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Flexibility to the grid : a consumer perspective

From prosumer to flexumer

How buildings will provide services to grids

Smart Meter Inclusif (SMI)

InterReg Oberrhein - Mulhouse

Date: 19.11.2020
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01 Global trends

02 Energy today

03 Energy tomorrow – from local (prosumer) to global optimization with flexibility on consumer side (flexumer)

04 How it works, some examples and benefits

05 Q&A

01 Global trends

The main drivers
Resources, cost, regulations

Limited resources

Decreasing cost of renewables

Regulations are driving technologies and business

Ambition to modify the energy landscape in Europe

Focus on solar and wind

1 kWp installed produces per year:

- **1156 kWh in Freiburg**
- **1203 kWh in Basel**
- **1229 kWh in Mulhouse**
- **1008 kWh in Hamburg**
- **1579 kWh in Marseille**
- **1783 kWh in Dubai**

Source: https://globalsolaratlas.info/map

E-mobility is growing
All car OEM have EVs in their portfolio and ambitions

Global sales of electric vehicles to reach 2.8 million (out of 98 millions)

Tesla Model 3 = 1/8 of World's EV Sales in 2019

The world of energy is changing

The future will be a full electric world in which nearly all applications in daily life and at home will be electrical

Photovoltaic (PV)
will be standard on single- and double-family houses

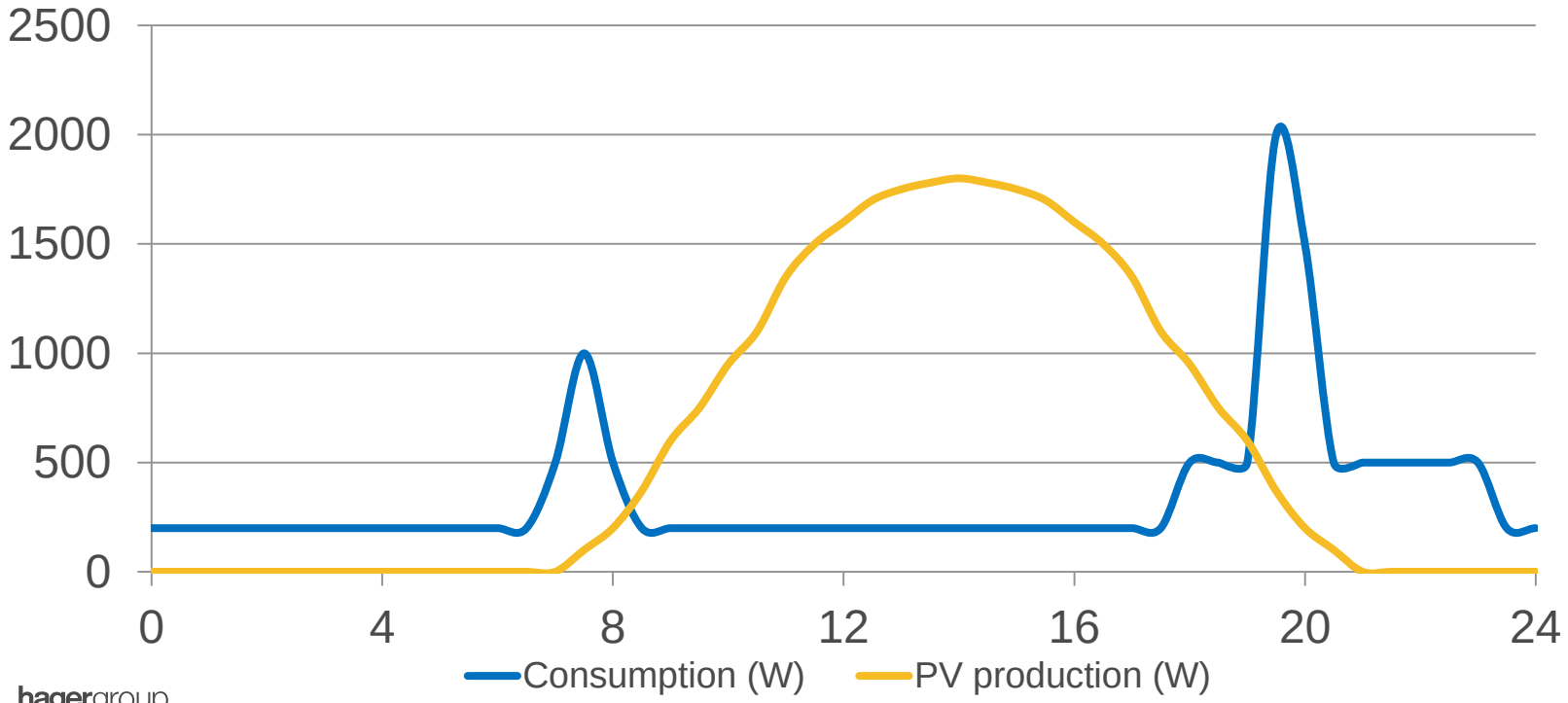
Smart Grids
Buildings will be connected with the grid

