



Hybrid Energy System for Sector Coupling

Enabling gas and electricity synergies

Stephan Kamphues, ENTSOG President

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What is sector coupling?

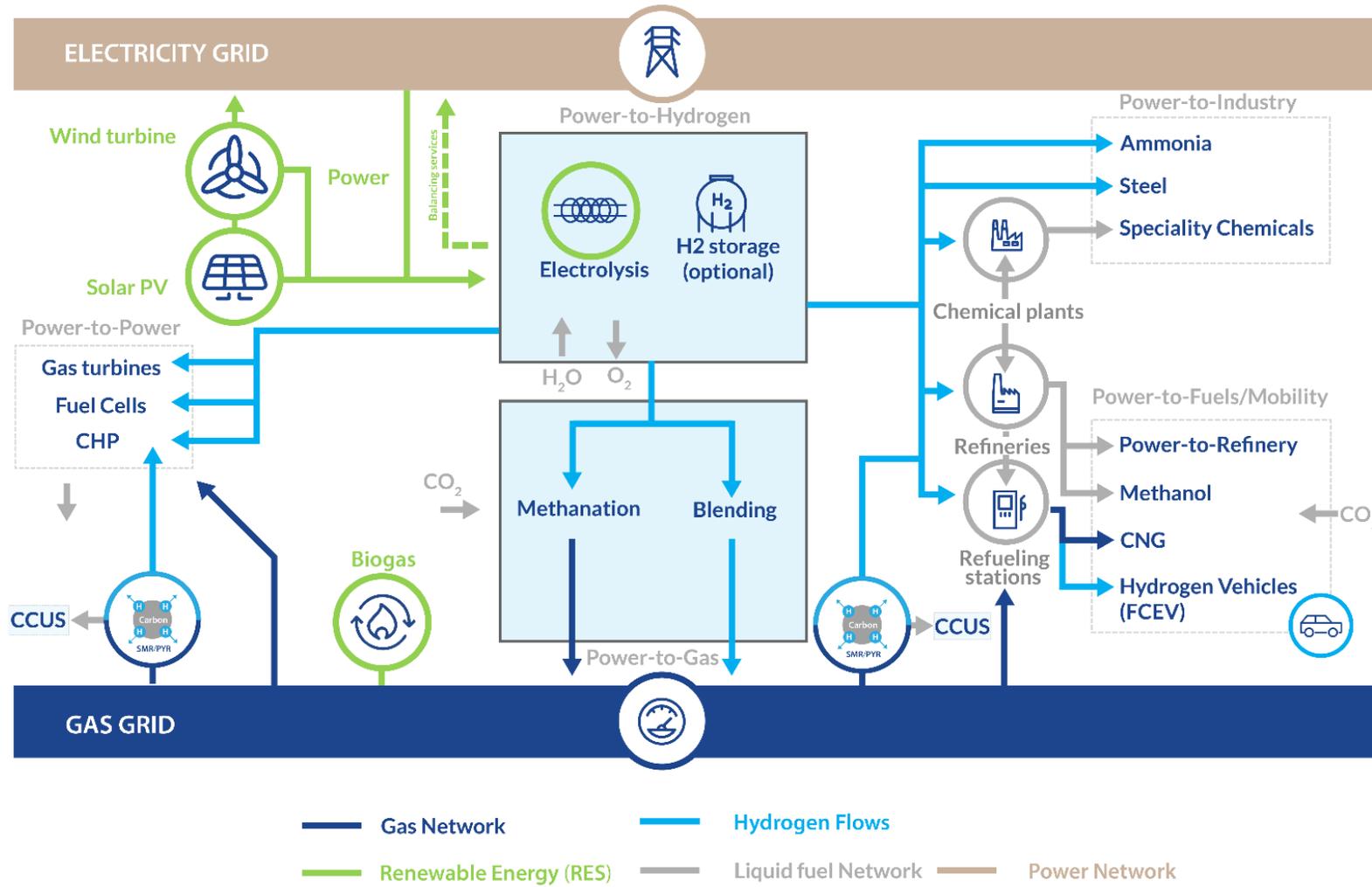
Technical View

- > Optimising development and planning of infrastructure and technology deployment across electricity and gas

