AURORA ENERGY RESEARCH

Agora Energiewende

Forum Energii
Analizy i dialog

THE EUROPEAN LIGNITE TRIANGLE.

SCENARIOS FOR A SECURE, COST-EFFECTIVE AND SUSTAINABLE ENERGY SECTOR TRANSFORMATION

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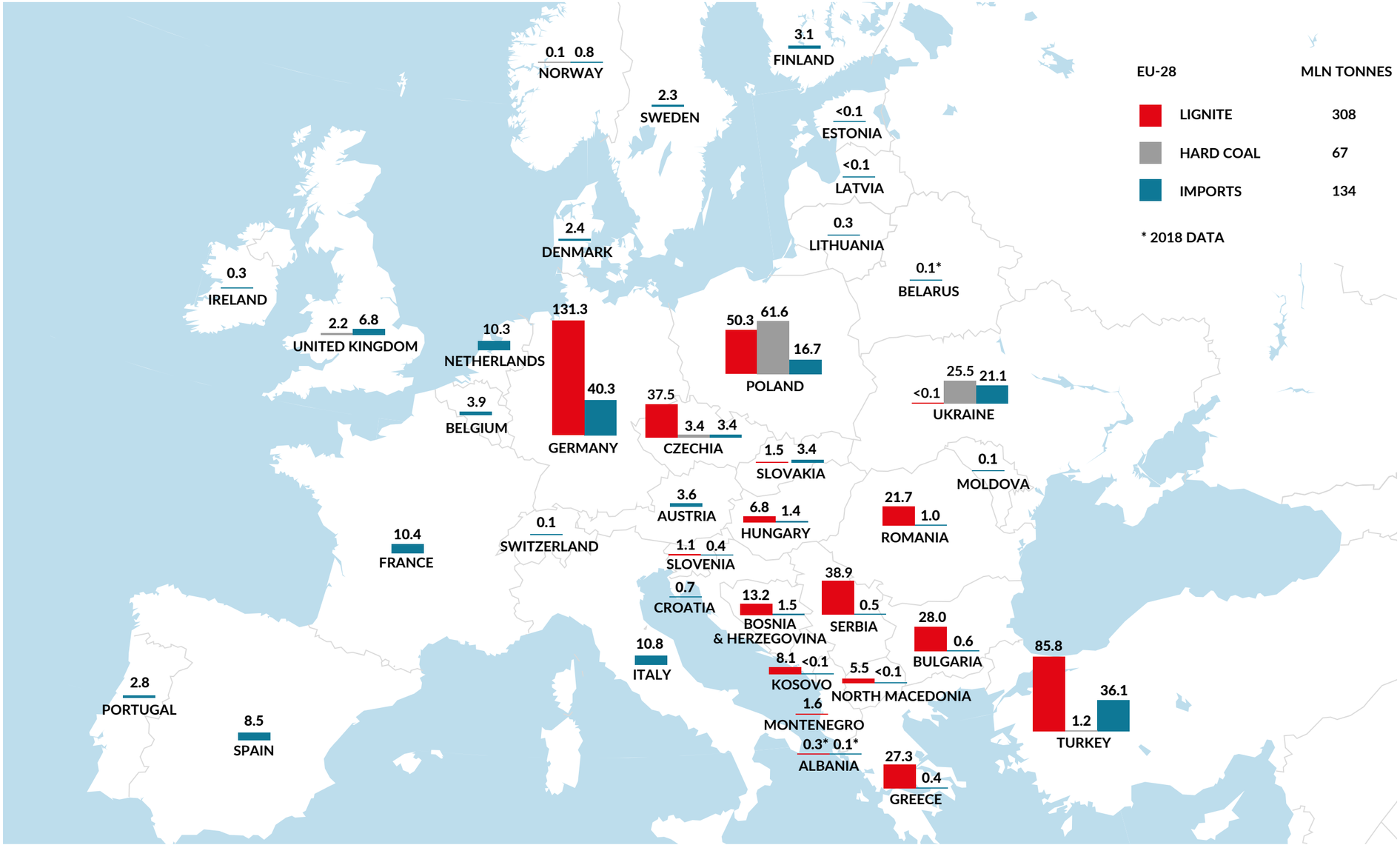
Background

Coal production and imports in Europe in 2019



Source: Forum Energii based on EURACOAL

Background

Coal gap	→ need for new, low-carbon capacities.
CO_2 emissions reduction	→ old/new EU targets for 2030 and 2050; lignite as the most emissive fuel.
Regional strategy	→ Germany, Poland and the Czech Republic are the main EU lignite producers. Interactions need to be analysed.
Lack of profitability of new coal projects	→ rising CO_2-prices in the ETS.
The transformation has already started	→ no proper decisions to address the challenge.

Objective of the analysis

Impact assessment of parallel lignite phase-out in Poland, Czech Republic and Germany.

security of supply

electricity trade balance and electricity flows

reduction of CO_2 emissions

wholesale electricity prices and overall costs

Approach

Elaborating reference scenario
– current energy plans of the Czech Republic, Poland and Germany.

↓

Two scenarios of lignite phase-out by: 2032, 2035

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Analysis of technological and economic conditions
in the Triangle countries.

↓

Modelling – hourly simulations of connected power systems;
cost optimisation.

Starting point – reference scenario

PL → "Poland's Energy Policy 2040", 2018 version; no nuclear power; cost-based decisions for both conventional and RES capacities.

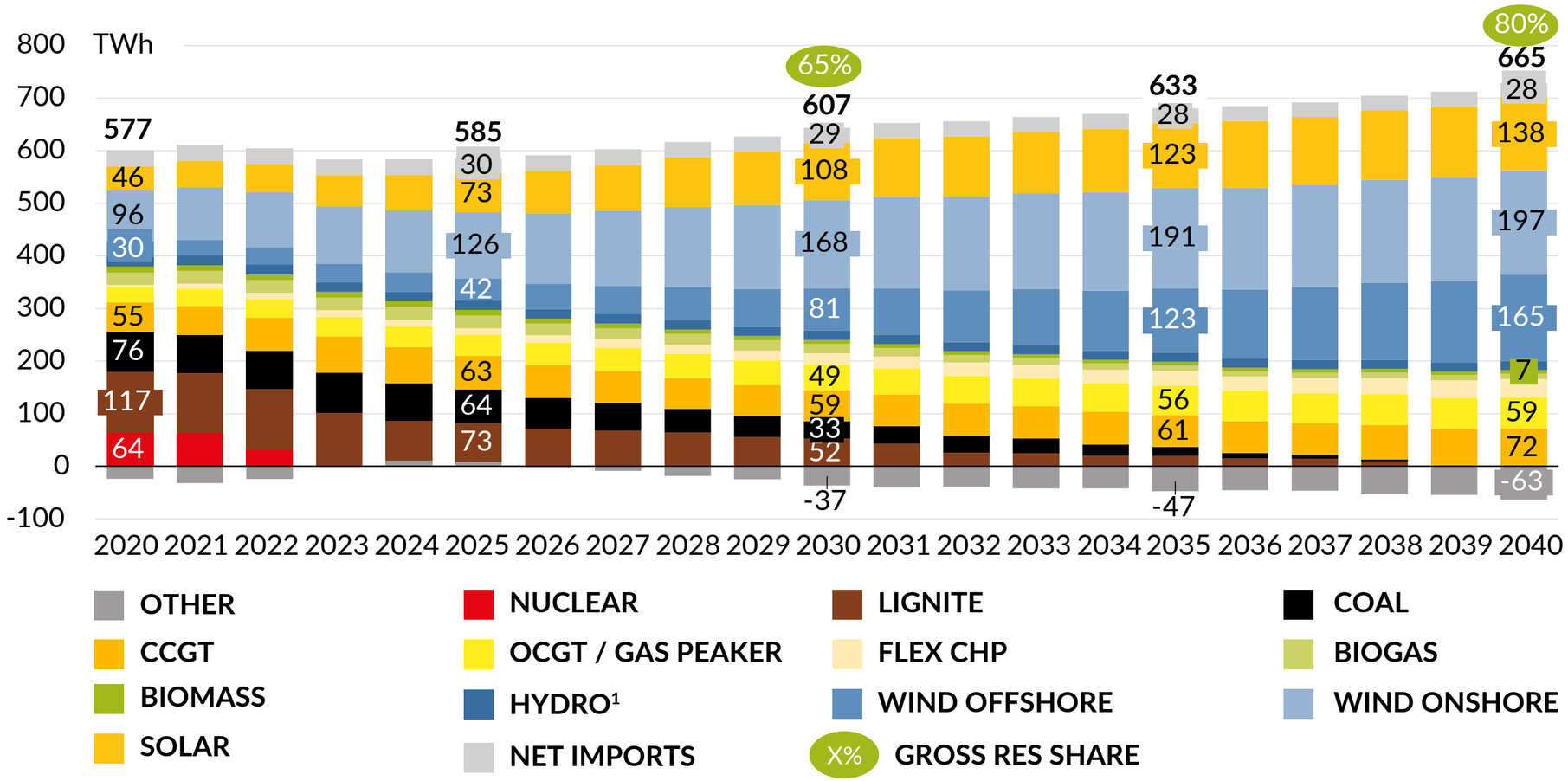
DE → recommendations of the Commission for Growth, Stability and Employment in early 2019, coal phase-out by 2038, 65% RES by 2030.

