The European Power Sector in 2019:

Up-to-Date Analysis on the Electricity Transition

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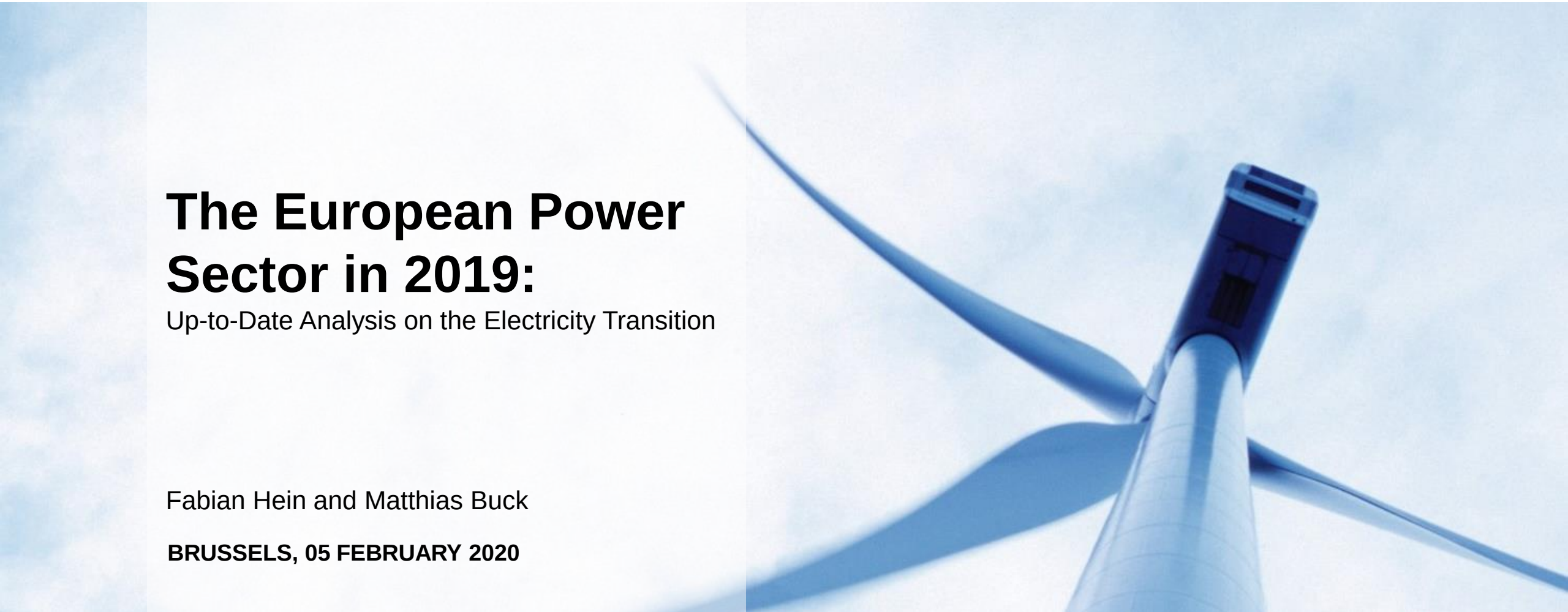

Key Findings

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Coal generation collapsed by 24% in the EU in 2019

- Hard coal generation dropped by 32%, lignite by 16%.
- Main drivers: rising CO_2 price and deployment of renewables.
- Gas replaced half of the coal; solar and wind the other half.
- Coal decline will continue: With Greece and Hungary joining in 2019, 15 Member States have now set phase-out dates. Only Poland, Romania, Bulgaria, Croatia and Slovenia are yet to start.

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Key Findings

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The fall in coal led to CO_2 emissions in Europe's power sector falling by a record 120 Mt, or 12% in 2019

- EU ETS stationary emissions, including heavy industry, fell by 7.6% in 2019; industrial emissions likely decreased by only 1%.
- Emissions covered by the EU ETS continue to fall much faster than the cap.
- A further strengthening of the EU ETS will thus play a central role to accelerate climate action in Europe.

Key Findings

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Renewables rose to a new record supplying 35% of EU electricity

- In 2019, for the first time, wind and solar combined provided more electricity than coal; contributing 18% of EU electricity.
- Western Europe continues to see the strongest increase in wind and solar. Poland and Greece started to engage. The rest of eastern Europe significantly lags behind.
- 2019 also saw record low auction prices for offshore wind (UK) and for solar (Portugal) - below wholesale prices.
- The largest wholesale price decreases occur in countries where wind and solar expanded most.

Key Findings

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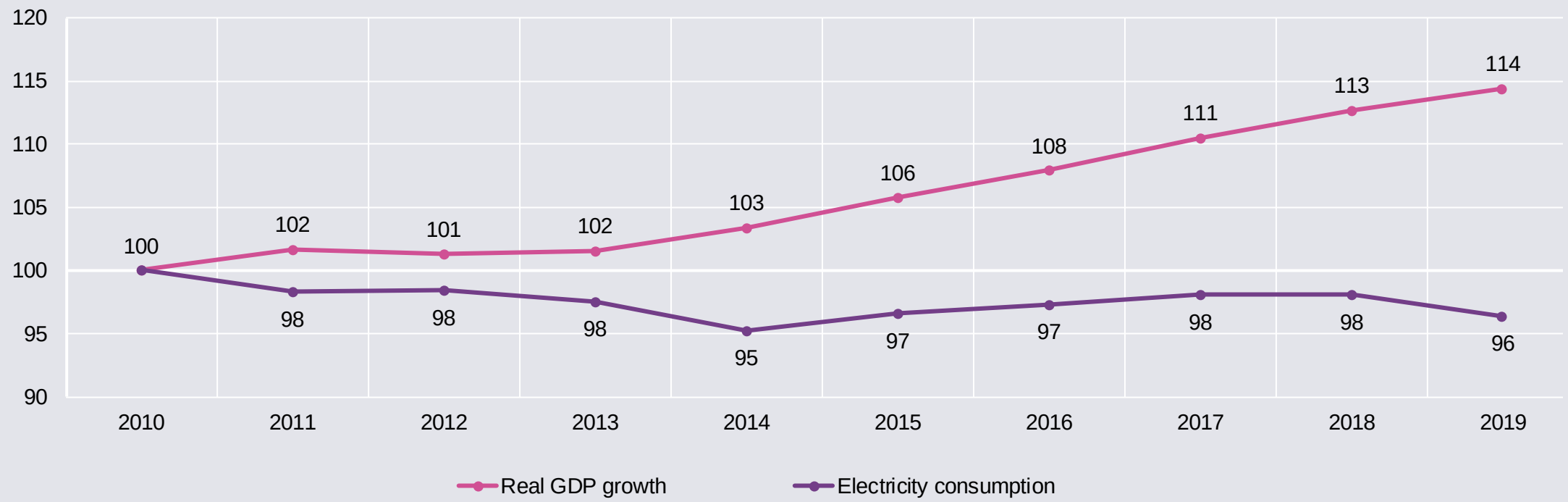
Europe’s energy transition is taking off

- The European Green Deal puts the fight against the climate crisis at the centre of EU policy-making.
- EU heads of state have endorsed the objective of Europe to become the first greenhouse gas neutral continent by 2050.
- The Commission will propose reducing EU greenhouse gas emissions by 2030 to -50% or -55% below 1990 levels.
- Power sector emissions will keep falling, even if sector-coupling results in increased electricity demand.

