



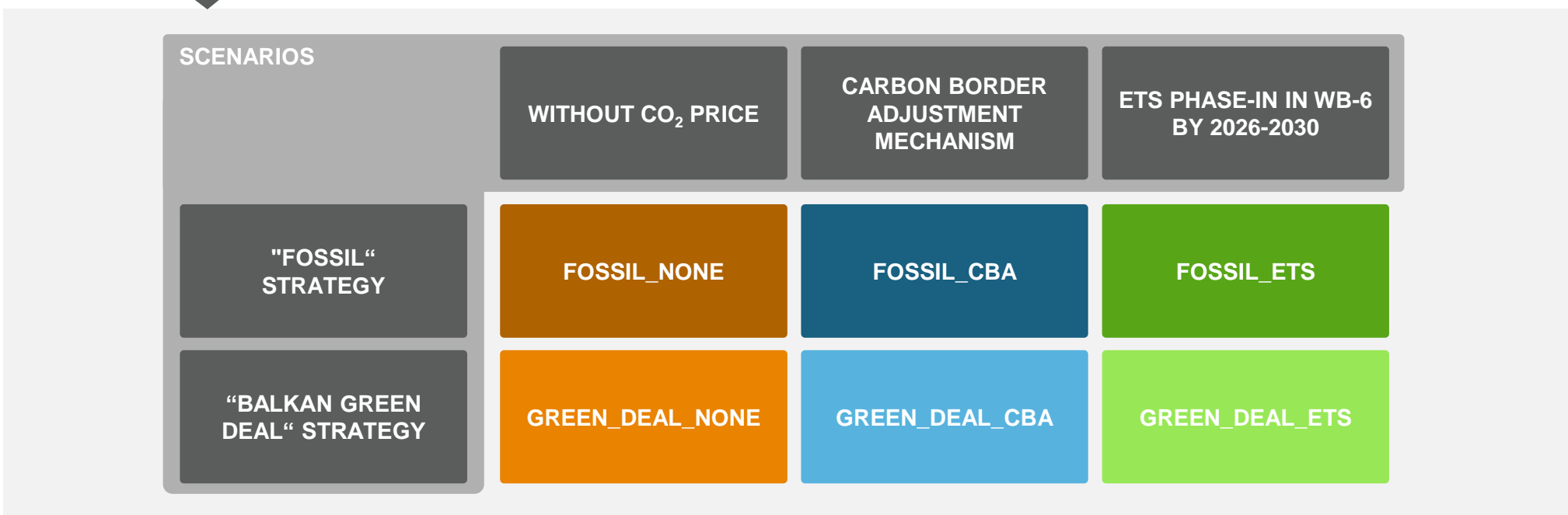
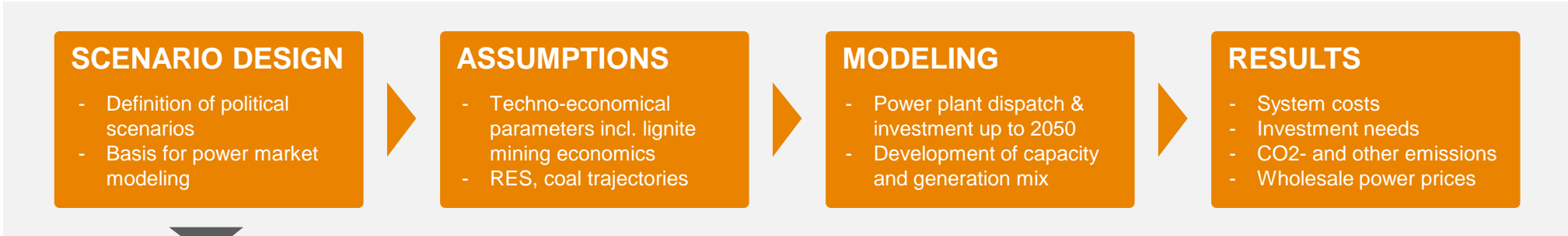
THE FUTURE OF LIGNITE IN THE WESTERN BALKANS