CZ → National Energy and Climate Plan and capacity planning by ČEZ; more ambitious development of RES, no new nuclear power.

Key results

Germany

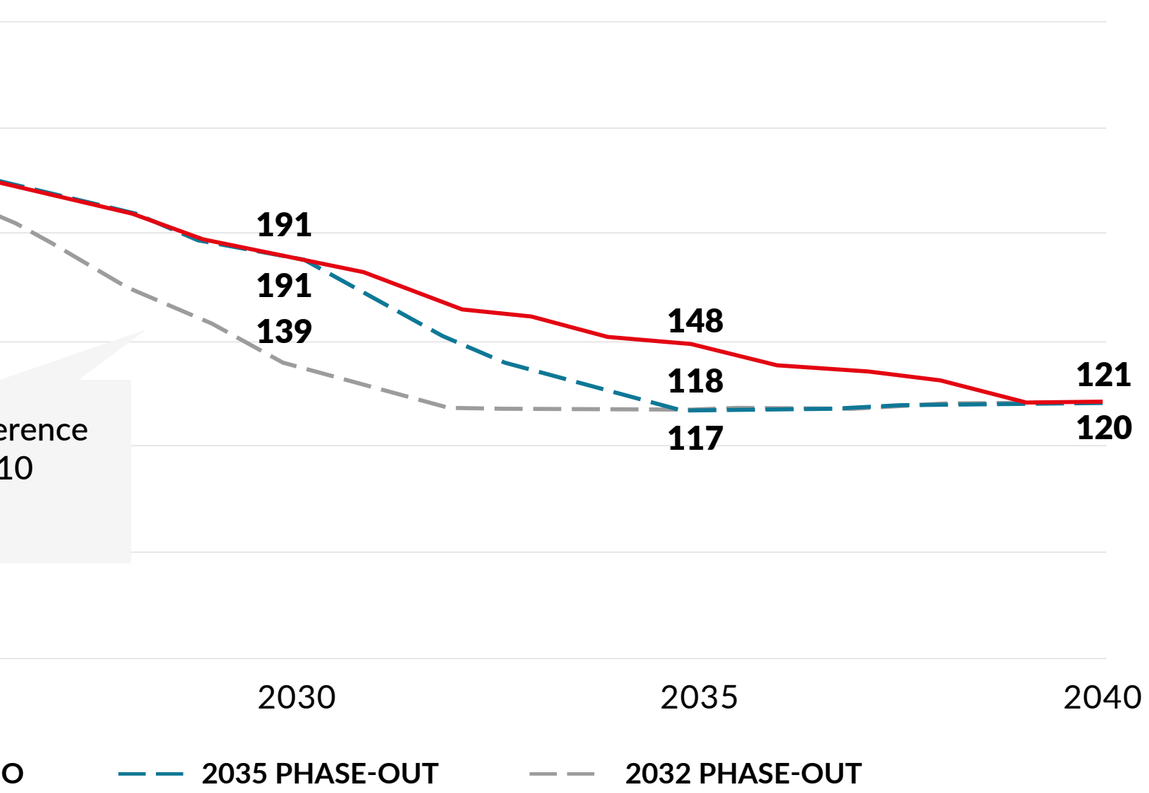
Electricity generation



Source: Aurora Energy Research.

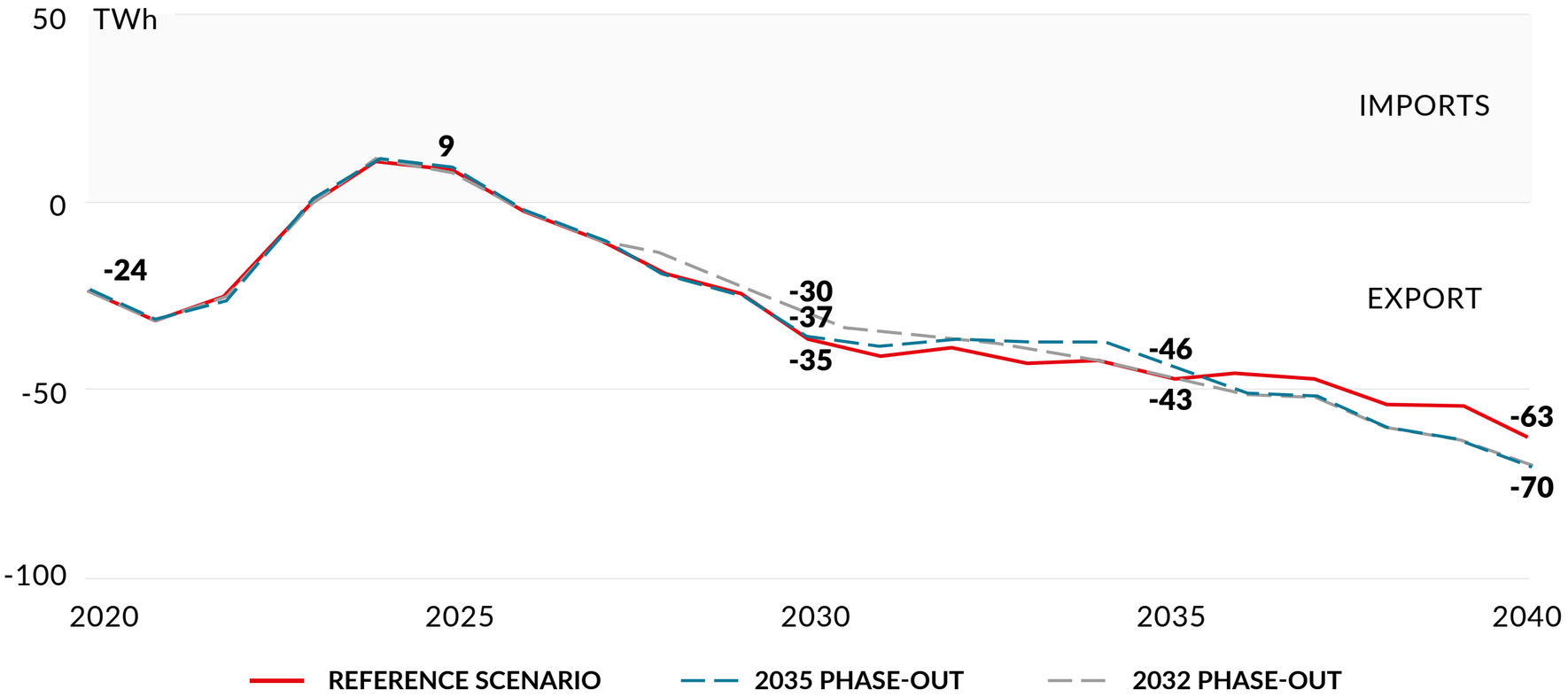
1) Hydro includes run-of-river, hydro storage and pump storage

