Convergence of Energy Market Data & Systems

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In today's rapidly changing energy markets, convergence is emerging as a common theme. The industry is experiencing consolidation of companies, production and marketing strategies, and even the information technology used to drive business decisions. The definition of convergence is, *'coming together, moving toward uniformity'.*

In many ways, the price of crude oil drives the energy industry. Oil prices sank to around US$10 a barrel during the recent Asian economic downturn. Many small independents were driven into bankruptcy, many larger oil companies into mergers and drilling activities were curtailed. The effect rippled throughout the industry. Business slowed at oil service companies, pipeline and storage companies had less oil and gas to transport and store, and refineries produced less gasoline and petrochemicals.

Now the industry is on the rebound as oil prices soared to over US$35 a barrel in late 2000 driven by OPEC production restrictions and rising world demand. The higher prices have reached most of the industry - producers, refiners, pipeline companies, equipment makers, oil field service providers, and gas station operators are all enjoying strong profits.

And as consumers worldwide complain about high energy prices, the industry is playing catch-up, trying to develop oil and gas fields, accelerating production, and storing more product. Sharply higher oil prices have also caused switching from oil to natural gas (and coal) in the utility sector. Natural gas prices have seen all-time highs recently driven by low supplies, extreme weather and more demand to fuel power plants, creating more business for natural gas transporters and marketers.

This strong market comes in the wake of consolidation amongst majors in the energy markets. Recent activity among US utilities provides an indication of the scope of this consolidation. Since 1992, 30 domestic electric power company mergers have occurred, valued at over US$60 billion in capitalisation; 23 deals are currently in the approval process, representing US$67 billion; and pending foreign investment in US utilities is estimated at roughly US$15 billion. US power companies have taken part in over 165 international M&A transactions, and more than US$79 billion has changed hands. By uniting the top talent in the industry, newly formed mega companies seek to leverage experience and translate it into higher profits.

Currently, three trends simultaneously affect the energy sector:

- Deregulation, privatisation and liberalisation
- Development of the Internet and related technologies
- Advances in the sophistication and application of financial devices in the commodity markets

The impact of these trends is still coming into focus. Dramatic increases continue in the transaction volume of energy commodities and their related instruments. More activity in the markets means that there is more market information than ever before. In the active trading markets of the energy industry, having access to a broad array of high quality, timely information has quickly become a requirement rather than a luxury.

> *'The need to aggregate data and share it through the enterprise is now paramount to achieving new efficiencies'*

The need to aggregate this data and share it through the enterprise is now paramount to achieving new efficiencies. Front, middle and back internal office systems, used as stand alone in the past, need to be joined together to communicate in a seamless fashion and guide the flow of integral data through the enterprise. Decision processes can be streamlined and even automated as information flows through the workplace at warp speed.

Energy Market Data Sources

The energy market information industry continues to be highly segmented. Consumers of information enjoy a plethora of choices when seeking delivery of mission critical data. For trading market price and news information, there are numerous companies offering various services. These can be categorised into two roles.

