

Strengthening Cross-Border Collaboration for Energy Transition: The Case of Bosnia and Herzegovina and the Surrounding Region

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Instead of an Introduction / Setting the Stage

European Green Deal, presented 2019



Sofia Declaration, signed 2020



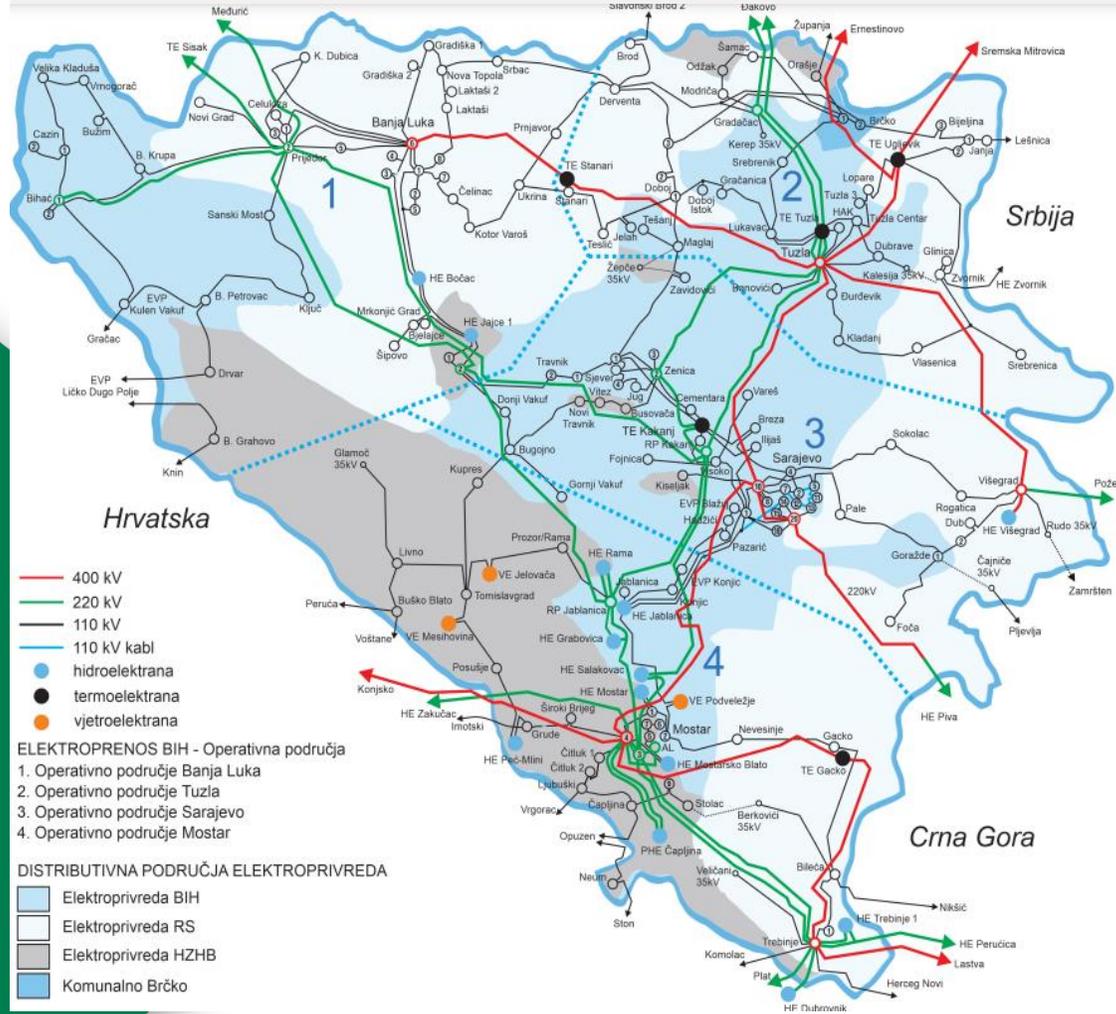
Energy transition = Systemic transformation

Defining the (Surrounding) Region



- The countries share:
 - legacy infrastructure,
 - extensive natural resources,
 - significant cross-border electricity flows.
- Bosnia and Herzegovina plays a particularly role:
 - surplus in electricity generation,
 - central connectivity to neighboring power systems.

The Power System of BiH in Numbers



- Total installed capacity: **5,185.14 MW** (31.12.2024.)
 - HPP **2,129.06 MW**
 - sHPP **168.54 MW**
 - TPP **1,965 MW**
 - WPP **218.6 MW**
 - sWPP **0.40 MW**
 - PVPP **235.62 MW**
 - sPVPP **372.02 MW**
 - biogas and biomass facilities **2.71 MW**
 - industrial power plants **92.85 MW**

**Coal vs. RES production:
60-65% vs. 40-35%**

- Av. electricity generation p.a.: **15 – 17 TWh**
- Av. electricity consumption p.a.: **12 TWh**



CBAM and Electricity Exports to the EU (1)

Estimates of CBAM costs for electricity exports and transit for CPs (except Ukraine) to the EU in 2023

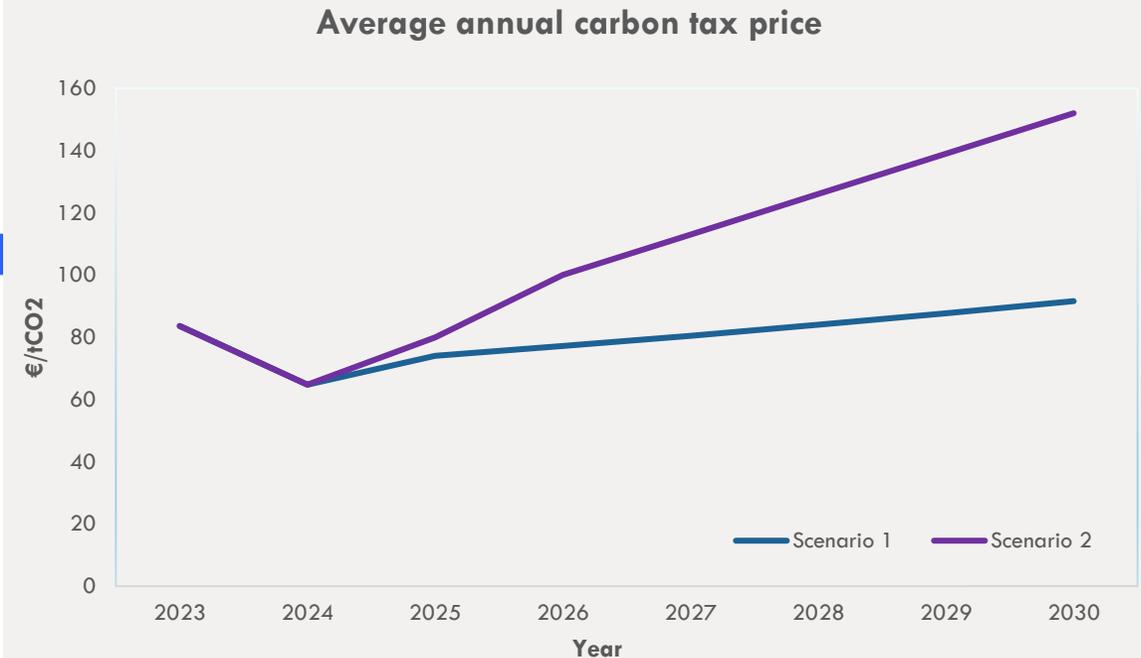
- *Due date: 2026*

Contracting Party bordering the EU	Export + Transit CP → EU (MWh)	Average annual marginal CBAM price per MWh (EUR/MWh)	Total annual CBAM cost for EU importers (EUR)
Albania	2,180,799	0.00	0
Bosnia and Herzegovina	2,489,323	95.30	237,235,144
Moldova	236,886	43.34	10,267,477
Montenegro	3,692,858	80.63	297,761,310
North Macedonia	3,409,421	76.91	262,207,316
Serbia	12,373,039	86.48	1,070,013,746

