

EU Climate Goals Accelerate Eastern European Decarbonization

Impact of higher carbon prices on
power sector outlook

Katherine Poseidon

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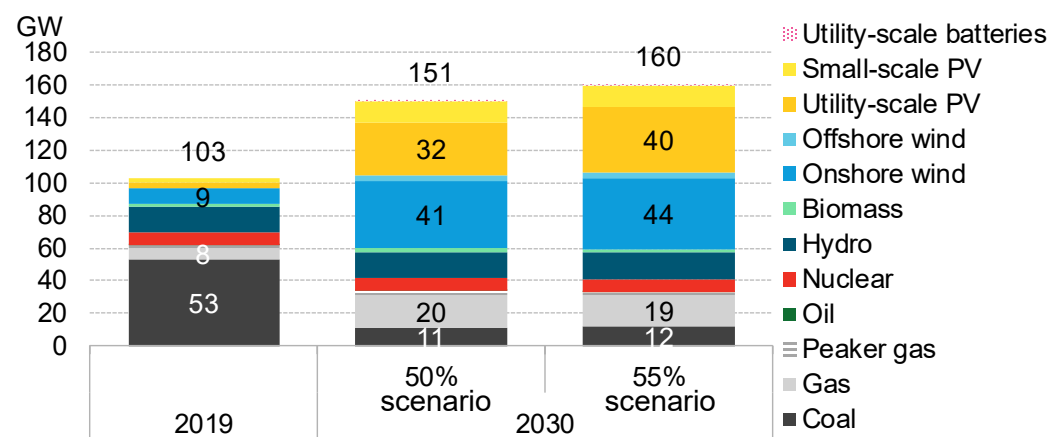
Executive summary

Higher EU targets for 2030 will require rapid decarbonization of the power sector, and a major acceleration of the energy transition in some European member states that still rely heavily on coal generation. The Commission's plan to use the EU carbon trading scheme as a key instrument to achieve these targets could drive some 40GW of coal power plants out of the market in central and eastern Europe by 2030.

- Poland, Czechia, Romania and Bulgaria are European member states with the highest share of coal generation that do not yet have a plan to phase out coal. Higher carbon allowance prices will hit coal generators in these countries particularly hard. BNEF modeling shows how these countries' power sectors may evolve through 2030 in response to higher carbon prices, depending on whether the EU adopts a 50% or 55% emissions reduction target.
- Much of these countries' coal fleets are already uncompetitive, and so even the 50% carbon price scenario sees the share of coal generation drop quickly when economics are left to determine the dispatch of generators. Between now and 2030, around 40GW of coal retires, much of which before 2025. In Czechia, this leads to an almost total phaseout of coal before 2030, while Romania and Bulgaria both phase out coal completely by the middle of the decade.
- New capacity is needed to meet this gap immediately, and while Poland already has a renewables pipeline, Czechia, Romania and Bulgaria are starting from a much lower baseline. Practical constraints will limit the speed of renewables uptake in the first half of the 2020s, which opens a need for around 10GW of new combined cycle gas capacity across the four markets.

- As renewables build accelerates, this zero-marginal cost generation squeezes gas generation as well as coal. This raises questions about the long-term investment case for new gas assets, which will likely need to look toward possible conversion to green gas or hydrogen from the 2030s to avoid being stranded.
- These four countries would see power sector emissions drop 78-82% from 2018 to 2030, driven by an average carbon price of 46 euros/ton over 2021-30. This reduction will be a critical contribution to the EU's 2030 goals, which would require the bloc to cut the equivalent of total emissions of the German economy.
- These carbon price scenarios bring about considerably higher emissions reduction than each country's proposed contribution to 2030 emissions reduction in its National Energy and Climate Plan. Even a 50% emission reduction target will require member states to rethink the roadmap to, and goals for, 2030.

