

OUTLOOK

OF SYSTEM NEEDS AND FUTURE TRANSFORMATION

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CEO, DNV GL - Energy

Grids meet Renewables
Conference and Best Practice Fair
20 February
The Egg, Bara Street 175, 1070 Brussels

Wind*
EUROPE
Renewables
Grid Initiative

Our vision: global impact for a safe and sustainable future

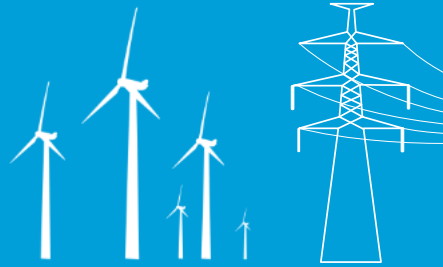
MARITIME



OIL & GAS



ENERGY



BUSINESS ASSURANCE



DIGITAL SOLUTIONS



TECHNOLOGY & RESEARCH



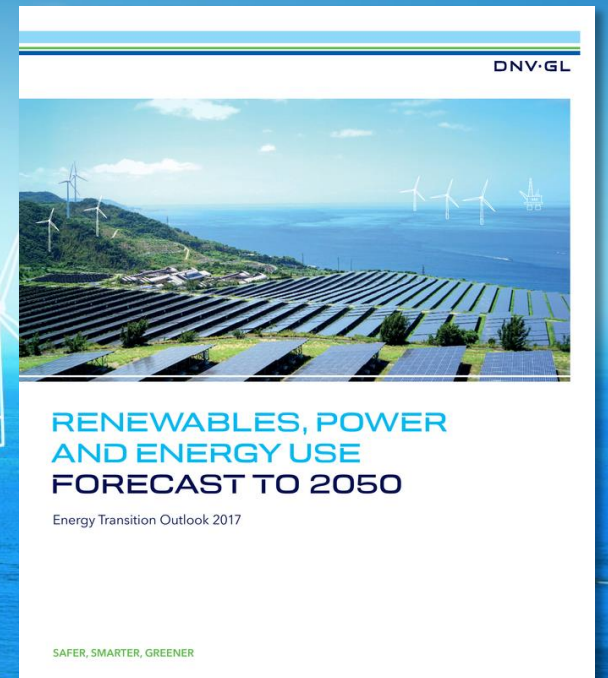
Taking a broader view – enabling safer, smarter and greener performance



- We **classify, certify, verify and test** against regulatory requirements, standards and recommended practices
- We develop new **rules, standards and recommended practices**
- We **qualify new technologies** and operational concepts
- We give **expert advice** on safety, technology, data management, efficiency, performance, risk management

