

# Lessons From the European Electricity Crisis

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## Instant Insight

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On January 23, 2023, the European Commission initiated a public consultation to reform the European Union's electricity market (European Commission 2023) on the heels of extremely high wholesale electricity prices in Europe in the last months and days of 2022. Negative spot prices, however, were recorded in a large number of European countries on January 1, 2023, including Spain, France, Switzerland, Germany and the United Kingdom. Despite the large variety in how power systems are organized worldwide, from fully integrated monopolies to liberalized systems, all countries can learn from Europe's experience. In Saudi Arabia and the Gulf Cooperation Council (GCC) countries, liberalization and markets are being introduced progressively, and it is an opportune time to learn from experiences abroad.

High natural gas prices due to cuts in Russian supplies have made European wholesale electricity prices skyrocket in 2022. Natural gas is typically the marginal fuel in Europe, meaning it sets wholesale prices most of the time. For example, in France, this occurred approximately 80% of the time in 2022 (Commission de Régulation de l'Énergie 2022). Under Europe's current market design, a component of retail electricity prices is directly driven by wholesale prices, causing retail prices to rise in 2022. High heating costs, also due to increased natural gas prices, combined with high electricity prices increases public health, economic security, and electricity market design challenges.

The debate on the European electricity market design must be understood within its context of distinct wholesale and retail electricity markets and the unbundling of generation, networks, and supply activities. Europe's short-term electricity markets are based upon the same principles and experience of other regions' electricity markets and other markets in general: prices are set by the marginal cost of the last producer needed to meet the demand. Nonetheless, the resulting extraordinarily high and volatile electricity prices raise questions about many components of Europe's electricity market design and fundamental political questions regarding consumer protections and the energy transition. The ongoing crisis has added to the European question of whether retail electricity prices should become more independent from wholesale prices. To date, the European Commission has received a wide range of advice, from keeping the basic design of its electricity market (and addressing high gas prices instead) to implementing significant reforms.

We propose four main lessons from the European crisis that can be echoed in GCC countries. First, electricity spot markets are not a panacea to achieving a country's vision of the energy transition that fits its circumstances. Indeed, as suggested by the European experience, implementing electricity spot markets is not enough to deliver political and societal expectations. It can even fail to bring the expected decrease in prices. In liberalized power systems, a combination of mechanisms is required to enable the energy transition. This can include pricing greenhouse gases or 'carbon pricing,' renewable support schemes (renewable portfolio standards, feed-in premiums), capacity mechanisms and long-term contracts. In the last decade, Europe focused on enabling renewable deployment through market-based mechanisms. However, the current crisis has shifted its concerns toward limiting high wholesale prices and, more importantly, making retail electricity prices less sensitive to shocks in wholesale prices. To this end, Europe is now (re)considering long-term contracts. Long-term power purchase contracts can bring competitive pressure and low-cost results. They can also help keep retail electricity prices constant and predictable

over long periods, assuming they are competitively procured and not purchased during periods of high prices. By reducing volatility in generators' revenues, long-term contracts can also bring additional benefits in reducing risk premiums. Long-term contracts can be used in liberalized power systems with electricity spot markets but also in systems without wholesale spot markets, as in Saudi Arabia.

Second, transitioning to renewable resources, either wind or solar together with storage or dispatchable renewables such as concentrated solar power, can mitigate interruptions in fuel supplies such as natural gas, but this does not necessarily prevent high prices. Europe has deployed significant renewables, but gas-fired power generation remains substantial and has led to the current crisis. In response, the REPowerEU Plan launched in March 2022 (European Commission 2022) aims to accelerate renewable and hydrogen deployment and reduce its dependence on gas. The picture is different for GCC countries that produce sufficient fuel supplies; their motivation for adopting renewables is not energy independence. Given their abundant supplies, these countries can plan and transition at a pace and scale that makes sense for them, given their climate commitments, the evolving trajectory of renewable and storage costs, and their economic development objectives, including the localization of energy transition-related industries.

Third, all potentially viable options should be considered, such as nuclear power, the carbon capture of emissions from power plants, the digitalization of the power system, behavioral-based information and incentives to reduce demand, and the acceleration of energy innovation. Some European countries have accentuated their gas dependence by prematurely shutting down other generation sources, failing to consider a broader range of solutions in their planning, or completing the timely deployment of smart meters to better manage loads. Germany decided to reactivate some of its coal plants (Connolly 2022) as an emergency solution to deal with high gas prices at the expense of emission reductions goals to meet near-term energy security objectives.

Fourth, the explicit incorporation of uncertainty in electricity planning needs to occur. Europe's situation suggests the need to be better prepared to respond to shocks and uncertainties. All power systems need to address uncertainty, regardless of their structure and organization. Countries without electricity spot markets need to continue planning at the governmental and utility level. Such plans should explicitly identify critical uncertainties and develop robust and cost-effective responses to them. The electric power system is capital intensive and takes time to deploy new assets, making responding to changing events challenging. Strategies such as mothballing but not completely retiring generation so that it can be returned to service, if necessary, should be considered. The cost of such 'insurance' may well be worth it if it helps avoid the public health and economic costs of large-scale electricity shortages and price spikes that Europe is currently experiencing.

Electricity markets are a means of achieving policy objectives such as low costs, economic development, energy security, and environmental enhancements. There are many electricity market designs, and they can evolve. The overarching lesson is that countries should pursue the type of electricity markets and the timing to implement them that meet their circumstances, with complementary policies to help achieve their objectives.

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