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Evolving Wholesale Energy Markets Demand New Technology Solutions

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Abstract

Volatility in the wholesale energy markets offers huge opportunities and equally huge risks. The entrance of new players to the space, particularly hedge funds, creates new dynamics that have placed unprecedented demands on companies operating in the market. Intraday price movements and long term trends that are in many cases disconnected from market fundamentals create the need for trading systems that cannot only capture information in near real time, but can provide insight into the market through improved business intelligence and analytics. Traders in this environment must be agile and seek out, analyze, and quickly execute opportunities.

These new market dynamics come at a time when new legislative, regulatory, and market driven governance initiatives are forcing companies to re-examine their internal policies and procedures. Adequate controls must be developed and maintained to monitor, and in many cases prevent, behaviors that could damage share-holder value.

This dichotomy of facilitating agile decision making and action versus the necessity for maintaining adequate control demands a new technology paradigm, moving from interfaced applications to a comprehensive solution based on new architectures, providing better integration, better connectivity, improved business process flow, and improved analytics and reporting capabilities.

Introduction

The ability of any commercial organization to successfully compete in today's wholesale energy market place is dependant upon that company's ability to deploy and maintain appropriate resources, both human and technical.

The appropriately skilled human capital is an essential component in that energy trading is an extremely dynamic environment, subject to extreme volatility and regulatory oversight. Having the right people who understand this environment and can make the appropriate decisions will determine whether that company can ultimately prosper, increasing shareholder value and acting as a good corporate citizen in the eyes of regulators.

Secondary to the human component are the technical tools and solutions brought to bear to support decision making and information management. Successful trading requires up to the moment data and information, which in turn, requires systems that can provide constant feedback to decision makers as to the company's position within that market. Additionally, these systems must operate as systems of record, keeping a complete litany of any and all trading and logistical activity undertaken by the enterprise. In energy trading, these systems are known as Energy Trading, Transaction, and Risk Management (ETRM) solutions.

The ETRM software space had its genesis in the Federal Energy Regulatory Commission's (FERC) Order 636 in 1992, which began the deregulation of the wholesale gas markets. Since that date and following other FERC Order's, such as 888 in 1996, which began the deregulation of the wholesale power markets, ETRM products have evolved from custom built applications, developed by entrepreneurs to support a single client, to systems developed and supported by multi-billion dollar international software companies. Yet, even in this environment, very small vendors continue to eek out a living, supporting a hand full of clients on relatively aged technology.

Even with the support and backing of these billion dollar companies, software vendors in the energy space struggle to service their large client bases, with each client demanding functionality and features unique to their business processes. Additionally, the demands of the “new” energy trading environment, one in which energy companies are more often trading multiple commodities, both physical and financial, and are demanding systems to support regulatory compliance (including Sarbanes Oxley and FAS 133), are placing unprecedented demands on software vendors to move their products forward, while maintaining support for their less aggressive clients.

Defining ETRM Software¹

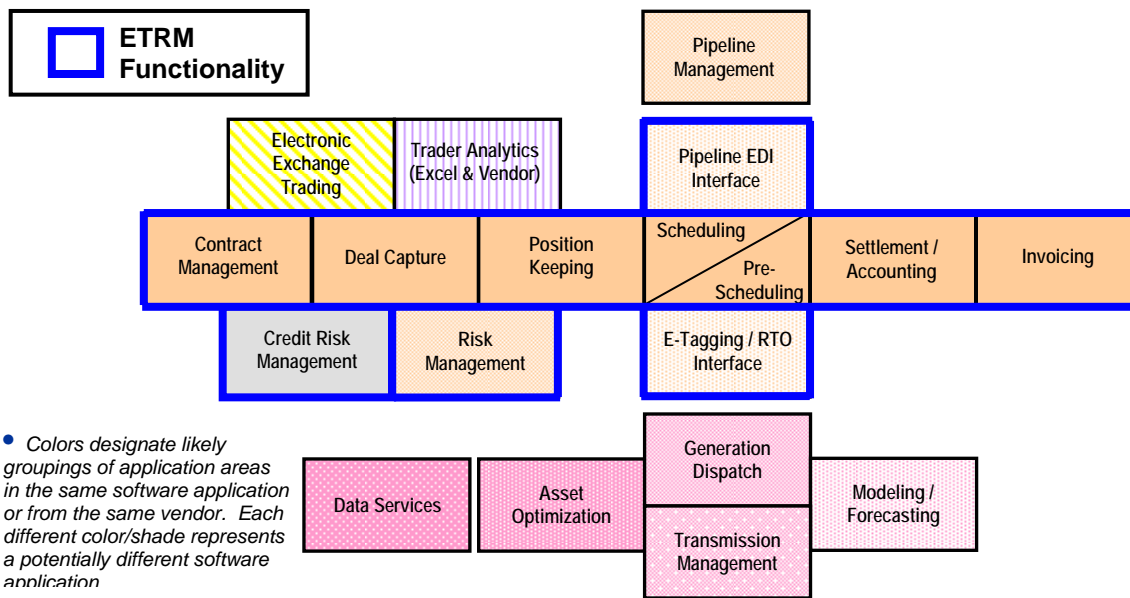
Energy trading, transaction and risk management (ETRM) software is that category of software applications, architectures and tools that supports the business processes associated with energy trading. In this sense, energy trading means the buying and selling of energy commodities such as crude oil, coal, natural gas, electric power and refined products, the management of the movement and delivery of the energy commodities and associated risk management activities. ETRM software comprises a broad set of functions that can vary considerably depending on what commodities are traded, what assets are employed in the business, where those assets are located, and what the company’s business strategy and associated business processes are.