Source: Energy Community CBAM – Readiness Tracker, October 2024

CBAM and Electricity Exports to the EU (2)

Bosnia and Herzegovina – Projections of CBAM related costs (1)



CBAM and Electricity Exports to the EU (3)

Bosnia and Herzegovina – Projections of CBAM related costs (2)

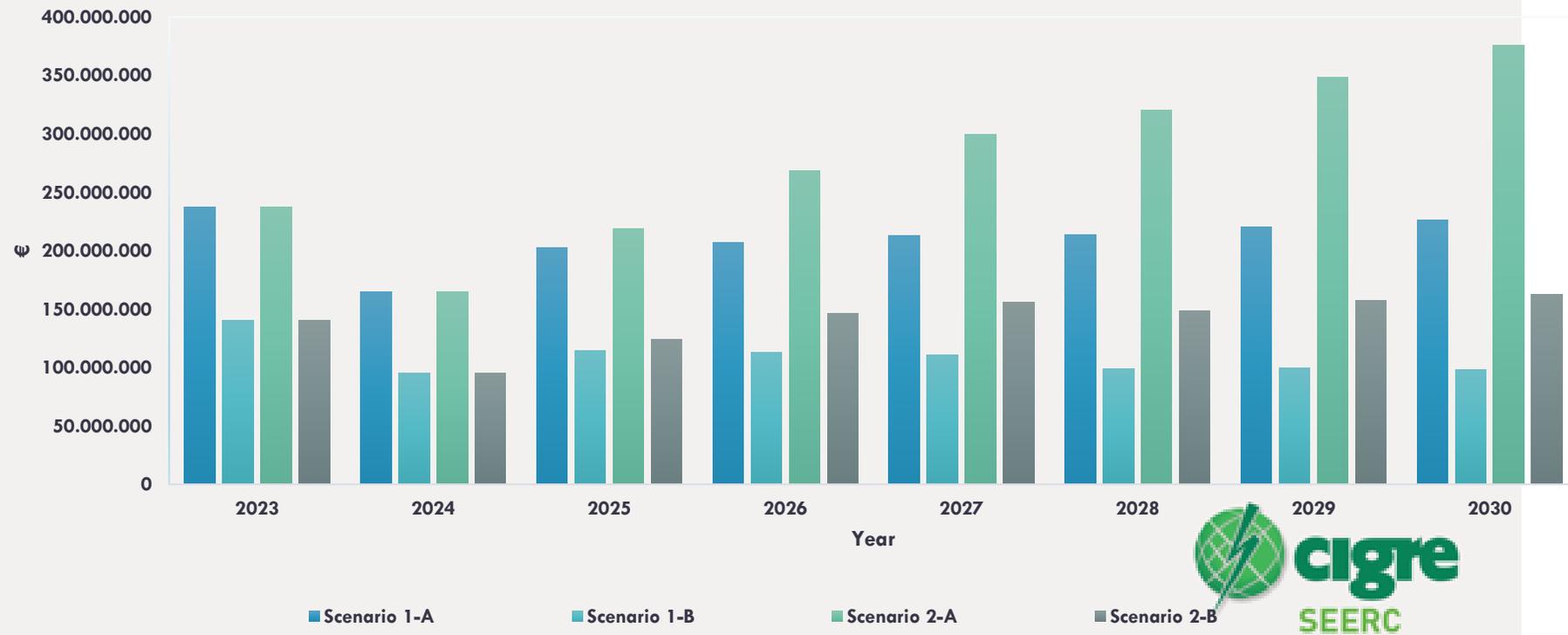
Carbon tax:

- Sc1- relatively stable price
- Sc2- intensive increase

Emission factor:

- ScA- CBAM Transition Register
- ScB- 2: grid emission coefficient considering decarbonisation path

Estimated CBAM costs for electricity exports from BiH to the EU

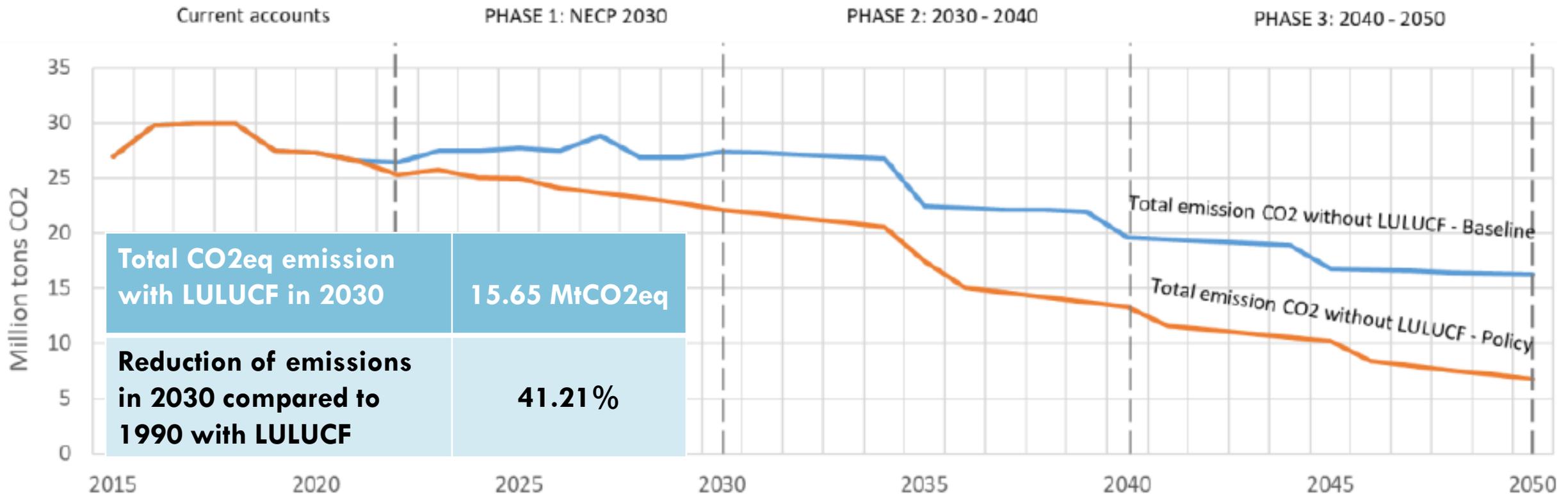


CBAM and Electricity Exports to the EU (4)

