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SLED: Support for Low-Emission Development in South Eastern Europe - Regional Assessment -

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REKK REGIONAL CENTRE
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Outline

- Project introduction
- Simulation results
- Sensitivity analysis results: CO2 price and hydro conditions
- Conclusions



The SLED project

- Aim: developing and analysing decarbonisation pathways for the electricity sector of the target countries
- Geographical coverage:
 - Albania
 - Macedonia
 - Montenegro
 - Serbia
 - (Bosnia and Herzegovina included in regional results)
- Methodology:
 - European Electricity Market Model (EEMM) of REKK: detailed, bottom-up economic simulation model covering the whole ENTSO-E region
 - network model of EKC covering the medium- and high-voltage network of the South East European (SEE) region (RES - integration impacts)
- Reports:
 - 4 national report and a regional report

<http://rekk.hu/analysis-details/220/support-for-low-emission-development-in-south-eastern-europe-sled>



Decarbonisation scenarios

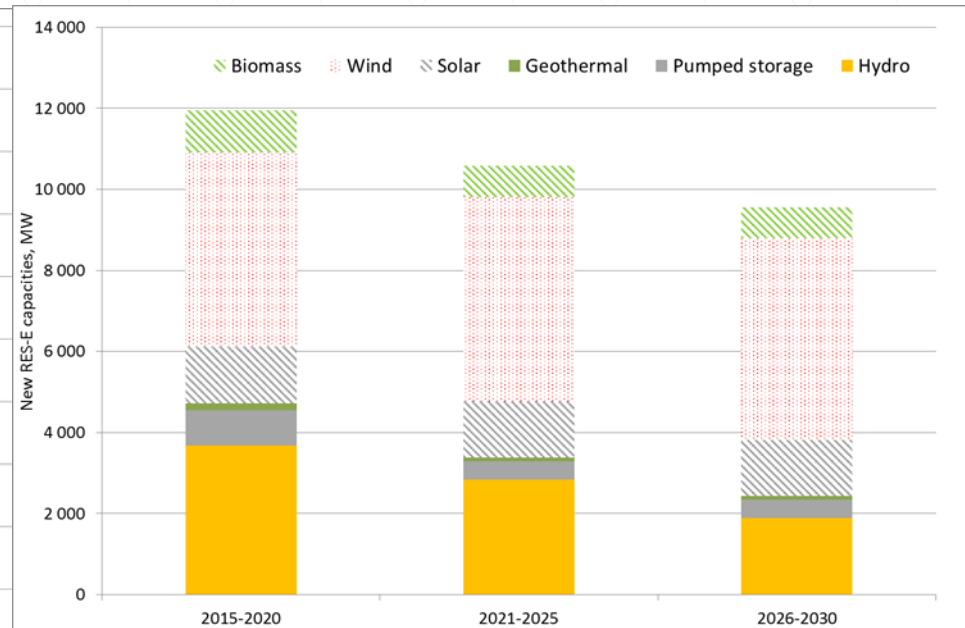
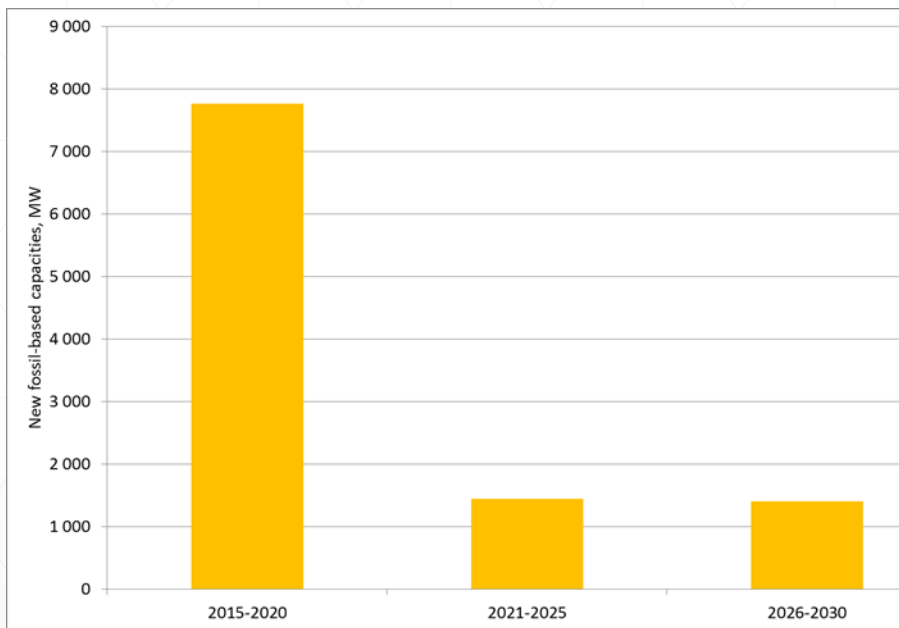
- Three scenarios were constructed and agreed with relevant ministries for each project country: Reference (REF); Currently Planned Policies (CPP); and Ambitious (AMB) – timeframe : 2030
- Scenario assumptions were related to six dimensions:
 - **carbon value**: either due to EU/EnC membership or as national carbon tax
 - **energy/excise tax**: minimum level of excise tax on energy products
 - **environmental standards**: PP closures and/or limitation of operating hours due to Large Combustion Plant Directive/Industrial Emissions Directive
 - **deployment of renewable energy technologies**: NREAP up to 2020 then 3 diverging paths or existing national model assumptions (Macedonia)
 - **deployment of conventional generation** technologies
 - **electricity demand** (integrating assumptions on end-use energy efficiency improvement)
- Regional scenarios are built up from the respective national scenarios (REF, CPP, AMB)



