# Implications of national policies on the EU ETS and the European electricity market

*Analysis based on the case of the German coal phase-out*

**Murielle Gagnebin**

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# Agora Energiewende – Who are we?

Think Tank with more than 40 Experts

Independent and non-partisan

Project duration 2012 – 2021

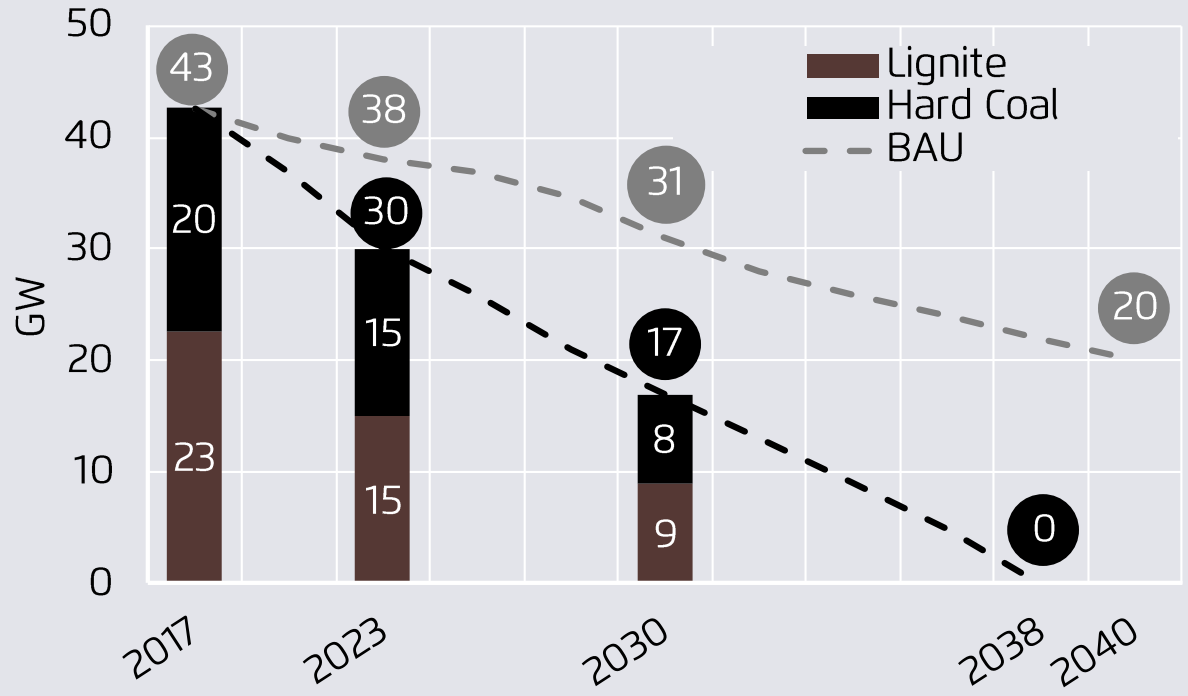
Financed by Mercator Foundation & European Climate Foundation

Mission: How do we make the energy transition in Germany a success story?

Methods: Analyzing, assessing, understanding, discussing, putting forward proposals, Council of Agora

# In January 2019, the Commission “Growth, Structure Change and Employment” agreed upon a coal phase-out plan that decreases coal capacities much faster than in BAU

Capacity development along the phase out plan and in the business as usual




Aurora Energy Research, Kommission WSB

- With the phase-out plan by 2038 (at the latest) Germany can achieve its medium and long term climate targets. However, these targets are still not compliant to a fair contribution regarding the Paris Agreement
- The coal compromise represents a comprehensive package of measures, which offers modernisation and growth perspectives for the traditional coal regions, as well as compensation to the industry - and at the same time not putting security of supply at risk
- The costs of the coal phase-out plan for the federal budget is still uncertain but is estimated at 69-93 bn€ until 2038 (3,5-5 bn€ per year, 1-1,4% of the total federal budget)

