Topic 4: Energy - Transition to Renewable Energy Case Study

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EE375 - Class lecture

Case Study: A just transition from Coal to Renewables

Photo Credit: Clean Energy Wire website

A roadmap for a just transition from Coal to Renewables

Learn from a Case Study: Insights from national coal-phase out discussions in Germany

Case studies: The UK and Germany

Why choose UK and Germany to study about coal phase-out pathway?

- Coal plays a major role for both countries
- UK: Decided in 2015 to phase out coal by 2025, replaced coal with natural gas and large-scale RE
- Germany: Considered to phase out coal by 2038, replaced coal with renewables

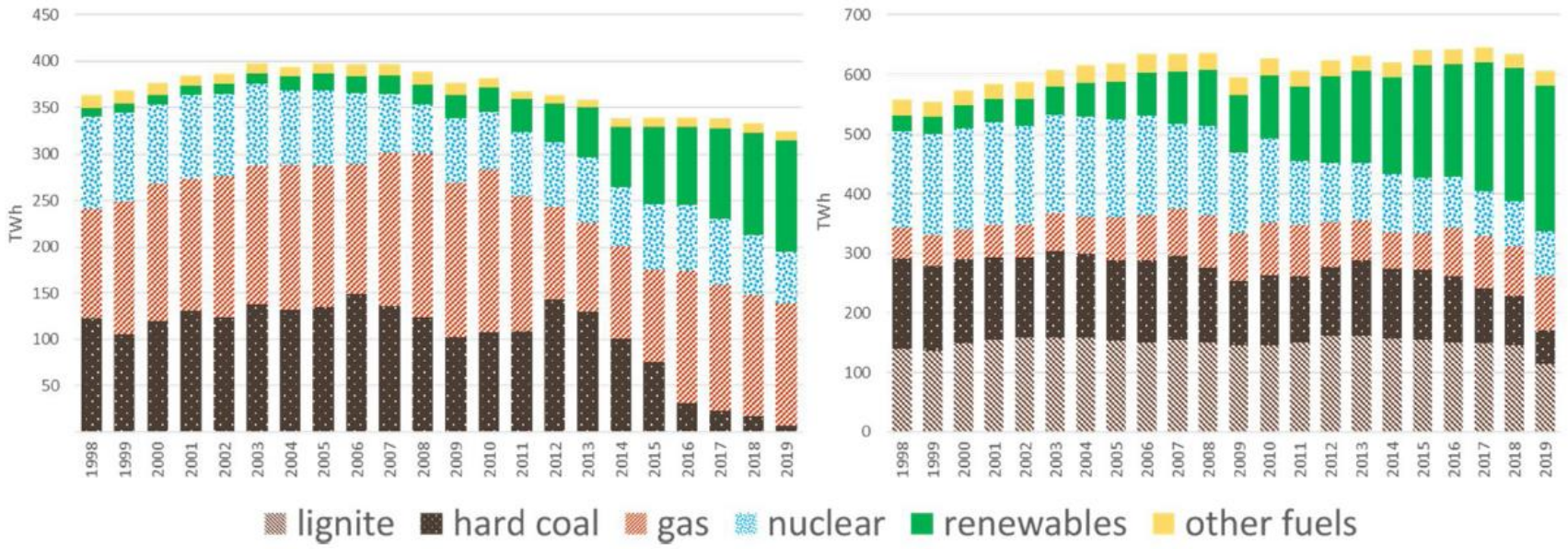


Fig. 2. Gross Electricity Generation for the UK (left) and Germany (right) in TWh.
Own depiction based on the Department for Business, Energy & Industrial Strategy (2020), Umweltbundesamt (2020a), AG Energiebilanzen (2020); numbers for 2019 are preliminary.

Source: Brauers et al. (2020). Comparing coal phase-out pathways: The UK and Germany's diverging transition

Stories behind diverging transition

UK

- **International competition on coal business** led to a quick decline of coal
- **Political incentive**: Starting in 2006, climate friendly political decisions creates opportunities for those prioritizing environment (high awareness of climate change.
- **Focus on cost efficiency** and not supporting new entrants (preference for large-scale technologies)
- **Several policies constrained coal's business** such as the Carbon Price Floor (CPF), the Renewable Obligations (RO), the Emissions Performance Standard (EPS) and the Climate Change Act (2008)
- **Incentivized incumbent** to deploy RE themselves
- **Subsidies for renewables were cut heavily in 2015** result in barriers for small scale RE projects, slow down RE investment and increase the need to use NG as replacement of coal