New planned PPs in the wider region*: coal and RES dominance

New coal-based power generation, MW

New RES-E generation capacity, MW



* region includes the following countries: AL; BA; BG; GR; HR;HU; ME; MK; RS; RO;



Low carbon dilemma: coal vs hydro

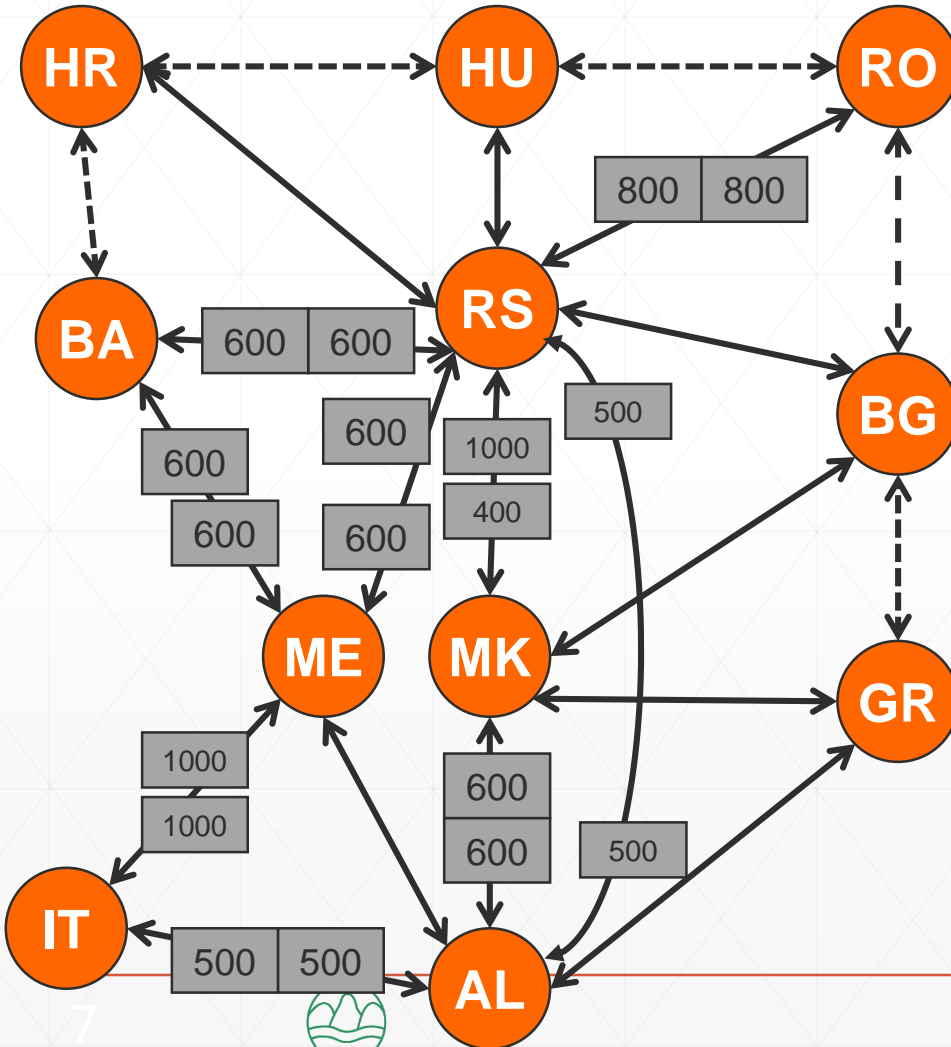
Estimated generation investment costs for the 5 countries

	Investment cost, €/kW	New capacity, MW			Investment cost, m€		
		REF	CPP	AMB	REF	CPP	AMB
Natural gas	1 000	1 920	1 480	1 480	1 920	1 480	1 480
Coal	2 000	5 049	3 254	1 999	10 098	6 508	3 997
Hydro	2 500	2 755	3 976	5 757	6 887	9 940	14 394
Geothermal	4 000	1	12	12	4	46	48
Solar	1 100	119	221	335	131	243	369
Wind	1 000	596	1 077	1 528	596	1 077	1 528
Biomass	3 000	209	319	461	626	957	1 383
Total	-	10 649	10 339	11 572	20 262	20 252	23 199

- The region faces significant investment need due to future generation expansion: between 20-23 bn €
- Coal and lignite investments dominate in the REF scenario
- Hydro has the highest investment share in the AMB scenario



Significant amount of planned new cross-border capacities



Country 1	Country 2	Year of commissioning	Investment status	O → D	D → O
RS	RO	2017	Approved	800	800
BA	ME	2023	Planned	600	600
IT	AL	2020	Planned	500	500
RS	MK	2015	Under construction	400	1000
MK	AL	2019	Planned	600	600
AL	RS	2016	Under construction	500	500
IT	ME	2018	Under construction	1000	1000
RS	BA	2022	Planned	600	600
RS	ME	2022	Planned	600	600

Under construction and approved categories are used in the model runs till 2030. IT-AL is not realised in the modelling period.