# The German electricity sector accounts for about 18% of the GHG emissions covered by the EU ETS in 2018

Total GHG emissions, emissions covered by the EU ETS excluding aviation and emissions of the electricity sector in $MtCO_2$-eq in 2018 in Germany and France


Agora Energiewende based on European Environment Agency, German Ministry of Environment, RTE, Observatoire climat-énergie

- Germany is the biggest emitter of GHG emissions in the EU ETS with 25% of the emissions covered by the scheme in 2018, followed by Poland and the UK
- The electricity sector represents about 35% of the German emissions in 2018, 71% of the German emissions covered by the EU ETS. In France, emissions of the electricity sector represent 21% of the French emissions covered by the EU ETS, but only 4% of its total emissions
- $CO_2$ emissions of the German electricity sector have been stagnating between 2005 and 2017, but reducing since – as some lignite power plants were put into the reserve (2,7 GW) and the commodity price development now favourable to the switch from old coal PP to new gas PP

* Total GHG emissions for France are for 2017

# The price of $CO_2$ certificates has been steadily increasing since 2018, both on the spot and futures markets. Future developments depend on various criteria

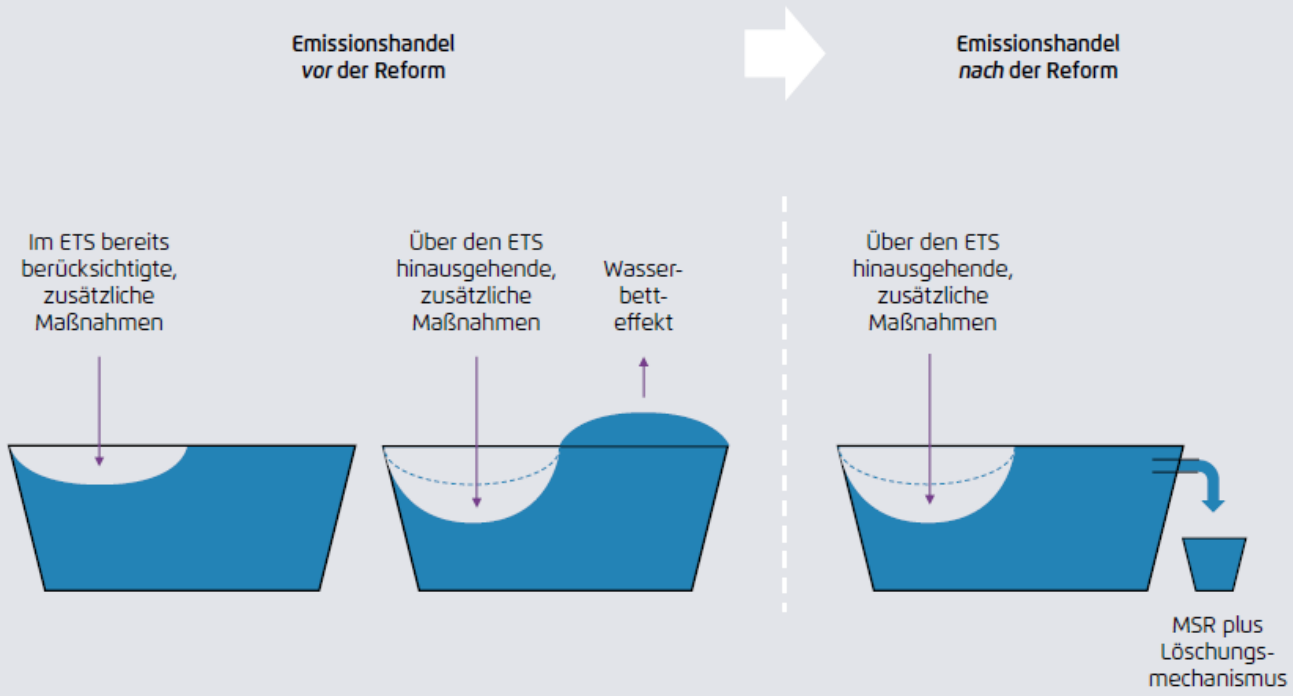
$CO_2$ European Emission Allowances – futures price in €/t for delivery in December 2022 since Dec 2017


