

On the road to a new energy age

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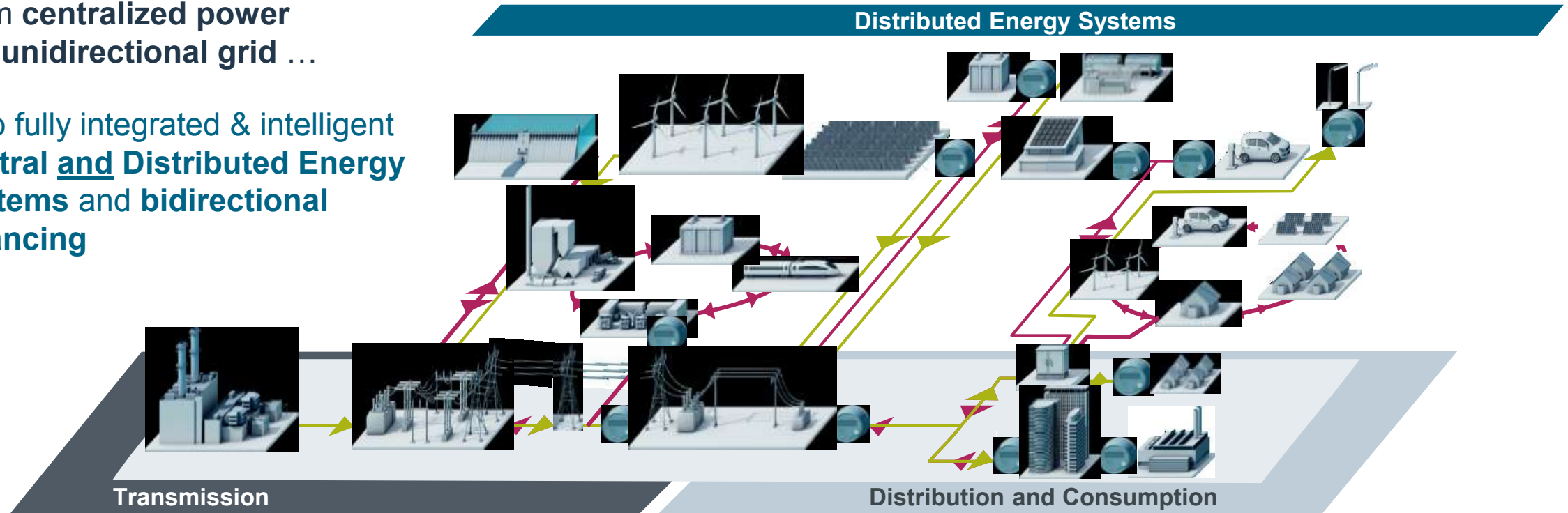
Global megatrends are changing our markets – structurally and profoundly



The Energy Revolution: Big Picture

From **centralized power**
and **unidirectional grid** ...

... to fully integrated & intelligent
**Central and Distributed Energy
Systems** and **bidirectional
balancing**



