

## The Evolution of the Electronic Energy Industry

By Peter C. Fusaro & Jeremy Wilcox\*

### Introduction:

Electronic Commerce (e-Commerce) opportunities for energy are being manifested for energy trading, energy procurement, and electronic billing and metering. The energy industry is significantly conducive to the use of Internet applications because of its information intensity, and electronic commerce is transforming energy markets. The mature markets of oil and gas trading as well as the emerging markets for electric power, emissions and weather trading are ripe for trading on electronic platforms. This article is extracted from our report, *Electronic Energy Trading*, and explores the market drivers for the changes taking place in energy trading globally.

Energy trading began after the end of Official Selling Price (OSP) programs by the major oil companies and OPEC nations after the 1973 Oil Embargo and coincided with the development of a spot market for crude oil and petroleum products. In 1978, the changing structure nature of the physical spot market for oil presaged the development of energy futures with the successful launch of the New York Mercantile Exchange (NYMEX) heating oil futures contract which was tied to its physical delivery in New York harbor. Successive oil futures contracts and the development of an active Over-the-Counter (OTC) market for forward oil trading in the early 1980s brought significant structural changes to the international oil industry. In effect, price transparency accelerated both physical and financial trading of crude oil and petroleum products globally. In April 1990, the NYMEX launched the very successful Henry Hub natural gas futures contract, which simultaneously coincided with the development of an active OTC natural gas market.

Electricity trading began with the Nord Pool contract for the Scandinavian markets in 1993. NYMEX, the Chicago Board of Trade (CBOT) and the Minneapolis Grain Exchange (MGE) have since launched eight failing electricity futures contracts. In this case, the OTC market for electricity derivatives in the United States began in late 1993 prior to the futures contract launches which began on March 29, 1996. Clearly, something had changed. What had changed is the structure of energy futures trading. The age of electronic trading coupled with OTC market flexibility have usurped exchange-traded electricity contracts. The exchanges have been slow to react to this phenomenon.

Other critical changes have occurred over the past twenty years, price assessment panels and index trading which failed in the late 1980s are succeeding in the 1990s. A sea change in energy trading is underway. Electronic index construction coupled with screen trading is already changing the industry globally. Electronic broking and trading platforms are emerging that will continue to change the face of energy trading.

Changes underway in energy trading are impacting on

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this capital intensive and conservative industry. The energy industry is on the brink of dynamic and dramatic fundamental change both in the physical and financial markets around the world. Electronic energy trading is now emerging across the globe in all energy markets. Companies such as Altra Energy Technologies, Houston Street, Swapnet, Bloomberg, RedMeteor.com, PEPEX and the like are leading the way. The futures exchanges are beginning to face this global challenge. The energy business is consolidating, restructuring and concentrating on a larger scale like never before. Margins are razor thin, therefore, volume becomes the only game in town and the need to move more barrels, molecules, or electrons is paramount.

Energy deregulation created the need for newer information systems that could support competitive markets. Deregulation shifts more risks to companies so that more trading and hedging is inevitable. The technological drivers of electronic trading and the Internet will fundamentally change the structure of energy markets that will inevitably enhance market liquidity across the energy complex and around the world. The Internet has become the tool required for the next generation of energy trading which is faster, higher volume, and needs IT to be successful. It is definitely a new world affecting market share, procurement patterns, and price volatility. The radical restructuring of the energy industries in oil, gas and power across the world is accelerating and simultaneously evolving with increased Internet usage by the industry.

Business-to-business e-commerce is already becoming a major part of the global energy trading markets and has been estimated by Forrester Research to grow to \$266 billion by 2004 including online exchanges, auctions and retail aggregators. Electronic trading also can reduce transaction costs through greater economies of scale, an advantage over both futures exchanges and brokers. Electronic energy trading will also be integrated into a robust price risk and transaction management system so that real time trading operations can be integrated into a company's front to back office.

The next wave of electronic energy will be in the retail markets as customer choice initiatives take hold through further deregulation. The ability to choose energy suppliers including energy measurement and bill payment through the Internet is just starting to take hold and is being offered by some utilities. The future will also integrate not only energy bills but also telecommunication and water bills into one Internet-based bill. Secure payment will be made by credit card over the Internet. Other Internet applications will be brought forward in the form of aggregators, which is key to unlocking the power of retail markets because of diffusion of buyers and sellers. Fragmented markets create inefficiencies. Robust electronic exchanges are the next step in the transformation of the energy industry toward an e-commerce base.

One of the problems in the past for electronic trading systems was that they had been dependent on costly, dedicated private networks and computer hardware, which added overheads for users making them less competitive against conventional telephone trading. Now though it is possible to harness the power of the Internet for business applications and offer global business-to-business e-commerce solutions for traders with no up front cost. All the user needs is an access to the Internet.