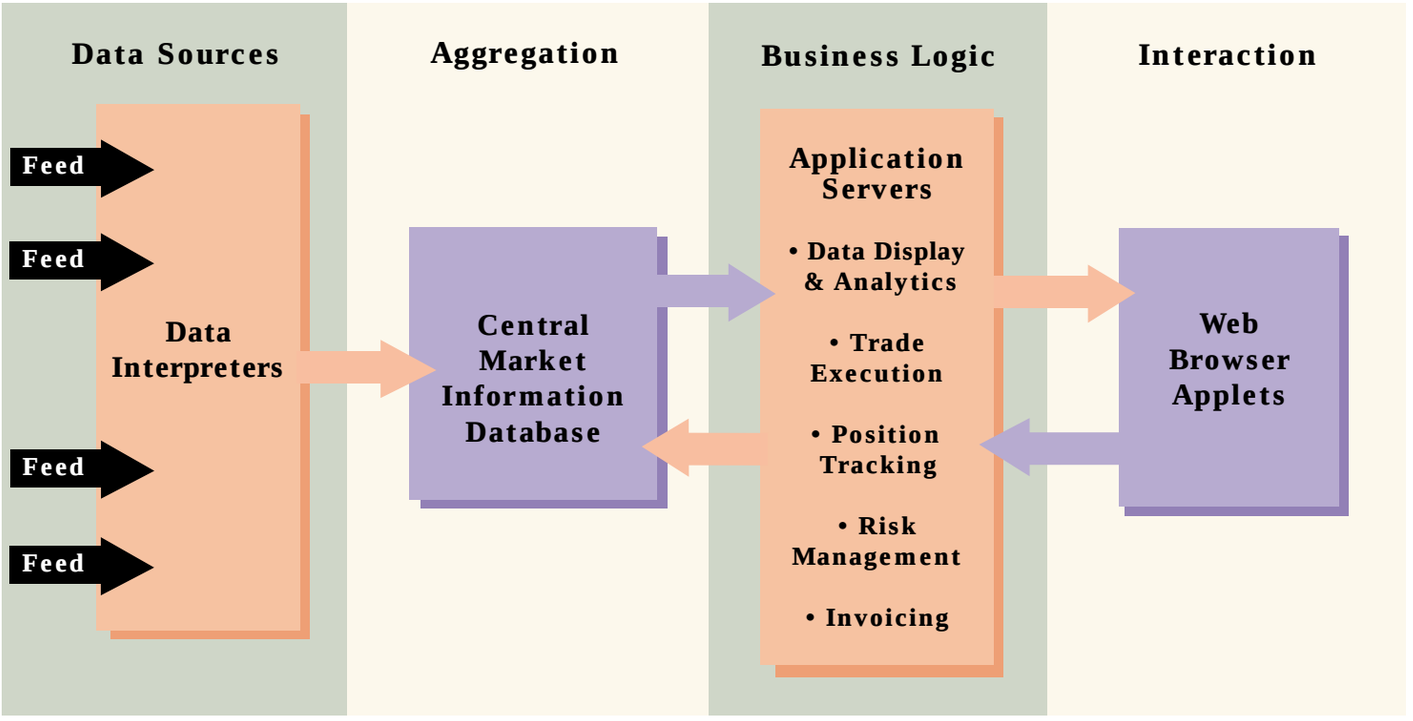
First are the publishers, those that actually produce the data. Second are the distributors, those that provide delivery of the data. The marketplace consists of many providers that may be either a pure player in one of these roles or a hybrid that performs both roles.

Distributors of market information have tended in the past to build their own large-scale electronic networks to deliver data to their customers. These networks typically consist of expensive dedicated telephone circuits and advanced satellite distribution systems. Companies like Reuters have invested hundreds of millions of dollars in their distribution systems, but the requirement for private systems has quickly diminished.

The emergence of the Internet and the plummeting costs of worldwide networking are changing the landscape of information delivery. Now there are few barriers for entrants into the information distribution industry. Deep content can be made readily available to anyone with a connection to the Internet. This trend means that providers need to focus on being the publishing source and by adding value through quality, timeliness and data aggregation.

There are a number of sources of data that are key to energy professionals active in the markets. Informed business decisions and the ability to interact with counter-parties demand access to vast amounts of information, but also the ability to synthesise and evaluate it. Many sources provide the benchmark price information that underlies both short-term and long-term contract deals between parties. These sources can be split into two types.

Energy Market Systems



First, there are industry specialists that monitor the markets, report on activity and make price assessments. These market assessors include established companies like Platts, Dow Jones and Petroleum Argus. Second, there are the actual marketplaces that publish transaction information. These include energy exchanges such as NYMEX, IPE and SGX as well as the quickly growing list of Internet-based online markets.