Study commissioned by Agora Energiewende

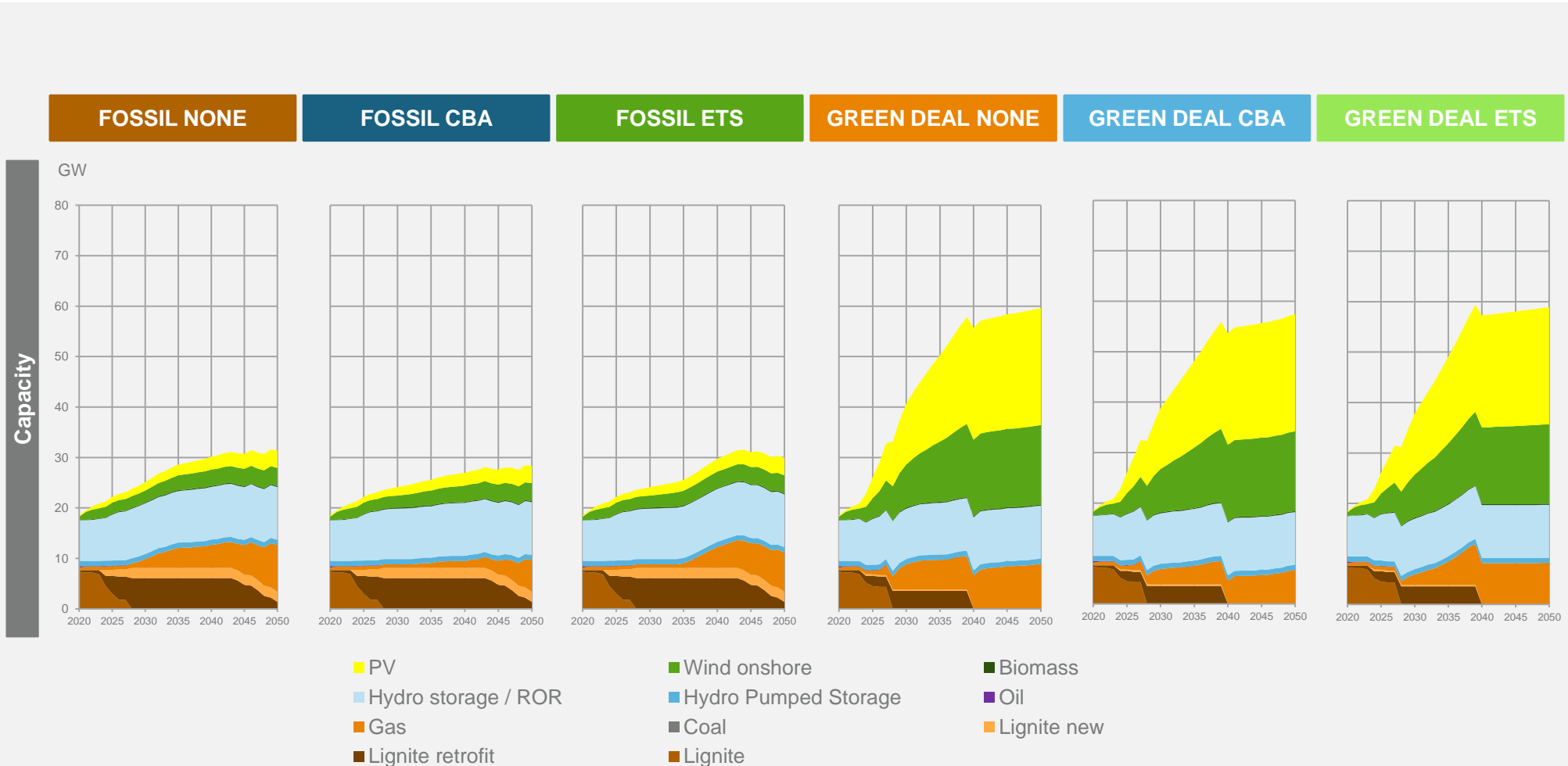
Berlin, 27.05.2021 | Rita Kunert

Methodology & Scenario Architecture

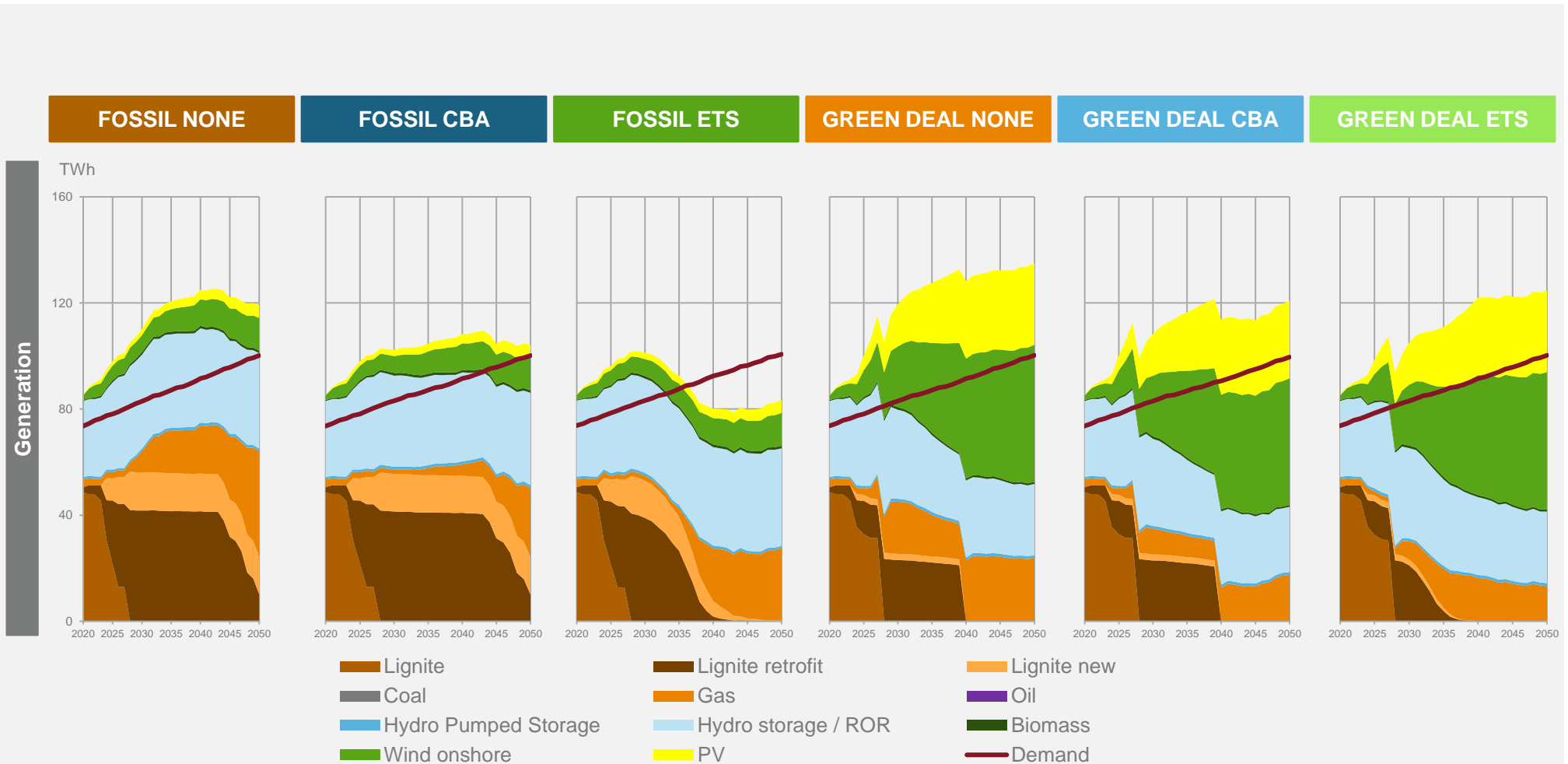
Power market scenarios were designed to assess the feasibility and merit of a 2040 coal exit in the region against a continuation of the current fossil strategy. Focus is directed towards the respective risk profile regarding carbon pricing.