Electricity sector exemption criteria

- Electricity exports to the EU may be temporary exempt until 2030
- Exemption criteria (*Regulation (EU) 2023/956 on the establishment of a Carbon Border Adjustment Mechanism*):
 - Existence of an organized electricity market
 - Signed market coupling agreement with the EU
(*i.e. effective integration into the EU's electricity trading system*)
 - Operational system for Monitoring, Reporting, Verification and Accreditation (MRVA)
 - Clear progress towards establishing a carbon pricing mechanism equivalent to the EU ETS
 - Adopted long-term roadmap towards climate neutrality by 2050
 - Defined coal phase-out plans in electricity generation

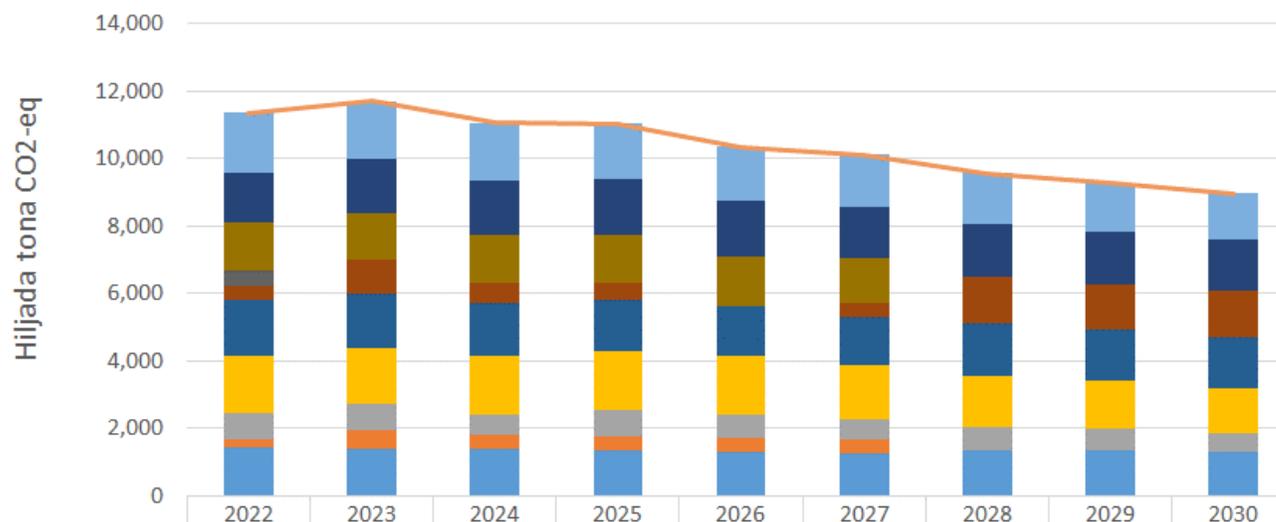
BiH Targets – Greenhouse Gas Emissions (1)



Source: NECP final draft, June 2024

BiH Targets – Greenhouse Gas Emissions (2)

Source: NECP final draft, June 2024



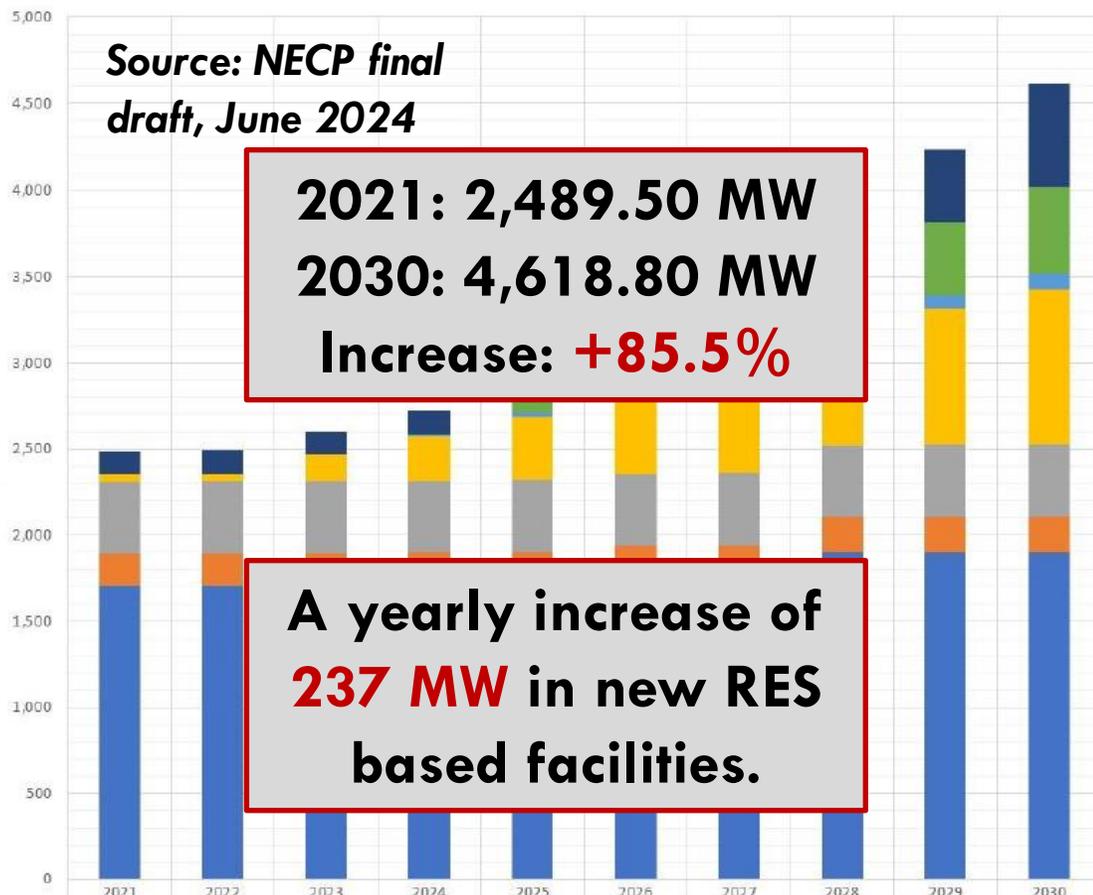
	2022	2023	2024	2025	2026	2027	2028	2029	2030
TE Ugljevik 300 MW	1,785.0	1,728.8	1,694.7	1,641.9	1,599.4	1,536.3	1,493.9	1,442.7	1,384.5
TE TZ6 215 MW	1,469.9	1,584.4	1,594.2	1,635.7	1,649.1	1,518.7	1,584.3	1,547.1	1,501.9
TE TZ5 200 MW	1,405.5	1,404.3	1,453.5	1,448.8	1,467.6	1,369.4	-	-	-
TE TZ3 100 MW	486.1	-	-	-	-	-	-	-	-
TE TZ 4 200 MW	394.2	980.7	593.7	495.3	-	397.1	1,355.4	1,337.8	1,370.6
TE Stanari 300 MW	1,659.0	1,603.1	1,568.6	1,517.5	1,477.0	1,418.3	1,547.9	1,520.7	1,499.9
TE Petroleum products	0.8	0.7	0.7	0.7	0.6	0.6	0.5	0.5	0.5
TE KK7 230 MW	1,692.8	1,691.3	1,712.2	1,744.9	1,759.1	1,592.0	1,525.0	1,442.4	1,365.7
TE KK6 110 MW	779.2	764.5	629.6	788.2	669.5	635.7	689.7	638.1	514.0
TE KK5 110 MW	220.4	540.6	424.2	423.1	419.4	409.2	-	-	-
TE Gacko 300 MW	1,448.2	1,400.1	1,370.7	1,326.8	1,292.1	1,241.4	1,355.7	1,338.8	1,321.3
Ukupno emisije iz proizvodnje električne energije	11,341.2	11,698.5	11,042.0	11,023.0	10,333.7	10,118.6	9,552.4	9,268.1	8,958.5

Changes in the electricity sector are the key for achieving the set GHG emission reduction by 2030.