Online Markets

The new online markets are revolutionising commercial activity by providing centralised, transparent markets where transactions occur more quickly and with less effort. These electronic and Internet marketplaces are evolving from being gathering places for buyers and sellers to becoming advanced online 'exchanges', providing real-time pricing and regulated trading mechanisms. The term 'exchange' has been used loosely in the Internet industry to refer to these online marketplaces. Established markets include Enron Online (EOL), Intercontinental Exchange (ICE), Altra Energy, Dynegydirect, Houstonstreet and RedMeteor.

Forrester Research in Cambridge, Mass., predicts that online trading of natural gas and electricity among production facilities, distributors and commercial buyers will reach US$266 billion by 2004, up from US$30 billion in 2000. Early evidence of online market success is demonstrated by recent activity in the natural gas market. On more than one recent occasion, NYMEX trading has been halted for one hour due to exchange dictated price movement limits (previously US$.75, now US$1.00). During those market halts, powerhouse EOL continued to trade and in fact became the price determinant for the market.

> *'Historically, the energy industry has been one of the largest users of derivatives transactions engineered to transfer price risk'*

There are currently three business models for these online markets. EOL represents a market where the company is the counterparty for each transaction. Some, including Houstonstreet.com and RedMeteor.com, focus on physical market acting as clearinghouses for energy products. Others like ICE act as an intermediary by providing financial transaction products such as swaps.

A goal of some sites is to establish peer markets where all traders interact as equals. The first focus for the online markets has been development of sophisticated trade matching engines able to capture multi-parameter trades. These sites match anonymous traders that learn the counterparty after agreeing on the transaction. The parties are then left to arrange settlement and delivery details. After some experience and lack of liquidity, some have had to reassess their model and seek out partnerships with large buyers or sellers to achieve the necessary order flow.

The early online markets facilitated transactions largely based on spot buying. However, the evolution of dynamic pricing has led to the establishment of centralised marketplaces, with price transparency and volatility. The majority of these sites were launched under the assumption that their existence alone would attract transactions. The results have shown that the mere promise of somewhat cheaper transactions is not enough to ensure a thriving market.

Markets exist to serve the needs of natural buyers and sellers, the actual producers and consumers of a product. However, a marketplace composed of only those parties is limited as they typically remain on one side of the transaction. The introduction of broker/dealers creates more counterparties while the use of derivatives encourages participants to take part in both sides of the transaction. Now the rush is on to increase transaction volume, with hopes for integrating traditional

financial and commodity market tools, including derivatives.

Derivative transactions, which include forwards, futures, swaps and options, encapsulate the trading of rights based on the underlying product, without requiring the direct transfer of the commodity. While spot markets offer buyers the ability to purchase products based on current prices, derivative transactions enable participants to set contracts for purchases based on prices projected into the future. This provides the ability to control the price risk of adverse future price swings and market variability. Historically, the energy industry has been one of the largest users of derivatives transactions engineered to transfer price risk.

Liquidity

The ongoing rush to create new online markets has created a high degree of fragmentation. Cheap capital provided by venture capital firms and high profits in the industry have helped fuel the growth, but most parties agree that consolidation of this marketplace is inevitable. In a fragmented market, where price discovery is both difficult and valuable, traders may be willing to absorb high margins. But as price discovery becomes easier, margins will be squeezed to their absolute minimums.

The measure of liquidity has been quite fuzzy in the world of online markets. In many cases, it is used to refer to the number of traders or the number of trades that they execute. A reasonable definition of liquidity is the ability to buy and sell with minimal price impact on the market. Achieving liquidity requires not only a combination of traders and activity, but also instant and accurate price discovery. As online markets add derivatives contracts to existing products, they hope to attract new classes of market participants, increasing liquidity and improving their overall effectiveness.