Green Deal strategy reduces lignite capacity and substitutes it with RES while limited gas expansion and interconnections provide capacity for security of supply

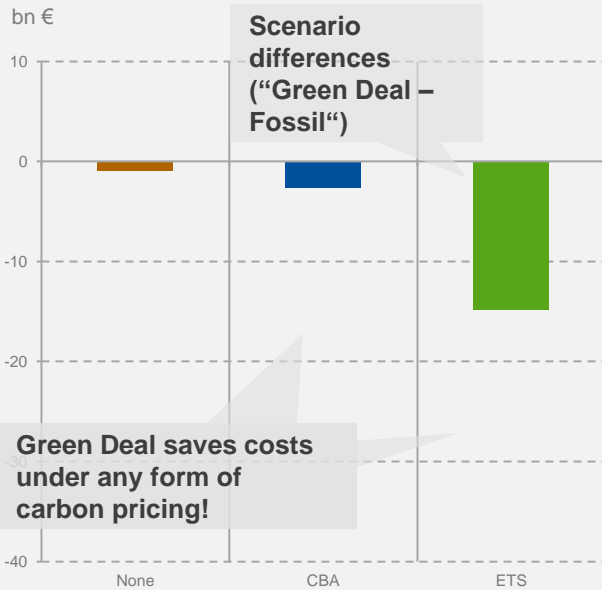


Lignite generation is strongly impacted by an ETS and less by a CBA, while the CBA does reduce incentives for export oriented gas generation

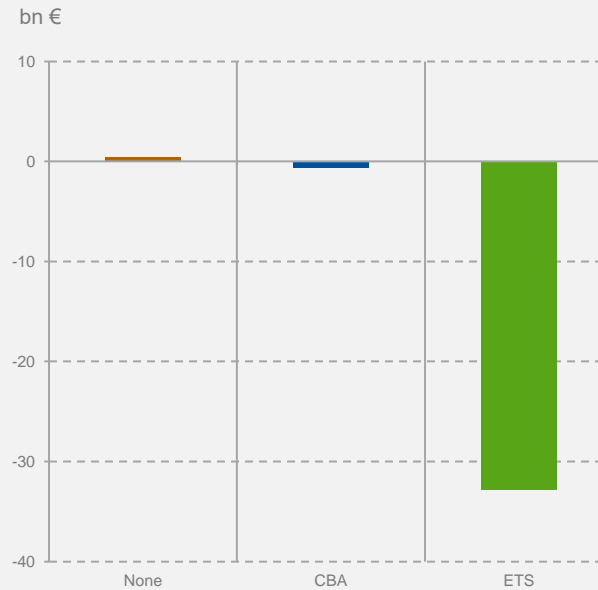


For BiH and Serbia, the Green Deal pathway is cheaper regardless of CO₂ regime. As soon as an ETS is introduced, a coal phase-out strategy is clearly the beneficial option

