Connected Active Buildings forming Energy Communities

**ISGAN-SIRFN, EERA JP Smart Grids, Mission Innovation and DERlab
Joint Workshop on *"Digitization, Research and Testing of Energy Systems for Energy
Markets Decision Support"* – Energy Communities panel session**
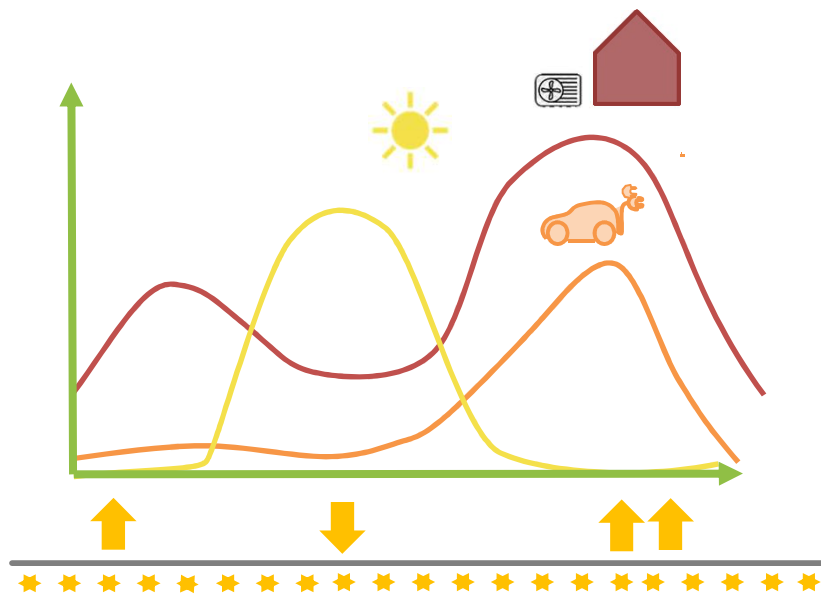
Chris Caerts (VITO)
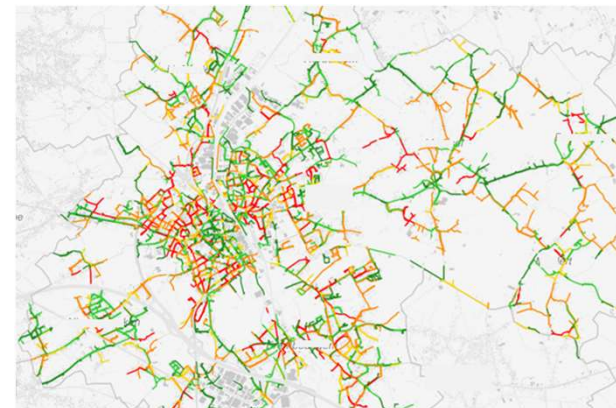
The challenge

Building: consumption and generation peaks

Medium-sized city
@ 30% penetration rate of HP & EV

Classification	Colour	Probability of Failure
Impossible	Dark green	0 %
Very Unlikely	Green	< 20%
Unlikely	Light Green	< 40%
Possibly	Yellow	< 60%
Likely	Orange	< 80%
Very Likely	Red	≤ 100%

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Energy Communities panel session

Solution: DR?

Building: consumption and generation peaks

Deterministic-ness?

Medium-sized city
30% penetration rate of HP & EV

Grid Security?

