EXHIBIT NO. ______ (PFP-1T)
DOCKET NO.____________
2001 PSE RATE CASE
WITNESS: P. FOX-PENNER

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND
TRANSPORTATION COMMISSION,

Complainant,

v.

PUGET SOUND ENERGY, INC.

Respondent.

DIRECT TESTIMONY OF PETER FOX-PENNER ON BEHALF OF PUGET SOUND ENERGY, INC.

NOVEMBER 26, 2001

PUGET SOUND ENERGY, INC.

DIRECT TESTIMONY OF PETER FOX-PENNER

Q: **Please state your name and business address.**

A: My name is Peter Fox-Penner. My address is 1133 20th Street, NW, Washington, DC.

I. INTRODUCTION

Q: Please describe briefly your educational and professional experience.

A: I am an economist specializing in electric utility regulation and energy policy and Chairman and a Principal of *The Brattle Group.* My qualifications are detailed in Exhibit PFP-2).

Q: What is the purpose of your testimony?

A: My testimony explains the economic policy reasons why Time of Day ("TOD") and other time-varying or dynamic pricing programs are necessary for the long run development of efficient electric markets and remain extremely salutary during the ongoing period of supply shortage in the Pacific Northwest.

Q: What are the primary conclusions of your testimony?

A: Time-varying electric prices such as PSE's are highly beneficial to most customers who have them and to the market place as a whole. Dynamic pricing encourages reduced consumption during peak periods when power is most costly, when the grid is under its greatest strain, and often when environmental costs are highest. Importantly, dynamic pricing programs help reduce volatility and price spikes in wholesale power markets. They use the inherent power of economic incentives to reduce costs, conserve resources, reduce wholesale price spikes, reduce the potential exercise of market power, increase reliability, and provide environmental benefits. This powerful combination of benefits helps explain why price-responsive demand programs have received widespread support in the Northwest and around the U.S. from regulators, academic experts, consumer groups, and the consumers who participated.

II. THE GENESIS OF DYNAMIC PRICING PROGRAMS AND THE DEVELOPMENT OF PRICE-RESPONSIVE DEMAND

Q: What is Time of Day pricing?

A: TOD pricing is a form of dynamic pricing that uses predetermined prices that apply to fixed time periods each day and each season. The TOD price differentials are based on the expected system marginal cost. In a simplified fashion TOD pricing captures the expected variation in marginal cost across periods of each day, business days vs. weekends, and seasons. By adjusting their discretionary loads, consumers can avoid overusing energy during periods when it is costly to supply and similarly they can avoid under-using low cost energy from "off-peak" periods.

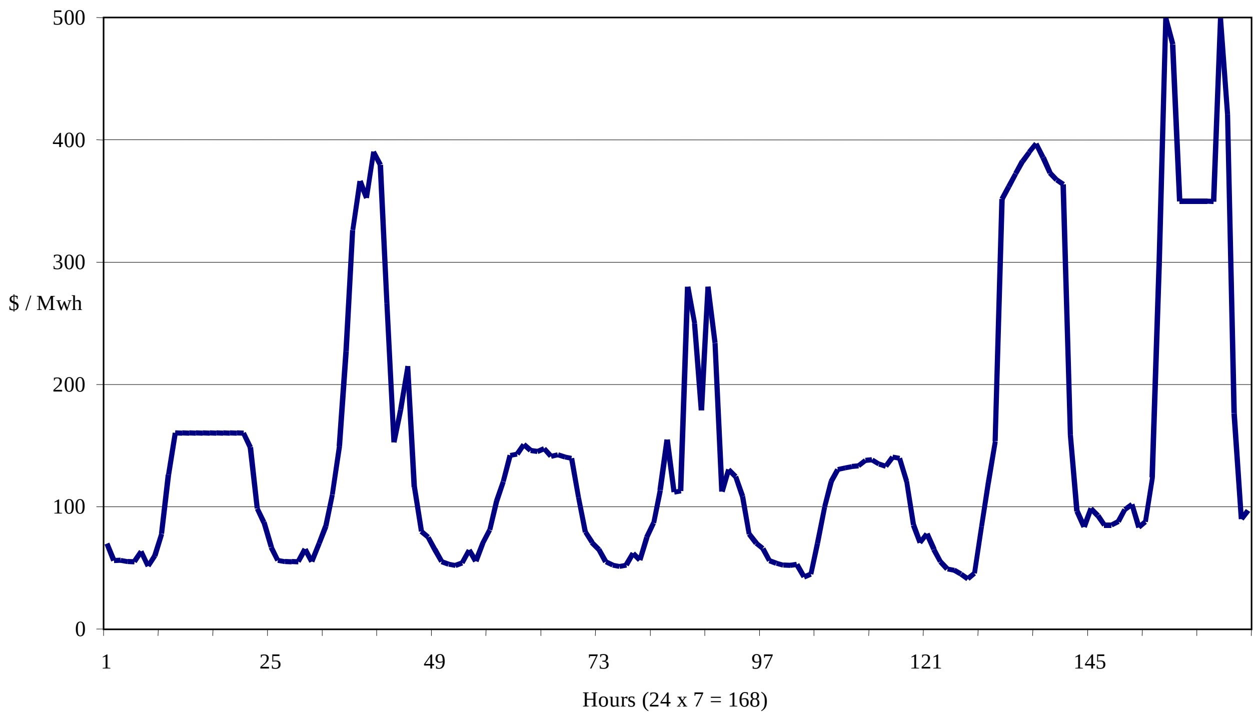
Q: Is this expected time variation in marginal cost something new?

