



# IssuesLetter

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## Electrical Realities: Volatile Markets and Customer Desire for Stability

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The wholesale and retail electricity markets created to date are not the competitive markets most energy policy makers had in mind. There is a substantial gap between the gritty realities of these markets and the sought-after, theoretical ideal. The challenge facing many policy makers is to understand not only what is occurring in these new markets but also how best to move closer to fully functioning, competitive markets.

Perhaps the most important reality is that the existing markets have effectively forced residential and small commercial consumers to buy all of their electricity in the short-term market, with short-term defined as one year or less. This may or may not have been intentional, but it seems a mistake for at least two reasons. First, even in well-functioning markets, the year-to-year price volatility -- and in particular the price volatility that results in large price increases -- will be unacceptable to most customers. Second, short-term markets are especially susceptible to market power problems which in turn result in short-term market prices that are even higher and more volatile.

This Issuesletter discusses these two problems and recommends solutions to protect customers, particularly small-use customers, while improving the long-term competitiveness of the wholesale markets. We describe why policymakers may want to establish a portfolio manager to provide default or franchise customers long-term price stability and reduced exposure to market power.

### **Volatility of Short-Term Markets**

In theory, long-term price stability simply requires a customer to sign a long-term contract for power. In practice, retailers do not offer long-term contracts, and customers do not sign them. While many possible explanations are put forward as to why there are no long-term electricity products, knowing why products are not available is less important than taking steps to manage the risks imposed by this absence.

Electricity markets appear to behave like many other commodity markets where products with long-term stable prices are simply not available to small customers. Ken Lay, Chairman of ENRON, was probably correct when he recently observed that electricity is traded in the world's most volatile market. Year-to-year price changes of 3 cents per kWh can be expected, at least for the foreseeable future. For instance, a fully competitive wholesale market with excess generating capacity and low gas prices (such as was the

experience in California for the first two years of the restructured market) will yield annual average prices of about 2 to 3 cents per kWh. Markets with tight capacity supplies and high natural gas prices are likely to yield average annual prices of 6 cents or more. Add more extreme conditions or market power and the year-to-year price changes can be even more than 3 cents per kWh and even less acceptable to the public.

Where retail competition exists, after initial rate caps (if any) end, competitive customers and default customers will either pay (again, at least for the foreseeable future) monthly prices based on the average monthly spot price or prices fixed for, at most, a year.

It is not that the market lacks long-term portfolio management. Large wholesalers, retailers and traders are very sophisticated portfolio managers. The problem is that the price stability benefits of their long-term portfolio management efforts do not flow to small retail consumers. This problem may be inherent in the nature of energy markets, or it may simply earmark an uncompetitive market where no pressure exists to cause these benefits to be passed on to customers.

The gasoline and heating oil markets show that the problem is an inherent one. In the gasoline market, Exxon, Texaco, and Shell are all portfolio managers. Each has assembled a portfolio of oil wells they own, supply contracts of various types and durations, financial hedges, and, in varying degrees, spot market purchases. Meanwhile, retail gasoline consumers are essentially in the spot market. Consumers may have some flexibility if they fill their tanks weekly, and farmers with on-farm fuel tanks may be in a slightly longer duration market. In the case of heating oil, many suppliers offer price stability for a year. But there are no longer-term products offered to or bought by consumers. In these markets, all consumers are essentially in the short-term market.

If the world wholesale price of gasoline and heating oil goes up by 20%, the retail price of gasoline and heating oil will go up by 20% within a day or two. However, the average cost to Exxon, Texaco, and Shell will not go up 20% because spot purchases were only one part of their

portfolios. When the price of gasoline goes up by 20%, oil companies make a lot of money. The firm with the best-managed portfolio makes the most money. Electricity markets are now like oil markets. Even if retail

suppliers are doing a fine job of portfolio management, neither the price stability nor the low average cost achieved through their diversity of supplies flow through to consumers.

<b>Table 1</b>		
<b>Weighted Avg. Price \$/KWh</b>		
<b>Year</b>	<b>ISO NE <sup>1</sup></b>	<b>Cal PX <sup>2</sup></b>
<b>1999</b>	<b>\$34.189</b> (May-Dec)	<b>\$30.14</b>
<b>2000</b>	<b>\$46.22</b> (35% increase)	<b>\$114.43</b> (279% increase)
<b>2001</b>	<b>\$50.35197</b> (Jan-Apr) (8.9% increase)	<b>N/A</b>
<sup>1</sup> Source: ISO NE		
<sup>2</sup> Source: University of California Energy Institute		

Electricity markets in California, Illinois, the Northeast and mid-Atlantic regions, Australia, and Canada have all shown how volatile electricity prices can be. Table 1 shows the average annual prices for ISO-NE and CalPX. Although volatility is highest from hour-to-hour, even the day-to-day, month-to-month, and year-to-year volatility is more than most customers are prepared to accept.

