Article Title: ARCHIVE | Criteria | Corporates | Utilities: Analyzing Energy Trading And Marketing Firms' Credit Quality Data: (EDITOR'S NOTE: —This criteria article is no longer current. It has been superseded by the articles, "Analyzing The Liquidity Adequacy Of U.S. Energy Marketing And Trading Operations," published May 4, 2004, and "S&P; Completes Initial 'PIM' Risk Management Review For Selected U.S. Energy Management Companies," published May 29, 2007.) Deregulation of the energy/utility industry has brought significant opportunity and risks to the business entities competing in these markets. Energy trading and marketing firms face a continuous challenge to mitigate risks in this environment, as their business strength, areas of operations, and, ultimately, their business strategies evolve or change. The broad areas of Standard & Poor's analysis of energy trading firms are commercial position, risk management framework, and financial risk and performance. The latter also includes the firm's capital structure and financial liquidity. Commercial Position Standard & Poor's analysis of an energy marketer's commercial position contains some fundamental areas similar to traditional utility analysis, yet tailored to a marketer. These areas are market presence and diversity, supply access and physical liquidity, and competitiveness, including operating costs, product pricing, and diversity. The industry's general business risk is high, given significant commodity pricing risk and expectations that marketers will speculate, hold unhedged positions, and use their market intelligence to arbitrage. Moreover, irrational competition, where new competitors enter markets, is creating greater price and volume volatility. The typical top-tier energy marketer has qualitative attributes that are only marginally investment grade because of the volatile nature of the commodities in the business. Given all this, the average energy marketer's credit quality assessment is at the low 'BB' category. Energy marketers of higher credit quality not only provide the commodity, but also sell the optionality and reliability of their service. These firms have leading national market positions, diversity in most aspects of the business, advantages as low-cost providers, expertise in using and selling financial derivatives, and substantial physical liquidity. Market presence. A firm's market presence, the size of the operation, and its share of sales within markets are important because there are informational economies of scale in marketing. Being at the center of the flow of data is crucial to knowing the direction of the market in the very short term. Greater size is a positive credit factor because larger players gain more product liquidity and added knowledge of many different transactions. A fluid ability to move a commodity gives marketers a better opportunity to act on sales prospects, and creates a more accurate forward pricing curve. Smaller firms do not generally have these informational economies, and, as the market has witnessed, can be whipsawed in a changing market. Size can be related either to sales or by the number of known active client accounts--the number of sales contracts, sales and purchase counterparties, or master swap agreements. Knowledge of a marketer's counterparties and sales contracts (including options contracts and whether these are at fixed or indexed prices) will help Standard & Poor's gauge the stability of a marketer's presence. That is, it will help when evaluating a marketer's ability to access a commodity and make a sale. The benefit of diversity is to moderate demand swings due to regional weather patterns and other regional supply/demand mechanics. The better-managed marketers are able to take advantage of these swings and focus daily trading efforts in regions where demand is high. Standard & Poor's recognizes that different management teams will have different tolerances toward long- and short-term transactions. A marketing firm that relies on daily trading activities for most of its revenues may be more at risk for generating sales than an entity with more long-term firm contrasts in hand. Yet, there are greater price risks with long-term sales. Although there are other factors to consider--such as daily supply access, customer reliance on the marketer, the marketer's reliability reputation, and price risk controls--Standard & Poor's believes that a more balanced sales approach (between long- and short-term sales) leads to better credit quality. Diversity. Another important feature of the higher-quality energy marketers is strong diversity and reliability of products and services. These companies should be able to provide either natural gas or electric power any time, anywhere, and at fixed or variable prices and volumes. It is important to understand that a marketer's customers are both the buyer and the seller of a commodity because the marketer provides services for both parties. A key to a successful energy marketing operation is delivering exactly what the customer wants and needs: the buyer wants reliable supply, volume flexibility, price flexibility, and predictability; and the seller wants a reliable outlet for the commodity and price risk management. The high-quality marketers do not have to provide all products and services to be successful. Yet, marketers

should be highly flexible and effectively deliver product at a profitable level. To be that reliable, an energy marketer will need to be able to access natural gas and electric power at will. A savvy marketer also will be able to arbitrage each fuel, which takes extensive knowledge of the supply and demand curves in all markets. If a marketer relies on futures contracts to make actual deliveries of a commodity, it must have strong financial liquidity. This reflects that most futures contract expirations result in financial settlements (not commodity deliveries), usually because the delivery location under the contract is not where the customer needs the commodity. In these cases, the marketer settles the futures contract (making a profit or a loss) and purchases the commodity in the spot market for the customer. If contracted correctly, the marketer should be indifferent to using the futures contract for delivery or as a pricing hedge, but it still needs the financial liquidity to close the deal. Asset control. Given the demands and reliability requirements faced by an energy marketer, the company must be able to access a geographically diverse supply of natural gas, electric power, and other fuels, as well as transmission storage and peaking facilities. These assets are the physical liquidity of an energy marketer. The quality of these assets and the control a company exercises over them are critical drivers behind Standard & Poor's evaluation of an energy trader's business profile and credit rating. Quality relates to the cost structure, size, and location, while control reflects ownership and contractual commitment, or lack thereof. Similar to the buy-versus-build debate in the electric utility industry, there are different issues depending on whether facilities are owned or rented. An energy marketer would have more control over a commodity if it owned gas reserves, gas storage, generation plants, electric wires, or gas pipelines. However, it would have the risk and responsibility to operate those facilities, and Standard & Poor's incorporates these factors into analyzing the credit quality at energy trading and marketing firms. Rented assets, such as purchased-power and gas contracts, tolling agreements, and commitments to use transmission or storage capacity offer less control over the commodity, but have no operational risks. However, there is credit risk; that is, the risk that a supplier will default on its obligation to deliver the commodity. Standard & Poor's will carefully evaluate the quality of a marketer's supply sources. For example, the quality of a source would be the type of generator (nuclear versus burning gas versus hydropower). A marketer that has dedicated access to a producer's gas or a generator's power may have even less risk than owning reserves or contracting for them, but is not fully without risk because the use of gas and generation can be constrained by pipeline or transmission line capacity. An example is where major gas producers buy an equity stake in a marketer and dedicated supply to the effort. These scenarios are healthy for credit quality, given the large amount of gas reserves involved and the