

The need for integrated commodity trading optimisation

Dr Wolfgang Ferse and Dr Irina Reitgruber discuss increased market volatility, globalisation, links between financial and physical assets, commodity dependencies, more sophisticated competition, and trading complexities that require a commodity optimisation solution

Today, commodity trading is more demanding than ever. Traders can no longer solely rely on their own judgement or simple decision software to make trades. This is because an exceedingly large number of variable market factors must be evaluated in making a trade in order to maximise profits while controlling associated risks. Such variables include: price differentials between the open market and stored commodities; pricing differences across regions; and transportation periods and options.

The evolution of the commodities markets has simply made the trader's job more difficult. One example is increased trading volume and velocity. Consider energy futures – according to the Bank for International Settlement's (BIS's) *Triennial Central Bank Survey*, energy futures and options traded on the New York Mercantile Exchange and on the Intercontinental Exchange increased from 85.2 million and 26.4 million contracts in 2001, to 353.6 million and 138.5 million contracts in 2007, representing compound annual growth rates of 24% and 32%, respectively.

Increased commodity trading complexity

Commodity trading has become more complex and demanding for several reasons:

Increased market volatility – the increase in trading volatility is caused by: increasing global energy shortages; environmental issues and related emission constraints; lack of investment in production and transmission infrastructure; growing interdependencies among commodities and markets; political instability in the Middle East and its effect on oil production, prices and related gas prices; and raw material embargoes, such as the curtailment of oil supplies, to support political agendas.

Commodity globalisation – commodity trading is no longer focused on regional markets and is more global in perspective. According to a survey by Barclay's Capital, the global commodities market is predicted to have a 50% transaction volume increase by the end of 2008 as compared to the previous year. With global expansion, the trader needs to consider opportunities for trading and transporting across geographic regions.

Greater link between financial portfolio management and other stages in the commodity life cycle – until recently, traders did not have to consider non-financial physical factors such

as production, storage and transportation. Profit-maximising opportunities now require a comprehensive trading view of both physical and financial factors. For example, if a trader fails to consider the pricing differential of commodities stored in inventory versus prices on the open market, profit opportunities could be missed.

Growth in trading of commodity derivatives – trading of complex commodity derivatives, contracts where value is derived from more than one commodity, has grown substantially, increasing trading complexity. According to data compiled by the BIS, global trading in commodity derivatives on exchanges rose 52% to 489 million contracts in the first quarter of 2008 from the same period a year earlier. The most substantial growth was in energy and agricultural products.

Trading of interdependent commodities – trading complexity has increased since some commodity prices are determined by their relationship to other commodities or are combined with other market factors. One example is a contract containing gas and power linked with a foreign exchange component.

Increased and smarter competition – the number of traders operating in the commodities sector has substantially increased. According to linkedin.com, "Employment in the securities and commodities industry has been projected to rise 20% from 2000 to 2010, faster than the 16% increase expected for all industries in the economy." Many banks with sophisticated financial software systems are now trading commodities, something they didn't do historically.

More complex portfolio management – to effectively optimise profits and manage risk, complex portfolios, including a combination of high-volume short-term contracts, intricate complex long-term structured products, and hedges must be considered. According to New York-based Global Change Associates, which advises hedge funds on energy investments, the number of energy related hedge funds that it lists has more than tripled in less than four years.

Coping with the commodity trading puzzle

To cope with current commodity trading enigmas, a different trading approach is required. The approach must effectively address the complexities mentioned above, including embedded flexibilities, and provide a trader with daily, fully optimised

boundaries and decision support information within which he/she can trade to achieve maximum profits and acceptable risk.

Examples of such boundaries include the following constraints: maximum injection/withdrawal volume per time for storage (for example, oil and gas); ramp-up time for a power production asset; and maximum amount of emission per time for a power generation portfolio.

Establishing these boundaries on a daily basis is not a simple task. As many as a 100 basic interrelated variable market factors must be considered. In some cases, as many as 100,000 factors might have to be analysed.

Fully integrated commodity trading optimisation is the only method that can satisfy a trader's need to address today's challenges. Optimisation is the process of applying mathematical modelling techniques to analyse the effects of multiple variable market factors when executing a trade. Examples of variables include: volume of options exercised; production rates; spot market prices; and transportation constraint(s) to a predefined route.

The trend to use commodity trading optimisation began in Europe 10 years ago and was stimulated by increased regulation of commodities. Now, US companies are recognising the competitive edge and substantial impact optimised commodity trading can have on their bottom line. A more complex commodity trading environment in the US has also stimulated a higher level of interest in optimisation.

Benefits of commodity trading optimisation

The specific benefits of using optimisation for commodity trading are that it:

- Allows for the integration of financial and physical assets through the supply chain as well as for physical asset and storage management;
- Provides the trader with optimal daily decision-making tools on how to use assets, storage and transportation;
- Provides the trader with a complete, accurate consolidated view of positions and reporting (a traditional energy trading risk management (ETRM) approach for evaluating complex contracts or generating assets only considers technical restrictions in a simplified way, making it more difficult to assess profitability);
- Allows consideration of total portfolio risk and performance;
- Provides an alternative to a pure market-oriented valuation of assets. The usual ETRM approach to the valuation of complex contracts or generating assets overly simplifies technical constraints in its attempt to model option value. Optimisation allows modelling such assets in their full complexity and flexibility;
- Offers new opportunities to maximise profits because it allows a global view of different markets and commodities. It allows the use of arbitrage opportunities between markets and commodities, taking into account physical constraints such as transportation limitations;
- Takes into consideration uncertainties in market prices such as those driven by variations in electric power demand.

To effectively implement a comprehensive commodity trading optimisation programme, robust, fully ETRM-integrated optimisation software is required.

Optimisation software cost versus benefits

Typically, the return on investment for implementing a fully integrated ETRM software optimisation solution is between one and two years. In addition, optimisation offers the possibility of profit increases as much as 10% across an entire portfolio.

Whether you are researching a complete ETRM solution or are a current OpenLink client using our Endur ETRM solution, OpenLink's iOPT_OPT trading optimisation software should be evaluated for its ability to potentially pave the way for new profit opportunities with a rapid return on investment.

About OpenLink

OpenLink is a provider of cross-asset trading, risk management and operational portfolio management software serving the energy and financial services industries.

Endur is OpenLink's award-winning front-, middle- and back-office solution for trading, risk management and operations for the energy sector. In a recent Energy Risk software survey, OpenLink's Endur was awarded first place in 13 out of 20 categories by industry users including Integrated Trading and Risk Management, Trade Execution, Portfolio Management, Modelling, Risk Metrics and Physical and Financial Integration.

OpenLink's iOPT_OPT, which seamlessly integrates with Endur, permits the integrated optimisation of trading and production. With iOPT's extensive library of model elements, it is possible to model any energy system – thermal, hydrothermal or combination systems. The planning horizons range from the immediate future for operations management to several years. In addition to classical optimisation, either with or without integrated risk management, maintenance, planning, stability and sensitivity analyses may also be carried out.

OpenLink established the world's first commodity trading optimisation excellence centre located at its Vienna, Austria, office. This centre focuses on commodity trading optimisation research, software development and education.

About the authors

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