Usually and in the broadest sense, ETRM solutions are fully integrated sets of software that help to manage the front, middle and back office aspects of an energy trading entity. Although definitions and organizational structures differ quite widely, the front office is usually concerned with deal capture and position management, the middle office with managing and reporting various risk exposures as a result of trading activities and the back office with settlements and accounting functions. Additionally, there will usually be a scheduling component to ETRM solutions allowing the energy company to plan, track, manage and account for quantities of energy that have to be physically moved from source to point of usage.

Although ETRM software functional coverage can be difficult to define, another way to look at it is to consider the types of company that need to utilize ETRM software:

- Hedge Funds trading energy commodities
- Investment banks trading commodities
- Energy merchants trading commodities
- Multinational oil companies trading commodities
- Producers selling their production
- Utilities (Investor-owned, Municipal utilities and cooperatives) buying fuel for power generation and for the sale of wholesale gas or electric power
- Local Distribution Companies buying wholesale energy to sell to retail markets
- Large commercial and industrial end users of energy
- Petrochemical and refining companies that procure feedstock in wholesale markets

Given the list of different segments of the energy industry that might require ETRM software, it can be readily understood that the required functionality of such systems can be extensive. Another way to think about ETRM software is to consider the management of two primary functions across these entities. First is the business of managing the assets employed in the business whether those assets are generation facilities, produced quantities of oil, gas or electric power, and secondly the merchant function that is involved in the buying and selling of commodities and managing the associated risks. ETRM software is used to manage the merchant function and has to be fully integrated with the asset management function.

Figure 1: ETRM Functional Area Diagram

As shown functional area diagram (Figure 1), ETRM software is generally identified as software that services any portion of the activity chain identified by the bold outline in the chart. Most of the activities shown are commodity agnostic, with the exception of the logistic portion, identified as Pipeline EDI interfaces for gas and E-Tagging/RTO Interfaces for power.

Vendors of ETRM applications may service the entirety of that activity chain, selling products that serve multiple commodities and manage all activities from contract administration to risk management on through invoicing. Other ETRM vendors, including SAS/RiskAdvisory, have chosen to focus on delivering a single functional component, such as risk management.

A Brief History of ETRM Software

Before the onset of wholesale trading in natural gas was enabled by FERC Order 636 and subsequent FERC Orders, natural gas marketing had been a “module” in the Production and Revenue Accounting systems used by producers to account for volumes, revenues, and disbursements associated with their natural gas marketing operations. Most of the major Production & Revenue Management systems were large-scale, mainframe-based systems from accounting and consulting firms such as Andersen Consulting and Price Waterhouse or, for the middle tier of the market, midrange solutions on AS 400s or similar, from a variety of smaller software vendors.

FERC 636 essentially resulted in the creation of marketing firms and wholesale markets for natural gas, creating a need for a new and specific solution – the natural gas marketing system. With the approach of deregulation, many of the larger natural gas producers hired contractors to develop the necessary tools and functionality to operate within the new regulatory regimes. Eventually, these early systems found their way onto the commercial markets either through the entrepreneurial efforts of their developers, or via the companies that paid for the original code, having spun the “product” out in effort to take advantage of the emerging market for software that deregulation had created.

These early systems found a ready market, as many gas producers looked for solutions to address the shortcomings of the outdated production and revenue accounting tools on which they had been reliant. The requirements to accurately account for sales to an increasingly large

number of counter parties and to account for costs associated with transporting their gas to market hubs compelled many companies to purchase products from these newly formed vendors.

As the vendors grew, signing these early adopters, they began to find that they had to commit more effort to developing unique functionality necessary to meet the needs of the “next” client, for despite many common business rules and processes across the industry, each company in this growing trading market had adopted or had evolved to business processes that were unique to their particular mix of assets and market coverage. This issue was exacerbated as these vendors sought out and secured new clients outside of their traditional base of natural gas producers.