friendly market-sensitive pricing arrangements. A less positive situation would occur if the producer had a weak business or financial position, such that delivery or price of supplies could be in question. In the renting scenario, Standard & Poor's would consider the monthly demand payments under certain contractual arrangements (take-or-pay contracts to purchase commodities, tolling, transmission, and storage) to be off-balance-sheet debts (defined as the net present value of the future obligations). Standard & Poor's analysis of these obligations will develop as energy trading firms adopt Financial Accounting Standard 133. This standard obligates companies to use mark-to-market accounting and record certain contractual arrangements as assets or liabilities at fair value. From a credit standpoint, an energy marketer with a high level of physical liquidity should offer greater delivery reliability. However, it may also reflect inefficiency. Contrary to regulated utilities that built assets to serve the peak needs of a franchised territory, energy marketers are expected to use physical assets more efficiently over a much larger service area. In fact, Standard & Poor's believes there can be a multiplier effect for marketers that own or control gas supply and power generation. A marketer should be able to sell many times more commodity than it owns or controls if it uses its counterparty network effectively, and leverages the use of financial derivatives (i.e., swaps, options, futures, and forward sales contracts), the liquidity of its assets, and the liquidity of the market. For example, gas reserves are highly liquid because they can be sold virtually anywhere in North America. A well-informed marketer would follow the weather patterns and the gas demands across the country, and sell a maximum amount of gas in the highest-premium markets. These firms should also recognize the relative liquidity of supplies--thus the relative values for commodities. This is important in gas trading because reserves in different regions sell for different prices (basis risk). Marketers without these skills will not use their own assets efficiently. In addition, the better-positioned players will have a

strong ability to acquire supplies in the spot market to take advantage of demand and price swings. This is substantially more important in the electric power marketing business because most sales are on an hourly or day-ahead basis. This alone makes power marketing far more difficult than natural gas marketing. Although Standard & Poor's generally views the presence of hard assets favorably, the only way to measure a marketer's skill at generating sales is through performance. If a marketer proves it can create more sales with less assets, then credit will be given in the analysis. Standard & Poor's believes only the largest marketers, with the greatest number of clients, are able to make this claim. Furthermore, marketers benefit from having a large number of traders with good counterparty relations. Traders are an energy trading company's greatest asset. The depth of their experience, their ability to trade physical and financial products, and their ability to source trading information are all critical factors in an energy trading firm's competitive position. Supply access and physical liquidity. An energy marketer's competitiveness is driven by the diversity, reputation, reliability, and market share of its products and services. A marketer with a high level of physical liquidity offers greater delivery reliability, which is related to a marketer's competitiveness. This is measured by more than just costs and prices. Standard & Poor's combines all the areas to evaluate the ability to succeed in marketing. Yet, like any other product for sale, price also matters. Pricing tends to have two components: the cost to acquire and deliver the commodity and the marketer's overhead costs. Standard & Poor's tracks both components, but given the competitive nature of the business, these confidential numbers may never be publicized. The hourly, daily, monthly, or long-term commodity price is usually based on the bid and the ask along a market-based forward pricing curve, where the marketer buys at the bid and sells at the ask. When the marketer is a true middleman in this transaction, it earns a "profit" on the difference between the bid and the ask. Theoretically, most trading and marketing firms' forward pricing curve will be similar to the market's curve, as all marketers should be reading all the same public information and talking with the same counterparties. However, a mismarked curve can occur if a marketer is unfamiliar with the market's load shape, or lacks a substantial counterparty base in a region, and thus does not share in all the pricing information. Firms that arrange long-dated deals beyond the known market forward price curve (usually one to three years) must commit to conservative prices. Usually this is based on forecasts of marginal costs to produce a commodity; a reserve should be established in case the market shifts against the marketer's position. Competitive pricing also will reflect a marketer's operating costs, which can vary depending on the cost to produce power or gas from owned facilities or the fixed cost of long-term gas and purchased-power contracts. Presumably, in either case, larger marketers can receive better bulk prices than smaller players. Yet, this is not always the case--a stronger competitor will be able to achieve wider bid/ask spreads. The more sophisticated players that take advantage of demand swings and efficiently use physical assets and client relationships should earn the better profit margins. Overhead costs eat into profit margins, so marketers that stay lean and efficient will be more price competitive--if overhead costs are low, a marketer may be able to discount more. Standard & Poor's will examine a marketer's overhead costs related to personnel, technology, office space, taxes, debt servicing, and cash dividends. Lastly, traders are an energy trading company's greatest asset to maintain competitiveness. The depth of their experience, their ability to trade both physical and financial products, and their ability to source trading information are all critical factors in an energy trading firm's competitive position. Risk Management Standard & Poor's analysis of energy trading and marketing operations continues to focus on three main areas: risk management operations, commercial position, and financial risk and performance. The cornerstone of a successful energy trading business is its risk-management operations. Standard & Poor's analysis of risk management concentrates on management oversight of the trading business, tolerance of risk, credit policies, and the systems used to control the process. In-depth analysis of these areas helps determine a marketer's ability to succeed. Standard & Poor's considers sophisticated risk-control systems a prerequisite to investment-grade credit quality. Management oversight starts at the top. Close monitoring of trading operations by senior executives, the board of directors, and senior officers of the trading firm's parent company (if applicable) is viewed as a critical component of managing risk. It is important that top management considers what constitutes an acceptable loss and communicates that loss tolerance via words and deeds throughout the organization. Management must mandate strict guidelines for controlling traded commodities, value-at-risk (VAR) limits, accounting procedures, and counterparty