Decommissioning of 410 MW & repowering(biomass)

deSOx&deNOx
TPP Kakanj 7
TPP Tuzla 6

BiH Targets – RES in Electricity Production



	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Wind	136.40	136.40	136.40	136.40	136.40	246.40	426.40	426.40	426.40	600.00
Solar prosumers	0.10	0.10	0.10	0.10	100.00	180.00	260.00	340.00	420.00	500.00
Solar industry	0.10	0.55	1.00	14.00	27.00	40.00	53.00	66.00	79.00	92.00
Large solar producers	41.30	41.32	148.66	255.99	363.33	470.66	578.00	685.33	792.67	900.00
Pumped hydro	420.00	420.00	420.00	420.00	420.00	420.00	420.00	420.00	420.00	420.00
Small hydro	186.80	189.02	191.24	193.47	195.69	197.91	200.13	202.36	204.58	206.80
Hydro	1,705.00	1,705.00	1,705.00	1,705.00	1,705.00	1,739.00	1,739.00	1,900.00	1,900.00	1,900.00

Share of RES in
GFEC 2030

43,6%

Technology	2021 (MW)	2030 (MW)
HPP	1,705.00	1,900.00
Reversible HPP	420.00	420.00
sHPP	186.80	206.80
PVPP (utility-scale)	41.30	900.00
PVPP (prosumers)	0.00	500.00
PVPP (industry)	0.00	92.00
WPP	136.40	600.00

Current Climate Landscape in the Region

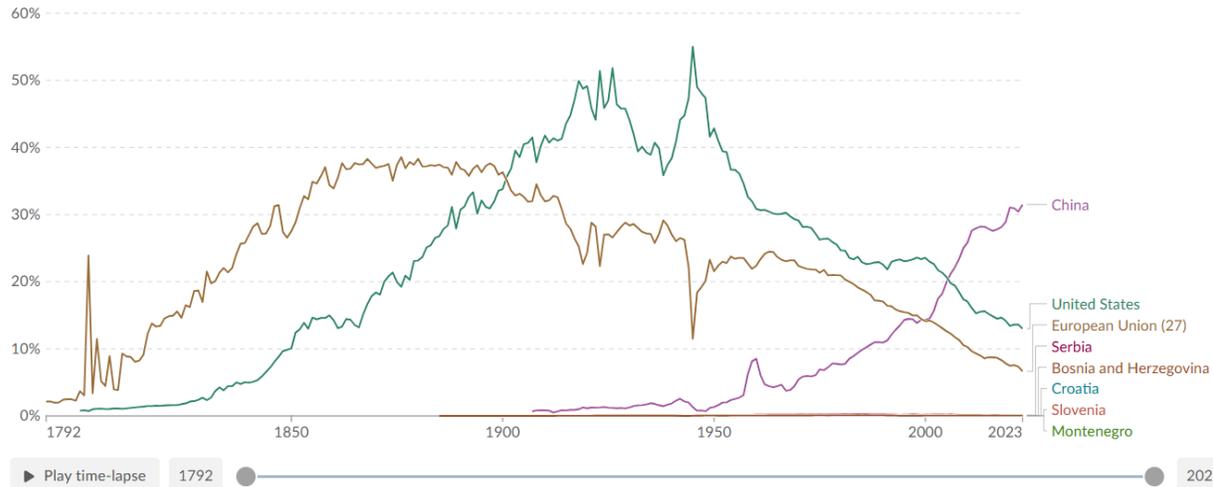
Share of global CO₂ emissions and per capita CO₂ emissions

Share of global CO₂ emissions

Carbon dioxide (CO₂) emissions from fossil fuels and industry. Land-use change is not included.

Our World
in Data

Table Map Chart



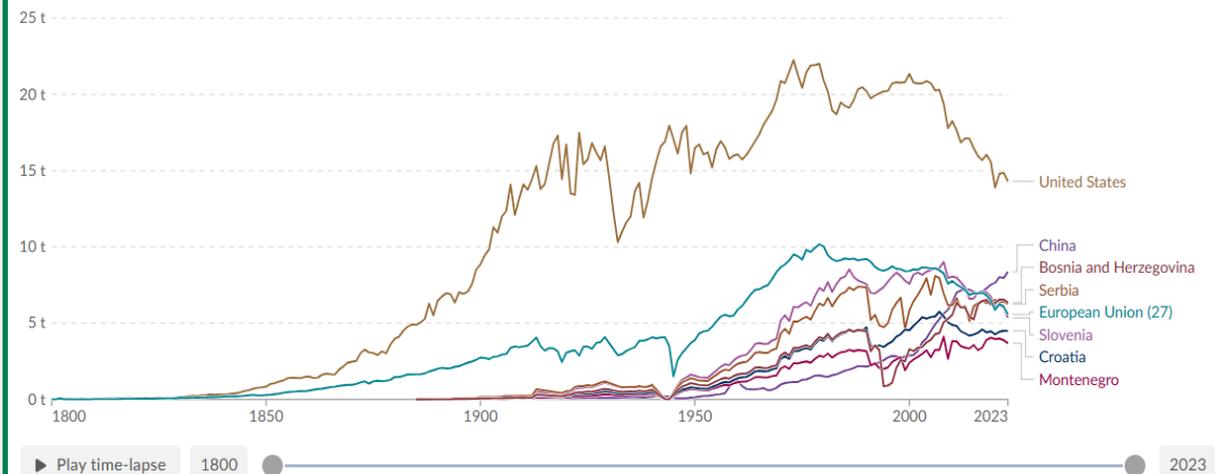
Per capita CO₂ emissions

Carbon dioxide (CO₂) emissions from fossil fuels and industry. Land-use change is not included.