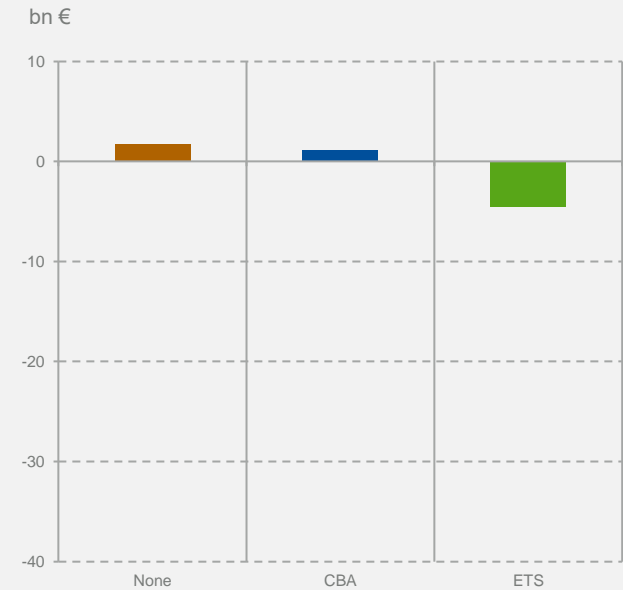
BOSNIA & HERZEGOVINA



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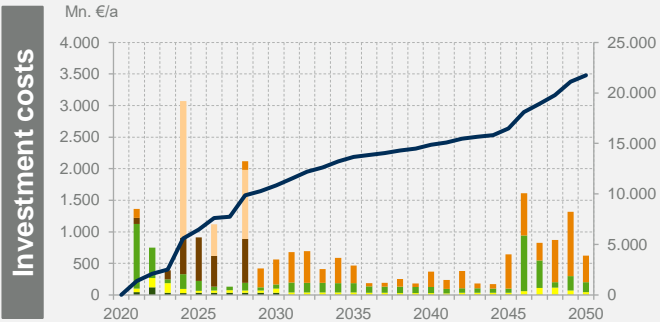


KOSOVO

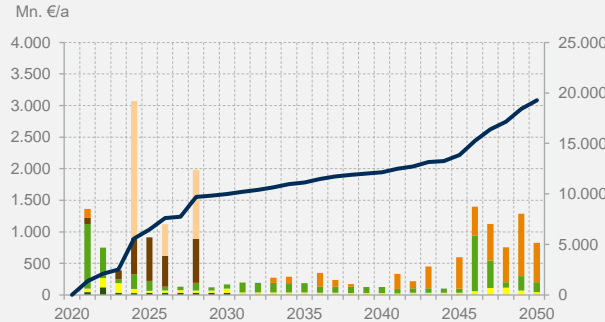


Investment needs in Fossil strategy cumulate to ~22 bn € and go mostly towards lignite and gas, while the Green Deal scenarios' ~40 bn € concentrate on RES