credit policies. Management should set precise guidelines defining which commodities will be allowed in the firm's portfolio, which the senior management should be familiar with, and the level of expertise and resources required on the trading floor. Standard & Poor's believes a conservative VAR calculation, a method used to determine the potential loss that a portfolio can incur, will account for all the "Greeks," i.e., the calculation should include such parameters as price change (delta), pricing curve convexity or concavity (gamma), price volatility (vega), and the speed of time decay for option premiums (theta). Management should also implement conservative accounting methods, such as mark-to-market, that will reveal the current market value of a portfolio and enable management to devise an appropriate strategy to lay off risk. Counterparty credit policies should set appropriate credit levels, not only in dollar values, but also in limits on commodity volumes. These limits should be checked regularly, optimally after each trade. The firm's reporting structure for maintaining order and controlling risk is important to a successful operation. The board of directors should institute a hierarchy in which committees, such as a risk management and control committee, establish and recommend updates to risk-management policy. This committee should also review and recommend modifications to VAR methodologies and limits. A separate credit committee should develop and maintain board-approved credit policies, report any incidents of noncompliance, exposure to counterparties, the use of parent guarantees, and anything else relevant to managing credit risk. A structure with independent committees for risk management and credit limits is prudent, especially when both will report separately to the executive committee or the board of directors. An executive committee should participate in limiting monetary loss, positioning credit exposures, and approving the systems and procedures used for valuing and marking complex structured transactions. Furthermore, Standard & Poor's encourages continual, independent, third-party audits by major accounting and consulting firms. Standard & Poor's analysis scrutinizes the firm's management by examining a variety of criteria, including the level of risk management background, knowledge of trading, and familiarity with derivative products. The track record is very important. Marketing firms may suffer from outsized or extended trading losses, control lapses, or fraud at one time or another. Standard & Poor's examines these instances to understand a firm's risk tolerance and the gravity with which management handles violations of limits and policies. Standard & Poor's also considers: Whether top management has a background in managing market risk; Whether management understands the risks of using financial derivatives and the necessary funding requirements; Whether day-to-day funding needs are actively monitored; The extent and frequency of performance and trading limit review by a firm's governing body; and What top management does to ensure that proper controls are in place before marketing new products. Risk tolerance: managing market risk. In addition to management oversight, a key concern of risk management operations is risk tolerance, which includes market risk management and valuation. Standard & Poor's recognizes the broad spectrum of risk tolerance in the energy marketing industry. Some organizations view themselves as being capable of providing every product to every customer, while many others are niche players. The risk in both approaches relates to how well a firm manages its open (unhedged) positions in a commodity; that is, its long or short position in volume, price, or location. Most companies claim to maintain balanced books, but in reality, this is impossible unless the traders conduct simultaneous and identical back-to-back buys and sells. Every marketer has open positions at the end of every day. A firm's risk tolerance relates to how large the open position is and the strategies for how to use those positions. Generally, many top-tier marketers try to maintain open positions of about 2% of their daily books of business. Smaller players with less financial liquidity should have less than that. Market risk tolerance can be measured by how a firm mitigates its open position. For example, a more conservative company will purchase financial derivatives from other marketers or financial institutions at the end of the day to effectively balance out all open positions. Although this adds a cost to operations, it can reduce volatility if done correctly. A less conservative firm will focus on making physical transactions the next day that balance the portfolios. In these cases, added expenses are not incurred, but true balancing never really occurs because this activity is continual. More aggressive players use their market intelligence to project the direction of prices or volumes in different regions to manage accordingly (arbitrage) their open positions to earn more money. Clearly, this activity can result in losses if market information is poor or if management's interpretation of that information is wrong. This is why the monitoring of daily, monthly, quarterly, and

annual earnings results is so important. Standard & Poor's believes only the biggest marketers--with a great number of counterparties, a large trading operation, and sophisticated modeling systems--will be successful in these activities. These tactics are generally related to a firm's view of market-making and physical deliveries. Most firms engage primarily in physical deliveries and arbitrage trading strategies backed by a strong ability to access energy commodities. Standard & Poor's believes the larger marketing companies will grow by offering market-making services using risk-management products (swaps, options, futures, and forward sales contracts) to customers in tandem with own-account trading. Although market-making can be viewed as riskier than physical deliveries, both have major risks if not managed properly. The risk in market-making is selling or buying a product assuming the commodity will be available to buy (or sell) at a profitable price. Marketers expect an efficient and abundant spot market to always support this effort. Although natural gas and electric power supplies are expected to remain abundant for many years, market-making can be a stable source of trading revenue if the organization is large and has a substantial number of counterparties from which to buy and sell commodities. The risks of physical deliveries and arbitrage are the carrying cost of assets to sell and assuming there will be buyers willing to pay prices that are profitable to the marketer. Firms with low-cost or market-sensitive access to commodities and a firm customer base may offset some risks. Again, a large number of counterparties in diverse regions enhances the ability to move products efficiently or to arbitrage. Sometimes, it can be difficult to distinguish between the risks of the two activities, particularly if a firm conducts both. More important is a firm's risk appetite, especially when markets become illiquid. A heightened willingness to take risk (hold open positions) can send a message to traders, making it critical that the firm clearly make traders accountable for the risks they take, whether market, credit, or operational. Standard & Poor's endeavors to understand a firm's trading philosophy and whether the instruments traded are consistent with the company's customer base. Information helpful in understanding a firm's risk tolerance and how it manages that risk includes: Volatility of profits and losses, particularly incidences of large, one-day trading losses or gains; Number and types of customers or counterparties; Transactions with affiliates; Average credit rating of all counterparties and any concentrations; Average length of transactions; Instruments traded, whether they are consistent with the firm's risk appetite and strategy, and how liquid, volatile, and hedgeable they are; How new products are evaluated; Unacceptable losses to the firm and whether the firm has a clear picture of its loss tolerance; Hedging policies followed and what management considers hedgeable risks; Arbitrage trading strategies; and The firm's competitive advantages, if any. Valuation is a key element. Market risk management is one element of the analysis of risk tolerance at energy trading firms, but management also needs to know the actual market value of its portfolio and the amount the firm could lose given a sudden change in market conditions. To satisfy the first condition, management should implement conservative accounting methods, such as mark-to-market, which reveals the current market value of a portfolio, reports the daily change in the value of the trading portfolio, and allows management to devise an appropriate strategy to lay off risk. To help measure market price risk, trading limits should be correlated to the VAR. VAR is a quantitative method used to determine the potential loss that a portfolio can incur. Standard & Poor's encourages the use of VAR models, but not as an absolute dollar measure of market risk (because firms calculate VAR differently and use different assumptions for the time it takes to liquidate the trading portfolio). Firms that assume one- or two-day closeout periods may not be incorporating the right amount of time, especially as market liquidity tends to dry up in times of stress. In addition, most VAR model results are calculated to within a 95% confidence level, meaning the calculation covers two standard deviations from the mean value of the portfolio. Stated another way, there is a 95% probability that any change in the portfolio for the period used will not exceed a specific value. However, this also means there is a 5% chance that something may occur that could exceed a firm's risk limit. VAR models are tricky because of the incredible number of parameters to consider for an accurate assessment, such as price, location, transportation costs and capacity, and optional commitments. Standard & Poor's believes that any marketer using unsophisticated or partial VAR models is fooling itself and may be surprised by large losses. Keeping this in mind, Standard & Poor's views VAR more as a good management tool to measure the change in market risk from one period to another, not the market risk itself. While some technical systems can use a number of approaches to determining VAR, such as correlation method,

