THE ROLE OF GAS
IN AN INCREASINGLY ELECTRIFIED WORLD
-
EURELECTRIC VISION

FSR Policy workshop
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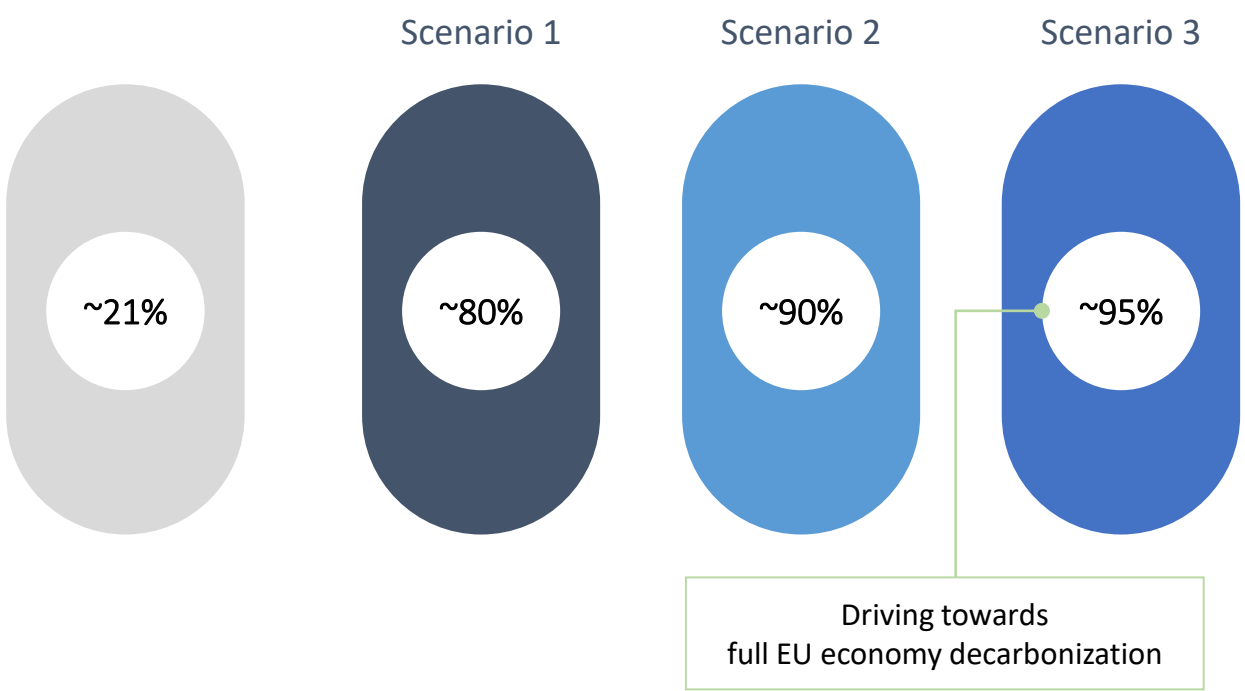
Eurelectric Electrification & Decarbonisation Study – 3 pathways

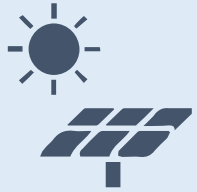
2015 - Baseline | 2050 scenarios

EU economy decarbonization achieved vs. 1990[1]



[1] Emissions out of scope are expected to contribute proportionally to the decarbonization effort required in each scenario

By 2045 we envision a carbon neutral power sector that makes a significant contribution to decarbonization of the EU economy