These new clients included merchants that had entered the space without holding assets, instead taking positions in physical commodities in hopes of selling for a profit. With these new clients came increasing functionality demands, including the need to move the applications from just being a system of record, to being a near real time position management solution, enabling them to update and maintain current position information as they bought and sold gas in the daily markets. Additionally, these merchants were adopting the tools of the financial markets, seeking to take advantage of new financial contracts in natural gas, both on a speculative basis and as a hedging tool.

This broadening of functionality led to ever increasing support issues for these vendors. Their original client base, the natural gas producers, soon found their systems burdened with functionality that they neither needed or wanted, and as the code grew more complex, they were also faced with a growing number of bugs with every new version release.

With the advent of the deregulation in the wholesale power markets, the vendors of ETRM products accelerated the expansion of their products, attempting to shoe horn the unique functionality requirements of power trading into their existing and sometimes overburdened products. After a number of false starts, many of the vendors successfully developed systems that were serviceable solutions for the new power markets, however, the new functionality created a code explosion, in many cases more than doubling the lines of code that needed to be maintained.

At the same time as these vendors were moving from a physical gas product to one that could service both their traditional markets and the newly emerging power markets, financial risk management tools vendors began to introduce sophisticated applications for the management of an ever increasing market in financial energy products. These new entrants were able to deploy sophisticated valuation and reporting tools that could not be matched by the traditional vendors, which had the effect of creating two distinct markets, one for physical energy transaction management systems and one for financial energy risk management systems.

During the mid 1990's and into early 2000's, many vendors of the physical management systems failed, unable to overcome an increasingly dissatisfied client base. This led to consolidation in the market, with these failed or failing vendors being bought up for their client bases by a few large and well funded players. Additionally, these larger players soon started acquiring many of the risk management systems vendors.

Unfortunately, these vendors had acquired a client base that was in many cases unwilling to surrender their legacy products, having spent huge sums in the implementation of the products, and much time and effort in achieving a relatively stable solution for their particular operation. After repeated attempts to move their newly acquired clients to what the vendor had deemed the “go forward” product, the vendors were generally forced to continue support of these clients on the older legacy systems in order to prevent them from going to the vendors' competitors.

With the burden of supporting products that were no longer being actively marketed and sold, and with continuing changes in the market place, including the collapse precipitated by the failure of

Enron in 2002, many vendors found that they were locked into a business model that limited their ability to respond to market demands.

With a client base representing virtually every segment of the wholesale energy chain, including utilities, producers, generators, marketers, end-users, and financial institutions, these vendors' costs soared. Their development organizations were focused on meeting the needs of new client signings for which new features or functionality had been promised; attempting to meet the demands of new versions of their development tools and databases, and correcting bug issues and other outstanding code problems.

Technical innovation in this environment proved extremely slow and in some cases impossible. While some vendors have successfully transitioned their code from two tier client server environments to new architectures based in java or .net, there are many that continue to struggle. Even the successes have had limited effect on changing the basic logical foundations of these systems, foundations that cannot take full advantage of the new technologies. Wholesale rewrites of the databases behind these applications would create the effect of stranding historical transactional information, and necessitating a virtual reimplementing of the applications. Vendors are well aware that clients faced with such a prospect would be likely to review their options in terms of changing vendors. Faced with a potential revolt in their client bases and the attendant loss of many, full scale ETRM vendors are, even today, forced into changes that are evolutionary at best.

Current State of the ETRM Market

Today's market for ETRM products can be divided into two categories, one representing the full spectrum ETRM product and another that is comprised of "specialists", companies that focus their development and sales efforts on a particular aspect of the ETRM value chain. These specialist vendors include those that provide energy trading centric solutions specific to risk management, gas scheduling, power scheduling, trader analytics, and credit risk management.

The full spectrum vendors provide solutions that can manage almost the entirety of the energy trading value chain, including contract management, deal capture, risk management, credit risk management, logistics, actualization, and accounting. The systems offered by these vendors are in many cases a mosaic of code, with separate code bases for functionality such as risk management and logistics. The vendors maintain the integration for these components and are able to successfully deploy them as a consolidated solution. Other vendors have created a monolithic code base, incorporating every key ETRM function into a singular code stream. While this practice has eliminated the need for maintaining integration touch points, it has created a very complex code base. Arguing the relative merit of either is moot; the real test for any of these vendors is in their ability to execute on their strategy.

In the late 1990's, with the entrance of the stand alone risk management systems that provided sophisticated analytics and valuation models, the larger buyers of ETRM systems started embracing the "best of breed" model, buying what they consider to be the best functional components, irrespective of the vendor. In doing so, they took the integration efforts upon themselves, spending millions of dollars in implementations that could last years. At this point, many looked to middleware vendors like Tibco to provide industry specific integration infrastructures through which they could tie the many disparate systems together. Unfortunately, these projects rarely yielded results in line with the original expectations, and for all but the largest companies, few could be considered successful by most measures.