Electricity consumption decreased by 2% while GDP grew by 1.4% in 2019

EU 28 electricity consumption, GDP (indexed)



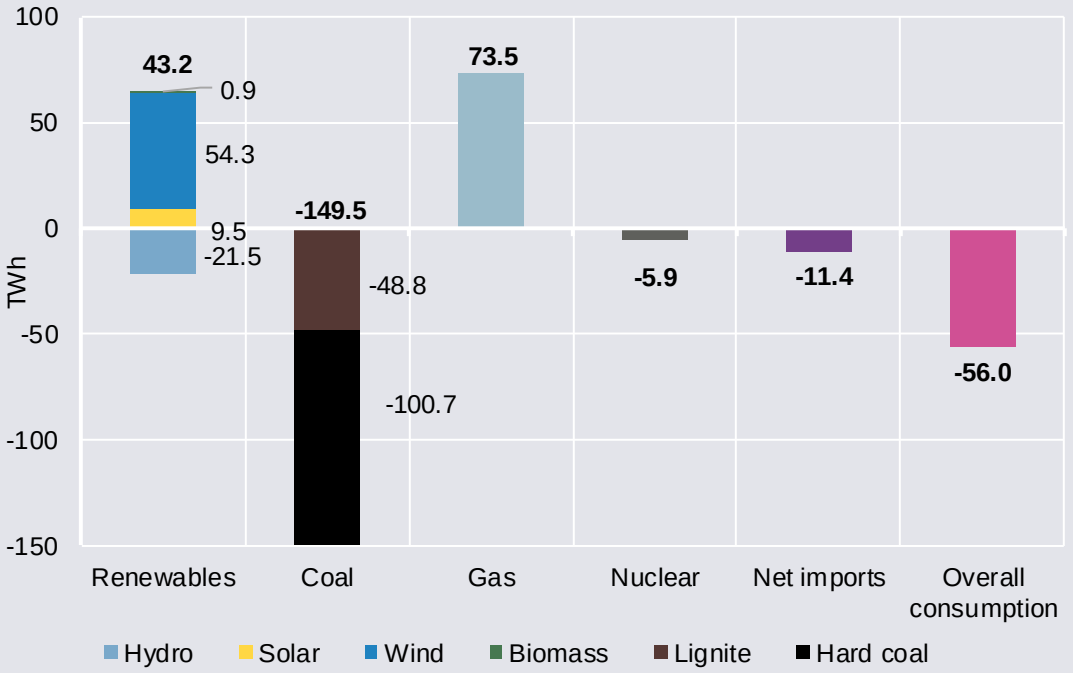
Electricity consumption from EUROSTAT data to 2017; Authors' calculations for 2018 and 2019; GDP from EUROSTAT

Renewables and gas displaced coal

Structural: Wind, solar (DE, UK, FR, ES, SWE)