"Incumbent-led" energy transition in the UK

Germany

- **Long subsidized coal by the Government**– existing incumbents the power to influence policies to support coal and a gradual phase-out plan
- **A Phase-out nuclear law in 2011 by 2022** make a coal-phase out more difficult as both comprise of 64% share of electricity generation
- **EU regulation forbid coal subsidies in 2018**, so hard coal mining declined and ended in Dec 2018.
- **Market pressures on coal business,** increasing the prices for allowance of EU Emission Trading System in 2019, shrinking gas prices made coal combustion increasingly uneconomic.
- **Renewable Energy Sources Act (EEG) in 2004** provided attractive FTI for green and support new market participants in RE. The Green Growth discourse further pushed the transition

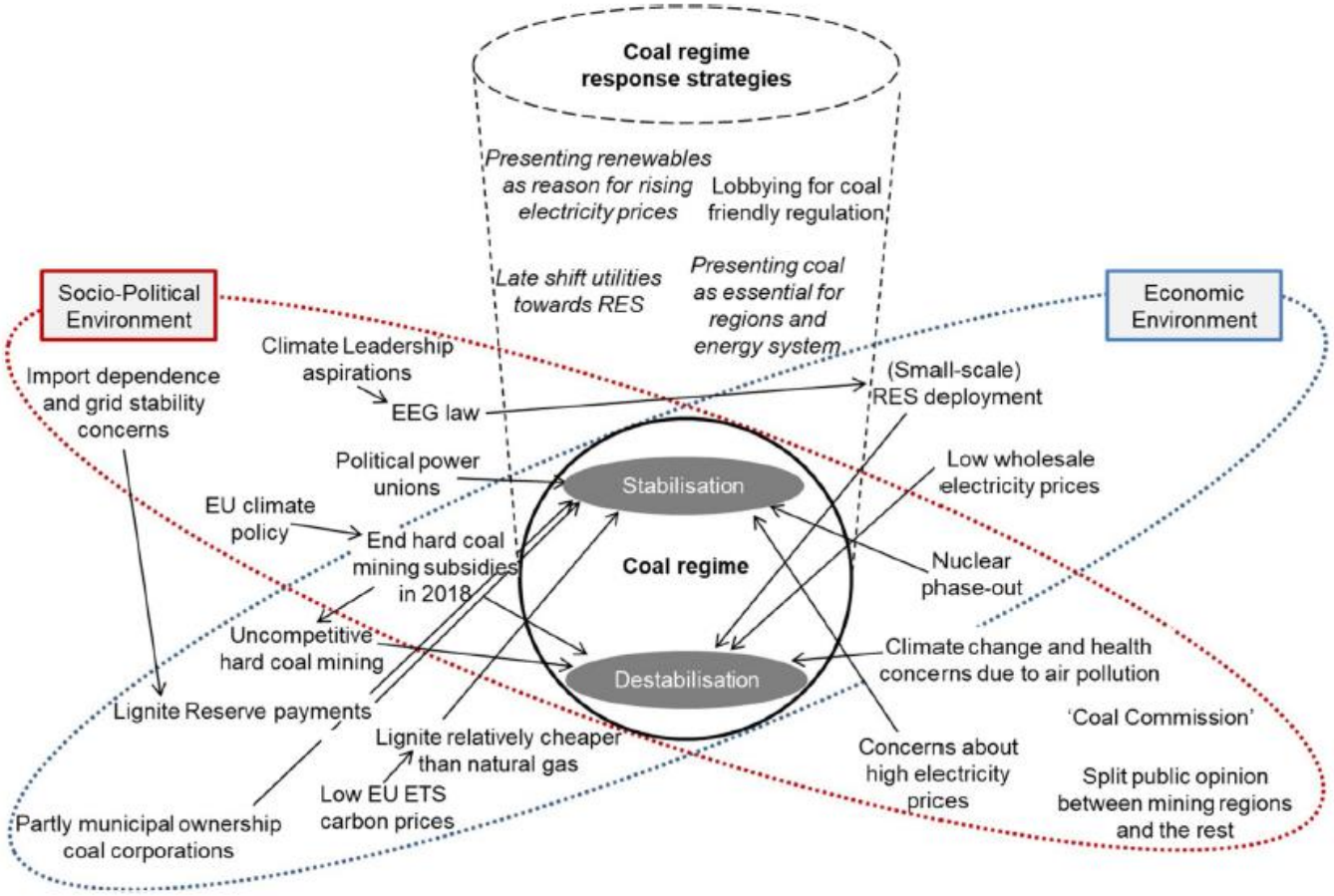
"New-entrant-led disruptive" energy transition in Germany