historical simulation, Monte Carlo simulation, or some other methodology, it is equally important how management reacts to and uses this information. In addition, the VAR calculation should be frequently monitored and estimated, as well as disaggregated into such different components as commodity, length of contracts, and regional exposure. Standard & Poor's prefers to review the daily profits and losses measured against the VAR results. Strong marketers should be able to withstand extraordinary events in the marketplace. This means remaining fully operational and with adequate financial liquidity during events not comprehended in the VAR calculations. Market price risk can also be controlled by setting volumetric limits at individual traders, by commodity, by tenor, by region, and by type of exposure. Option risk exposure limits, such as vega (or volatility) limits by commodity and tenor, should also be set. Price and volatility stress tests should be run daily in the summer months for power and in the winter months for natural gas. Shock testing can run less frequently, but trading and marketing firms should have this capability. Importantly, all valuation models and methods must be consistently validated and tested. Firms that employ an experienced quantitative staff to perform these tests are apt to be more successful over the long term. Credit policy's role in managing risk. A successful energy marketing company manages risk by skillfully managing assets and liabilities, and by developing sound credit procedures to protect itself from nonperformance on a counterparty's behalf. Over-the-counter transactions with specific counterparties constitute a significant portion of the business of energy marketing firms. Energy trading, as opposed to financial market trading, involves physical delivery of the commodity. Moreover, power has additional complexities of being nonstorable and transmission-constrained. These characteristics can result in electricity pricing volatility, as reflected by power prices rising as high as $7,000 per megawatt hour (MWh) and several contract defaults during the summers of 1998 and 1999. This pricing fluctuation, coupled with the weak capital structure that is typical of most marketers, makes it necessary to scrutinize each counterparty's credit profile. Exposure to credit risk is controlled by setting standards and limiting explicit dollar trading limits by counterparty, commodity, tenor, and region, along with explicit volumetric limits by the same variables, especially for counterparties with lower credit ratings. Fundamental to assigning dollar limits to trading accounts is the underlying methodology, or the benchmarks used to determine the level of exposure. There is a broad spectrum of policies, each with its own degree of risks. Standard & Poor's views a "cash on the barrel head" approach as having the least amount of risk because the counterparty has prepaid for the commodity. Thus, a firm's exposure is essentially confined to volumetric limits. Extending a credit line based on a percentage of equity or historical free cash flow has more risk. Also, when setting dollar trading limits on counterparties, several components should be analyzed. First, trading limits with counterparties should recognize outstanding receivable balances. Ideally, this should be done automatically by linking the accounts receivable system to the trading and risk management systems. Another consideration is the replacement costs of the proposed contracts. This factor must account for the difference in the contract price relative to the current market value (another reason to support mark-to-market accounting practices). Credit policy should also account for potential price increases due to market volatility that will significantly increase replacement costs. Volumetric limits are essential because large price increases can bring a counterparty's account over its credit limit. This also can affect internal risk policy in that, if this situation arises with numerous counterparties, it could violate the firm's VAR limit. The combination of dollar and volumetric limits could have helped more than a few firms dealing with noncompliant counterparties during the peak pricing periods in 1998 and 1999, when large commodity price swings increased contract prices and exceeded many set credit limits. Credit policy at an energy trading and marketing firm should also include an examination of a counterparty's exposure by region. Due to generation capacity and transmission constraints, physical liquidity is as important as financial liquidity for energy trading and power marketing. A counterparty may have sufficient generation to meet a firm's credit criteria. If this generation is not in the same region as the contract exposure, the counterparty may have a physical liquidity shortage in a period of high demand. Even if the counterparty meets an asset test, credit policy should dictate the level of exposure to any one region. High concentration in one region makes the portfolio vulnerable to that market's conditions, which creates a higher business risk. Naturally, some marketers deal solely in a specific region, which allows them to amass a great deal of expertise in that region. This strategy may mitigate some of the regional concentration risk. However, these types of companies tend to be small or have weaker

financial profiles. Larger, higher-profile marketing firms tend to be able to access a larger number of counterparties in all regions, which supplements physical liquidity. Most important, however, is conducting daily monitoring of the actual and potential exposures by counterparty, commodity, and region. Current risk exposure is measured by using mark-to-market accounting, while potential exposure employs a market VAR approach by counterparty to limit potential loss to a firm from a counterparty's defaulting in the future. In all cases, immediate reporting of credit violations to management and speedy institution of remedial measures should be undertaken. Control systems to control the risk. The final critical element of an energy trading and marketing firm's risk management is its control systems. These include the structure, staffing, procedures, and technical ability necessary to prevent lapses of risk management. Examples range from internal structure credit-risk management, management reporting systems, trade processing and operations, and accounting, disclosures, and contract documentation. Strong internal organization with systematic accounting and approval for every transaction is an important feature that helps encourage the control of risk. Generally, risk management functions should be structured and staffed to maximize accountability and communication. The proper structure of a marketing organization would include true separation, or "fire walls," between the traders (or the front office), the back office (accounting, cash management, transaction settlement, deal confirmation, contract management, and administration), senior management, and the internal credit department. The appropriate reporting lines ultimately should have the senior executives in charge of the front office, with the back office reporting to the firm's president or chief operating officer. The credit department typically reports directly to the chief financial officer. This structure helps avoid collusion between employees (or departments) who originate