Assessment of the Impact of High Levels of Decarbonization and Clean Energy by 2030 on the Electricity Market and Network Operations in Southeast Europe
Key Recommendations for Leaders to Consider

Adapted from the USEA/USEA EMI Report on Decarbonization and Clean Energy in Southeast Europe

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The Foundation and Reasons for this Position Paper

This Position Paper is based on the EMI's December 2021 study of the massive changes to wholesale power markets and the grid in Southeast Europe from substantial power sector decarbonization by 2030, which is a clear commitment of the EMI members, the European Union, and many others. This Paper is a joint, regional voice and a call for progress.

The EMI members' latest Ten Year Network Development Plans (TYNDPs) show that our 11 countries in SEE will retire vast amounts of lignite and coal capacity, and more than triple renewable capacity by 2030. At the same time, the intent is to fully consolidate our power markets regionwide. Such efforts are well underway.

Clearly, putting targets in a plan is much easier than bringing them to fruition. **So, the question addressed in this Position Paper is: what are the actions today that the EMI WG recommends that decision-makers consider and take, and which we believe are vital to enable these challenging, yet critical changes to take place?**

While this transition in the power sector will be a huge challenge, this past winter's energy crisis and the war in Ukraine have made it starkly clear why it is vital and urgent for such a shift to rapidly proceed. The EMI WG members seek to be a positive, future-oriented voice for change, and envision this moment as a rare window in which the region's laser focus on energy issues provides an historic opportunity for progress. To be successful, this shift will require careful consideration in each country, and coordination among EMI members, policy makers, regulators, and other stakeholders.

Overall, the goals of this historic transition include the need to:

- Maintain reliable supplies of electricity;
- Prepare for changes in wholesale energy prices;
- Achieve meaningful CO2 emissions reductions;
- Enhance regional energy cooperation and security;
- Anticipate the social impacts of these changes; and
- Guard against becoming dependent on any single fuel supplier.

To implement these vast changes in the next 8-10 years will require considerable adjustments and new approaches on many levels, including system operations; market integration; grid enhancement and upgrades; regulatory oversight; private investment; growth in renewables; and energy policies. The ability to successfully realize a number of these changes depends on proactive and supportive regulatory and policy decisions, as described in the Recommendations below.

Key Study Findings

In this analysis, the EMI WG evaluated the impacts of different levels of retirement and decommissioning of lignite and coal generation in SEE by 2030, including three main scenarios:

A. Reference Case – a 50% lignite and coal capacity reduction, which is the level already planned in the EMI countries and their TYNDPs, along with the retirement of older, inefficient natural gas generation units;

B. Moderate Case – a further reduction to 67% of lignite and coal capacity; and

C. Extreme - close to an 80% reduction, retiring nearly all lignite and coal generation not needed for grid stability or for combined heat and power purposes.

We also assumed that all markets in SEE would be fully integrated (coupled) at the wholesale level by that time, and that renewables would rise sharply. Under these conditions, our recent analysis showed the following results:

Generation Mix

- EMI members expect to triple the capacity of wind generation in SEE, and quadruple solar capacity, from a combined 12 GW today to 42 GW in 2030. Some countries expect RES capacity to grow an order of magnitude.
- Lignite and coal capacity and generation in 2030 in SEE will fall sharply, by 12-18 GW, depending on the scenario. These units will provide just 6% to 10% of regional consumption then, versus 40% to SEE, and 60% to the WB6 countries today.
- At the time of the study, to maintain a reliable power system when these plants were decommissioned, EMI members planned to add more than 9 GW of new natural gas capacity by 2030 (of which 8 GW was planned in Romania, Bulgaria, and Greece). Other technologies (e.g., energy efficiency, battery storage and hydrogen) are not expected to fill this gap by 2030. Regional natural gas generation was projected to increase 50-60 TWh, at least triple today's level, to "keep the lights on". Based on the war in Ukraine and other factors, a number of EMI members are already planning to lower their dependence on gas, particularly from Russia. This study's recommendations regarding gas infrastructure and fuel supply are especially true in light of such events.

CO2 Emissions and Power Imports

- Across all scenarios, CO2 emissions from the power sector will decrease 40%-60% by 2030 compared to current levels. This is a substantial, historic drop, and a solid stepping stone to further GHG reductions.
- In all decarbonization scenarios, the EMI region will need to import substantially more power from the rest of Europe by 2030 - between 7 and 24 TWh (2% to 8% of regional consumption). In addition, the internal balance shifts substantially, as some countries become large exporters, while others quickly ramp up electricity imports.