ENERGY TRANSITION OUTLOOK 2017

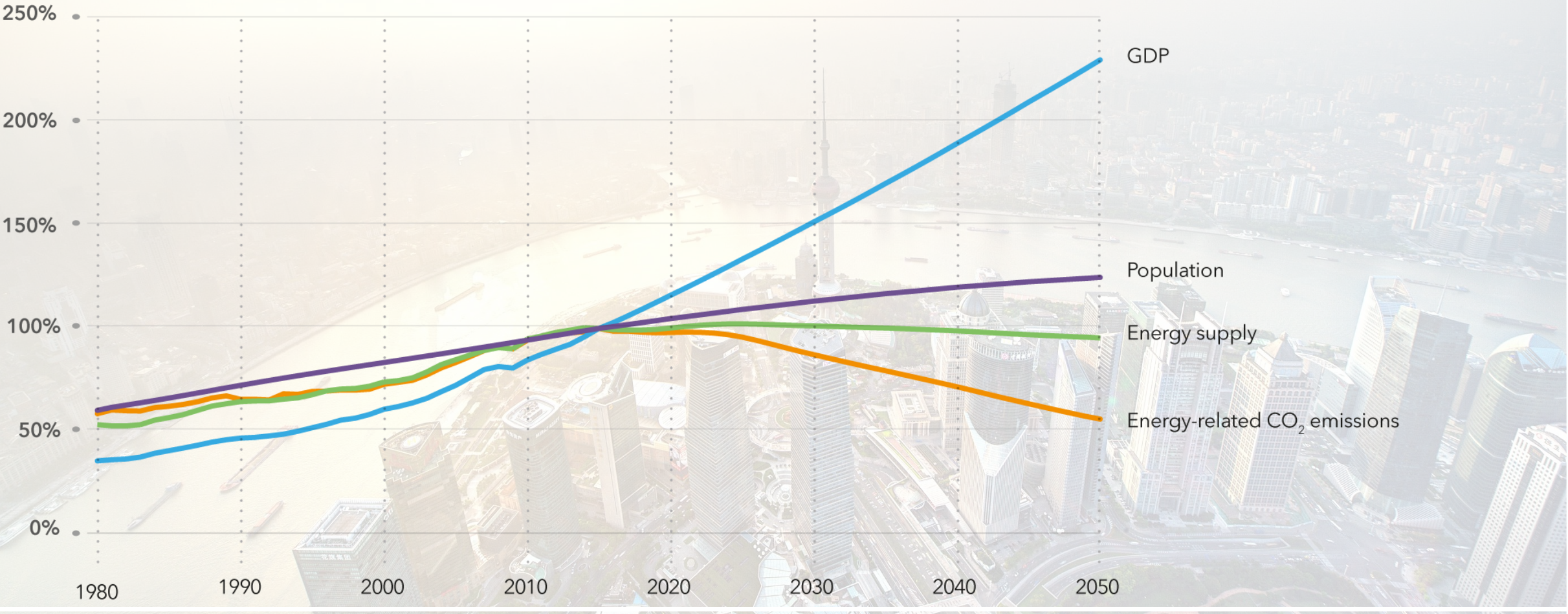
**INSIGHTS AND IMPACT
FOR THE EUROPEAN ENERGY SECTOR**