transactions and those who account for transactions. In addition, the credit department must be able to report confidentially to the board of directors if it uncovers developments that threaten the integrity of the firm, such as collusion or departures from policies. The internal credit department should be physically separated from the trading floor to further avoid any compromise of its separation from transaction origination and accounting. The credit department should conduct credit analyses on all counterparties and establish credit exposure limits, monitor all risk positions to ensure that the firm is staying within stated exposure limits, and calculate VAR exposures to help senior management formulate strategies for the portfolio. The credit department should be given broad policy, procedural, and dispute resolution powers, and should regularly report directly to the board of directors with violations of policy, VAR calculations, periodic portfolio balances, or the occurrence of extreme risk positions. The back office carries out a variety of trade processing (record-keeping), confirmation, payment, and reconciliation functions. Back-office control functions can be underappreciated by those at the head of a corporation. Risk-averse marketers place a high value on back-office operations. The separation of these functions from the traders' influence is fundamental to the risk-control environment. Also, a firm should impose accountability for overseeing these activities, which means ensuring that transactions do not fall through the cracks. A fundamental issue that cuts across control functions is how controls are adequately imposed on overseas or even separate domestic offices. Branch offices are difficult to oversee. Centralized and automated risk measurement, position monitoring, and trade limit enforcement create an environment in which communication is established and accountability for visible risks can be enforced. Credit risk management, as the term applies here, refers to a trading firm's evaluation of its credit make-up and the current dollar exposure of its counterparties. These parameters indicate the level of risk a firm is willing to take on and whether exposure is concentrated. In addition, the board of directors should set predefined limits on how much exposure the firm is willing to take on within each rating or scoring category. Some firms set credit limits indexed to a particular credit rating and require guarantees or other forms of collateral before doing business. Standard & Poor's also encourages the use of netting agreements, whereby receivables and payables to the same counterparty are netted monthly to limit the exposure to counterparties. Management reporting is another critical operation within control systems. It is important that senior management be informed daily of the profit and loss, risk exposure, credit exposure, and exceptions to policy. Reporting should break down dollars, volumes, commodities, regions, and other variables of exposure. The level of daily profit or loss at which the chairman or CEO of the parent company is notified provides a sense of the strategic value that is placed on this business segment. What it takes to keep control. Standard &

Poor's considers sophisticated computer systems essential to controlling a firm's risk. A system that keeps track of all transactions (credit, trading, and other limits) and performs exposure calculations daily requires very sophisticated computer equipment, software, and technical support. Marketers should be equipped with systems that model transactions and keep track of shifting market prices, demand, and inventory. A fundamental system informs a trader of trading limits and the appropriate pricing of a transaction. Its analog would link accounts receivable information with trading programs, prohibit a transaction that exceeded any limits, and require all authorizations to complete a deal. An even more sophisticated system would calculate all risk positions and forward pricing curves on a transaction-by-transaction basis. In addition, all branch office transactions and multiple trading sites should be linked to one trading and risk management system to timely capture the full risk exposure and hopefully limit or prevent any rogue trading. Standard & Poor's not only considers these features in our analysis, but also the system's origin. If it is internally developed, the firm should have a sizable in-house technical staff that provides operating support, as well as developers who can provide upgrades. A purchased system should come from a well-established software maker that provides support and upgrades for its products. Standard & Poor's considers purchases of tailored packages from small "boutique companies" to be more risky because these types of businesses are more likely to fold. This would leave the marketer without support and upgrades, thus forcing the firm to "fly blind" or invest in a new computer system. Within this area, Standard & Poor's also focuses on system safeguards, security, and especially disaster recovery. A better-positioned marketer has a secure off-site backup facility to provide contingent operations if a natural disaster knocked out all information technology and communication systems at the firm. This is extremely important so that open or unmatched positions can be monitored and closed out, if necessary, to avoid significant losses. Another analytical factor concerns system procedures, manuals, and documentation for all trading and marketing functions. This includes not just risk and credit policies, but also processes such as counterparty confirmation, broker confirmation, discrepancy reporting, and the like. A complete set of system and process procedures also facilitates training new employees. Strong trade processing and operations are critical to the success of an energy trading firm and are a key component of Standard & Poor's analysis. Firms that rely on just historical, fundamental, or technical data to make trades can be successful, but companies that employ all these factors in their trading decisions are apt to be more successful. Standard & Poor's looks to ensure that the integrity of trading data is maintained throughout the process. A series of checks and balances should be conducted for every transaction and for the entire portfolio of activity. For example, each transaction should be approved by a trading desk supervisor; the back office should confirm pricing and volume, and ensure that deliveries are made; the credit department should determine if trading or credit exposure limits were exceeded; and senior management should review transactions that exceed any limits. It is important that no one but the trader inputs transactions. But, it is equally important that only the midoffice personnel make changes to deals in the risk management and trading systems. All trades should be verbally confirmed by the midoffice the same day and confirmed in writing by the next day. The midoffice staff should be responsible for the accuracy of all positions and perform daily verification, calculation, and reporting of positions and value. Pipeline imbalances, which have caused headaches at many firms, should also be addressed promptly. Despite the possibility that increased staffing for the reconciliation and confirmation functions can eat into already thin profit margins, inadequate staffing can be disastrous. The risk-control system and trade system, if they are different, should be systematically reconciled daily. Tape recordings and data imaging helps reconcile the trade settlement process if discrepancies appear. Lastly, although the back-office and midoffice personnel have distinct functions from the traders, it is beneficial that all staff be cross-trained to fully understand the complete cycle of a trade. Capital Structure The proper capital structure is fundamental to a firm's long-term financial viability. Given the diverse mix of players in the energy markets, a single optimal capital structure may be limiting. Energy marketers have several distinguishing factors that make it difficult to compare each other on the same scale, especially risk-management practices. To facilitate the analysis of risk management, Standard & Poor's has adopted a framework developed by PricewaterhouseCoopers LLC (PWC) that is well suited to consider the inherent difficulties of managing risks of all types. This framework consists of four integrated levels: strategy, process, infrastructure, and environment.