A. No, it is not new. Marginal production costs have varied since the days Samuel Insull discovered the value of aggregating customer loads. However, utilities today supply an increasing portion of their retail load by buying it on the bulk power market, rather than generating it. Moreover, all utilities are responsible for "balancing their loads" – either selling or buying the surplus power they need in any hour beyond what they can supply, and for this they frequently use competitive spot markets. This greater reliance on spot markets has increased the visibility and importance of the marginal cost differences for hours, days, or months.

Q: **Can you provide an example of the time varying nature of wholesale market prices?**

A: Yes, Figure 1 shows the extreme volatility in day-ahead prices for Northern California over a single week during the summer of 2000. During this week, the peak price was more than twelve times the week's lowest price. While the volatility of prices shown here exceeds current prices, it is not at all unusual to see peak period marginal costs ten times as large as the lowest off-peak spot price.

Figure 1: Northern California Hourly Prices for the Week from July 25 to 31, 2000



Source: California Power Exchange day-ahead zonal clearing prices for the North of Path 15 zone.

Q: **What is Real Time Pricing?**

A: Although marginal costs have a representative seasonal and diurnal pattern that serves as the basis of TOD rates, marginal costs have additional, unexpected variations around the usual pattern due to actual demand, weather, and other factors. This gives rise to another form of dynamic pricing known as Real Time

Pricing ("RTP"). Under RTP, actual hourly prices for a day are posted only 24 hours or even one hour ahead of time when actual marginal costs or market conditions are known. Both RTP and TOD pricing options provide price signals for customers that are much better aligned with the marginal cost of producing and delivering electricity than flat rates.

Q: What are the similarities and differences between the competitive markets for electricity and those for other commodities that make dynamic pricing important?

A: Every market has ways of balancing the pressures of demand and supply. However, the working of the electricity market across the grid of high voltage transmission lines differs from most other markets. At the present time, there generally is no economically feasible way to store large amounts of electricity, so the amount of generation supplied must equal demand at every moment. Demand for electricity varies significantly throughout the day due to the society's cycle of work, leisure, and rest as well as the weather. Further, the variable or marginal cost of producing electricity differs dramatically across the whole spectrum of generators called upon to meet this varying aggregate load. These and other characteristics of the electric industry explain the significant price volatility of wholesale market prices for power that varies dramatically even on an hourly basis.

Q: Under traditional regulation, have retail electricity consumers been "signaled" about the high variability of marginal cost through the way that electricity has been priced?

A: In general, no, and especially not smaller customers.[1] Despite the volatility in hourly wholesale prices, retail electricity prices have historically been set at flat,

---

[1] There are certainly individual exceptions to this general rule. Many utilities experimented with TOD rates in the 1980's and subsequently offered voluntary programs that

time-invariant or "single price" rates. The base rates are generally fixed at a level designed to recover average costs for a period of several years. The flat rates sometimes vary with the price of fuel and purchased power on a semi-annual or other periodic basis. When wholesale market prices are high retail customers continue to pay a single price rate that is not equal to and most of the time is below the true cost of supplying power at that time. Unfortunately, this flat price provides retail consumers with an incentive to use more power than is economically efficient during hours when marginal costs as reflected in wholesale prices are high and exceed the flat rate paid by retail customers.

Q: If dynamic pricing is employed to provide such a price signal, how are customers likely to respond?