Capital Investment and Power Prices

- This major transition of the generation fleet will require substantial capital. With all the RES, natural gas and hydro additions, SEE will require over $50 billion by 2030 to build new power generation capacity. This does not include the large investments that will also be required in gas, power distribution or new technologies.
- At the outset of this study, average annual wholesale power prices in the EMI countries varied by a factor of 2:1. When markets integrate, and cross-border electricity trade is free and open, power prices will converge. In our study, they rise from an average of just over 40 Euros/MWh to over 70 Euros/MWh in 2030 due to the cost of new generation, carbon prices and fuel costs. Prices are already much higher today due to multiple factors, including the war in Ukraine. These currently high prices strongly reinforce this study's recommendation that policy-makers need to find ways to mitigate the impact of price increases on electricity customers.

- With extreme decarbonization, the security of supply in SEE is endangered if imports from the rest of Europe are limited. If there are "net zero" imports to SEE, regional power supplies would be unable to meet demand, reliability would falter, and annual wholesale prices could sharply increase, reaching 180 to 280 Euros/MWh.

The Power Grid

- The regional electricity grid is robust and well meshed. Even with all these generation changes, there are few bottlenecks that would require significant changes to the regional network topology that are not already planned.

EMI WG Positions and Recommendations

Below, we use the study's findings above as a foundation for specific recommendations for all stakeholders to consider.

Key Findings	Specific Recommendations
1. **To retire the majority of legacy lignite and coal generation assets by 2030 in SEE will require substantial new natural gas generation and infrastructure to maintain the reliability of power supplies as a bridge to a clean energy future.** **While other options are desirable, they will not be available to fully fill the gap left by lignite and coal retirements.**	To help realize this massive shift in the generation mix, we recommend that decision-makers: • Ensure that gas supply for new generation is from diverse sources, so no single supplier can exercise market power or influence another country by controlling energy supplies. Russia's conflict in Ukraine, begun in February 2022, emphasizes the vital need for such diversification. • Encourage private investment with an attractive economic and regulatory climate for new gas infrastructure, and optimize such gas investment with district heating • Closely coordinate planning of the power system with the development of gas pipelines, LNG, storage and fuel supply • Before making final decisions on new gas plants, also consider options such as energy efficiency, battery storage, hydrogen, geothermal, biomass and nuclear power. • Ensure that all new gas infrastructure (pipelines, LNG, storage) is compatible with future hydrogen utilization • Plan for the economic and potential social impacts of retiring significant coal, lignite and natural gas generation
2. **To realize the major RES increases projected in the TYNDPs, green energy and climate plans for wind and solar generation by 2030 and beyond will require billions of Euros, largely from the private sector.** **Realizing this investment will in turn require a number of critical process improvements, regulatory adaptations and policy changes.** **The dramatic rise in fuel prices and the war in Ukraine this past winter strongly emphasize the need to swiftly adopt company, regulatory, policy, and legal measures that will rapidly accelerate the supply of power from non-fossil resources.**	To achieve the projected RES potential by 2030, we recommend that decision-makers work to: • Resolve long interconnection queues by setting strict standards and financial requirements that enable the better RES projects to succeed, and eliminates the others • Review and improve interconnection procedures at the TSO and DSO levels to focus on the best RES projects • Strictly follow and improve current regulations, permitting and siting procedures to stimulate private sector RES investment and avoid project delays • Redouble efforts to create and couple day-ahead and ancillary service markets across borders, and accelerate a more competitive, regional electricity market. Doing so will provide attractive market and contract options for RES developers, and not limit them to a single buyer • Greatly increase the use of electricity storage, in different forms, to compensate for the variability of wind and solar • Eliminate or phase out RES incentives and premium pricing that is no longer needed to attract investors, and

