

Pulling the Business Together

As the physical and financial sides of energy trading become intertwined, technologies must keep up with business drivers.

By Dr. Wolfgang Ferse

High volatility, velocity and volume – this could be a description of trading on the foreign exchange markets but nowadays equally characterises the world of energy trading.

The energy markets have two distinct dimensions; the trading of energy and energy related commodities, e.g. crude, emissions, and agricultural products (originally the domain of energy companies and utilities), and the trading of financial products, either based upon the underlying commodity or supporting hedging strategies, e.g. foreign exchange (originally the purview of financial institutions). The two are becoming increasingly intertwined.

The factors behind this convergence are many, as are the challenges it presents. The blurring of these traditional lines between financial institutions and energy companies begs the question as to whether this development is a positive one for the marketplace. Here we consider the impact these changes are having on financial institutions and energy companies, and, in particular, on their IT systems.

Energy Market Trends

Energy Market Development

During the last few decades, energy shortages increased. The reasons for this are as follows:

- Increased demand caused by increasing population and industrialisation.
- Environmental issues leading to reactions such as a reduction in exploration (e.g. land-based oil drilling) and generation (e.g. coal-fired power stations) as well as the introduction of emission constraints.
- Global and local energy politics that deferred or forbade the deployment of certain key technologies (e.g. nuclear power), limited investment in production and transportation infrastructure as well as the politically controlled reduction of energy source production.
- Existing physical constraints in production (availability of natural resources) and transportation.

This situation is exacerbated by the unique nature of energy – especially the real-time character of electricity. Unlike other assets, electricity cannot be stored, at least not in cost effective quantities. Moreover, energy cannot simply be transferred according to preference – like most commodities – as its movement is limited by physical transmission infrastructure, which can vary significantly according to geography.

Traditional fuel resource depletion, increasing costs along the value chain (particularly in the exploration and production industries), together with the development of new markets and their effects on traditional trading structures, have created a new energy paradigm.

The combination of these factors has led to increased end-user prices, decreased margins in parts of the classic energy business, and extreme short-term price volatility.

Changing political conditions in many regions... have all contributed to a more globalised energy marketplace

Energy Market Globalisation

Changing political conditions in many regions, the emergence of the BRIC economies (Brazil, Russia, India and China) as major consumers and producers, and the advancement of technology for transporting crude and energy, have all contributed to a more globalised energy marketplace. Take the development of liquefied natural gas (LNG) as an example. This advance allows gas to be transported to locations that, because of physical restrictions, would have found the delivery of gas by pipeline a major challenge, if not an impossibility.

The European market could currently be described as the most 'international' in the world of energy trading due to geopolitical

conditions, the transportation and transmission links between countries and the introduction of the European-wide Emission Trading Scheme (ETS). The growth of environmental concerns has even led to bridges between continents. As CO₂ emissions have become restricted within Europe, generation companies that are challenged by the limits imposed are investing in Asia where power generation technology is not quite as advanced. By allowing the transfer of investments in clean technology in Asia into European emission allowances, an additional international link between the European and Asian energy markets has developed – and the positive environmental impact per invested dollar is often much higher.

For many years, the US has had a resource advantage over Europe, as well as having lower or no emission constraints. This led to the situation where energy and energy politics were never a cause of public concern. More recently, increased energy shortages, capacity constraints and growing interest in emission issues – as evidenced in recent debates by US Presidential candidates – are pushing the US towards building an open, international market, perhaps even introducing parts of the European energy construct.

Energy Market Regulation

To deal with issues like increased environmental pollution, the negative impact on economic development caused by interlinked global energy asset portfolios with high risk, or to motivate investment in new technologies, global groups and lawmakers have introduced and will introduce even more additional boundary constraints (e.g. emission regulation in Europe or the Sarbanes-Oxley Act) to the energy market. This, in addition to the described market trends, further increases the complexity and interaction of the global energy market.

Market Reactions

The energy market developments described here, together with globalisation, have led to different reactions.