A: If a customer gets a price signal indicative of variable marginal costs in the wholesale market, the customer will be incented to adjust his or her consumption relative to the increased (or decreased) cost of the commodity. The customer's incentive arises because he or she can lower his or her bill by changing the timing of their discretionary electricity usage (temperature settings, running the dish washer, washing clothes, etc.) to avoid the high price periods. (Non-discretionary uses such as a refrigerator or certain lighting are usually not adjusted.) With programs like TOD pricing, these changes can become routine.

---

were joined by small numbers of customers. Some states made TOD rates mandatory for non-residential customers above some size. A few states selectively mandated residential TOD rates, including MD for new residential homes with air conditioning and very large customers and ME for very large residential customers. All of these programs have now became voluntary and they have kept many of their participants. However, the total number of residential TOD participants is a few hundred thousand, whereas there are about 100 million U.S. households.

Q: What infrastructure is required to deliver these dynamic-pricing options to retail customers?

A: Implementing dynamic pricing programs requires advanced metering, billing, and communication technology. This infrastructure must enable the utility to provide the time differentiated price information to the customer in a clear fashion. Second, there must be metering that records and stores usage by the time periods in which the TOD or RTP prices vary. This is the only way the consequences of an individual consumer's efforts to conserve energy can be rewarded. Third, the customer's interval kWh-consumption data must be transmitted periodically to the utility for billing. Finally, it is generally the case that consumers will respond rationally if the utility can provide direct feedback about conservation actions in terms of data and analysis on the customer's recent electricity use and its bill-savings impacts.

Q: Does Puget Sound Energy have this technological capability?

A: Yes. PSE has outfitted most of its system with new metering, communications, and billing technology that measures not only how much electricity is consumed, but when it is consumed.

III. THE BENEFITS OF DYNAMIC PRICING

Q: What are the broad societal benefits provided by dynamic pricing?

A: Sending end-use consumers price signals through time-varying prices provides five kinds of benefits to consumers.

- Price signals will encourage customers to shift demand away from high price periods, resulting in reduced peak period usage and bill savings by the customers directly involved.

- Demand-side responsiveness by the participants will increase the competitiveness of electricity markets and reduce the severity of price spikes to the benefit of all customers.
- Lower consumption during peak periods will increase system reliability.
- Dynamic pricing will provide some environmental benefits.
- Dynamic pricing should reduce the need for additional peak generating capacity.

Q. How does dynamic pricing encourage price responsive demand and how does price responsive demand reduce peak period usage and customers' electric bills?

A: If peak period prices rise (and off peak prices fall), then simple economics says that, other things being equal, peak period usage will fall (and off peak usage will rise). This response may or may not take time depending on the motivation of the consumers and other factors. Encouragingly, results from the pilot program showed customers immediately reduced peak consumption and this, in turn, enhanced demand responsiveness. For example, in this PSE pilot TOD program, the average usage in the peak periods went down by about 4.4%.[2]

Q: Should policy makers be encouraged by the reaction of PSE customers to its TOD pilot program?

A: Yes. The evidence to date shows that consumers are willing to participate in TOD programs when they see an alignment between what their retail provider is offering and the larger regional policy goals of conservation, cost savings, and the management of a drought-induced water crisis. When the customers participate, they appear to find that price incentives accompanied by a high-tech informational

---

[2] The Brattle Group, *An Evaluation of the Impacts of Puget Sound Energy's Time-of-Day Program*, Prepared for Puget Sound Energy, November 5, 2001.

support system enable and motivate them to change their patterns of use for their own and society's betterment.

Q: How does dynamic pricing decrease the wholesale price of power on average and reduce the impacts of price spikes?