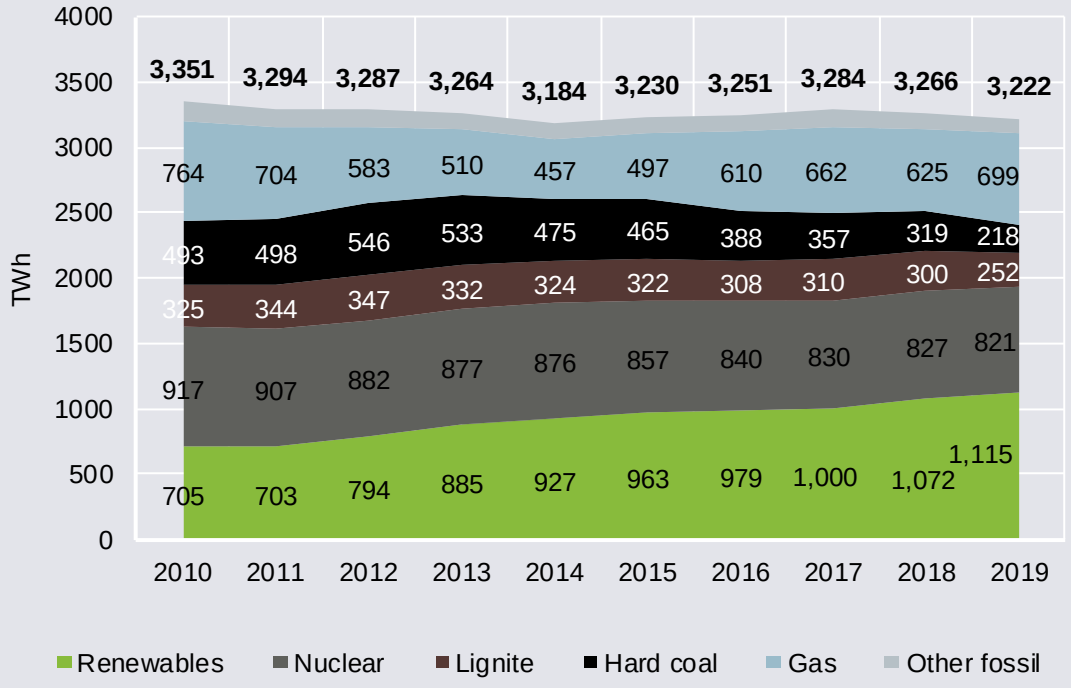
Weather: good wind and solar conditions

Changes in EU 28 electricity generation from 2018 to 2019



EUROSTAT data to 2017; Authors' calculations for 2018 and 2019

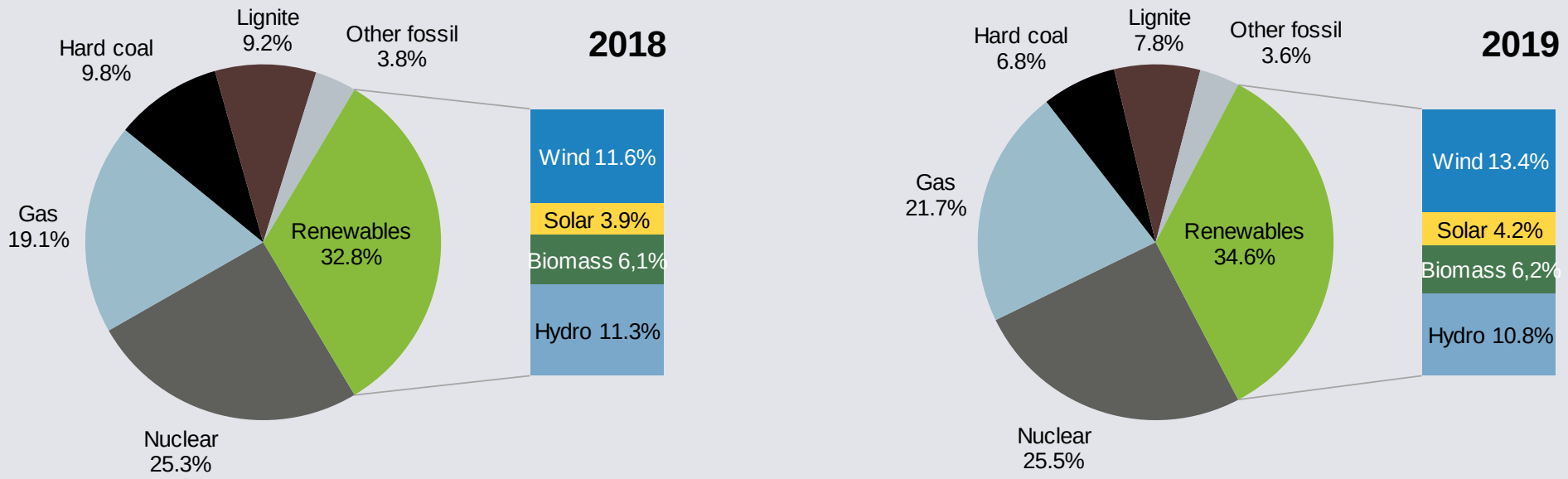
EU 28 electricity generation



EUROSTAT data to 2017; Authors' calculations for 2018 and 2019

The EU power mix: Wind and PV on the rise; coal declines

EU 28 generation mix



EUROSTAT data to 2017; Authors' calculations for 2018 and 2019

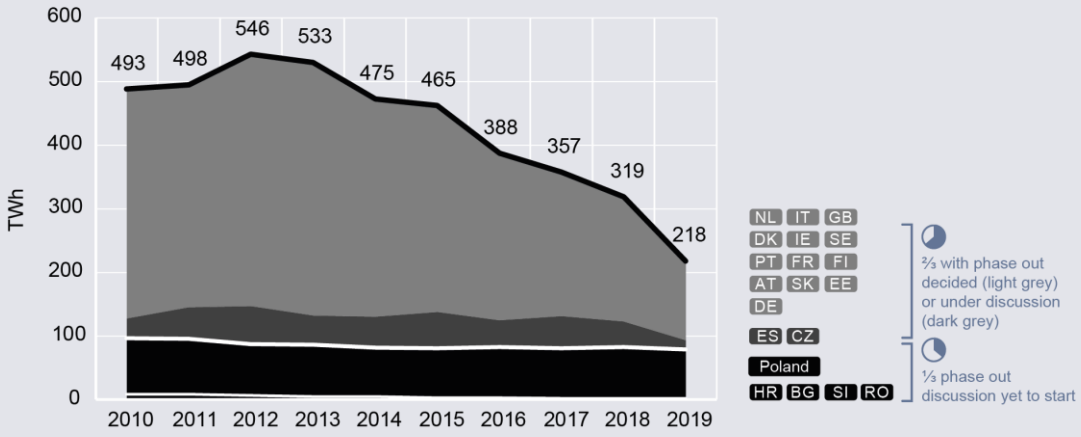
Coal is declining throughout Europe:
...**Hard coal** fell by 32 percent
...**Lignite** dropped by 16 percent

sandbag smarter climate policy

Agora Energiewende

Hard coal generation (EU 28)

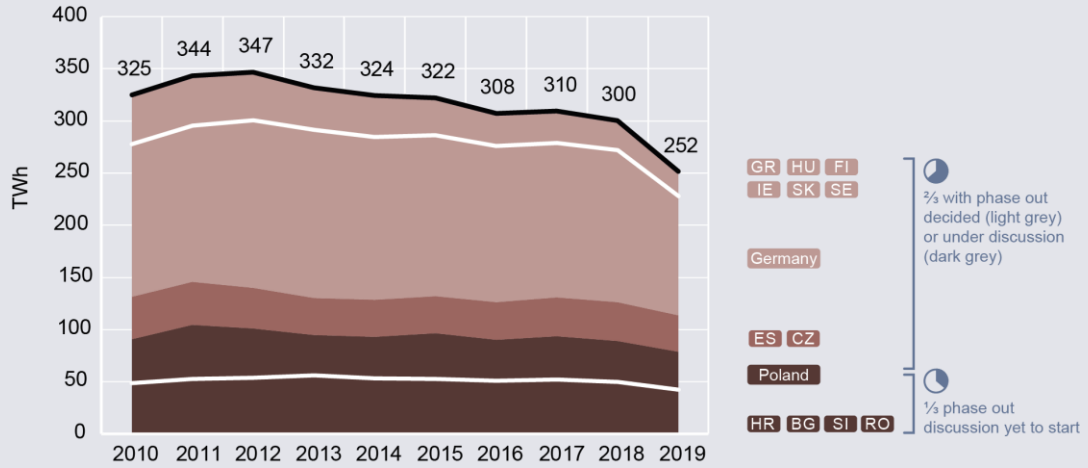
2018 to 2019: -32%
2012 to 2019: -60%



EUROSTAT data to 2017; Authors' calculations for 2018 and 2019; phase out details from Beyond Coal 2020

Lignite generation (EU 28)

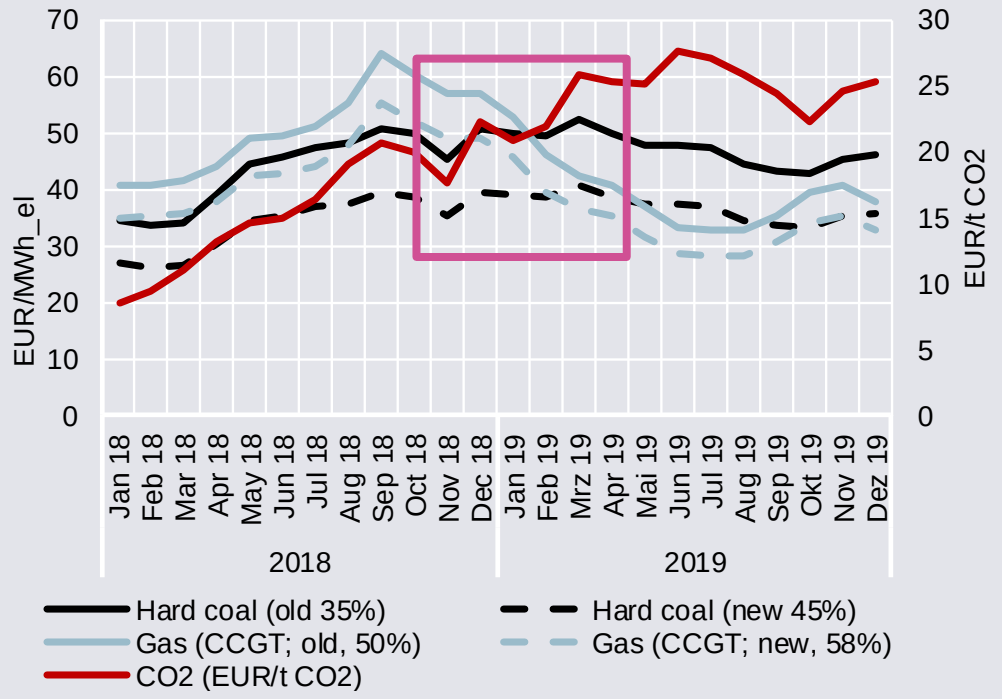
2018 to 2019: -16%
2012 to 2019: -27%



EUROSTAT data to 2017; Authors' calculations for 2018 and 2019; phase out details from Beyond Coal 2020