1 Changing
generation mix

2 Generation
capacity
additions

3 Distance from
source to load

4 Decentralization
(public/private)

5 Refurbishment/
upgrades

3D – Decarbonization, Decentralization and Digitalization

The current energy world is being heavily disrupted

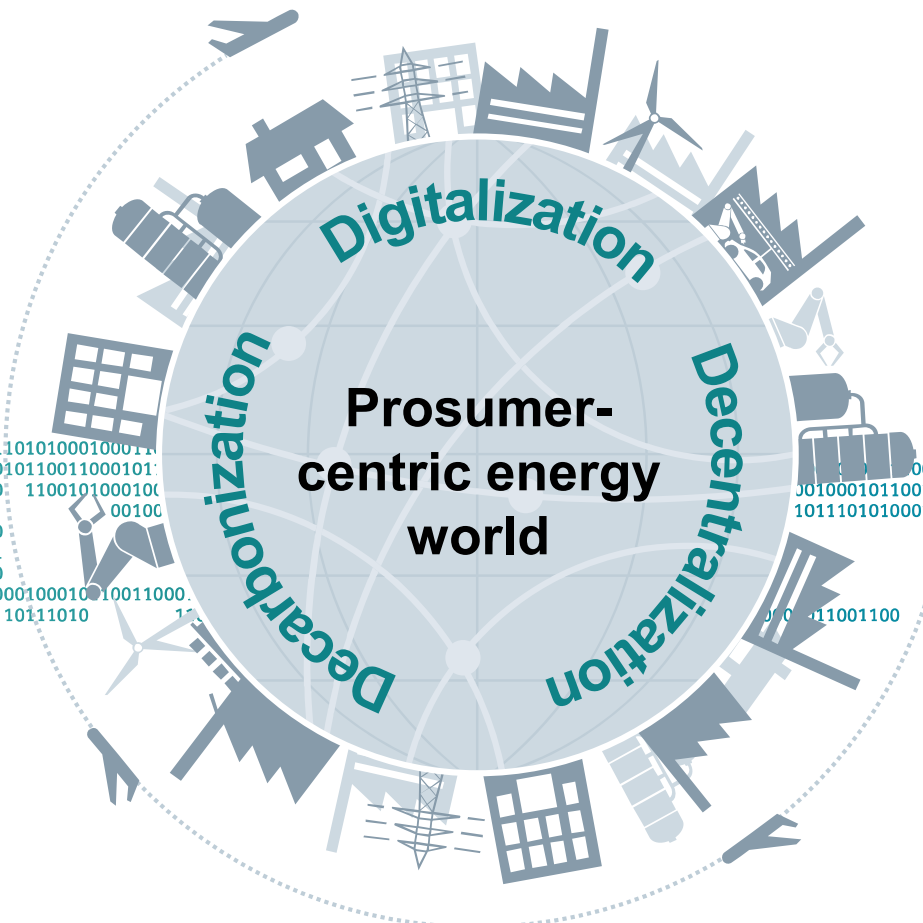


From

Predominantly fossil

Centralized energy production

Vertically integrated utility



To

Renewables + storage

Consumers become prosumers

Energy trading platforms = digital utilities

Electricity Grids allow direct integration, transmission and application of renewable Energy

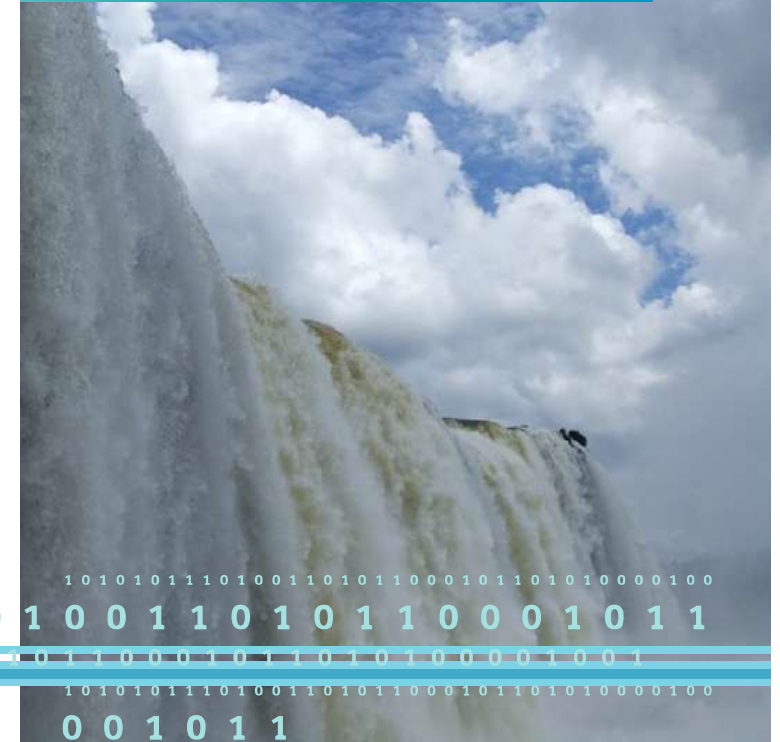
Worldwide **Solar PV**
capacity growth in 2017-
2022: **400-600 GW**