Aggregate capacity mix in Poland, Czechia, Romania and Bulgaria

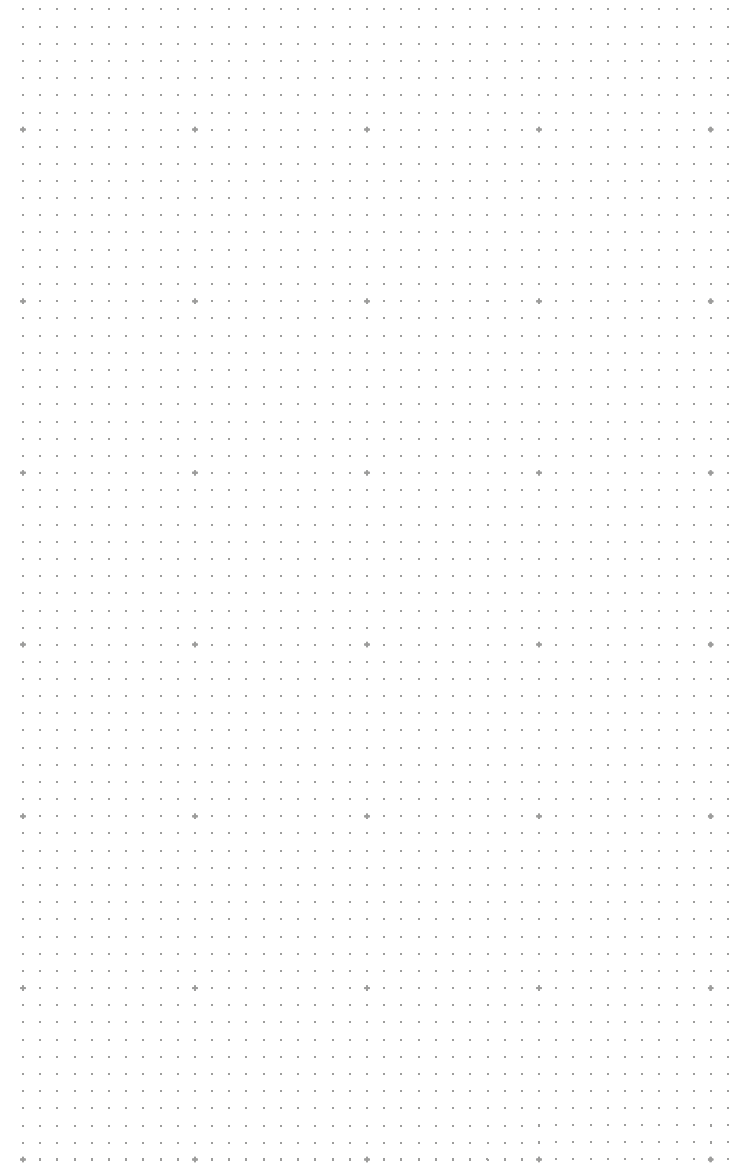


Source: BloombergNEF

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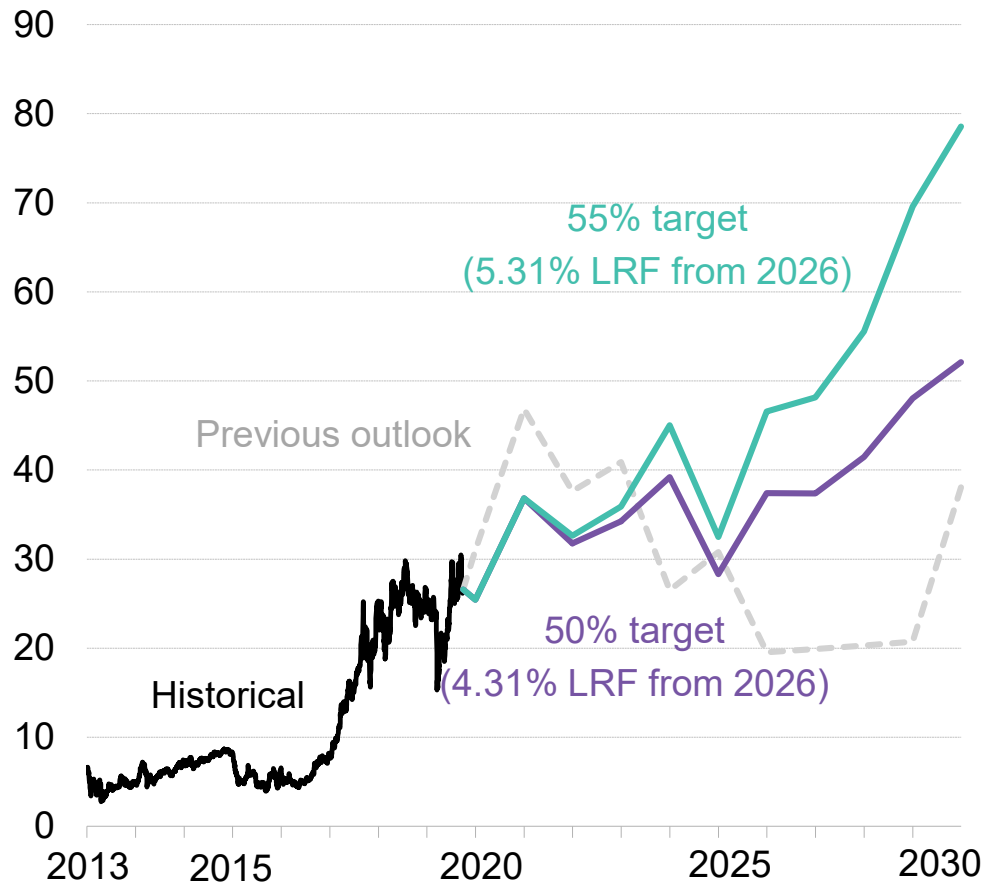
Background



BNEF carbon price outlook for 50% and 55% emissions target

Medium- and long-term EUA price projections, annual averages

EUR/t, nominal



- The EU ETS has proven to be resilient in the face of the pandemic, and policy support is likely to continue to support the carbon price.
- The European Commission's impact assessment that accompanied its 55% emissions reduction target announcement indicates that the EU ETS will be a key policy mechanism used to help the EU deliver its 2030 climate and renewables goals.
- As debate around the 2030 target continues in the European Council, BNEF uses a 50% reduction target as a central case, with a linear reduction factor (LRF) of 4.31% from 2026. The outlook is bullish in the medium term, with prices located between 30 and 40 EUR/t until 2025. BNEF foresees a dip in 2026, followed by further price gains as a higher linear reduction factor removes supply.
- For a 55% emissions reduction target to be achieved by 2030, the LRF would need to change to 4.42% from 2024, or 5.31% from 2026 for a 55% target to be achieved. The timing of the LRF change has the biggest impact under a 55% target scenario.
- For this exercise, BNEF uses a 5.31% LRF scenario. A lower LRF removes less supply each year, but earlier implementation would mean that supply is reduced more across the trading phase. With a 5.31% LRF changed in 2026, the average 2021-30 price is 46 euros/ton.

Source: BloombergNEF

Scenarios explained

The European Commission's September 16 proposal to slash the European Union's total emissions by 55% compared to 1990 levels will require an uptick in the pace and scope of decarbonization. While the bloc debates whether a 55% or 50% target will ultimately be adopted, the Commission has made it clear that it will use the Emissions Trading System (ETS) as a policy tool to drive decarbonization.