Power sector CO_2 emissions – all scenarios



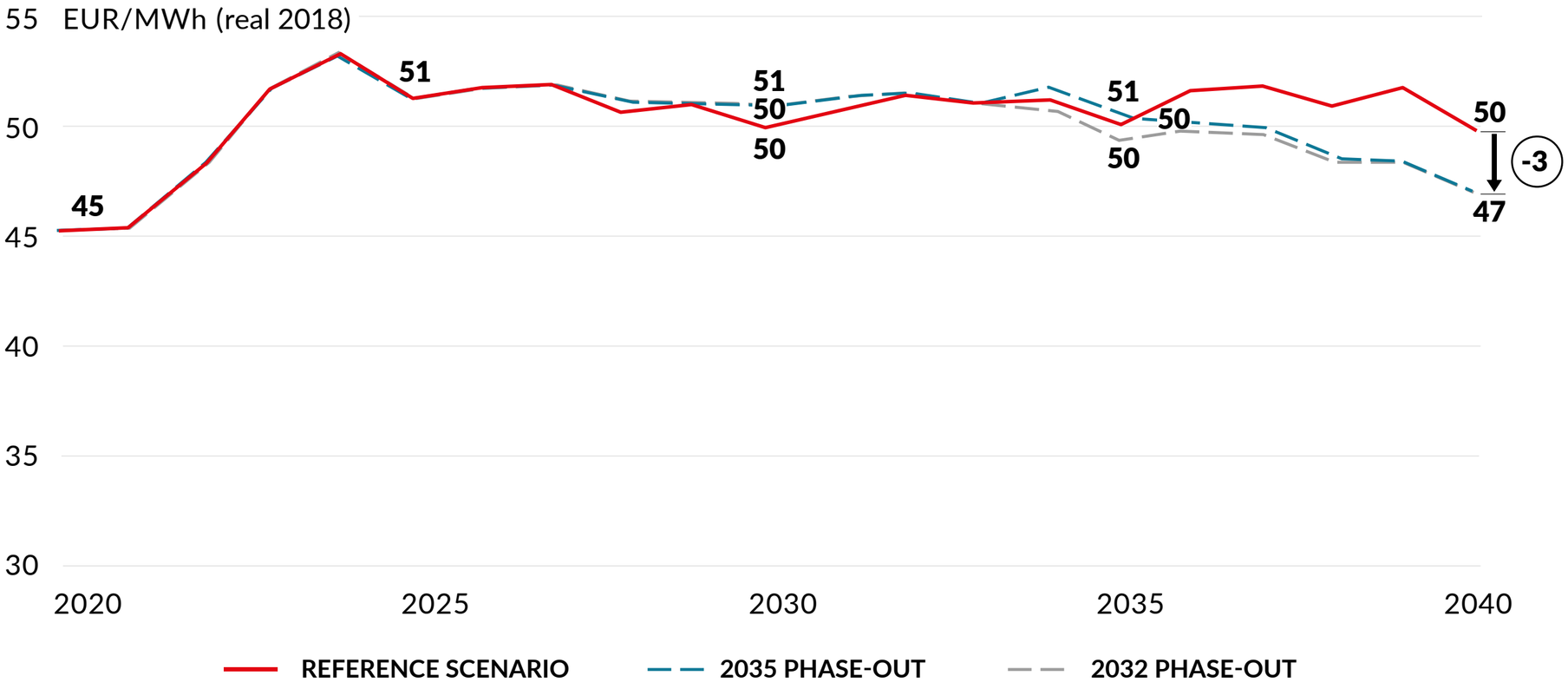
Source: Aurora Energy Research

Electricity trade balance



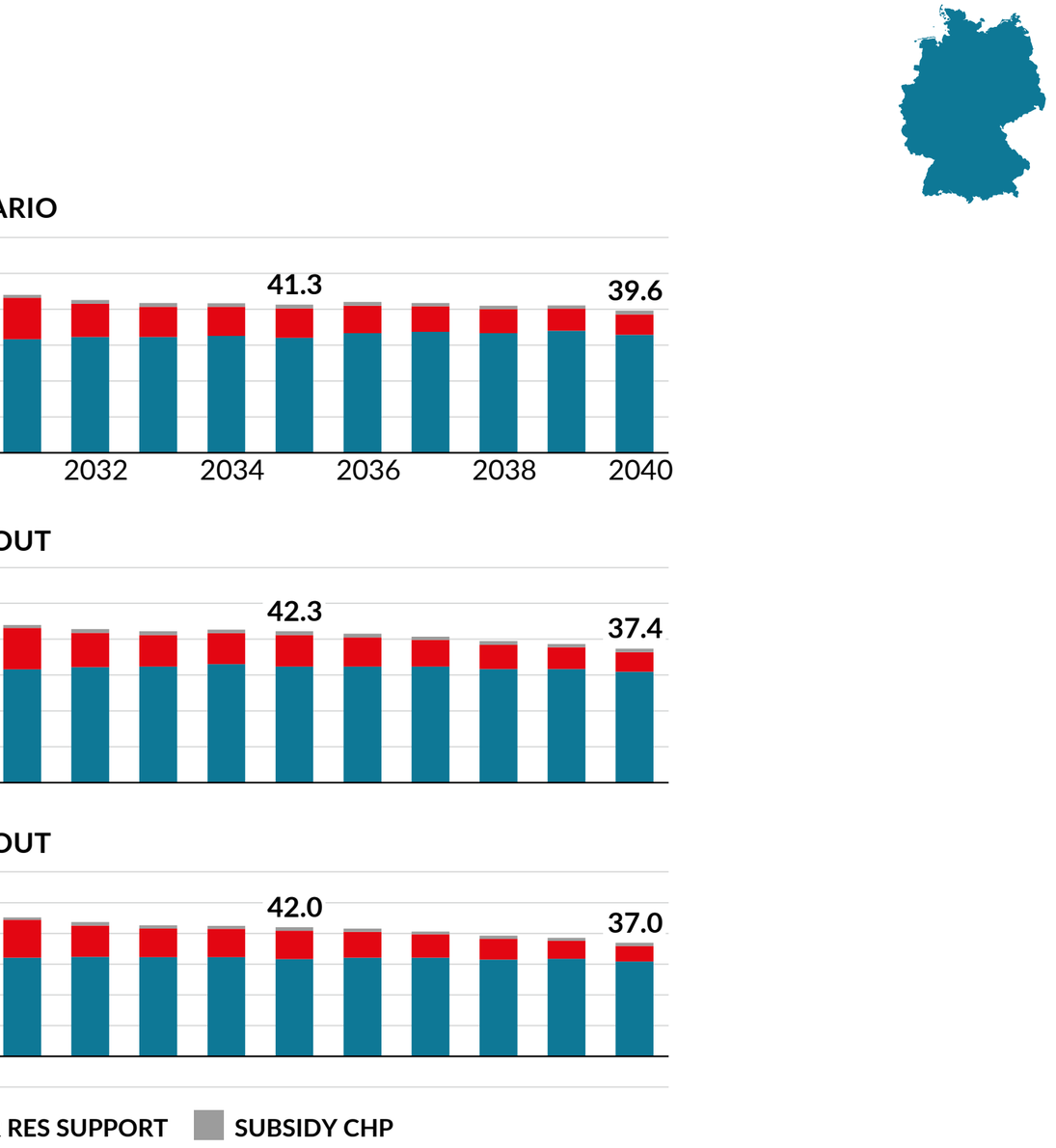
Source: Aurora Energy Research

Wholesale electricity prices – all scenarios



Source: Aurora Energy Research

System costs

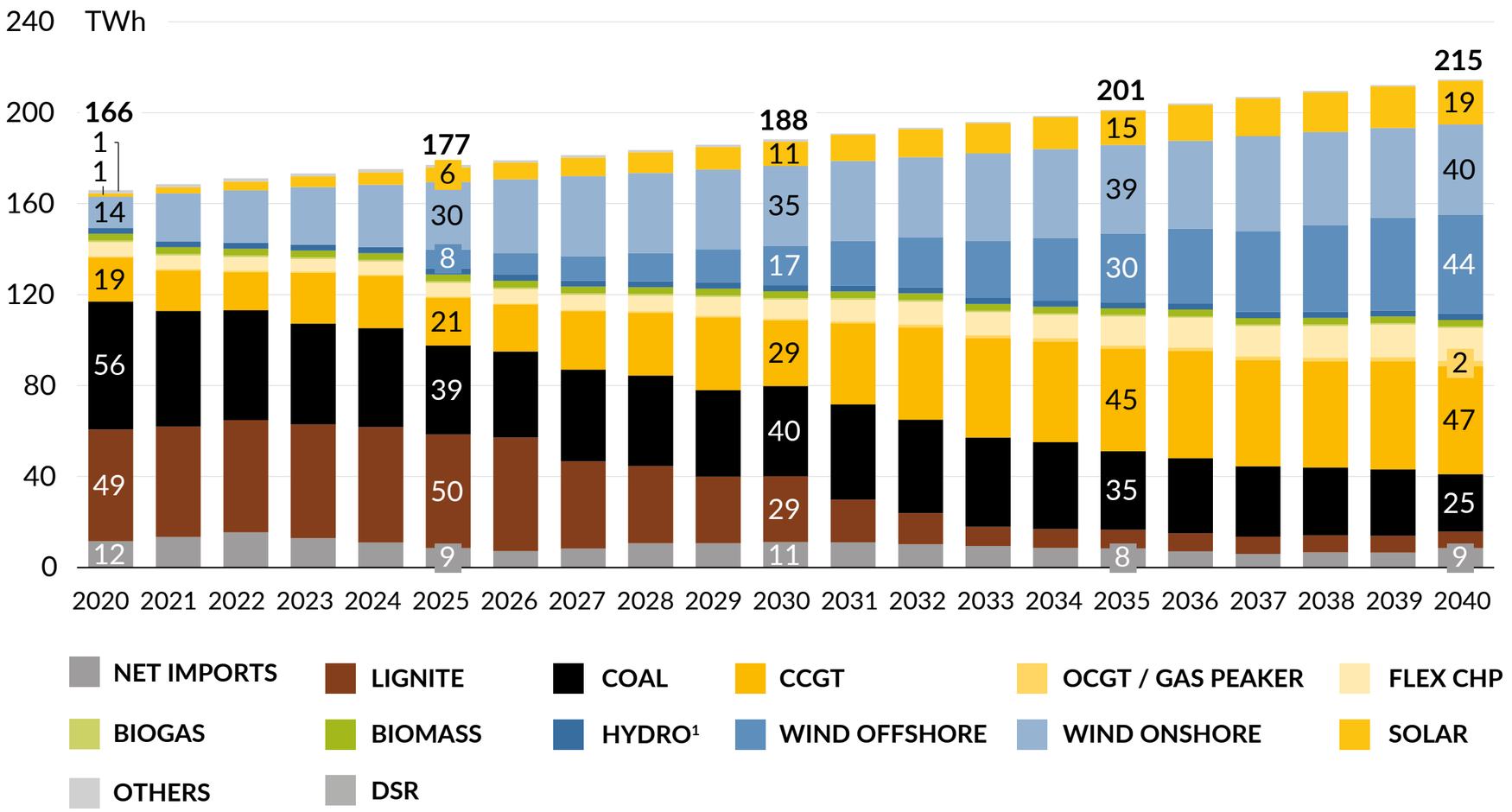