Source: Brauers et al. (2020). Comparing coal phase-out pathways: The UK and Germany's diverging transition

Incumbent coal firms' responses

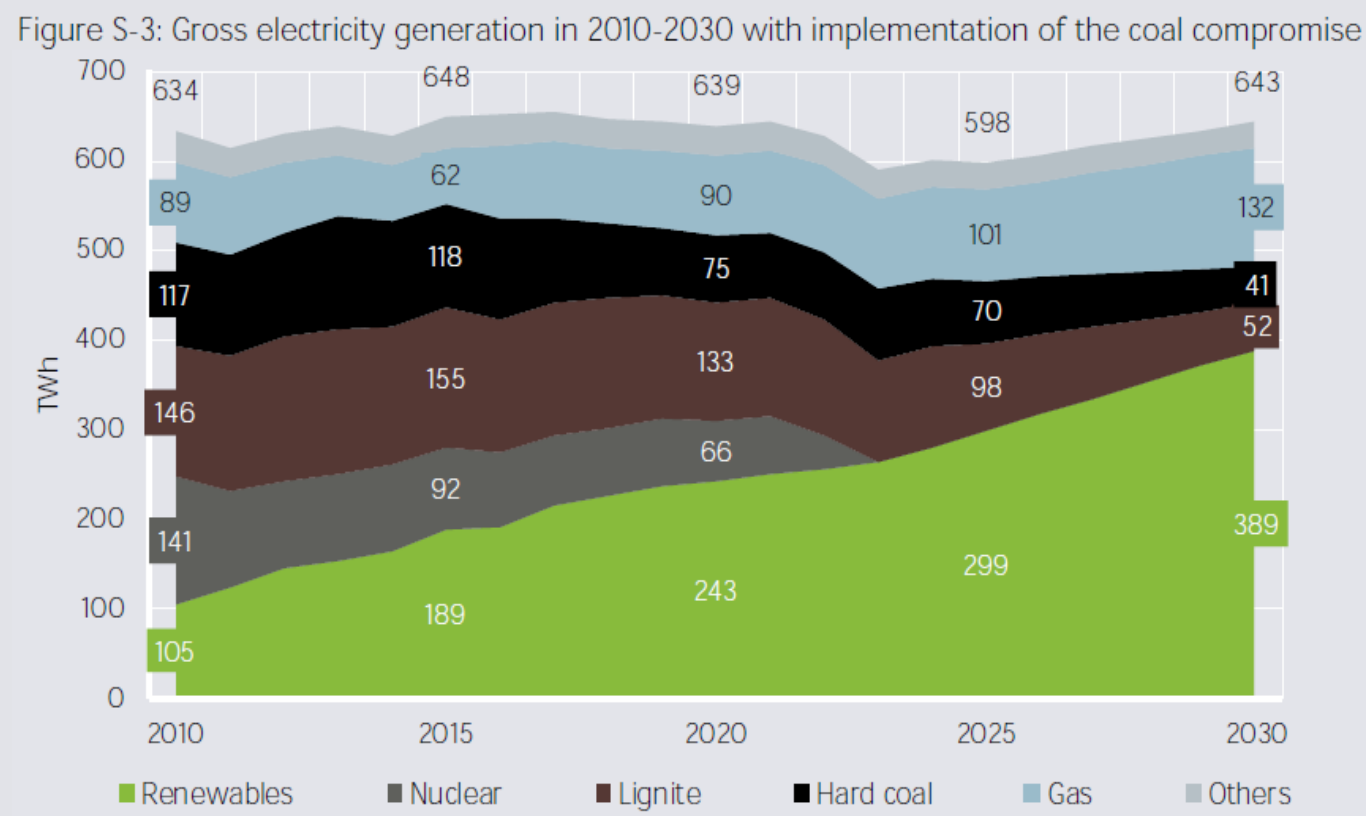
In Germany

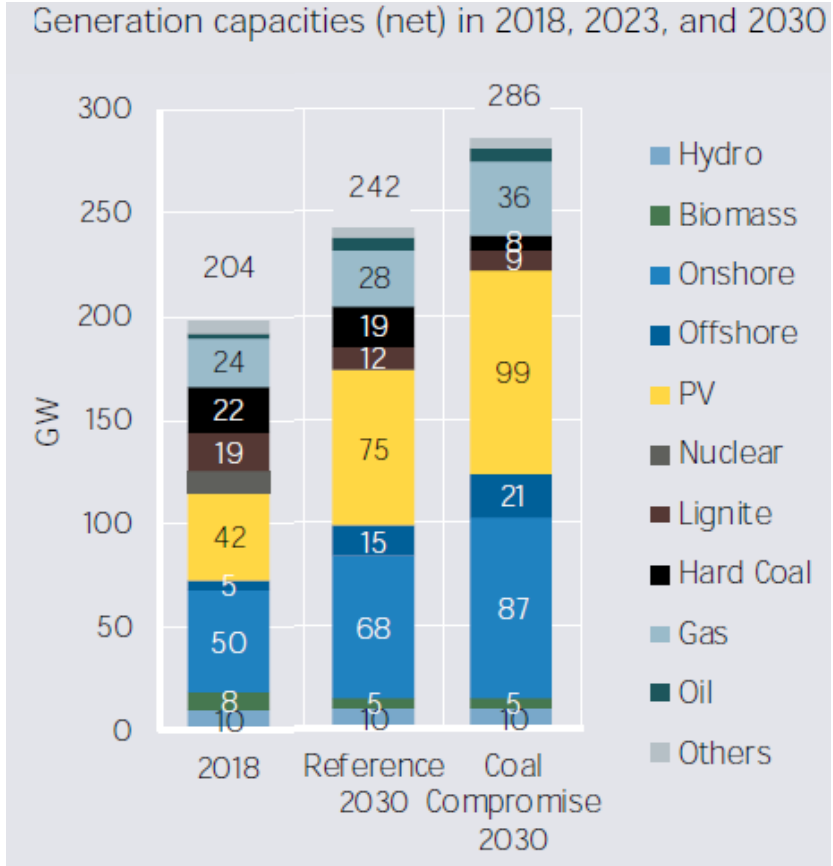
- Lobby for coal friendly regulation
- Misrepresent the effect of renewables for the general public
  - On electricity price– FIT for renewables paid by consumers explicitly on bills while coal subsidized by state budget not visible to consumers.
  - Uncompetitive German industries with increasing energy costs
  - Energy security despite that various studies showing that grid stability is not threatened by increasing RE
- Make German industries uncompetitive by increasing energy costs
- Underestimate the fast growth of RE, so missed the opportunity to invest in non-fossil fuel technologies and unwilling to invest in small-scale RE projects.



Source: Brauers et al. (2020). Comparing coal phase-out pathways: The UK and Germany's diverging transition