ICE

- The carbon price varies around 25€/$tCO_2$ on the spot market since April 2019, while futures with delivery until Dec. 2022 vary around 26-27€/$tCO_2$, showing market actors so far do not expect any notable price increase
- In the longer term, various analysts expect carbon prices around 22-27€/$tCO_2$ in 2028, but those expectations diverge in 2030 at the end of Phase 4 (between 15-35 €/t)
- Price evolution depends on:
  - Reduction path of the cap compared to level of actual emissions
  - Switching price between coal and gas power plants
  - Market liquidity, which also depends on the behavior of market actors

# With the reform of the ETS Directive, States can cancel the certificates freed by national climate instruments such as the German coal phase-out, neutralising the waterbed effect

From the waterbed to the bathtub

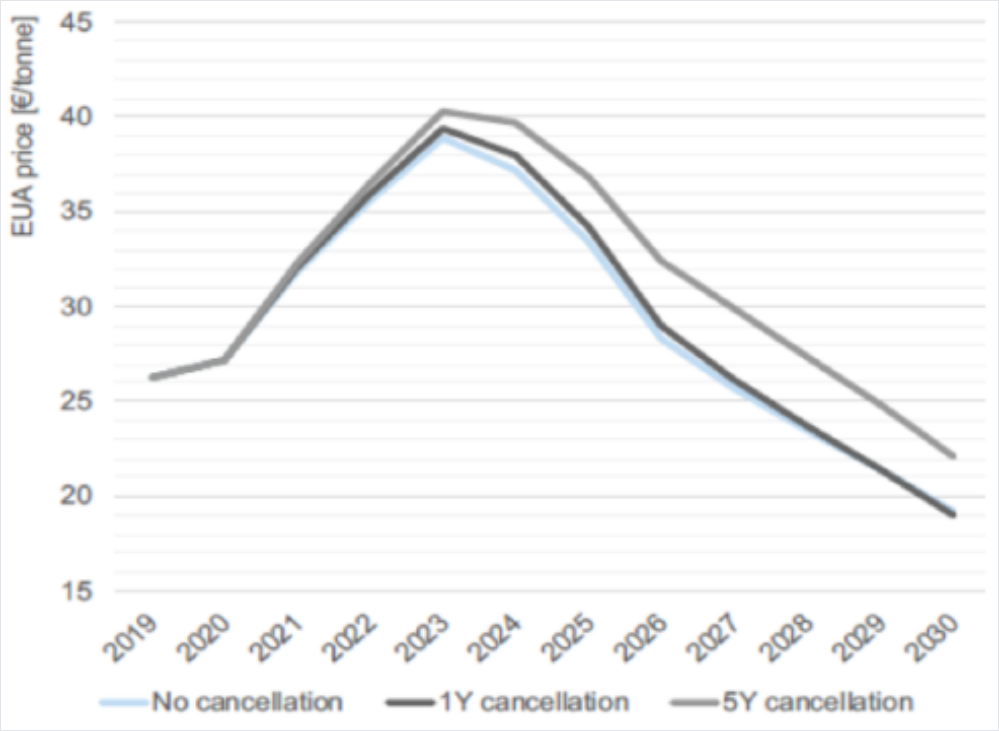



Agora Energiewende (2018)

- Before the reform, additional national measures led to a surplus of emissions allowances, leading to the transfer of emissions – either geographically or to a later point in time (waterbed effect)
- The reform introduced:
  - the successive invalidation of surplus through the mechanism of the MSR
  - in case of decommissioning of power plants: possibility to invalidate the corresponding certificates, amounting to the emissions of the decommissioned power plant deducted with the emissions of the power plant replacing it (2:1 relation)
- If Germany invalidates the certificates freed by the phasing out of coal power plants – as proposed by the Coal Commission – the waterbed effect will not occur