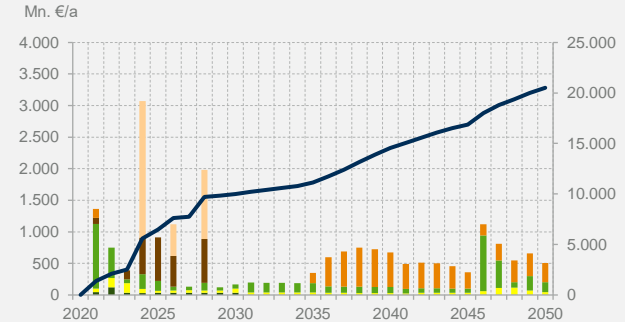
FOSSIL NONE



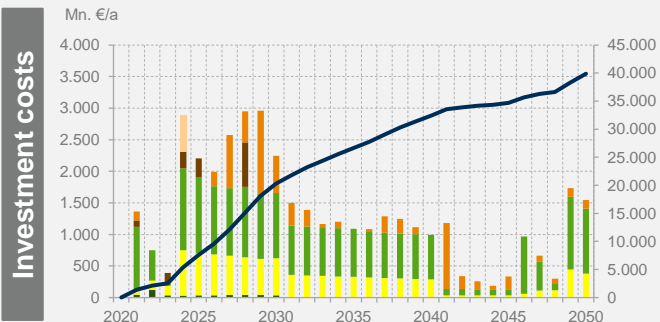
FOSSIL CBA



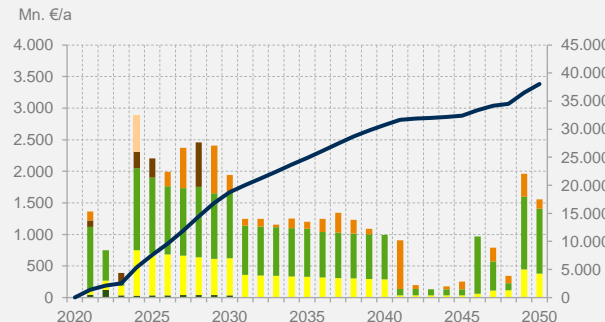
FOSSIL ETS



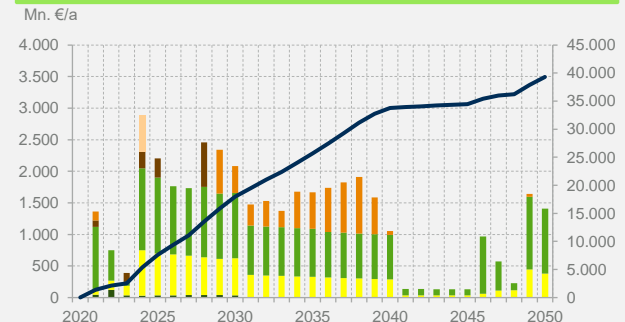
GREEN DEAL NONE



GREEN DEAL CBA



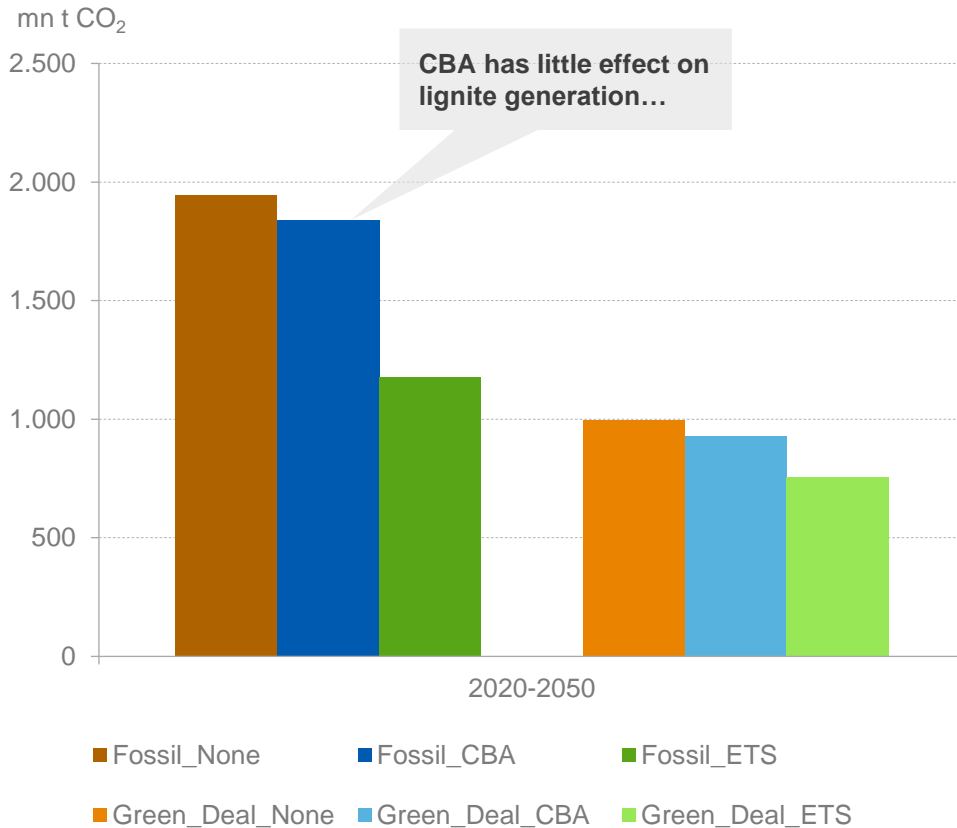
GREEN DEAL ETS



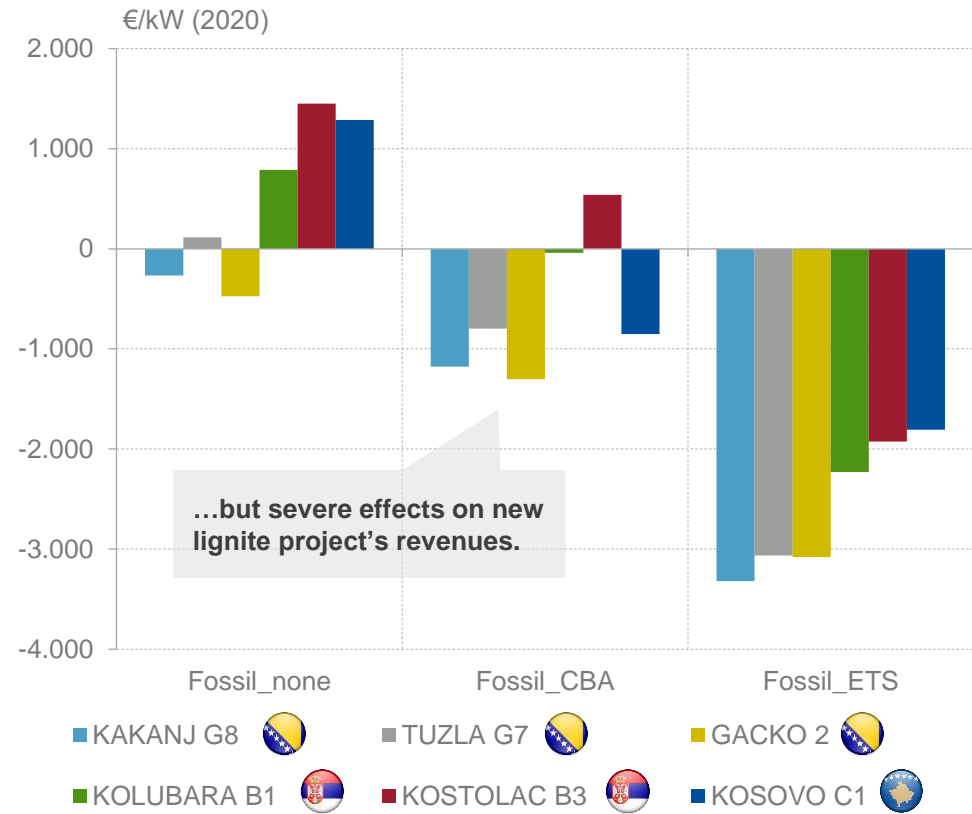
- Biomass
 - PV
 - Wind Onshore
 - Hydro
 - Lignite
 - Lignite Retrofit
 - Lignite New
 - Gas
 - Coal
- Cumulated Cost of Invest

An ETS reduces CO₂ emissions and lignite revenues most strongly, but a CBA still threatens the viability of new projects

Cumulated CO₂ emissions



NPVs of planned lignite plants



Source: Own calculations based on various sources and assumptions

Key results

Security of supply is ensured in all scenarios, coal phase-out is feasible.

