

Assessment of the Impacts and Substantial Implications of High Levels of Decarbonization and Clean Energy by 2030 on Power Markets and Network Operations in Southeast Europe

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Overview

The massive transition taking place in the power sector of southeast Europe is both unique to the region, and full of lessons for the rest of the world. It's no secret that Europe intends to rapidly decarbonize the power sector. The conflict in Ukraine has deepened that resolve. Many countries and utilities across Southeast Europe – whether in the European Union or not – are developing national climate plans and actions to sharply reduce emissions, chiefly using two pillars: retiring existing lignite and coal generation plants, and adding substantial renewables.

At the same time, they plan to consolidate (couple) and organize their markets to trade power seamlessly across borders, achieving benefits in both generation and transmission, and providing liquidity and clear price signals to potential investors. Given this tsunami of changes, it's vital to anticipate and prepare for the opportunities and speedbumps in advance.

To enable stakeholders to do so, the US Energy Association, in cooperation with the members of our Electricity Market Initiative (EMI) and the US Agency for International Development, recently completed an in-depth analysis of the market and network impacts of these changes, regionally and for eleven individual countries, by 2030.

Methods

Our analysis was comprehensive. To evaluate the impacts all of these changes by 2030, the work included important inputs about projected fossil retirements, carbon prices, renewables development, and hydro availability. Over the years, USEA has built tools and data to assess the market and network in this region that are state-of-the-art and ensure that we can reliably anticipate alternative future conditions. We utilized both a market model and a grid model for this analysis, and populated them with the latest data from the EMI members to ensure its credibility. We analyzed three different levels of decarbonization, normal and dry hydro conditions, and import restrictions.

Results

We found that these changes will have a huge knock-on effect, and raise vital issues to be addressed, including: 1) Southeast Europe (and each country's) ability to actually implement such vast changes in generation; 2) Whether the new level of CO₂ emissions is acceptable; 3) How to deal with the likely increase in wholesale power prices; 4) The need for new grid investment for stability and reliability; and 5) the acceptable level of future power imports. There are six key findings of this analysis, and each poses challenges, as follows:

First, renewables, particularly solar and wind, will play a crucial role in the generation mix, and in reducing emissions, and should be fully encouraged. These 11 countries plan to vastly increase renewables by 2030, from about twelve gigawatts to nearly forty-two gigawatts. This is many gigawatts higher than their plans just a few years ago. However, even at these levels, renewables cannot fill the gap in power supply from anticipated fossil retirements, due to their intermittency and low-capacity factors.

Second, to substantially eliminate lignite and coal by 2030, will require substantial new natural gas generation to keep the lights on. In fact, countries in Southeast Europe already have substantial gas generation in their resource plans. Options such as energy efficiency, renewables, storage, hydrogen, nuclear and demand-side resources, are certainly desirable, and should be evaluated to fill some of the gap from the reduction of coal and lignite generation.

Third, these countries need to mobilize considerable capital in the next several years, largely from the private sector, for this shift to occur. The days of governments owning new wholesale generation are waning. USEA estimates that the region will require \$50 billion or more by 2030 to bring the needed gas, renewables, and hydro plants online.

Fourth, there will be considerable increases in wholesale electricity prices by 2030 in Southeast Europe compared to pre-Covid prices as markets integrate, and all countries adopt carbon dioxide pricing through the European Union's Emissions Trading System or the fledgling Cross-Border Adjustment Mechanism.

Sixth, even with massive generation additions, electricity imports will rise considerably, raising key policy issues. The region can go from relative balance today to importing up to seven percent of its needs; however, some countries' imports could rise to fifty percent or more, and policymakers should decide whether such import-dependence is acceptable to achieve market integration and high levels of decarbonization.

Moreover, it is unclear if neighboring countries will always have enough power to export to southeast Europe if they are also undergoing similar transitions. If such shortfalls arise, reliability could fall, power prices could rise untenably, and attempts to further decarbonize could unravel.

Fifth, the percentage drop in carbon dioxide emissions will be substantial, falling 40-60% by 2030, though the remaining coal and lignite plants and new gas capacity must operate at high-capacity factors. While this pace may not satisfy all, it does not preclude major emissions reductions in decades to follow, to net zero by 2050.

Finally, and fortunately, the regional grid can handle all these changes, and remain reliable, with few bottlenecks that transmission owners and operators can well accommodate by 2030. This testifies to the strength of existing interties; strong transmission planning; and market integration that will raise cross-border transfer capacity.

Conclusions

While such ambitious renewables goals are laudable, they will not come about automatically. Many countries need to reform incentives; rationalize interconnection queues; ensure positive regulatory and permitting procedures; and provide favorable investment climates before this capacity will materialize. This is feasible but will not be easy.

A key question is where all the new gas will come from? This shift will require substantial, regional gas-electric coordination, and must rely on truly diverse sources so that no supplier such as Russia can jeopardize security. This further requires major investments in LNG and pipelines, providing an opportunity for those willing to step in.

Will bringing in such financing for this massive shift be challenging? Yes. While one-off projects in Southeast Europe are possible, attracting all the equity and debt needed will require the conditions above, plus, a competitive, liquid wholesale energy market, integrated regionally at first, then with all of Europe. This is another heavy lift.

Such wholesale price increases will pose regulatory challenges and raise questions about government subsidies and could cause social unrest. We only need to look at recent protests in Peru, France and Kazakhstan for examples of turmoil when energy prices rise. Government policymakers and national regulators should anticipate these price changes and adopt measures to ensure a just transition, particularly for vulnerable populations.

The finding about imports supports the need for several actions: in-depth system adequacy and flexibility studies (such as strong contingency planning) in each country to raise decision makers' confidence that power supplies will be secure; efforts to foster regional energy and capacity markets; and wider European geographic market integration.

In sum, these simultaneous changes will be challenging, and require proactive measures well before 2030. To achieve net zero emissions by mid-century, stakeholders in Southeast Europe and beyond should utilize these findings to support market integration and anticipate the impacts of deep decarbonization now.

Government utilities and market operators should collaborate with regulators, policymakers, private investors, and others on potential solutions to ensure that the path to a clean and reliable electricity future is a smooth one for each country in Southeast Europe. USAID and USEA are in a strong position to continue supporting those efforts.