Moreover, to capture the different dimensions in the analysis of a trading firm's capital structure, Standard & Poor's, together with PWC, established a common scale. The marketer's activities should be considered according to a risk-adjusted measure of capital reserved for risk purposes. Risk adjustment of assets occurs along three base dimensions: credit risk, market risk, and operational risk. Capital should also be established for general obligations, such as broker deposits, inventory, working capital needs, and capital expenditures. Although allocating capital for market and credit risk is common, operational risk is a fairly new practice, especially in energy. The first, and possibly the most important, consideration of a marketer's capital structure is its business strategy and risk appetite. A prudent risk-management framework begins with a precise statement of the marketer's business mission, objectives, and strategies; as well as a clear identification of the risks to be taken and the expected returns associated with those risks. Different business strategies require different degrees of sophistication in the risk-management program to support the business objective. Characteristics that help describe the marketer's risk appetite are the amount of product, or commodity, diversification, the level of hedging using forward and futures markets, and the desire to adopt risk mitigation approaches to reduce operation, credit, market, and other risks. A clear risk strategy will not allow ambiguity in risk limits or targets. Marketer's strategies can be categorized into three buckets: low risk, moderate risk, and high risk. Low-risk strategy. A marketer with a low-risk strategy is much like an extension of the traditional utility practice. In this case, the marketing group is delegated to manage load/supply and physical assets such as generation and transmission. They sell power when short-term prices are above incremental costs of generation. This strategy is unlikely to create large market exposures because only the excess capacities are sold on a short-term basis. Effectively, controlling and managing physical assets give a marketer more flexibility to control market price risks. The optionality embedded in these assets can be deployed to absorb shocks from unexpected market events. Moderate-risk strategy. A marketer with a moderate risk strategy is generally an unregulated energy marketing arm of a utility company and independent power marketing firms. This group sells energy by engaging in long-term contracts when the premium is sufficiently higher than marginal costs of generation. This presents two types of risks: First, the market price of contracts committed may rise even higher in the future. Second, the uncertainty of generation and demand is greater the further away from actual delivery. Demand may increase faster than forecast, creating exposures to uncertain market prices to cover loads. High-risk strategy. A higher-risk strategy is often taken by a trading entity whose operation is an aggressive marketing center. Because trading commodities typically earn lower margins in liquid markets, to contribute significant earnings the firm must either trade large volumes of contracts, enter into substantially speculative positions, or both. A firm that trades energy as a commodity and does not control any physical assets is apt to apply this strategy. Capital requirements. Once a firm's strategy is determined, it can then begin to develop the capital requirement that fits with the company's risk profile. In summary, measuring risk along the three dimensions (credit, market, and operational) helps determine how much risk capital should be allocated to the various functions of an energy marketer. A marketer with a proven ability to hedge open positions would recognize lower market exposure; in addition a marketer with a robust credit risk management program could reduce its credit exposure. Likewise, less risk capital would have to be allocated to cover operational risks for an experienced marketer with an exceptional record of physical asset management. After determining a firm's business strategy and "comfort level" within the business risk spectrum, one of the three factors used in evaluating the financial profile and capital structure of an energy trading and marketing firm is the amount of credit risk capital required to cover counterparty exposure. Some of the variables that affect this component of total capital are the marketer's distribution of counterparty exposure, the types of product it trades, as well as regions of activity, and the tenor of contracts. Credit risk reserves. Credit risks arise because energy marketers contract bilaterally with counterparties that may default on their responsibility to pay for the receipt of physical goods. In addition, counterparties may engage in "contract frustration" by complaining about the quality or timeliness of delivery, and questioning the legal foundation of contracts. Calculating an appropriate amount of credit risk capital first entails an evaluation of a firm's counterparties, by subsequently assigning a score or rating to each and examining the total credit lines that exist at each credit class. Applying Standard & Poor's default risk probabilities by rating category to these amounts produces a weighted average credit exposure. The

table displays a hypothetical counterparty profile and employs this methodology. Standard & Poor's calculates this value using a one-year default probability. It is believed to be the most representative, to reflect the variety of origination and forward contracts, as well as monthly natural gas day-ahead and hour-ahead power deals. Credit Risk Capital Reserves RATING CATEGORY CREDIT LIMIT (MIL. $) DEFAULT PROBABILITY (%) CAPITAL AT RISK ($) AAA 200 0.00 0 AA 150 0.01 15,000 A 125 0.04 50,000 BBB 100 0.21 210,000 BB 50 0.91 455,000 CCC 25 20.93 5,232,500 Total 650 -- 5,962,500 Although the simple calculation determines the capital at risk due to defaulting counterparties, it does not capture liquidity risk; the need to cover short positions, or the risk to the bid/ask spread when a counterparty defaults. These are embedded risks. In power markets, it is widely believed that defaulting counterparties drove the market turmoil during the past three summers rather than fundamentals of electricity supply. When downstream players entered the market to purchase power at above fundamentals, this only exacerbated the damage to additional supply agreements. The appropriate amount of risk capital should incorporate these embedded risks. Moreover, it is expected that energy marketing and trading firms that desire higher credit ratings should carry multiples of this credit risk. These results could be refined by applying an ultimate recovery calculation. However, given the ambiguity of the senior rankings backing up each counterparty's credit, it is more conservative to assign a low ranking to the portfolio and assume no ultimate recovery or payment of liquidated damages. Commodity transactions usually incur greater credit risk for counterparties than analogous financial deals due to the implicit extension of credit between physical delivery and financial settlement. Application of fixed-income techniques to estimate probabilities of default is evolving and gaining rapid acceptance. However, forward prices that vary based on the creditworthiness of the counterparty--similar to a corporate yield curve--are still not widely observed. However, it is Standard & Poor's' view that it is just a matter of time before the energy trading and marketing business matures to a level where there is strong liquidity in all traded commodities, and that the sector begins to offer premium pricing based on credit ratings, not just based on volumes. Market risk reserves. The capital reserve component most associated with energy trading and marketing firms is market risk capital. The first step in determining what level of capital