E-Mobility
Future cars will be electrical

Heating (HVAC)
Heating will be electrical

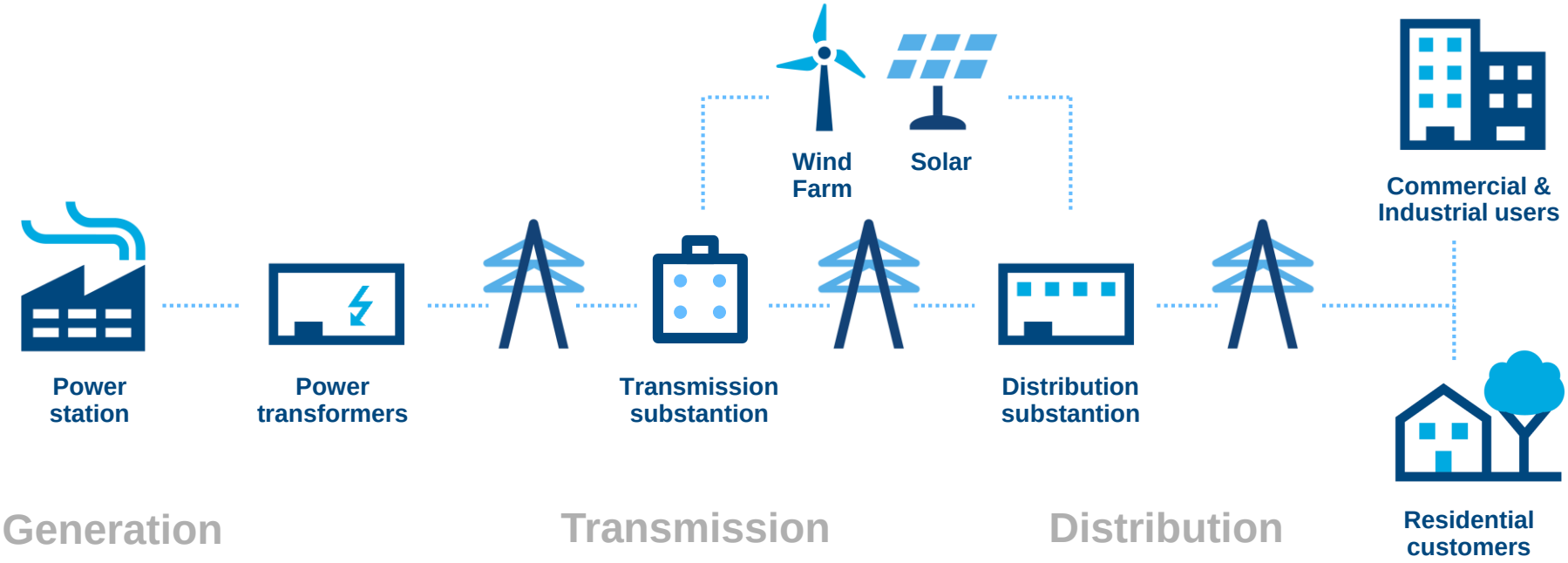
02 Energy today
Consumption driven

Single house daily profile
Consumption, local photovoltaic production



Classical grids – controlled power

Production and distributors adapt to consumption



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03 Energy tomorrow – from local (prosumer) to global optimization with flexibility on consumer side (flexumer)

