

## **U.S. Sees Power and Gas Supply Shortage and Price Spikes amid Cold Waves**

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The year 2021 opened with severe cold waves in Northeast Asia, day-ahead spot electricity price spikes in Japan, and Northeast Asian LNG spot price hikes. While Northeast Asian conditions have stabilized, severe cold waves have recently hit the United States, seriously affecting civic life, and exerting great impacts on power and gas markets.

Record cold temperatures have been observed at various locations in the United States under serious winter storms since last week. Minnesota and Kansas recorded temperatures at more than 30 degrees below freezing, according to media reports. Record cold waves have spread to Texas in the South. The largest Texas city of Houston saw accumulated snow and temperatures at more than 10 degrees below freezing. In Texas that usually has few opportunities to see accumulated snow or below-freezing temperatures, serious road traffic confusion and accidents occurred, greatly affecting oil, gas, electricity, and other energy business operations that account for a key part of the Texas economy. In response, Texas Governor Greg Abbott declared a state of disaster. U.S. President Joe Biden declared a state of emergency in Texas, offering federal support for the state.

The severe cold waves, while stimulating heating demand, froze wind power plant turbines and affected gas supply to thermal power plants, leading the power supply-demand balance to rapidly tighten. Texas reportedly saw nearly four million outages temporarily, followed by rolling outages. The tightening power supply-demand balance boosted intraday wholesale electricity market prices in Texas to the upper limit of \$9/kWh. Natural gas prices also shot up as growth in potential demand for gas for power generation was combined with supply constraints caused by cold waves that affected oil and gas production. The Waha gas hub price in Texas skyrocketed from less than \$3 per million British thermal units before the cold waves to more than \$150 on February 12.

Crude oil prices have also risen as cold waves affected oil supply. On February 16, the closing price of the front-month futures contract on West Texas Intermediate rose by \$0.58 per barrel to \$60.05 on the New York Mercantile Exchange, topping \$60 for the first time in 13 months, since January 7 last year. Although the growing risk of a U.S.-Iran military conflict boosted crude oil prices early last year, the tightening supply-demand balance under severe winter storms is supporting crude oil prices amid a stock market uptrend this time. In the Permian Basin, the center of U.S. shale oil production, cold waves have forced many oil wells to suspend production, resulting in a production decline of some 1 million barrels per day, according to some media reports.

Amid unusual cold waves, the tightening energy supply-demand balance, power and gas price spikes, and crude oil and petroleum product price hikes are affecting civic life and the economy. Such a tight supply-demand balance and price hikes under abnormal weather may end as weather goes back to normal. As seen after the tight power supply-demand balance and LNG spot price hikes in Japan, prices may stabilize on an end to cold waves.

As well as the Japanese and Northeast Asian cases, however, the current tight power supply-demand balance and unusual hikes in power and gas prices in the United States have led us to recognize the significance of stable energy supply. This is because energy is indispensable to civic life and economic operations. Outages and energy supply halts under cold winter weather can endanger human survival. Energy is thus extremely important for human livelihood and survival. Particularly at a time when electrification has made global progress, with gas and LNG accounting for a major share of the energy mix in major countries, electricity, gas, and LNG supply security has become more important.

The most important among various prescriptions for securing stable energy supply and enhancing energy security is the possession of sufficient or surplus supply capacity. As cold waves come, power demand shoots up inevitably. The presence of sufficient power generation capacity may prevent the supply-demand balance from tightening remarkably. However, things are not so simple. Possessing sufficient supply capacity in preparation for a once-a-decade (or less frequent) event means maintaining excessive surplus capacity at normal times. In a competitive energy market, anyone possessing such excessive capacity may have to pay higher costs and fail to survive.

In the modern competitive wholesale electricity market, the entry of renewable energy electricity sources with variable costs at almost zero pushes down prices to make it difficult to possess thermal and other power plants with high variable costs. Everyone may understand that sufficient surplus supply capacity is required for stable supply. Given market realities, competition policy promotion, and renewable energy diffusion, however, how to secure supply capacity has become a major challenge. The introduction of a capacity market is being promoted as an institutional solution to the challenge, but it remains in the trial-and-error stage, falling short of becoming a complete solution. Another important point is that the introduction of the capacity market will be accompanied by costs for securing surplus capacity, which must be shouldered by someone.

The surplus supply capacity conceptually includes reserve or buffer capacity to respond to emergency situations. Such reserve or buffer capacity may play a key role in emergency, but its construction and possession may take considerable costs. It is not easy to survive a competitive environment while shouldering such costs in peacetime. If policymakers strategically conclude or decide that it is important to have reserve or buffer capacity to respond to emergency situations, they should be prepared to minimize additional costs and request relevant parties to shoulder such costs.

Another important prescription is the diversification and best mix of supply options based on their respective characteristics. Even if an energy source offers a short-term cost advantage or cost competitiveness in some context, excessive dependence on the single energy source would endanger stable energy supply. I believe that it is essential for energy security and stable energy supply to set a balanced energy mix after fully considering the characteristics of each energy source from various angles. "Safety and certainty in oil lie in variety and variety alone," the late British Prime Minister Winston Churchill said when he was serving as navy minister. This statement is still important even for the current energy security.

The current tight supply-demand balance for power and gas in the United States and similar events in Northeast Asia and Japan in January give us an opportunity to consider the significance of energy security and relevant measures anew. I hope that these cases would be effectively used for policy discussions in Japan, the United States, and the world.

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