BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

May 21, 2003

In the Matter of the Investigation Of Time Of Use Pricing For Idaho, Power Residential Customers	**Case No: IPC-E-02-12**
Filed on Behalf of the Citizens, State of Idaho	**Response to Order No. 29196 Time-of-Use Rates Response to Order No. 29226 Notice of Public Workshop**

BY:

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COMES NOW before the State of Idaho Public Utilities Commission, Messieurs Patrick R. Clifford of Boise, Idaho (rate payer) and Tom D. Tamarkin of Sacramento, California (industry expert,) who do hereby request, declare, and note for the record:

1) In informal testimony presented to the PUC during the Public Workshop held May 19, 2003 regarding the above captioned matter by the Idaho Power Company, it is apparent that the cost figures for the proposed communicating meters and various communication network systems related components for deployment in the AMR system may have been inaccurate due to their having been based on older first generation technology. Thus, the overall cost figures presented for the system deployment may be overstated and the pay back period for ROI recovery unduly

prolonged. Therefor, the Commission should consider directing Idaho Power Company to reevaluate its system topology and components and either substantiate the current cost analysis or revise it according to new findings of technology.

2) It must be noted for the record that the incremental cost increase for a single phase class 200 meter supporting Time of Use rates with up to 96 daily records of 15 minute interval data stored for 35 days is very low as of May, 2003. Such meters would allow the implementation of Time of Use rates now or in the future. On the other hand, if meters were selected for mass deployment which were not capable of this feature, the conversion to Time of Use rates would require yet another change out of approximately 375,000 meters. Further, the adoption of Real Time Pricing structures which is the logical and natural extension of Time of Use rates can easily be achieved to the extent that the meters deployed, 1.) measure Power, not just accumulated Energy, 2.) have the aforesaid Time of Use capability, and 3.) are capable of communication to an optional in-home user interface. A basic research report and trend analysis authored by Judith Warrick on Real Time Pricing as published by Morgan Stanley Dean Witter entitled The Value of Information-Lessons From California is attached hereto and incorporated by reference herein.

3) Although the issue of critical peak power was not a direct subject of discussion in the workshop pursuant to the limitations established by the Commission, it is obvious to the common man that the purpose of Time of Use rates is to help reduce the peak power demand thereby reducing generating process requirements and transmission and distribution system maintenance. Therefore, it is in the best interest

of the consumer, commission, and Idaho Power Company to encourage conservation by users. It is generally accepted wisdom in the industry that consumer's react negatively to forced conservation through programs such as remotely controlling air condition units, etc. by the utility. It has also been established by numerous studies that when consumers are provided immediate feedback regarding their consumption of power in dollars and cents, the typical consumer will use 10 to 15% less power per month. The difference relates to human nature and the concept of free will and voluntary conservation versus forced conservation. Documented studies may be found in the trade and in numerous instances of public testimony including, but not limited to, the testimony of S. David Freeman, Chairman of the Public Power Authority of California and 2001 assistant to the Governor of California during the "California Energy Crises" citing such facts. As a rate increase may be required by the Idaho Power Company to fund the deployment of the AMR system, the voluntary savings on the part of consumers can be an important offset to such rate increase. More importantly, the impact of conservation goes far beyond the issue of a ratepayer's rate increase offset.

4) Technology exists today which will allow the consumer to have the up to the second consumption, cost, and pricing information required to conserve as stated in paragraph 3 above. Any communicating meter to be installed by the Idaho Power Company must be capable of communicating to such a consumer display. Said consumer display communications should be supported by wireless communication methodology thus making the consumer display and controller device a user installable device which can be purchased by the consumer, on a voluntary basis from the utility

company or other vendor. This device may be used by the utility to provide up to the minute pricing information to the consumer via the display screen thus providing the total means to deliver Real Time Pricing structures to the consumer. Since this device is optional, the consumer has the choice to purchase it at their whim and convenience and this device is not in the billing information data critical path between the meter and the utility CIS and billing system.