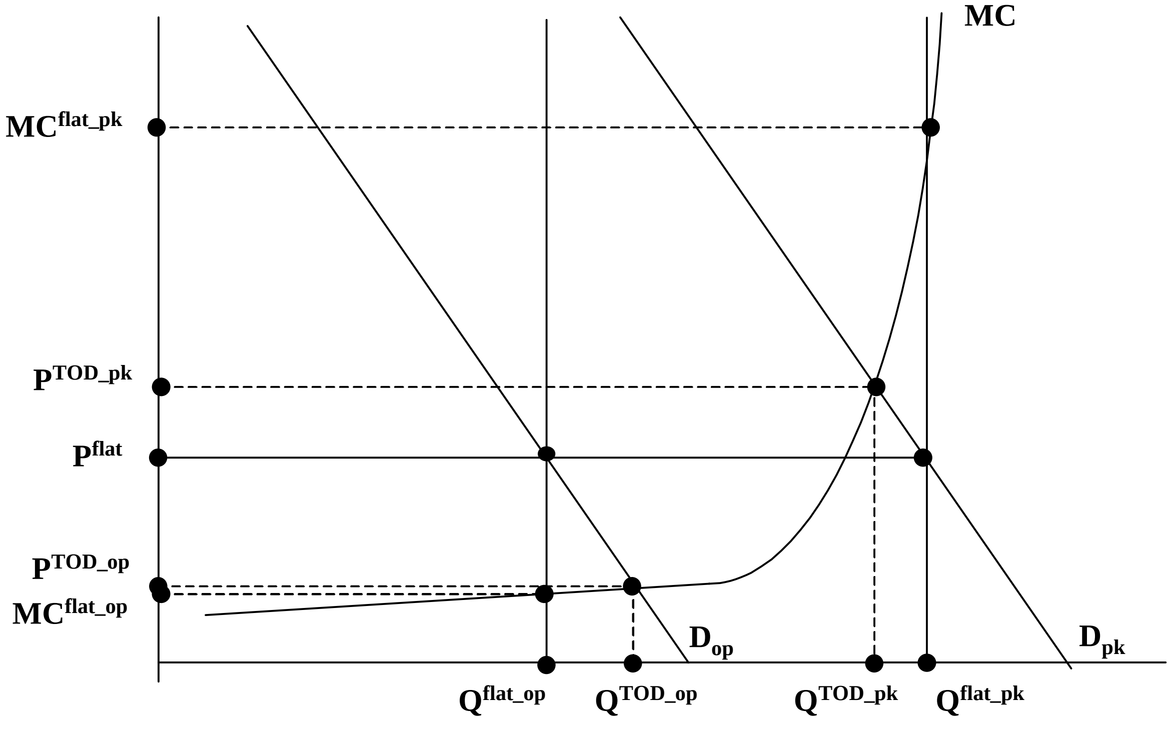
A: The benefits of price-responsive demand extend well beyond the set of customers participating in the dynamic pricing program. The introduction of price-responsive demand decreases the average regional price of wholesale power in the market as a whole. Since virtually all utilities buy some amount of power on the spot market or at prices tied to the market, all utilities will see a cost decline. When cost savings are passed to customers, there will be benefits from TOD pricing throughout the region. The benefits to the Pacific Northwest region are examined in more detail by PSE witness Eric Hirst.

Q: Can you describe how price responsive demand works, particularly on price spikes?

A: Yes, this behavior is shown in Figure 2.

Figure 2

Impact of TOD Versus Wholesale Pricing



The wholesale marginal cost curve ("MC" in the figure) represents the marginal cost of supplying generation to the regional wholesale market at varying levels of wholesale prices. The demand curves, D_{pk} and D_{op} represent the aggregate demand for peak and off-peak electric power respectively.

Under traditional rates, consumers see only one flat, fixed price during both periods, P^{flat}. Given this single price, consumers demand Q^{flat_pk} during the peak hours and Q^{flat_op} during the off-peak hours. On the right side, the figure clearly illustrates that the marginal cost, MC^{flat_pk} of producing Q^{flat_pk} energy is much higher than the fixed price, P^{flat}. Thus, consumers are given the wrong price signal and they tend to overuse expensive peak electricity, adding to peak demand and decreasing reliability. During the off-peak hours, consumers under a fixed price system would see the same price, P^{flat}, and would choose to consume Q^{flat_op}. The marginal cost of producing this energy, MC^{flat_op}, is below P^{flat}, and there is another wrong price signal. However, the difference is likely to be less than at peak because the marginal cost curve is typically much flatter during the off-peak.

Under dynamic pricing, these price signals are corrected. In the peak period, consumers will see a price, $P^{TOD\_pk,}$ equal to the higher expected marginal cost of producing energy and consume the quantity, Q^{TOD_pk}. In the off-peak period, consumers would face the price, P^{TOD_op}, equal to the lower expected marginal cost and would choose to consume quantity, Q^{TOD_op}. During peak TOD periods, higher TOD pricing will incent consumers to reduce the quantity demanded (from Q^{fixed_pk} to Q^{TOD_pk}) relative to a market without TOD pricing, in proportion to numbers of customers are on TOD programs and their demand responsiveness. That reduction in the quantity demanded will result in a lower wholesale market price. The potential for significant reductions in peak prices will provide benefits to all consumers that participate in the wholesale market, even those not on dynamic pricing rates.

Q: Has the potential impact on price spikes of dynamic pricing and the induced price responsive demand been estimated?

A: Yes. For the summers of 1998 and 1999, Caves, Eakin, and Faruqui estimated the potential impact that RTP could have had on the Midwest price spikes.[3] Assuming a relatively modest demand response to market prices from only 10% of customers, these simulations found a significant impact on market prices.