# Some incertainties remain which require further analysis on the impact of national instruments on the evolution of the certificate surplus, the $CO_2$ price or the overall emissions

The EUA price development over Phase IV according to three scenarios around the German coal phase-out and linked cancellation from the auction calendar



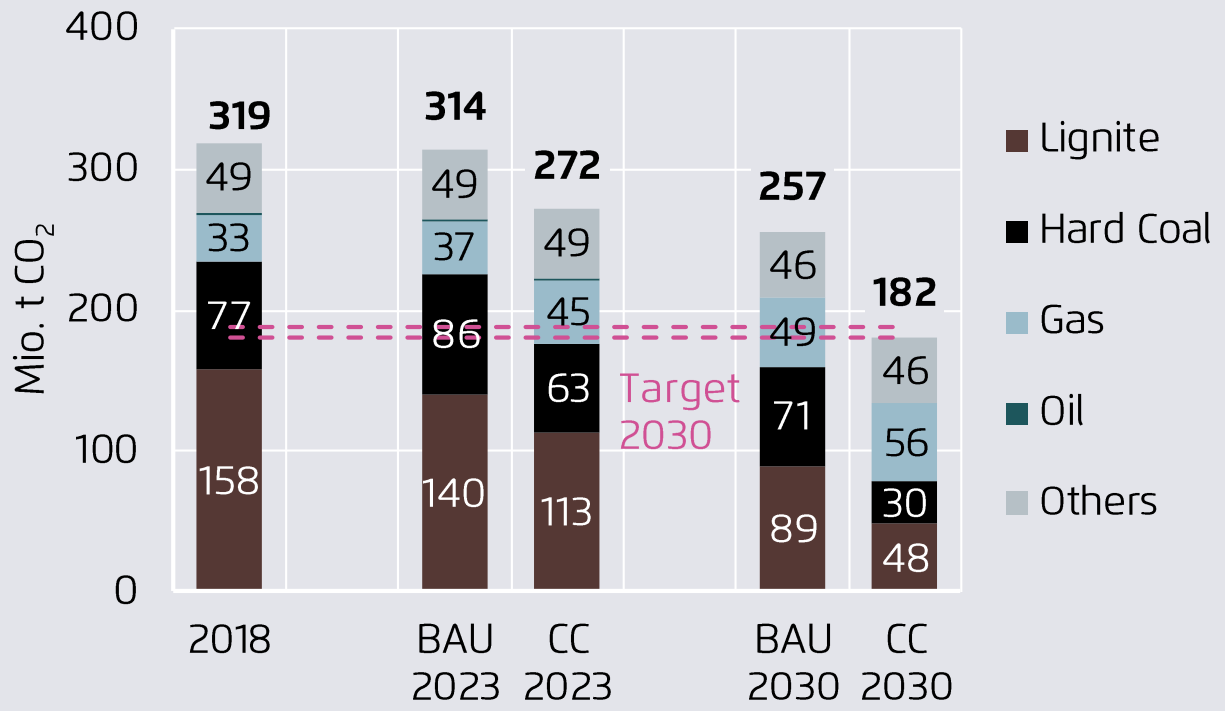

ICIS, February 2019

- Uncertainties affecting surplus and prices:
  - It is unclear when and at which rate the German State is going to cancel the certificates linked to the emissions reduction due to coal phase-out
  - Other national measures leading to additional emissions reduction can at this stage not be linked with a unilateral cancellation of certificates by the state
  - The annual emissions cap is set for the whole period
- The revised EU ETS Directive foresees a review of the MSR for 2021 and 2026. It will be necessary to sharpen the annual emissions cap as well as better coordinate the ETS with national instruments in order to integrate the reinforced target of net zero by 2050
- A $CO_2$ price floor would prevent the $CO_2$ price from falling again

