

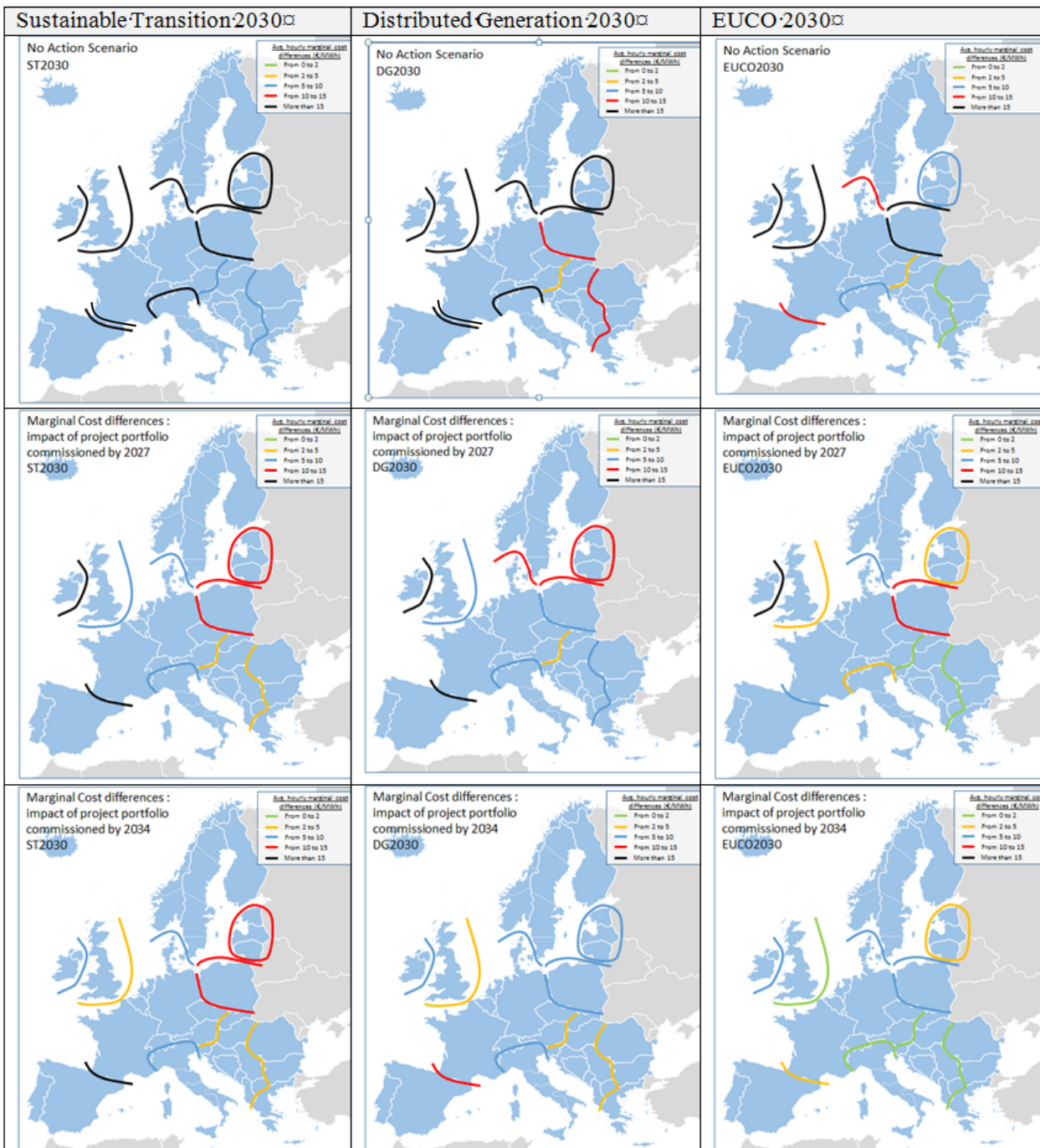
Grid investments for the energy transition

Jean-Baptiste Paquel, Long Term Planning Manager

Technologies for Global Energy Grid

What should the electricity grid look like in 2030 and 2040 to create maximum value for Europeans, ensure continuous access to electricity throughout Europe and deliver on the climatic agenda?

Impact of TYNDP projects on Price Differences per Boundary in 2030



No Action: only projects under construction are added to the existing grid

Avg. hourly marginal cost differences (€/MWh)

- █ From 0 to 2
- █ From 2 to 5
- █ From 5 to 10
- █ From 10 to 15
- █ More than 15
- █ More than 40

TYNDP projects planned by 2027

All TYNDP projects

Optimal grid 2040 compared to “no-action” delivers...