Worldwide **Wind**
capacity growth in 2017-
2022: **300-350 GW**



Worldwide **Hydropower**
capacity growth in 2017-
2022: **80-120 GW**



Electrical Energy is as versatile applicable as no other energy carrier

SIEMENS
Ingenuity for Life

Electrified tracks account for nearly 1/3 of total tracks globally



100 million e-cars on the road expected until 2030

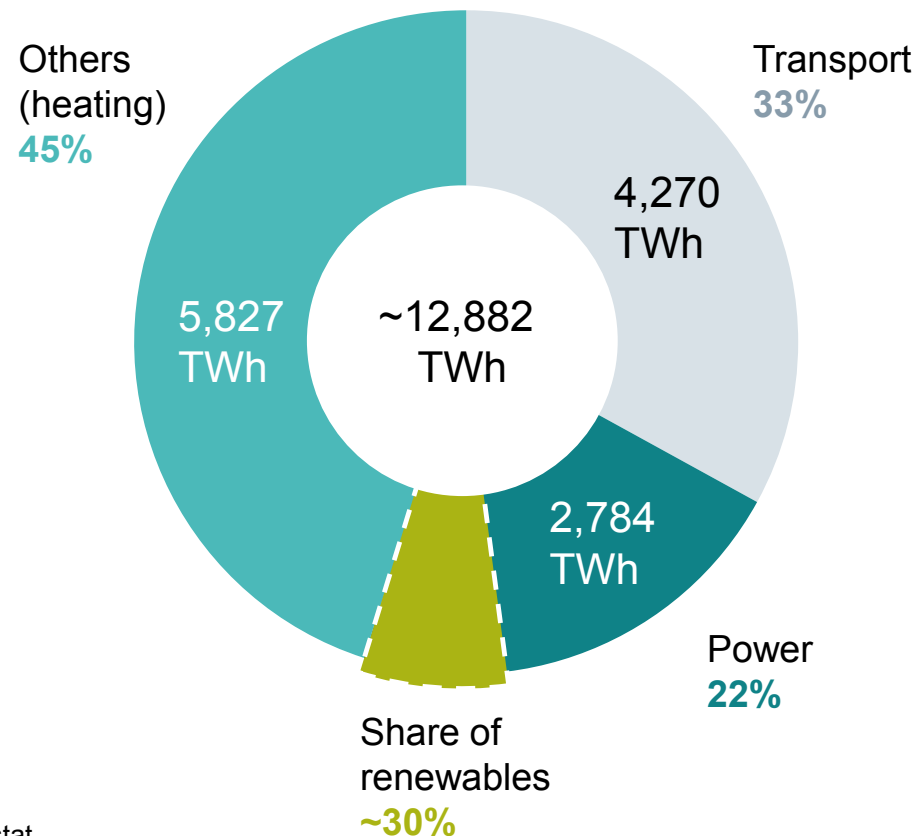


Efficient heat pumps: 4 kWh heat with 1 kWh electric power



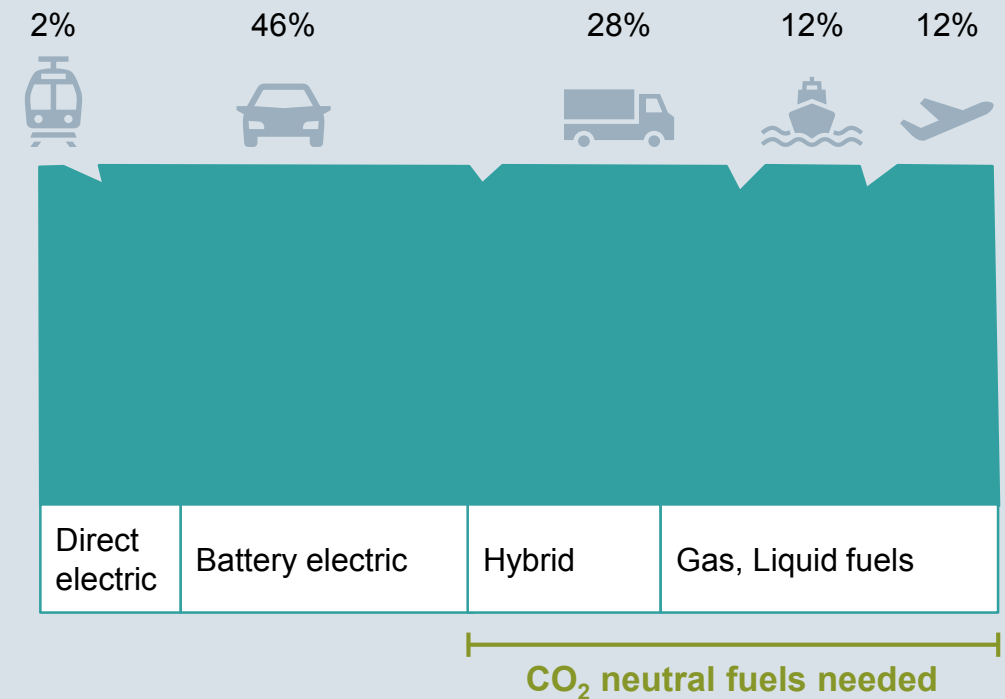
Electrification becomes main driver to decarbonize the economy

Final energy consumption EU28 in 2016



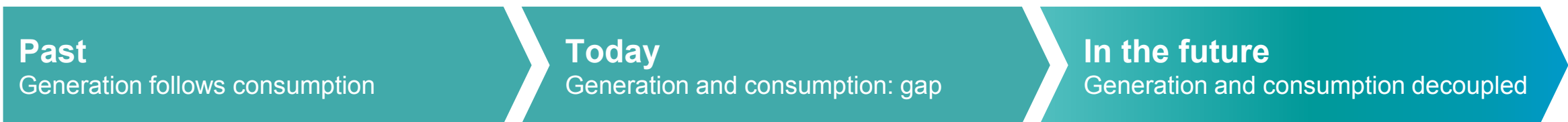
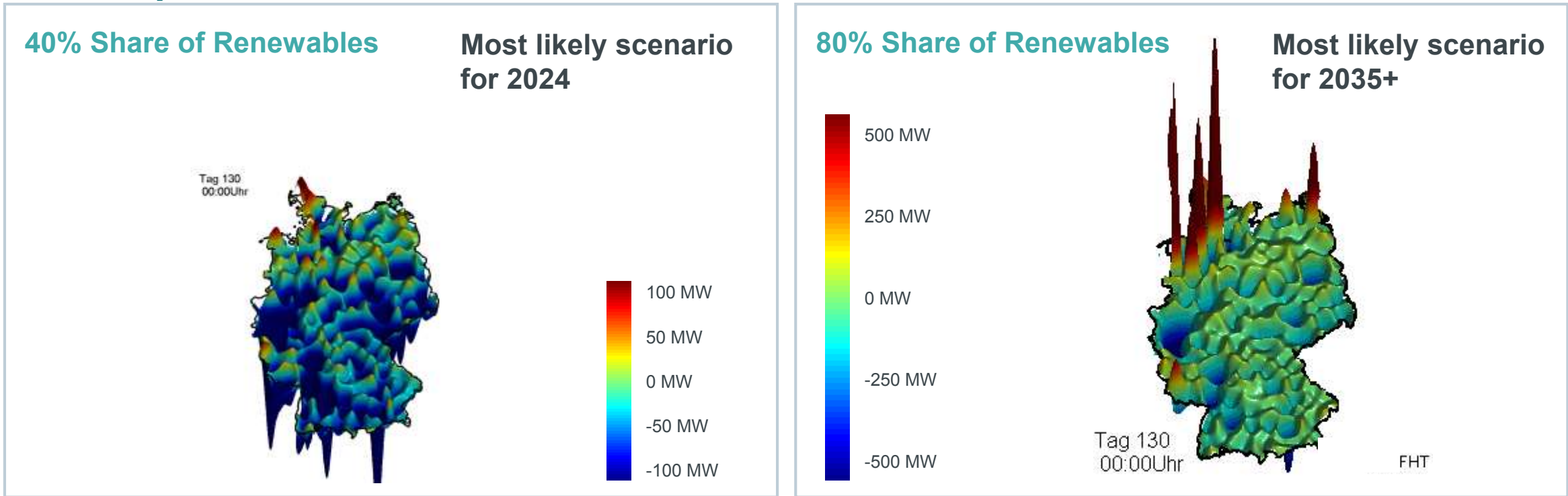
Pathways for decarbonization