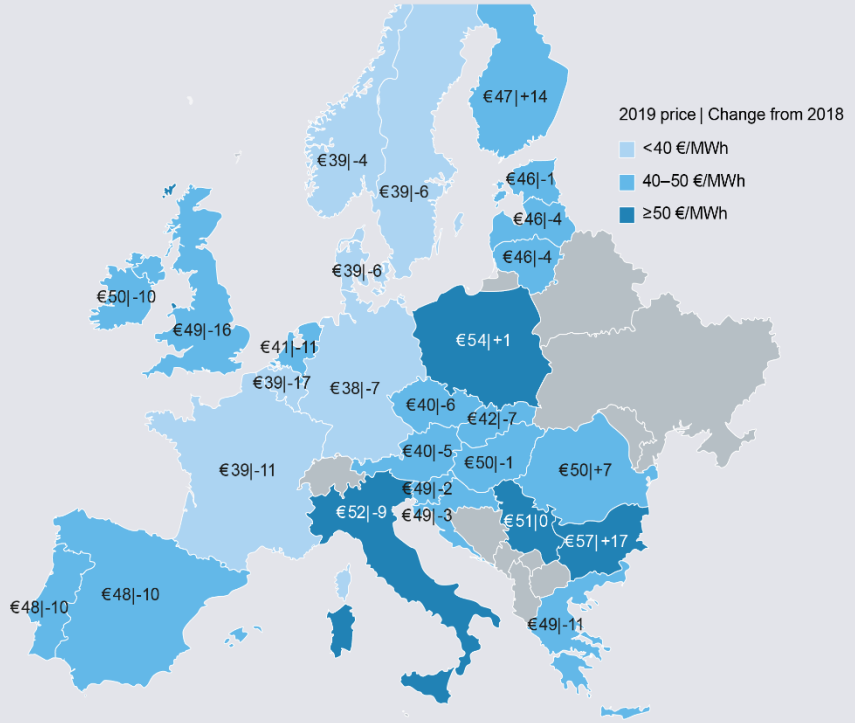
The increase in CO_2 prices makes gas cheaper than coal

Coal and gas plant running costs (average day-ahead price)



World Bank 2019; Bundesbank 2019; UBA 2015; DEhSt 2019; Authors' calculations

2019 wholesale electricity prices (average day-ahead)



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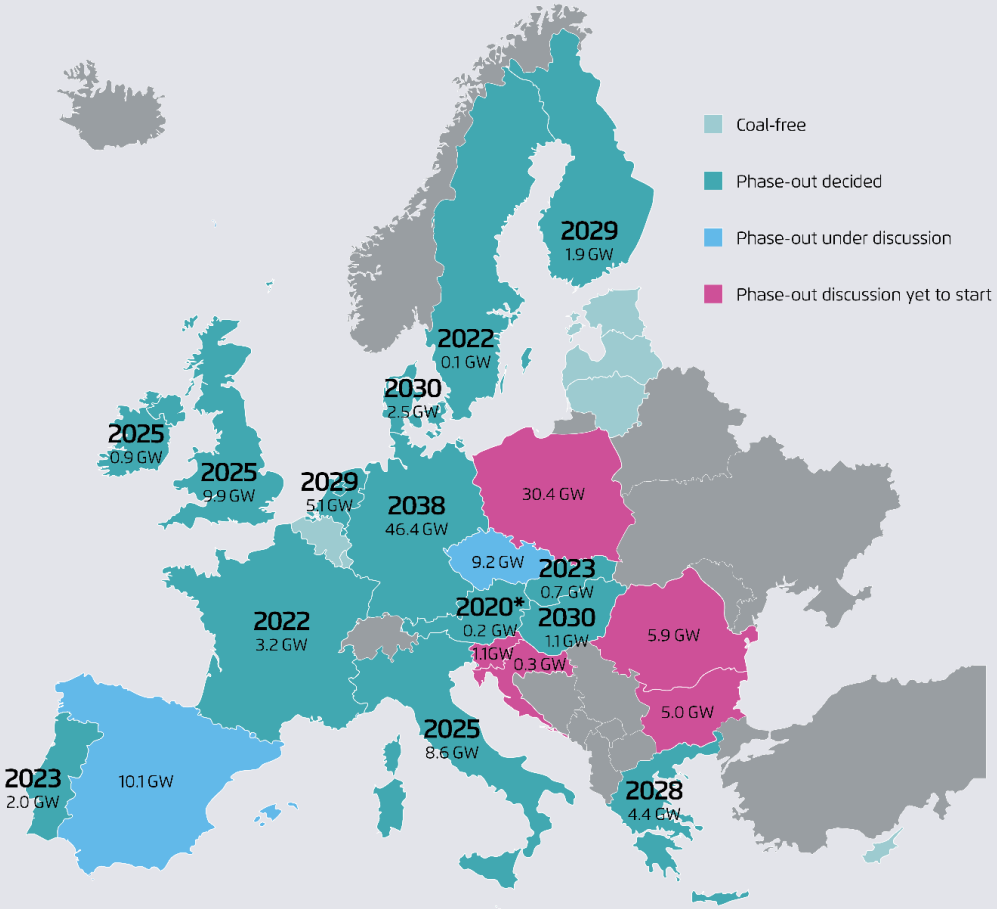
The decline of coal will continue, driven by coal phase-out plans and market forces



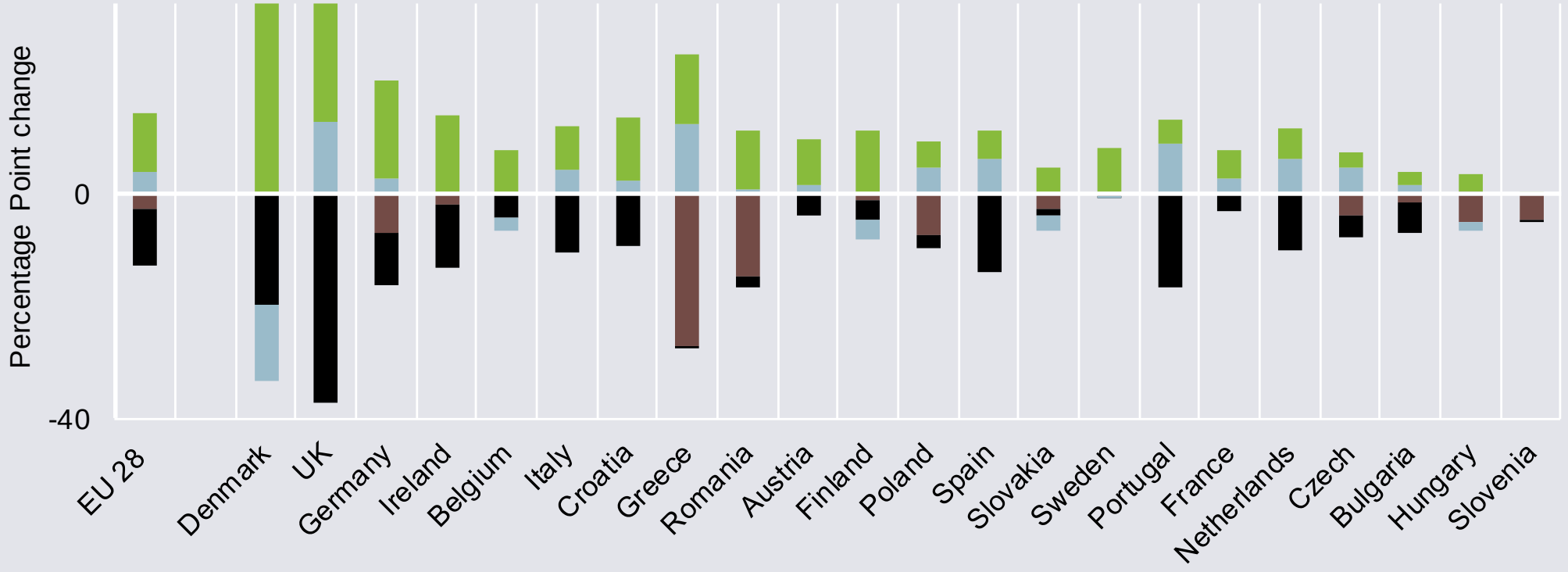
An end date for coal is the new normal, not the exception