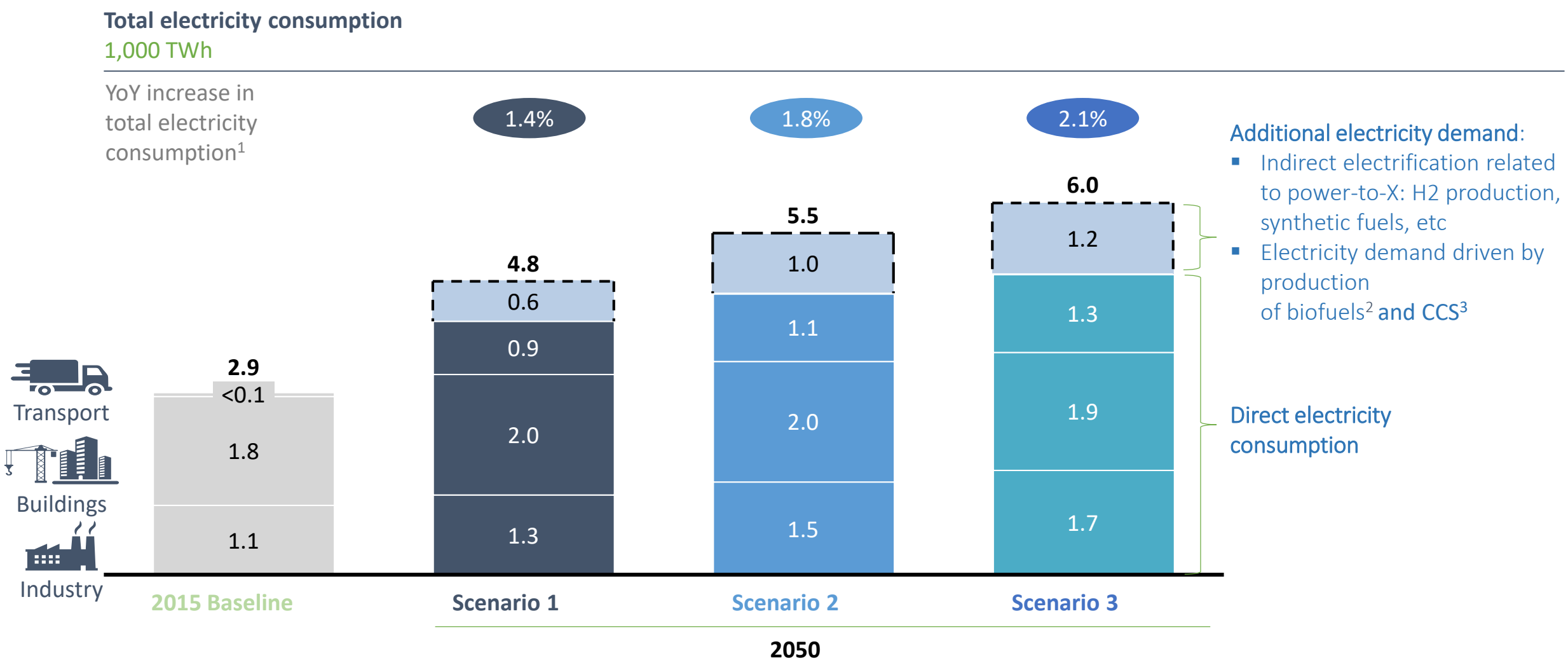
High penetration of renewables will be the main driving force of the European energy transition. Renewables will represent >80% of electricity supply driven by large potential and declining costs

System reliability and flexibility needs provided by multiple sources in the power sector and from other sectors. These include hydro, nuclear power and gas, and emerging sources deployed at scale such as demand side response, battery storage, hydrogen electrolysis and power-to-X

Changing role of fossil generation. Fossil electricity supply will be gradually phased out and represent only ~5% of total supply by 2045. However, gas will still represent ~15% of total installed capacity to contribute to system reliability and flexibility, especially in regions that don't have access to hydro or nuclear