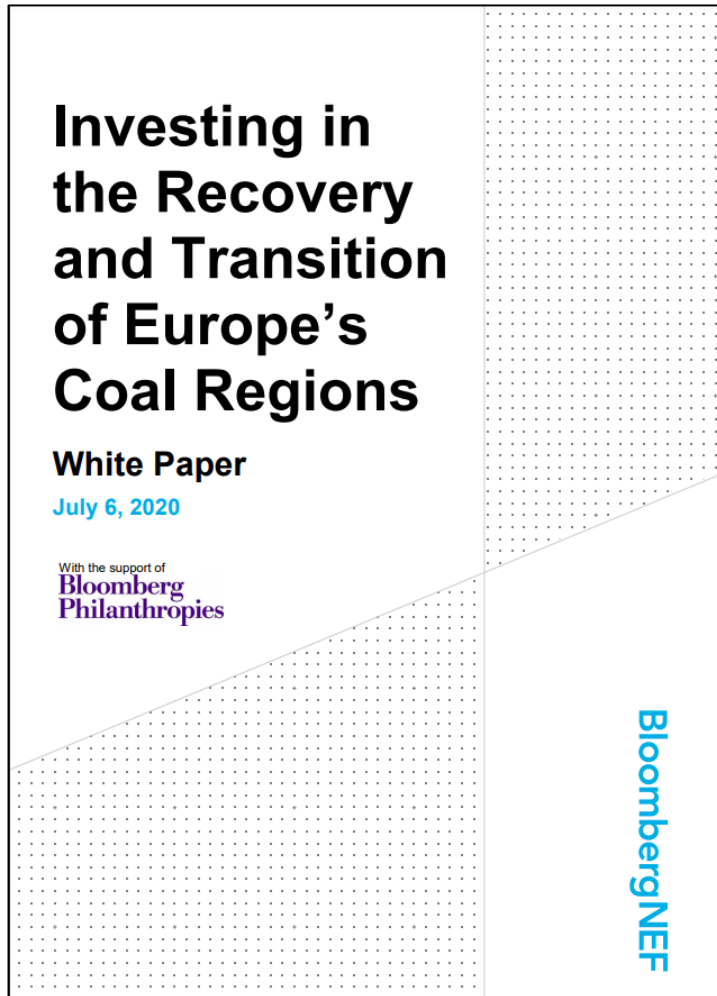
Scope

- For countries with a high share of carbon-intensive power generation, rising carbon prices will hit them particularly hard. Poland, Czechia, Romania and Bulgaria are Europe's member states with the highest share of coal generation, which do not yet have a plan to phase out coal.
- BloombergNEF, with support from Bloomberg Philanthropies, examined the least-cost pathways for the power sector of Poland, Czechia, Romania and Bulgaria, in the report *Investing in the Transition of Europe's Coal Regions*. This research uses the same foundations to examine the impact of higher climate ambition, as the EU discusses its 2030 emissions reduction targets. The EU ETS will be one of the key policy tools that the European Commission is planning to use to accelerate decarbonization, so the analysis is done using different carbon price scenarios.
- This note thus includes modelling results for a scenario where the EU agrees to reduce emissions by 50% by 2030 against 1990 levels, the **50% scenario**, and those for a 55% emissions reduction target, the **55% scenario**.

Methodology

- The scenario analysis takes the same approach as BNEF's flagship *New Energy Outlook* (NEO). NEO is a fundamentals-based, least-cost outlook for the power sector. In the medium to long term, the results are driven by the cost of building and operating new power generation technologies to meet both total and peak demand. In the near term, the outlook is based on market projections driven by policy and BNEF's proprietary project pipeline database. NEO does not assume any new policies or subsidies, or aspirational targets.
- Technology costs underpin the economic analysis. BNEF regularly updates the levelized costs of electricity (LCOE) for new power plants. These includes the cost of capital, operations and maintenance, financing, fuel and carbon. We also evaluate resource availability and market operating conditions to work out expected capacity factors that – in the case of renewables – take account of curtailment.
- Demand expectations take into account a multi-wave coronavirus pandemic, with outbreaks continuing or returning over 3Q-4Q 2020, and requiring repeated action from governments to bring the pandemic under control. Our fundamental demand expectations are driven by economic growth and population. For Poland, Czechia, Romania and Bulgaria, which have seen stagnant-to-negative population growth, we expect the protracted impact of Covid-19 to depress the modest economic growth that the countries have seen over the last decade.

Investing in the transition of Europe's coal regions

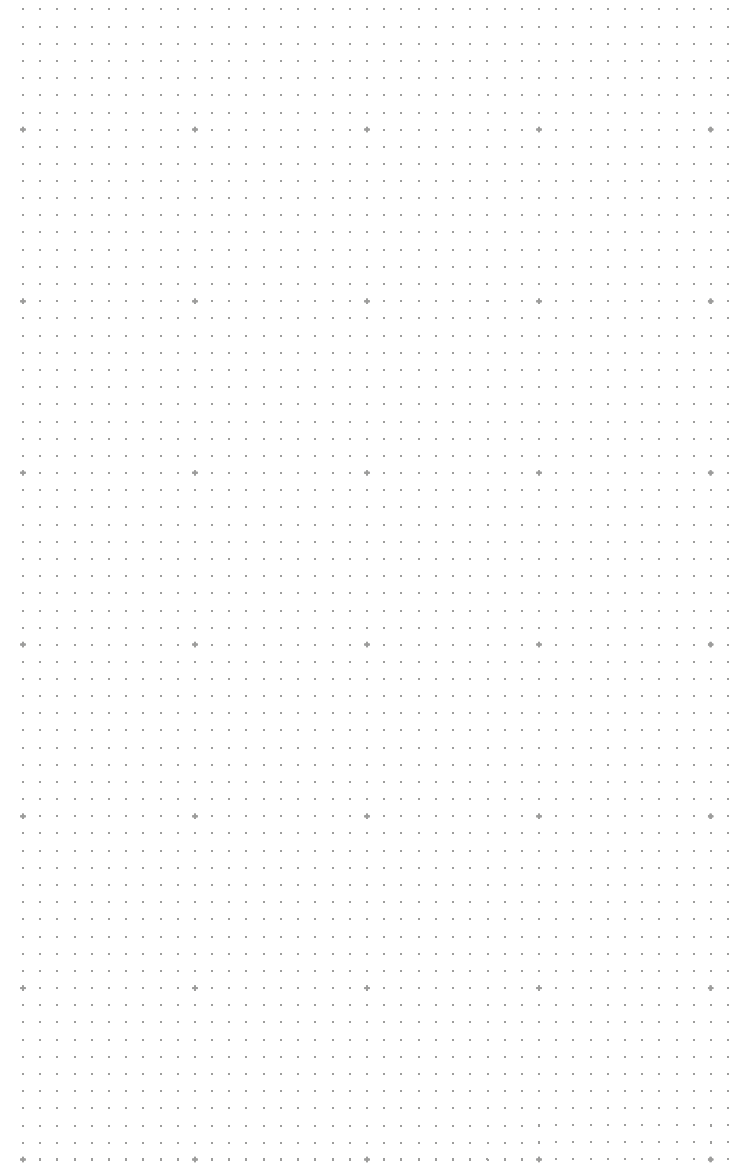


In July 2020, Bloomberg Philanthropies and BloombergNEF (BNEF) released “*Investing in the Recovery and Transition of Europe’s Coal Regions*,” an in-depth analysis on the transition of the power sector in four key Central and Eastern European economies: Bulgaria, Czechia, Poland and Romania. Undertaken as part of Bloomberg Philanthropies’ partnership with the European Commission’s Coal Regions in Transition Platform, the report reveals that through clean energy investment, these countries can be important drivers of Europe’s green recovery and climate efforts.