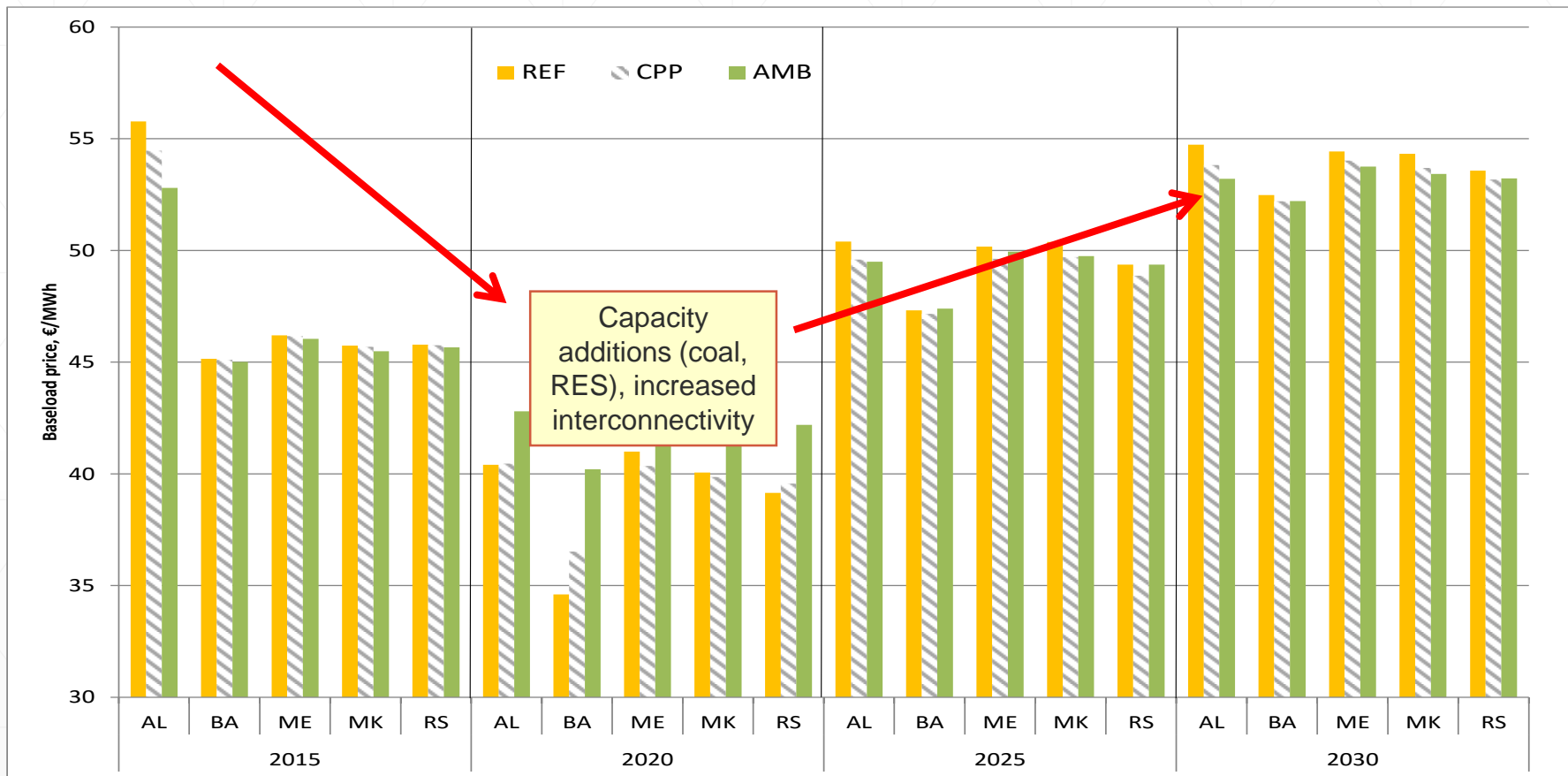
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Wholesale price impact does not inhibit more ambitious GHG policy