- Map shows coal phase-out dates and remaining coal capacities
- 5 EU Countries have no coal; 15 have phase-out plans in place; 2 are discussing it.
- Only 5 countries are missing (in order of importance): Poland, Romania, Bulgaria, Slovenia, Croatia

- Europe Beyond Coal 2020

Countries with the largest declines in hard coal also have the biggest increases in renewables

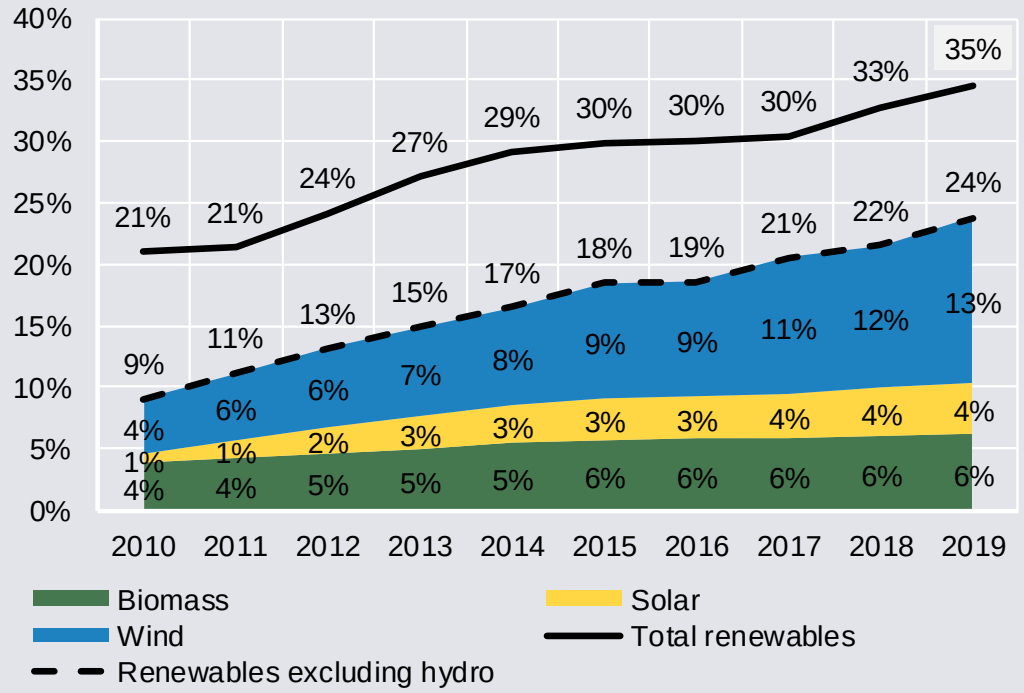
Electricity mix percentage point changes from 2012 to 2019



EUROSTAT data to 2017; Authors' calculations for 2019

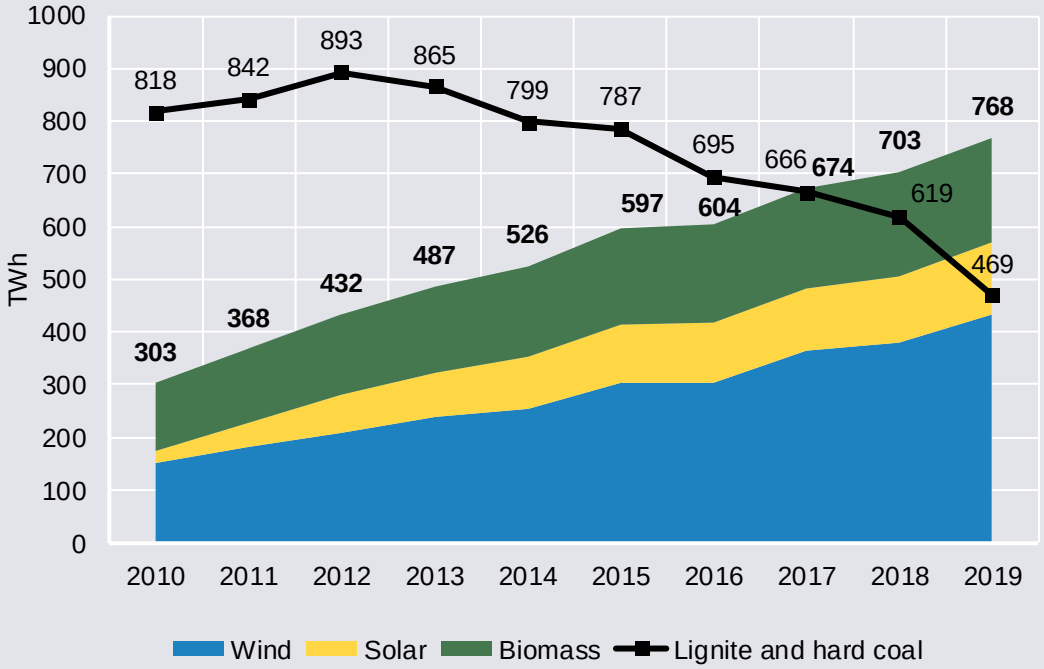
Renewables reach 35% of gross electricity production; wind and solar provide more electricity than lignite and hard coal

Renewables share (as % of gross electricity production; EU 28)