5.) In the workshop it was stated that other meter features such as service outage reporting, overvoltage/undervoltage reporting tamper and theft of service detect and reporting, had merit but were difficult to quantify. A modern state-of-the-art communicating meter capable of providing the features and functions articulated herein has these capabilities as well. Thus the implementation and use of these features becomes a software implementation issue by the utility and can be phased in as time and resources permit with no additional hardware cost.

Respectfully Submitted,

Dated this 21st day of May, 2003

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Market Commentary/Strategy

August 6, 2001

The Value of Information — Lessons From California

- **The value of transparency in electricity markets is becoming obvious**
  Financial vendors used to charge for day-old and 15-minute old stock quotes. Real-time, essentially free quotes have radically changed the financial markets. I see the same in store for electricity.
- **Real-time electricity quotes through your meter?**
  The electricity business uses antiquated technology. But technological advances and transparent markets make real-time meters economical and valuable, in my opinion.
- **Electricity *is* price elastic; consumers armed with data will adjust their demand**
  The apparent electricity demand-supply imbalance could reverse if data were available to consumers to make costs and prices transparent throughout the system. Average pricing would disappear.

The Value of Information — Lessons From California

The headlines are no longer screaming about the trauma facing California. Hysteria is being replaced by more rational discourse (except those politicians who only seem rational when viewed in the context of an election bid). Forecasters are rushing to lower projections of the number of hours that the state will be plunged into darkness and chaos. (Indeed, I just saw a forecast drop from 300 hours to zero.) Consumers are acting rationally, suppliers are responding, and prices were falling even before the regulators caved in and ordered price caps that I believe will only interrupt the process of restoring order to the market.

So is California — a bust? And to those of us who don't live there, does it matter?

Yes, I continue to think California will be a bust. I continue to believe that price elasticity does exist in electricity and that consumers are rational, that suppliers will act in their own best interests, and that the media will do what it can to create maximum hysteria to capture maximum eyeballs. In other words, the world is continuing along its normal, predictable path. Except…

…Except that California has provided us with some real-time real-life lessons that we ignore at our peril. And some other opportunities to understand how the world really works, how that is changing, how that can change, how we see the future, and what we ought to do about it.

How the World Really Works

Electricity Is Price Elastic

Even in electricity — even in that commodity that everyone loves to say is *different* — markets work. Electricity *is* price elastic. This is a basic fact of life that most people simply refuse to believe. While it is true that electricity is less price elastic than many other products, services, and commodities, *it is still price elastic!*

It took me a long time to learn the difference between less elastic and inelastic. My economics textbook used both electricity and gasoline as examples of products that were price *in*elastic (this goes way back, folks) and I believed it for a long time. Then I came to learn that until prices increase (and they hadn't for decades up to the mid-70s), it's hard to see price elasticity. Of course, in the mid 90s when prices decreased and price elasticity worked to *increase* sales (of both gasoline and electricity) people assumed that it was a natural function of growth in the economy and the natural order of things. (Ever wonder why growth in electricity in California spurted in the mid 90s? Hint: it's not because of the Internet and Silicon Valley. Just look at the record declining prices of natural gas and electricity prices during those years.)

So, the first lesson to be taken from California's debacle is that while electricity may be less price elastic than other goods and services, it is price elastic. A recent study by Cambridge Energy Research Associates (CERA) concluded the price elasticity of electricity ranges from 0.1 to 0.28 (0 is inelastic, 1 is perfectly elastic), depending on the customer class. This may not sound like much, but when prices rise by 20%, this means a decrease in volume *due to the price increase* of 2% to 6%. In an industry growing at 2–3%, or even 4% per year, this is huge. CERA calculated that, given relative usage rates in California, a 10% price increase for residential customers would reduce demand by the same amount as a 34% price increase for industrial customers. Governor Davis, are you listening?

Probably not, but then neither are utility managements. Several sources quoted utility managers as being astonished by consumer reactions to price increases…

Electricity Prices Are Volatile…

The volatility in electricity prices came as a real shock to a lot of people — especially those who owned securities of California utilities last fall. But while consumers in California have been shielded from the volatility in prices, the volatility in costs has long been a fact of electricity production.