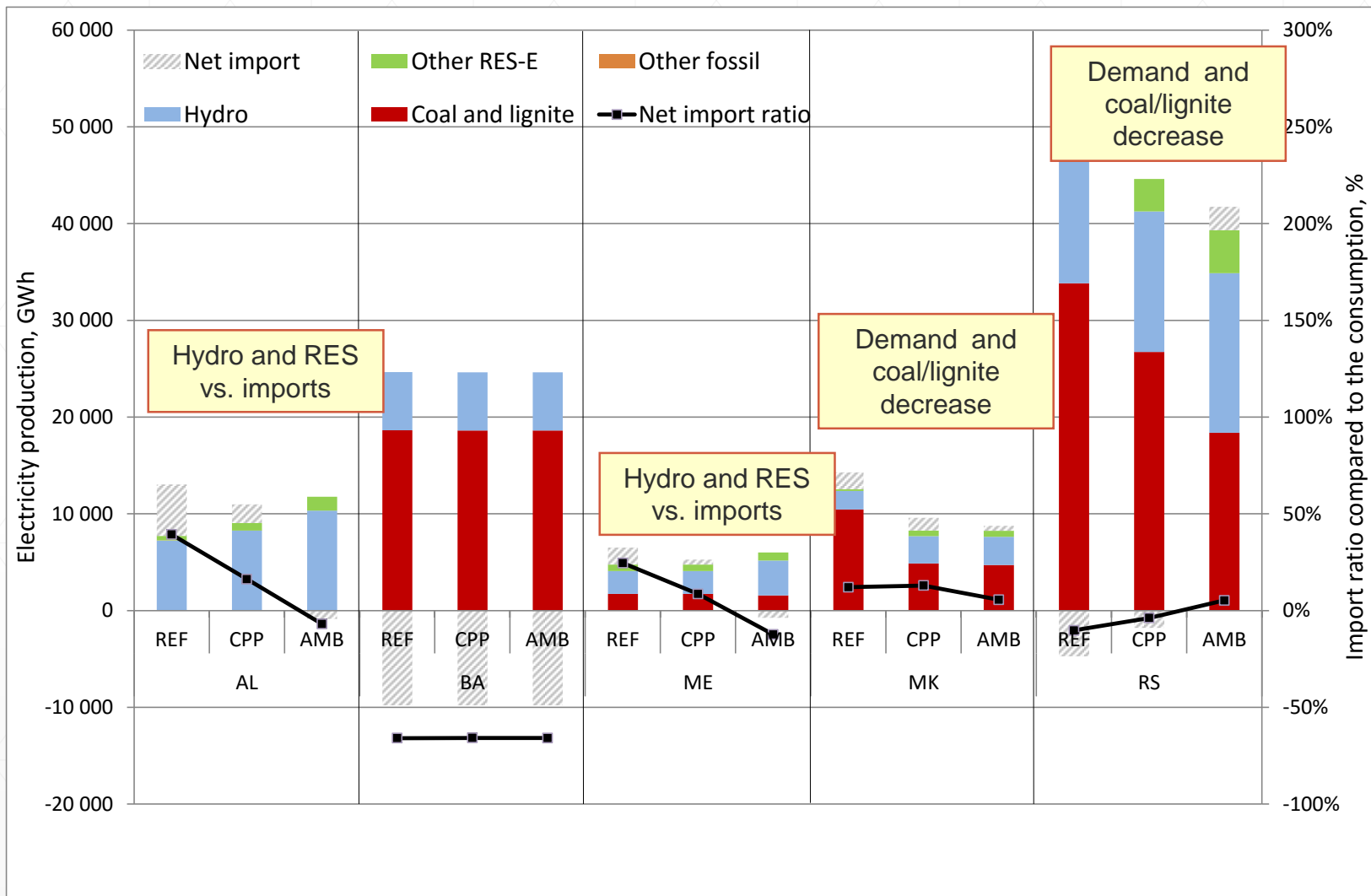
Baseload prices (€/MWh)