Customer choice was created in the hope that competitive retailers would provide a wide range of products and services. One expected product was long-term price stability for customers wishing to avoid the price volatility of hourly, daily, monthly, or even yearly markets. Why have such products failed to materialize?

### **Portfolio Management and Efficient Pricing**

Adopting portfolio management in states with retail access should be seen as an opportunity to move toward more efficient prices, not as a means of hiding real costs from consumers. Where retail access exists, most competitive prices for small consumers, and virtually all default service prices, are simple flat-rate, year-round average prices. Oddly, the movement to retail competition may slow the transition to more efficient pricing.

Thus, a very important task for portfolio managers and regulators is to use careful and innovative rate designs that send efficient price signals to consumers. A portfolio with an average cost of 4 cents per kWh has an average price of 4 cents, but rate designs can and should be set not only to reflect current market prices but also the cost of power at different times of the day and year.

Textbook economics offers two explanations as to why customer choice should work. First, because electricity costs at the margin are highly volatile, prices should be volatile too. This should give buyers the right price signals so that they use electricity when costs are low and avoid electricity use when prices are high. In theory, over time, such responses will enhance the societal efficiency of energy use. Second, with effective competition and retail choice, customers who dislike volatility can choose suppliers and products with fixed prices or moderate price swings, much like consumers who choose between fixed and variable rate mortgages.

These explanations ignore three critical limitations of existing electricity markets:

1. Competitive markets, by their very nature, create huge volatility. Existing, wholesale electricity markets lack opportunities for demand response and are overrun by the presence of market power. Both make prices more volatile and higher than those produced in a well-designed competitive market. Markets can be structured to promote more or less volatility, and current electricity markets are biased to the high volatility end of the spectrum.
2. Small customers do not see hourly, daily or weekly price signals due to the lack of real-time metering. But even if such meters were in place, many small customers

- could be expected to choose providers who offer flat rather than real-time prices. Further, because retail suppliers serving small consumers are billed for electricity purchases based on average load profiles rather than the real-time use of their customers, they do not see the market price signals either. This leaves suppliers with no reason to respond to volatile prices.
3. The standard offer service policies in most states have virtually eliminated any hope of retail competition. There are almost no competing retail suppliers, and the few suppliers who do exist do not offer long-term options to consumers. All of these combined make today's electricity markets more volatile than they need be, and policy makers have unwittingly designed retail access and standard offer policies that put small customers in this excessively volatile short-term market for all of their electricity needs.

### **Unchecked Market Power Worsens the Inherent Volatility of Electricity Markets**

The evidence is rapidly mounting that market power is a more serious problem than originally thought. Studies by the California ISO's Market Monitoring Committee have shown that market power in the California market accounted for about \$7 billion in excess charges from mid 2000 to mid 2001. If this estimate is even close to accurate, market power will cost consumers far more than any estimate of the efficiency gains to be squeezed out of competitive markets. If market power problems are not solved quickly, the cost of market power to California in the next year or two will exceed the total stranded cost California utilities accumulated over the 20 years prior to restructuring.

At least as frightening as the alleged degree of market power is the slow pace at which the regulatory, legislative and judicial process seems to be able to solve the problems. Whether we will ever be able to reduce market power to acceptable levels is a debatable and important question. In the meantime, portfolio management provides a way to reduce consumer exposure to it.

Portfolio management can reduce the risk of market power by relying more on long- and medium- term contracts and other proven risk management tools and less on spot markets. Market power is most easily exercised in short-term markets where bidding strategies and capacity withholding can be profitable to suppliers. The long-term market is much less susceptible to these practices. The long-term market also benefits from the price-reducing effects of new entrants, new technologies and other efficiency gains. Thus, in addition to reducing consumers' exposure to unwanted price volatility, another key role of portfolio management is to reduce consumers' exposure to market power-ridden, short-term markets.

The critical question for every regulator and policy-maker is whether it is prudent to put the vast majority of small customers in the short-term market for all of their electricity needs. If the answer is "NO" because prices will be unacceptably volatile, we need to create a permanent portfolio manager. If the answer is "YES" because price volatility adds economic efficiency to the grid and will be tolerated by consumers, we still need a

temporary portfolio manager until effective means of reducing market power have been put in place. In either case, portfolio management is now an essential function of the electric system. The challenge is deciding what the portfolio management function should include and who should provide it.