Global transportation energy, 2012¹



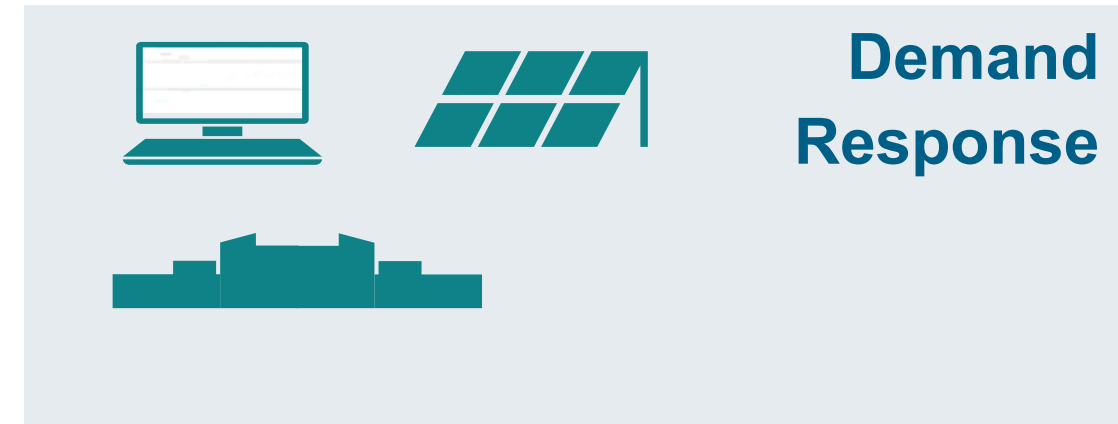
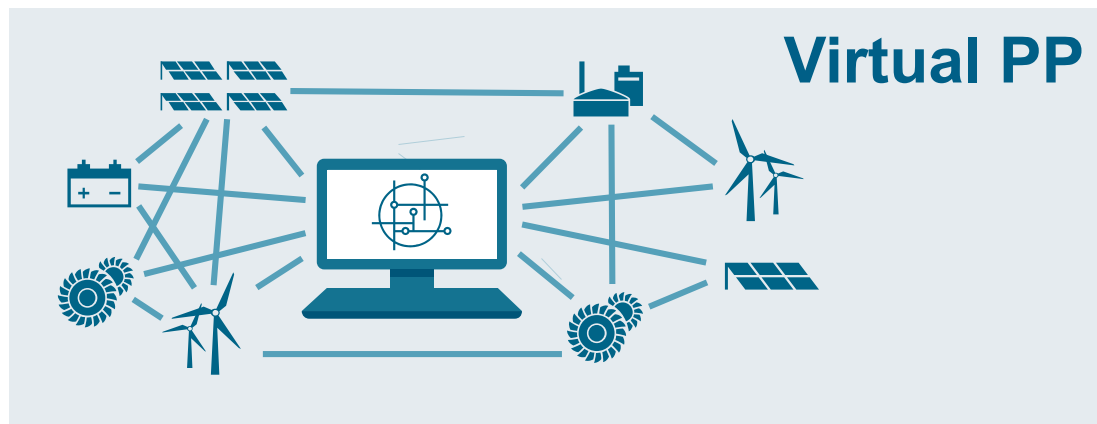
¹ eurostat