The BNEF report maps the least-cost transition options for four key power markets in Central and Eastern Europe. This was the first time BNEF has used its New Energy Outlook modeling tools to explore the transition of these countries’ power markets. It found that by 2030, the least-cost scenario would allow these four countries to reduce their power sector emissions 48% from 2018 levels. Taken together, new renewables capacity in these four markets could bring up to 53.7 billion euros (\$63 billion) of new investment.

Full report is available [here](#)

Key messages and results



Key messages

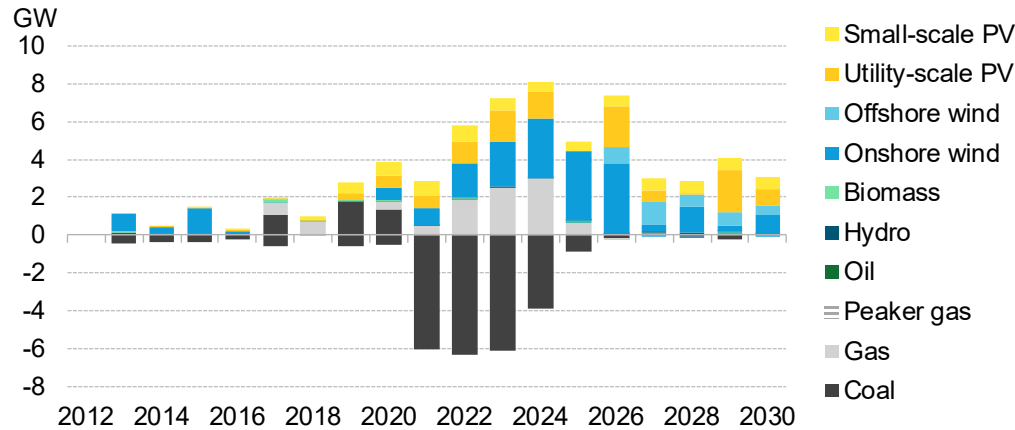
1. A large proportion of each country's coal fleet is already uneconomical to run. Both scenarios see some 40GW of coal and lignite come offline between 2020 and 2030 across Poland, Czechia, Romania and Bulgaria.
2. Both a 50% and a 55% carbon price scenario entrench coal-to-gas fuel switching, but a higher carbon price sees renewables eat into gas generation as well as coal.
3. A 55% scenario achieves a 82% emissions reduction in power sector carbon emissions from 2018, while a 50% target brings emissions down by 77%.

Key messages

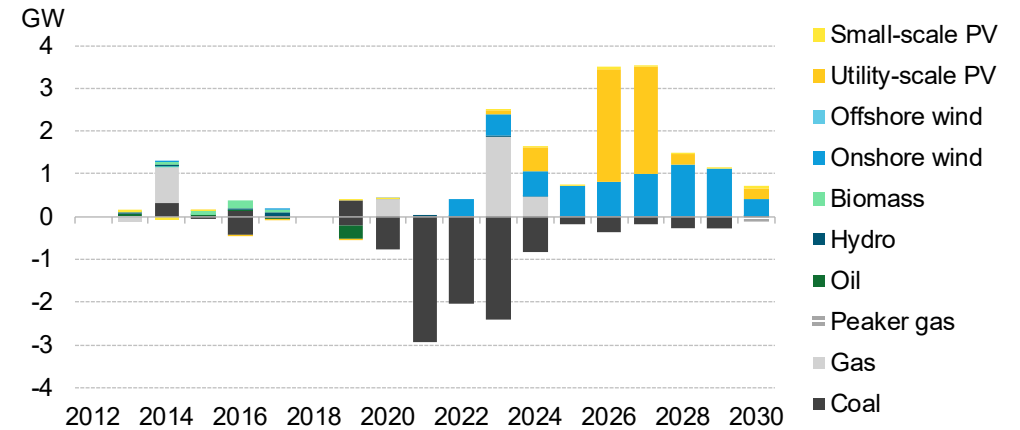
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40GW coal generation closes across the four markets in a 50% scenario

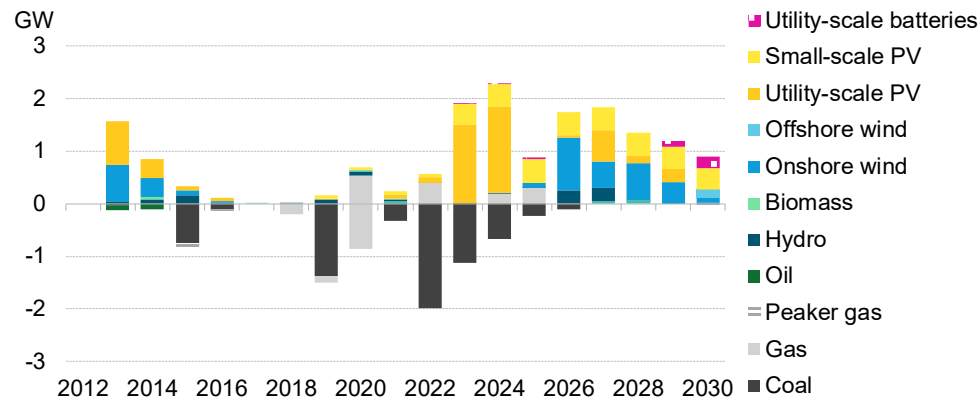
50% scenario - Annual additions and retirements, Poland