3 to 14 €/MWh
reduction in marginal costs
of electricity generation



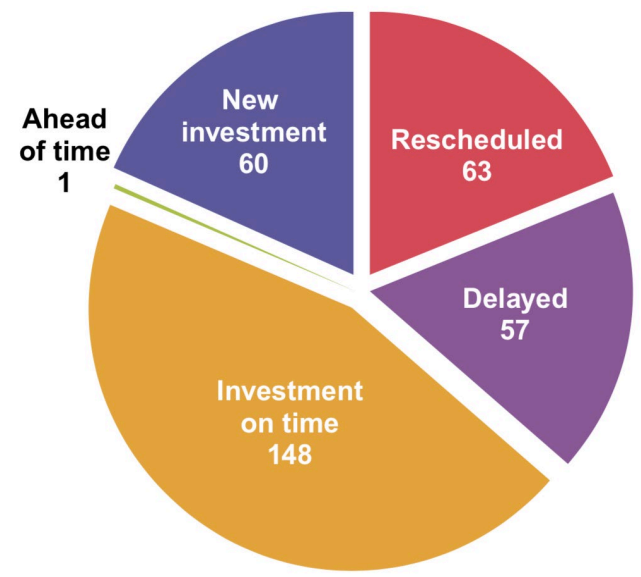
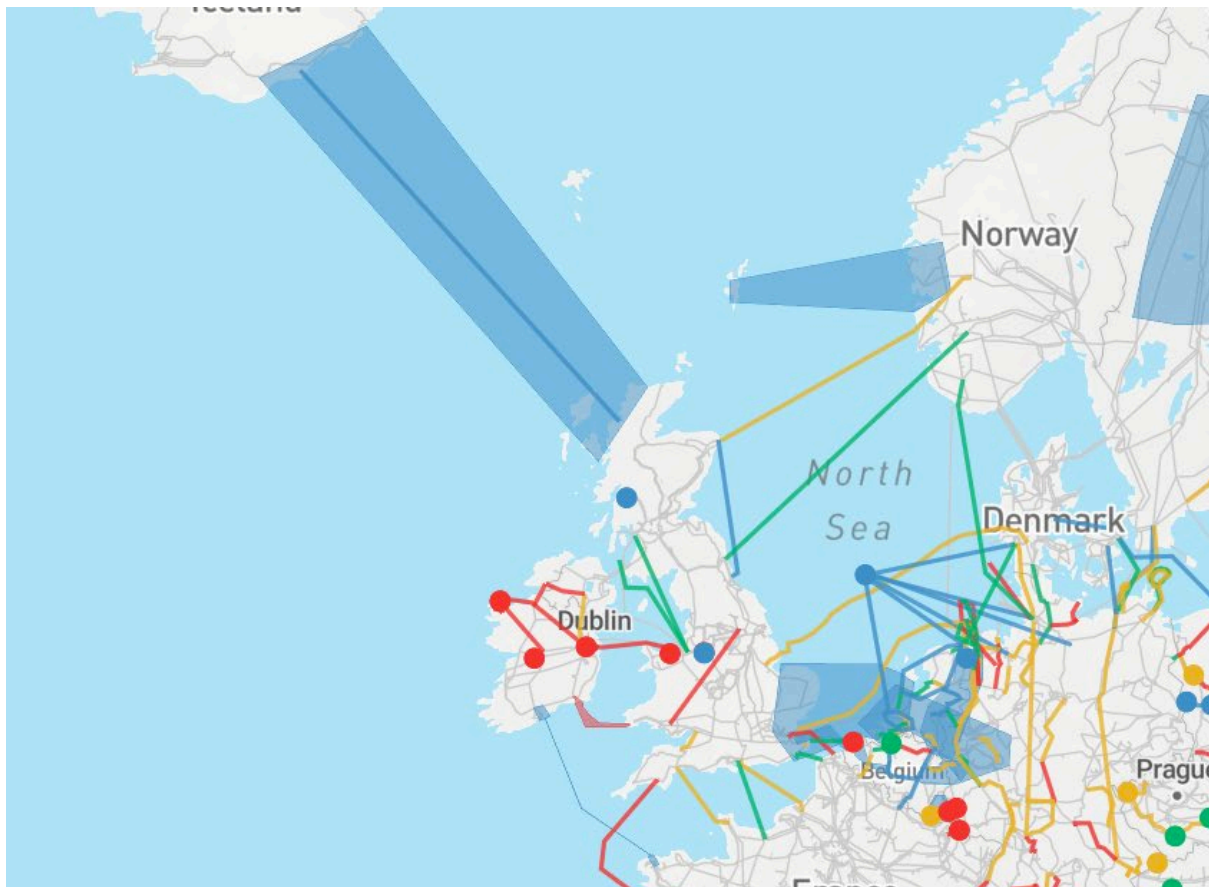
58 to 156 TWh
less curtailed renewable energy