Given this experience with attempting to create a "best of breed" solution, the market reverted to one in which the full spectrum vendors are again prospering. However, the market is still willing to support specialized products vendors if that vendor can demonstrate superior functionality and can elaborate a value proposition that is compelling enough to support what may be an expensive integration effort for the client. In order to facilitate more efficient integration, many vendors are

now offering xml or web services integration strategies, creating version stable API's for commonly used integration points.

Currently there are less than ten vendors servicing the wholesale trading markets that can rightfully claim to provide multi-commodity, physical/financial systems capable of meeting most of the requirement of a large energy trading operation. Of this limited number of vendors, there are 4 or 5 that are currently capturing about 80 percent of market for vendor supported systems. The remaining 20 percent of the value of the market is primarily associated with the specialized vendors, those that can, by demonstrating superior functionality, offset or compliment specific functional components in these larger full spectrum systems.

Today's market for ETRM systems is perhaps the most active it's ever been. New regulation, combined with sometimes extreme price volatility, has crystallized for many energy companies the need to ensure their systems are adequate to meet the demands of this market. Banks, hedge funds, and other financial institutions have entered the markets, trading virtually all energy commodities, both physical and financial, filling the void left with the collapse of the mega-merchants, like Enron and Dynegy. Liquidity and open positions on the exchanges are at all time highs, indicating that not only new players are in the energy markets, but the traditional players are taking larger positions and are more active in managing those positions.

Given the high profile losses associated with the failure of some hedge funds like Mother Rock and Amaranth, companies in the market are aware of increased scrutiny and are willing to make investments in infrastructure necessary to ensure they are in compliance not only with regulators, but also with the expectations of their shareholders.

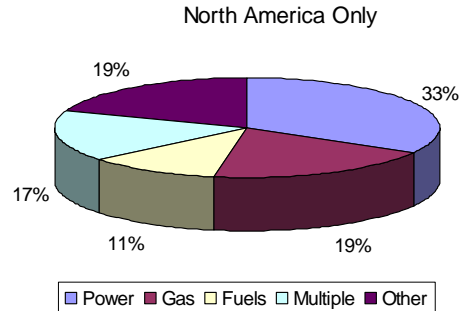
In 2006, UtiliPoint International tracked more than 40 deals for new systems in the North American market². The information was gleaned from public sources (press releases), "word on the street" sources, and from discussions with the vendors themselves. While it is certain that not every deal was tracked, as some ETRM clients are very strict about confidentiality, there is a high level of confidence that a high majority of the deals were captured.

An analysis of the transactions was conducted from the perspective "was the deal driven by a specific commodity?", even if the transaction involved multiple commodities. The goal was to identify commodity drivers in the market as a whole. A large number of deals done in 2006 included licenses for multiple commodities; in fact it appears that more than half of all deals involved more than a single energy product. There were still a large number of new licenses that involved only a single product, as there are a number of companies that do business around a single commodity (e.g. airline fuel purchases, a producer that markets only gas), or companies that have multiple legacy systems that are specific to individual commodities and are interfaced together. They may be comfortable with some portion of their overall internal systems (or are so heavily invested in that replacing them all is prohibitively expensive), yet they still have a need to address inadequacies around a specific commodity.

The analysis found the 2006 data is consistent with a trend established over the last several years (Figure 2). Power continues to drive most deals, with about a third of all ETRM purchases. Systems purchased to primarily support natural gas trading accounted for 19% of the deals identified. System purchases primarily for fuels management had what is probably the category's strongest year with about 11%. Crude, crude products, coal, NGL's, and LNG combined accounted for about 19% of the market for new systems. Deals where there was no discernable "lead" commodity accounted for about 17% of all deals reported. These were primarily purchases by merchants, banks, and hedge funds which actively trade in virtually every energy commodity.

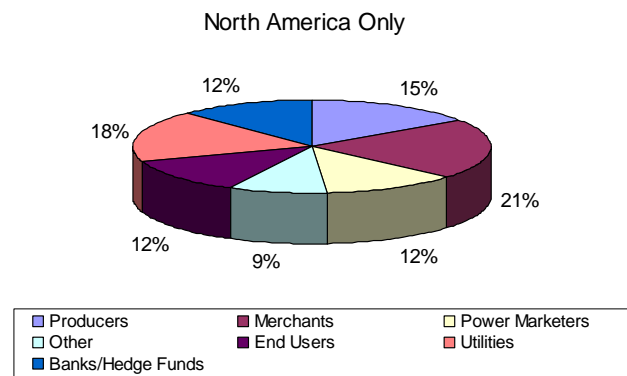
The year end analysis also looked at what entities were purchasing systems (Figure 2). In 2006, the merchant organizations, utilities and producers were the most active buyers in the market. Significant deals were also done with power marketers, end users, and refiner/distributors. Again, these buying patterns are on trend with what has observed over the last several years. One difference, however, is in the sheer number of deals done. Most of the vendors in the space, particularly the larger ones, reported that 2006 was a record sales year.