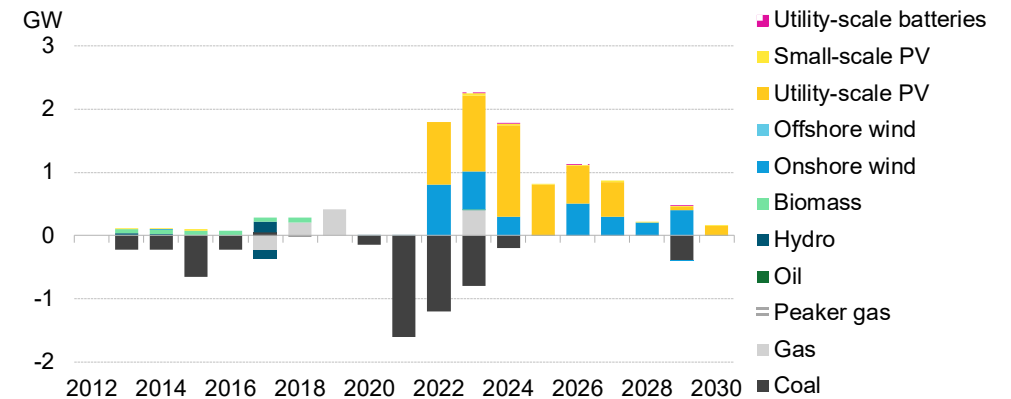
50% scenario - Annual additions and retirements, Czechia



50% scenario - Annual additions and retirements, Romania



50% scenario - Annual additions and retirements, Bulgaria



Source: BloombergNEF

Some 66GW of new renewables are added by 2030

Poland

- Economics alone push Poland's lignite fleet out of the power system by the middle of the decade, and another 15GW of hard coal – more than half of Poland's current fleet – is set to close by 2030.
- Onshore wind and utility-scale PV increase rapidly, reaching 12GW and 24GW respectively by 2030. Another 4GW of offshore wind allows the system to further decarbonize.
- To ensure that the country's needs are met at all times, 6.5GW new gas capacity is installed early in the 2020s, responding to a rapid coal phaseout.

Romania

- Growing costs for Romania's coal fleet sees both coal and lignite exit the system by the mid-2020s. Several planned conversions of lignite plants to combined-cycle gas see 900MW CCGT come online by 2030.
- Utility-scale PV offers the most competitive option for new-build capacity in Romania, and the country sees nearly 4GW of capacity added by 2030, in addition to almost 3GW of new onshore wind. High renewables penetration sees the addition of nearly 400MW of utility-scale battery capacity to provide flexibility.

Czechia

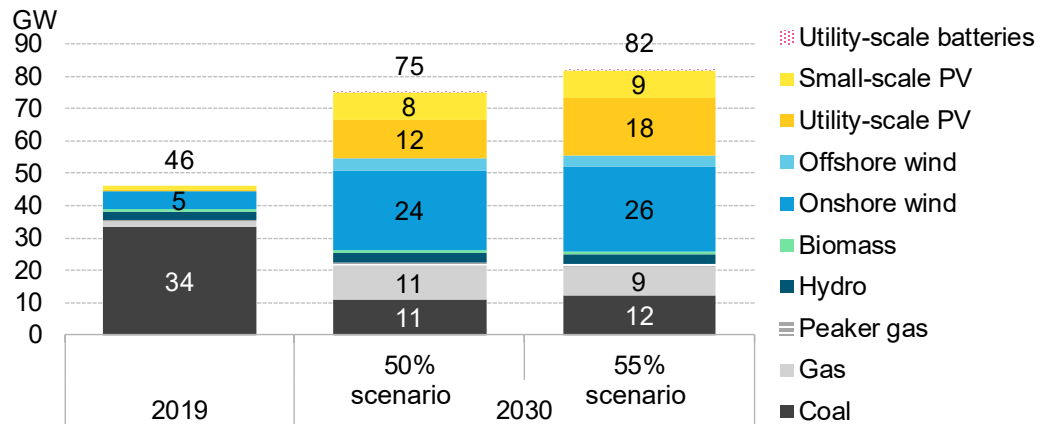
- Czechia sees 12GW of new renewables added by 2030 to replace 9.5GW of uneconomic coal capacity. Some 6.7GW of this total is onshore wind and 6.3GW is utility-scale PV.
- Economics drive this build, but there are concerns that land constraints will depress renewables build. This scenario assumes a low build limit of 400MW in 2022 and then a gradual acceleration year-on-year.
- To account for coal retirements, just over 2.4GW of combined cycle gas capacity is added in an economics-driven scenario.

Bulgaria

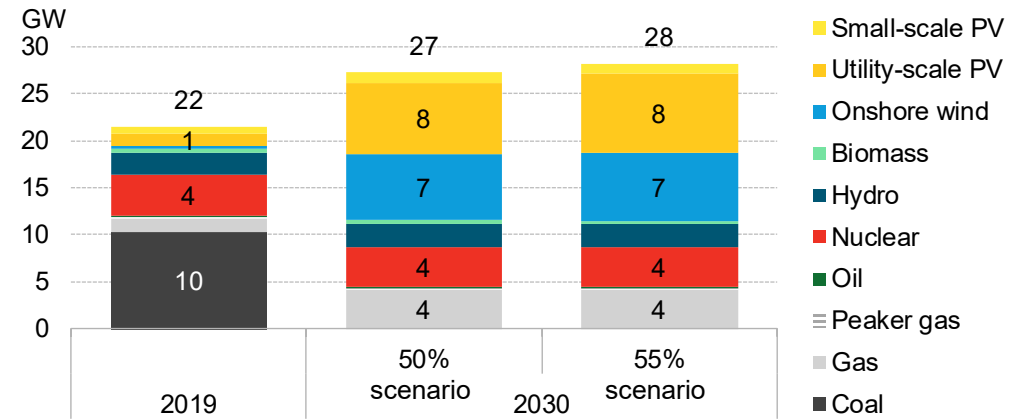
- A 50% scenario carbon price scenario drives an almost total coal phase-out in Bulgaria, with almost all capacity coming offline by 2024 due to already uncompetitive economics. Less than 200MW of lignite remains in the system in 2030.
- Renewables are able to replace nearly all of this capacity, with almost 9GW of wind and solar combined added by 2030. Just 400MW of CCGT is added to the system.