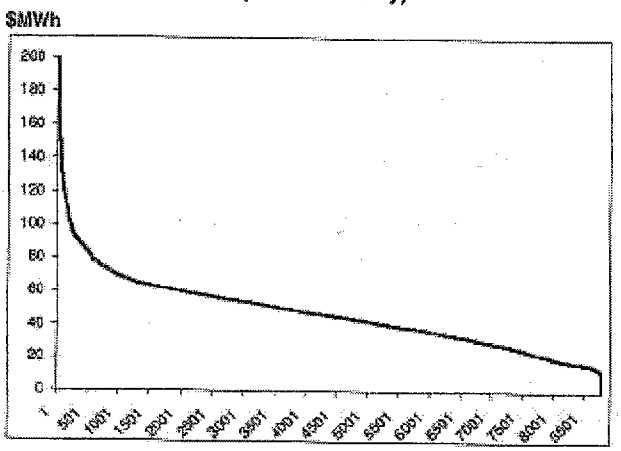
In the days of electricity monopolies and regulators, wildly varying differences in the cost of production at varying times of the day, week, and season were (and in many cases still are being) averaged out to one price charged at all times. This is doesn't make economic sense unless the cost of collecting information (that is, who used how much and when) is greater than the total variation in cost. In the days before silicon, the assumption that costs of data collection were higher than total costs may have been accurate. But no longer.

...But Dynamic Pricing Compresses Volatility

A hard look at a standard price duration curve (see Exhibit 1) for power rapidly leads one to two conclusions: one, prices are volatile, and two, that volatility drops dramatically from the peak. (Note: so that the remaining data would be more visible we have capped the graph at $200 MWh, which cut off 22 hours where prices exceeded $200 MWh. Had we not capped the graph, the y-axis would have extended above $1000 MWh but at the scale of this graph, the data line merged with the y-axis.)

Exhibit 1

Price Duration Curve (New York City)



Source: NEPOOL, Morgan Stanley Commodities

In fact, according to Dr. William Smith, manager of market-driven load management at the Electric Power Research Institute, a 10% drop in peak demand could lead to a drop in wholesale electricity prices of 50%. But those who are focused on the supply side of the business ignored such calculations because they couldn't imagine peak demand could be cut. It's no wonder that those who continue to believe that electricity is price inelastic and that demand response is non-existent were surprised by the dramatic drop in California electricity prices in the last several weeks.

Liquidity Will Determine the Future

Electricity trading is a nascent market. Liquidity still leaves a lot to be desired. But it is also a market where the difference between boom and bust pricing scenarios are razor thin — a concept paid little attention by many observers. I've seen one study that concludes that the difference between boom and bust pricing is 2% of capacity. In other words, a 2% shortage leads to a boom in pricing (reserve margins of, say, 13% versus 15%) and 2% more capacity than needed creates bust pricing.

Two thoughts strike me about this. (1) How difficult it is to determine demand in this industry. (Remember when inaccurate forecasts of demand in the late 70s and early 80s resulted in overcapacity in the entire US electric utility industry for more than a decade?) (2) An economic slowdown or two years of back-to-back hot weather would account for much more than 2% of capacity. This would likely lead to a rapid swing between boom and bust pricing — otherwise known as extreme price volatility. Indeed, California's perfect storm was little more than a drought (combined with a pipeline explosion) that was sequentially mishandled.

So volatility — in sales and, therefore, in pricing – seems to be inherent in the current industry structure. But does it have to be? And who can change it? And how?

Information Is Ever More Valuable — and It Costs Less

I believe both sales and pricing in the electricity industry are in the first days of some serious rethinking. And that the application of technology and new ideas to this old, monopoly-constrained business has the potential to unleash huge creativity and huge structural change in the business so many people think they know and understand. And what will become increasingly clear is that many people do not really know or understand the business and what really makes it tick.

I think the real value of the California crises will turn out to be that creative minds — made aware of electricity as something more than what makes a light switch work or what exists behind one's computer plug — will devote more attention to the power issue. Numerous voices have been raising the issues of power quality and power reliability and the need for "clean" power for the digital age. But nothing brings home a point like a crisis. And the heart of the digital age and the seat of venture capital and technological savvy has a new appreciation for a force so ubiquitous we all have learned to take it for granted.