$E > GDP$

Economic growth vs. energy efficiency growth

Units: Percentage of 2015 level

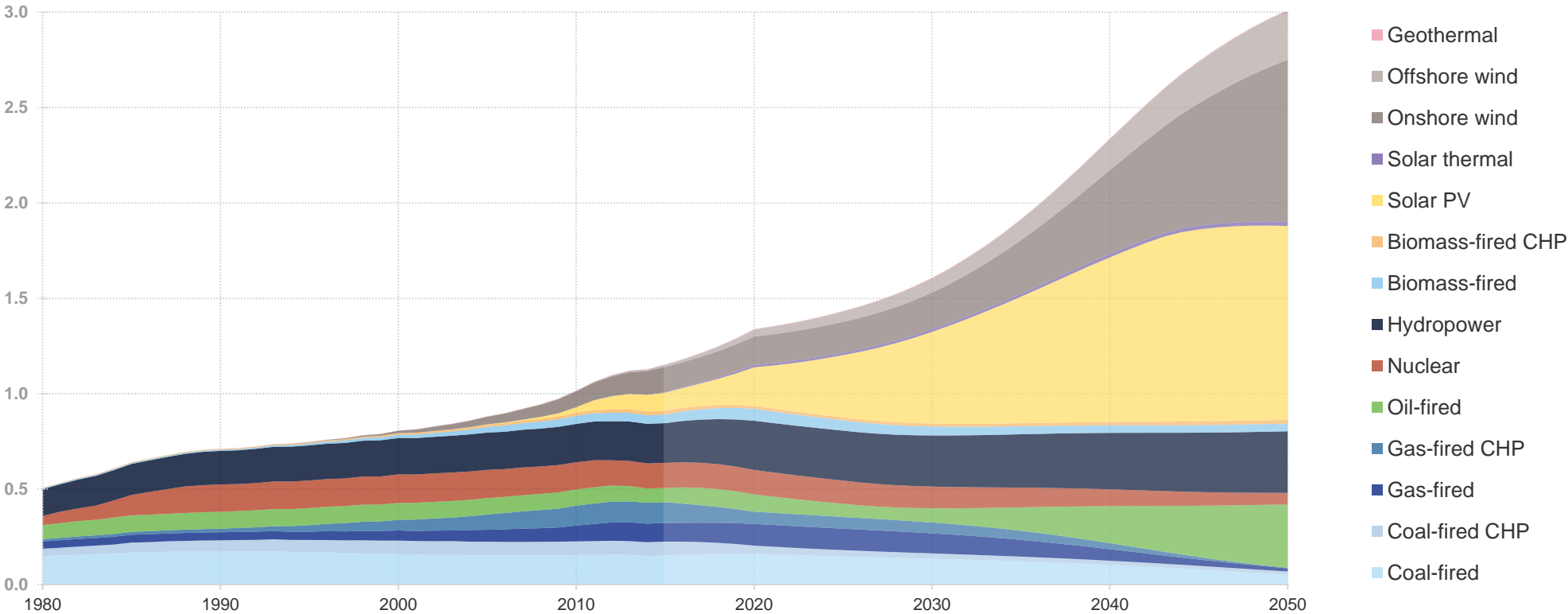


ETO shows accelerating growth rate in RES for EUR

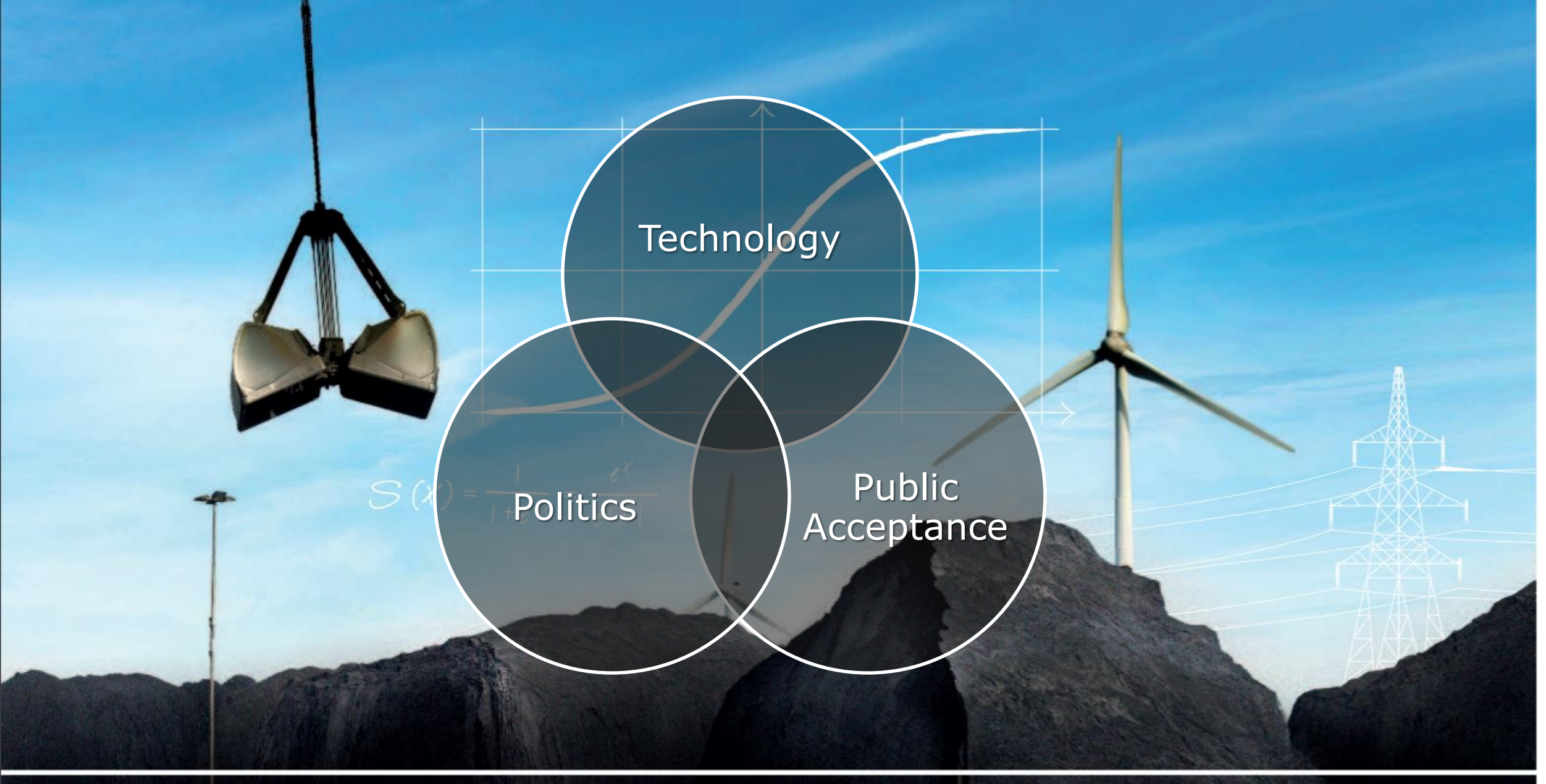
EUR ELECTRICITY CAPACITY BY ENERGY SOURCE