Coal phase-out plan to renewables in Germany

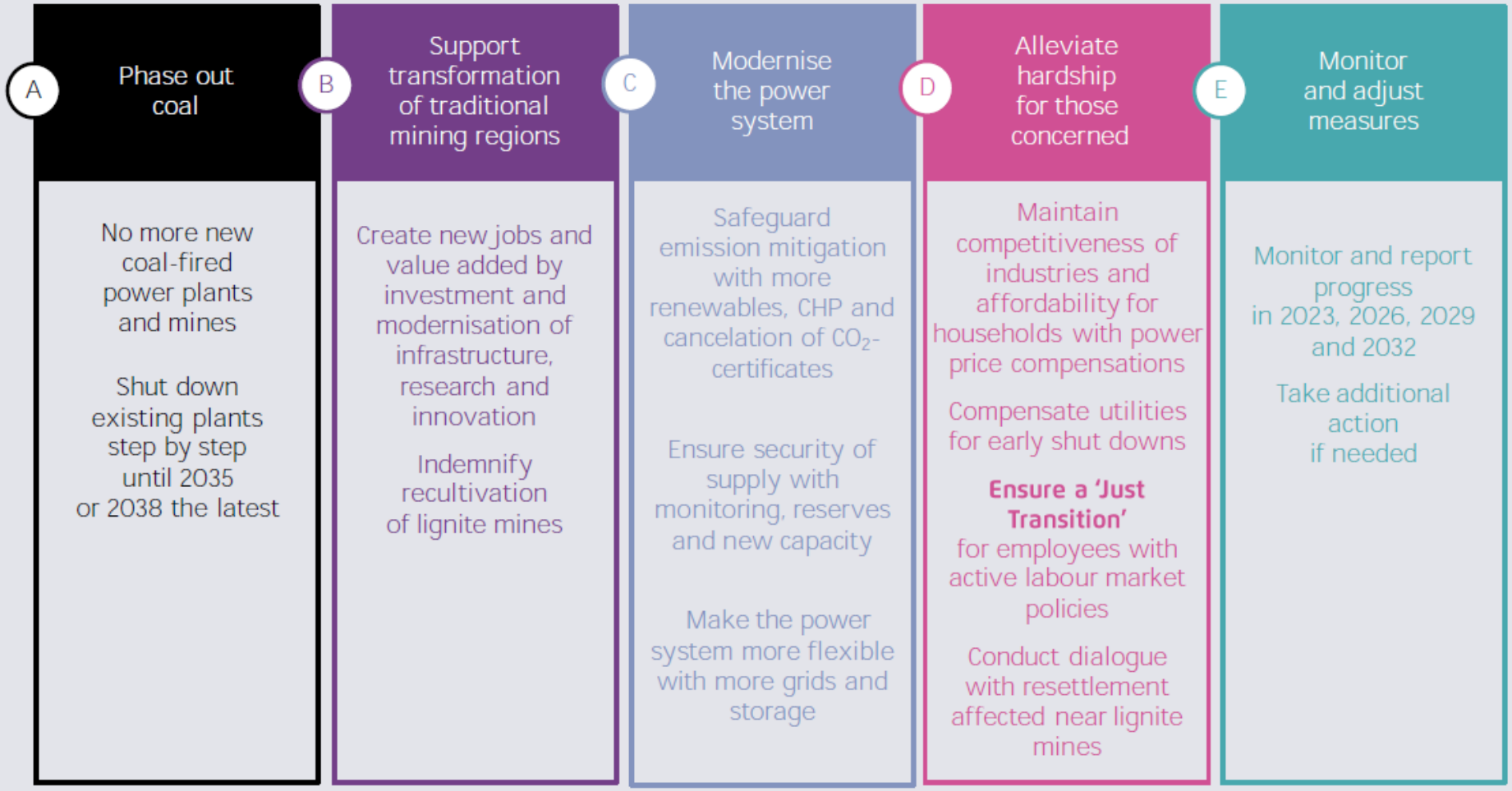




Source: Agora (2019). A roadmap for a just transition from coal to renewables

Step by Step to phase out coal