Figure 2: 2006 ETRM Deals by Commodity Type



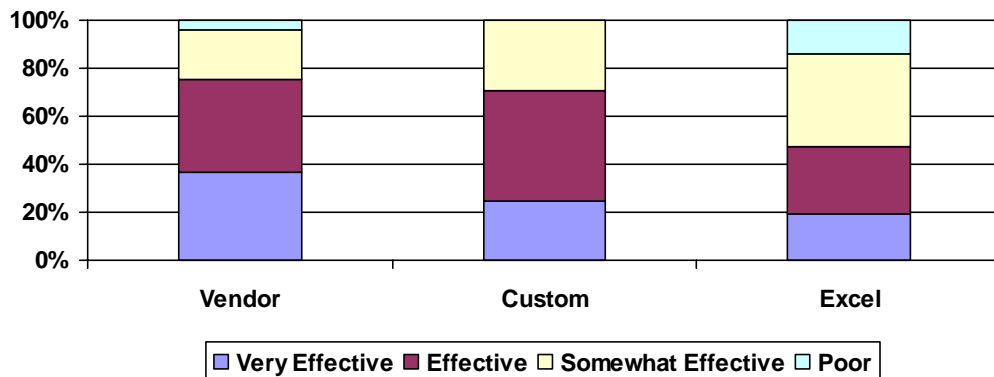
While record sales may indicate an active market, additional research by UtiliPoint indicates that the commercially available systems still fall short in terms of their being able to answer the entirety of the needs of the market place. A study completed last year, in which the company polled users of commercially supported ETRM solutions, indicated that for most multi-commodity trading organizations, even after implementation of the latest generation of ETRM systems, spreadsheets were still utilized to some degree in the information chain. While not reflecting broad failure on the part of the systems vendors, the result does indicate that some deficiencies exist.

Figure 3: 2006 ETRM Deals by Market Segment



Additional studies conducted by UtiliPoint point to some level of dissatisfaction with vendor supported systems, although those systems do have a higher level of satisfaction than the alternatives, such as custom developed systems or spreadsheets. In the 2005 Natural Gas Benchmarking Study³, almost 30% of users of vendor systems reported they felt the systems were not fully effective in managing their business (Figure 3).

Figure 3: Effectiveness by Type of Solution



So, despite the sales success of the vendors in today's market, indications are that they are failing to meet the all the needs of the market. This failure can be attributed to several factors.

The most widely accepted measure of success for any software company is new license sales. As these companies seek out new clients, there has been a historical willingness to commit to development of new features or functionality to attract new clients, even if that committed feature or function is not a requirement of their broader client base. This is not to say that most are willing to do pure customization of their core code, but they will include additional features for a relatively minor segment of the market if they feel that segment will provide some new sales. This type of development activity can come at the expense of changes and/or upgrades that are requested by the majority of the vendors' clients. Additional development pressures come from changes needed to maintain clients' compliance with regulatory mandates, such as development of functionality that was required in order to ensure compliance with Sarbanes Oxley legislation.

In virtually every case, new functionality is an expansion of code. Feature and functions are added, but rarely are elements removed from the code. The experience of the industry has been that if you provide a feature to a client, they will find some use for it, even if it's not its original intended purpose. Removing any of these features will create client issues and endanger the support and maintenance revenue stream for the vendor. It is this prospect of client losses that has prevented ETRM vendors from being able to leverage the latest technologies and bring true innovation to the wholesale energy trading market.

Difficulty in Driving Innovation in the ETRM Market

Vendors of ETRM systems are faced with a difficult balancing act. Technology advances create expectations in the market that software products should leverage the best available technologies. However, given the breadth and depth of functionality of ETRM systems, driving technology innovation can be extremely difficult, time consuming, and expensive.

As previously noted, vendors are constantly forced to allocate limited resource to meet the demands of various stake holders. Stockholders expectations, even in privately held corporations, are that any enterprise should demonstrate growth. For traditional software companies, of which most ETRM vendors can be considered, growth is best demonstrated by year over year increases in license revenue. However, an additional component of an ETRM vendor's revenue stream is support and maintenance payments derived from their base of licensed users. Most vendors in this market will charge an annual support and maintenance fee equivalent to 18% of the list license fee. As their client base grows, this revenue becomes a very significant part of their overall revenue structure. A loss of any client can represent a significant impact to the company's bottom line, particularly in a market place of limited size such as this one (according to UtiliPoint estimates, total license sales for ETRM systems is estimated to \$105 million in 2007).