Minor wholesale price difference between the scenarios

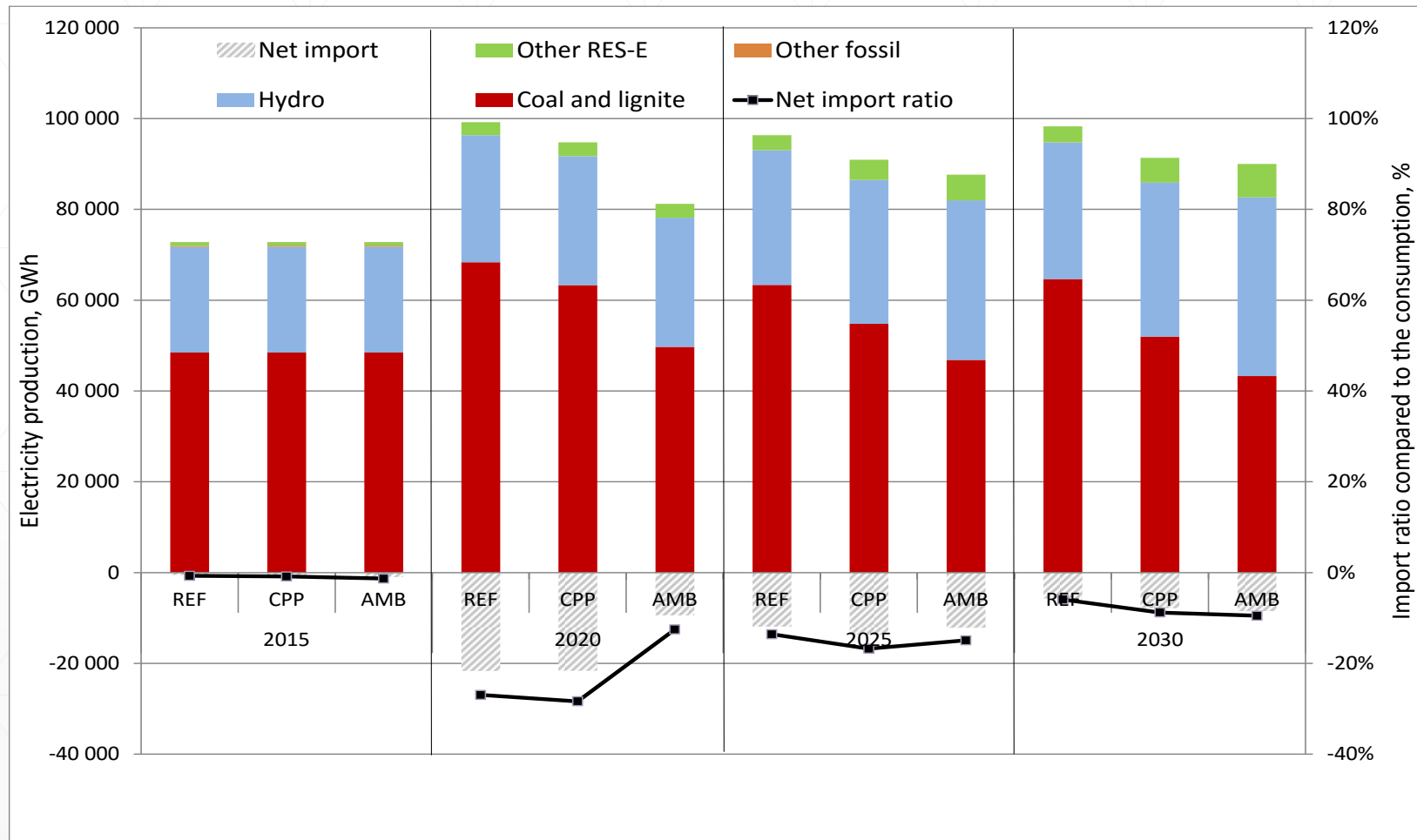


Generation mix per scenario in the five countries in 2030



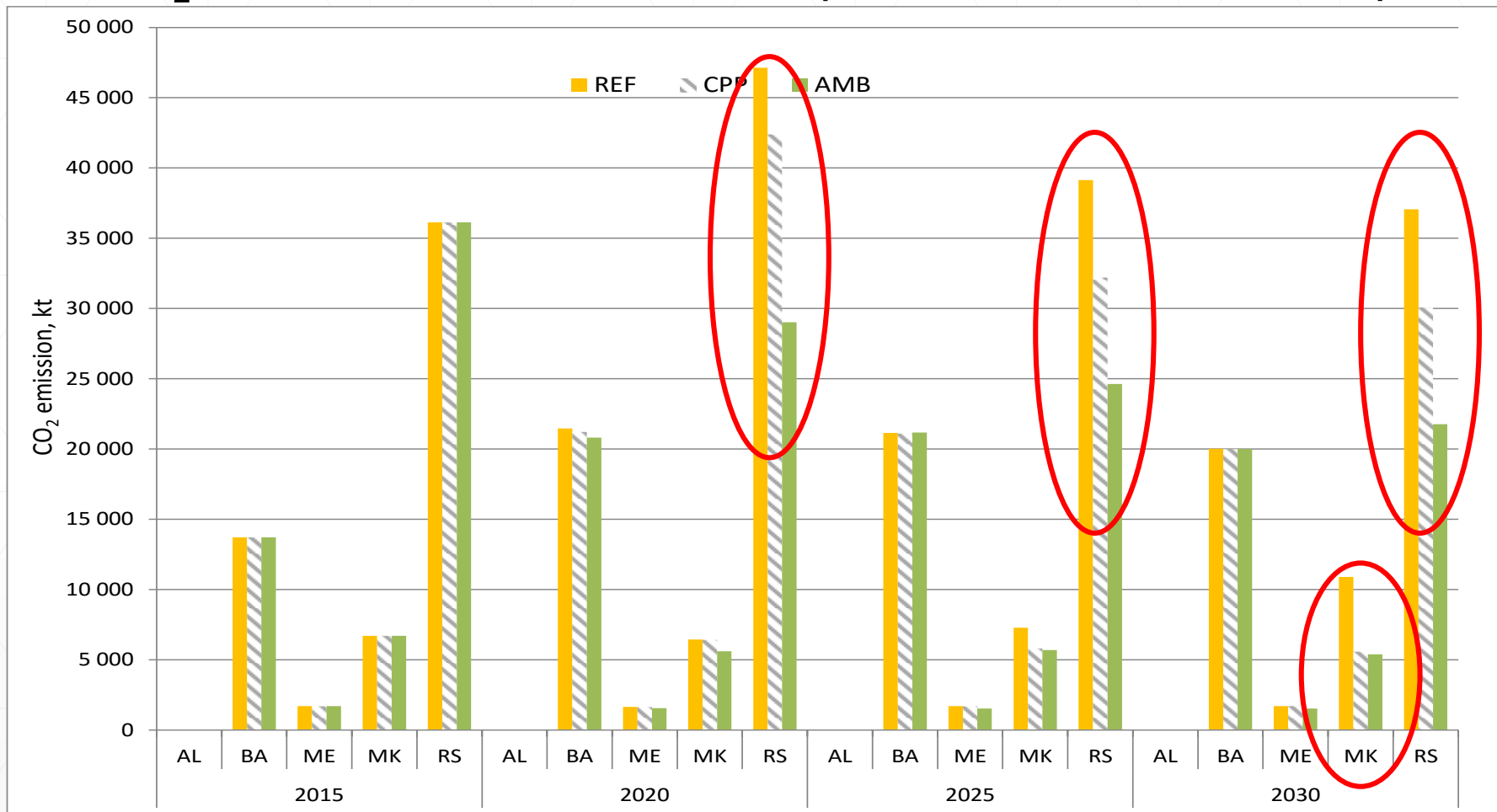
Region turns into net exporter from 2020 due to capacity expansion and demand change