Source: Aurora Energy Research, Netztransparenz.de.

Note: The payment for RES support is the difference between set level of RES support and achieved market revenue.

Poland

Electricity generation



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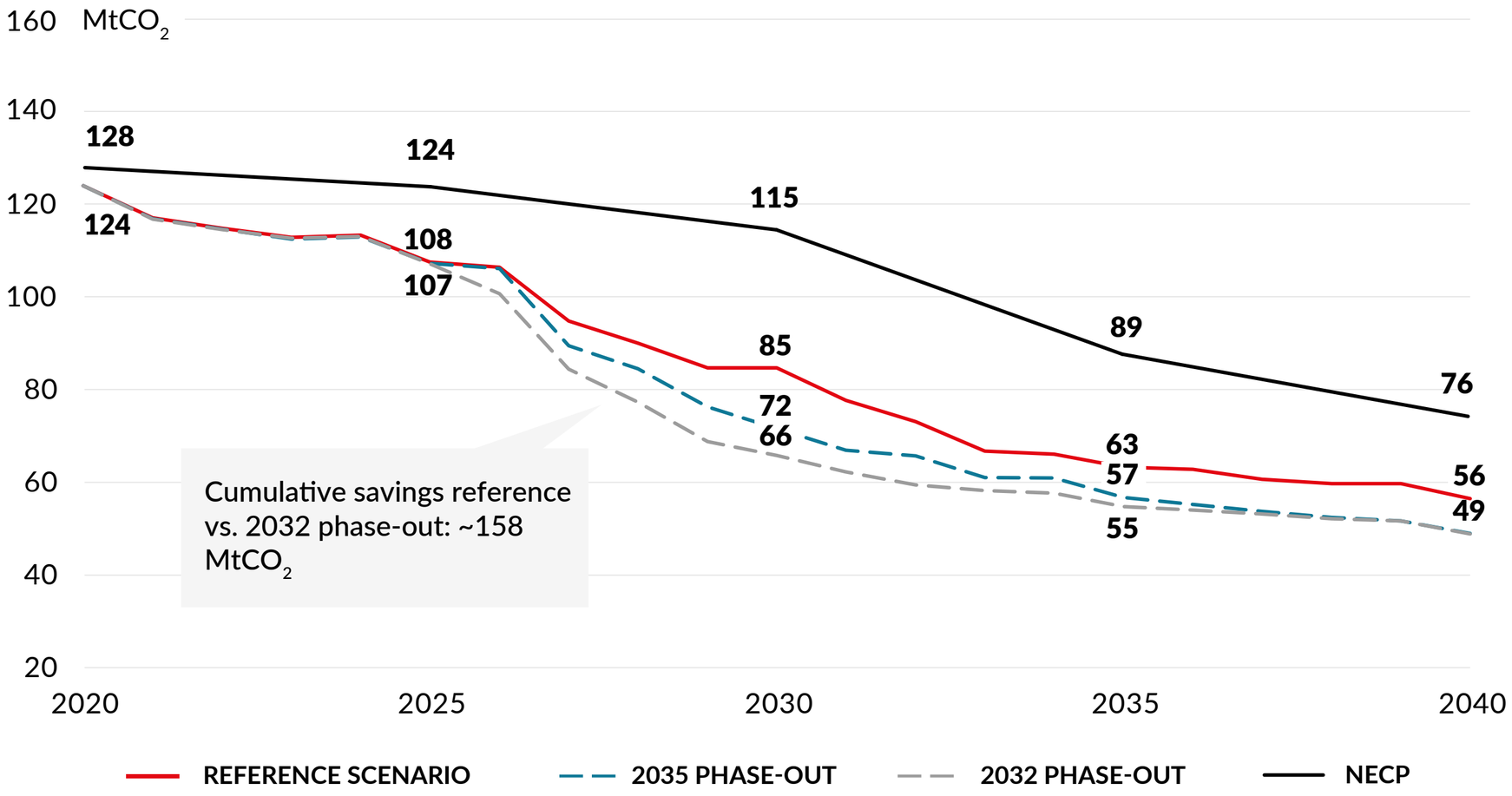
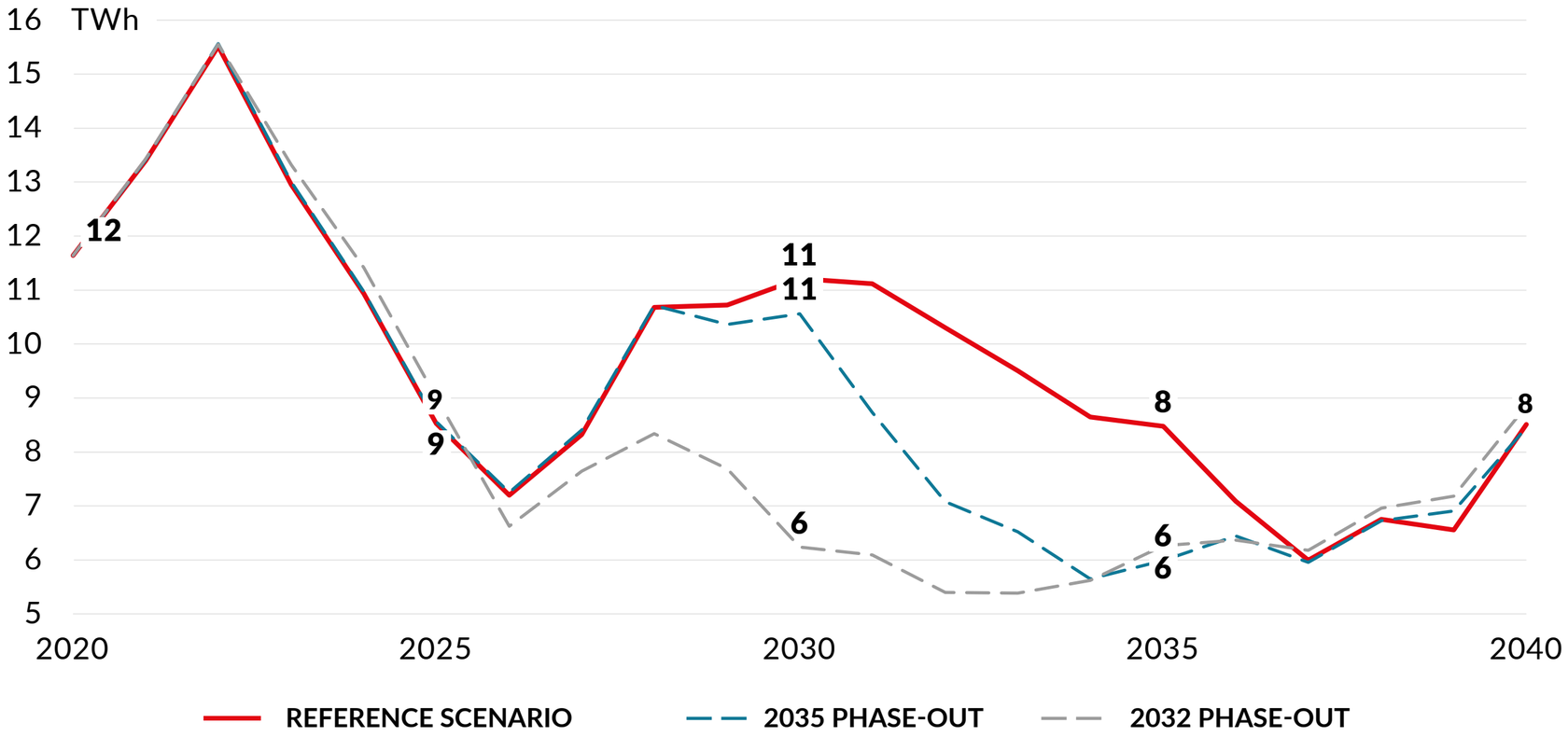