### **What Is Portfolio Management and How Does it Fit With Today's Markets?**

The concept and practice of portfolio management is not new to this industry. Portfolio management means assembling a mix of long-, medium- and short-term resources, resource types, and financial instruments with the aim of balancing cost and risk. The portfolio may not be least-cost in terms of price alone, but it is least-cost when taking price, risk, and the environment into account.

Portfolio management does not require abandoning or slowing the shift to more competitive wholesale markets, but it does mean closer regulatory attention should be given to protecting retail customers from the current imperfections in both wholesale and retail markets. A robust portfolio would consist of a diverse mix of power plants, contracts, spot energy purchases and other risk-reducing measures such as investments in energy efficiency and renewable resources, as well as demand management and load response programs. The well-understood principles of Integrated Resource Planning (IRP) can be used to identify the best portfolio.

Building portfolio management into retail markets without distorting or destroying any hope of vigorous retail competition requires care, but a range of approaches is available. States could encourage retail competition and require all retail competitors to fully disclose price and price risk. Retail sellers might also be required to offer at least one multi-year service option (much like requirements on cable TV companies to provide basic cable service and on banks and insurance companies to offer certain products as a condition of operation). Customers not choosing a retail competitor would receive competitively bid default service on a multi-year, stable-priced basis with termination rights that are clearly and simply stated. For example, providers like ENRON, Select Energy, and others could be invited to bid to be the long-term portfolio manager for a specified group of consumers. The bid would be evaluated based on price, risk, and other characteristics. Traditional IRP principles and tools can be used to evaluate bids and select the winner.

At the other extreme, states could essentially abandon retail competition for small customers and in its place franchise or license one or more portfolio managers to provide retail service using portfolio management principles. The distribution company, if it is not in the generating business, could possibly hold the retail franchise, or it could be bid out or assigned to other potential licensees. In this scenario, the portfolio management function is overseen by regulators. Consumers receive the price stability, risk reduction and environmental benefits of a balanced portfolio. If the cost of one part of the portfolio -- say natural gas -- increases, the effect on consumer prices is moderated by the parts of the portfolio not fueled by natural gas.

## **Who Provides the Portfolio Management Function?**

The questions of who performs the portfolio manager function (competitive providers, the distribution utility or a state agency) and whether the portfolio manager is regulated or competitive are interesting, but not critical. The paramount consideration is how the risks associated with portfolio management are allocated between consumers and the portfolio manager. Regulators must focus on the risks and who bears them.

## **What Are the Risks of Portfolio Management to Consumers and Regulators?**

Under traditional regulation, customers bore virtually all the risks of power supply decisions, including volatility risks, and they had little ability to manage those risks other than through load-shifting, self-generation or conservation and efficiency investments. Regulators could manage these risks to some degree through the IRP process, certificate of need reviews and post hoc prudence reviews. In the "ideal" competitive market, customers would have a wide range of choices and would bear the risks they choose to bear. However, as we have seen, the ideal market has yet to develop for small customers. A critical issue for portfolio management is striking a reasonable allocation of risks and rewards among suppliers and consumers.

Portfolio management reduces price volatility risk but does not guarantee the lowest possible prices to customers. In the same way that the return on a mutual fund will not always exceed the return on the "market", not even the best portfolio management can guarantee prices that will at all times be less than the price in the short-term market (or less than the prices of other managed portfolios). Sometimes the portfolio manager's price will be below the market price, and sometimes it will be above. (However, the more the short-term market suffers from market power, the more often the portfolio manager's price will look attractive.) The fact that low, short-term prices will occur, and at times may persist for a year or more, presents great political and economic risk to a portfolio management approach.

Recall that most of the support for restructuring in the mid-90s was fueled by the fact that utilities' portfolio prices (a blend of competitive and regulated prices) were above prevailing, short-term market prices (in markets where utilities were fully recovering their fixed costs through customer rates). How will consumers, regulators and legislators react if long-term portfolio management is adopted and market prices again fall below the portfolio manager's prices? Already, some are predicting that the portfolio of resources recently assembled by the Department of Water Resources on behalf of California consumers will be more costly than emerging alternatives, and the California PUC has declared that those costs will have to be passed on to customers without a prudence review. There are no easy answers, but from a policy perspective there are two choices. Either customers will be entirely exposed to the price volatility and market power risks inherent in short-term markets, or they will be served from a portfolio of long-, medium-, and short-term supplies. Neither option will make customers happy all of the time.