EUROSTAT data to 2017; Authors' calculations for 2018 and 2019

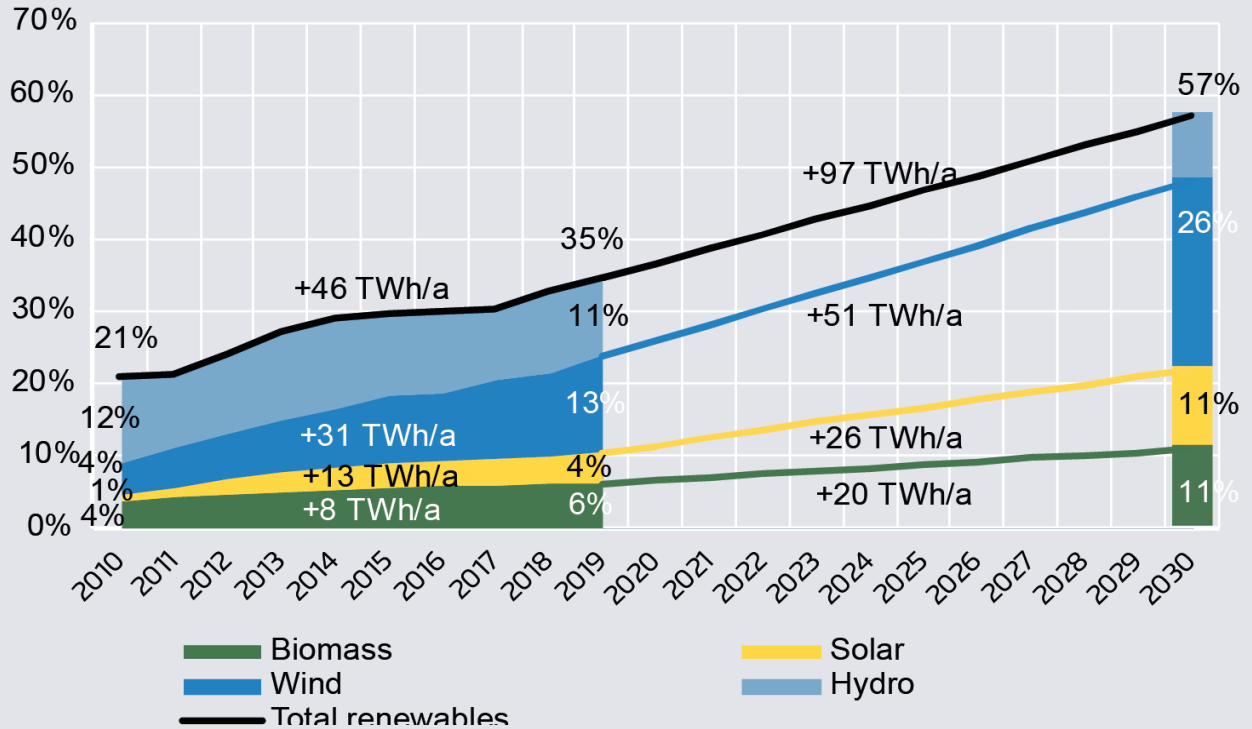
Generation of wind, solar, biomass, lignite and hard coal combined



EUROSTAT data to 2017; Authors' calculations for 2018 and 2019

To reach the current 2030 renewables target, renewables must be deployed at twice the speed from 2020-2030 compared to 2010-2019

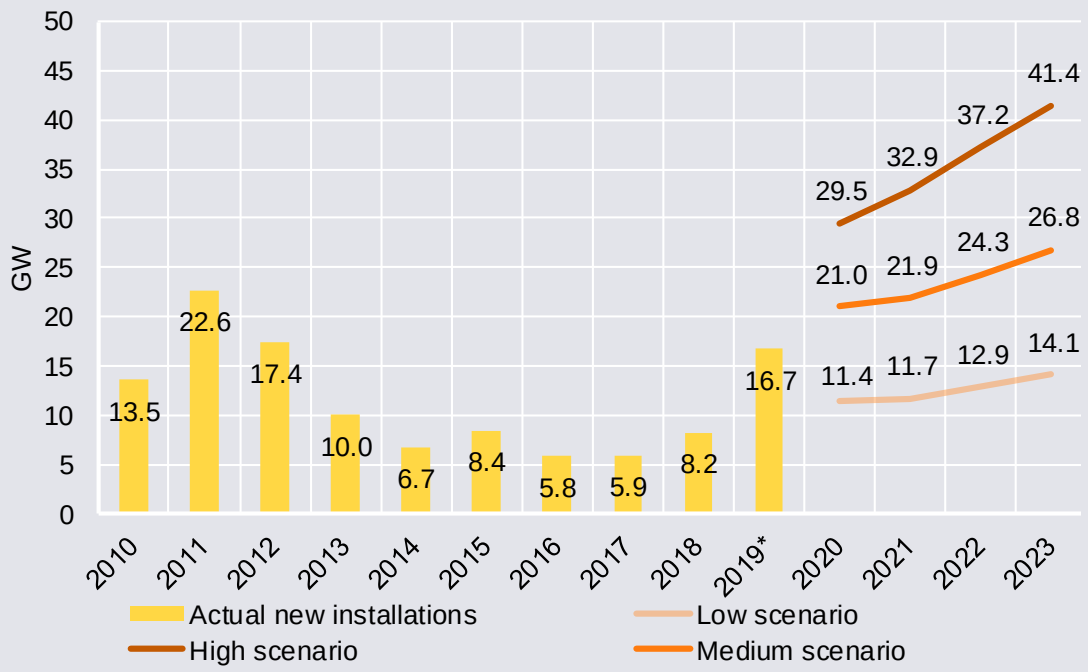
2030 projection of renewable electricity share in European Commission's Long Term Strategy



EUROSTAT data to 2017; Authors' calculations for 2018 and 2019; 2030 projection from "Long Term Strategy", European Commission 2018, dashed lines show projection

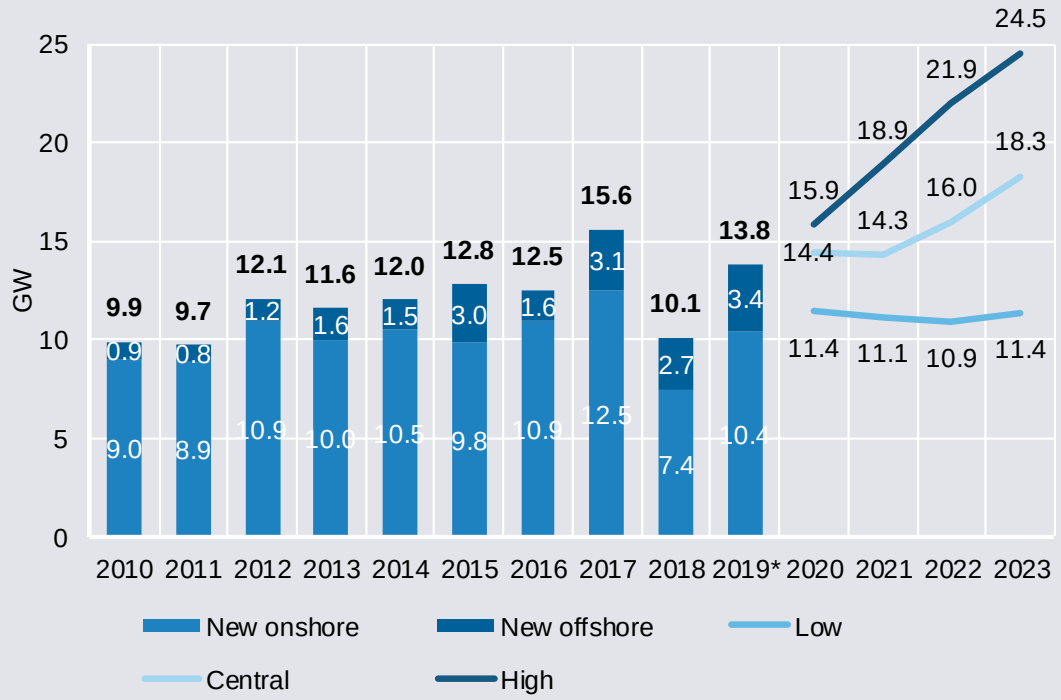
To avoid heavy reliance on biomass, wind and solar capacity should develop along high forecasts: Added capacity and latest forecasts