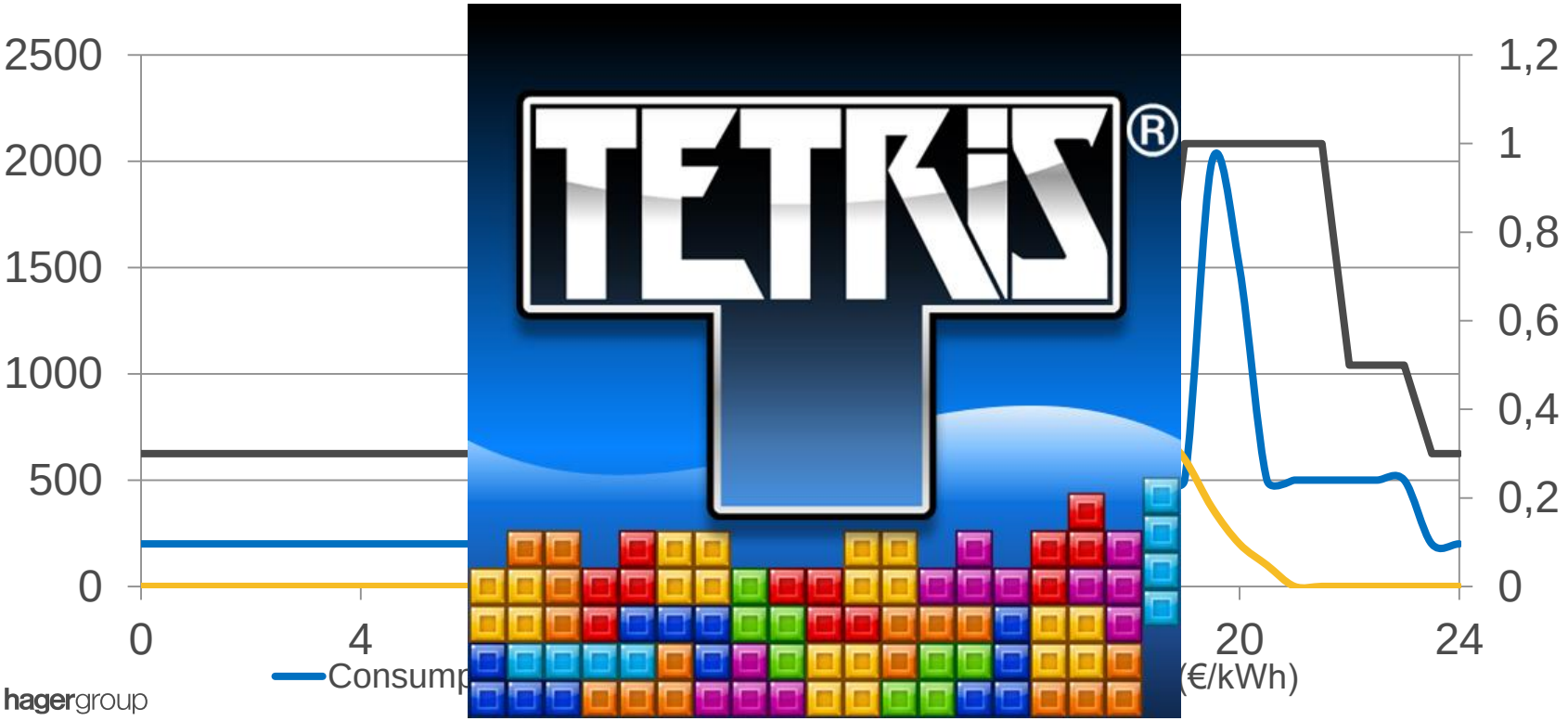
More and more renewables in the electricity mix
Flexibility as an enabler