The Green Deal strategy reduces lignite capacity and substitutes it with renewables. Wind and PV deployment in all WB-6 countries, cross-border system and regional power market integration, and, limited, investments into flexible gas ensure security of supply in all scenarios. Expanding renewables enable a high level of overall import-independency for the power sector.

Closing existing lignite plants by 2040 is economically sensible.

Because of air pollution regulation, effects of carbon pricing (to the least carbon border adjustment mechanisms at the EU's border) and state subsidy needs (open and hidden) to operate loss-making lignite plants, closing the existing lignite plants in the Western Balkans by 2040 and phasing in renewables instead comes at limited additional system costs of max. 3-4 €/MWh. If an ETS was phased-in, a Green Deal strategy even reduces system costs.

Renewables are a “no regret option” and cause multiple co-benefits.

Renewables contribute to lower wholesale prices, hedge against effects of carbon pricing and reduce power & fuel imports. Though RES costs can increase in Green Deal scenarios, most of it is refinanced by market revenues (esp. in ETS scenarios!) and thus support needs do not increase proportionally. In addition, renewables allow for better air quality and offer opportunities for new job creation, while green investment needs are eligible for EU funding.

New lignite plants are financially not viable under any form of carbon pricing.

The 2 GW of lignite capacity currently planned in the region (Bosnia and Herzegovina, Kosovo and Serbia) will, if built, generate a cumulative loss by 2040. This is because of low efficiency of lignite mining, costs to comply with air pollution regulation and, importantly, limited export opportunities because of carbon border adjustment at the EU's border. The phase-in of an ETS in the Energy Community parties would make new lignite an even riskier investment.

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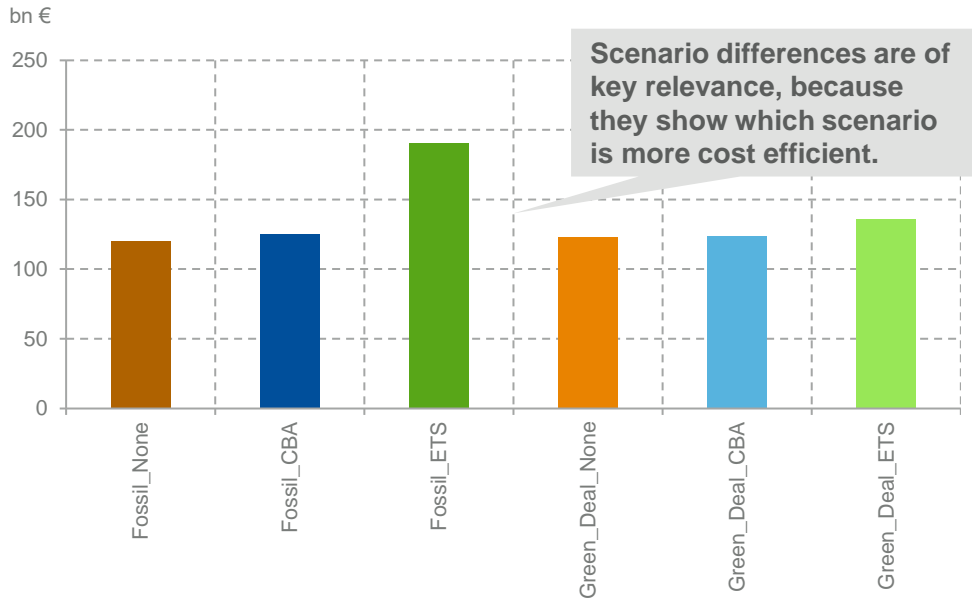
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BACKUP

Incremental Generation Costs

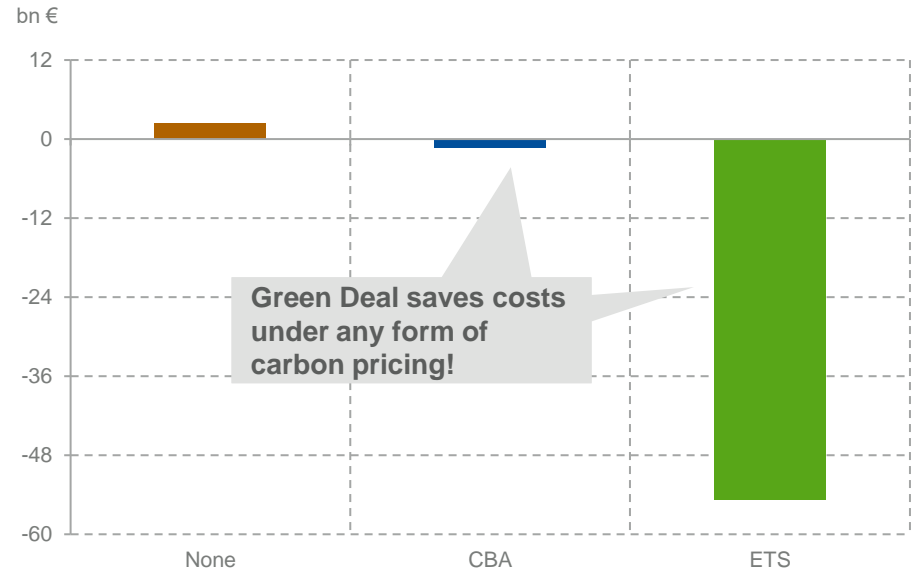
Comparison of incremental generation cost for WB-6 region shows: Green Deal scenario (GDS) hedges against an ETS phase in, while a CBA has little impact on overall cost differences. In a scenario without any CO₂ pricing at all, differences in incremental generation costs remain in a relatively tight range.