The new energy world: fully electrified, more complex and with renewable energy provision that is decoupled from consumption



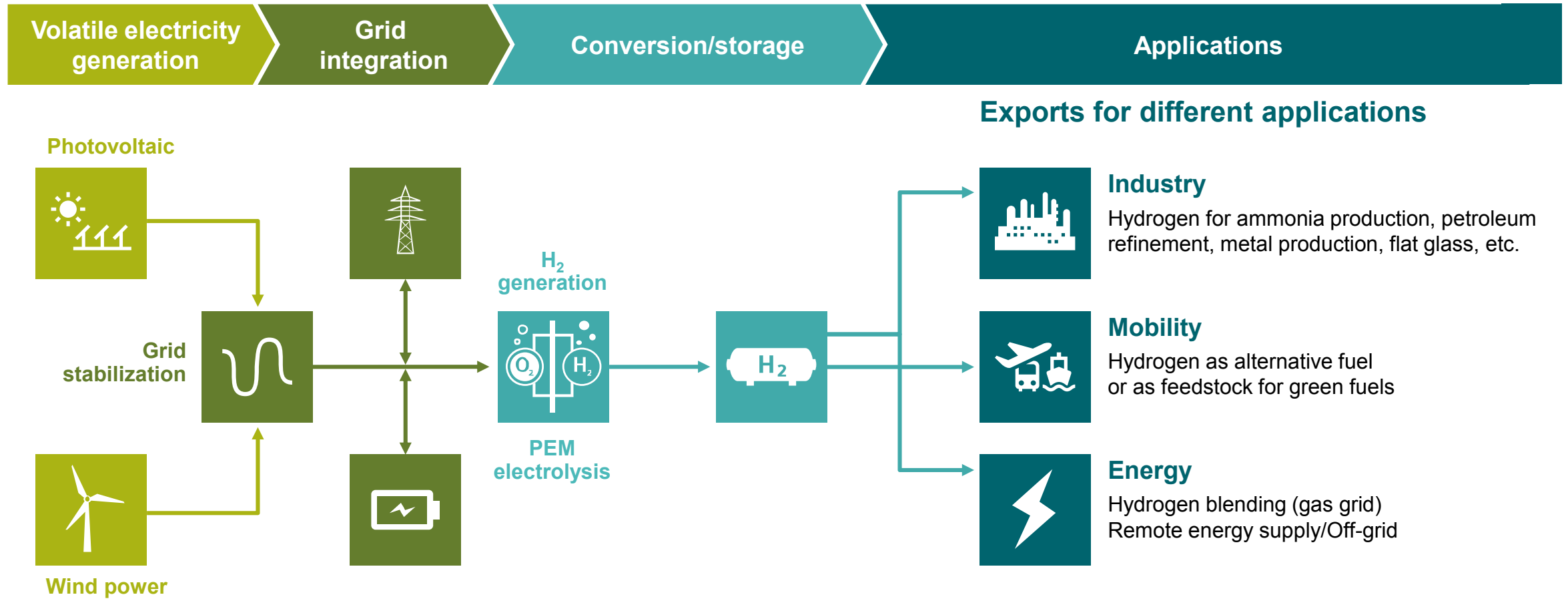
Source: German Power Network Development Plan, IFHT RWTH Aachen

Flexibility is key in the future electricity system



**Growing investments needs in flexibility solutions
challenges the current kwh-based electricity market design**

Electrification will drive sectoral integration – Example Power-to-X electrolysis



Regulatory frameworks need to be fit for green hydrogen and enable sectoral integration