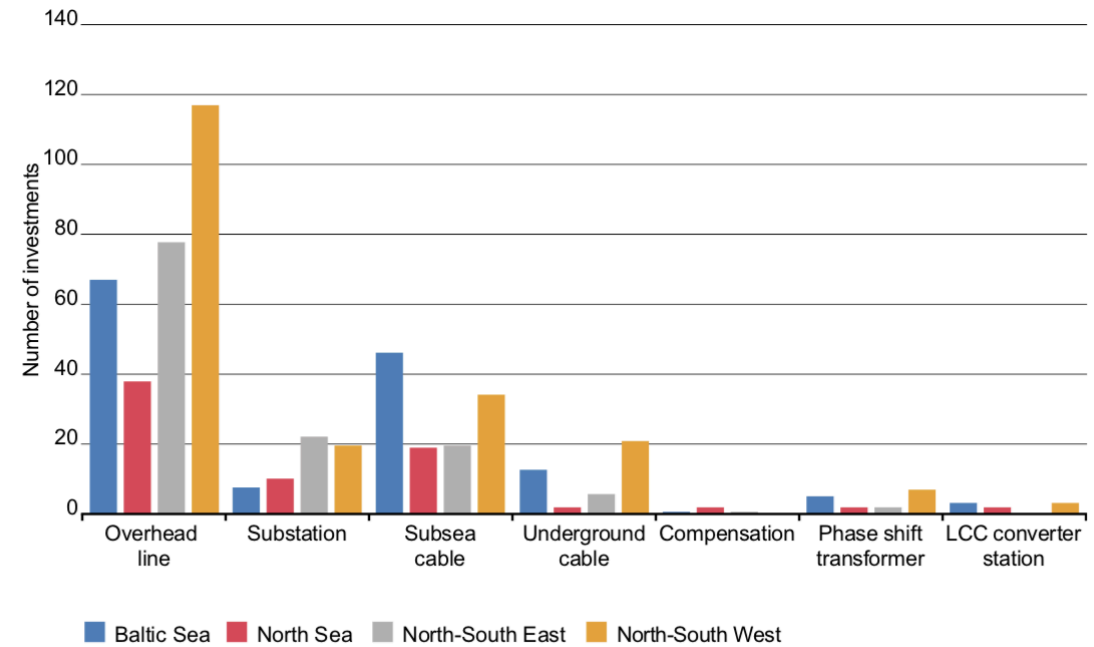
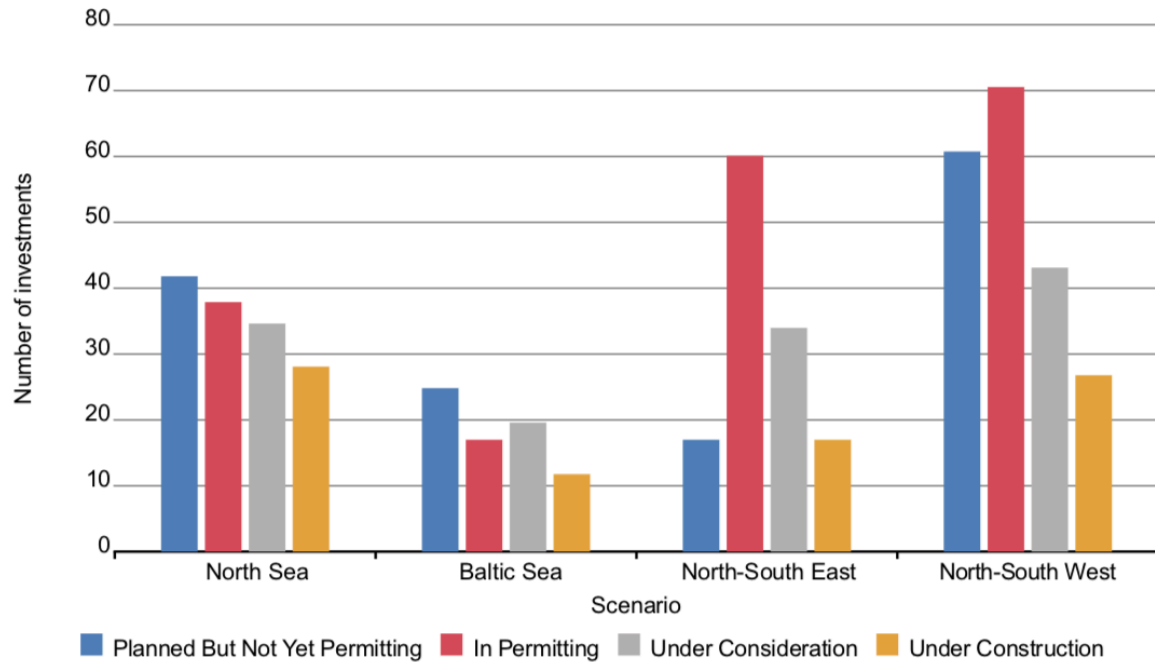
37 to 59 Mton
reduction in CO₂