As the client base grows, so do the demands placed upon the vendors support staff and development organization. Code issues and functional deficiencies become more obvious and more urgent with an increase in users. Additionally, many clients will not stay current with the vendor release cycle, despite contractual obligations to do so. Unfortunately, for many vendors, past releases were of poor quality, leading clients to decline to take new release and demand that they be supported on their installed version. In doing so, they are forcing vendors to keep open code streams that should have been closed and brought forward to the latest version releases. There have been very recent instances of vendors supporting more than 6 versions of the same product, running on two different databases, creating more than a dozen versions of a single product that must be managed. In these types of instances, the costs of providing level two support can be enormous and draw down the ability of the vendor to dedicate development resources to bring innovation to the product.

However, even if a vendor had no constraints on development resources, re-architecting an ETRM system to take true advantage of technology improvements can be a daunting task. Again, due to 1) the complexity of the applications and the scope of the business processes they represent and 2) the evolutionary development that has occurred for most of these products, the underlying data structures are not fully optimized in order to advantage of the new technologies.

While some vendors have been able to move parts of their systems forward to a .net or java environment, they have been limited to making less than wholesale changes to the structure of the database. If they were to do so, they would lose the ability to programmatically move their clients forward from version to version, requiring that those clients essentially re-implement the new product. Given the costs in terms of dollars and time of a full blown implementation effort (which can reach over a million dollars and require more than a year of effort), any client faced with such a prospect would most likely start to review their options to 1) commit to the costly implementation effort, 2) refuse to move and demand support on the current version, or 3) seek out a new vendor. As a software vendor, unless you can create an extremely compelling value proposition, you're going to have extreme difficulty convincing the client that the benefit of a technology change will be worth the effort, particularly as the first release under that new architecture would probably be at best equivalent to the old version in terms of functionality.

Given these harsh realities, and as mentioned previously, ETRM software vendors are generally consigned to making step changes, utilizing limited development resources to make incremental improvements in technology while working to ensure they retain their client base by not creating product upgrade cycles that are too costly for the clients to manage.

Despite the difficulties faced by many ETRM vendors, many of the systems available today are actually quite effective and do provide significant functionality improvements over previous product generations. Those vendors that have proven successful over the long term have been able to overcome, to some extent, the inherent issues faced in servicing energy trading.

In some cases the vendors were able to enter the market with a product from the financial services markets, making their first offering somewhat innovative from the outset, not having been tied to the "traditional" physical natural gas model that so many of the incumbent vendors were struggling with, a model that while effective for that particular market segment, constrained the developers and forced them into making compromises as they tried to expand their products to meet the needs of the broader market. In fact two of the top four "full spectrum" ETRM vendors, those that provide multi-commodity, physical/financial systems capable of managing transactions from contract initiation through logistics through invoicing, entered the energy trading markets after having success in the financial markets.

Other innovators, such as SAS/RiskAdvisory, began producing products that serviced one of the specific segments of the energy trading value chain, and have maintained that focus, growing by expanding their markets horizontally, and again in the case of RiskAdvisory, seeking partnering or M & A opportunities to leverage their expertise in the market and expand their presence outside of their original niche.

What is the Current State of the Art for ETRM Systems?

If you examine the products offered by the market leaders, both "full spectrum" and those that specialize in a functional area, you can identify certain traits that have made them successful. While no vendor's product leads the market in each of these traits, they have deployed products that demonstrate some degree of innovation.

Taken together, these traits indicate that the market leaders, while still constrained in their ability to make wholesale changes to their products, have been able to address both functional and technological advances in products.

▲ Front to Back Office integration

For the companies that provide "full spectrum" transaction processing, being able to seamlessly pass data and information through their systems without intervention is a key to delivering an effective operational system. As more energy trading companies are involved in the financial energy markets, timeliness of data becomes the difference between profit and loss. Decisions must be made in real-time,

decisions that require the market feedback instantaneously, not after a process is run or a spreadsheet is up-loaded.

This requirement is also known as straight thru processing. Applications serving the value chain do not necessarily have to be supplied by a single vendor; however they must provide integration strategies that support real-time integration with other products in the chain.

Many of the leading vendors in the ETRM market are now offering products based upon a .Net or Java platform, technologies that offer more promise in achieving true straight thru processing.

▲ **Physical and Financial Capable**

With the continuing evolution of the energy markets, including the increased access and liquidity in the energy futures markets, most physical market participants are involved, at a minimum, in hedging strategies to limit their exposures to price volatility. Other traditionally financial oriented companies, such as banks and hedge funds are increasingly taking physical positions and require the tools of the physical markets.