## **What Conditions Must Be Placed on Customer Choice?**

If retail access is permitted to coexist with portfolio management, conditions must be placed on consumers' rights to shift between the managed portfolio and competitive retail suppliers that are sufficient to balance the risk taken by the portfolio manager through long- and medium-term commitments. Otherwise, at times when the short-term price is below the portfolio price, customers will leave the portfolio, and the manager may be saddled with stranded costs. The reverse can also occur when market prices rise, as recently seen in both California and Pennsylvania. Different options may be pursued depending on a state's desire to encourage competitive entry. For example, open enrollment periods could be allowed whenever the portfolio manager's contractual commitments are less than its customers' load or when its average price is less than or equal to the prevailing market price. Moreover, it is not necessary to offer all portfolio customers the same price. Those who choose a retail provider and then wish to return to the portfolio may be obliged to pay a portfolio price that reflects current, not historic, conditions, like a homeowner refinancing a mortgage.

### **Energy Efficiency and Renewables Aid Risk Management**

Energy efficiency and renewables are some of the best the tools available to reduce consumer costs, prices and risks. But by itself, adoption of portfolio management does nothing to assure that these resources will be of interest to the portfolio manager.

Cost-effective energy efficiency (energy efficiency that saves a kWh for less than the marginal cost of producing and delivering a kWh) always reduces customer bills, but it may or may not reduce prices. Making cost-effective energy efficiency a part of its portfolio hinges on two related factors -- the incentives faced by the portfolio manager and how the wholesale market is structured.

The incentives faced by the portfolio manager will be determined by the regulatory rules, if the portfolio manager is regulated, or by the contract terms, if the portfolio manager is a competitive supplier. In either case, careful attention to how portfolio managers make money is the key to understanding their interest in energy efficiency. For example, if portfolio managers are insulated from the risk of high spot market prices and are allowed to earn a margin on all sales, they will have no reason to invest in energy efficiency, even where efficiency would lower the cost of the portfolio to customers.

The structure of the market may also influence whether the portfolio manager has an incentive to invest in energy efficiency. In particular, if the value of demand response is fully incorporated in wholesale markets, the portfolio manager will have a much stronger incentive to pursue some types of energy efficiency.

As for renewables, their virtue is their freedom from fossil fuel cost volatility and escalation as well as insulation from new environmental costs arising from air pollution or climate change mitigation requirements.

Portfolio managers can reduce price and other risks through physical or financial hedges. But all hedges do not have the same level of security to consumers. What types of hedges

are best from the consumers' perspective? If market prices increase, there is a risk that portfolio managers will default on their obligations. Retail suppliers in California and Pennsylvania have ceased service and returned customers to the default provider. A default service provider in Maine (chosen through a competitive bidding process) had its wholesale providers default when market prices increased, thereby causing the Maine PUC to agree to raise the fixed price the retailer had originally agreed to. The lesson is that if market prices increase, suppliers who agreed to deliver fixed prices will be quick to seek relief of one sort or another, including breach of contract. Financial promises to deliver fixed prices may be meaningless if market conditions change too much.

Hedges in the form of contracts with renewable generators can provide a very high level of security. Indeed, one of the best hedges is one with a physical asset that has underlying cost characteristics matching the hedged contract prices. A fixed priced contract for the output of a gas-fired power plant provides the appearance of price stability, but there is a risk of non-performance if gas prices increase. The same contract with a wind facility provides much more security as it lacks the risk of a variable fuel cost.

Notwithstanding the widely recognized benefits of energy efficiency and renewables, experience shows that even under the best conditions portfolio managers under-invest in these resources. This is the main reason most states have adopted System Benefit Charges and Renewable Portfolio Standards to assure that at least minimum amounts of these resources are delivered. It will remain a critical responsibility of regulators and lawmakers to keep energy efficiency and renewables a part of portfolio management. At a minimum this would include retaining and expanding System Benefit Charge and Renewable Portfolio Standards policies.

## **Conclusion**

Regulators today face a continuing challenge of providing some measure of protection for small customers who either lack meaningful retail choices or are participating in markets with serious flaws. One of the key risks facing small consumers is the increased price volatility of current, short-term electricity markets. In the absence of regulatory action, providers of electricity services can be expected to capture portfolio gains by charging for all use at short-term prices, with all their coincident volatility. A sound portfolio management framework provides the appropriate tool for identifying and valuing these risks. Until such time as default or standard offer service is terminated or becomes insignificant through attrition, careful rate design and portfolio management oversight will remain a core responsibility of regulation.

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