Incremental Generation Costs



Graph shows sum of “incremental generation cost” over time for WB-6 including CAPEX of additional assets, OPEX, net-import costs, RES and lignite cost as well as costs for CO₂ certificates and external effects (health) but excl. infrastructure & capital costs of existing assets (“sunk”).

Scenario Differences

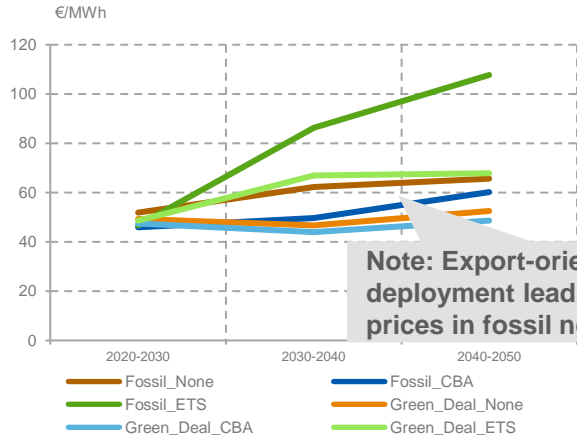


Graph shows scenario differences (“Green Deal – Fossil”) within each CO₂ regime: CBA with little impact on overall costs, non-ETS scenarios show incremental generation cost in a relatively tight range.

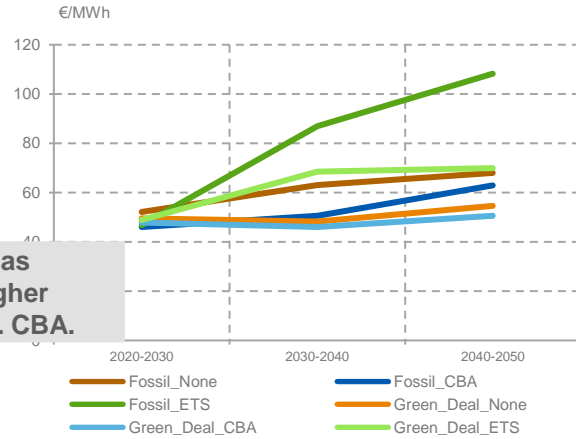
Wholesale Base Prices

Average wholesale base prices per modelled decade in €/MWh: wholesale price level increases moderately (power demand, fuel cost) across most scenarios, more significantly if an ETS is introduced. GDS mitigates the resulting prices increase noticeably. Fossil scenarios result in higher wholesale prices within each CO₂ regime.

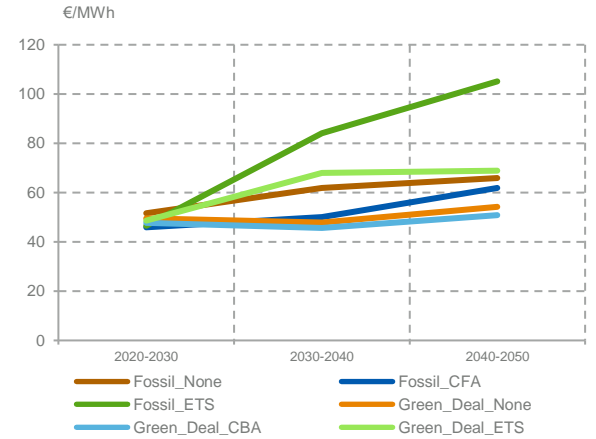
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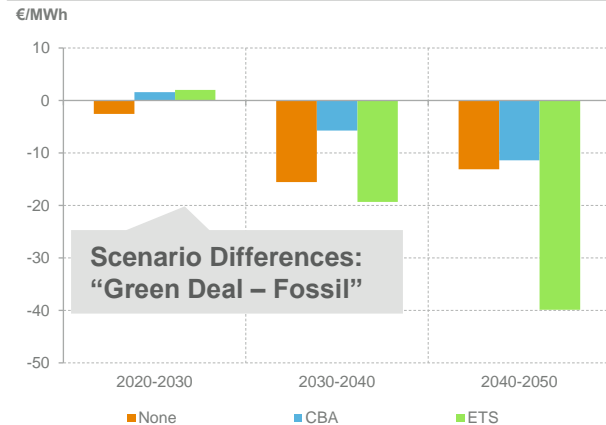
SERBIA