Our World
in Data

Table Map Line Slope

Settings



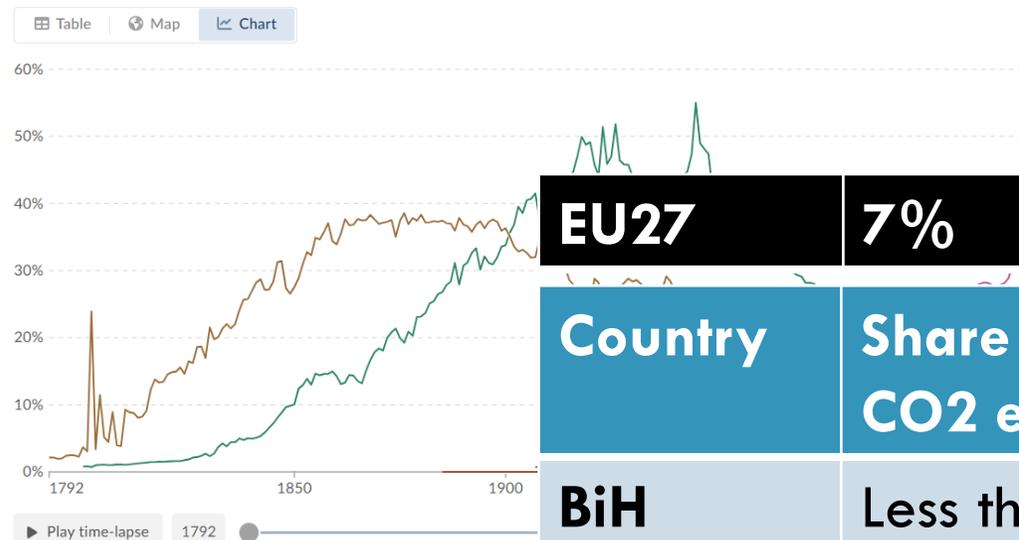
Source: ourworldindata web page

Current Climate Landscape in the Region

Share of global CO₂ emissions and per capita CO₂ emissions

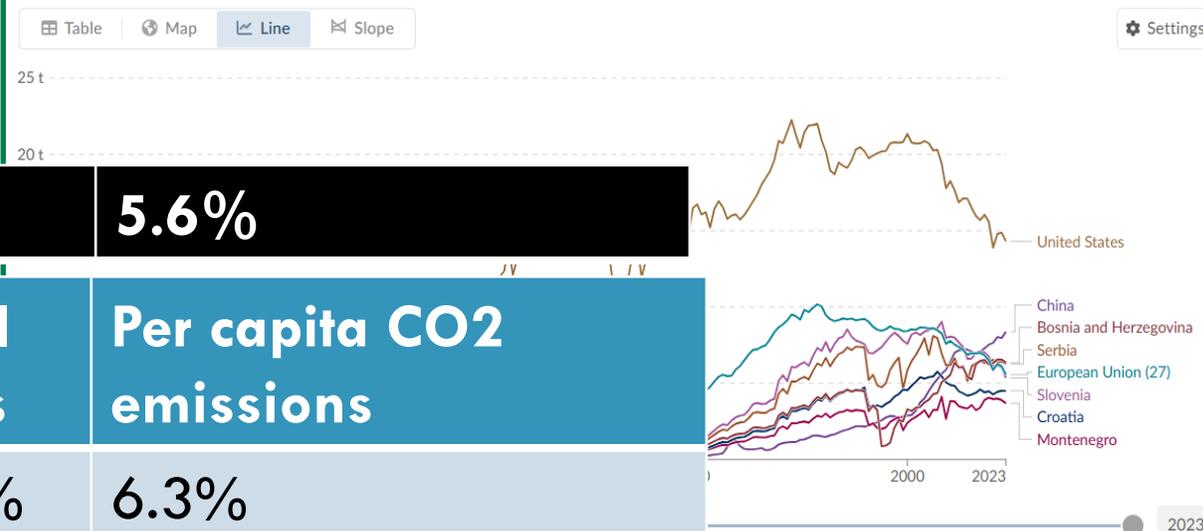
Share of global CO₂ emissions

Carbon dioxide (CO₂) emissions from fossil fuels and industry. Land-use change is not included.



Per capita CO₂ emissions

Carbon dioxide (CO₂) emissions from fossil fuels and industry. Land-use change is not included.



Source: ourworldindata website

Country	Share in global CO ₂ emissions	Per capita CO ₂ emissions
EU27	7%	5.6%
BiH	Less than 0.05%	6.3%
CRO	Less than 0.05%	4.5%
MNE	Less than 0.01%	3.7%
SLO	0.03%	5.3%
SRB	0.11%	6.3%

Current Electricity Landscape in the Region

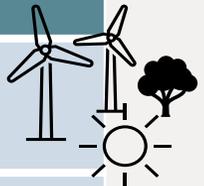
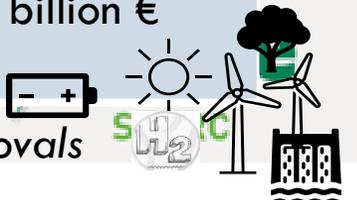
Share of RES in the electricity mix

Country	RES share in electricity production	Energy sources exploited
BiH	35 - 40%	coal, hydro, wind, solar, biogas, biomass
CRO	54%+ (2022)	nuclear, gas, oil, coal, hydro, wind, solar, biogas, biomass, geothermal
MNE	55 - 62%	coal, hydro, biomass, wind, solar
SLO	29.4% (2022)	nuclear, hydro, coal, gas, solar, biomass, wind
SRB	28.3% (2023)	coal, hydro, gas, wind, solar

Future Climate and Electricity Landscape in the Region (1)

2030 GHG and RES share targets



Country	Greenhouse gas emissions (GHG)	Share of RES in GFEC 2020	Share of RES in GFEC 2030	Share of RES in final electricity consumption	Investments
Bosnia and Herzegovina	(1990: -41.2%) 15.65 MtCO _{2eq}	40%	43.6%	65%	8 billion € 
Serbia	(1990: -40.3%) 47.82 MtCO _{2eq}	27%	40.7%*	45%	10.2 billion € 
Montenegro	(1990: -55.0%)** 2.42 MtCO _{2eq}	33%	50.0%	79%	4.7 billion € 
Croatia	2005: 62%***	2021: 31.7%	42.5%	76.7%	19 billion € 
Slovenia	(2005: -55%) 47.82 MtCO _{2eq}	2022: 25%	33%	52%	57 billion € 