Market View

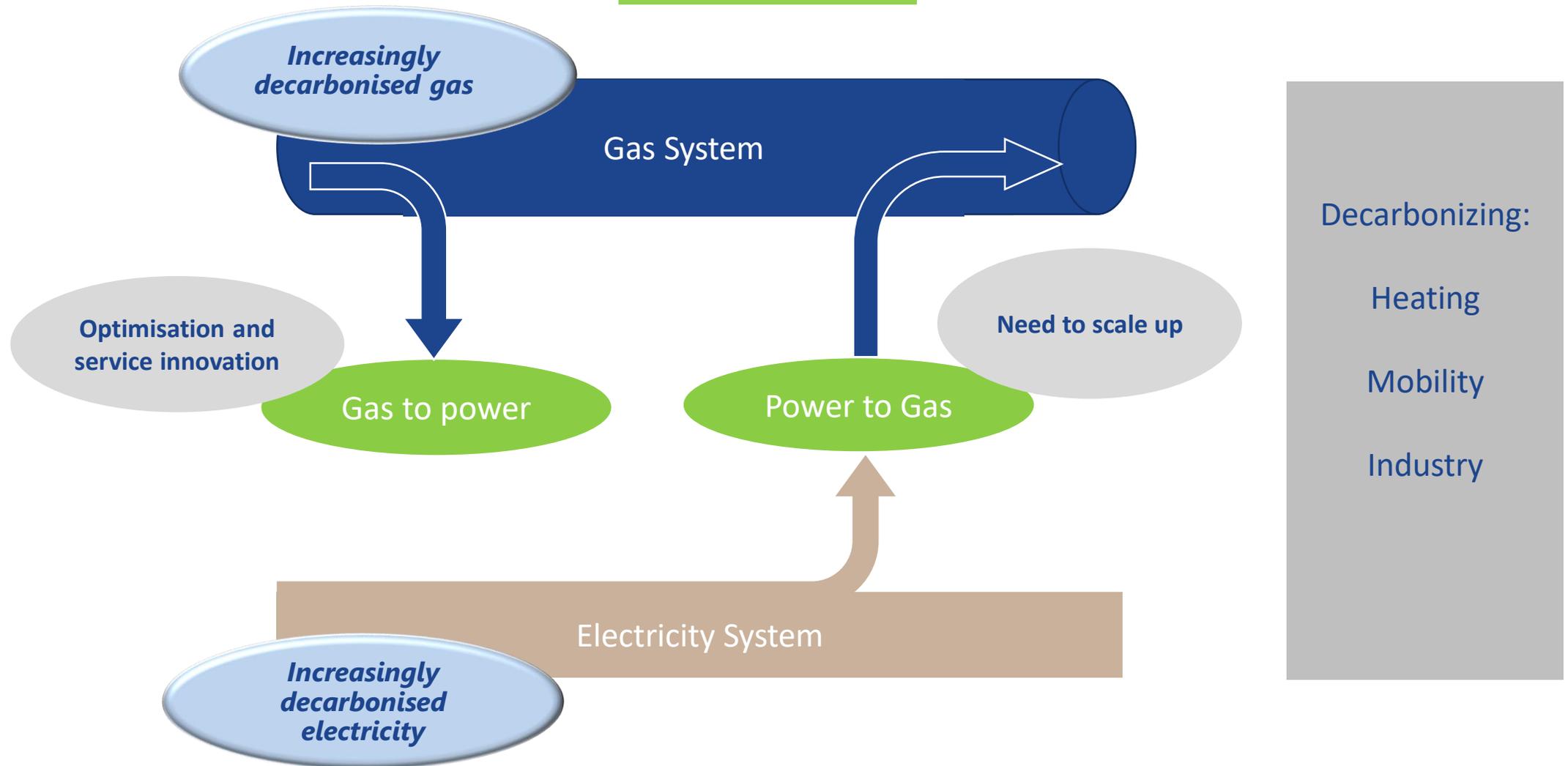
- > Combining strengths in solving structural problems of one sector by another (balancing and flexibility)

Hybrid Energy System



ENTSOG believes that for the future we need a Hybrid Energy System building on increasingly decarbonized electricity and gas.

