

Towards an EU coal exit

Options, challenges and requirements

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Early lignite phase-out* in BG, CZ, DE, EL, PL and RO is feasible, ensuring reliable electricity supply and not increasing system cost

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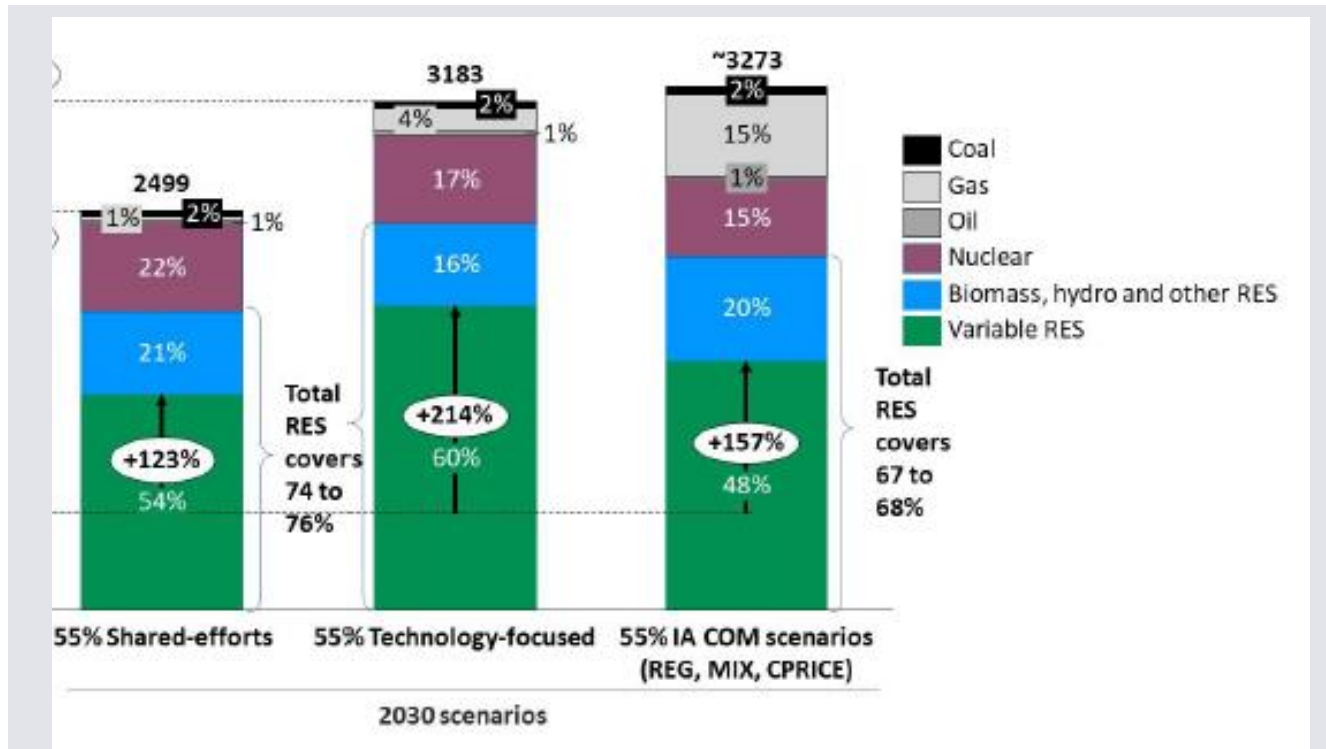
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* CZ, DE, PL: 2032 full lignite phase-out; Remaining 2030 coal & lignite capacities: BG: 422 MW; EL: 0 MW; RO: 0 MW

The new EU climate & energy policy framework implies a (near-)complete phase-out of coal & lignite by 2030

Electricity generation in a -55% GHG European Union



- Near-complete phase-out of hard-coal and lignite power generation in EU-27 by 2030
- Fossil gas generation will also decrease
- Total fossil generation in 2030 will be some 500 TWh (compared to 1300 TWh in 2019)
- Reduction triggered by rising EU-ETS prices (ca. 55 EUR/ t CO₂ in 2030), coal-phase out and RES deployment policies

ecologic and CLIMACT (2020): ANALYSING THE IMPACT ASSESSMENT ON RAISING THE EU 2030 CLIMATE TARGET

Coal replacement challenge: A ‘Coal to Clean’ approach is required – coal must predominantly be replaced by renewables