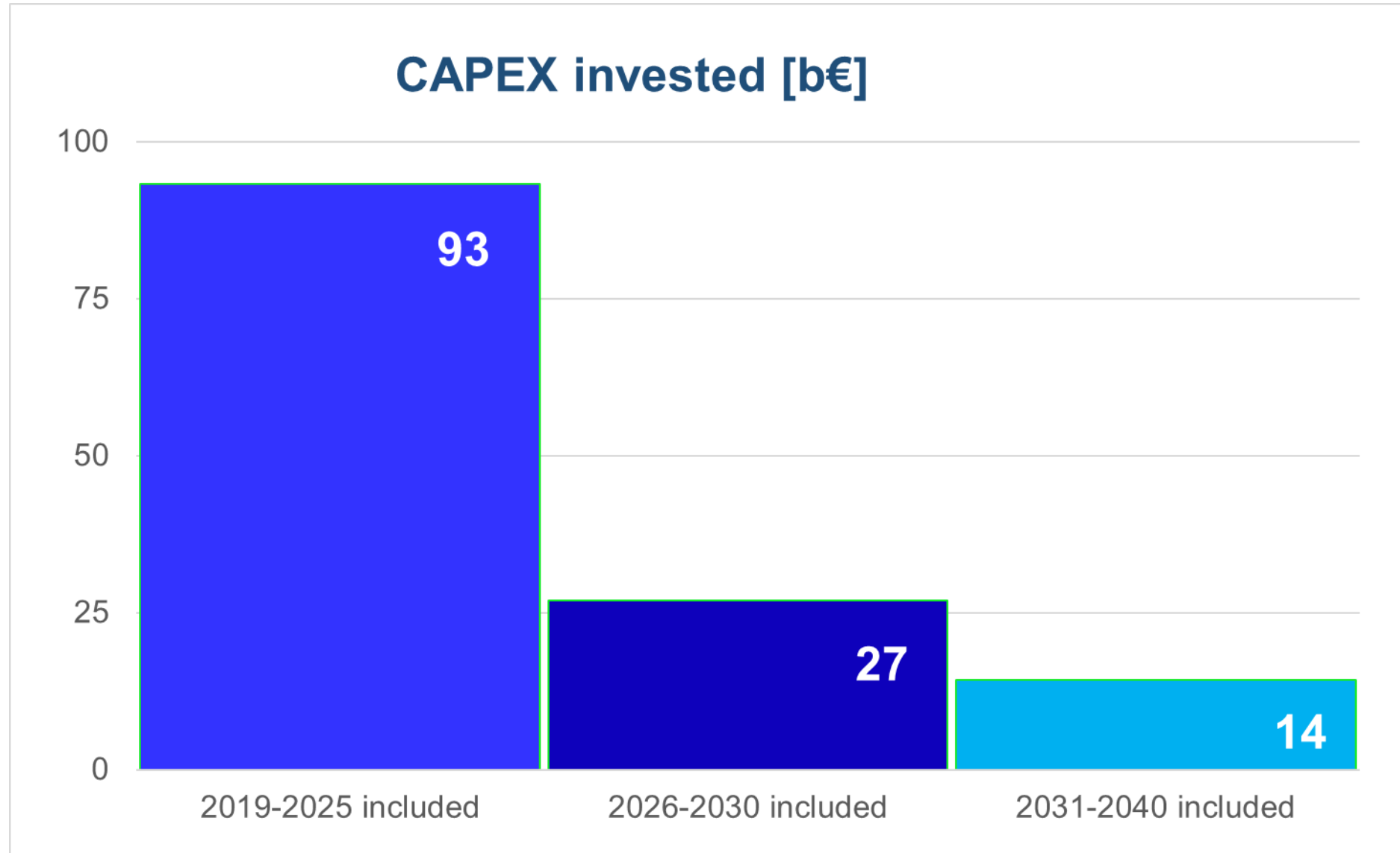
24 to 471 GWh
reduction in Energy Not Served