	• Evaluate and decide how to best handle balancing issues that will arise with substantial RES additions, including the use of balancing reserve markets
3. Given all the changes in the generation fleet, CO2 emissions will fall 40-60% by 2030 in the power sector, depending on the scenario, in SEE as a whole. **This is a strong foundation for greater reduction (e.g., to net zero levels). The emissions picture in each country will vary widely.**	Decision-makers in each EMI country should: • Evaluate their greenhouse gas emissions from the power sector in light of the EU's "Fit for 55" program, and develop an approach to comply with this regulation • In the WB6 countries, understand the significant cost impacts of the CBAM mechanism due to begin in 2026 • Evaluate new technologies such as carbon capture, utilization and storage (CCUS) to reduce CO2 emissions from new gas generation and remaining lignite capacity • Review the alternatives to gas generation named in Finding #1 above that will have little or no carbon footprint • Assess the potential for greater imports and cross border transmission capacity, especially at the Western borders of the region. Use transmission as a key element of long-term emissions reductions and energy planning.
4. The massive expected generation changes, power market integration and new regulations (e.g., MACZT) will cause SEE electricity imports to rise considerably. **Individual countries will see their flows of power change substantially from now to 2030 and beyond, affecting self-reliance, supply risk and reliability.**	To deal with these changes, the EMI recommends that decision-makers: • Regularly analyze power system adequacy and resilience to ensure the security of power supplies for customers. This analysis is also required under the Resource Assessment and Adequacy (RAA) regulations of ENTSO-E and is important to effectively manage the energy transition. • As these changes shift the power flows in all countries, proactively consider the appropriate level of self-reliance, and of electricity imports and exports • Support the grid changes required to accommodate such shifts in power flows. • Based on such studies, pursue options to ensure resource adequacy and competitive power supplies, such as auctions and capacity markets • As mentioned above, accelerate the creation of competitive markets and the coupling of markets across borders, leading to a regional market for day-ahead energy and ancillary services. • Proactively and collaboratively prepare for risks and emergency situations across borders, by arranging to share resources and skills.
5. With all these changes, wholesale power prices could rise considerably in a number of EMI countries, given changes in fuel prices, massive new generation capacity, and EU carbon fees and the implementation of CBAM in the WB6 by 2030.	To deal with these substantial wholesale price changes, policy makers will need to: • Carefully consider how to translate wholesale price and market changes into customer tariffs • Evaluate the current system of fees and subsidies, and the anticipated market and regulatory changes, to ease the transition and mitigate undesirable customer impacts.
6. Given the strong existing network and plans for new lines and substation additions, the transmission grid remains reliable throughout the decarbonization transition process.	We agree that all EMI members will: • Continue strong grid planning to ensure a reliable network due to the massive expected changes in generation by 2030

	• As mentioned in Item #2 above, work hard to rationalize the RES queue and coordinate inter-connections given the major expected increases in RES development • Conduct more cross-border grid coordination and consider joint transmission planning to accommodate the substantial changes in power flows in Item #3 above • Actively promote market coupling to raise net transfer capacities (NTCs), support private investment and mitigate wholesale price increases • Implement new digital solutions and grid technologies to raise the quality of network operations and maintenance and accommodate the large influx of RES generation and demand-side resources.

The EMI members stand ready to discuss these recommendations with all decision-makers in the region and beyond, and to support their implementation as a matter of high priority.

Overall Conclusion

The SEE TSOs and Market Operators fully support the region's efforts to meet decarbonization and renewable energy targets, while integrating markets and keeping prices at reasonable levels. We believe that there needs to be greater understanding of the market and reliability impacts of these massive changes, and what it will take to achieve these goals.

To help fill this gap, based on our recent study and knowledge of best practices, the EMI Working Group suggests a number of regulatory and policy actions in this Position Paper. These actions identify the steps needed by 2030 to help: 1) achieve large-scale retirement of lignite and coal generation (and what will replace it); 2) bring about massive additions of RES; 3) foster substantial emissions reductions; 4) adapt to major changes in wholesale prices; 5) anticipate significant changes in power imports and exports; 6) assure resource adequacy and reliability; 7) create a positive investment climate; and 8) enhance grid and natural gas planning, as described above. We encourage policymakers (ministries and regulators), financial institutions, and other stakeholders to actively consider these EMI findings and recommendations.

About the Southeast Europe Electricity Market Initiative

USEA and USAID established the Electricity Market Initiative (EMI) in July 2018 to enhance the integration and operation of power markets in Southeast Europe (SEE). Under the EMI, USEA works closely with transmission system operators, market operators and electricity regulators in the region to project and anticipate the impacts on power markets and the grid that could emerge from a more integrated and sustainable power market.

This forward vision – looking over the horizon - enables EMI members and stakeholders to anticipate key changes; develop better long-term plans; meet regulatory requirements; make better investments; accelerate market coupling and develop regional markets, and realize the benefits of all these actions.

In this period, the EMI Working Group has developed three major regional studies; conducted numerous bilateral assessments; hosted a dozen joint meetings; and fostered many workshops and discussions on key issues such as electricity market coupling; RES integration; capacity markets; decarbonization; and network infrastructure needs.

The EMI Working Group includes representatives from 15 TSOs and Market Operators in the 11 countries below, and the EMI consultants are EIHP, Croatia and EKC, Serbia.