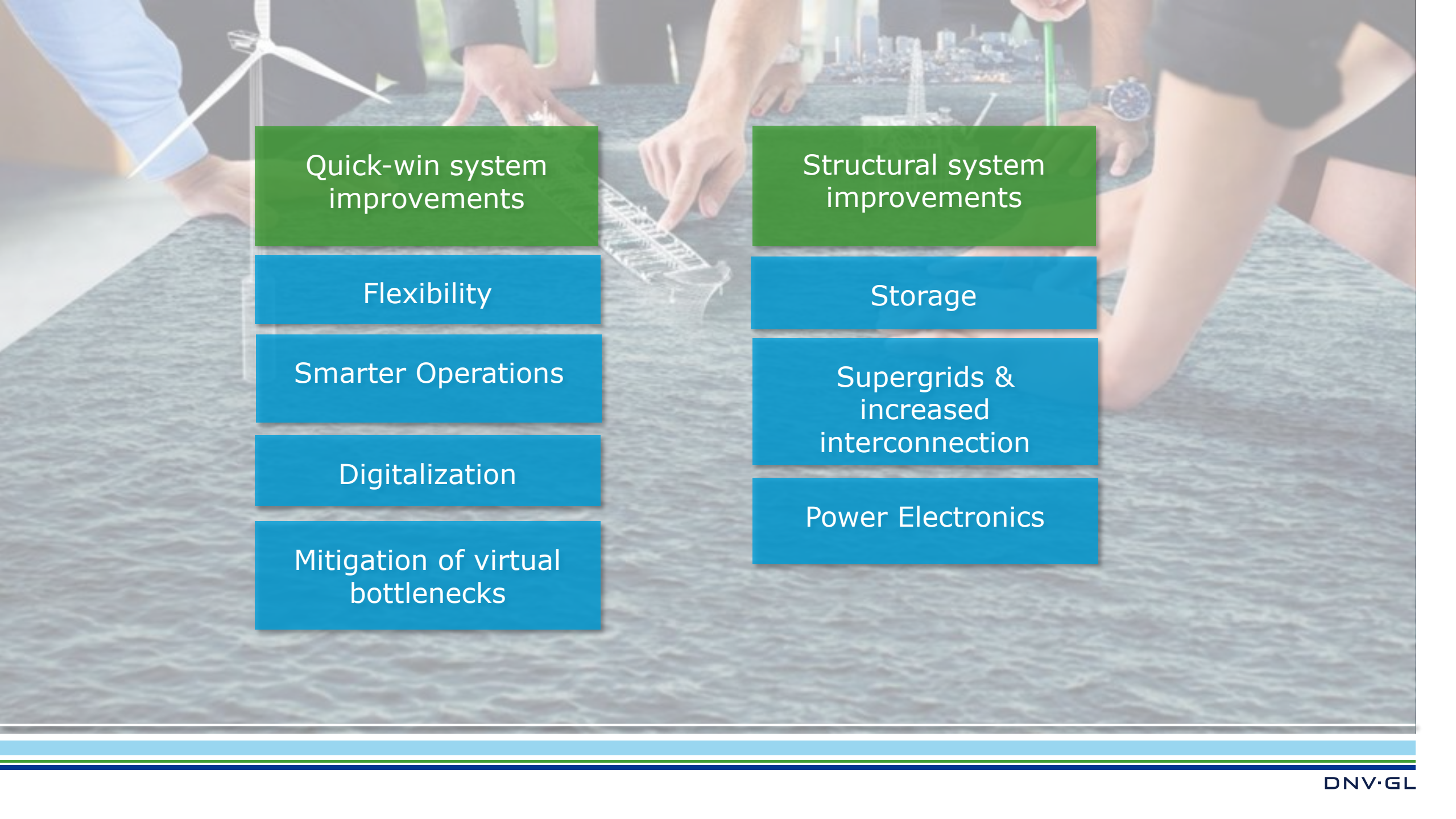
Units: TW

Energy source



“CAN THE EUROPEAN GRID CAPACITY
KEEP UP WITH THE ACCELERATING
GROWTH RATE IN RENEWABLE ENERGY
SOURCES?”





