

# Decarbonization in Southeast Europe: Security, Reliability, Affordability

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The United States Energy Association (USEA) is an association of public and private energy-related organizations, corporations, and government agencies. USEA represents the broad interests of the U.S. energy sector by increasing the understanding of energy issues, both domestically and internationally.

**USEA Mission Statement:**

*USEA's mission is "to promote the sustainable supply and use of energy for the greatest benefit of all."*

# ETAG Program Components



Black Sea Regional Transmission Planning Project (BSTP)

Plan for robust, reliable cross-border transmission interconnections as the backbone infrastructure for cross border trade and exchange of electricity generated by clean and innovative energy technologies.



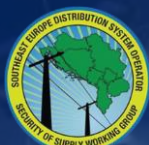
Electricity Market Initiative

Develop technical rules, guidelines and network infrastructure assessments to accelerate integration of clean and innovative energy technologies.



Eastern Europe Natural Gas Partnership (EE-NGP)

Improve security of supply in distribution systems by supporting optimization planning; line loss education; asset management programs; smart grid technology; and region wide disaster preparedness and emergency response programs.



Southeast Europe DSO Security of Supply Working Group (SEEDSO)

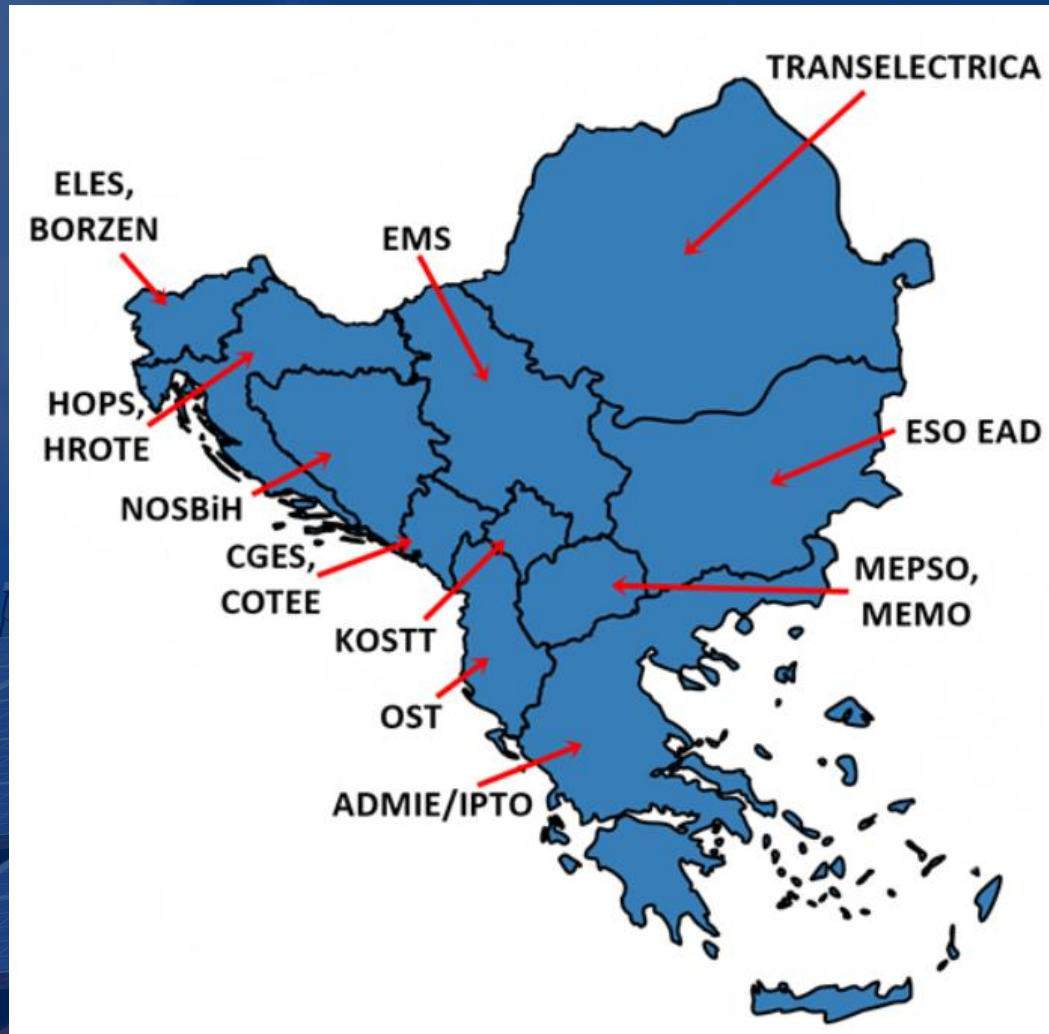


Utility Cyber Security Initiative (UCSI)

Fortify the capability of electric power and natural gas utilities to defend against cyber-attacks and improve their capacity to restore service in a timely and effective manner



# Electricity Market Initiative



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# Objective

- Inform TSO and regulators on impacts of decarbonization in 2030
  - Composition of regional generation fleet & energy
  - CO2 emissions reduction
  - Wholesale Market Price
  - Energy Security



# Methodology

## 8 Market scenarios (8,760 hours)

Demand	Hydrology	RES Capacity
Non-Res Capacity	Fuel Prices	CO2 Prices
X Border Transmission Capacity		

## 16 Network scenarios (selected hours)



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# Lignite & Coal Scenarios

- Coal & lignite plants decommissioned based on age, efficiency & contribution to grid stability