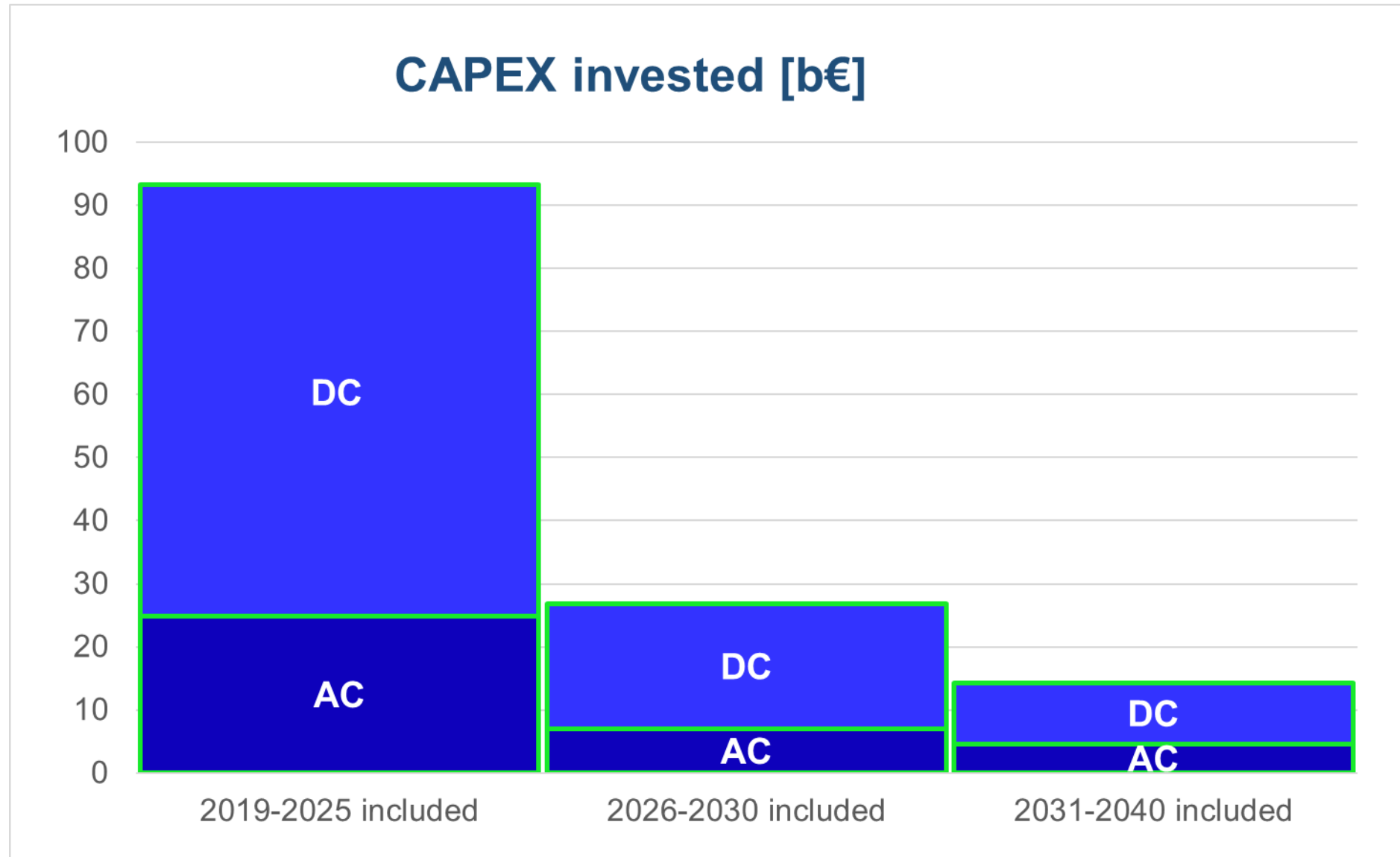
Investing for the energy transition: Investments in the TYNDP 2018



Overall investments in the grid



Overall investments in the grid: AC/DC

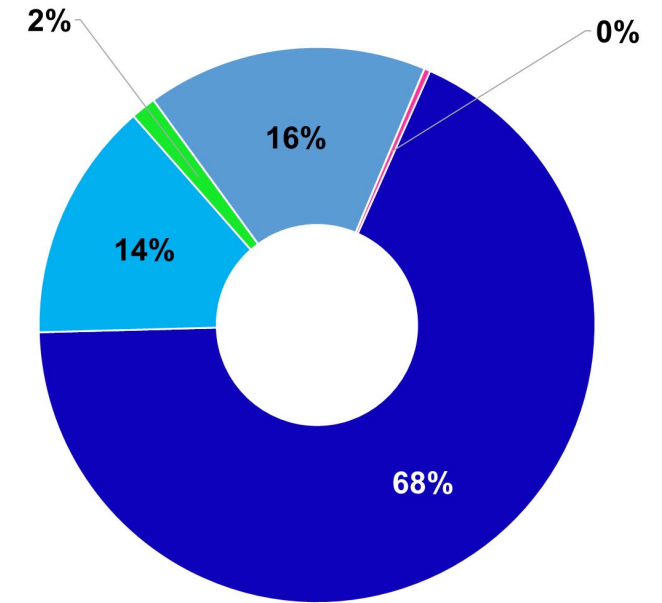
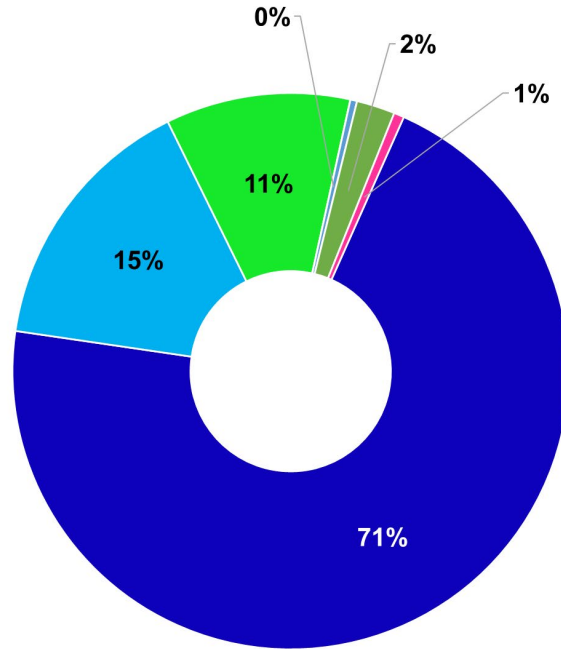
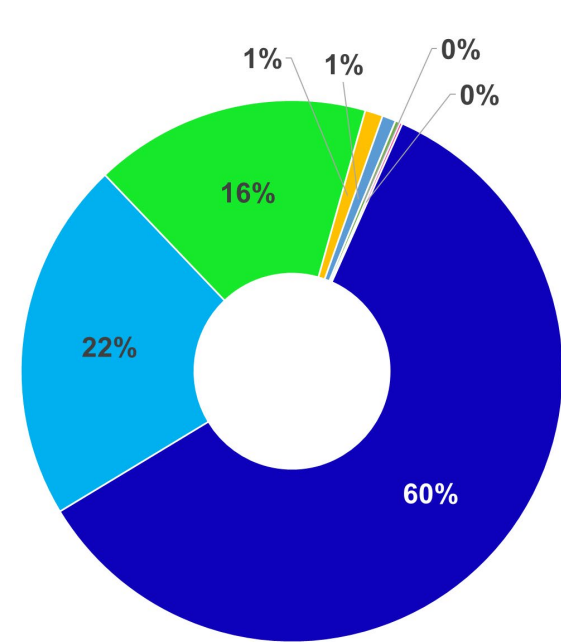