EU 28 annual new solar PV installations



SolarPower Europe 2019; *latest forecast

EU 28 annual new wind installations



WindEurope 2019, *latest forecast

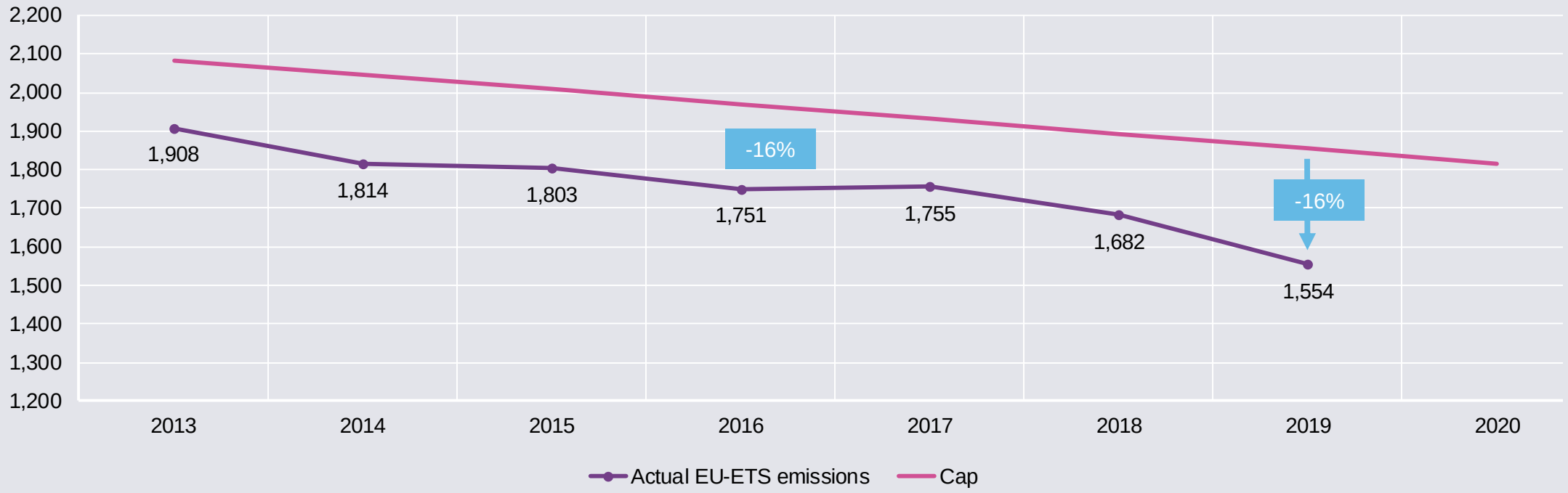
Almost all EU countries are adding wind and solar; though often from very low levels

Relative (left) and absolute (right) numbers of additional wind and solar generation in 2019

Authors‘ calculations

ETS emissions again falling faster than the cap. Strengthening the EU ETS must play a central role in raising EU climate ambition

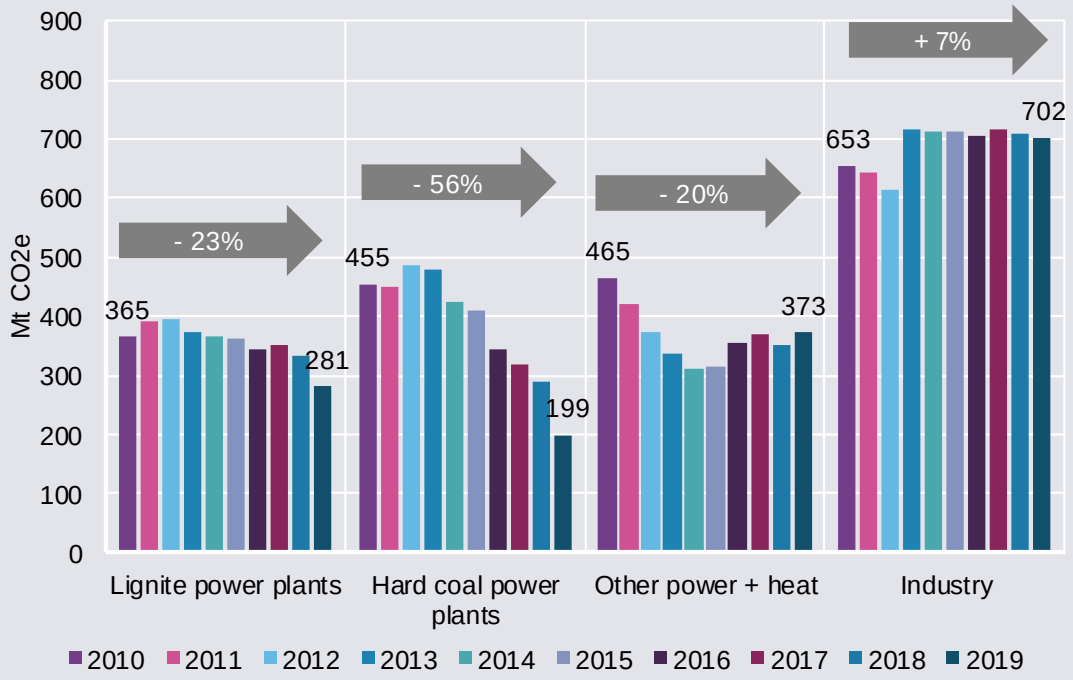
EU ETS emissions and cap



EEA data to 2018, scope-adjusted; Authors' calculations for 2019

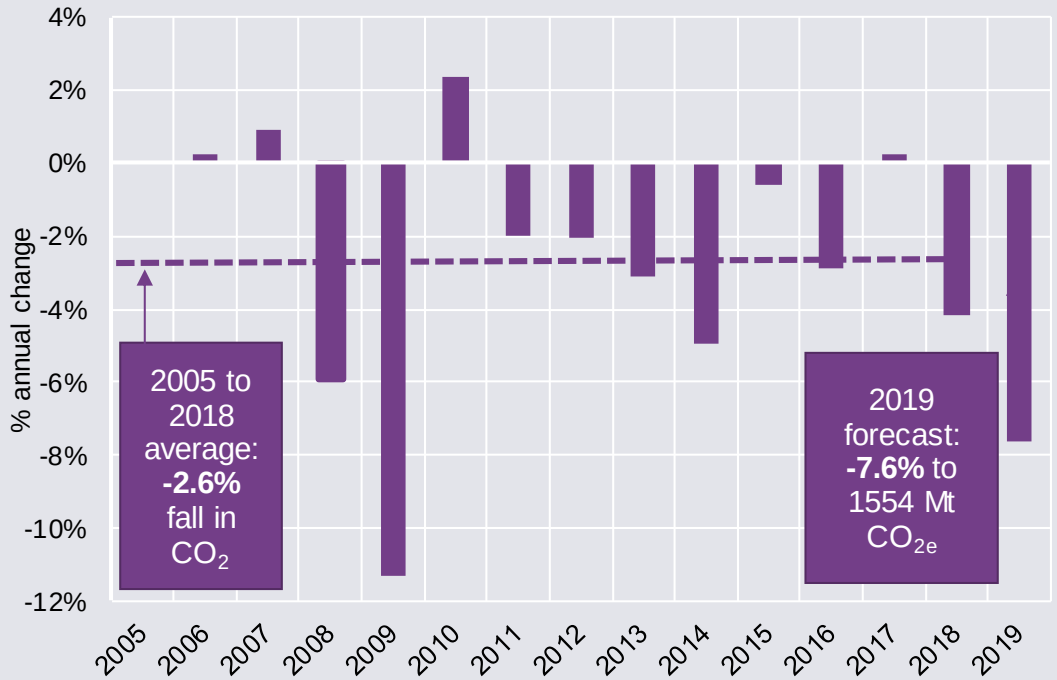
The largest ever fall in power sector emissions (-12%) and stagnating industry emissions (-1%) combine to -7.6% of EU ETS emissions