---

[3] Mitigating Price Spikes in Wholesale Markets through Market-Based Pricing in Retail Markets, Douglas Caves, Kelly Eakin, and Ahmad Faruqui, Electricity Journal, April 2000.

When market prices without demand responsiveness were $10,000 per MWh in one case and $100 per MWh in another, this small amount of demand responsiveness would have led to demand reductions of 6% and 1%, respectively, and price reductions of 73% and 11%, respectively. The market price in two cases impact on increased consumption at below-average market prices was also analyzed in the same study. When market prices were $25 and $17 per MWh, increased consumption would cause wholesale market prices to rise by 4% and 0%, respectively.[4]

For the California (and Western) market during the summer of 2000, another study by Braithwait and Faruqui developed simulations to analyze the impact that price-responsive demand would have had on wholesale prices.[5] Their analysis shows that "customer demand response to hourly, market-based retail prices could have generated load reductions of 1,000 to 2,000 MW, reduce [*sic*] market prices by six to 19 percent, and produce [*sic*] energy cost savings ranging from $0.3 to $1.2 billion." These results show that the price relief offered by the introduction of a TOD program can be significant. The price benefits described here are broadly consistent with the Pacific Northwest regional benefits estimated by PSE witness Eric Hirst in this proceeding

---

[4] While this study evaluated the benefits of RTP, the results are still broadly applicable to PSE's PEM program, although potentially somewhat muted because TOD rates will not reflect the extreme price spikes.

[5] The Choice Not to Buy: Energy Savings and Policy Alternative for Demand Response, Steven Braithwait and Ahmad Faruqui, Public Utilities Fortnightly, March 15, 2001.

Q: What is the impact of dynamic pricing on the possible exercise of market power in Western wholesale power markets?

A: High market prices give rise to concerns about the abuse of market power. Adoption of dynamic pricing reduces the potential for the exercise of market power. A December 1999 analysis of the California market by Severin Borenstein and James Bushnell found that "in hours when the potential for market power exists, its impact on prices is significantly reduced when the [price-responsiveness] of demand is increased."[6] The California Independent System Operator also noted in a recent filing that "a workably competitive market requires price-responsive demand."[7]

Q: Is there any way to predict how Western wholesale energy markets will behave in the future and whether dynamic pricing will be as necessary?

A: There are a number of uncertainties in predicting the future of Western energy markets, including the development of new generation supplies, (including distributed and renewable power) hydrological conditions, the pace and design of RTOs and other market institutions, and, finally, the amount of price responsive demand and conservation. This considerable uncertainty only increases the value of time-varying prices. Time-varying prices would have been economically and environmentally wise even in the far less uncertain pre-restructuring utility industry. Today, with restructuring and its greater uncertainties upon us, the rationale for time-varying prices is overwhelming. Time-varying prices provide a forward-looking hedge against price volatility and an excellent form of insurance

---

[6] An Empirical Analysis of the Potential for Market Power in California Electric Industry, Severin Borenstein and James Bushnell, December 1998, p. 35.

[7] Price Cap Policy for Summer 2000, California ISO Department of Market Analysis, March 2000, p.31.

against the possibility of another crisis. A broad array of wholesale and retail providers should adopt time-varying prices as soon as possible to reduce the chance that another crisis occurs in the U.S. electricity market place.

Q: How does dynamic pricing increase reliability?

A: The peak-reducing benefits of a dynamic pricing program will occur at the times when capacity is least available because demand is the highest. By reducing the peak load, price-responsive demand will result in higher generation reliability margins. Lower peak demands will also reduce peak loadings on transmission and distribution facilities, which will improve regional and local reliability.

Q: How quickly can the reliability benefits of dynamic pricing be achieved and how does this compare with supply side resources?

A: The benefits of dynamic pricing programs can be achieved very quickly relative to most supply-side options. Programs, like PSE's PEM program, can be implemented for a large share of its customers almost immediately. While the general expectations have been that there would be a lag of some months as customers went through a learning process about how to change consumption patterns in response to the TOD rates, the PSE TOD pilot program began to show load shifting in the first month the program was initiated. In contrast, construction of new generating capacity generally has a lead-time of two or more years.

Q: Does the introduction of dynamic pricing to the Northwest provide environmental benefits?

A: Yes, price-responsive demand will also provide environmental benefits to the Northwest in four ways. First, the incorporation of efficient price signals into existing rates will lead to a more efficient combination of supply and demand resources to meet reliability. The use of more demand-side resources to ensure reliability will reduce the need for additional generation, transmission, and distribution resources. Reducing the need for these supply-side assets will reduce the potential environmental costs associated with siting and operating facilities.