Gas, coal, atom
- controlled
- centralized

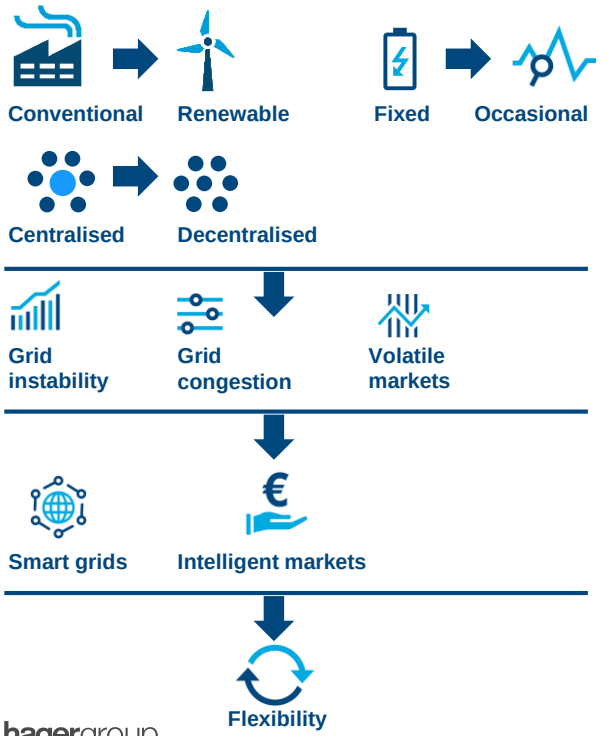
Sun, wind
- fluctuating
- weather dependent
- decentralized

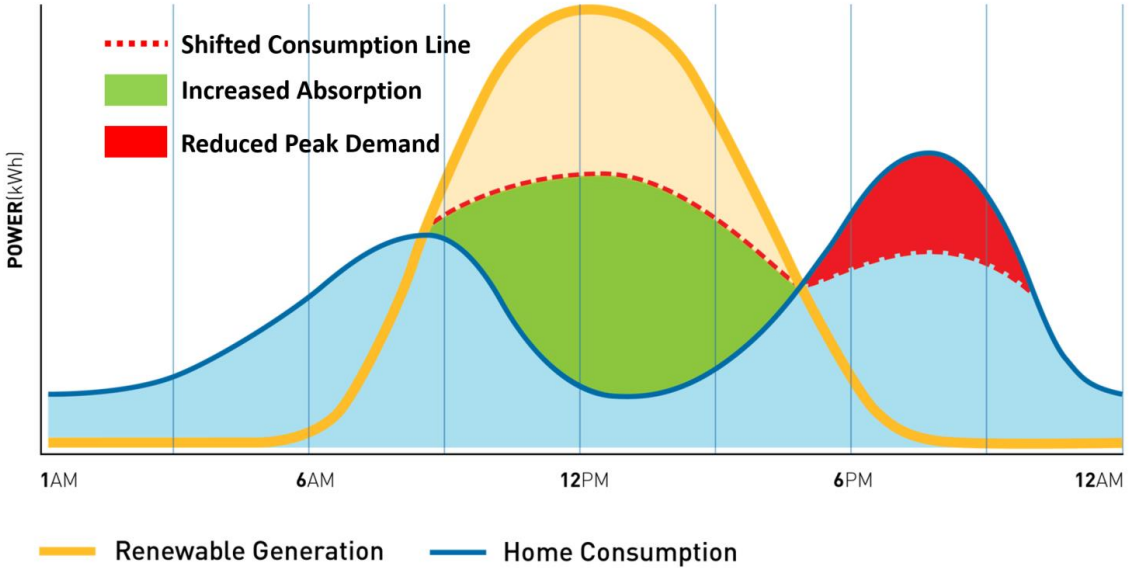
Playing TETRIS

Make the consumption profile fit to the production one



Flexible systems – consumer become active
Demand response – from prosumer to flexumer