Quick-win system improvements

Flexibility

Smarter Operations

Digitalization

Mitigation of virtual bottlenecks

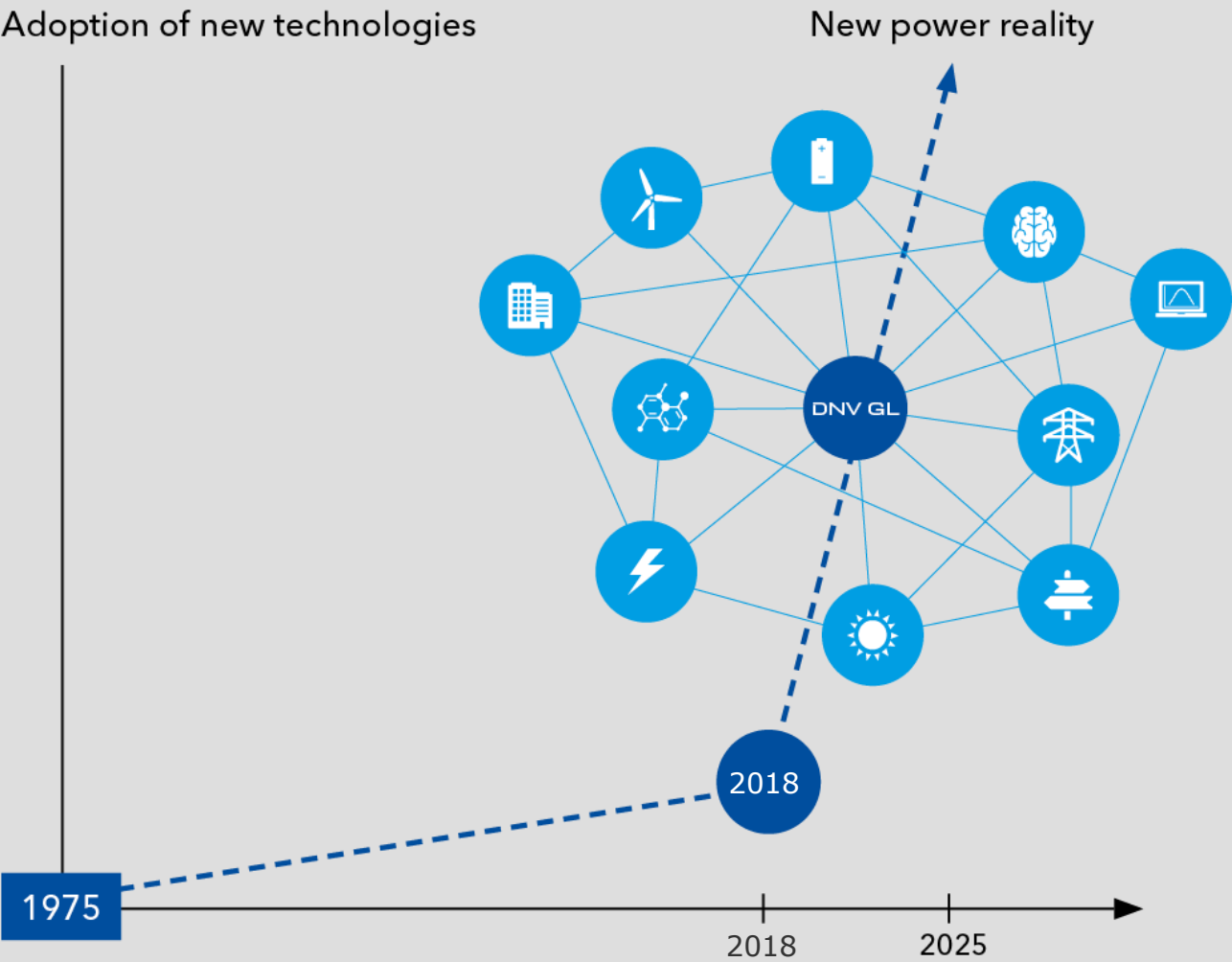