Lessons Learned from California

So what are some of the lessons they (and we) have learned from California's year-long nightmare? Here they are as I see them:

- First, there is a huge problem *and, therefore, a huge opportunity* in the supply and demand balance of electricity.

- Supply is the one side of the equation that traditional players want to address. The other side, demand, is where the real opportunity lies.

- Third, the technology of electricity is mired in the mid-20th century. Silicon and solid-state electronics have not been widely incorporated in the majority of the electricity system (including generation, transmission, distribution, or supply). *An appreciation for the role of technology and the potential for a technological solution to the supply/demand imbalance may be California's real contribution to the rest of the world.*

- Government and the traditional utilities and suppliers are part of the problem, not part of the solution. Consumers' trust in and support for both government and electricity providers appear to have badly eroded. Utilities are now the bad guys with brand image problems. First, getting into such a bind, and now, more ludicrously, having the problem reverse so rapidly, so decisively, and so publicly just exacerbates the impression that neither government nor the energy industry can be trusted to solve the problem or to seize the opportunity.

- All varieties of consumers *want a long-term solution.*

- Price elasticity is alive and well in electricity. Consumers *can* have control over their destiny and *can* respond to appropriate pricing signals and *can and did solve California's short-term problem.*

While much of the industry and many if not most in government still talk about "conservation" or "demand-side management," (much to my dismay) — it is increasingly obvious to the rest of the world (those who "don't know better") that price affects demand in both the long and the short run.

And that's where the opportunity lies and where the real value of information is.

A Growing Appreciation for the Real Value of Information

Those who are beginning to recognize the size of the opportunity that California delineated, those who view the industry with an outsider's eyes, those without the blinders that don't say "but electricity is different," and with an appreciation for what technology can accomplish, may have a better awareness of the possibilities inherent in this industry.

Those who are part of the Information Age can visualize the informational inefficiencies inherent in this system. To name just a few, consider the:

- informational value of the difference in prices of electricity and gas (the genesis of electric/gas convergence);

- information capable of being captured from corporate systems and customers' meters;

- value inherent in capturing such information;

- value inherent in accurate weather information, prediction, and hedging; and

- remarkable value of accurate information about costs and prices.

Each of these is worth a separate treatise but let me just give a few examples. One of my favorites:

Case in Point: Intelligent Air Conditioners

What if your air conditioner's sensors knew a temperature and humidity increase was likely to cause higher electricity prices and was programmed to contact other air-conditioners and refrigerators in the neighborhood and organized a cycling pattern to reduce overall consumption with no apparent change in air comfort and food temperature?

Air conditioners and refrigerators are responsible for a huge chunk of electricity usage nationwide. Combine that with the relationship between peak demand and wholesale prices noted above and the potential exists for a dramatic swing in pricing and future price expectations. Add that to the slowdown in technology industry sales and the huge new market for chips and routers and servers and bandwidth that such a scenario implies and it's not hard to understand the excitement that the electricity industry is beginning to generate outside its own world.

Dynamic Pricing: Letting the Consumer Know the Cost of Electricity in Real Time

After spending so many years as an analyst and observer of the electricity industry, sometimes my patience wears a bit thin. This confession is brought about by thoughts of "conservation" and "demand-side management" and "real-time pricing." What value a real marketing person could bring to this subject...

As I watched the debacle in California unfold, I couldn't help thinking that the real solution to the problem was frighteningly simple. It lay smack in between Governor Davis' refusal to raise prices and pleas for conservation and President Bush's implied belief that price caps don't work and real Americans won't conserve.

Of course people don't want to pay more! Of course people want all the electricity they can use! Of course price controls don't work! Of course people want to protect the environment! *These are not mutually exclusive concepts!*

But we live in a democracy. So what's wrong with letting the people choose? I believe that for just a small portion of the obscene amount of money California poured down the drain buying all the power its government thought its citizens wanted and with a decent marketing campaign, everyone could have had all they wanted. Governor Davis could have said he didn't raise prices. President Bush could have said he wasn't capping prices. Consumers could have used all the energy they wanted. And their bills wouldn't have to go up. Too good to be true? I don't think so...