04 How it works
Some examples
Benefits

How to provide flexibility to the grids? Flexible consumer

An example of EV Smart Charging project

01

Local overload protection

02

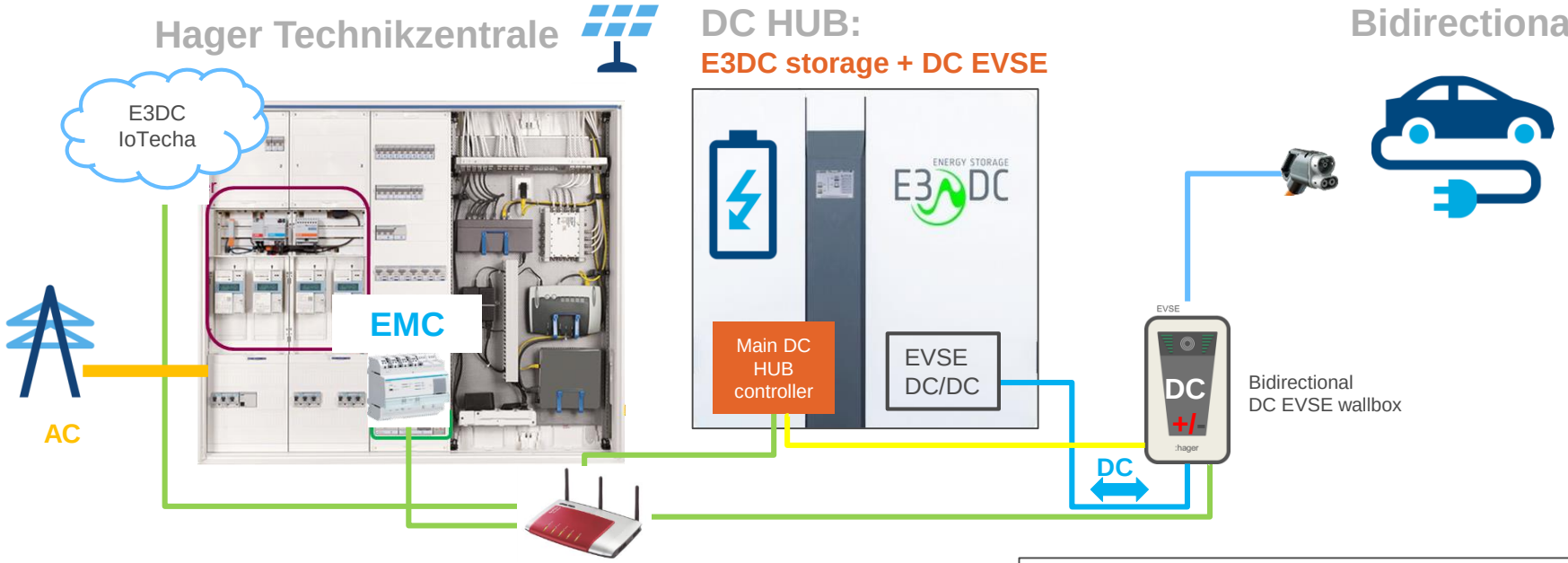
PV own consumption optimization

03

Charging based on dynamic tariffs + forecasts

How to provide flexibility to the grids? Flexible producer

Use the battery of EV as a flexibility vector



Electric car is able to send energy in the building.
Communication between EMC and car.

V2x = Vehicle2home/grid: bidirectional energy transfer to/from EV
EVSE = EV Supply Equipment
DC = direct current
EMC = Energy Management Controller