Current TSO plans = 50% decommissioning

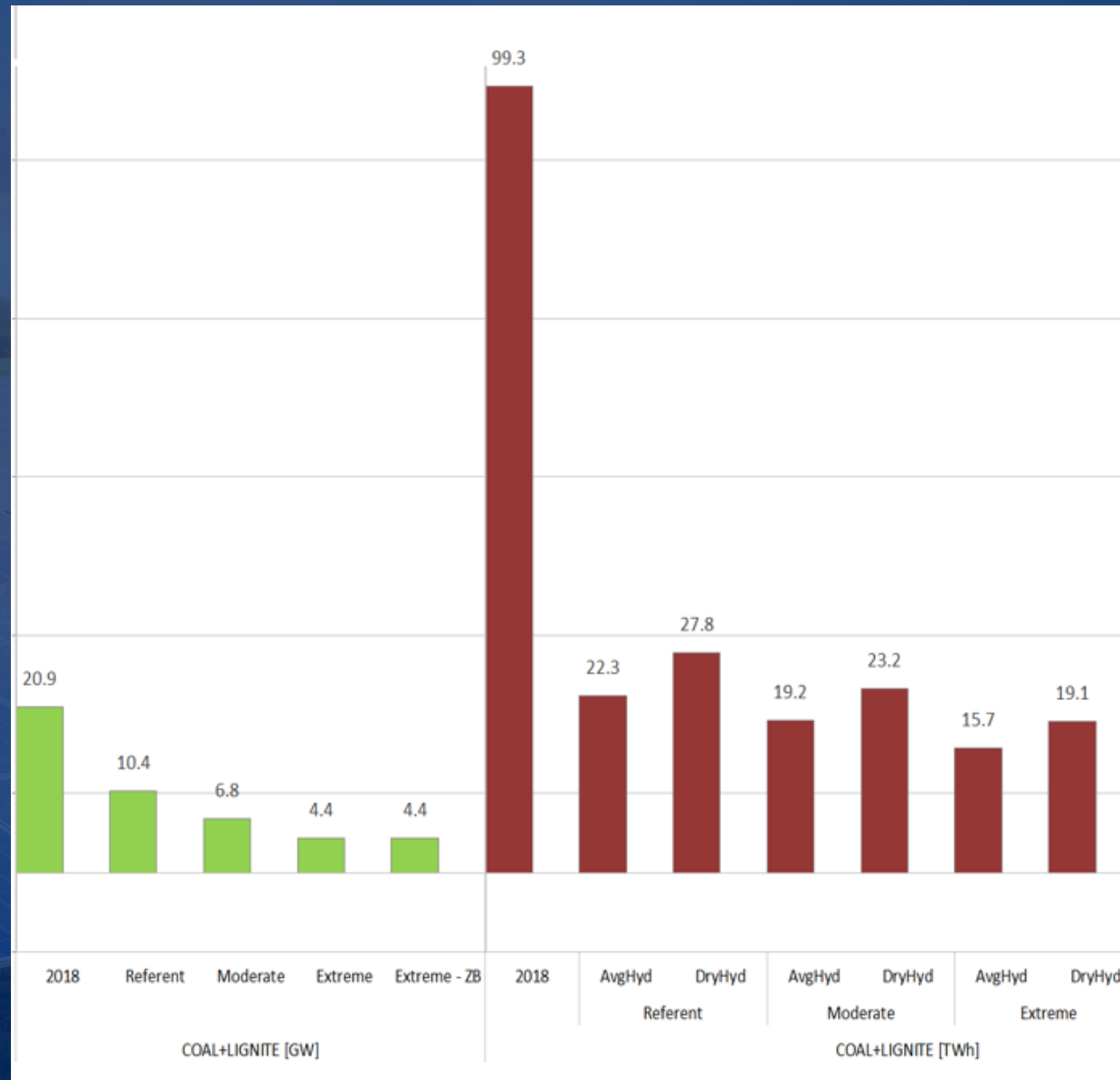
Moderate = 67% decommissioning

Extreme = 79% decommissioning

- Moderate & extreme scenarios are “what ifs” & are not commitments by EMI members



# Lignite & Coal Capacity & Energy 2030



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# Fossil Generation (TWh)

2018		Fossil 2030					
		Ref		Moderate		Extreme	
Coal	All Fossil	Avg Hydro	Dry Hydro	Avg Hydro	Dry Hydro	Avg Hydro	Dry Hydro
99.3	128.2	100.9	114.2	96.9	108.6	90.6	101.3

# Natural Gas Generation Capacity

Gas	Total installed capacity in 2018	Total Decomisioned capacity till 2030	Total NEW capacity till 2030	Total capacity in operation in 2030 in Referent scenario	Total capacity in operation in 2030 in Moderate scenario	Total capacity in operation in 2030 in Extreme scenario
OST	0	0	300	300	200	100
NOSBiH	0	0	0	0	0	0
ESO EAD	926	99	1,901	2,728	2,070	1,470
IPTO/ADMIE	5,213	0	2,265	7,478	6,927	6,303
HOPS	883	341	142	684	684	684
KOSTT	0	0	0	0	0	0
CGES	0	0	0	0	0	0
MEPSO	317	0	269	586	586	586
Transelectrica	2,672	824	3,841	5,689	5,689	4,359