Second, dynamic pricing can help save scarce and valuable water resources. During a severe drought such as the winter of 2000-01, avoiding shortfalls of power can require the use of emergency hydropower. According to the NWPP, "the impact of drought reduced the region's hydropower supply by about 4,000 megawatts – nearly enough power for four Seattles."[8] The amount of stored hydropower was ultimately restored, but the reduced water spills at the Columbia and Snake Rivers resulted in reservoir levels and flow rates that did not meet targets set for Salmon and Steelhead. Price-responsive demand will reduce peak energy usage, and thus the need to operate emergency hydro.

Third, by creating a resource that can avert potential shortfalls during the summer and winter, price-responsive demand can lead to emissions reductions by eliminating or reducing the need to operate emergency backup generators. These backup generating units are often diesel-fired and are a source of particulate and NOx emissions.

Fourth, dynamic price signals could create an incentive for more rapid development and deployment of smart-building technologies. These technologies are communications and energy control applications that can adjust energy consumption automatically in response to programmed instructions and inputs on internal demands for comfort, temperature and humidity readings, and current electricity prices. In conjunction with TOD or especially RTP pricing, this type of

[8] http://www.nwcouncil.org/library/releases/2001/1017.htm

technology can allow customers to minimize their peak usage and accompanying benefits while maximizing convenience of the users.

While this "smart building" equipment is available for homes and commercial spaces from vendors such as Carrier, Honeywell, Johnson Controls, and Science Applications International Corporation, it is yet to experience wide-spread acceptance. In a classic "chicken and egg" situation, builders have been reluctant to incorporate smart-building technologies in their buildings because flat prices reduce the economic benefit of these technologies, while utilities do not see sufficient demand responsiveness by customers to offer dynamic pricing. However, this situation is changing in response to the widespread concern over possible price spikes.

For example, in New England, Connecticut Light and Power (CL&P), a regulated delivery subsidiary of Northeast Utilities, has in the past year expanded its menu of Demand Side Management (DSM) programs to include the Load Response Incentive Program developed in conjunction with the New England ISO.[9] This program provides a variety of incentives, including on-site assessments and direct monetary incentives or interest-free loans for the costs of software, data recorders, and site preparation. Two ways exist for reducing power costs, including monthly payments for having load on 30-minute standby and real time pricing. These payments are developed in conjunction with the New England ISO in an attempt to reduce peak demand and increase reliability. New building technologies are being included in the DSM programs that reduce peak load as well as increase energy efficiency, including energy management systems

---

[9] See www.cl-p.com where there is information on the Load Response Incentive Program of Connecticut Light and Power in conjunction with the New England ISO.

and control technologies, and dimmable high efficiency lighting ballasts. Because it is so new, CL&P has begun marketing this program by conducting seminars for CEOs of its medium and large customers.

IV. REGULATORS' AND INTERESTED PARTIES' VIEWS OF PRICE-RESPONSIVE DEMAND PROGRAMS

Q: Have any of the parties involved in energy policy in the Pacific Northwest and the Western U.S. called for increased use of time-varying pricing?

A: Yes. The disconnect between retail and wholesale electric markets is widely recognized as one of the principal contributors to the western electricity emergency and, in general, a significant barrier to competitive electricity markets. This has prompted widespread calls for the implementation of dynamic pricing programs, such as PSE's dynamic pricing programs. These calls have included statements by public officials, regional planners, regulators, consumer groups, and academic experts. This section of my testimony summarizes the positions of these key policy-makers and industry participants.

Q: What is the position of the Western Governor's Association ("WGA") regarding price-responsive demand?

A: On February 1, 2001, the WGA convened a roundtable to identify critical problems leading to the energy emergency and develop possible remedies. Based on discussions at this meeting, a policy paper was released with recommendations for short-term and long-term actions for addressing the situation. While supply-side solutions were an important part of the WGA's recommendations, the demand-side actions were also important. One of the key demand-side measures was developing electricity rates that provide customers with more accurate price signals:

> *Request utilities and state and tribal public utility commissions to adopt rate reforms that send more accurate price signals (or a*

> *proxy for such price signals) to consumers. This is the first step in empowering customers to make wise decisions about their energy usage and to make investments that reduce their total use and cost. This means developing and deploying technologies that allow building owners and other consumers to receive more accurate price signals that encourage them to reduce or shift consumption to off-peak times.*[10]

Q: What is the position of the Northwest Power Planning Council ("NWPPC") and the Washington State Office of Trade & Economic Development on price-responsive demand?