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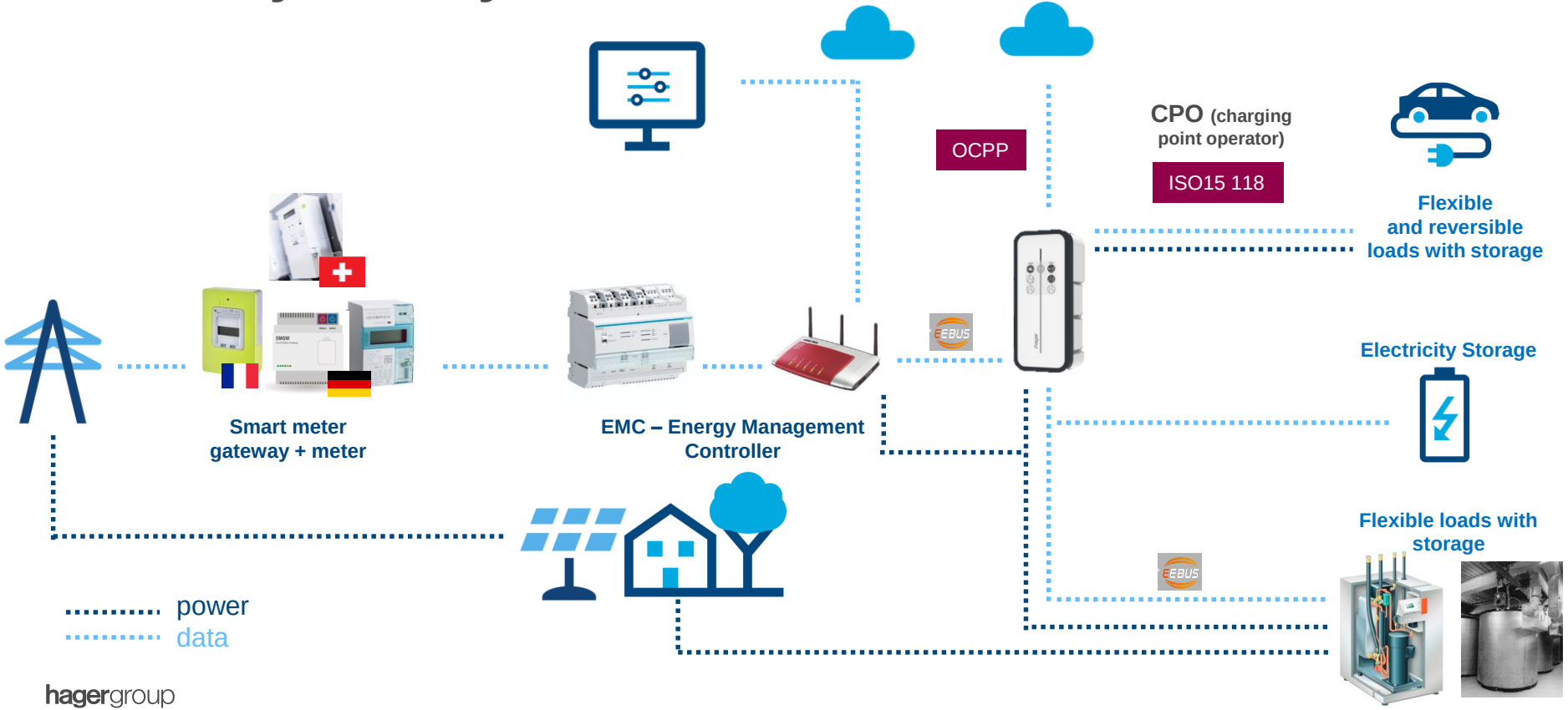
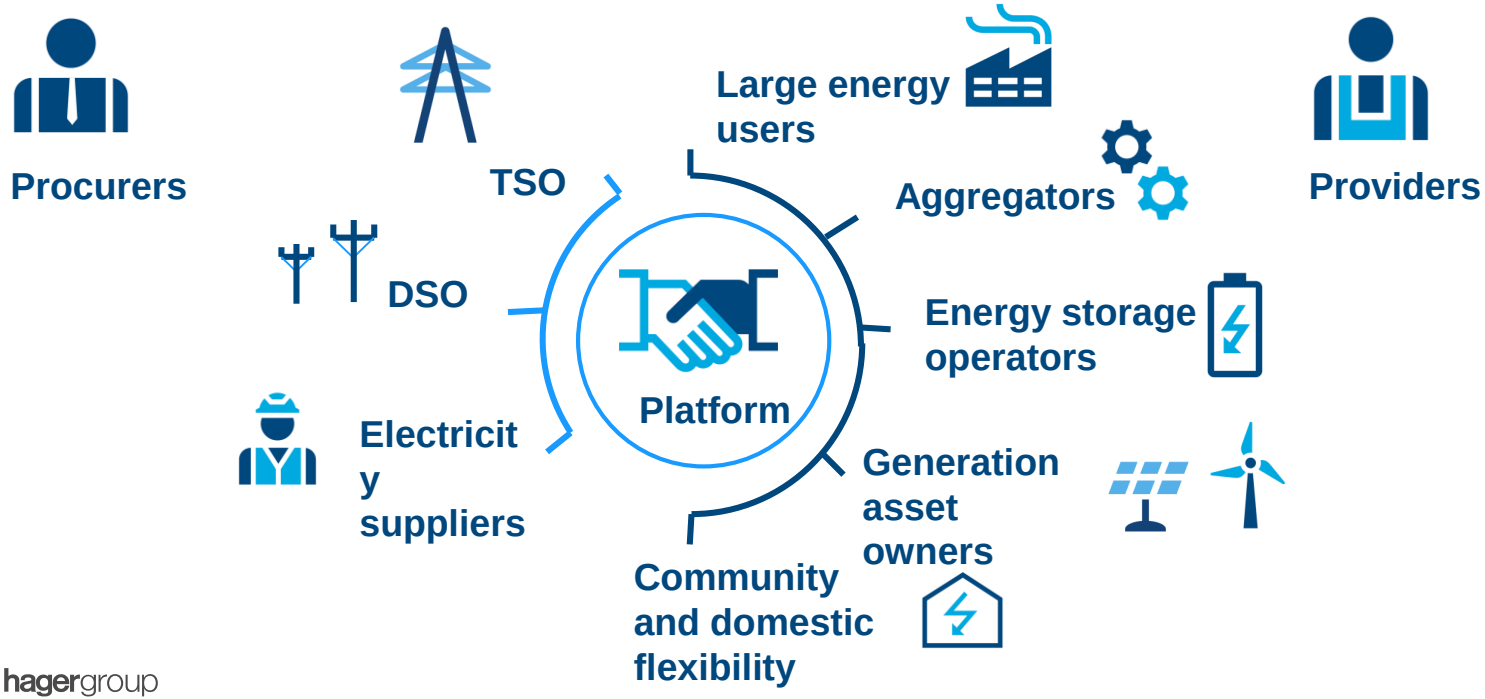
How to provide flexibility? Flexible consumer / producer