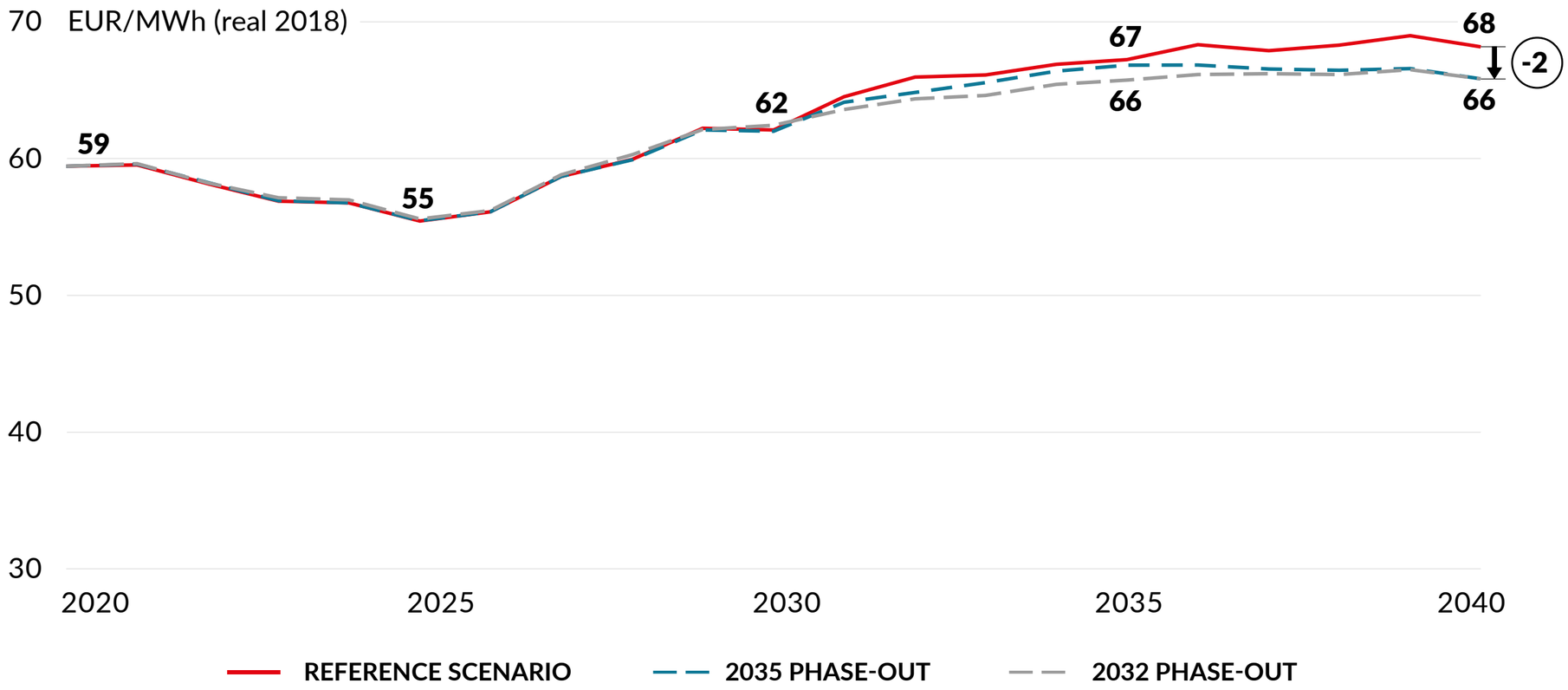
Source: Aurora Energy Research

Electricity trade balance



Source: Aurora Energy Research

Wholesale electricity prices – all scenarios