Overall investments in the grid: elements

CAPEX invested [%] : 2019 - 2025 included

CAPEX invested [%] : 2026 - 2030 include

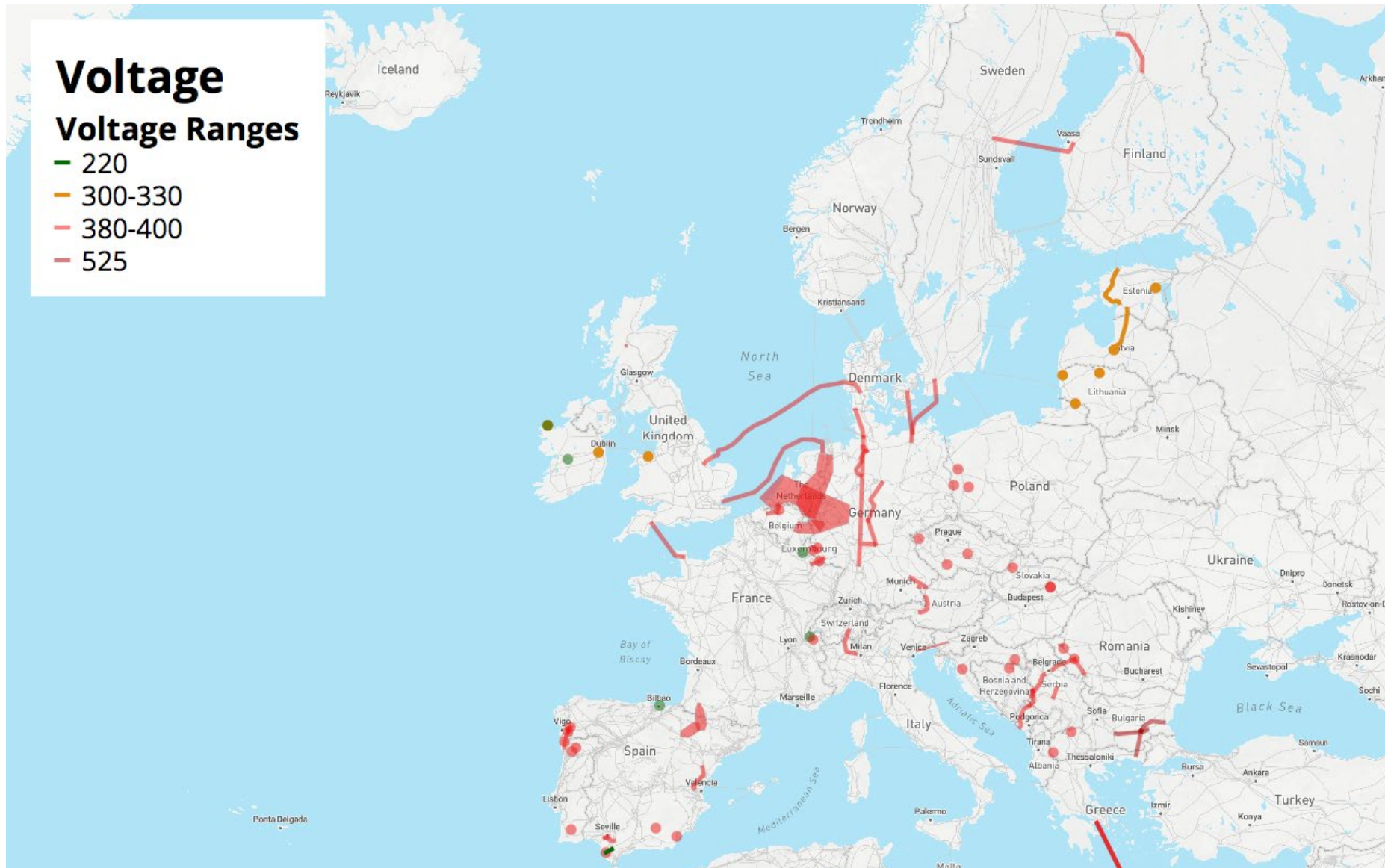
CAPEX invested [%] : 2031 - 2040 included