reserve to maintain for market risk entails knowing the size of the firm's trading portfolio. This best approach is mark-to-market (MTM) accounting. MTM is a conservative accounting method that will reveal the current market value of a portfolio and allow management to devise an appropriate strategy to lay off risk. The essential elements for performing MTM on commodity portfolios are forward pricing curves and volatility term structures. Typical marketing operations hold positions that extend beyond observable forward and option markets. In the near-term, forward price curves are developed from actual market activity observed either by the marketer's traders, or from brokers providing quote sheets. The forward curve is then often extrapolated to additional years by using the existing last 12 monthly quotes. Volatility estimation relies on the observation of market option price quotes. In power markets, options are quoted for only about 12 months ahead. An additional complication for power markets is the existence of multiple volatility term structures due to the common practice of day-ahead and hour-ahead dispatch of generation. The additional flexibility to exercise daily and hourly options increases the value, and the risk, of holding these options. Firms that deal in retail marketing must use an additional input essential for valuing and measuring risk of retail contracts: the load forecast. To value a retail contract, the marketer must develop an estimate of the expected quantity of energy to be consumed by their customers in the future. Usually, the forecasts are based on historical load shapes of the customer, or customer type, and are normalized for weather patterns over the observation period. In addition, the valuation methodology for retail contracts is more sophisticated than a purely financial portfolio. Specifically, the value of the retail contract depends on the covariance between prices and loads. This requires an estimate of price volatility, load volatility, correlation between prices and loads, and a valuation approach that considers these elements in the expected value of the retail contract. Given the number of elements necessary for the valuation of energy contracts and the evolution of market structure, it is often difficult to assign a value to a contract with certainty. Due to this uncertainty, a contract's MTM value often has a reserve account to offset the value of the contract before it is reported in the financial statements. However, the level of reserves applied to a contract can often be very subjective. For this reason, the marketer should establish reserve accounts to address specific uncertainties with this

market valuation approach. These reserves should address market liquidity, modeling deficiencies, and regulatory issues. Market liquidity refers to the valuation of contracts using the unobservable portion of the forward curve and volatility term structure. Examples of modeling deficiencies include using monthly volatilities for daily exercise contracts, and not including price and load correlation in the valuation of variable quantity retail contracts. Regulatory issues consider the dynamic nature of evolving regulation in various regions of the U.S. From here, a firm can determine its exposure to market risk and set a capital reserve level appropriate for the firm's strategy. The most common way for a firm to determine its level of reserve is to use a value at risk calculation. There are a number of VAR methodologies that can be used. The three most popular are Monte Carlo, covariance, and historical simulation. Standard & Poor's views the Monte Carlo technique to be one of the most useful evaluations because it can account for derivatives such as options. Option curves are nonlinear due to their "time-decay" component. The covariance method cannot account for the nonlinearity of options contracts. However, this approach may be appropriate for firms that conduct purely physical trading. The historical method can only model market risk if the market repeats historical patterns. Standard & Poor's considers this method the least accurate. Operational risk reserves. In addition to having sufficient capital to cover credit and market risks, a firm should have capital on hand to account for the operational risks associated with a trading operation. Operational risks are the probability that an operational constraint or failure will frustrate the execution of normal market procedures. Examples include transmission constraints, generation outages, computer or telecommunication systems failures, human error, ambiguous policies, the accuracy and comprehensiveness of reporting methods, and essentially any circumstance that could halt a business from functioning properly, including ambiguous corporate policy. This possibility requires marketers to have contingency plans to meet physical delivery commitments and perform the marketing and trading function. Standard & Poor's urges all companies to develop more comprehensive policies and procedures for identifying and mitigating operational risks, because this is a relatively new area of assessment. Not only must a firm identify operational risks associated with the physical delivery of energy products, it must be aware of the trading side's pitfalls. One way to measure a portion of trading operational risk is to first determine the total number and total value of trades for the year. This would include sales and purchases. Next, analyze the types of errors made at the firm over the past year or two. Major errors are those that terminated trades, minor errors are those that delayed trades. From this, determine an error rate and multiply this by the total value of trades. Generally, Standard & Poor's would calculate a worst-case scenario, and then suppose some percentage of trades that delayed operations could also have terminated them. Also keep in mind the same multiple strategy applied to the previous capital components. Other capital needs. This figure should then be adjusted again for capital expenditures associated with emergency replacement equipment and estimates of disaster recovery expenses. The amount of capital necessary to support the trading operation should also include the general capital needs noted here. Broker deposits are necessary to cover margins on physical delivery or open positions. Capital may also be needed to purchase commodity inventories, such as natural gas storage. Working capital needs (or short-term capital) are another class of capital to account for. A conservative approach would take the worst accounts payable position over the past 12 months. This could be adjusted down for payables to a parent company (assuming there is leniency on payment terms), and adjusted up for an expected increase in business. Finally, capital is needed to cover capital expenditures for office furniture, computer equipment, and office space to accommodate current and expected growth of operations. In summary, measuring risk along the three dimensions (credit, market, and operational) helps determine how much risk capital should be allocated to the various functions of an energy marketer. A marketer with a proven ability to hedge open positions would recognize lower market exposure; in addition a marketer with a robust credit risk management program could reduce their credit exposure. Likewise, less risk capital would have to be allocated to cover operational risks for an experienced marketer with an exceptional record of physical asset management. Therefore, an energy marketing firm should develop a capital structure around its stated business strategy and the level of risk it expects to incur in the three functional risk categories. Liquidity Is Key A healthy equity layer, relative to a firm's risks and obligations, is supportive of energy trading and marketing company's credit quality. However, Standard & Poor's takes the analysis further, and examines a trading firm's liquidity, specifically its cash position.