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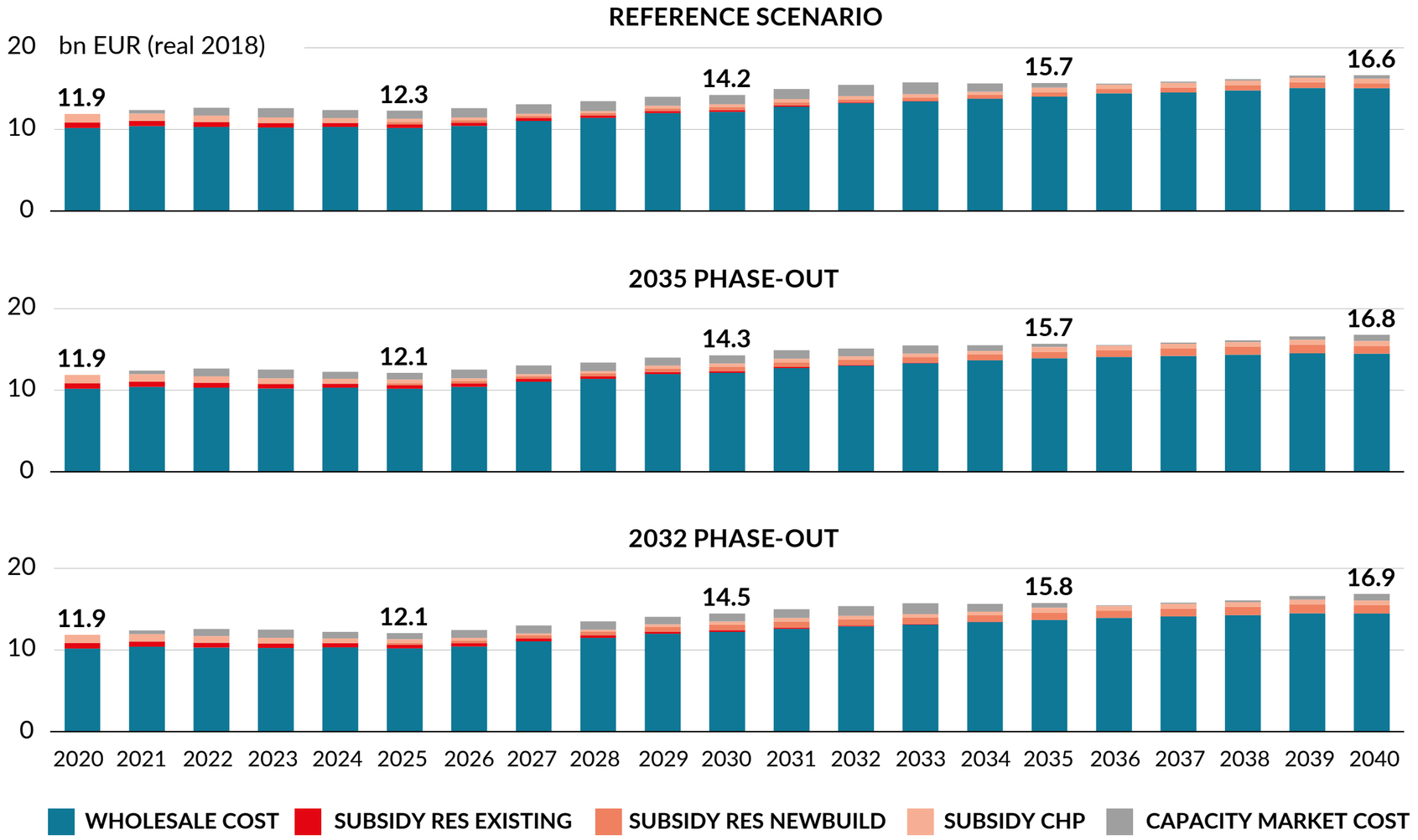
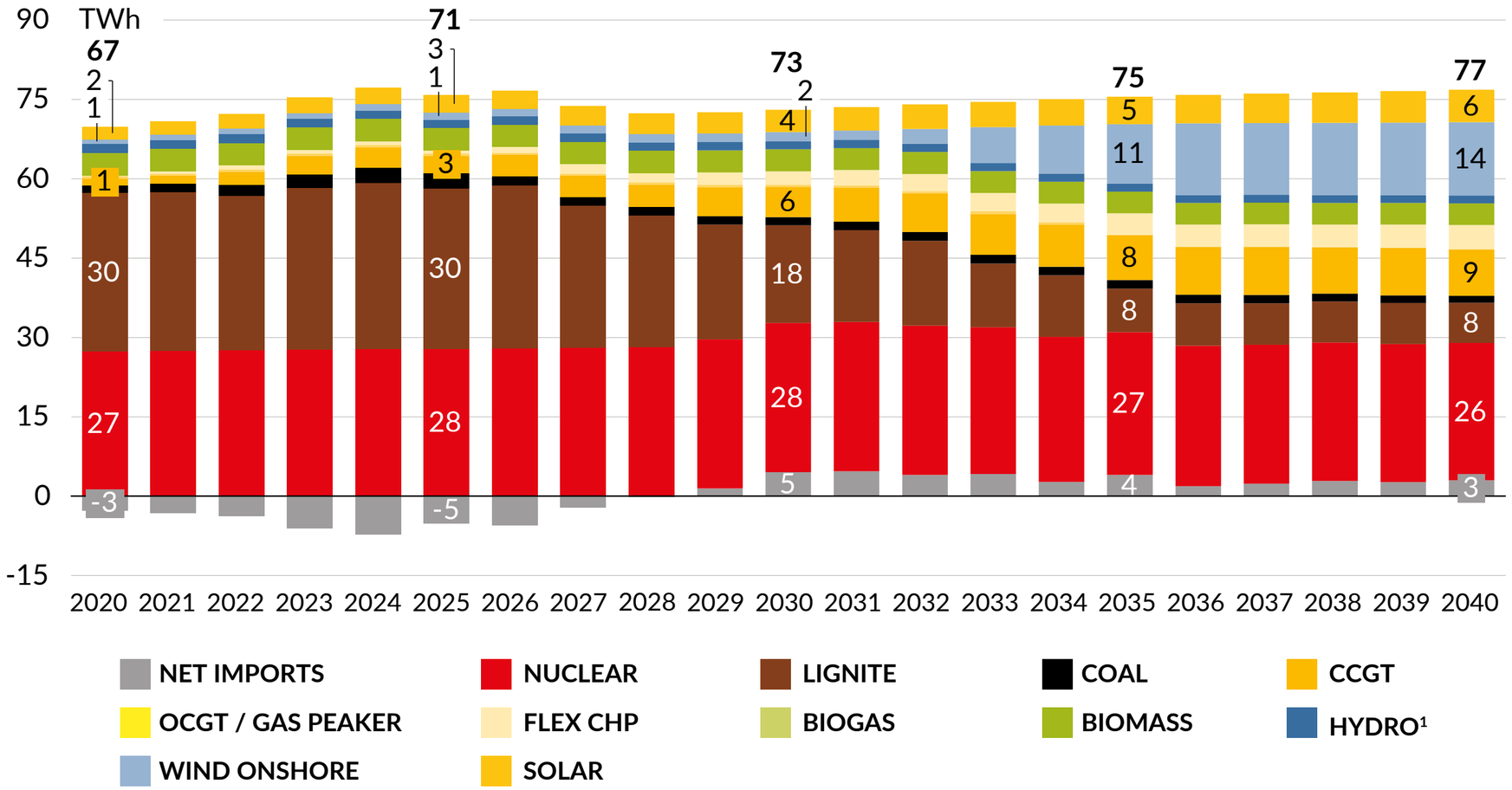
System costs