Liquidity tends to pool the buyers and sellers to a central market. This argues for the consolidation of the online markets. But the electronic world of the Internet may provide new models not previously possible. As a large network, the Internet creates an opportunity for peer-to-peer networking. This means that hundreds or thousands of independent sites can exist and be interconnected by sharing a common protocol of communication, where there is actually no central location. It may be possible to aggregate the markets in a virtual sense and not centralise in the conventional ways. In this scenario there need not be one dominant player.

Beyond the existence of online markets, there are a number of factors that are causing the dramatic growth of market information in the energy markets. The trend of deregulation and globalisation continues to gain momentum resulting in more trading activity. Many online markets extend the trading hours possible while inviting participants from all regions of the world. The impressive growth in the number of marketplaces adds to the proliferation of market information sources. The expansion of trading activity has created regional product specifications that produce ever-increasing volumes of price information.

As a result of diminished government interference in the free play of supply and demand, energy markets have migrated from fixed prices and have started to experience heavier price fluctuations, strongly pressuring energy companies. They run large risks by not utilising electronic markets and paper instruments for managing risks and face enormous exposures if they do not use these products wisely. As a result, energy professionals' market information needs have increased greatly. Fortunately, the development of new technology has improved the flow of information that is relevant for energy trading.

Key Energy Market Information Contributors: Exchanges

Major Energy Exchanges

NYMEX: Website: www.nymex.com
The largest physical commodity futures exchange in the world, trading nearly 110 million energy and metals futures and options contracts in 2000, worth approximately US$3.3 trillion.
Region: International/North America.

IPE: Website: www.ipe.uk.com
Europe's leading and the world's second largest energy futures and options exchange, trading over 23 million contracts in 1999, worth more than US$500 billion.
Region: International/Europe/Middle East.

SGX-DT: Website: www.simex.com.sg
Formerly SIMEX, SGX-DT trades a broad range of international interest rate, fixed income, equity and energy derivatives. A total of 27,571,963 contracts was traded in 2000, the second highest annual trading volume in the exchange's history and a 6.7% increase over 1999.
Region: International/Asia Pacific.

Regional Energy Exchanges

Amsterdam Power Exchange: Website: www.apx.nl
The APX was launched on May 25, 1999. In the year 2000, the total trading volume on the Amsterdam Power Exchange was 5.82 Terawatt hour (TWh), almost 6% of the total Dutch electricity consumption. 32 market parties from 9 different countries are active on the exchange.
Region: Europe.

Nordic Power Exchange: Website: www.nordpool.no
Nord Pool is the world's first multinational commodity exchange for electric power, established in 1993. In November 2000, the year-to-date volume of electric power contracts cleared by Nord Pool crossed the threshold of 1000 TWh.
Region: Europe

California Power Exchange: Website: www.calpx.com
CalPX is a private non-profit, public benefit corporation that was created through state legislation to provide an efficient competitive auction for energy. Until recently, it was the largest of the 15 power exchanges in the world serving all consumer classes, with approximately 70-75% of the electricity consumed in California being purchased and sold at CalPX. CalPX recently announced it will be ceasing operations, in large part as a result of the electricity crisis in California.

PJM: Website: www.pjm.com
PJM Interconnection, L.L.C. operates the largest wholesale electric market in the world. It handles over 8% of the US market with a pooled capacity of 56,000 megawatts.
Region: North America.

Key Energy Market Information Contributors: Online

Online Energy Exchanges

Altrade (operated by Altra Energy Technologies): Website: www.altra.com
An independent online trading platform for natural gas, natural gas liquids, power and crude oil. Altra reported in September 2000 that its power platform experienced a volume growth rate of more than 500% since inception (October 1999) and natural gas exchange volumes have increased by more than 200% since September 1999.
Industry partners: American Electric Power, BP, Conoco, Koch, Prebon Energy.
Region: North America/Europe.