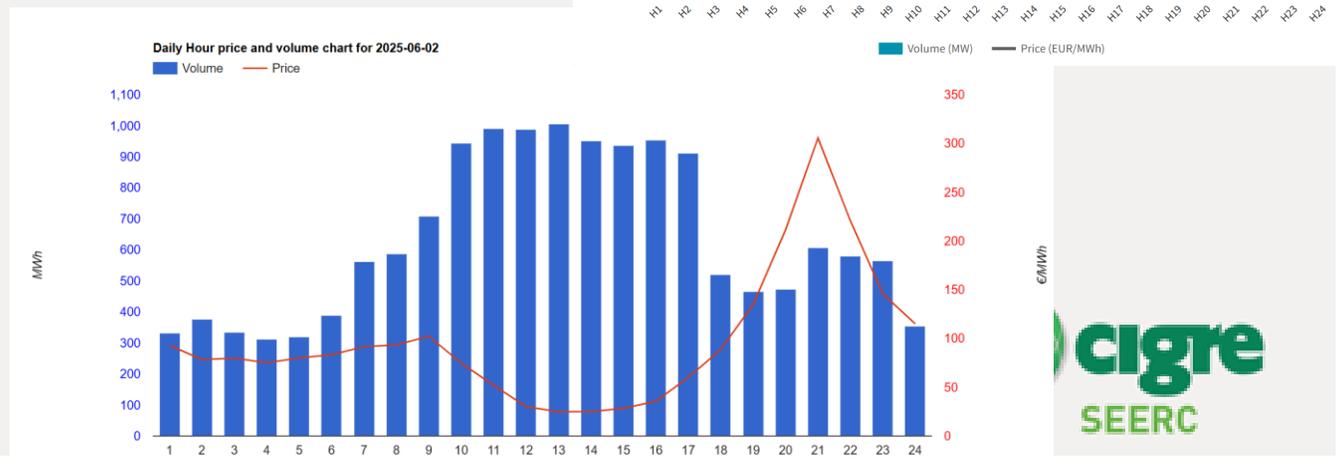
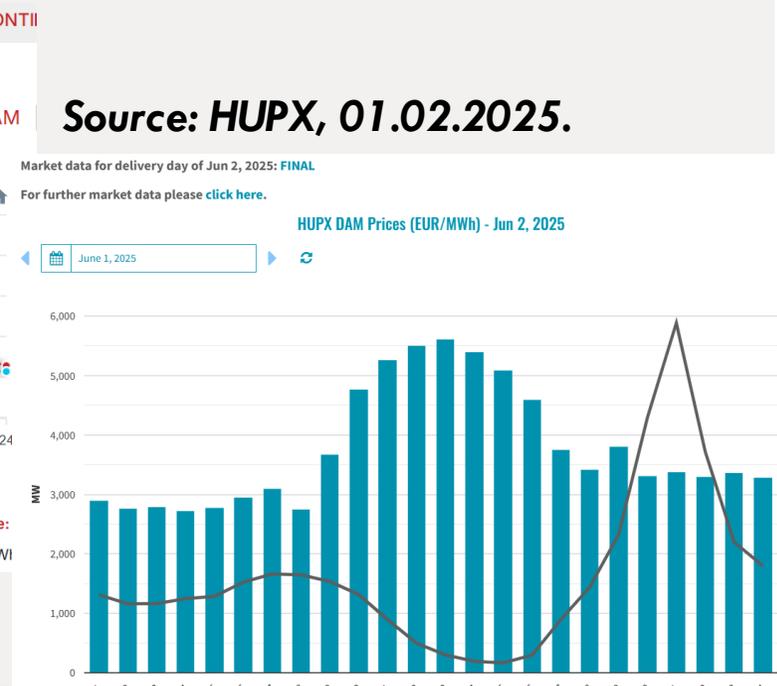
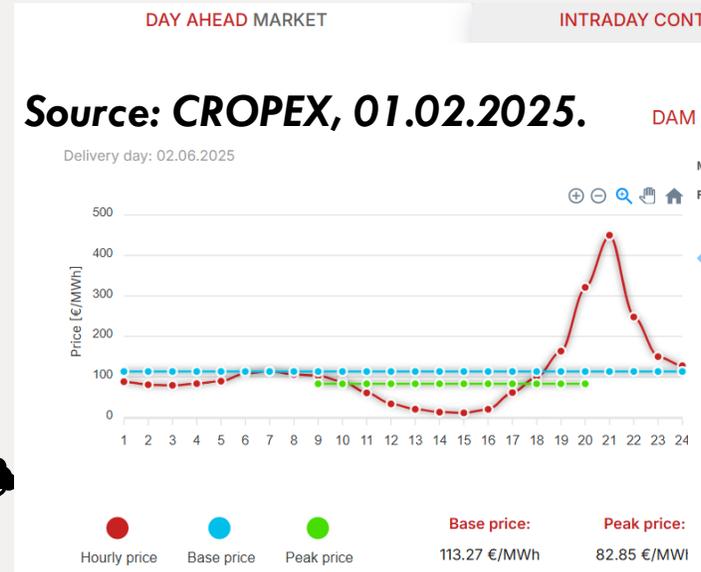
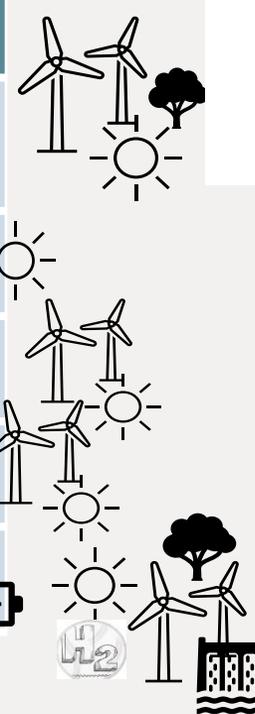
* NECP target not in line with Ministerial Council Decision, ** excluding LULUCF emissions and removals

*** sectors in the EU ETS

Future Climate and Electricity Landscape in the Region (2)

2030 RES share targets

Country	Share of RES in final electricity consumption - 2030
Bosnia and Herzegovina	65%
Serbia	45%
Montenegro	79%
Croatia	76.7%
Slovenia	52%



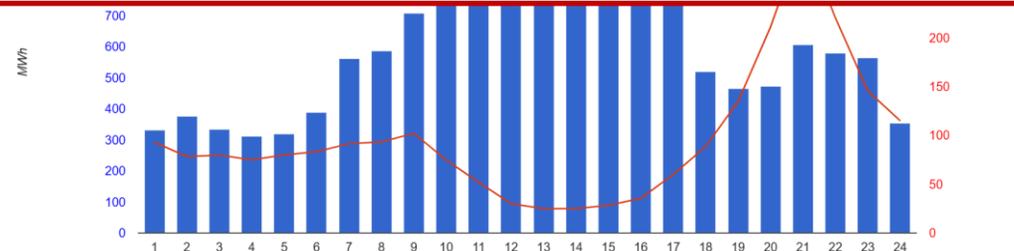
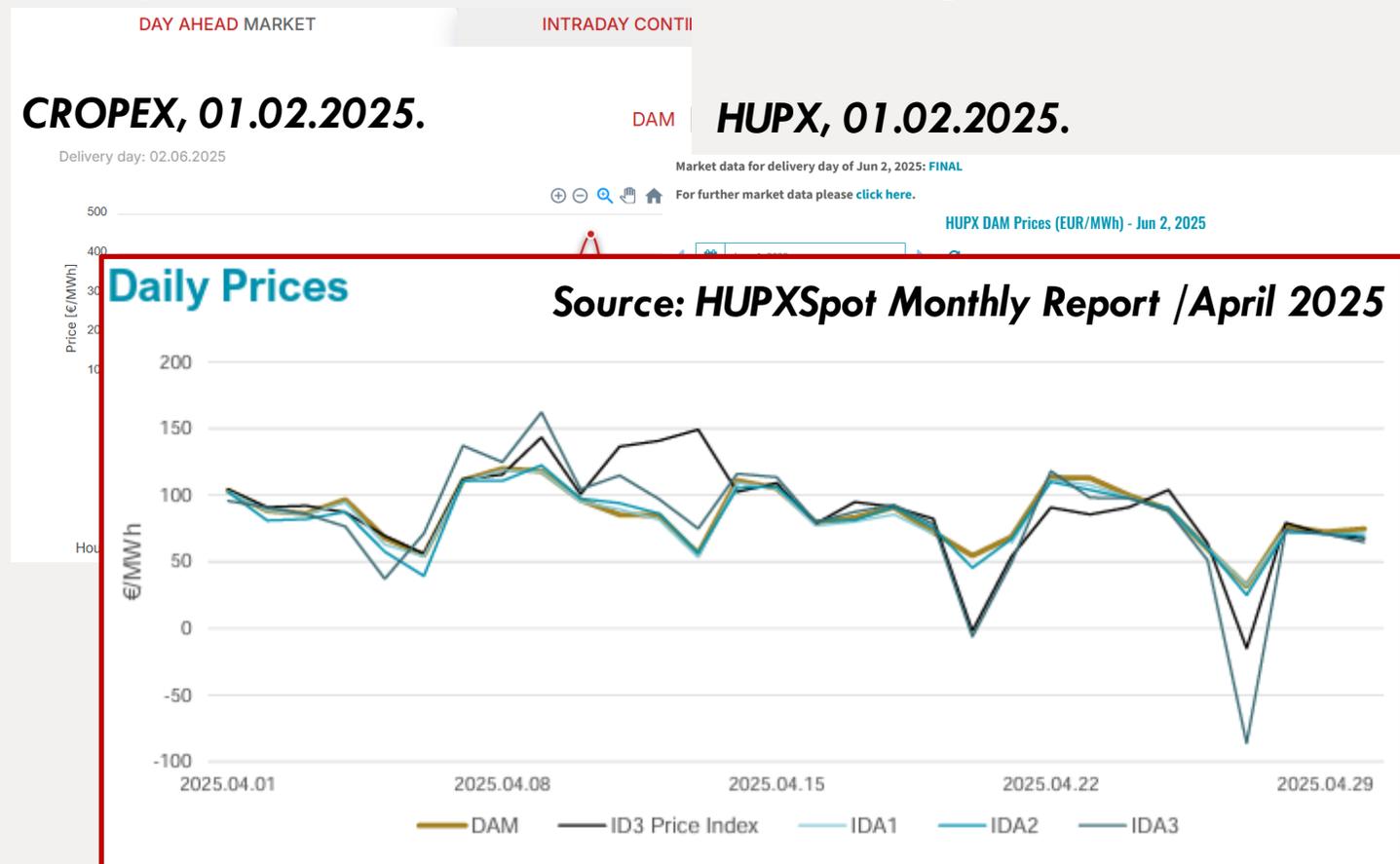
Source: SEEPEx, 01.02.2025.