A high-quality firm has a very high percentage of liquidity coverage. This translates into a strong cash position and access to bank lines. Bank credit facilities are also important to finance day-to-day transactions, providing the facility can be paid down without causing financial and additional credit pressure. However, credit lines dry up fast during times of stress. Thus, cash is viewed more positively than credit facilities. The ability to access cash may be the most important financial characteristic. Cash is needed to settle transactions and to purchase supplies daily and to make monthly demand charge payments. Also, cash provides the means to meet broker deposits and maintain working capital when there is a disconnect between the timing of payables and receivables. Access to cash is especially critical in the event that a physical delivery cannot be made or is terminated, or when a futures or derivative transaction is made as a price hedge. Also, volatile energy markets can cause large price swings, which affect the value of trading position, and, therefore, cash calls for maintenance margin payments. Moreover, strong financial liquidity is necessary to deal with extraordinary events not factored into the value-at-risk calculations. So the question now becomes, How much is enough? Obviously, enough cash to cover working capital needs is a prerequisite for a solid credit profile. But how much more cash is needed to cover all the unexpected events. This is an issue that would stem back to the types of risks a firm has accepted. Capital structure is a major component of financial risk and performance. When examining a marketer, Standard & Poor's considers the risks associated with counterparty exposure, portfolio exposure, operations and general capital needs. Once Standard & Poor's quantifies these risks, they are compared with the company's equity layer. The ratio of risks to equity is the foundation for determining an energy trading firm's financial profile. Given that a trading firm's obligations are more contractual than actual debt, this method fits better than the traditional analytics. Margin calls increase need for liquidity. Standard & Poor's analysis of energy trading and marketing firms' liquidity position relative to the firms' risk profile (credit risk, market risk, and operational risk) and capital reserves has been heightened due to the increase in maintenance margin calls in the industry. Typically, energy marketers enter into two basic types of transactions: cash trading and long-dated structured deals. Cash trading, for the purposes of this article, is considered to be proprietary trading of energy and energy-related commodities with cash settlement. This type of trade is an integral part of an energy marketing and trading firm's operations because it is predominantly speculative in nature and presents the best opportunity for profit. Therefore, ample liquidity, or working capital, is fundamental to the viability of this business strategy. Without the capacity to settle proprietary trades financially or make broker deposits when called upon, an energy trading firm will quickly get shut out of the market by its counterparties. Generally, long-dated transactions tend to be bilateral contracts that have deal-specific terms and are not found on exchanges. In late 2000 and early 2001, events in the energy markets have stirred interest in issues related to long-dated structured transactions. One of these issues is whether a trading firm's counterparty can make maintenance margin payments. Or, to put it another way, how does a counterparty's working capital position affect an energy trading firm's market liquidity? Long-dated structured deals typically involve granting a counterparty an unsecured line of credit with a threshold limit. The threshold limit varies from counterparty to counterparty and is based on perceived creditworthiness (or actual public credit rating). Once the threshold is set, the marked-to-market (MTM) value of a deal determines if there is a need to post maintenance margin. This occurs when the true MTM value of the transaction exceeds the credit threshold. When prices are volatile, MTM values can swing widely and create the need to post margin. Margin calls often are met with an increase in a performance guarantee. However, due to the late 2000/early 2001 credit events in the energy industry, more firms are seeking cash, letters of credit, or government securities to cover margin calls. This pressures a firm's liquidity position and the need for cash reserves, liquidity facilities, or commercial paper programs. Firms that lack this liquidity could "game" the system, to some extent, through contract frustration. This tactic could buy a cash-strapped firm time to muster the funds needed to make margin calls by disputing the terms of a contract, such as the valuation methodology, terms of delivery, or quality of the product. Here's an example of how this could occur: Party B is selling to Party A and buying from Party C (Party B has no physical liquidity). Party B sells a futures contract to Party A, which becomes "deep in the money" and breaks B's threshold. Party A asks B for maintenance margin to fulfill master trading agreement requirements. Party B turns to C and asks for the same maintenance margin call because this position is now deeper in the money. But, C disputes the valuation of the

contract and refuses to pay maintenance until this matter is settled. Resolution could take weeks, but the maintenance margin to A is required immediately. This scenario is a potential liquidity crunch for B. For B to avoid a problem, the firm must reserve enough cash to cover its margin obligations or keep credit lines available. In the latter case, the marketer must have the ability to pay down those lines, in a timely fashion, or suffer a loss of credit quality, which reverts back to the need for a strong cash position. The same argument applies to a firm that issues commercial paper to fund operations. Commercial paper needs a back-up facility to support remarketing, which, if used, needs cash to pay off any open balance. Therefore, Standard & Poor's will further review the capital requirements criteria for an energy marketer and determine an appropriate liquidity position relative to a firm's risk appetite and capital reserves.