# Effects of the coal phase-out plan on the power sector

# The power sector is likely to meet its sectoral climate target for 2030, but without additional measures in the heating and transport sector, the overall climate target is still at risk

$CO_2$ emissions in the power sector by source in 2018, 2023 and 2030

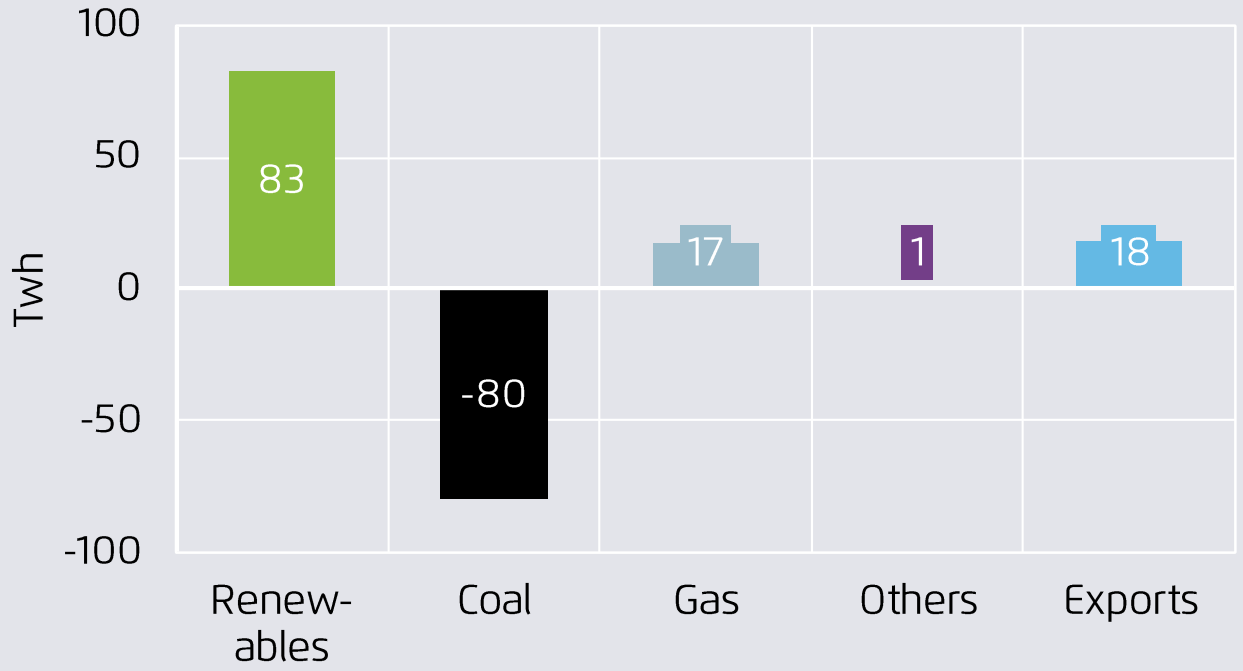



Aurora Energy Research (2019)

- The German coal phase-out plan should bring an additional reduction of 350 $MtCO_2$ by 2030 and about 1 billion $tCO_2$ by 2038
- The plan includes the development of RES to reach 65% of consumption by 2030 as defined by the government in 2018 as well as the deletion of the surplus certificates linked to the closure of coal power plants