Flexibility with dynamic tariffs



How to provide flexibility? Aggregation at a larger scale

Virtual Power Plant - Aggregation



Flexibility to the grids - summary
Concepts and benefits

Use main loads with high inertia that can be turned down, stopped or activated such

Use local production or storage systems

Flexibility to the grids
Current situation and next steps

Main benefits:

01 Flexibility

02 More and more renewables

03 Improved pay back

04 Energy transition

Next steps:

01 Business models

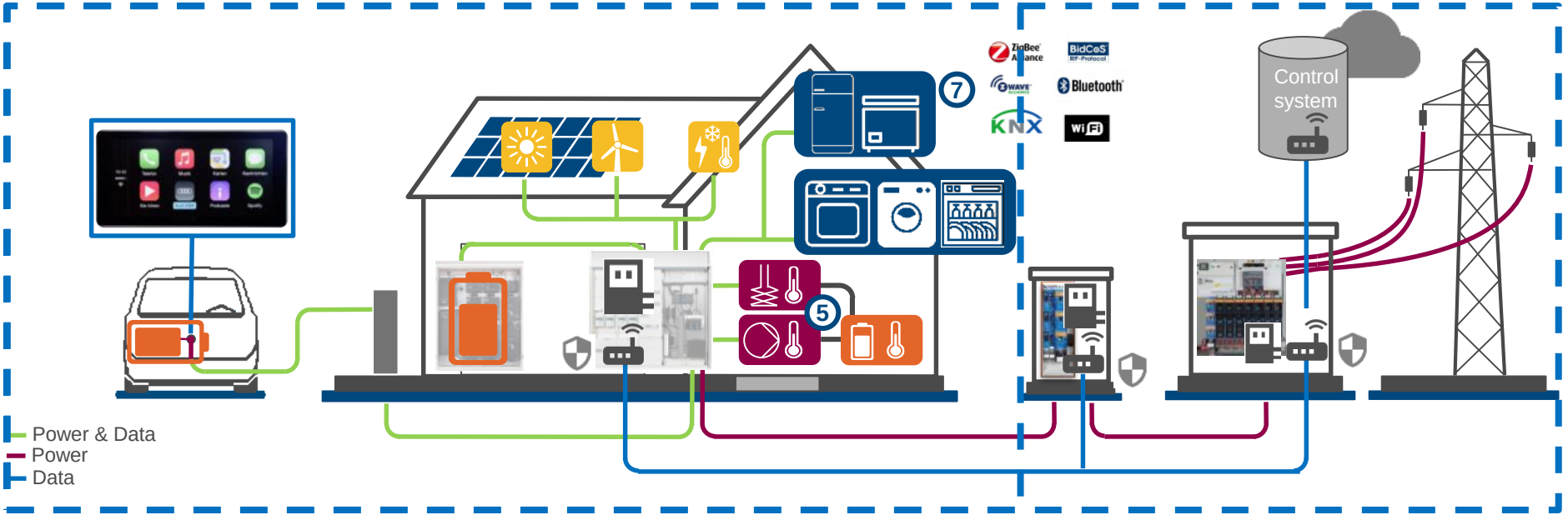
02 Test the concept, projects in progress