Flexible & Complex Products

Finding a solution to shortages, to decreasing margins in the classic energy business, and increased volatility can be a profitable endeavour in itself, and new tradable products are being brought to market with increasing frequency. Where previously simply buying and selling power had been the norm (and swaps from an index to a fixed price would have been the high end of product complexity), now the industry faces hybrid products that combine fuel, biofuel, power, finance, foreign exchange and emission aspects of the business, thus massively increasing the complexity of transactions – and the human skills and IT systems needed to match. Such complexity requires that a strong balance be struck between the physical and financial sides of the business if trading is to be supported effectively.

High Volumes & Standardisation

Inevitably, globalisation will only be effective if the corresponding regulations between different regions and networks – as well as the necessary technologies – are introduced. With the growth of international markets and the introduction of electronic exchanges, products have become increasingly standardised, driving the use of high-volume, low-complexity products.

Before, traditional energy portfolios carried a relatively low number of large transactions that were complex and long-term in nature. Up to 90% of a portfolio can now consist of high volumes of standardised trades that can be traded on an exchange or over-the-counter, with only 10% of a portfolio composed of complex energy contracts.

Hedging & Risk Management

All these market factors and market reactions have had a direct impact on another area of trading power – the ability to manage risk in this challenging market. This in turn affects the hedging requirements of the business.

By linking geographic regions and introducing complex products, a complicated set of correlated risk factors

has resulted. Weather conditions, price volatilities for all product components and markets, exchange rates, physical delivery and transportation risk, replacement risk, as well as credit risk, must all be considered since they can all have a big impact on the stability and profitability of the new complex portfolios.

Due to the real-time character of electricity and the obligation to deliver energy to end-users, risk management needs to be performed not only on the financial side of the business but also on the physical side, where the ability to provide the power itself is invaluable. Given that, organisations that were trading only on the financial side of the business have seen an advantage in taking shares in generation assets to cope with the physical and financial hedge required.

Players & Barriers

In the past, traditional energy players have traded the physical side of the power business comprised of large, complex, long-term trades. A portfolio would be made up of trades owned by those with physical infrastructure.

Joining the traditional energy companies, new players have entered the market during the last decade, principally banks and hedge funds. These newcomers were attracted mainly by the market factors described earlier – high volume, an increasingly global appeal, high volatility and therefore potential profitability.

... traditional energy players have become more active in the financial business

Although the new players originally traded on the financial side of the energy marketplace, they are now taking on more and more physical business. The relaxation of regulations is allowing further ownership of previously untouchable assets. Some of the largest banks in the UK have been pioneers in trading on the physical side of energy while other global banks in Europe and the US are now global players on the

financial as well as the physical side of the energy marketplace – all of them having invested in physical assets, thus creating 'real options' in their portfolios. The reason for this paradigm shift is that new players, based on their accumulated knowledge about the real-time character of the energy market, have realised the unquestionable value of physical hedges from a market perspective.

In turn, traditional energy players have become more active in the financial business, seeing the opportunities offered by structured products as part of their trading and risk management strategies. They have structured their own trading operations like those of the banks with dedicated trading floors and risk management functions.

These developments have led to a growing trend in both higher volumes of financial and physical standard products and more complex inter-commodity finance products. This has resulted in an increasing demand for sophisticated IT systems that will allow an organisation to provide connectivity between the two.

There are very different barriers to entry for each side of the business. For example, if an organisation is engaging in purely financial trading (such as dealing futures on an exchange) it does not need dedicated energy knowledge *per se*, but it does require a high volume trading and risk management IT system and interfaces to the relevant exchanges. Within the emerging complex physical-finance energy markets there are additional barriers: the need to own physical assets, and expert knowledge in the areas of generation, transportation and scheduling. Because of the global players who also move fuel sources for electric power across continents, a new dynamic market has emerged and those involved on the trading and scheduling side need to acquire new skills, knowledge, and systems, for the risk profile and methods of delivery and hedging to be properly managed.