EU-ETS Emissions by sector



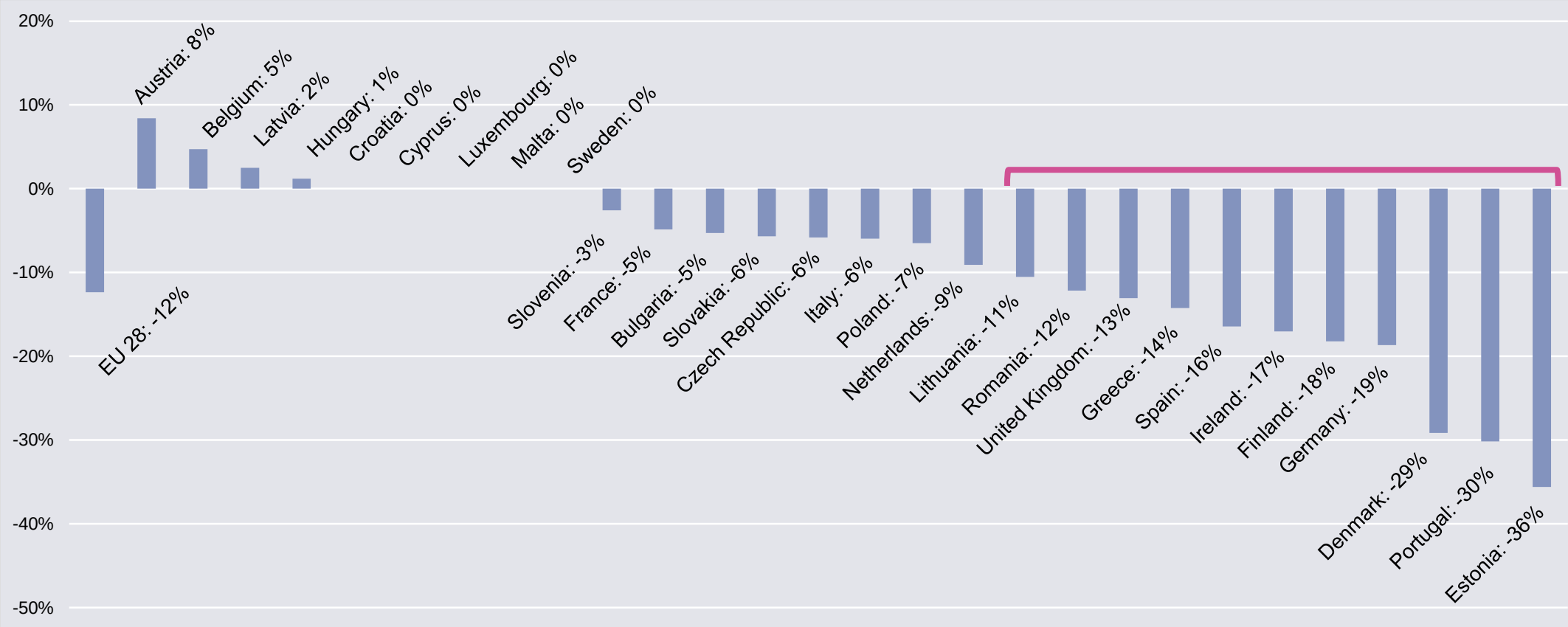
EUTL data to 2018, based on Sandbag classifications; Authors' calculations for 2019

EU-ETS Emissions, annual change

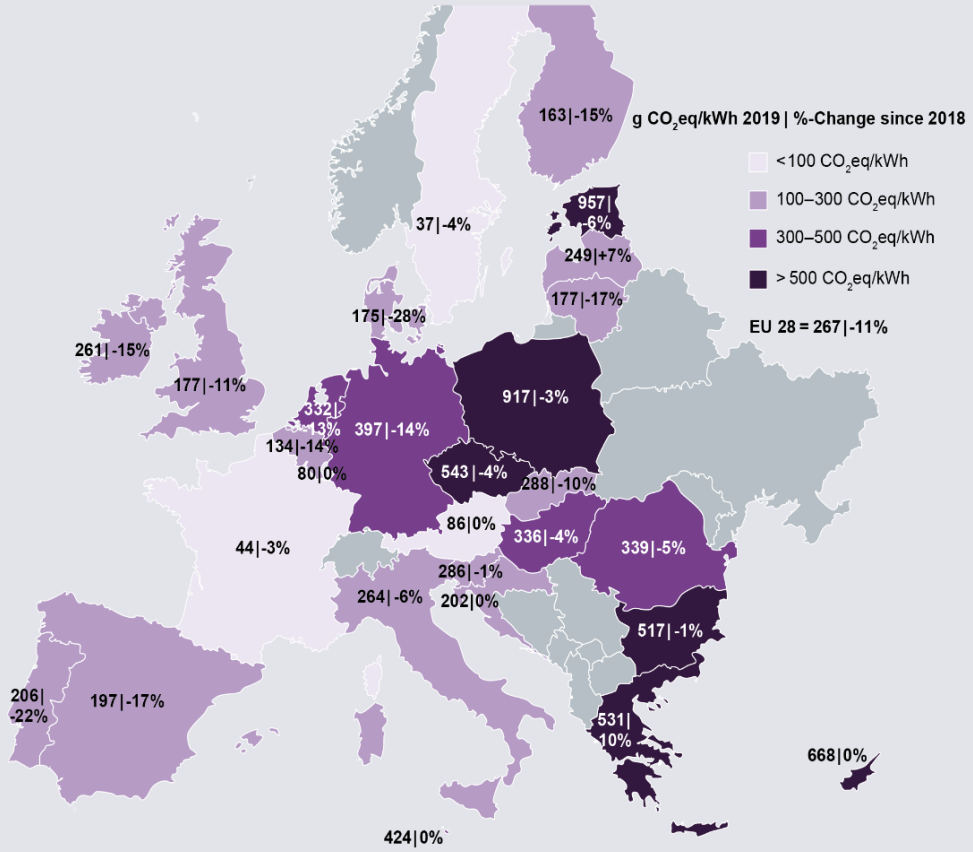


EEA data to 2018, scope-adjusted; Authors' calculations for 2019

Over 10% emissions decline in more than 1/3 of EU member states:
Relative EU ETS emissions change from 2018 to 2019



Carbon intensity in the EU power mix fell year-on-year to 267gCO_2/kWh, or –11%. Huge differences prevail between the national mixes



European Environment Agency, Authors' calculations

- CO_2-intensity of electricity consumption
- Carbon intensity down by 11 percent
- Decrease takes place almost everywhere, although this effect is smaller in coal-heavy countries without plenty of renewables
- Estonia still has by far the highest specific emissions in Europe (957 gCO_2/kWh) followed by Poland (917 gCO_2/kWh)

Thank you for your attention!

Questions or Comments? Feel free to contact us:

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