DR

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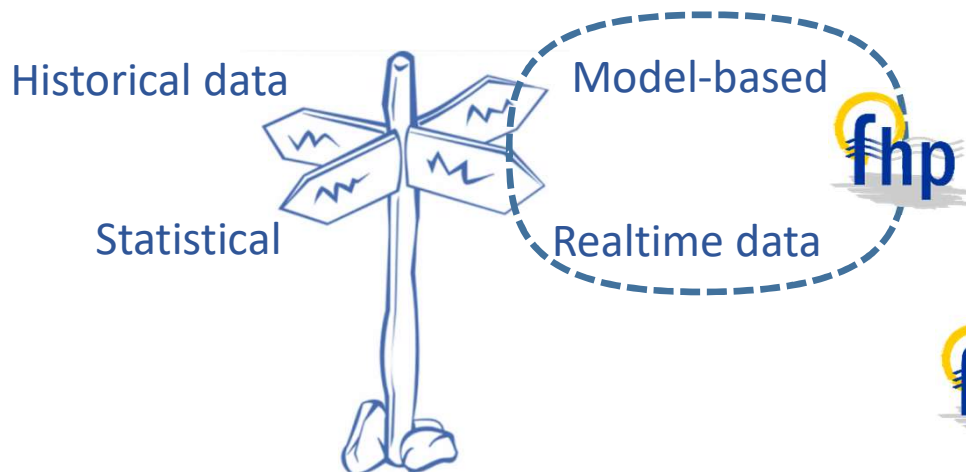*Energy Communities panel session*
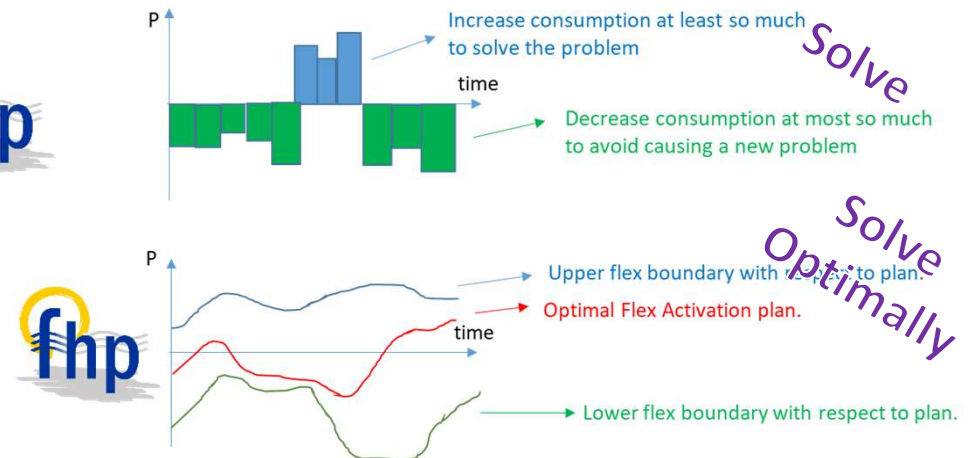
Decentralization: Energy Communities

- Community: cluster of local (DG connected) flexibility
  - Local (DG) problems (e.g. congestion): forecasting
  - System level problem (e.g. balance): forecasting & clearing by DSO (local constraints)
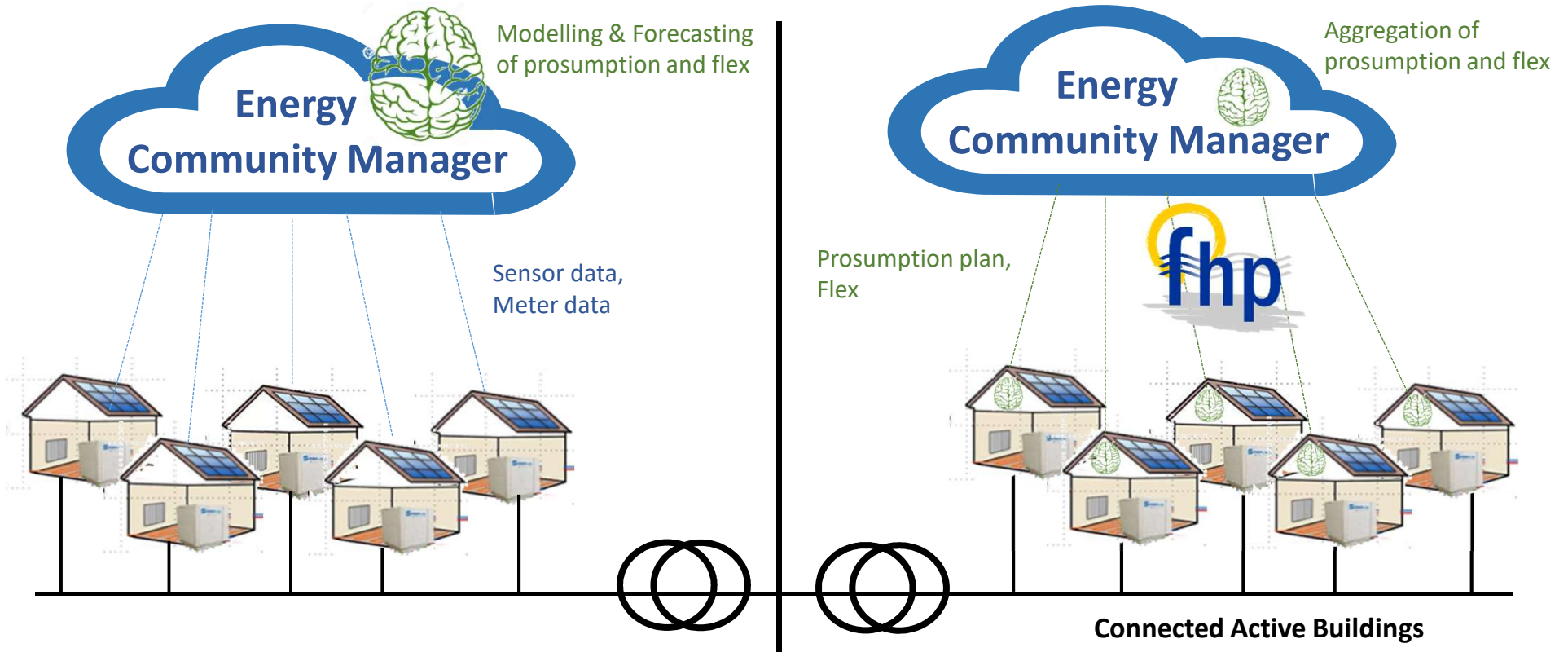
Forecasting