Yet despite the increasing globalisation of energy trading, local markets still have local rules. For example, if you want to transport power in different countries in

Europe you have to notify the Transmission System Operator (TSO). Inaccurate or delayed decision making leads to significant penalty payments. As the protocol for notifying the TSO in each country is still different, this requires expert local knowledge of different systems.

With the financial institutions and energy companies participating in both sides of the business, a highly competitive market for energy and risk experts has been created.

For participants who are active in the financial and physical energy markets, flexible cross-commodity financial trading and risk management systems have become a must in order to deal with both complex structured products and high volumes.

Conclusion

As the market becomes more and more global, with increasing and varied means of transporting energy, so the complexities and opportunities grow. With the US moving toward an international model and the bonds between Europe and Asia growing, so will the physical and financial trading operations of traditional and financial services players grow. This trend, combined with the introduction of new technologies for energy conversion and emission-incentivised international investment in clean technology, will provide the right direction to control global energy issues. But let's focus on the energy trading and risk management (ETRM).

At first glance, the market reactions discussed above such as the increased introduction of flexible and complex products and advanced hedging on the one side, and the trend to high volume and standardisation on the other, seem to be a contradiction. But, in reality, it is the secret to success.

Those organisations that will have the biggest commercial success will be able to find the right balance between these different forms of trading and operations – (standard/complex – financial/physical) – and will be able to 'forecast' political trends

in the energy markets and boundary conditions. The last few years have shown that there can be no decoupled or one-sided view of the market if you want to be successful. The winners in this contest will be those with the right skills, tools and knowledge within all the interlinked areas of energy trading.

Market participants who want to be among the winners need proven tools that will allow them to efficiently manage the complex and intricate processes related to the trading, scheduling and settlement of physical power transactions across diverse energy markets with minimum risk as well as provide the decision support to evaluate alternative scenarios within this complex environment. These participants need to equip their trading and scheduling staff with the most appropriate tools that allow them to execute their trading strategy in both the financial and physical markets, monitor their risks and positions, schedule their physical obligations in the timeline specific to each market and monitor and manage the schedules. Key elements a trading and operations solution need to support are:

- Being able to model all elements of the value chain from exploration/production to delivery/scheduling for all relevant asset classes (physical and financial trades, generation, storage, transport, hedge deals, foreign exchange deals, etc.) in a integrated front-to-back-office environment.
- Providing consolidated real-time positions for all users (traders, schedulers, risk managers, back office, etc.).
- Providing advanced risk methods to calculate the real integral risk of the total portfolio considering all risk factors across the complete value chain.
- Providing decision support for complex exploration, production, trading, storage and transportation scenarios considering existing boundary conditions and constraints.
- Supporting a data-related single version of truth and unified workflow

management to avoid operational risk.

- Interfacing and messaging to all relevant market participants and information providers.

The entities that want to be most prepared to meet the challenges of this new market place will require systems designed to support all the required functionality within one integrated environment, allowing real-time decision support and removing the potential for increased operational risk caused by integration of disparate technologies.

The fact that OpenLink was founded on providing solutions to the financial services sector and later entered the market to provide solutions to the physical energy arena where it has dominated for more than a decade has put OpenLink in the unique position of providing an answer to this challenge.

OpenLink's award winning ETRM system and physical scheduling systems have been designed from the very beginning to marry both worlds of financial trading and commodity/energy trading and risk management. By extending the OpenLink solution suite with operations tools for physical scheduling and decision support tools (forecasting and optimisation) during the last eight years, an integrated platform has been created which provides a unique answer to the cross-commodity finance challenges of the market described in this article with one integrated framework.

OpenLink's ETRM system is used worldwide by the most advanced energy companies and financial institutions across markets. Driven by this marquee client base and providing a flexible framework to configure the system to the individual needs of the markets and clients, OpenLink has proven that its tools provide the needed support, regardless of the changes that may occur within the markets and regardless of geography. ■

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