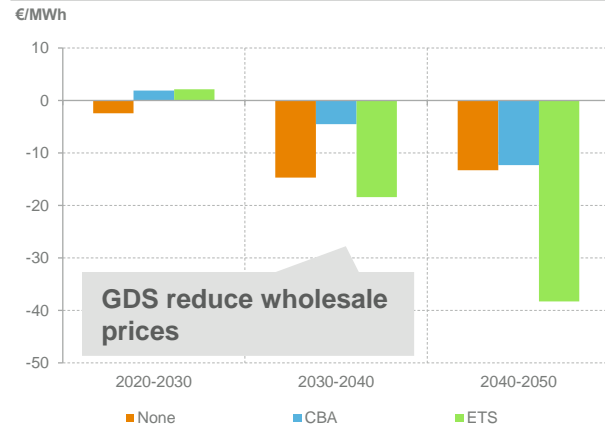
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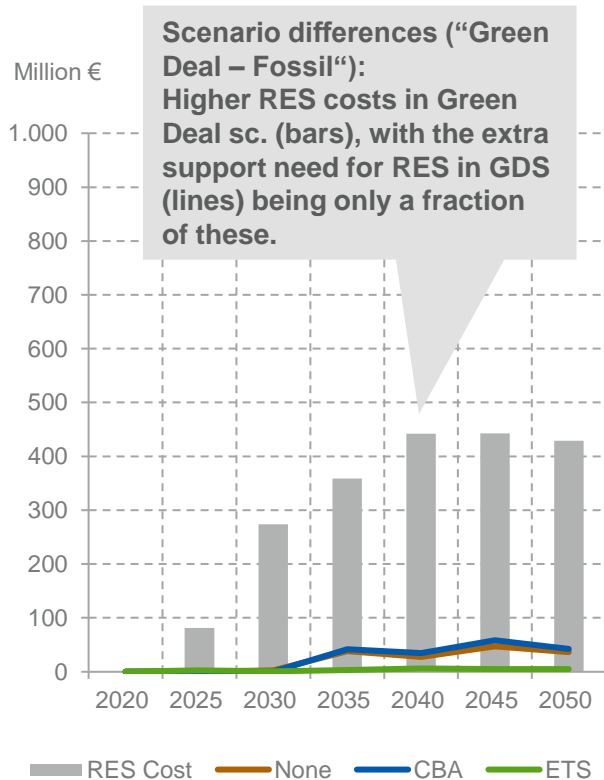
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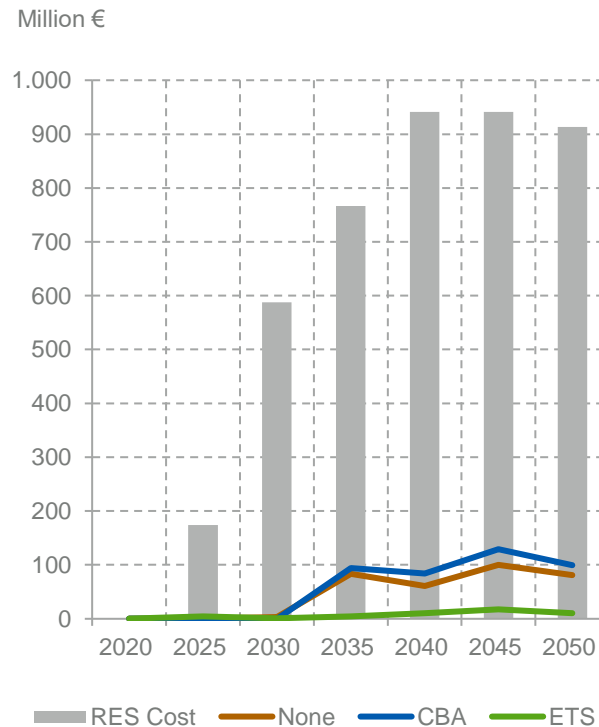
RES Financing

The graph shows **RES costs** (column) vs. **RES support** (lines). While significant RES costs occur in the Green Deal scenarios (GDS), most of it is financed by market revenues (esp. in ETS scenarios!) and thus does not increase support needs proportionally. In the ETS scenarios, the average RES support costs throughout 2050 are only around half the 2018/2019 averages for direct lignite subsidies reported by the Energy Community*.

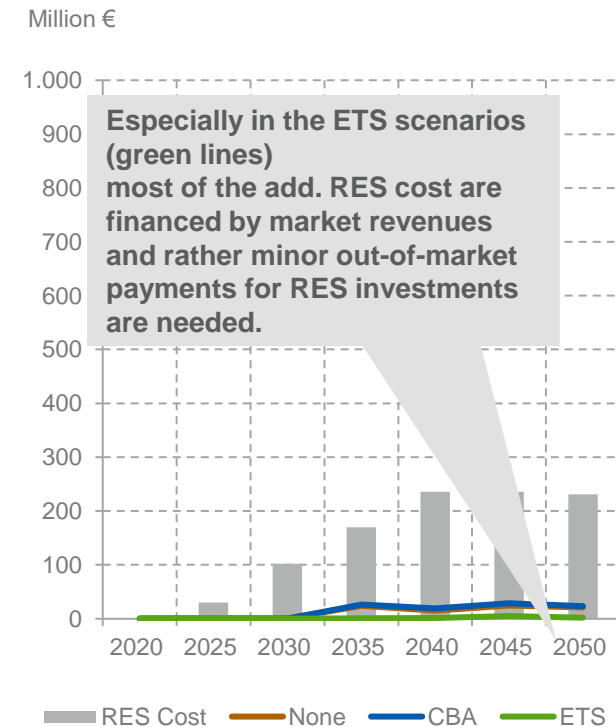
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* See: Miljevic 2020: "Investments into the past", Energy Community Report.



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