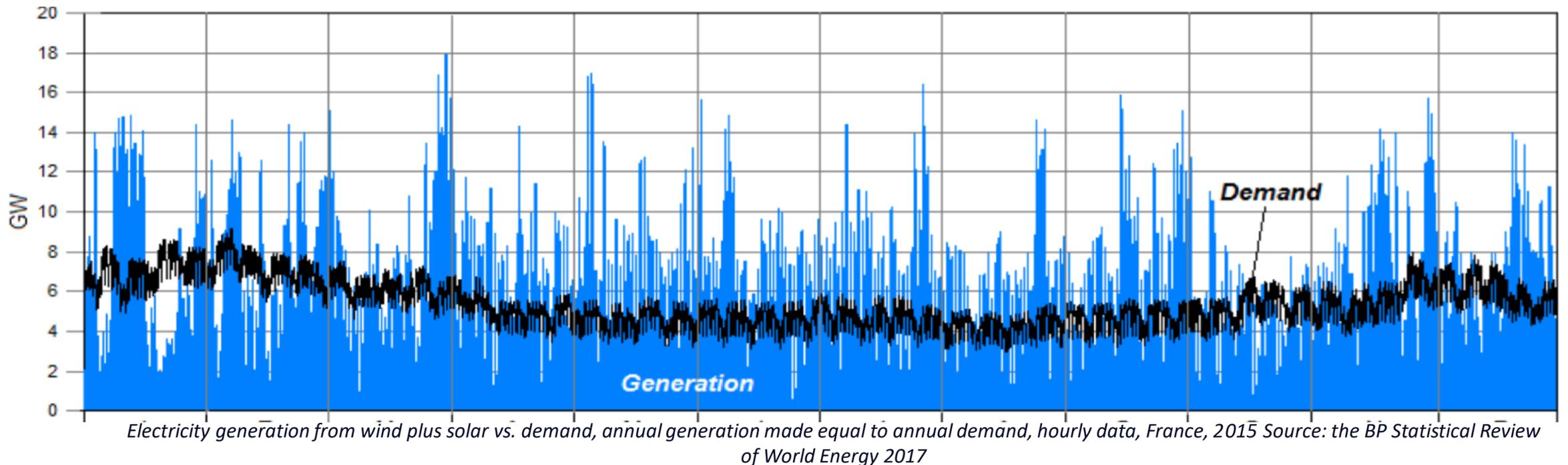
Hybrid Energy System for economy



Sector coupling offers strategies to maximize integration of renewables for heating, mobility and industry and needs to start now

Building on synergies – grids example

Apply power-to-gas to manage excess of electricity generation to balance the energy system, producing renewable hydrogen that can be stored or utilized in the gas system



P2G is flexible and builds on storage and line pack capacities of gas grids.

Offers systematic market solutions that are predicable even more than Power-to-heat or Power-to ammonia

What gas and electricity context?

Needs on the electricity side:

Large distance transportation of bulk energy

Long term seasonal energy storage for managing big weather patterns

Peak shaving and intermittency management in daily



Solutions on the gas side:

EU28 Cross-border flow per hour:

Gas: 3315 TWh

Electricity: 0.456 TWh

Source: ENTSOG & ENTSOE Transparency Platform, 2017

EU28 Storage capacity:

Gas: 1130 TWh

Electricity: 0.0016 TWh

Source: TYNDP, 2018 & EASE, Delta-ee 2018

20% of electricity in the EU is generated from gas

What share of gas (renewable hydrogen) can be generated from electricity to help decarbonize the economy?