Regulation of the industry is also forcing innovation in ETRM systems as it concerns financial products. FAS 133 establishes rules for the accounting treatment of hedges, forcing ETRM product vendors to create functionality that reflects these new accounting pronouncements.

Vendors in the market must provide, at a minimum, the ability to capture these transactions and provide methods for appropriate accounting, or again minimally, provide stable and open integration points that facilitate the use of add on tools to properly value them.

The leaders in the market generally include sophisticated futures valuation tools, like value at risk, profit at risk, and stress testing, for managing financial transactions.

▲ **Support for Global Operations**

As global markets become more integrated, energy trading companies are seeking out new opportunities in markets outside of the North America. Even within the North American market, differences in currencies and units of measure occur between the US and Canada.

ETRM products must provide the functionality necessary for energy companies to engage in cross border trading. Additionally, given the currency market fluctuations that have been occurring in the last several years, FX management is becoming more important.

Some vendors have also chosen to offer their products into the growing European and Asian markets. While some commonality does exist between these markets and North America, these emerging wholesale energy markets are less mature and do require increased system flexibility in order to model these markets appropriately.

▲ **Multi-Commodity Management and Consolidation**

The FERC, in their most recent report, *2006 State of the Energy Markets Report*⁴, noted growing market linkages among energy commodities, primarily natural gas and power, and natural gas and crude oil. These noted linkages are partially a result of increased cross commodity trading within the wholesale energy market. The large merchants, banks, hedge funds and marketers, are increasingly seeking arbitrage opportunities across the commodity spectrum. Additionally, utilities are more actively

managing their fuel supplies, taking advantage of market price opportunities and volatilities.

For these companies that are involved in multi-commodity trading it's important to not only capture deals across the commodity spectrum, it's also necessary to see their consolidated position, both physical and financial. As energy commodity prices can show extreme intraday volatility, each commodity must be treated as a component of a larger portfolio and be visible to the trader.

Providing a consolidated physical and financial view has proven for many vendors, even the largest, difficult to achieve.

▲ **New Architecture(s)**

Client-server technology still dominates the market for ETRM products. Many of the leading vendors in the market still rely upon this architecture as the core of their product set. However, virtually all have acknowledged the shift to more open technologies, such as .Net or Java, and are creating components that take advantage of these technologies.

The ETRM market is definitely moving toward those new technologies, but as previously discussed, the inability of their client base to accept broad structural changes has limited this movement to step changes and very few vendors have been able to achieve wholesale adoption of the technologies.

As the ETRM vendors evolve toward the new platforms, opportunities will present themselves to create a more componentized architecture, allowing products to be maintained and delivered as components, reflecting specific business functionality, such as contract management, deal capture, scheduling or accounting. Utilizing a componentized architecture will enable vendors to better manage their code base, and for clients, will limit the impact of version upgrades and allow them to better match the vendor offering with their requirements for functionality. While most vendors advertise componentized architectures, they will also acknowledge that they are continuing to evolve from interfaced modules to one that allows true "plug and play" implementation of functionality.

ASP delivery for products is gaining adoption in the market. Despite early concerns around security of highly confidential information, ASP products have developed a following in the ETRM market. Most of the successful ASP models are those that deliver specific functionality, such as risk management tools or applications for power scheduling into RTO's or ISO's.

Small to medium size companies have been particularly accepting of the ASP model, as it limits their internal support costs and allows them to acquire sophisticated functionality at a lower initial cost.

▲ **Business Intelligence**

All vendors of ETRM products have acknowledged the necessity of providing, at a minimum, the facility for integrating third-party analytics into their products. Among the leaders, some are developing and providing the analytic tools themselves, while other have provided, in cooperation with other vendors, the ability to "plug in" third party tools into their systems.

Clearly, for a "full spectrum" ETRM provider, it is not required that they provide these tools themselves, however, it is necessary to provide the stable integration points for enabling their client to work with other vendors in order to have access to the analytics required to effectively compete in this market.

▲ Good Workflow Management

A growing trend in ETRM software is the ability to provide configurability to individual users, allowing those users to create screen views that help them to do their jobs more effectively.

While the level of configurability and flexibility varies greatly among the vendors, and at best is limited in its ability to adjust the workflows inherent in the underlying product, it does portend the potential that in the not too distant future, “packaged” ETRM products can provide levels of customization that allow each client to create an environment that mirrors their processes and requirements, and limits or eliminates the necessity to adjust any business process to meet system processes.

▲ Comprehensive Reporting

The early generation of ETRM systems provided a set number of “canned” reports. Any additional reports that users needed required the vendor to develop a custom report. Some vendors bundled a Crystal Reports runtime with their products, allowing clients to develop their own. However, the ability to create ad hoc reports was nonexistent in these early versions.