The variety and scale of the electronic trading platforms

would seem to indicate that there will be a large ramping up of many competitive systems, a consolidation period, and then the emergence of clear winners. Since many new and unknown competitors are in the offing, it is helpful to look at the existing systems of today and evaluate their road to success or failure. This discussion will include electronic exchanges, OTC brokers, and the development of e-trade capability by traditional floor exchanges such as NYMEX, IPE and SIMEX (Singapore International Monetary Exchange) now known as the Singapore Exchange.

However, the key financial market change was the shift of the Deutschmark from the London's LIFFE (London International Financial Futures Exchange) to Eurex in a matter of months when Eurex went electronic in early 1999. LIFFE eventually went electronic but lost its momentum. This incident was a wake up call for the futures industry that electronic trading was real and an accelerating threat to the traditional monopoly of floor-based futures trading.

The second electronic competitive threat is proliferation of cheap electronic communication networks (ECNs) that are already threatening both financial and commodity exchanges. Unfortunately, exchange members are slow to adapt since they have an interest in maintaining the status quo and have been reluctant to move aggressively from floor-based to screen-based trading. ECNs match buyers and sellers without a need for voice confirmation. ECNs such as Island and Archipelago have already stolen volume from the New York Stock Exchange.

The question, thus, becomes how will electronic trading transform energy markets not when. Energy brokers are trying to forestall this event by pooling their gas and electricity data through 'broker-assisted' networks that will fall by the wayside in the wake of rapid technological change and a migration to the Internet. System openness will cause these alliances and closed systems to dissipate. Their clients are not technologically phobic and will gravitate to new trading solutions based on ease of access, cost and reliability of the emerging system platforms.

Energy markets are conservative in nature and thrive on security of supply. The avoidance of risk would seem to be a curious place to foster the electronic future, but the added impetus of energy deregulation as a global phenomena is bringing the technology solution to the industry quite rapidly as a consequence of more market risk. Liberalization is the process of introducing competition and brings with it radical changes to the structure of the industry. Traditional business practices tend to disappear, as new competitive forces are unleashed. Moreover, new competitors such as Oracle, Microsoft, AT&T, British Telecommunications and IBM already have made inroads into this industry for many years.

The e-Business model for the electric utility business is just now evolving but the core concept is the ability to allow transactions for the business either in wholesale energy trading or in retail services for customers. Utilities are starting to recognize that the technology imperative becomes a key market driver for not only reducing customer service costs, but also a means to retain and attract customers. It improves the quality of the customer service. Incidentally, Internet back office applications like billing and customer care are becoming much more central to the energy business.

Today, some of the key barriers to electronic electric and gas bills are the lack of industry standards since the market-

place is still developing as well as the need to create an "electronic bond" with customers. It extends the reach of the utility and should improve efficiencies in utility operations. It is also bringing with it new competitors who have a different view of the industry and use different business models. Some of these efforts will fail, as a shake out in the industry is inevitable. But it is interesting that Internet information parallels energy flow and the liberalization effort now underway. It is another change agent that fundamentally changes the utility business. Further penetration of personal computers for residential as well as commercial and industrial customers will make aggregation efforts easier to become successful. In the future, the Internet will become the standard for all utility transactions, and the value of this transaction-oriented data will become more valuable.

The next generation of e-commerce is beginning to emerge with the use of more seamless technology. Electronic Data Interchange (EDI) and other standards are beginning to emerge which are better encrypted and more secure. But the reality is that today, the energy electronic commerce solution is focused on the building of an infrastructure rather than exploiting more powerful network applications. In a sense, they are first and second generation technologies. Once the networks are more established and robust, even more competitive solutions and applications will emerge. Business to business e-commerce in energy will be forced to move to real time with next hour gas markets following electric power markets. Aggregators will provide more bundled services. And a true multicommodity warehouse of oil, gas, coal, power, emissions, weather and bandwidth will be available in the trading equation as a one-stop shop.

While established energy commodity exchanges fear erosion of their market franchise due to new electronic competitors, fragmentation of the market will be the immediate impact before the market consolidation period occurs. Competition will force the existing exchanges to alter their traditional way of doing business but probably can not move them fast enough to meet the new competitive floorless challenge.

In a world without walls, global exchanges will be the shapers of the rules, standards and technologies. New electronic exchanges were not envisioned under the regulatory structures of open outcry trading floors. While traditional risks of mishandling of accounts and floor trading market manipulation will recede, new types of regulatory oversight will be needed. Record keeping requirements, for pit trading will become obsolete, but electronic audit trails will need to be maintained.

Rapid growth of electronic trading is forcing fundamental, structural changes in the energy markets and in the energy industry. The model of global energy trading is being irrevocably changed. Better transaction data, more price transparency, reduced trading fees, and access to better information will create more liquidity but lower margins. Volume will surge, and newer players will be engaging in the business of energy risk management and energy trading.