A: In October 2000, the NWPPC issued its "Study of Western Power Market Prices: Summer 2000."[11] This report examined the cause of the price increases that occurred during the summer of 2000. As with many other studies, the NWPPC pinpointed the lack of demand-side response as one of the key causes underlying the electricity emergency. The Council also indicates that a projected near-term deficiency in supply should be addressed through a combination of new generation capacity and economical load management.

A March 26, 2001 NWPPC report reiterates the call for price-responsive demand as a critical resource to support reliability at a time when shortfalls are a reality. The report's imperative for demand-side responsiveness reflects the view that these measures can be implemented quickly in order to provide immediate and continuing relief to the system. The best options for demand-side

---

[10] Governors' Recommended Actions for Addressing Immediate Electricity Problems in the West, Western Governors' Assoc., Feb. 2001.

[11] Study of Western Power Market Prices Summer 2000, Northwest Power Planning Council, October 11, 2000, p. 2. See *http://www.nwcouncil.org/library/index.htm.*

management are those programs that provide consumers with efficient price signals, such as real-time pricing.

The views of the NWPPC are echoed in the 2001 Biennial Energy Report, a review of energy issues facing the state of Washington developed by the Washington State Office of Trade & Economic Development for the state legislature.[12]

Q. What is the position of the Federal Energy Regulatory Commission ("FERC") on time-varying rates?

A: The FERC recognized the disconnect between wholesale and retail markets early on as part of its 1998 report on the Midwest price spikes:

> *The fact that retail customers had no incentive to adjust their usage based on price contributed to the price spike. Retail competition, coupled with the ability to respond in real time, could allow customers to see the price of the power they use and react accordingly.*[13]

In its November 2000 report reviewing the performance of western power markets during the summer of 2000, the FERC encourages California to implement policies that will increase the price-responsiveness of retail demand. One way that California could create this price-responsive demand would be to allow time-varying rates. As the FERC noted "Just allowing large retail

---

[12] 2001 Biennial Energy Report: Issues and Analyses for the Washington State Legislature, Washington State Office of Trade and Economic Development, Energy Division, January 2001, Chapter 1. See *http://www.energy.cted.wa.gov/BR2001/default.htm.*

[13] Staff Report to the Federal Energy Regulatory Commission on the Causes of the Wholesale Electric Pricing Abnormalities in the Midwest During June 1998, FERC Staff, September 22, 1998, page 4-6.

customers to face the price in the wholesale market would provide more demand responsiveness to the wholesale market."[14]

Q: What is the position of the California Public Utilities Commission ("CPUC") on time-varying rates?

A: In August 2000, the CPUC and the state's Electricity Oversight Board issued a report determining factors that led to problems during the summer of 2000 and providing recommendations to avoid future problems.[15] The report recognized the importance of price-responsive demand as a way to combat horizontal market power, noting " . . . the potential for sellers' market power or customers' inelastic demand to drive up prices." Further, the report indicated that a reliance on load management is essential to prevent blackouts:

> *Demand side management and load shifting actions form a crucial component of our ability to avert black-outs. For example, the State may be able to conserve 1000 MW of electricity during peak demand times if the State Water project and its contractors forego water pumping during specified peak times. . . . Installing meters and telemetry equipment to enable water pumpers to be able to defer pumping – and to coordinate with other users and pumpers – is key to obtaining this statewide load shifting benefit.*

---

[14] Part I of the Staff Report to the Federal Energy Regulatory Commission on Western Markets and the Causes of the Summer 2000 Price Abnormalities, FERC, November 1, 2000, page 6-1.

[15] California's Electricity Challenges and Options, Report to Governor Gray Davis, California Public Utilities Commission and Electricity Oversight Board, August 2, 2000, p. 52.

Furthermore, in a proceeding involving San Diego Gas & Electric the CPUC wrote[16]:

> *The revelation of the real-time price of electricity coupled with a rate alternative that allows the customer to respond intelligently will produce savings for any customer who is able to shift demand from peak to off-peak hours. The potential that many customers will respond to this opportunity to take significant control over the cost of their consumption will produce a collective benefit, in that demand will be redistributed away from the current peaks. Future generation demands will be forestalled even as existing investments in generation are made more productive. The result is a triple win, embracing the individual consumer of any class who is able to reduce costs by shifting load, the society at large which defers the demand for new generation, and investors in existing plant and equipment who see it put to more productive use.*

Q: Has the Federal Trade Commission ("FTC") commented recently on time-varying rates?