A 55% emissions reduction scenario spurs additional 10GW of renewables build

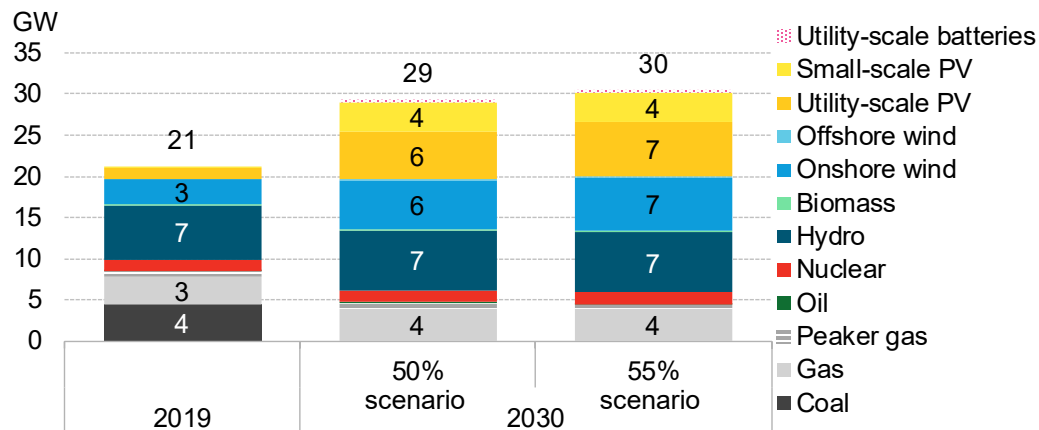
Capacity mix 2019 and 2030, Poland



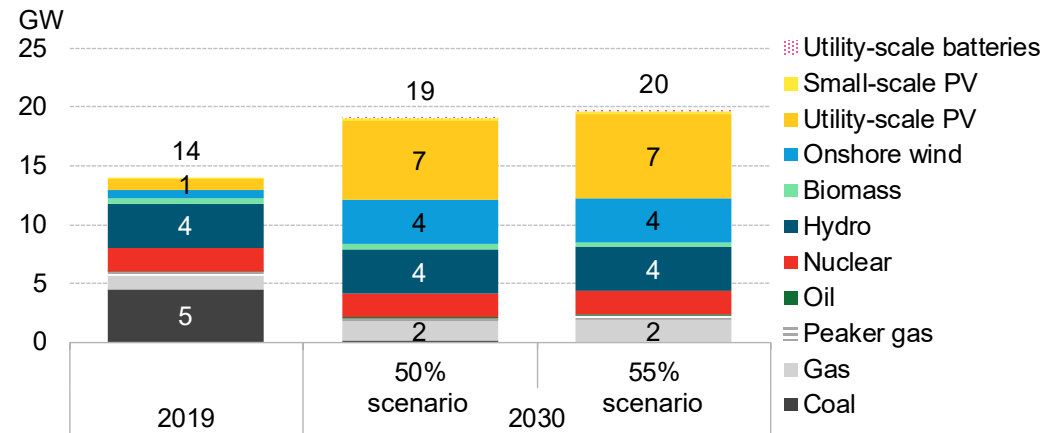
Capacity mix 2019 and 2030, Czechia



Capacity mix 2019 and 2030, Romania



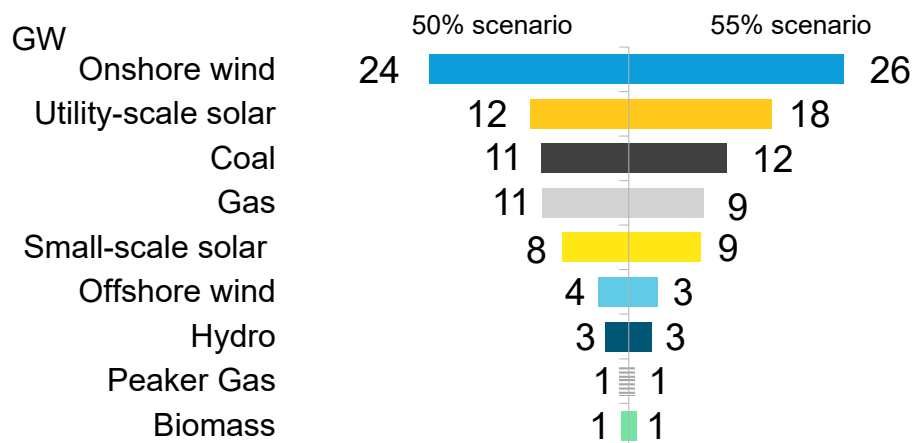
Capacity mix 2019 and 2030, Bulgaria



Source: BloombergNEF

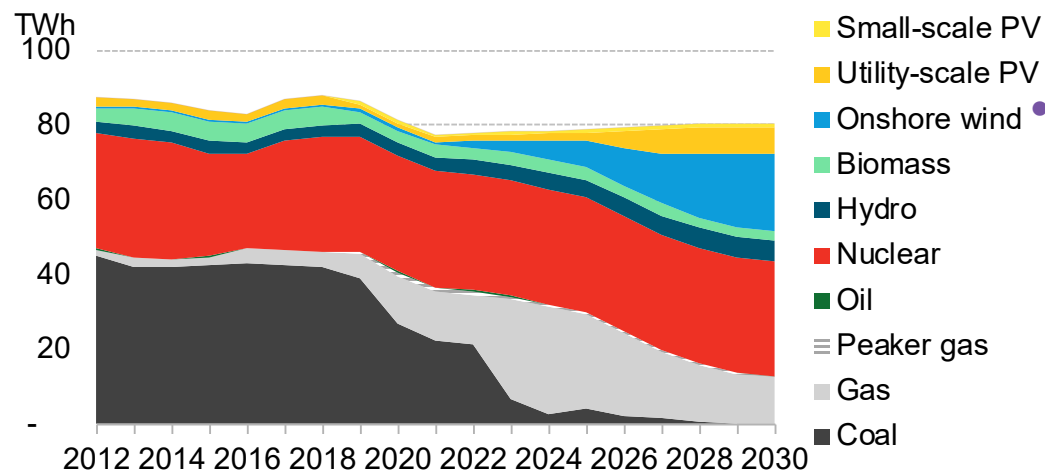
A 55% emissions reduction scenario spurs additional 10GW of renewables build

Poland installed capacity in 2030, 50% vs 55% scenario



- Until 2026, the 50% and 55% carbon scenarios follow a similar trajectory, so modeled build-out follows a similar path in both scenarios until the middle of the decade. The 55% scenario drives more significant volumes of renewables build-out, as even gas becomes less competitive.
- In Poland, a 55% scenario sees around 8GW additional renewables build compared to a 50% scenario. However, just under 1GW of additional coal capacity remains online in the 55% scenario compared to 50%. This is due to the pressure of the carbon price on gas margins. Economics suggest that it makes more sense to maintain marginally more coal in the system and build more renewables rather than building out new combined cycle gas capacity.