Coal capacity in the German market and share of renewable energy

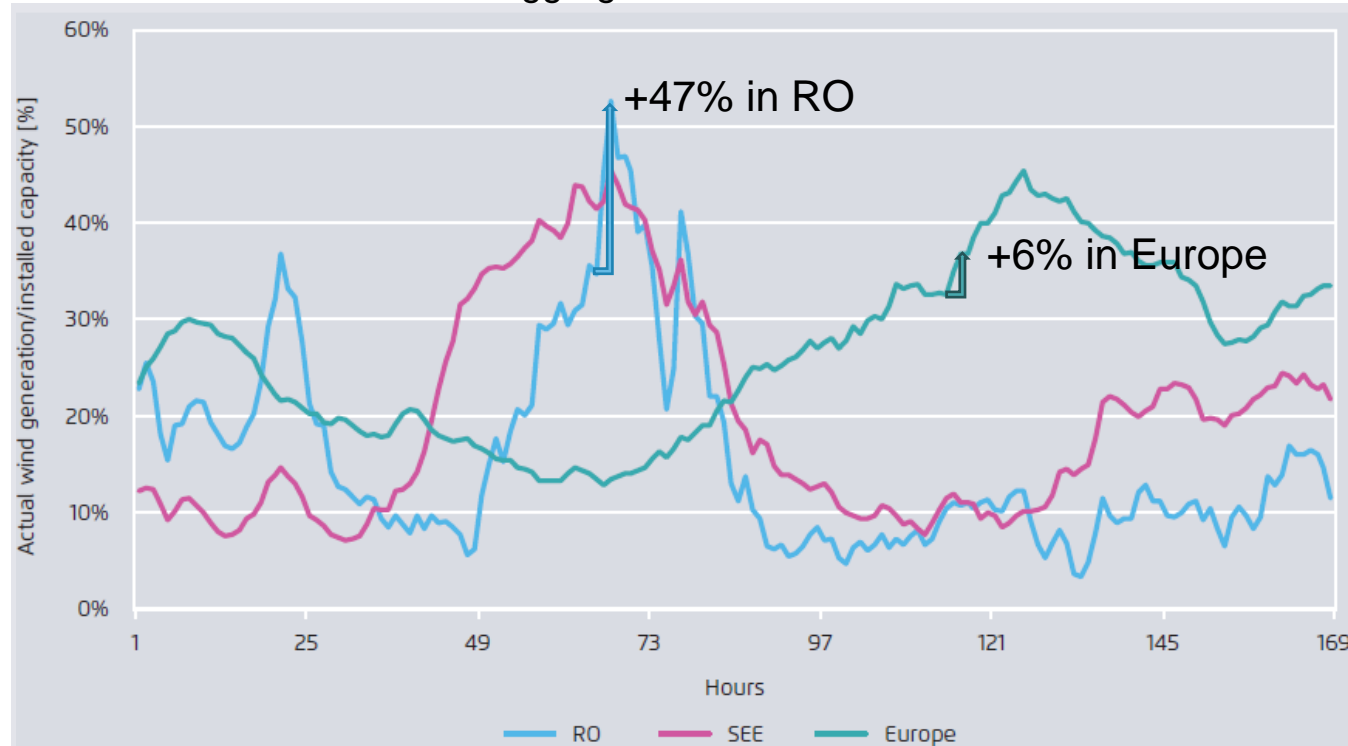


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- Decline in electricity generation from coal-fired power plants must predominantly be replaced by **renewable energies**
- A small part is compensated by generation of **gas-fired power plants**
- In order to ensure security of supply with electricity and heat, the construction of some GW new gas-fired power plants (mid-merit/peak-operation) will be necessary

Cooperation challenge: Cross-border integration and cooperation needs to be strengthened

Time series of onshore wind power generation in a simulation for the first week of 2030 at different levels of aggregation