# The decrease in coal generation will be supplemented mainly by renewable energy sources within Germany

Changes in power generation between BAU and Coal Compromise in 2030

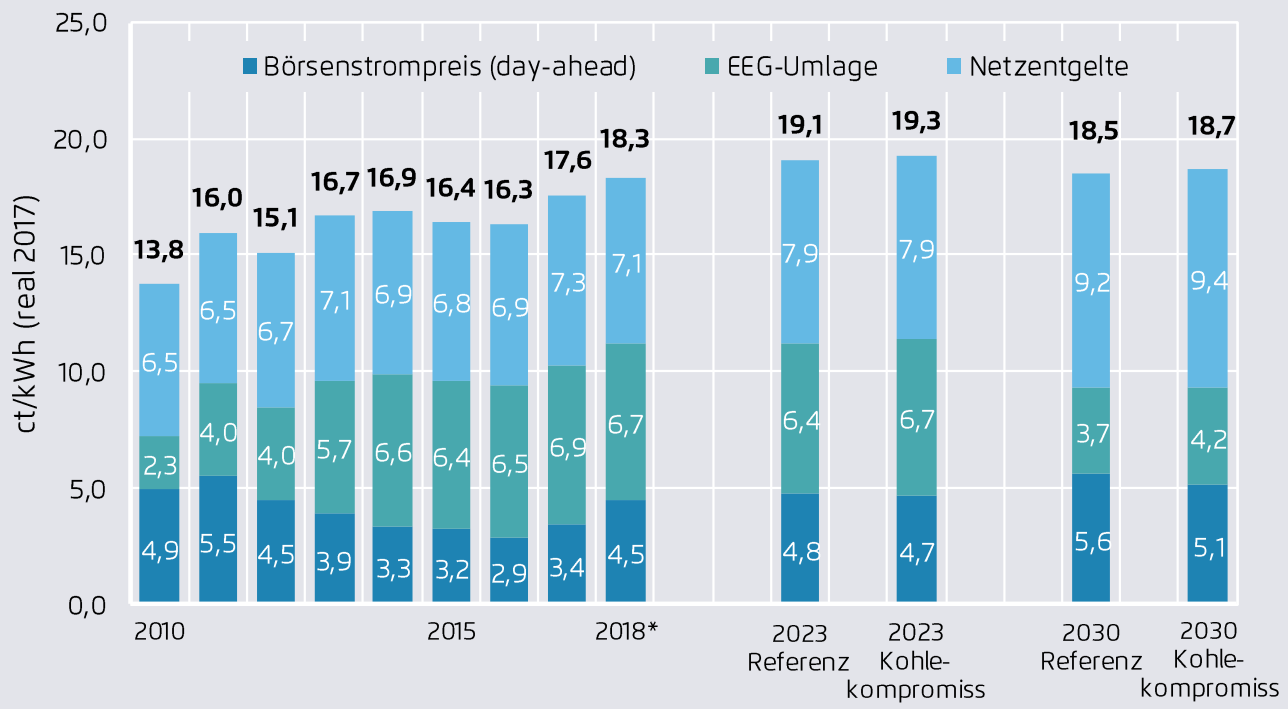



Aurora Energy Research (2019)

- Most of the reduced coal will be compensated by renewables within Germany.
- Additional utilization of gas capacities will be limited, although to ensure security of supply, additional gas capacities are needed both in the BAU scenario and in the coal-compromise scenario in and outside of Germany.
- The coal commission did not challenge the government's decision to opt for an Energy-Only-Market two years ago. Instead, it requests the government to monitor the investment situation more closely and if not enough investment is foreseeable after the implementation of the coal phase-out, to re-discuss its position on capacity mechanisms.

# Wholesale prices will be lower in the phase-out scenario than in the BAU scenario, while retail prices might hold current levels or increase