Dynegydirect: Website: www.dynegydirect.com
An online trading system connecting customers to Dynegy's prices and products including US natural gas and natural gas liquids, US power and Canadian natural gas. Began trading November 1, 2000 and posted approximately US$1.5 billion in total transaction value as of mid-December.
Region: North America.

EnronOnline: Website: www.enrononline.com
Covers almost every major energy market in the Americas, Europe, Asia and Australia and is presently the largest online energy exchange. As of mid-December, EnronOnline had an average daily trading volume of US$10.5 billion and 35,000 transactions in more than 30 commodities, smashing initial targets of a US$30-40 billion annual trading volume.
Region: International.

Enymex: Website: www.enymex.com
NYMEX's forthcoming entry into the online exchange arena. Due to be launched in the first half of 2001, enymex will be a global, independent online trading platform for forward trading and clearing contracts in a range of physical commodities with an initial focus on energy and metals.
Region: International

HoustonStreet Exchange: Website: www.houstonstreet.com
An independent online trading platform for electricity, crude oil and refined products. HoustonStreet reported that their crude oil and refined products platforms surpassed more than $1 billion in trades in its first four months of operation (April - October 2000).
Energy industry partners: BayCorp, Conoco, Equiva, Sithe Energies, Vivendi, Williams.
Region: North America, Europe.

Intercontinental Exchange (ICE): Website: www.intcx.com
An electronic exchange for trading over-the-counter (OTC) energy, metal and other commodity products. The ICE reported that as of November 17, 2000, the total notional value for all OTC products traded was over US$13 billion. ICE participation currently includes 85 of the world's largest energy and financial commodity firms.
Energy industry partners: AEP, Aquila, BP, Continental Power Exchange, Duke, El Paso, Reliant, Royal Dutch/Shell, Southern Co., Totalfina Elf.
Region: International.

TradeSpark: Website: www.trade-spark.com
TradeSpark is an electronic marketplace focusing on a core group of standard electricity and natural gas products in North America. Energy industry partners: Coral Energy, Dominion, Dynegy, Koch Energy Trading, TXU Energy, Williams.
Region: North America.

Market Information Tools

In today's business world, information technology (IT) applications provide the central decision support infrastructure for management complexities and developing strategies for the global trade environment. The information systems, which include marketing, financial, production planning and control information systems, increasingly share databases and information resources while at the same time continuing to support unique global applications. There is little doubt that design and implementation of strategic global information systems requires a solid understanding of the issues at the functional level.

A brief historical view reveals that not long ago, choices were not so prevalent. To receive a data service, one had to commit to using a dedicated computer terminal that was installed by the provider and carried only the data offered on that terminal. For those with varied needs, that usually led to a multiplicity of systems, each with its own computer screen, in order to access all the required information. This resulted in duplicated technology accompanied by compounded expense, not to mention the inability to share data between systems.

Budget cutting forces combined with technology evolution and the growing needs of the users have driven the industry to a more efficient model. The systems integrators developed software that allows multiple data sources to be combined and distributed over local and wide area networks. This technology can also provide an information display application that not only aggregates and displays the multitude of data sources, but can also perform sophisticated manipulation and analysis of that data along with trade execution. GlobalView Software Inc. is one provider that offers state-of-the-art enterprise applications for market information integration, display and analysis.

> *'XML is rapidly becoming the key data interchange standard for time-critical, high-volume information sharing'*

For the trading markets to evolve, the key element is the creation of the technology enabling the market participants to monitor the many markets and conduct transactions on individual markets in a completely transparent fashion. While this seems to be a large and difficult task, the establishment of information messaging standards that can be used to communicate between all the parties will allow it more quickly.

An industry consortium, Energy Trading Standards Group (ETSG), has been initiated by industry participants with the expressed purpose of creating standards for energy industry price and trading data. The goal is to develop open standards based upon XML (Extensible Markup Language), the emerging technology of business-to-business (B2B) Internet commerce. The companies will

initially create standards for exchanging data between online trading platforms and transaction/risk management systems used by wholesale electricity and natural gas trading companies. XML is rapidly becoming the key data interchange standard for time-critical, high-volume information sharing on the web.