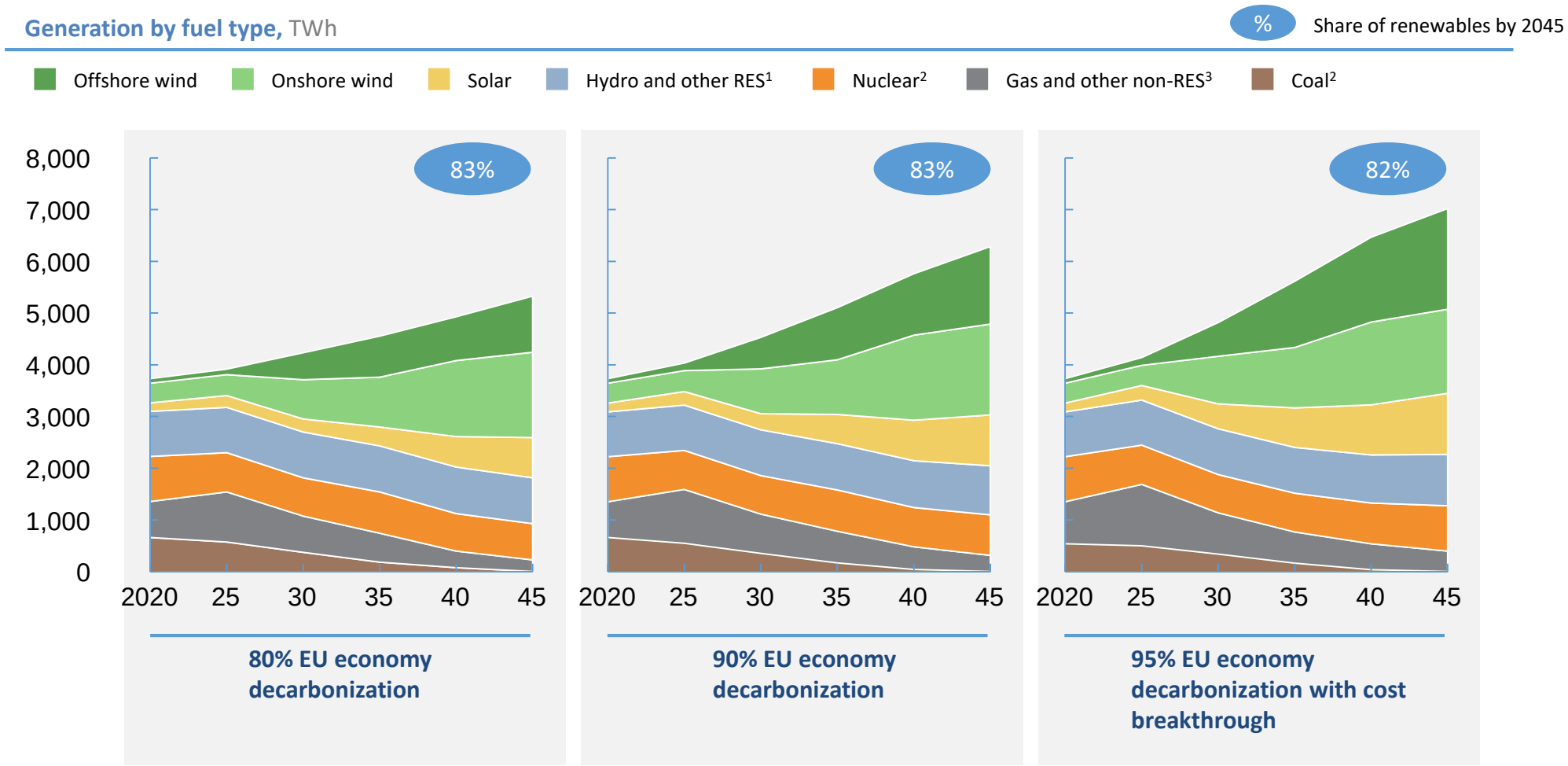
Decreasing costs of carbon neutral technologies and innovation to abate the last tons of CO_2 emissions (*e.g.* CCS, negative emissions) coming from the marginal use of the remaining thermal capacity such as negative emissions and CCS technologies