Wholesale power prices 2005 – 2018, 2030

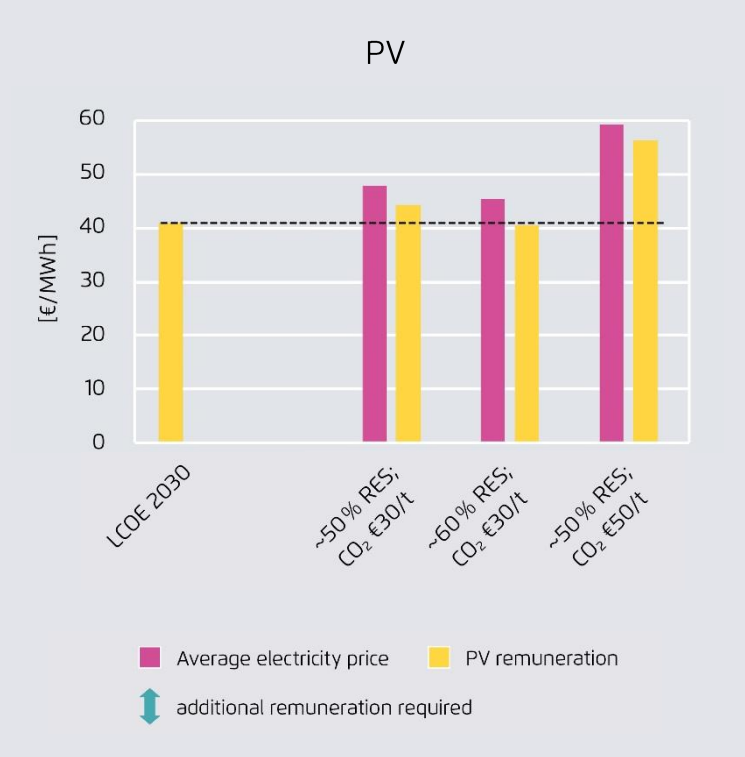


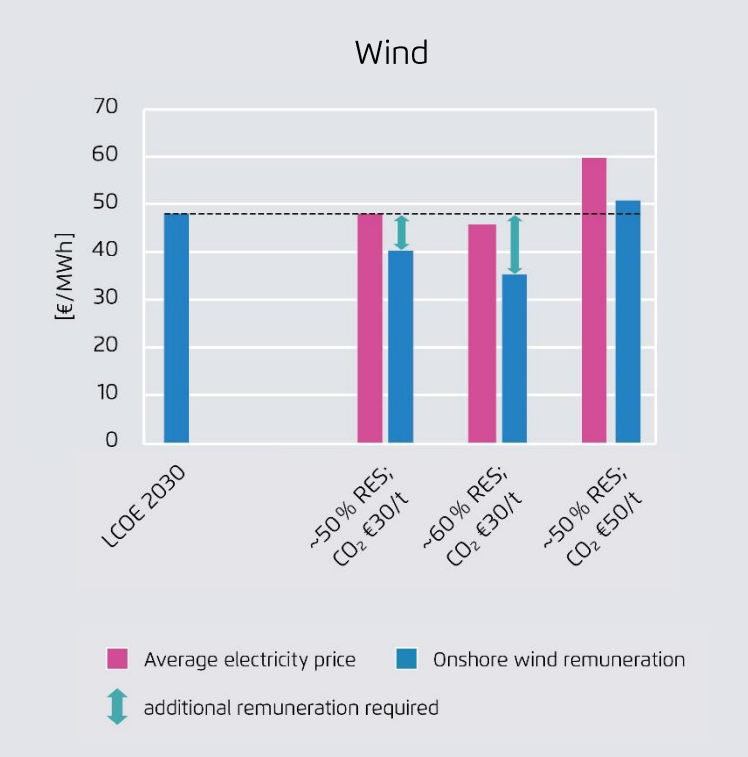

Aurora Energy Research (2019), Agora Energiewende (2019)

- The combination of phasing out coal and increasing renewables results in lower wholesale power prices than in the business-as-usual scenario, favouring energy intensive industries
- Non-privileged consumers pay the total sum of wholesale price + EEG levy + grid costs, which will increase by 2023 to decrease back to almost current levels by 2030:
  - Grid costs drive the cost increase in both scenarios
  - The EEG levy will reach a peak around 2023 and will start decreasing, compensating the increase in grid costs

# With a higher $CO_2$ price, the ability of renewable producers to cover their costs through market revenues improves significantly