Source: Aurora Energy Research

Czech Republic

Electricity generation



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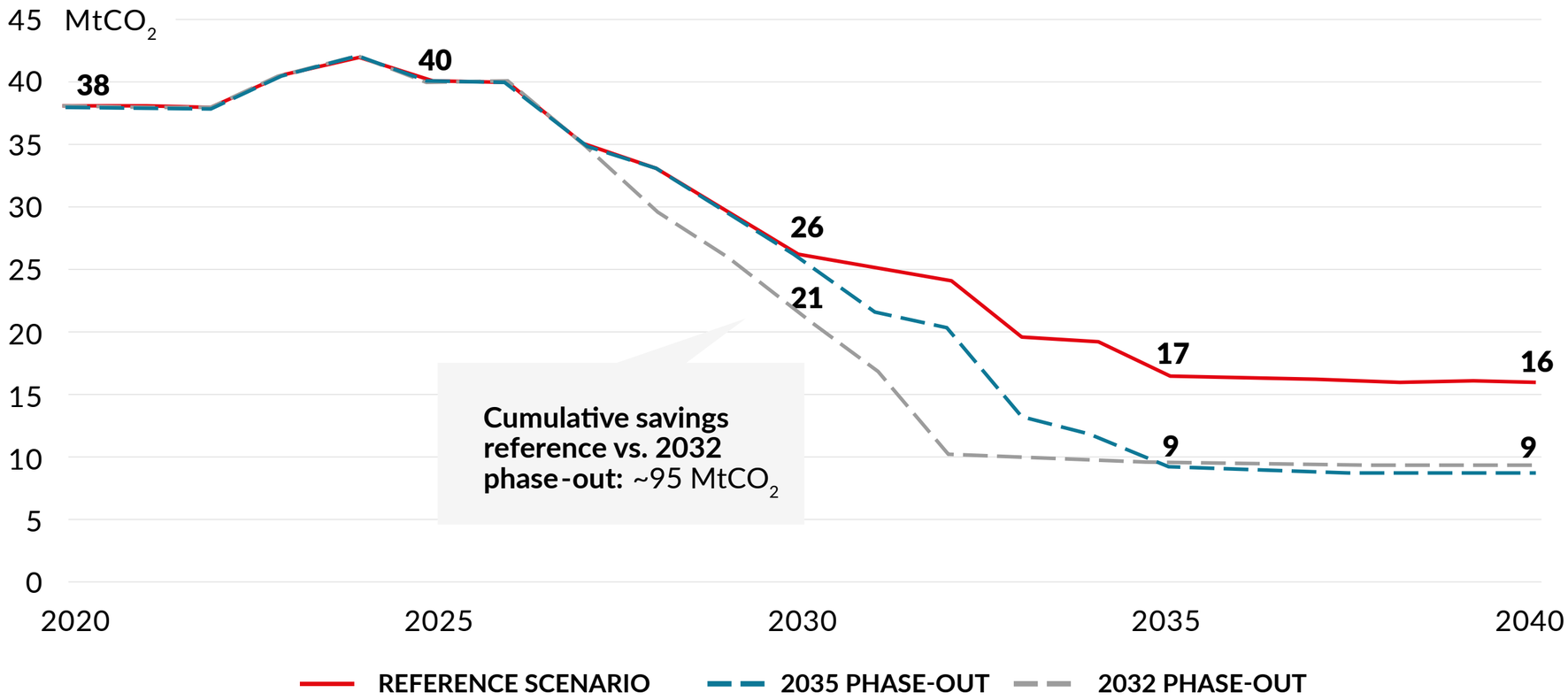
Power sector CO_2 emissions – all scenarios



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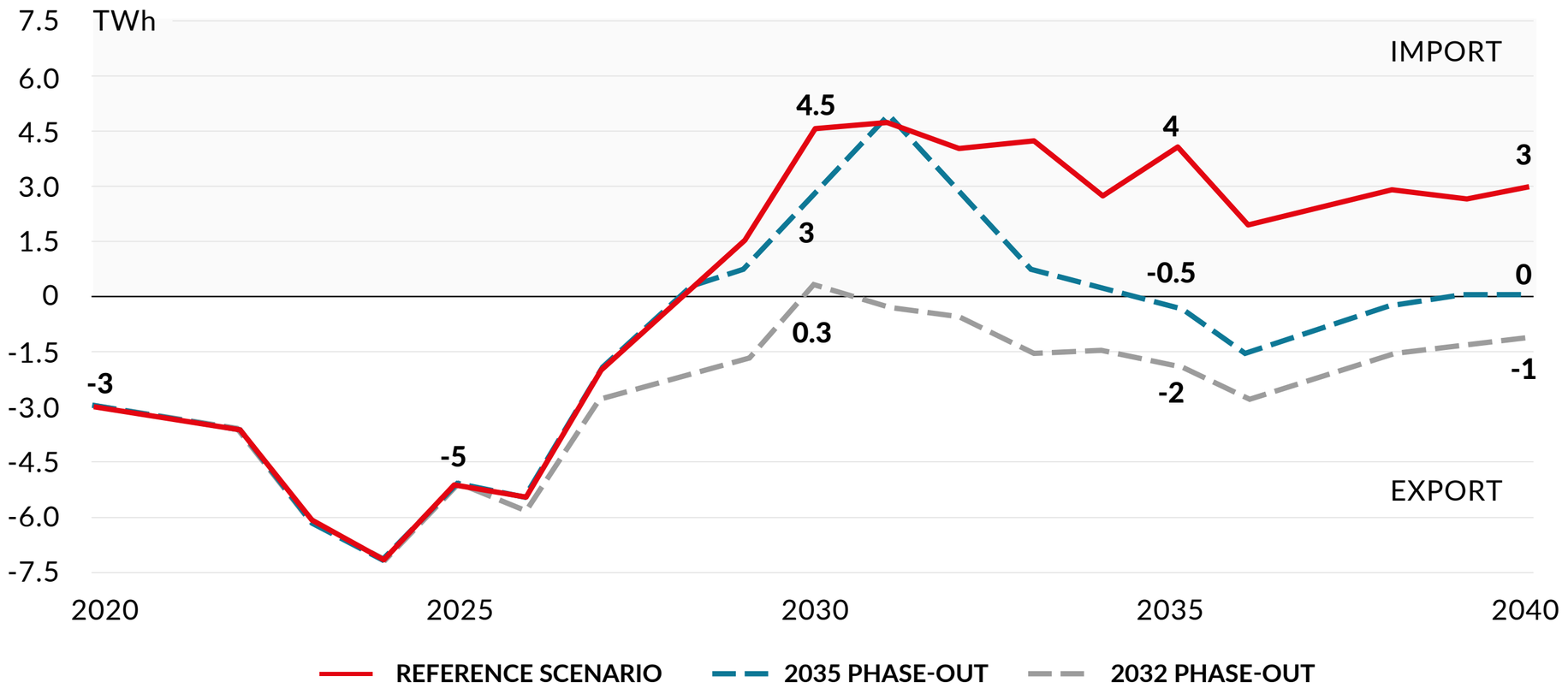
Electricity trade balance