Structural system improvements

Storage

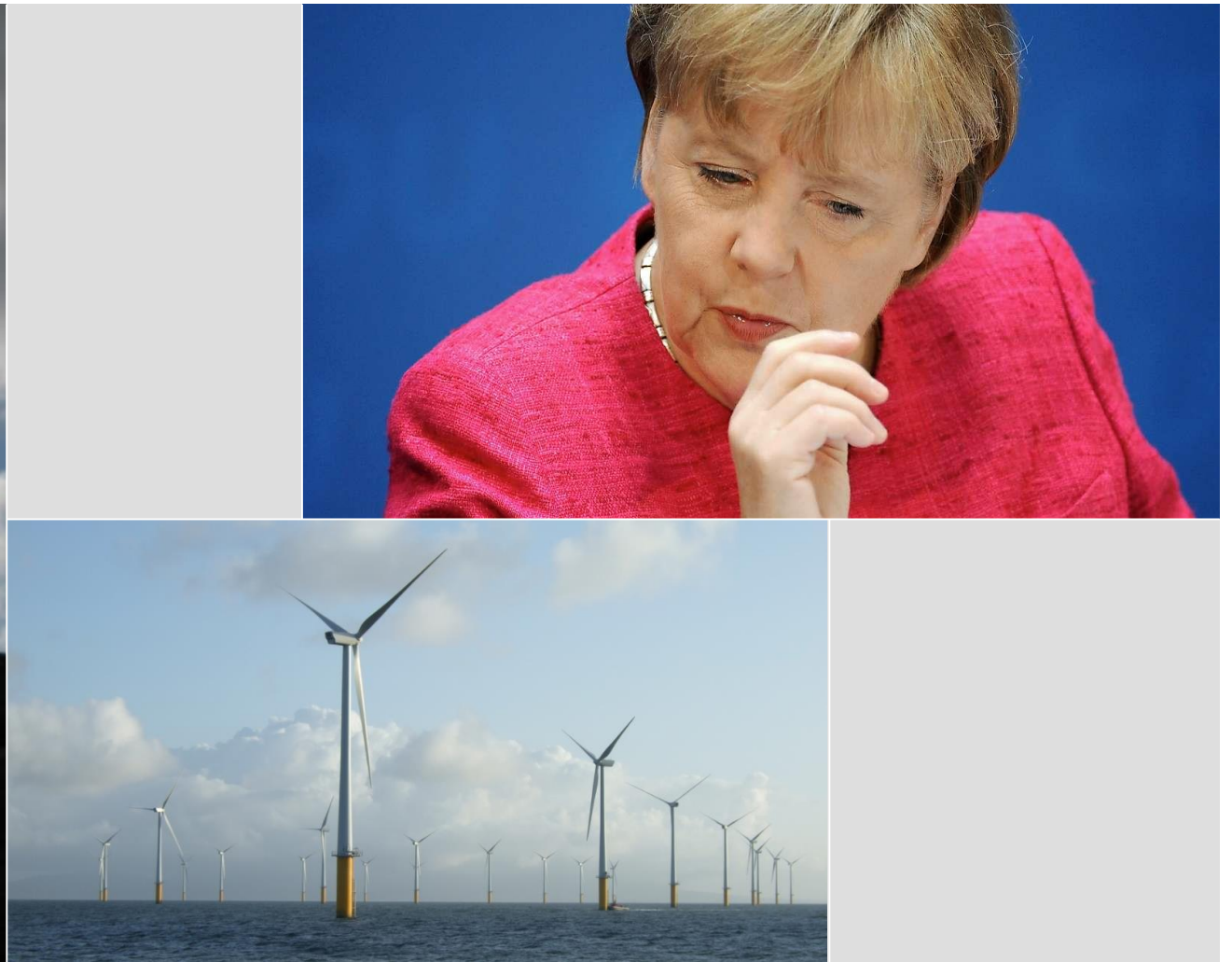
Supergrids & increased interconnection