This automation will save energy trading companies time and expense by eliminating the errors associated with trade ticket generation and data entry, providing real-time access to trade data and eliminating the cost of building and managing proprietary systems and connectors. The consortium intends to develop standards to improve the often-fragmented external exchange of transaction and related data among energy trading partners. Open information exchange standards will allow wholesale energy buyers and sellers to benefit from nearly instantaneous electronic trade confirmations.

The materialisation of more complex commodity markets poses a challenge for energy firms to remain successful participants. The decisive area for the competitiveness of energy firms shifts from production to information use. The key challenges are in the integration of systems used to manage the intensive data flow within these companies.

Web Browser Tools

The Internet has not only improved the flow of information that is relevant for keeping up with the markets, but also intensified the competitive pressure to use information efficiently. More data becomes both a blessing and a curse. Given instantaneous access to a vast amount of timely information relevant for trading, working professionals have to invest their most precious commodity, their time, to find the appropriate information and resources necessary to perform their jobs. The Internet was seen by many as a very interesting toy - fun to look at when one had time, but not a realistic avenue for detailed information.

The key to harnessing the power of the information is to provide user systems that require little training and can be supported at low cost. The advent of the web browser has provided an excellent path for the technology evolution to accomplish just that. Web browser tools are a composition of components that can search the web, extract disparate data sets and allow that information to be viewed in a common interface. The web browser has proven itself as a useful and powerful tool to professionals both on and off the job.

The introduction of web browser tools has altered the landscape of how business and communication are conducted. We are now witnessing the evolution of the web browser into more powerful information analysis tools. The underlying technologies and architectures of web-based systems are developing in new directions that can provide new ways of bringing information together and allowing detailed filtering required for complex analysis.

Portals & Vortals

Enterprise Information Portals (EIP), or corporate portals, offer business users a single browser-based approach to access their critical information in the same manner that familiar web portals serve as gateways to the abundance of subject matter on the web. The target is to make information needed for business decisions as easy to work with as a typical website. A truly powerful portal can combine 'unstructured' information, such as Word documents, web pages, and other text-based content, with 'structured' information, such as that contained in historical databases and other back-office systems. The whole package is then delivered to users through a web browser interface. This provides a valuable tool for companies building internal corporate portals for employee use, an extension of the intranet.

Vertical Industry Portals (Vortal) are portal websites that provide information and resources for a particular industry in the B2B space. Vortals are the Internet's way of catering to consumers' focused-environment preferences. Vortals typically provide news, research and statistics, discussions, newsletters, online

Key Energy Market Information Contributors: Data Providers

Energy Data Providers

APPI (Asia Petroleum Price Index)
APPI is an independent price source for crude oils, acknowledged to be the standard price setting mechanism in the Far East for crude oils.

Dow Jones Newswires
The Dow Jones Energy Service includes international news coverage of key developments affecting supply and demand, commentary and analysis on price trends in the world's cash, paper and futures markets, and coverage of the natural gas, electricity, LNG, LPG and petrochemicals markets.

E.A. Gibson Shipbrokers Ltd.
E.A. Gibson provides reporting on international oil transportation. Gibson maintains both ship and charter information databases that are updated daily.

FT Energy
Financial Times Energy produces multiple sources of energy industry news and analysis including FT Energy Gas Daily and FT Energy Megawatt Daily, providing analysis of retail markets, power generation and distribution, oil and gas, coal and mining, and environment issues.

OPIS Energy Group
OPIS tracks more than 50,000 North American rack prices for heating oil, gasoline, and kerosene, plus thousands of contract prices for jet fuel, LPgas, residual oil, feedstocks, natural gas and alcohol.