A: Yes. The Federal Trade Commission recently issued a major report on electric-power regulatory reform.[17] One of its key recommendations is that:

---

[16] San Diego Gas & Electric Company 2000, *Application of San Diego Gas & Electric Company (U 902-E) for Authority to Provide Customers with Real-Time Energy Meters*, Docket No. A.00-07-055, before the California Public Utilities Commission, San Diego, CA, July 31.

[17] Federal Trade Commission 2001, *Competition and Consumer Protection Perspectives on Electric Power Regulatory Reform: Focus on Retail Competition*, p. 50, Washington, DC, September 2001.

> *"Until customers have the ability to participate effectively in retail markets through variable pricing in conjunction with sufficient and transparent price information, retail markets cannot operate efficiently, and thus are less likely to be fully competitive. Wholesale markets also are more likely to fall short of being fully competitive because of market power problems. Variable pricing and installation of real-time or time-of-day meters along with time-sensitive rates are two measures that can increase the demand-side responsiveness in retail (and wholesale) electricity markets."*[18]

The FTC also found that:

> *". . . neither retail nor wholesale markets for electricity generation encourage effective demand-side responses. Generally, retail customers do not have price information and time-sensitive rates that reflect the changing price of obtaining electricity at various times of the day and over the course of the year. Prices are likely to be lower and reliability is likely to improve if more customers have time-sensitive rates and timely and accurate price information. With these things, customers can make better consumption and investment decisions that determine an efficient market equilibrium for electricity services. Increasing the price sensitivity of demand also will help to constrain existing or potential market power in generation. This is true because a price increase will be less profitable for generators if it is passed through and retail buyers respond by reducing their consumption by a significant amount."*

Q: What is the position of The Utility Consumers' Action Network ("UCAN")?

A: On November 12, 2000, UCAN issued a proposal for restructuring the California electricity market to solve the electricity emergency.[19] According to UCAN, one of the key problems that must be addressed in reforming the California market is the "inadequate demand responsiveness to a volatile electric wholesale market."

---

[18] Id. at 54.

[19] UCAN's Proposal for Comprehensive State Energy Reform, November 12, 2000. See *http://www.ucan.org/law_policy/energydocs/statefix.htm.*

This position has led UCAN to call for legislative and regulatory action to "promote deployment of time-based consumption measurement (real-time metering or some similar technology) to all customers and require them to be used for demand responsiveness." UCAN believes that demand-side responses, such as time of use metering, are the most immediate means of responding to the emergency.

Q: Have academic experts discussed the importance of time-varying prices?

A: Yes. In January 2001, the University of California's Institute of Management, Innovation and Organization convened a forum comprised of renowned academics to discuss public policy solutions to the California electricity emergency. This group developed and published the "Manifesto on the California Electricity Crisis" (the "Manifesto") which proposes solutions to the emergency.[20] The lack of price-responsive demand was cited as one of the key factors contributing to the emergency. The Manifesto calls for prices that reflect the fundamental scarcity of electricity during certain hours and the Manifesto indicates that TOD rates are an effective way to reflect market conditions when the requisite metering equipment is available.

In April 2001, Professor Frank Wolak of Stanford University and Chairman of the Market Surveillance Committee with the California ISO advocated real-time pricing as a necessary program for improving the energy problems facing California. In his report Professor Wolak identifies real-time

[20] See http://haas.berkeley.edu/news/california_electricity_crisis.html

pricing as a vital resource in mitigating potential price spikes and in limiting the potential exercise of market power by generators.[21]

More recently, a survey by the Ernest Orlando Lawrence Berkeley National Laboratory at the University of California, Berkeley, cited several pilot Price Responsive Demand programs including Puget's as innovative resources in the creation of competitive electricity markets.[22]

There are many other papers from notable academics and academic institutions that have concluded the same thing. Price responsive demand programs which include TOD programs, real-time pricing programs, and many others are essential for the creation of an efficient electricity market. The institution of programs that allow consumers to receive timely and transparent price signals will allow the market to allocate resources more efficiently, and result in the many other benefits that I have cited throughout my testimony.

Q: Does this complete your testimony?

A: Yes.

[BA013250004]

---

[21] "How to Create the Equivalent of 10,000 MW of New Capacity by June 2001", Wolak, Frank A., Stanford University, April 24, 2001.

[22] "Demand Responsive Programs – An Emerging Resource for Competitive Electricity Markets?", Heffner, Grayson C., Charles A. Goldman, Lawrence Berkeley National Laboratory, University of California, August 2001.