Strong electricity uptake in all sectors, with a role for green gases



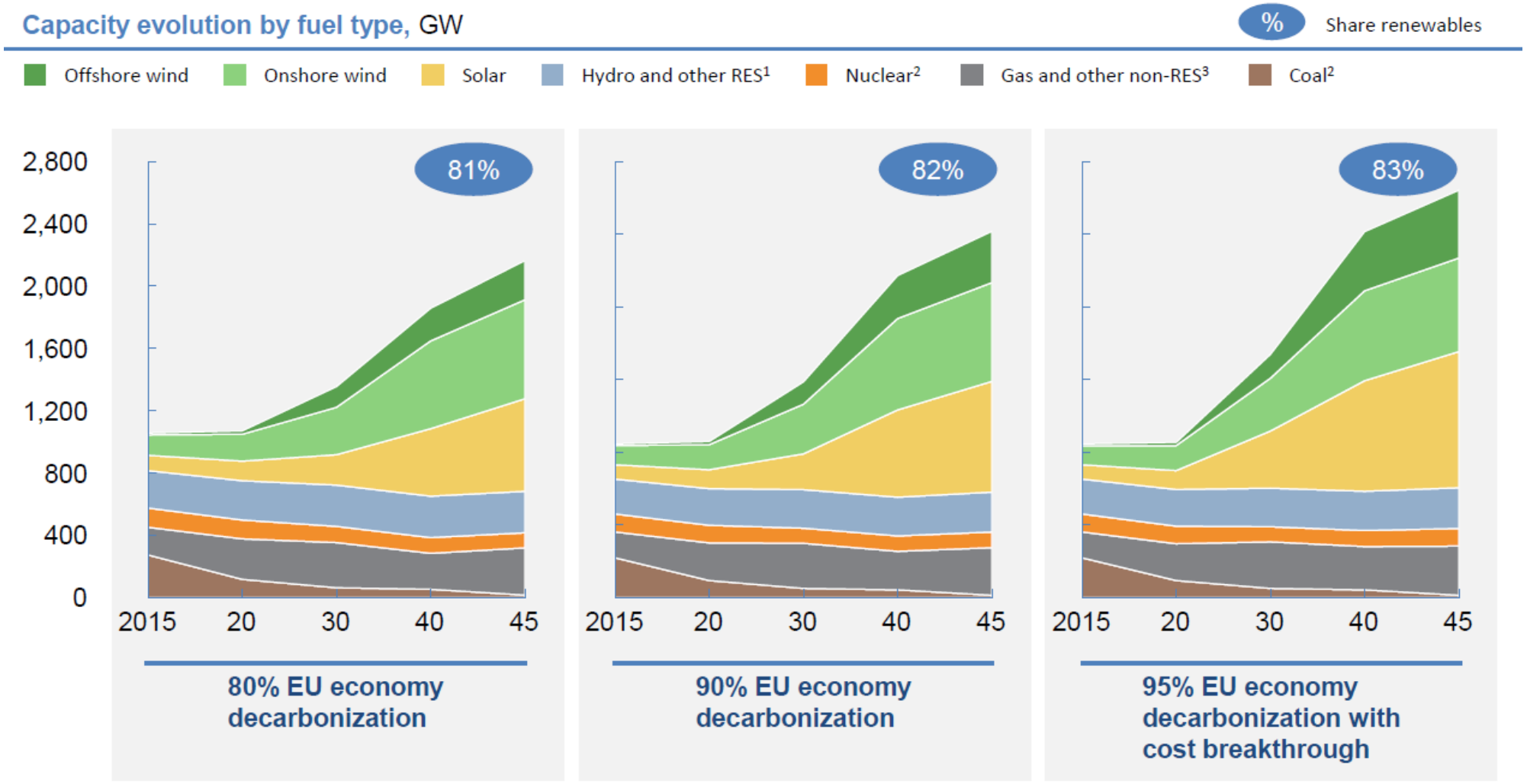
[1] Includes both direct and indirect electrification (power-to-X) as well as electricity demand driven by production of CCS and biofuels
[2] Biofuels require feedstock as well as additional energy (either in form of thermal energy or power) for their production – see glossary
[3] Total CO2 abated through CCS: <200 Mt Co2; CCS may require technology improvement as well as increasing acceptability, e.g., for underground storage

In the least-cost, carbon neutral electricity system the bulk of electricity is provided by renewables and nuclear…



[1] Includes also small amounts of geothermal, biomass and biogas
[2] National policies on nuclear and coal phase out have been reflected
[3] Up to 15% of gas capacity with CCS and other non-renewables

In terms of capacity, gas will still represent ~15% of installed capacity to contribute to system reliability, especially in regions without access to hydro or nuclear