It is predicted that the spread of the Internet and electronic commerce will give rise to price destruction on manufactured goods and fundamentally change the manufacturing industry. E-commerce is already becoming the main

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distribution channel for the energy industry. The change rate is accelerating as energy trading takes hold throughout the industry. It is only the beginning of this fundamental change process.

While today Internet technologies are still prone to problems regarding reliability, speed and performance, the transformation into a medium that is fast, reliable, and convenient is rapidly emerging. Already hand held wireless devices for cellular phones and notebook computers are under commercial development and will use Wireless Applications Protocol (WAP). This change will bring seamless access to the Internet. The impact on Internet energy trading will be instantaneous access in real time from anywhere in the world. The movement toward broad band technologies with text, voice, video, and graphics will widen applications even more and move past current Internet gridlock. DSL and cable modems will move more data, that is, financial transactions; thus adding the technological capability to enhance market liquidity. Moreover, speech recognition and translation technologies will be more finely developed which will further globalize Internet-based trading. These new speech recognition algorithms will improve the interface with the network creating the virtual global trading floor. Some energy market players are in fact waiting for greater technological develop-

ments before they launch their electronic trading platforms. They will use the technologically advanced edge to gain market share.

Electronic energy trading may be a double edge sword. It may lead to more trading liquidity with more individual investors, but it could lead to higher price volatility since active day traders try to exploit tiny price discrepancies in the market. This trend is already in evidence in U.S. stock trading as a "volatility influence" exists. For the energy complex, which are the most volatility commodities ever created, it probably means even more volatility fueled by day traders. This phenomenon is already in evidence and influenced by NYMEX floor traders who trade for their own account on a daily basis.

As established futures markets consolidate and demutualize in response to the new technologically advanced competitors, the role of existing exchanges changes to that of listed companies and their floor operations are fighting survival in the wake of technological change and global financial integration. They must adapt or be superceded with the next generation of technology. These new electronic exchanges are thus perfectly positioned for the emerging markets of electricity, emissions, weather and bandwidth trading since they can be constructed quickly and at minimal costs. Real-time will really be in real-time in the future with 24 hour markets everyday of the year.

## Report of the 2000 Annual General Membership Meeting and the Year 1999

President Peter Davies called the meeting to order on June 9 at the Hilton Hotel, Sydney, Australia and introduced Council members present.

Davies went on to report on the results of the Council and strategy meetings held earlier in the week, noting:

- Agreement to commission studies on topics of current interest and using these as the basis of a session at the Aberdeen meeting.
- Agreement on the intent to strengthen the association's Web site by:
  1. Increasing the number of links to other organizations.
  2. Placing *The Energy Journal* content on the site in a manner indicated by best industry practice; the precise manner to be determined in consultation with the editors.
  3. Offering each affiliate a web page using a standard format.
  4. Becoming the center for energy knowledge and information – the site first turned to for energy information.
- Agreement to establish a two member student advisory group to the president; this to be done by the president-elect soliciting recommendations and then naming two students to advise him on student matters during his year as president. The scholarship fund was raised to \$20,000 and is to be redirected to paying the expenses of these students to Council and international meetings.
- Agreement to encourage joint relationships/links with other energy groups, and to use the IAEE logo as appropriate to help implement this. The Vice President of Conferences was empowered to manage this.

### • Other

1. Council expressed its desire to have HQ handle the complete logistics of future conferences.
2. Efforts will be made to develop a target membership-marketing program.

Discussion followed with a suggestion made to include a job market at the international meeting.

Other matters discussed included fees for academics at the meeting, the distribution of meeting content between business and academic, the desirability of having a presidential address at the meeting and the pros and cons of holding meetings at academic locations.

The meeting was adjourned at approximately 6:45 pm.

Subsequent to the meeting, the Executive Director reported the following:

### 1999 Statement of Income and Expense

<u>Income</u>		<u>Expenses</u>	
Dues	\$146,000	Admin. & Office Oprs.	\$126,000
Meetings	26,000	Publications	118,000
Publications	99,000	Other	<u>39,000</u>
Interest	32,000	Total	\$283,000
Other	<u>28,000</u>		
Total	\$331,000	Net Income	\$48,000

### December 31, 1999 Balance Sheet

<u>Assets</u>		<u>Liabilities &amp; Fund Balance</u>	
Cash & Equivalents	\$697,000	Accounts Payable	\$2,000
Accounts Receivable	<u>15,000</u>	Deferred Dues &	
Total	\$712,000	Subscriptions	<u>68,000</u>
		Total	\$70,000
		Fund Balance	<u>642,000</u>
		Total	\$712,000