	2019-2025 included [b€]	2026-2030 included [b€]	2031-2040 included [b€]
Subsea Cable	56	19	10
Overhead Line	20	4	2
Underground Cable	15	3	0
LCC converter station	1	0	0
Substation	1	0	2
Compensation	0	1	0
Phase Shift Transformer	0	0	0

Background

Investments by Voltage Ranges



Investments till 2025

< 2025

Investments

- In Permitting
- Under Consideration
- Under Construction
- Planned but not yet permitting

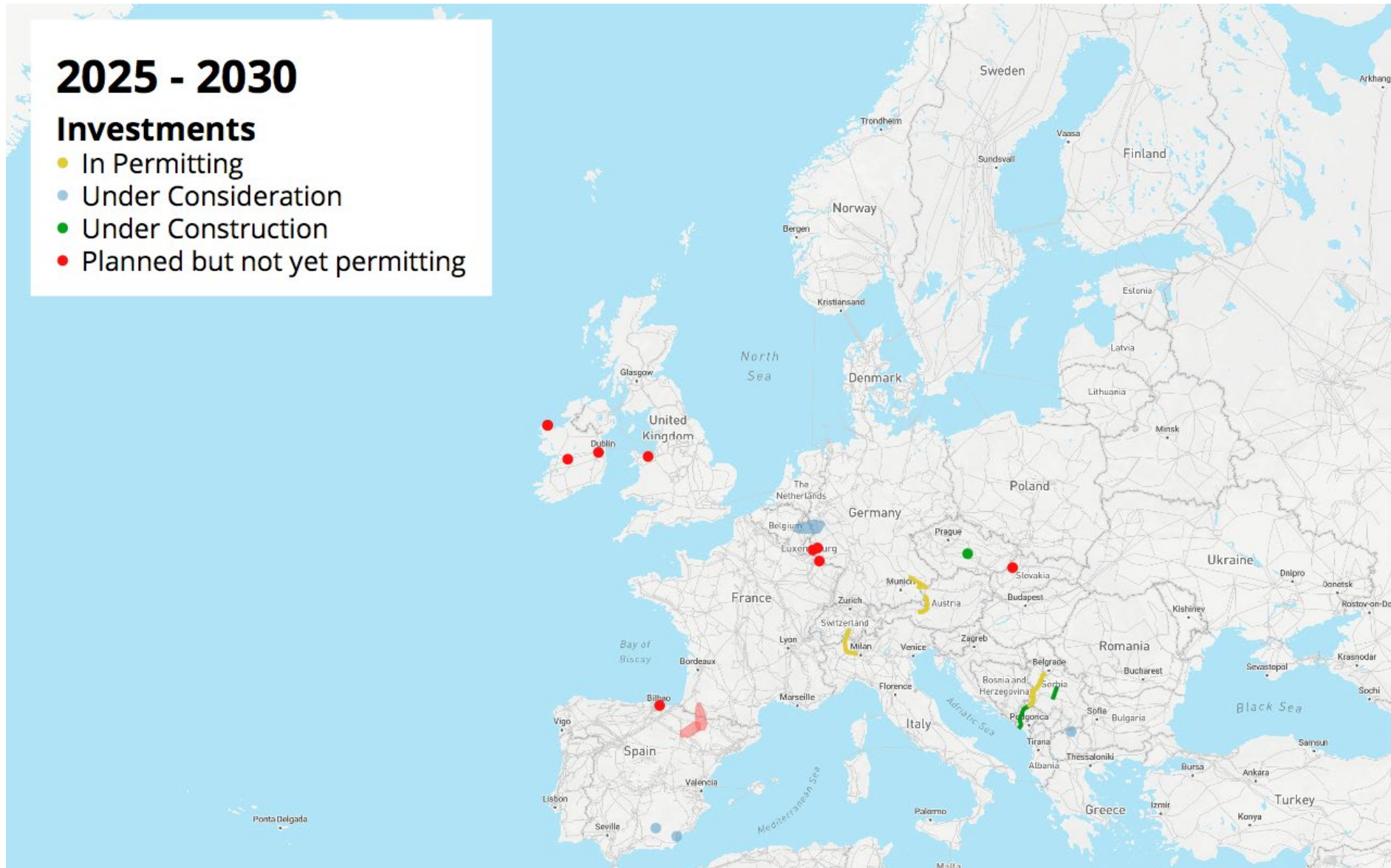


Investments 2025 - 2030

2025 - 2030

Investments

- In Permitting
- Under Consideration
- Under Construction
- Planned but not yet permitting