03 V2H ready electric cars

04 Flexibility offers

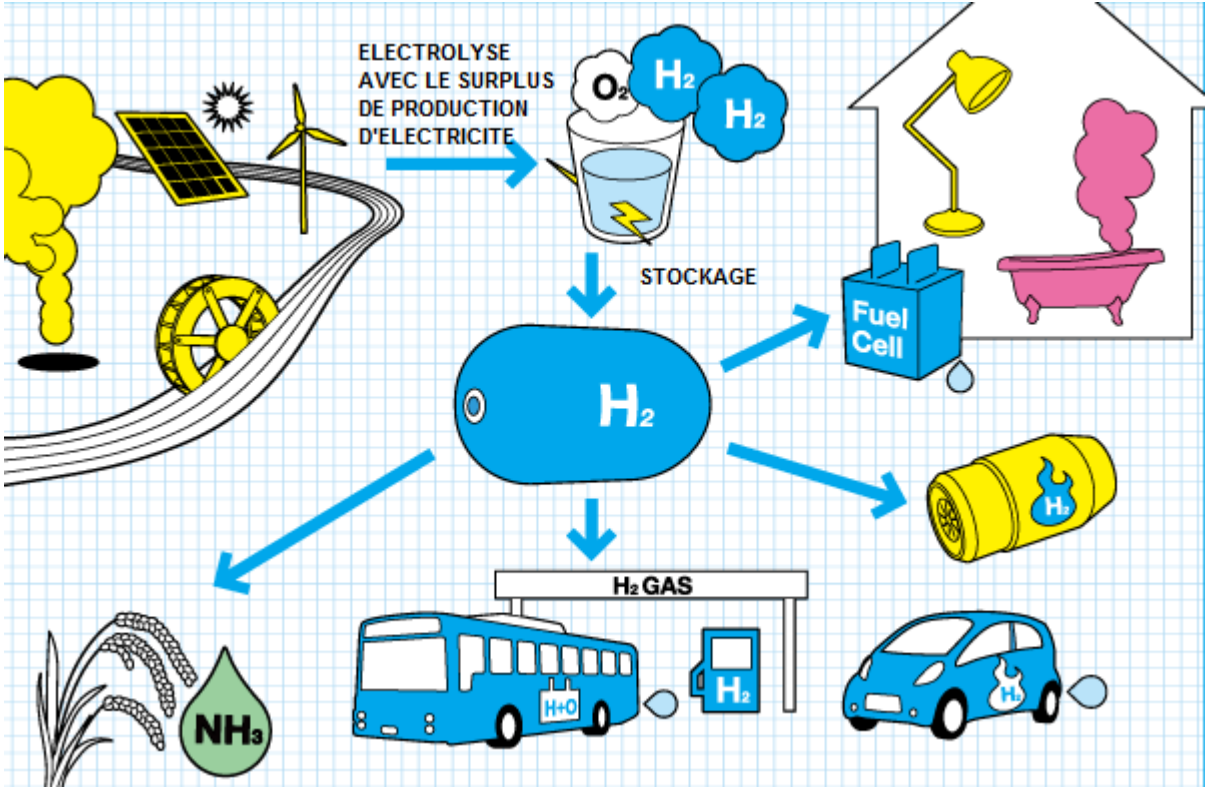
A global ecosystem, from the grid to the car

From passive to active, from local to global,



And after? the hydrogen society?

When?



06 Q & A

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Thank you
for your attention!

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Back up
Electricity prices in Europe