Sector coupling with molecules - system perspective 1/2

RES progress
on electricity
and gas side

**Facilitate
the large-scale
integration
of renewables**

**Enabling grid
balancing: G2P
and P2G**

Power
capacity



R&D on all
technologies
contributing to
decarbonisation

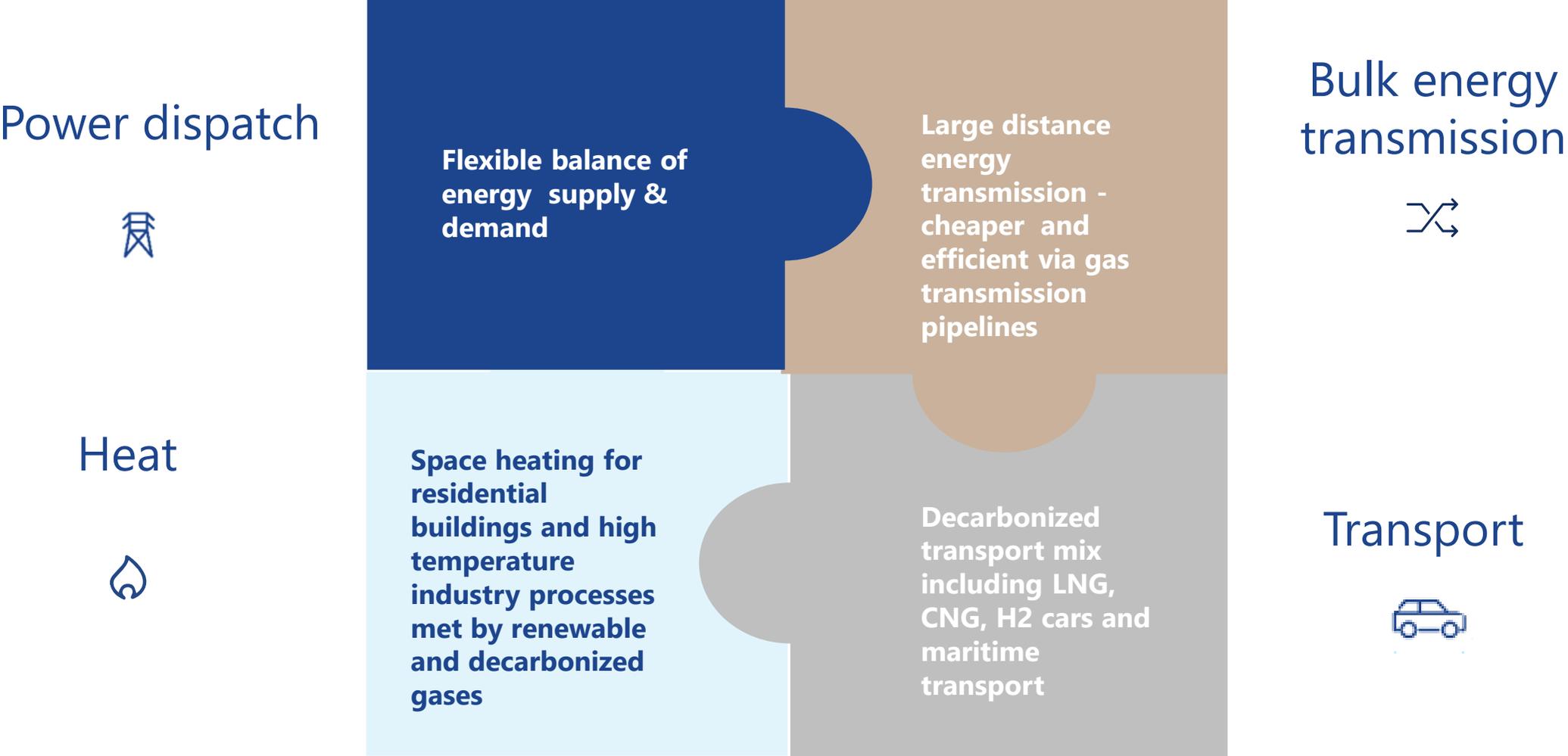
**Decarbonisation
of natural gas
through P2G and
innovative
technologies**

**Enabling
seasonal
storage**

Power
dispatch

Sector coupling binds power and gas systems to integrate RES in the energy sector maximizing efficiency and value

Sector coupling with molecules – economic gains 2/2



Sector coupling brings market & customer benefits as gas is cheaper to transport and store



Framework for sector coupling needed for all decarbonization options

- building on Hybrid Energy System



“The combined generating capacity of offshore wind farms could reach around 100 GW by the year 2030 and the PV capacity installed is expected to increase to almost 60 GW in 2020. Using power-to-gas technology could help to accommodate these quantities of renewable electricity”

DG Energy



Thank you for your attention

Stephan Kamphues, ENTSOG President

ENTSOG -- European Network of Transmission System Operators for Gas,
Avenue de Cortenbergh 100, B-1000 Brussels

www.entsog.eu | info@entsog.eu