Czechia generation mix, 50% scenario



- In Czechia, both a 50% and 55% scenario see an end to coal generation in the power sector, as nuclear becomes the largest single technology in the mix. In both scenarios, gas accounts for around a 15% share of generation in 2030, and a full quarter of the country's electricity demand is met by onshore wind. PV also holds a similar place in the mix, accounting for 10% of generation in 2030 in both outlooks, as the presence of nuclear limits further expansion.

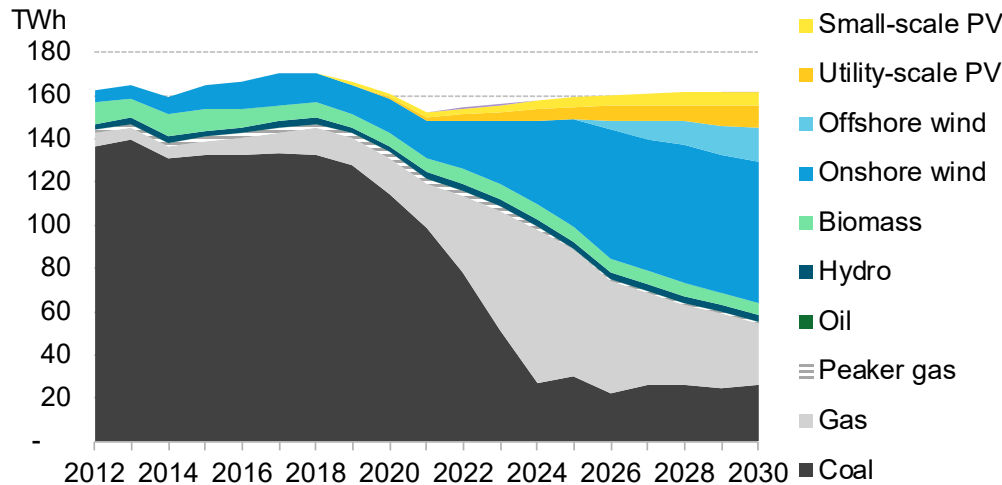
Source: BloombergNEF

Key messages

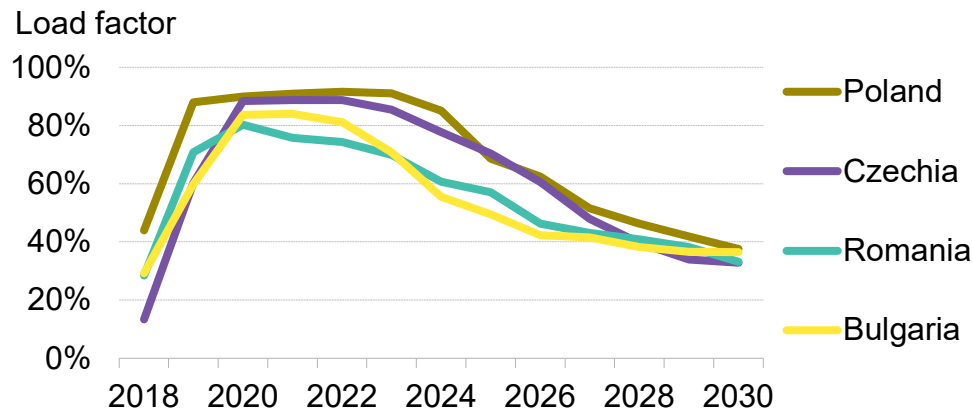
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Gas running hours are squeezed by renewables build-out

55% scenario - Poland generation mix



55% scenario - Utilization of higher efficiency CCGT



Source: BloombergNEF

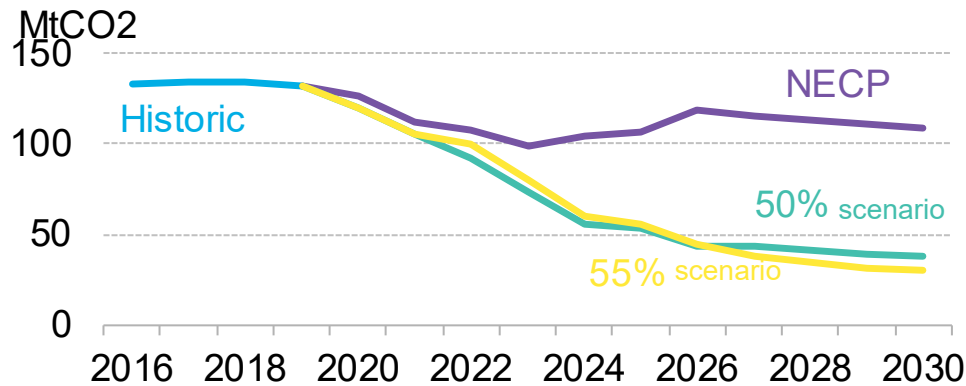
- In both a 50% and 55% carbon scenario, early coal retirements create a gap that needs to be filled with new capacity. In all countries, reasonable renewables deployment limits were implemented for 2022-23, on the assumption that these markets are unlikely to double or triple renewables installations in the next year, given the lead time for construction projects.
- This means that there is a market for new gas capacity through the middle of the decade. Across the four markets, around 10GW of new CCGTs will deliver dispatchable capacity instead of uneconomic coal.
- Over time, renewables build accelerates, due both to increasingly competitive economics and to a gradual lifting of capacity limits on the assumption that renewables markets can increase steadily.
- Higher renewables penetration and rising carbon prices toward 2030 see the usage of gas assets drop, as the marginal cost to run these assets falls below the tipping point when renewables become more competitive.
- After an initial period of extremely high capacity factors, gas generators play their role in integrating a higher share of renewables by providing dispatchable generation and flexibility, with capacity factors leveling out at 40%.