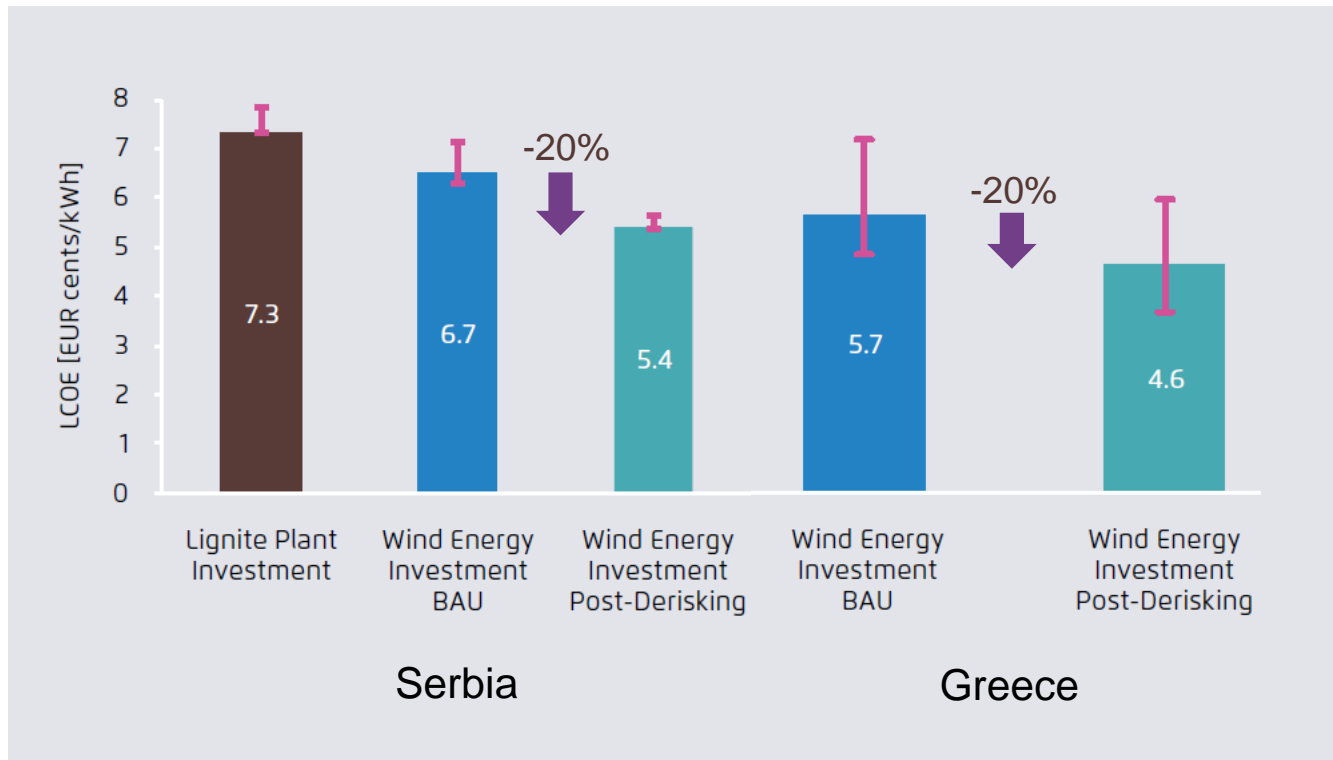
REKK (2019)

- Wind generation can fluctuate from one hour to the next by up to 47% in Romania, whereas the comparable figure for Europe is just 6%
- In the SEE region, wind speeds show weak correlation, ranging from 11% to 46% between countries
- SEE follows a different wind generation pattern from northern European countries, which means wind production would not peak at the same time

Regional integration minimizes national flexibility requirements, needs for gas-fired back-up capacities and system costs, and maximises security of supply

Financing challenge: Derisking measures are key tools for enhancing RES. They lower LCOE of RES by 20% and allow benefitting from dropping technology cost

LCOE comparison, lignite* vis-a-vis onshore wind in Serbia and Greece



Derisking measures with the highest projected impact include:

- the proposed EU budget guarantee mechanism under Invest.EU
- reliable, long-term RES remuneration regimes, including long-term RES targets
- provisions to allow corporate PPAs
- Open, well-functioning and regionally integrated balancing & intraday markets

An EU budget guarantee alone accounts for some 40 % of the estimated financing cost decline in Serbia and Greece

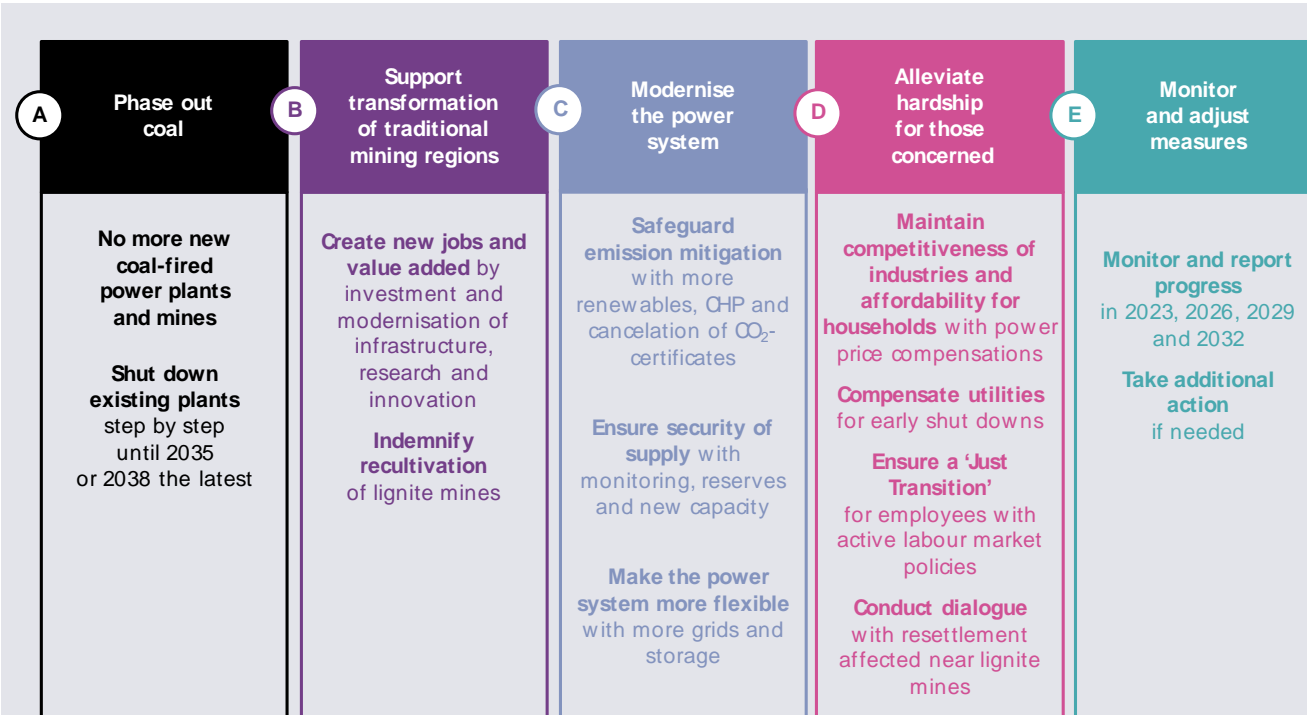
A guarantee scheme in the WBIF is already implemented

NewClimate Institute (2019)

* At current ETS prices of 25 EUR/t CO₂, LCOE of new lignite in Serbia would equal 150 EUR/MWh

Country strategies are needed for smart and managed retirement of coal and lignite generation capacity

Overview of the recommendations of the German Coal Commission



Authors' figure based on "Kommission WSB" (2019)

- Renewable energy is now cheaper than coal when investing in new power capacity
- Preconditions:
 - Robust regulatory frameworks governing RES deployment
 - Smart financing / de-risking instruments to reduce risks and costs of RES investments
- Managed retirement of coal and lignite capacities incl. deep & wide policies for a "Just Transition" of mining regions

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