Future Climate and Electricity Landscape in the Region (3)

DAM prices

- Countries have **aligned development strategies** with the promotion of (mainly) **iRES**.
- The **structure and availability of electricity** have changed.
- **PVPP** have introduced a **distinct generation pattern**.



Source: SEEPEX, 01.02.2025.

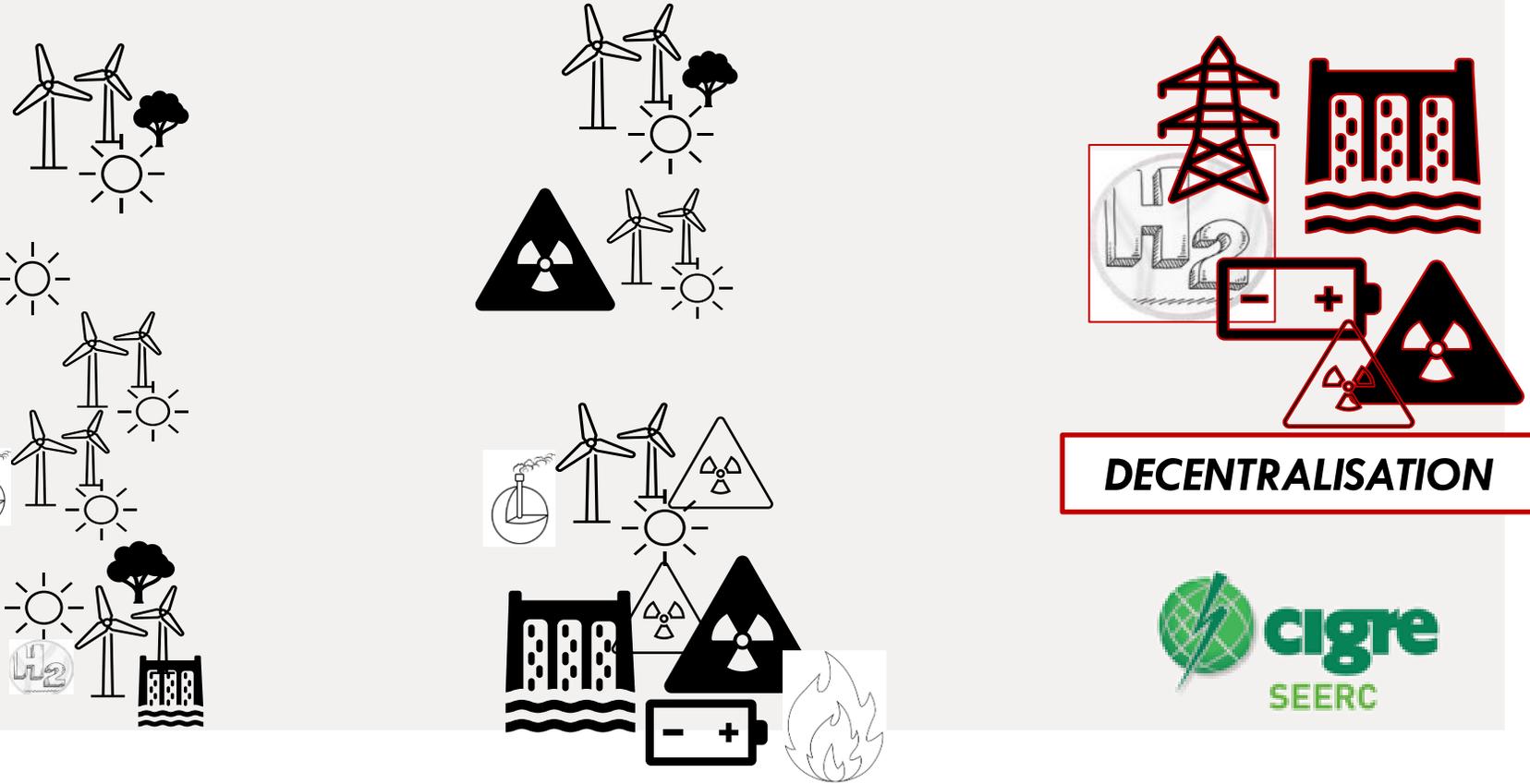
Future Climate and Electricity Landscape in the Region (4)