Figure 11: Overview of the recommendations of the Commission on Growth, Structural Change, and Employment



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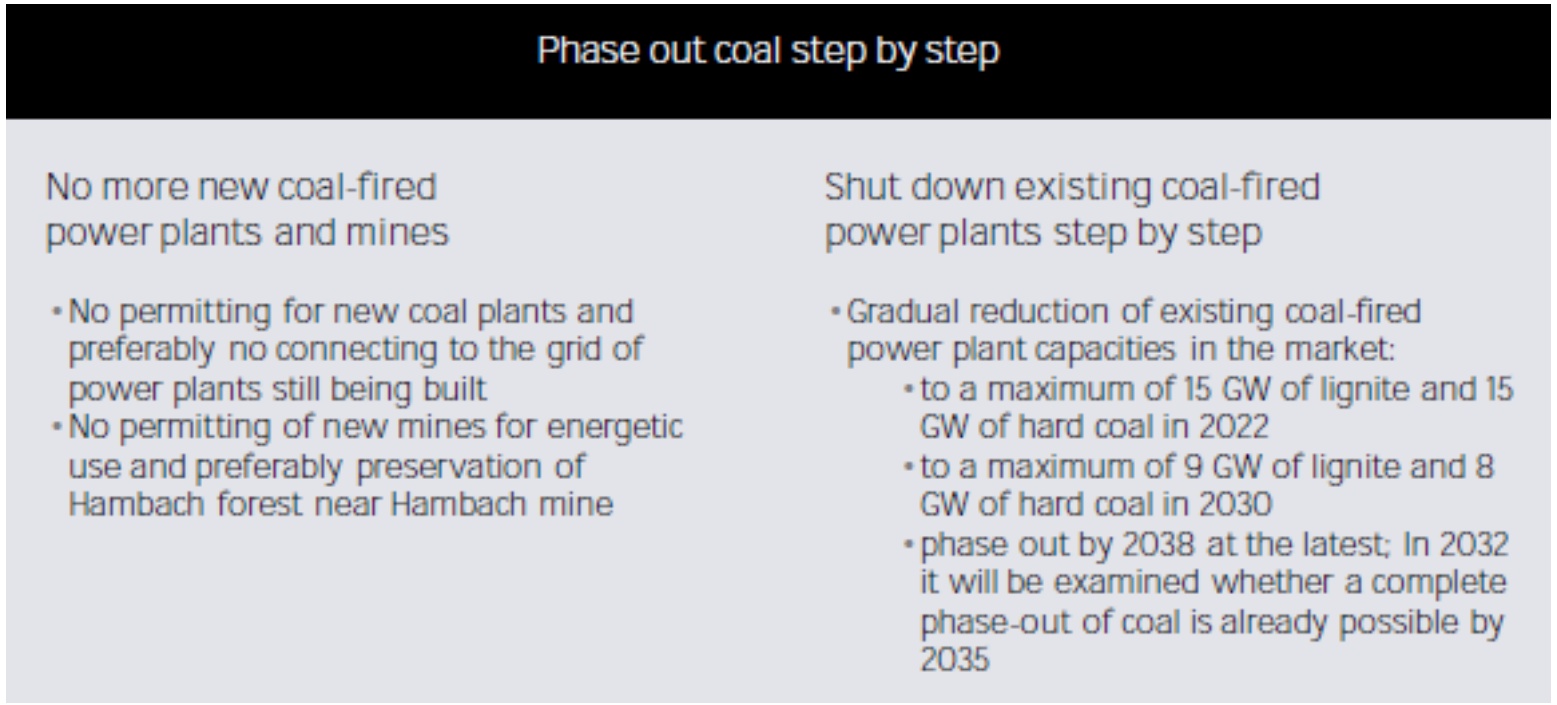
Step by Step to phase out coal: A