Today, the leading vendors have acknowledged this short coming and instead of trying to anticipate user needs for reports, have developed and provided (either as core component or an licensed module) robust ad-hoc reporting and query engines. The best of these tools allow non-technical users to generate, in real time, complex reports drawing information from historical and/or cross functional sources.

Additionally, for systems supporting utilities and other regulated businesses, many vendors do provide and maintain preconfigured reports required by regulatory entities.

▲ Solid Integration methodologies

As an overriding theme of this paper, integration is perhaps the most vital factor in determining success for any client. In this current wholesale energy market, silos of information, loosely coupled or integrated through manual processes can lead to poor decision making and in turn to huge financial losses.

Complex integration infrastructures, while functional once completed, can limit the ability of a client to remain current with required new functionality, as the effort associated with rewriting “spaghetti” code with each new product release can be overwhelmingly costly and time consuming.

The “best” solutions available in ETRM products today provide version stable API's, utilizing web services and Service Oriented Architectures (SOA's) as communication conducts both into and out of their products.

▲ Comprehensive Controls

Sarbanes Oxley legislation has driven a significant amount of development for ETRM vendors in the last 3 years. Security and auditability issues had to be met within the systems in order for clients to be in compliance with regulations. The leading vendors have all been able to at least minimally meet the new requirements; however, some have leveraged their experiences in the financial markets to provide audit functions that go beyond just meeting current requirements.

Counter party credit, post Enron, has also become a focus area for users in this market. Given the huge exposures created by even “small” transactions, it is vitally important that systems provide credit support in the decision making process. Again

the leading systems on the market can at a minimum provide notification of potential credit violations; however a few vendors are providing additional functionality around true credit risk management.

What is the Future of ETRM Software?

Many ETRM vendors have migrated, or are in the process of migrating, at least some portion of their application architectures from a client/server model to n-tier and a service oriented architectures (SOA). Although the chosen architectures differ from vendor-to-vendor, the impact is somewhat the same. The new architectures are allowing vendors to deliver solutions that are more flexible, configurable, and scalable, while also providing significantly improved connectivity via web services for example. These new architectures are set to have a broad impact on the industry.

The benefits for the end user and the developer of these recently available architectures are substantial but perhaps, most importantly, they provide the built-in connectivity that allows the integration issues to be solved. In effect, the new architectures being deployed by the ETRM vendors provide many of the following benefits;

- Provide connectivity that allows integration with enterprise applications, external data feeds and applications and provides the basis for constructing a true best in class suite of fully integrated ETRM applications;
- Enhances scalability of the ETRM software through the easy addition of additional processing power;
- Provides the basis for the addition of workflow and business process management tools, audit and document management capabilities;
- Allows for enhanced reporting functionality via the addition of a reporting application or using the vendors own reporting capabilities. Some of the vendors are now offering drill-down reporting complete with graphing and mapping features;
- Provides the vendor the opportunity to build in more configurability allowing the package to be customized for each users particular environment and culture thereby enhancing implementation success rates and allowing the vendor to pursue a traditional software vendor business model more easily;
- Enhances the vendor's ability to keep up with industry change by allowing them to break the application up into smaller modules of more discrete functionality;
- Enhances the support and maintainability of the ETRM application.

There are many additional benefits of these architectures including the ability to build data marts and data warehouses from which to perform more analysis.

As vendors migrate their current applications to these new architectures and platforms, they will be able to serve their users with more flexible, usable and customizable but supported third-party software. However, the implication of this migration is that the dichotomy of requirements described above can be met with best in class ETRM software suites from a single or multiple vendors. The lack of integration and the risks inherent with that lack of integration seen among marketers and utilities today can potentially be resolved.

CONCLUSION

Participants in the wholesale energy markets are operating in an ever increasingly complex environment. Growing interdependencies among energy commodities, combined with high prices and high volatility, create significant profit opportunities, but carry equivalent risks.

For these traders and marketers, timely, complete, and comprehensive information will ultimately determine success or failure. ETRM products can be the locus of the trader's information

universe, consolidating not only historical information, but also capturing current activity, market intelligence and logistical information (such as transportation disruptions). When combined with sophisticated risk management and forecasting tools, the best systems can go beyond being a system of record to one that can actually create value for the enterprise.

However, to achieve this level of integration into the enterprise, product vendors must continue their march toward full adoption of new product architectures and technologies that provide solid, stable and intelligent integration points that their clients can use to create a holistic view of their enterprise. However, clients also have a responsibility to support their chosen vendors through active participation in user groups, providing feedback, advice, and support on future development.

REFERENCES

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RECOMMENDED READING

Trends in Energy Trading and Risk Management Software - A Primer

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