Electricity prices and remuneration in 2030 for PV and wind energy in Germany




Agora/IDDRI/Artelys (Analysis of the authors and Artelys Crystal Super Grid model results)

- → PV costs could be covered solely by market revenues by 2030 in Germany
- → Wind production costs are not covered by market revenues with $CO_2$ at 30 €/t. A price of 50 €/t would be necessary

**Agora Energiewende**
Anna-Louisa-Karsch-Str.2
10178 Berlin

**T** +49 (0)30 700 1435 - 000
**F** +49 (0)30 700 1435 - 129

www.agora-energiewende.de

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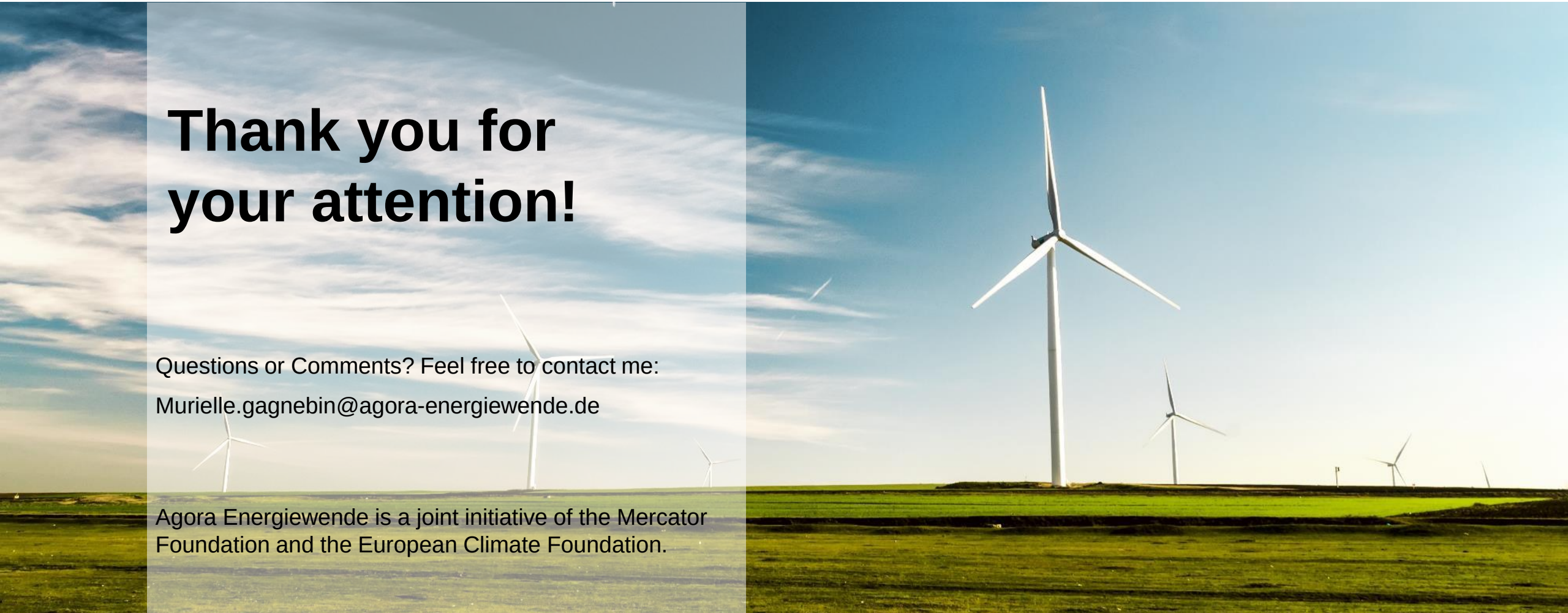

# Thank you for your attention!

Questions or Comments? Feel free to contact me:

Murielle.gagnebin@agora-energiewende.de

Agora Energiewende is a joint initiative of the Mercator Foundation and the European Climate Foundation.