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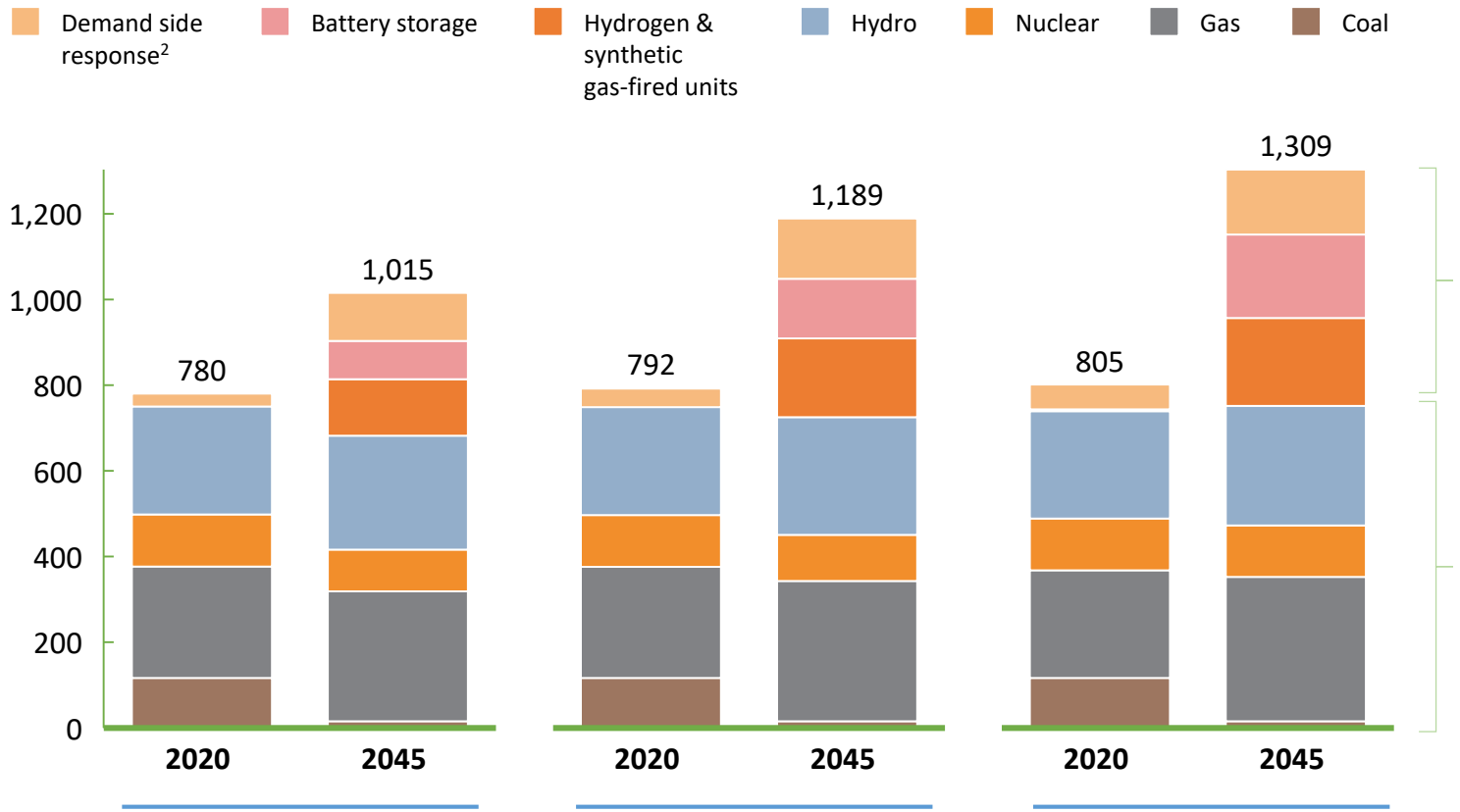
System flexibility is provided by several sources of dispatchable resources serving as a back-up for days with low renewable generation