Regional generation mix and net import

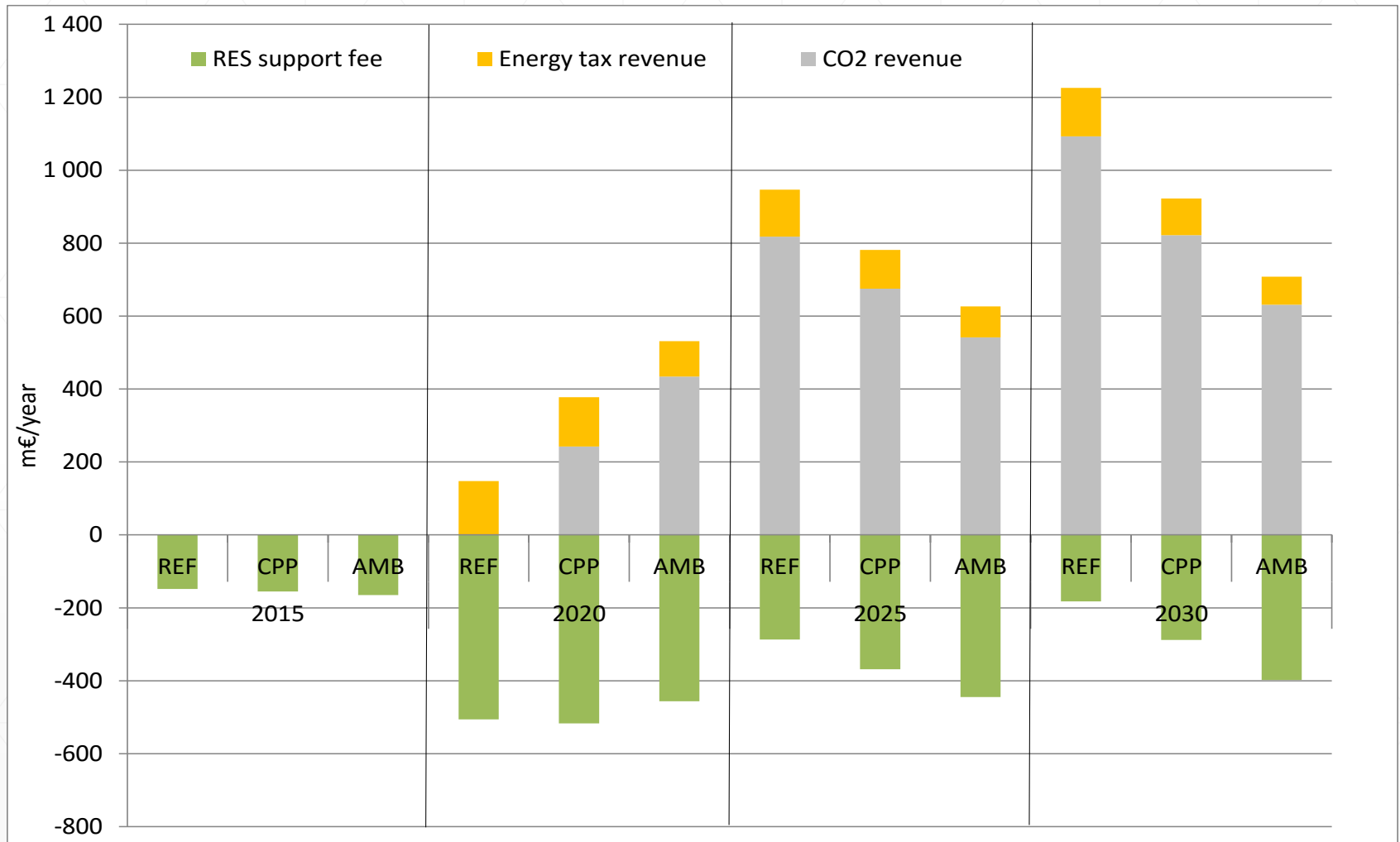


Slightly ambitious policies could result in 30-50% CO₂ reductions

CO₂ emissions in the five countries (2015, 2020, 2025 and 2030)



