

Energy trading in an interconnected world

As energy markets become more complex and interconnected, new models are needed that can track multiple commodities and their mutual impacts.

Matteo Mazzoni, Director of Energy Analytics, ICIS

Energy markets are evolving, moving away from discrete regional or local hubs to become truly global and far more interconnected than ever before. The rise of LNG and associated infrastructure investment, for example, has seen it emerge as an analogue of more traditional natural gas hubs. Whereas previously, a view of the Title Transfer Facility (TTF) - the virtual trading hub set up by Gasunie in 2003 to trade physical gas, futures and exchange trades within the Netherlands - would be sufficient to build a position and establish margins against another hub, that is certainly no longer the case. The impact of an 8 June explosion last year that shut Freeport LNG's export facility in Texas rapidly spread to European markets and beyond. Global LNG and European gas prices softened significantly as a result of the anticipated restart of the LNG plant. The Independent Commodity Intelligence Services (ICIS) TTF gas benchmark into Europe was down to €51.7/MWh (\$16.20/MMBtu) as prices in European hubs fell by around 34% on news of the facility's restart. Freeport LNG provides around a fifth of US LNG processing capacity. Overall, gas market prices are being increasingly driven by Europe, which has emerged as a particularly strong influence on global energy commodity prices.

Similarly, European electricity markets are becoming more strongly correlated as interconnectors are establishing transmission links from north-south and east-west, progressively transforming what used to be a collection of local market zones into more of a regional market. In this way, reliability issues and other problems that hit much of the French nuclear fleet last year prompted European electricity prices to spike. As France looked to import power from neighbouring Italy and Germany to compensate for its reduced nuclear contribution - about half of their reactor fleet was shut down at one point - prices shot up in nearby electricity markets. With Germany already facing the challenge of a lack of Russian gas to supply its gas-fired generation capacity, its baseload power price set a record high of EUR709/MWh; as a result, jumping by some 50% in a fortnight. High European gas prices also meant more coal-fired generation was deployed in the European power mix while more

fossil-fired generation was needed to fill the sizeable gap left by a lack of French nuclear capacity.

Meanwhile, the recent phase-out of Germany's last three nuclear plants is likely to result in increased gas, coal and lignite generation, the latter two to a lesser extent but still significant. Germany will also have to ramp up imports from France and the Netherlands, particularly during peak demand periods. German electricity imports are expected to increase by nearly 20 TWh or more than 60%, while German exports to Austria and Switzerland look set to fall by 52% and 27%, respectively, and Belgium will switch from an importer of German electricity to a net exporter.

The challenges of complex market dynamics

At the same time, as the energy transition accelerates and markets become more connected the role of carbon is expanding beyond its historical sectors, embracing buildings, transport and imported goods into the EU and new energy commodities are emerging. Examples include hydrogen, which is rapidly gaining ground as a new globally traded energy vector, and biofuels and their precursors. The likelihood is that still more energy commodities will emerge over the coming years as markets for things like ammonia and power to X products are established and become more actively traded. Again, the global nature of these commodities will have a profound impact on electricity, gas and oil markets worldwide. On current trends, it's not too much of a leap to see how the cost and availability of electricity in Chile might be impacted by the green hydrogen price in Europe as renewable energy resources are swapped and traded as hydrogen or ammonia and independently of a traditional electricity grid.

Furthermore, not only are markets becoming more global, but they are increasingly interconnected too. Already, it is not possible to trade German electricity without understanding the role of carbon prices in driving spark spreads, as well as the role of LNG in setting market prices. Similarly, it's become almost impossible to trade carbon without understanding whether the future gas market is turning short or long.

Markets are also becoming more complex too, with almost real-time trades in some electricity markets, which typically featured day-ahead trading only a few years ago. Companies are already rolling out new intraday trading capabilities to respond to these new market structures. Energy markets are also becoming more competitive as new players enter the fray. Big industrials and energy users are setting up their own trading operations to

make purchases directly, even as traditional oil and gas operations are establishing trading positions in electricity markets. Energy markets are also being impacted by a rise in automation, with certain trades being performed by AI algorithms rather than humans.

The evolution of price forecasting platforms

The influences of these interconnections between markets, combined with the intricacies of external energy market factors, mean that energy price forecasting in today's markets has become far more complex and challenging. Trading companies have traditionally modelled energy commodity markets by either building a fundamental view based on the physical supply and demand characteristics or by building a statistical model based on historical data. However, both approaches fail to capture the much higher degree of interconnection between commodity markets and the multiple factors that are potentially having an impact on each market at any point in time. Being able to accurately build out forecasting models to capture these interdependencies is necessary to give a holistic view of the factors that will move markets tomorrow is essential for traders to make a profit and buyers to minimise cost. Given the challenges associated with monitoring changes in market fundamentals from multiple sources, new tools are now emerging that can support multiple markets simultaneously but, crucially, can also track the interdependencies between them. ICIS, for example, has developed a suite of models that include a series of feedback loops that link the carbon market to changes in power pricing and the impacts they have on choices by industrial buyers. The Power Foresight model was rolled out at the end of April, and a similar approach for the gas market is scheduled for later this summer. With an integrated view across all the primary energy commodities traded in Europe: electricity, gas, and carbon, as well as factoring in the global LNG market and building in the influence of external elements like the weather, this approach allows traders to better understand cross-commodity impacts on their trading positions and help industrial companies better manage their energy costs. Ultimately though, understanding the cross-commodity influences and their relationships grants greater visibility on forward prices and, therefore, the ability to act on both the threats and any market opportunities which emerge.