Dispatchable resources[1], GW



New sources of flexibility

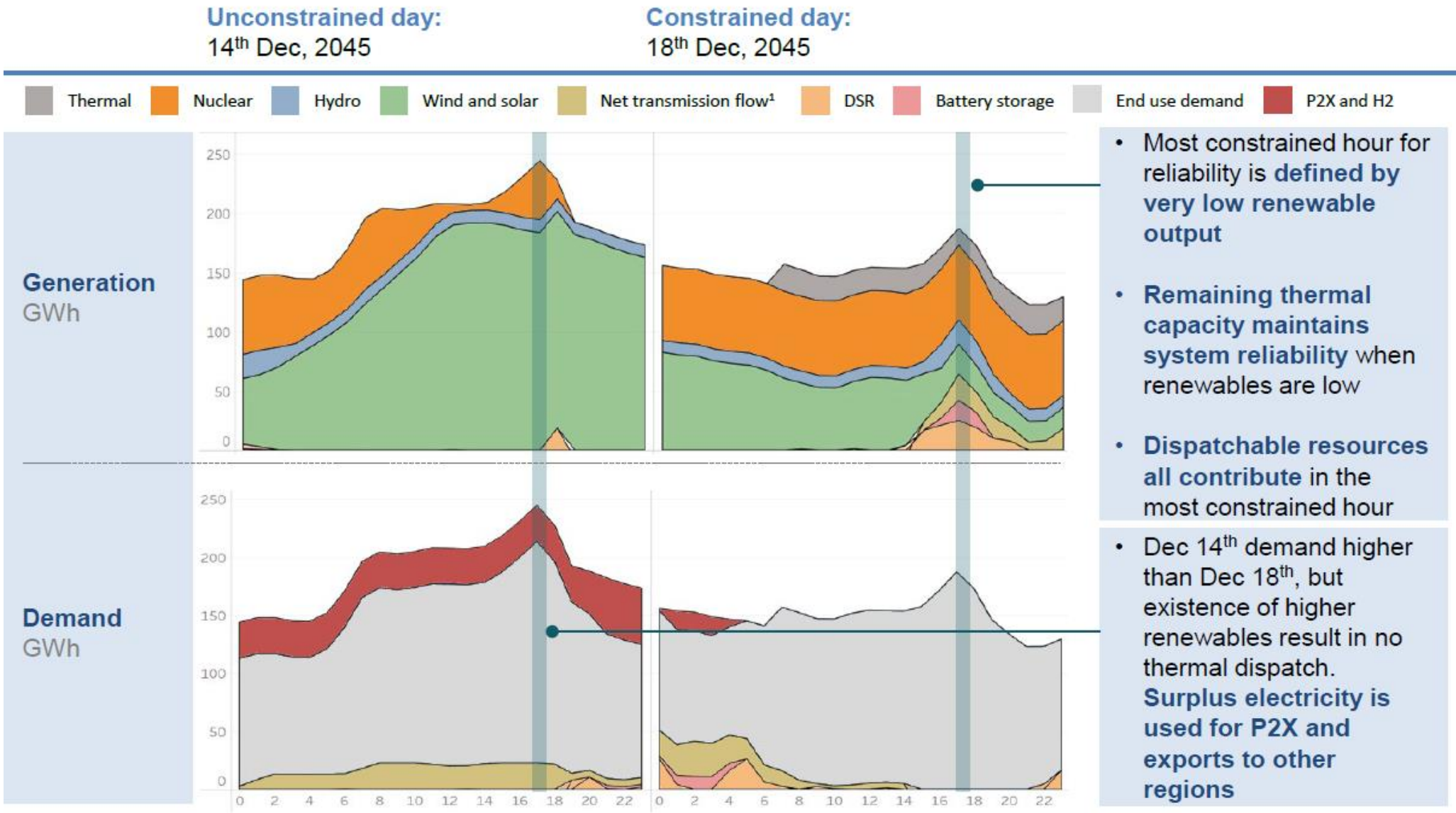
- Enable better utilization of other generators
- Significant increase in capacity expected

Traditional sources of flexibility

- Similar capacity needed in a high renewables, higher demand system as today
- Provide electricity when renewables production is low and ability to leverage DSR has been exhausted
- Hydro plays a unique role and can improve the overall dispatch and system economics

[1] District heating that is coupled with power sector is not included in this analysis
[2] DSR flexibility is provided by hour to hour load shifting in transportation, buildings and heating