Fiscal revenue from carbon and energy tax exceeds RES support requirements

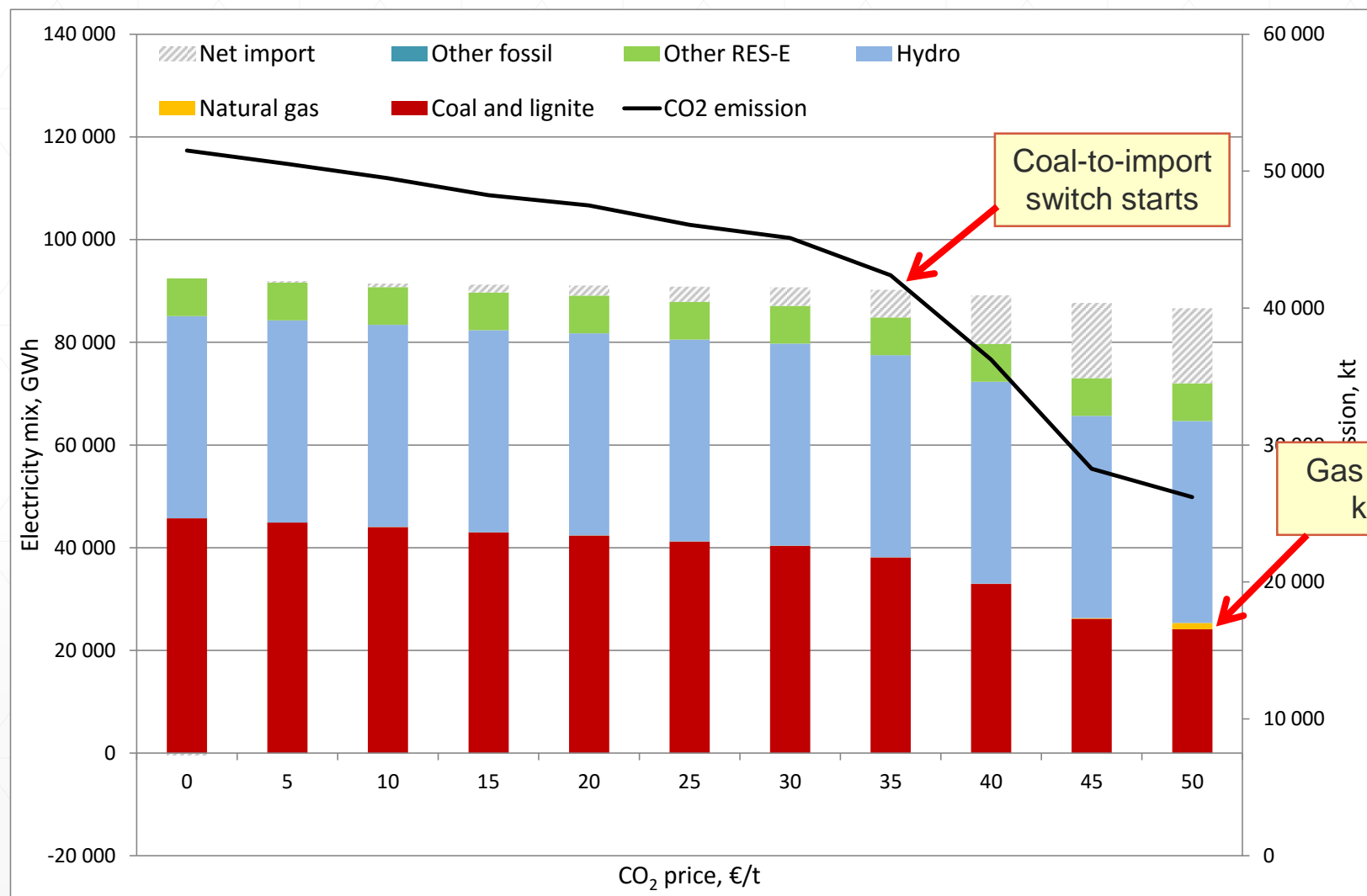


Outline

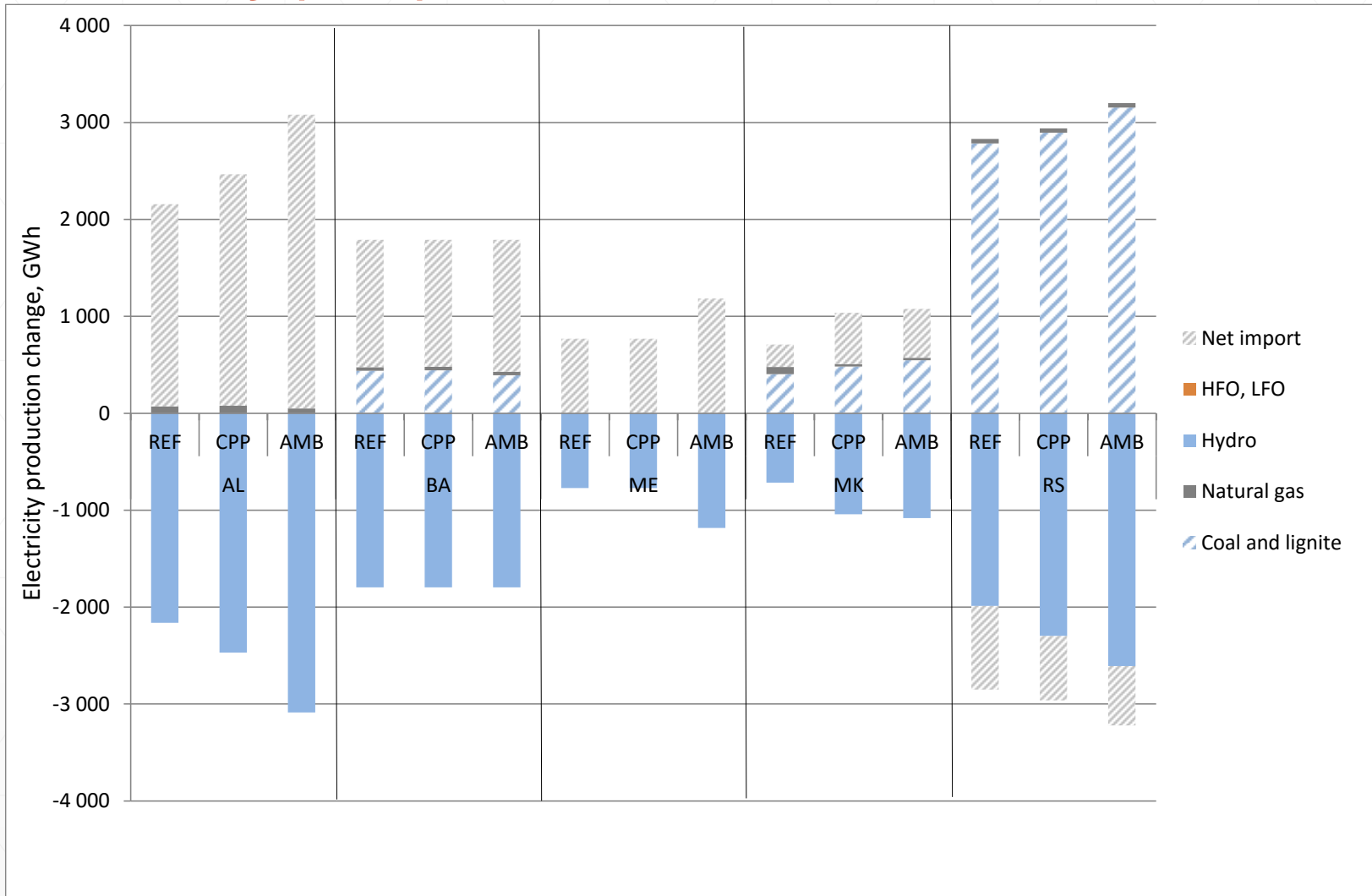
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Regional generation mix with different CO₂ prices in the AMB scenario (2030)



Generation mix change in the case of low hydro availability (2030)



Hydro is substituted by mainly import, except Serbia (coal)



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Conclusions

- Slightly ambitious low carbon development policies could in itself result in 30-50% CO₂ emission reduction in the region
- Low carbon development policies combined with higher CO₂ prices result in further coal-to-import switch and CO₂ reduction
- Carbon and energy tax revenues (if introduced) could offset increased spending on planned RES-E support in longer term
- Limited role for gas in decarbonisation under present infrastructure and price conditions
- Key energy policy dilemma: carbon/lignite- or hydro/renewable-heavy development?
- The hydro/RES choice is hindered by the lack of carbon pricing, uncertain timing of EU accession and already high exposure to hydro resources
- Stronger interconnectivity helps market integration, RES-integration and hydro utilization for the region. Without planned network additions contingencies might appear in Serbia and Macedonia



SEERMAP project

- REKK now leads a new assessment project on the region:
 - SEERMAP – South East Europe Electricity Roadmap
- Increased geographical coverage: 6 Energy community countries (Albania, Bosnia and Herzegovina, Kosovo*, Macedonia, Montenegro, Serbia) + Bulgaria, Greece and Romania,
- Extended timeframe: up to 2050
- With a consortia of TU Vienna (AT), EKC (RS), OGR (CZ) and six local partner from EnC countries
- Aims for assessing more ambitious decarbonisation scenarios of the electricity system of the SEE region



Thank you for your attention!



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