Key messages

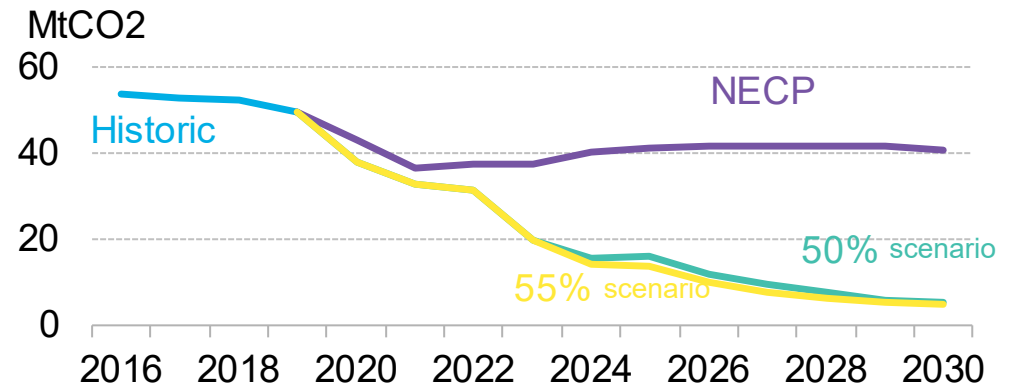
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Carbon emissions can fall by more than 80% from 2018 levels

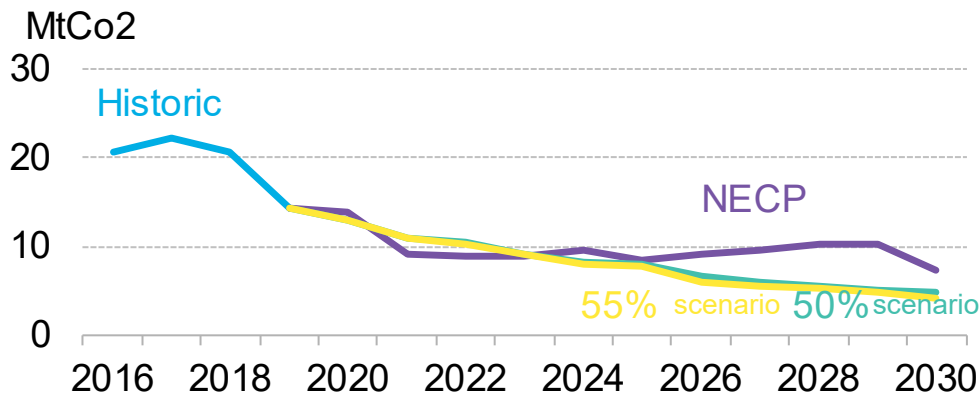
Power sector CO2 emissions, Poland



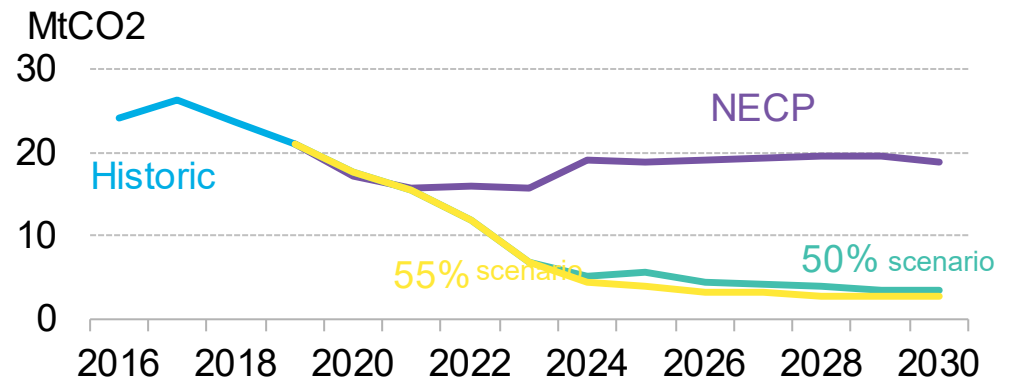
Power sector CO2 emissions, Czechia



Power sector CO2 emissions, Romania



Power sector CO2 emissions, Bulgaria



Source: BloombergNEF. Note: NECP refers to capacity mix outlined in National Energy and Climate Plans

Carbon emissions can fall by more than 80% from 2018 levels

Poland

- Poland released a new energy strategy in September, but its NECP has not been updated to reflect the more ambitious goals outlined by the policy. The capacity mix laid out in the country's current NECP – and modeled without reform to the EU ETS -- sees Poland achieve a 19MtCO₂ absolute reduction in emissions in 2030 from 2018 levels.
- Even in a 50% emissions reduction scenario, Polish power sector emissions are down 97MtCO₂ in 2030 compared to 2018, due to rapid coal closures.

Romania

- Romania's large hydro and nuclear fleets mean that carbon intensity of the grid is already below the EU average. The capacity mix outlined in its NECP sees power sector emissions falling 65% by 2030 from 2018 levels.
- Both emissions reduction scenarios, however, see a coal phaseout by 2025, with a 77% reduction in emissions by 2030 from 2018 levels, in a scenario with an EU target of 50% emissions reduction.

Czechia

- The capacity mix laid out in the current NECP sees Czechia fall short of its already unambitious target to reach a 21% share of renewables in power generation by 2030, from 16% in 2020.
- In both a 50% and 55% emissions reduction scenario, coal generation is completely phased out of the system, allowing for a significant reduction in emissions. By 2030, power sector emissions are less than one-tenth of 2018 levels, and come from gas, which accounts for around 15% of generation in both scenarios by 2030.

Bulgaria

- A rapid drop in power sector emissions in Bulgaria is driven by the exit of uncompetitive coal assets. Coal generation is phased out as early as 2023.
- The country's current NECP, modeled without a reform to the EU ETS, sees emissions in 2030 just 5MtCO₂ below 2018 levels. A 50% emissions reduction target brings about a nearly 20MtCO₂ reduction in absolute emissions in 2030. Gas accounts for about 14% of the generation mix in 2030.

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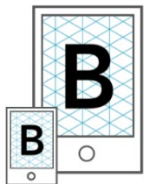
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