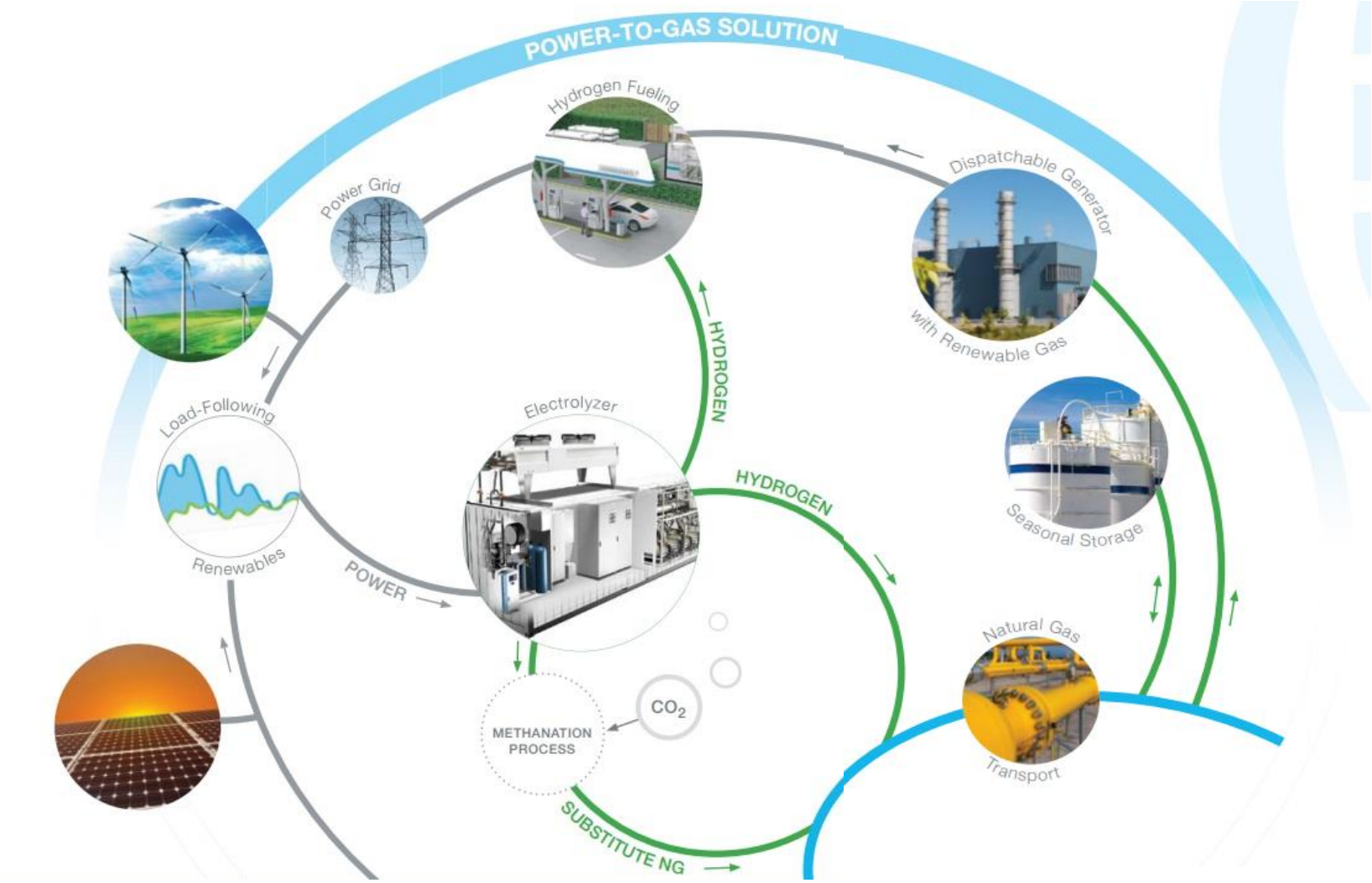
Example: power systems will use a variety of flexible resources (gas incl.) to match supply and demand when renewable production is low



[1] Imports/exports

As part of sector coupling, P2X & H_2 production will be key components driven by demand from various sectors and by need for flexibility

Existing gas pipeline infrastructure can be repurposed for power to gas and hydrogen transport and storage




Thank you