...**The real value of information in electricity is in knowing real costs and real prices in *real time.*** This concept always brings to mind the financial markets and the value of real-time information. How many wouldn't laugh if I said the average price of Pets.com over the last year was $100 and I won't tell you want the current price is — do you want to buy some? No wonder the merchant energy companies are making bundles capturing the value of the information they have about current prices and real, current costs. Yet consumers continue to be treated as outsiders. I see very little difference between the huge price companies once charged for stock quotes that were more recent than yesterday's newspaper. Then for prices that weren't "tape-delayed" by 15 minutes or more. Until the advent of information systems that provided real-time quotes essentially free. Think how that changed the financial markets.

The electricity equivalent I call *dynamic pricing*. It's what customers can get with a meter that has a few dollars worth of silicon and a 24 hours a day/7 days a week connection to the outside world. (I recently asked a distribution utility executive what he thought such a meter would cost. I found it frightening that, in the space of three minutes and with no input from anyone else, he cited three estimates for such a meter: $1500, $1200, and $1000 — it was clear he just didn't have a clue as to current costs. Other industry sources looking at new, high, tech meters put this number at a cost of $100 to $150 to the customer.)

With a tiny fraction of the money it spent on 10-year contracts at extraordinary prices, I believe the government of California could have outfitted every consumer in California with such a meter — and then announced "we're not raising prices — but we'll let you know how much the power *you* use costs *when you use it*. And you can use all you want whenever you want. If you use power when its cheaper, you could even *reduce* your bill and still use just as much as you have in the past.

This is just one example of the value inherent in information. All the average pricing and average costing and subsidies and inefficiencies in the industry are beginning to be unmasked. And that has two important implications: first, that the risks inherent in the industry are shifting and second, that the information that is being uncovered is infinitely valuable.

Recognition of Volume/Price Risk

What is becoming painfully obvious, what California is clearly unmasking, is the risk inherent in the industry and how that risk is shifting.

When all customers do not pay the real costs of the power they use, those costs are paid by someone else. In the old days of regulation and monopoly and mechanical switching — i.e., before silicon and the digital age, the best system that could be devised was average pricing across customer classes. Some very large users justified the use of expensive metering to determine actual demand and real volumes, but most did not.

Those days are long gone, however — for a few reasons. Two of the important ones: First, the cost of information: it is falling rapidly. Second is the difference in peak versus non-peak costs and prices. While there were always large differences, there were no incentives to arbitrage the difference.

Today, convergence allows players in the market to trade the spark spread — the differential between gas and electricity prices. Energy marketers and traders have the incentive to manage load and capture the value inherent in the difference between peak costs and off-peak costs. With a 2% difference between boom and bust pricing, everybody has an incentive to increase the efficiency of capacity and to capture all of the information in load shape and load patterns and customer price sensitivity and to implement, develop, and create technology to do so.

It's All About Choice...

Dynamic pricing is one solution about to happen. But others abound. Allowing customers to choose power quality. Allowing equipment to choose quality and reliability. The ability to choose power quality, reliability, and price by customer, by equipment, and by usage (the quality of power you might assign to your use of a computer for business purposes and that of your teenager for Voice over Internet Protocal might be substantially different...).

And then there's the opportunity inherent in networking — I recently wrote a piece (*Musings on Boundaries, Criticality, and Emergence*, March 23, 2001) on the potential for restructuring the industry in networked distributed generation and using complexity science and the work being done on complex adaptive systems to control the electric grid just as the Web and telecommunications systems do.

I've since seen numbers that indicate up to 50,000 MW (yes, that's 50,000 megawatts) of installed gensets are largely *not* interconnected. (That's 20% more that the peak demand of the entire state of California.) And that 270 million remote devices such as electricity, gas, and water meters contain critical enterprise data. This represents a real opportunity. And the venture capitalists and the technology entrepreneurs in Silicon Valley and throughout the US and the rest of the world are being turned on to the possibilities. I don't think its an accident that both *Technology Review* magazine and *Wired* magazine ran cover articles on the new power technology being developed and implemented. The power tech business went red hot, just as the dot-coms turned ice blue.

But if there is value in information, knowing where and when the opportunities abound, and knowing how to leverage and exploit them is truly infinitely valuable. And that may be the real lesson from California.