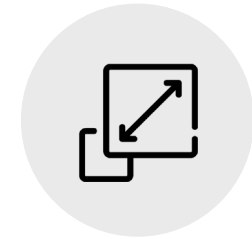
Real-time

Smart meters with EDGE EMS automatically controls devices in 1-minute interval, ensuring grid-level coordination.



Flexible

Integrates with energy optimization strategies and virtual power plants (VPPs), aggregating distributed resources into one controllable unit for balancing services



Reliable

Flexium periodically recalculates and adjusts capacity limits, grid stability doesn't rely on consumers adjusting their usage. If a home misses its limit or doesn't respond, the system redistributes the adjustment across other homes, actively coordinating flexibility.



Reference project with Mercator and Elektro Ljubljana

Information about the project:

- Customers: Mercator (retail chain) and Elektro Ljubljana (distribution system operator)
- Country: Slovenia
- Application: Distribution grid flexibility and assets optimization
- Goal: maximize on-site energy use from their own sources and minimize energy costs.

Assets:

- Rooftop solar PV plant connected to the store.
- Battery storage system rated at 100 kW / 233 kWh, installed on-site next to the store.
- Energy import only (no export to the grid).

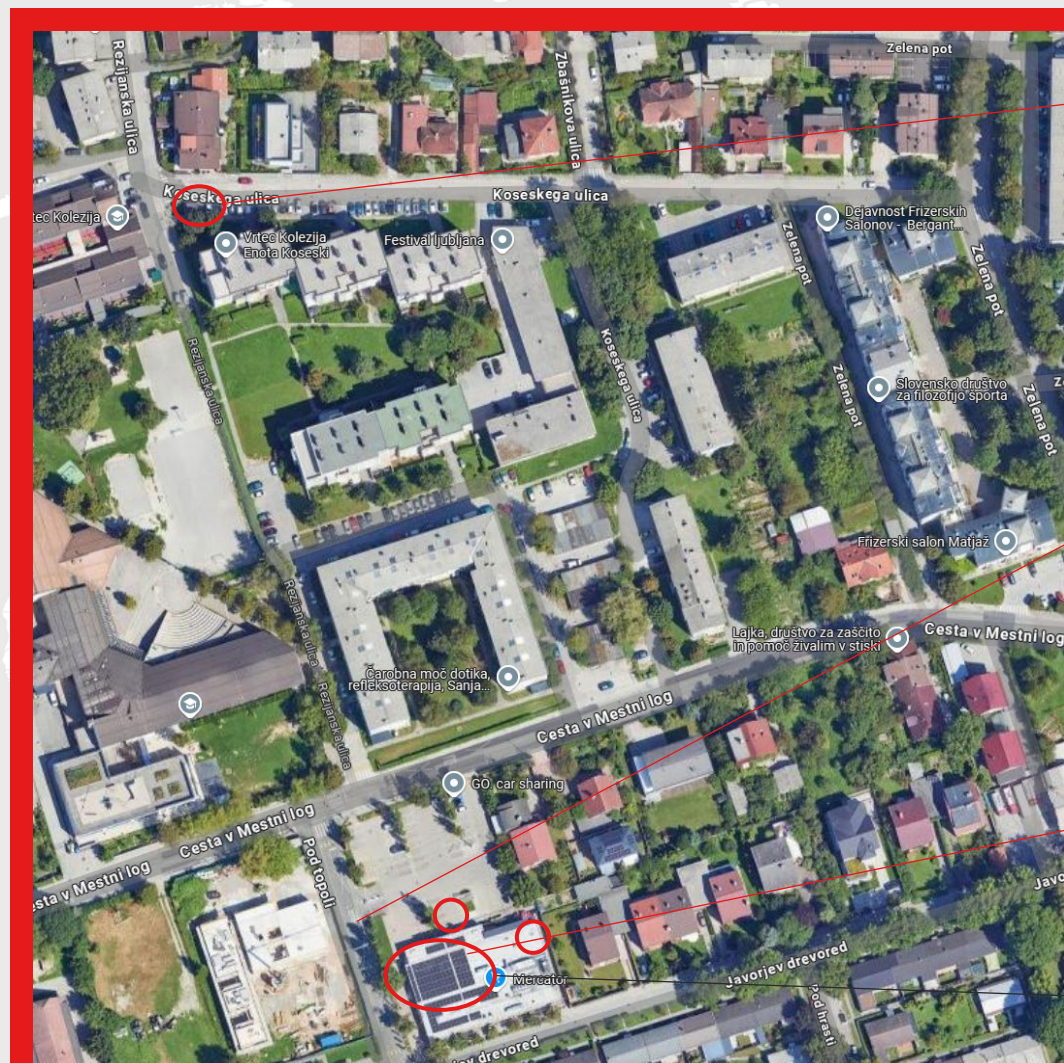
FLEXiUM use case:

- Flexium generates one-day-ahead forecasts using load, solar generation, and energy prices forecasts.
- Based on these forecasts, it calculates the optimal day-ahead plan for battery and solar.
- The EDGE executes real-time control: Battery management (charging and discharging schedules). PV output control, aligning production with forecasted on-site consumption.

Results:

- Lower energy costs (cost reduction of X %, depending on conditions).
- Improved self-consumption of PV energy.
- Automated control and optimization, without overloading the grid or requiring manual intervention.

Mercator's Murgle store.



A smart meter with an EDGE module is installed in the transformer station on Koseski Street.

The battery storage system and the solar PV plant are connected according to wiring scheme PS.2.



A 100 kW / 233 kWh battery storage system is installed next to the store.



The EDGE EMS is installed on the smart meter, which is connected in parallel with the billing meter P3.



The solar PV plant is installed on the store's roof.

Mercator's Murgle store.



Transformator

Additional meter with EDGE module.



Solar power plant: 70 kWp / 60 kW



Battery storage system: 100 kW / 233 kWh



Ethernet/
Modbus

Ethernet/
Modbus

Central
EDGE EMS
Azure

LOCAL EDGE EMS



Dodaten števec z EDGE modulom

Thank you