In order to ensure sufficient legal certainty, the Commission recommends that, as an instrument, consensual negotiation agreements, including compensation payments, should be concluded with operators by 2022. These are then to be fixed by law. For the period from 2023 to 2030, the Commission recommends a competitive bidding process to determine which hard-coal-fired power stations will be decommissioned and the level of compensation to be received. By contrast, the phase-out for lignite-fired power plants will continue to be based on negotiated solutions. If no amicable agreement can be reached between the federal government and the operators by 30 June 2020, the federal government should adopt a mandatory decommissioning schedule, including appropriate compensation for power plant operators.

Source: Agora (2019). A roadmap for a just transition from coal to renewables

Step by Step to phase out coal: B

B

Support the transformation of traditional mining regions

Creating new employment and value added

- Modernisation of energy infrastructure in including the expansion of renewables, grids, storage and PtX
- Speeding up formal planning processes
- Developing ‚model regions'
- Investment in transport and digital infrastructure as well as R&D
- Locating federal government offices and employees

Indemnify recultivation of opencast lignite mines

- Adaption of permits to changes in lignite demand
- Usage of the possibility of security payments when approving permit changes
- Usage of compensation payments for power plant operators for recultivation

Source: Agora (2019). A roadmap for a just transition from coal to renewables

Step by Step to phase out coal: C

C

Modernise the power system

Safeguard emission mitigation of phase out

- Expansions of renewables to 65% of gross electricity consumption by 2030
- Cancelation of CO_2 certificates
- Examination of appropriate CO_2 pricing in sectors outside emissions trading

Ensure security of supply

- Expansion of measures to monitor security of supply
- Usage of existing reserve mechanism and replacement of decommissioned coal capacities from the reserve
- Continuation and modernisation of CHP support
- Examination of capacity mechanism in 2023 if needed

Make the power system more flexible

- Modernisation and better use of grids through optimisation, expansion and market measures
- Promotion of storage systems
- Review of the existing tax and levy system in the energy sector

Source: Agora (2019). A roadmap for a just transition from coal to renewables

Step by Step to phase out coal: D

D

Alleviate hardship for those concerned

Ensure socially acceptable implementation

- Protections against dismissal, enabling early retirement without financial losses, provisions for retraining, and measures for reallocation to new jobs for coal workers
- Power price compensation for households
- Engagement in dialog of regional governments with residents near mines

Maintain competitiveness of commercial and industry

- Continue and further develop CO_2 electricity price compensation at the European level
- Power price compensation for commercial and industry

Phase out in agreement with power plant operators

- Financial compensation for power plant operators for the early shut-down of capacities in a negotiative and/or competitive bidding process

Source: Agora (2019). A roadmap for a just transition from coal to renewables