EMS	218	0	183	401	401	401
ELES	542	211	139	470	242	189
<b>TOTAL</b>	<b>10,770</b>	<b>1,475</b>	<b>9,039</b>	<b>18,334</b>	<b>16,798</b>	<b>14,092</b>



# RES Generation

- RES Capacity rises from 22 GW in 2018 to 77 GW by 2030

# CO2 Emissions (Mt)

2018		2030					
		Ref		Moderate		Extreme	
		Avg Hydro	Dry Hydro	Avg Hydro	Dry Hydro	Avg Hydro	Dry Hydro
106.1		49.3	57.6	46.5	53.5	42.5	49.1



# Regional Energy Balance Surplus vs. Deficit (TWh)

2018		2030					
		Ref		Moderate		Extreme	
		Avg Hydro	Dry Hydro	Avg Hydro	Dry Hydro	Avg Hydro	Dry Hydro
2.1		-7.0	-10.5	11.1	-16.3	-17.4	-23.8

# Wholesale Electricity Price (Eur/MWh)

2018		2030					
		Ref		Moderate		Extreme	
		Avg Hydro	Dry Hydro	Avg Hydro	Dry Hydro	Avg Hydro	Dry Hydro
43		71.1	72.8	73.3	76.3	77.9	84.5



# Conclusions

- TSO plan for 3x RES capacity by 2030
- EUR 66 CO2 price drives out coal and lignite capacity
- 9 GW of new natural gas capacity planned – 30% of regional consumption by 2030
- CO2 emissions fall from 40 - 60% in all scenarios
- Regional energy balance & CO2 reductions sensitive to natural gas capacity