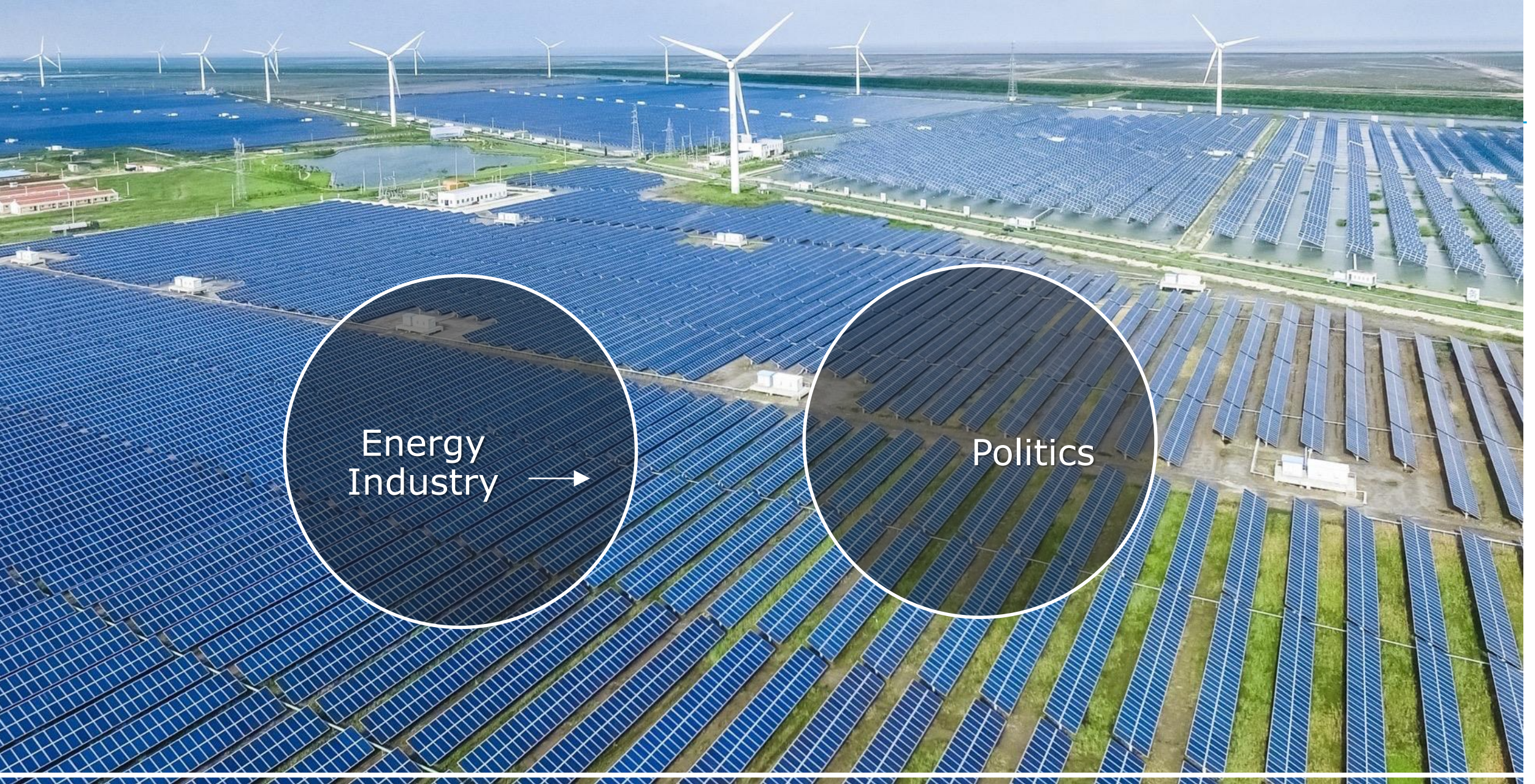
Power Electronics

Technology



Public acceptance





Wrap up

**SYSTEM
IMPROVEMENTS**



ACT



COLLABORATION