Beyond 2030

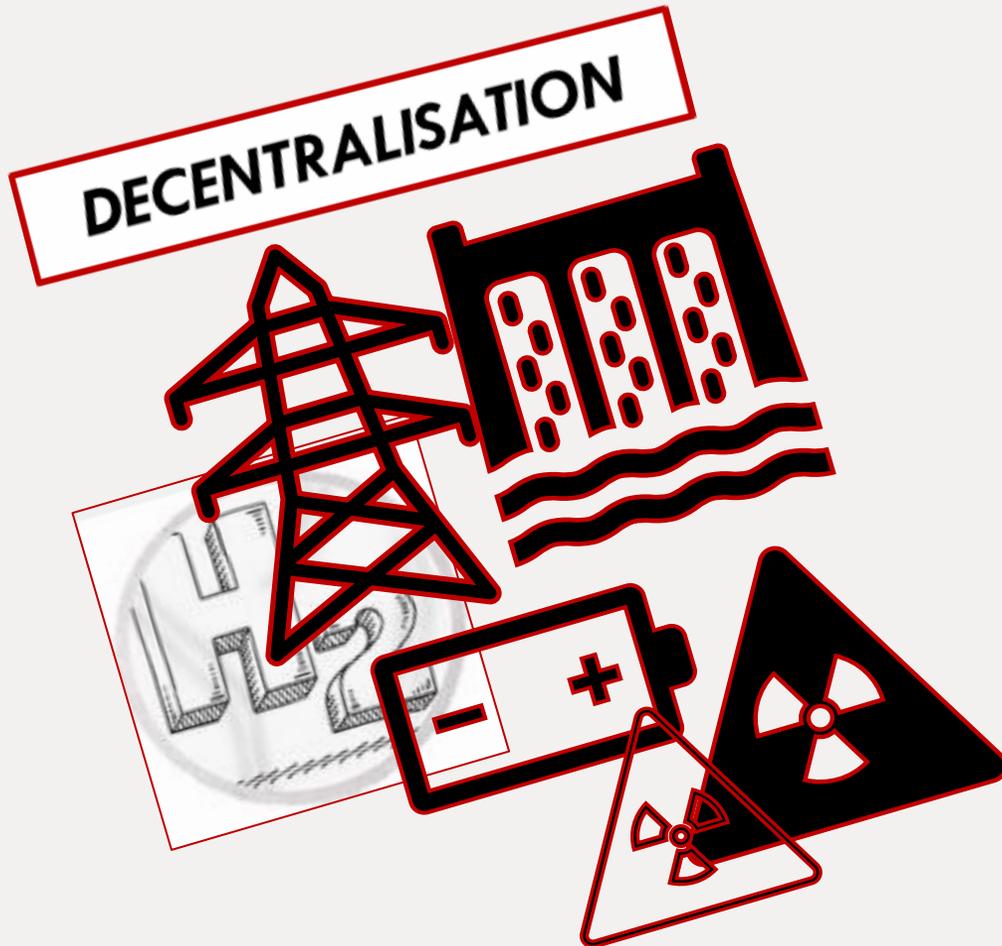
2030 - 2050



Country	Share of RES in final electricity consumption - 2030
Bosnia and Herzegovina	65%
Serbia	45%
Montenegro	79%
Croatia	76.7%
Slovenia	52%



Cross-border Collaboration Aspects (1)



To support the continued integration of RES in reaching carbon neutrality by 2050 and ensuring long-term sustainability, the Region must prioritize:

- **Investment in energy storage** (battery systems and pumped hydro)
- **Grid modernization and regional interconnection enhancements** (to improve regional balancing, security of supply, and market integration)
- **Market and policy reforms that incentivize flexibility and demand response.**

Without these structural improvements, the growing penetration of iRES could lead to inefficiencies, more frequent renewable output limitations and increased price fluctuations on the market.

Cross-border Collaboration Aspects (2)

Regional: Albania – Kosovo 400 kV Transmission Line

Cross-border interconnections are a cornerstone of an integrated and resilient energy transition.

Description

- 400 kV Transmission Line Tirana - Pristina
- Securing the power supply
- Increasing Energy Efficiency

Country & Partner

- Albania & Kosovo
- Transmission utilities OST & KOSTT

Funding

- Total costs: 78,2 Mio. €
- KfW-loan: 59 Mio. €
- BMZ Grant: 16,5 Mio. €
- Partner Contrib.: 2,7 Mio. €

Effects

- Annual electricity export: 1500 GWh



Cross-border Collaboration Aspects (3)

Regional: Trans-Balkan Corridor

Description

- Electricity Transmission Line along the Balkan region
- KfW is financing different parts in Serbia and Montenegro

Country & Partner

- Serbia & Montenegro
- Transmission System Operators EMS & CGES

Funding Serbia

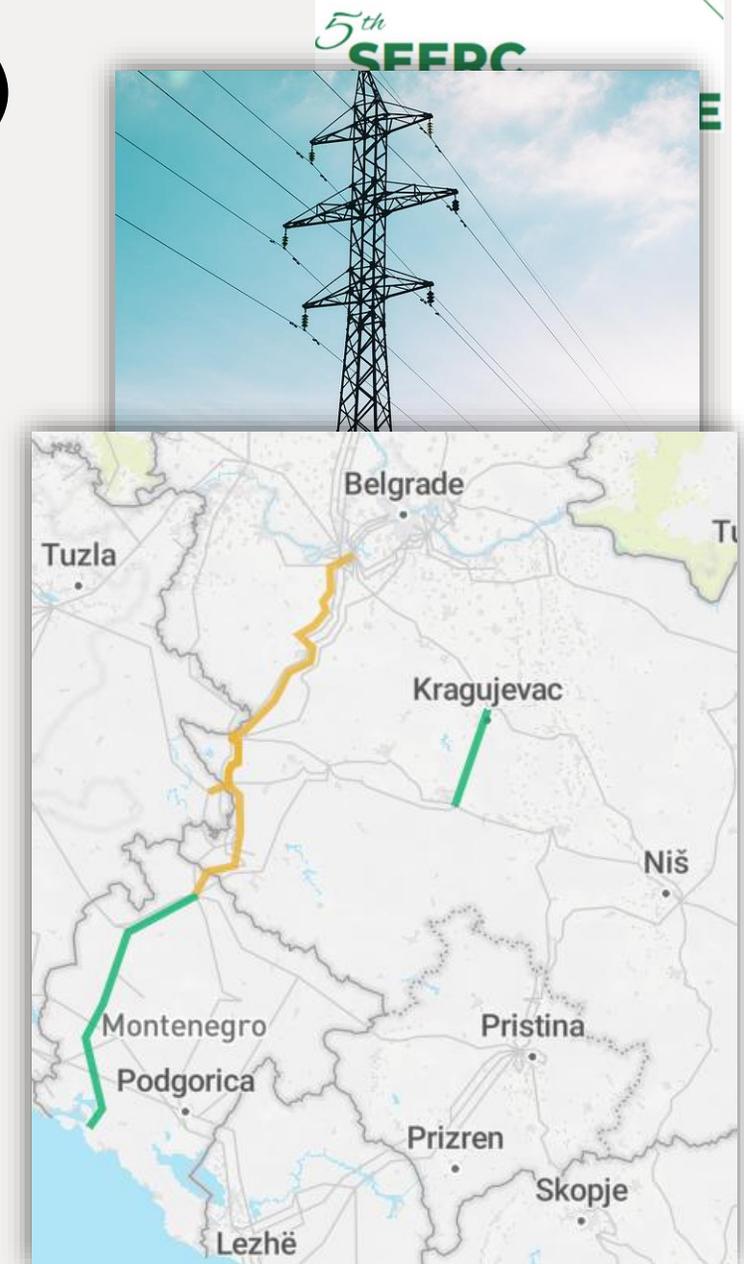
- Total costs: 170 Mio. €
- KfW-loan: 120 Mio. €
- EU Grant: 34 Mio. €
- Partner Contrib.: 16 Mio. €

Funding Montenegro

- Total costs: 127 Mio. €
- KfW-loan: 25 Mio. €
- EBRD: 60 Mio. €
- EU-Grant: 25 Mio. €
- Partner Contrib.: 17 Mio. €

Effects

- Reduction of transmission losses
- Reduction of 163.600 t CO₂



The Need for Cross-border Cooperation

Why is cross-border cooperation so critical in this moment?

- For **stability**: RES bring variability, and balancing this variability across a wider regional area increases system resilience.
- For **security of supply**: interconnected systems reduce the risk of local shortages.
- For **cost effectiveness and market efficiency**: integrated planning, technology transfer and joint infrastructure (where possible), reduce costs and improve market liquidity.
- For **investment attractiveness**: large, stable, interconnected markets are more appealing to investors.
- For **acceleration in reaching decarbonization goals**.

THANK YOU FOR YOUR ATTENTION

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cigre

For power system expertise

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