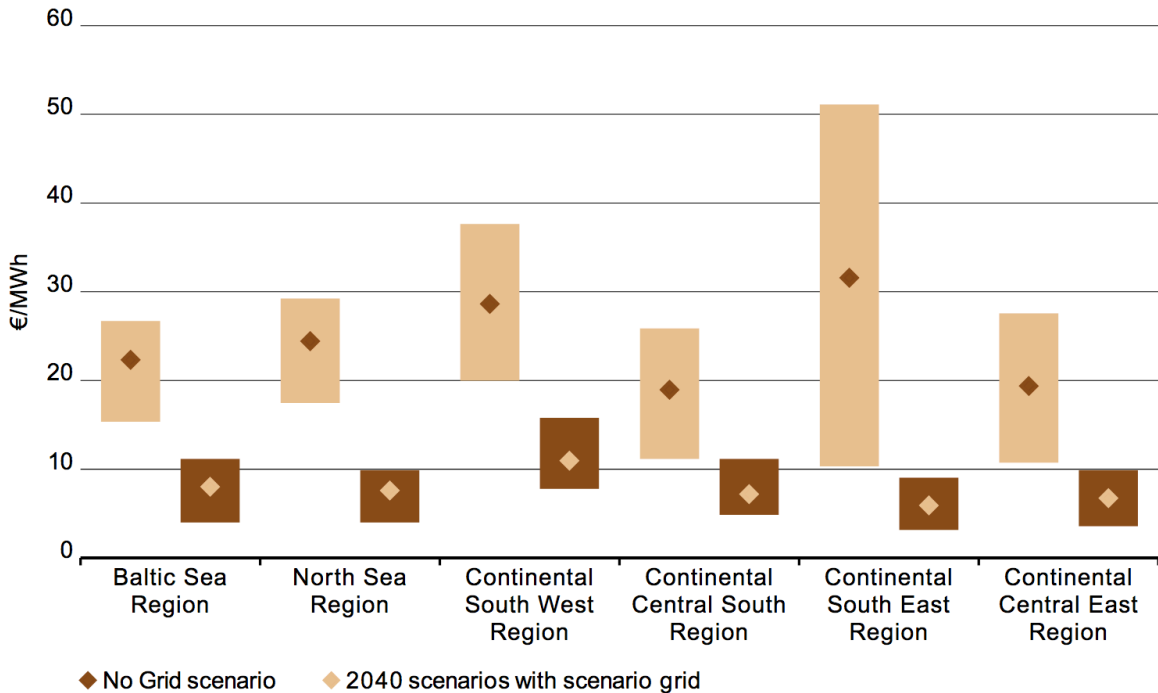


Investments by elements

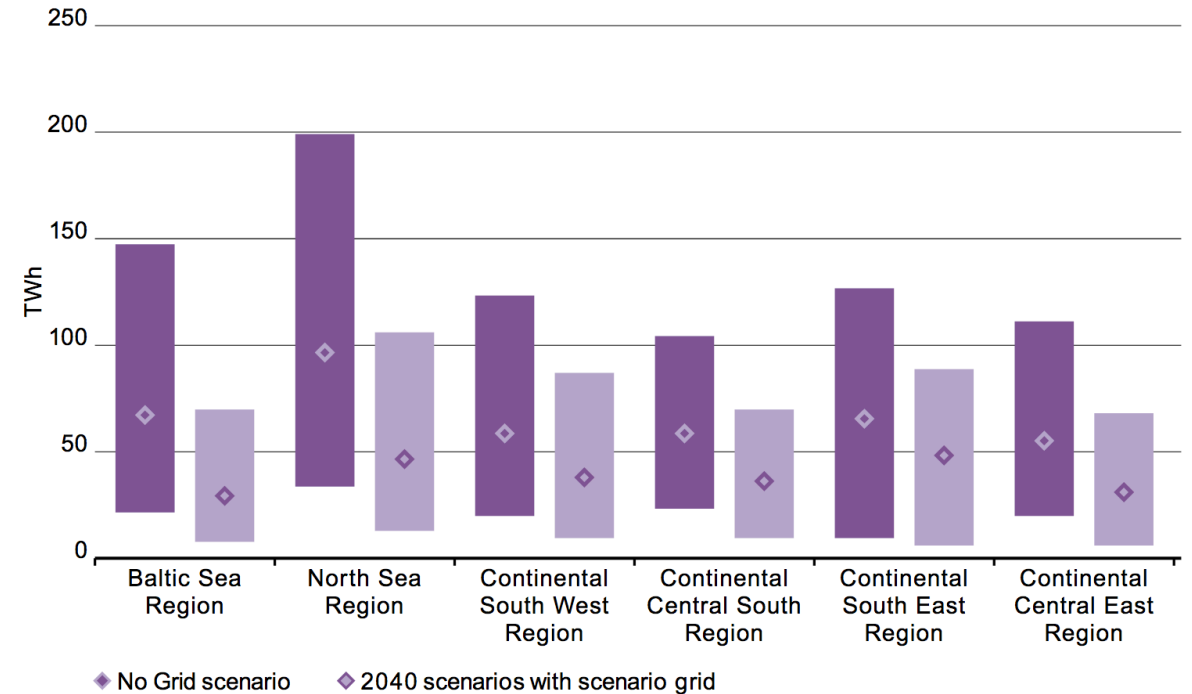


The system in 2040: high RES create new needs

Range and average of all scenarios and climate years



European – Curtailed energy
Range and average of all scenarios and climate years



43 Md €/year

156 TWh/year