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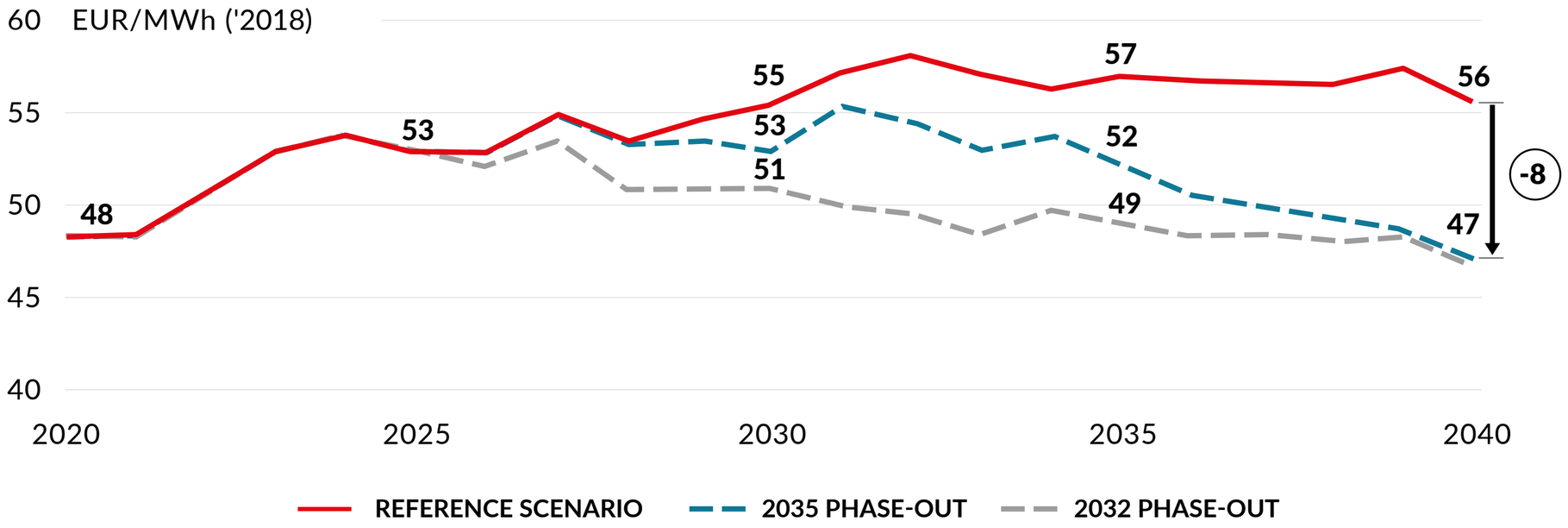
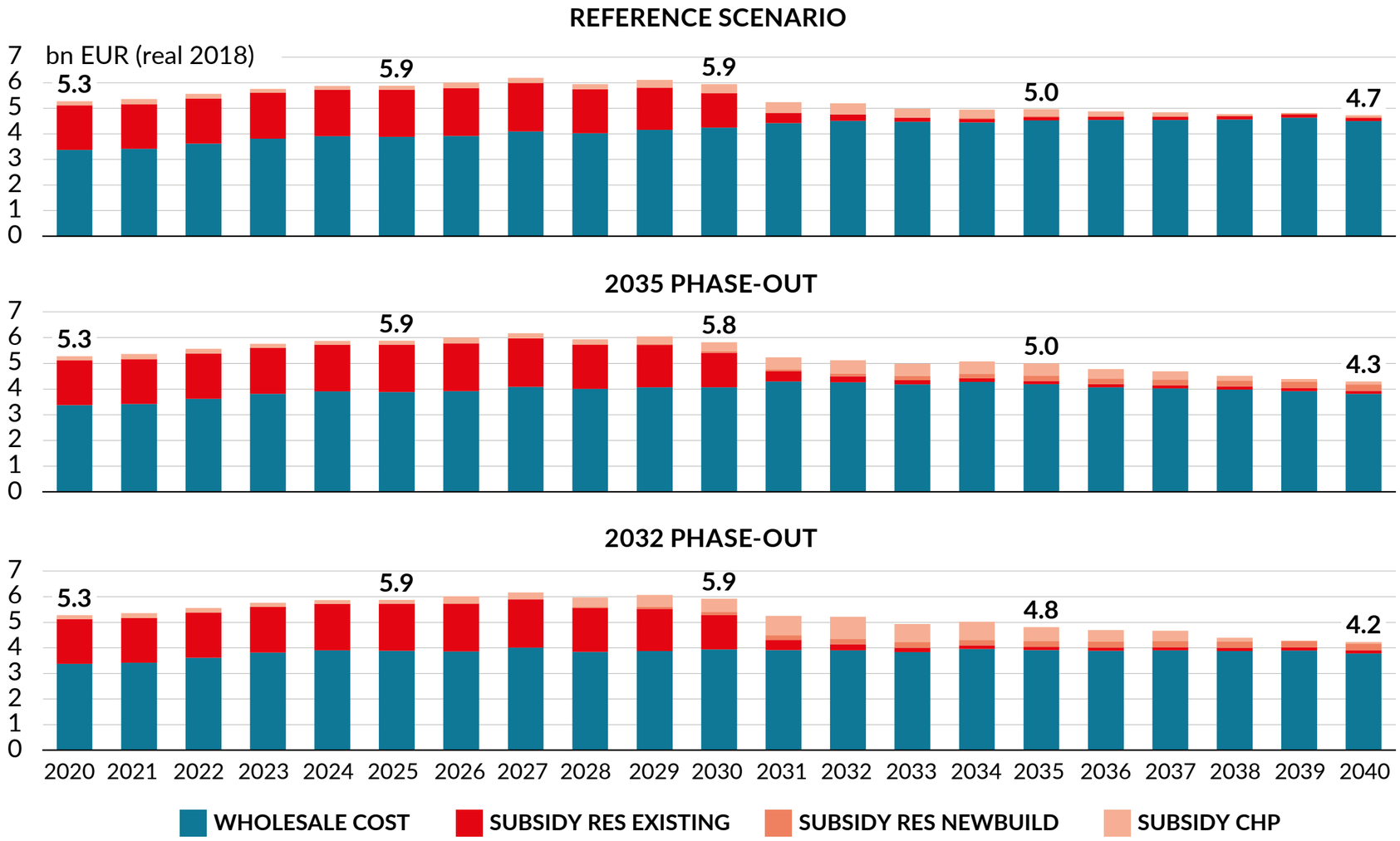
Wholesale electricity prices – all scenarios



Source: Aurora Energy Research.

System costs



Source: Aurora Energy Research.

CO_2 emissions reduction in power sector between 2020 and 2030

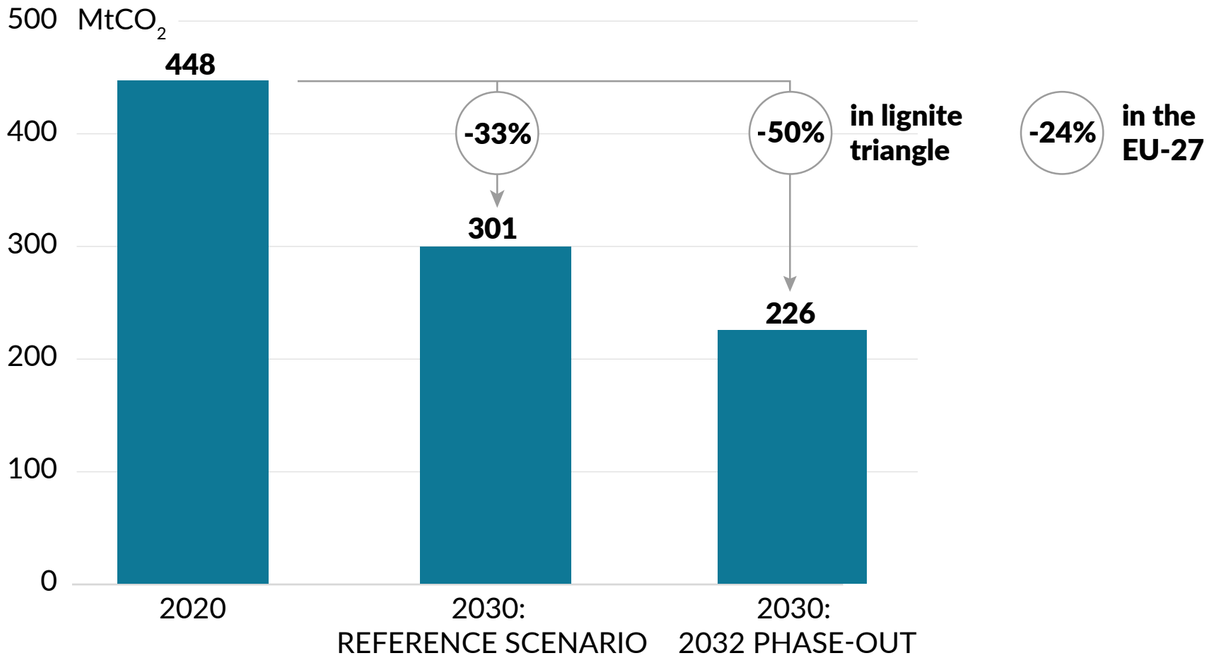
Lignite phase-out brings significant CO_2 reductions in the EU

The faster the phase-out (2032 scenario), the faster emissions drop between 2020 and 2030

-47% PL

-51% DE

-44% CZ



Summary

- The decline of lignite is inevitable. Key decisions and coordinated regional action are needed.
- Security of supply in the region can be ensured even if we speed up the phase-out of lignite, but such a transformation requires a plan.
- A move away from lignite can significantly reduce CO_2 emissions in the region and in the EU.
- Leaving lignite faster will not cost more.
- Accelerated withdrawal from lignite reduces electricity imports.
- Date of lignite exit: 2032 is realistic.
- To phase out lignite successfully, an alignment of strategy is necessary.
  This includes the future role of gas in the system.

Thank you for attention

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