Petroleum Argus
Petroleum Argus publishes news, pricing, market analysis and commentary for the international oil, gas, and power industries.

PH Energy
PH Energy publishes news, price assessments, market analysis and commentary for the European natural gas and power industries.

Platts
Platts provides news and pricing for the international energy markets, including oil, petrochemicals, non-ferrous metals, shipping, power and natural gas. More recently, Platts has begun to offer an analysis service for various markets.

RIM Intelligence Co.
RIM Intelligence Co. provides oil price reports for the Asia-Pacific and Middle Eastern markets, including market commentary and daily crude and products assessments.

tools, and many other services that educate users about a specific industry. A vortal trade community provides content, community and commerce to the industry group. This means that one site can offer superior information, congregation of industry professionals for interaction and a marketplace for buyers and sellers to do business.

Personalisation

Often, traders are only interested in certain information, such as pricing from a key market region, but are flooded with generic information. The key to successful utilisation of the information access application is personalisation. The software must have the ability to be completely personalised to the needs and interest of the market professional.

Users can their view of market price information as well as geography, weather, the movement of related stocks and key news developments related to a particular commodity. For traders, the requirements are to instantly post bids, make offers, counter, re-counter, and close. This must all be configurable by the individual with little effort. The marriage of software applications with personalised portal technology is the key to building successful information systems.

Systems Integration

Another key element to achieving data convergence in the enterprise is to centralise the data storage and eliminate unnecessary redundancy. In typical environments, this can only be accomplished through painstaking, step-by-step re-engineering of complex systems that have been established over time using both internally produced and externally supplied software. But the benefits can be quickly demonstrated. Productivity of energy professionals is improved by utilising one database for all price storage and discovery. Process efficiency and speed can be improved by eliminating the need for manual data transfer to multiple applications for multiple groups. And finally, automation of back-office functions can be achieved by performing daily and intra-day information transfers.

True benefits through technology can be realised when the many different enterprise systems can finally be integrated. By creating a data flow through these systems, information can be shared as needed and duplication avoided. In order to capitalise on the wealth of information, the key integration must be made within the applications that are utilised for price discovery, market information, and trade execution. Energy market professionals need these functions merged into a cohesive display that allows them to leverage the information and initiate the transaction process. Systems designers are now challenged to create homogeneous tools that combine the complex functions of many differing applications.

Summary

The demonstrated explosion of market information and increased pressure to harness it presents many challenges to today's energy concerns. The race is on to craft solutions that will create new efficiencies while managing the growing volume. Progress can be made in leaps and bounds as convergence is realised.

As the online market evolution continues, there will be new demands placed on the current data publishing sources. Spot market transaction information, formerly private between counterparties and only reported as trends via agencies that collect market information, will be available in real-time through a single source just as prices are from traditional exchanges. Market professionals will rush to acquire tools that will handle the many sources of information.

The result of the convergence of data and systems clearly means many benefits to the companies that can attain and capitalise on it. Using just one convenient PC client, users will have access to complete price discovery and costing of energy, perform price trend analysis, and access trade execution facilities. This means providing a fully integrated software systems solution with a universal interface.

Using just one screen, a trader has instant access to the key information needed to make informed decisions and move towards a profitable deal. This will increase trader productivity by simplifying each step that goes into making an energy deal. The opportunities for automation are increased for key trading tasks, from setting up schedules to issuing invoices thus freeing up manpower.

> *'The marriage of software applications with personalised portal technology is the key to building successful information systems'*

IT departments can realise numerous benefits as well. Using one common database to store price information from all external and internal sources can greatly simplify systems management and work to secure data integrity. Integrating components from disparate vendors can be made less complicated and cause fewer problems using standard interfaces and messaging protocols.

In the energy business that strongly influences the global economy, advances in process and systems are paramount to its continued health. Convergence is becoming the reality. Taking advantage of the opportunities using technology is quickly becoming strategic to survival in this dynamic marketplace ●

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