Clearing

Historical data

Model-based

Statistical

Realtime data

Solve

Solve Optimally

P

Increase consumption at least so much to solve the problem

time

Decrease consumption at most so much to avoid causing a new problem

P

Upper flex boundary with respect to plan.

Optimal Flex Activation plan.

time

Lower flex boundary with respect to plan.

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Distributed Intelligence

Modelling & Forecasting
of prosumption and flex

**Energy
Community Manager**

Sensor data,
Meter data

Aggregation of
prosumption and flex

**Energy
Community Manager**

Prosumption plan,
Flex

Connected Active Buildings

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# FHP Dynamic Coalition Manager concept for Energy Communities

Flexible Power and Heat

Managing community/collection of
Connected Active Buildings
- Buildings with HP
- Large seasonal Thermal Storage, charged by HP

Offer **Grid-Aware** Flex Services
- Local (technical) RES curtailment mitigation
- System (Economic) RES curtailment mitigation
- Balancing
- ...

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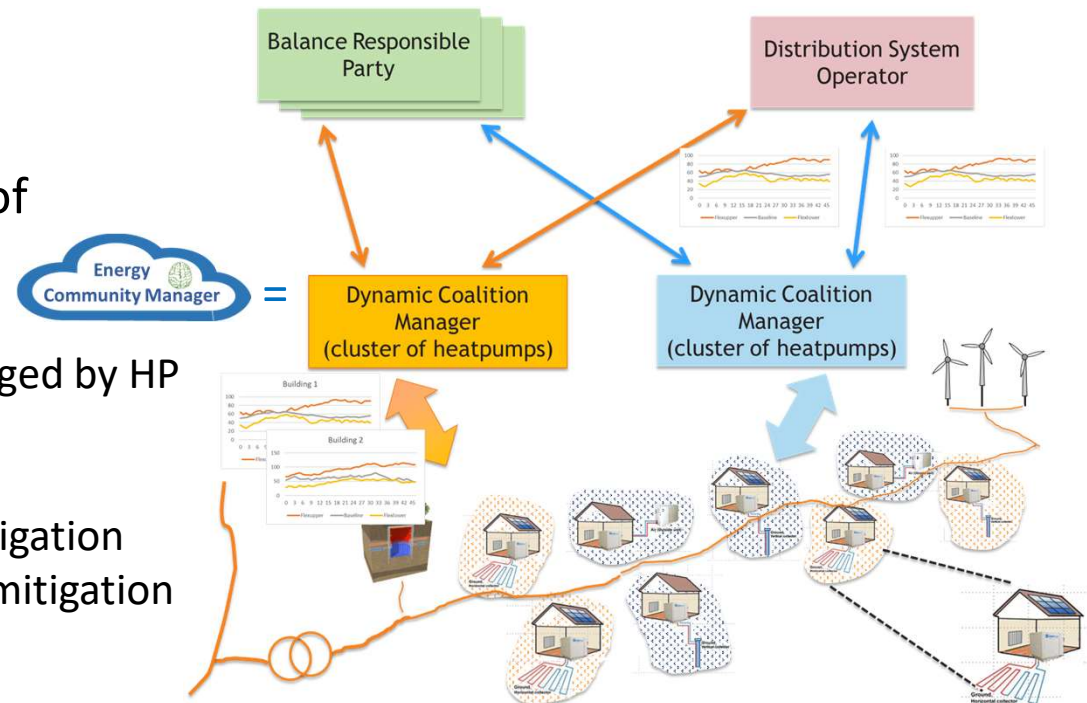
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FHP project is funded by European Union under the grant agreement no. 731231.

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