

# STATE REGULATORY ACTIVITY ON TIME-DIFFERENTIATED ELECTRICITY PRICING PROGRAMS

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## INTRODUCTION

This paper summarizes some of the results of the Association of Energy Services Professionals (AESP) Pricing Topic Committee's (Committee) efforts to assess the regulatory view of innovative pricing options. The goal of this effort was to contact State Public Utility Commissions<sup>b</sup> (PUCs) to develop a summary of innovative electric pricing programs that are part of regulatory proceedings. Information was gathered using a questionnaire developed by Committee members<sup>c</sup> and reviewed by several state regulators. The questionnaire was designed to assess the status of pilot programs and tariffs, ascertain staff/commission views on innovative rates that are in the public domain, and generate insights regarding the future of innovative electricity rates.

For the purposes of this paper, time-differentiated rates include:

- Time-of-use (TOU) rates – Prices that vary by fixed time period within a day or across seasons.
- Real-time pricing (RTP) – Prices that vary with wholesale prices or costs of production.
- Critical-peak pricing (CPP) – Prices that reflect changes in wholesale prices, costs of production, or system conditions. The prices are dispatched to a predetermined level for a fixed time period with limits set on the number of times the critical-peak rate can be called.
- Other forms of time-differentiated pricing such as extreme day pricing, in which prices are set to a “high” pre-specified value on a limited number of critical days with high market prices, production costs, or critical system conditions.

This paper is organized in the following manner: Section 1.0 describes the methodology used to develop and conduct the survey; Section 2.0 presents trends that were identified from the survey responses; and Section 3.0 summarizes the key findings of the effort.

## 1.0 - SURVEY DEVELOPMENT & METHODOLOGY

The AESP Pricing Topic Committee, which is comprised of an assortment of industry actors including regulators, utility representatives, technology providers, and consultants, utilized an interactive process to develop and refine the survey instrument. Each member of the Committee was asked to submit potential questions for inclusion in the survey and review the list of submitted questions to select those most appropriate for the project's scope. In addition, Committee members and a panel of state regulators were asked to review the final list of questions chosen for the survey to ensure that the questions were structured to provide insights regarding the likelihood of pricing reforms occurring in the near future, the probable spatial and temporal spread of the reforms, and the barriers and issues that must

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<sup>a</sup> Mr. Barkett served as the chair of the Pricing Topic Committee, Mr. Johnson was the analyst that tabulated the survey data, and Dr. Violette was the former Chair of the Pricing Committee.

<sup>b</sup> Or similar organizations, i.e., Public Service Commissions, Public Regulation Commissions, etc. For the purposes of this report, the term PUC will encompass each of these organizations.

<sup>c</sup> The Pricing Topic Committee members that assisted in this effort include: Eric Dresselhuys, Ahmad Faruqi, Dave Hyland, Mike Messenger, and Laura Rooke.

be resolved before more extensive pricing reforms can be implemented. A copy of the survey instrument is provided as Appendix A to this paper.

Contact information for each state's PUC was obtained from the National Association of Regulatory Utility Commissioners. This information was used to contact the PUCs and determine the most appropriate person, either commissioner or key commission staff, to respond to the survey.

The surveys were conducted by various Committee members via telephone and a limited number of email transmissions. In order to reduce response bias, at least five attempts were made at different times of the day to reach potential survey respondents.

At the date of this writing, all 51 PUCs have been contacted and 25 surveys have been completed representing a reasonable cross-section of regulatory personnel. Attempts will be made to complete additional surveys and incorporate those responses into the final topic committee report that will be made available at the AESP's National Energy Services Conference on December 9, 2003.

## **2.0 – TRENDS IDENTIFIED FROM SURVEY RESPONSES**

This section presents trends that were identified from the 25 survey responses received by Committee members thus far. Six trends are listed below and discussed in the body of the paper.

- Trend 1 – Regulators Have Positive Views of Time-Differentiated Rates.
- Trend 2 – Time-Differentiated Pricing Experiments and Investigations are Common and Are Focused Primarily upon CPP and RTP Rate Structures for C&I Customers.
- Trend 3 – CPP and RTP Rate Structures Are Generating Interest within the Regulatory Community.
- Trend 4 – Regulators Believe that Time-Differentiated Rates Provide Benefits to Markets and Customers.
- Trend 5 – Regulators Perceive Most of the Resistance to Time-Differentiated Rates as Coming from Customers and Utilities rather than from the Regulatory Community.
- Trend 6 – Regulators Believe a More Compelling Argument for Time-Differentiated Rates Exists Today than in the Past.

The trends provide insights regarding the likelihood of pricing reforms occurring in the near future, the probable spatial and temporal spread of the reforms, and the barriers and issues that must be resolved before more extensive pricing reforms can be implemented. Several trends also provide insights into the role innovative rates will play in post-transition electric markets in states with markets that have been opened to competition where all current electricity tariffs expire when the transition phase is complete.

### ***Trend 1 – Regulators Have Positive Views of Time-Differentiated Rates***

When survey respondents were asked whether or not their Commission has expressed any views for or against time-differentiated rates, 17 of the 25 respondents (68%) answered in the affirmative, five states were neutral, two respondents did not know, and one respondent expressed a view that his Commission had not been favorably inclined to time-differentiated rates. Of the 17 affirmative responses, 16 responses (94%) indicate that the Commission viewed time-differentiated rates in a favorable light with answers that ranged from “there is no official position, but the staff in general seems to be in favor of these rates” to the stronger “rules actually require regulated utilities to offer these rates on an optional basis to all customers.”

The trend of positive regulatory views toward time-differentiated rates is further emphasized by the fact that respondents from all states that currently do not have utilities implementing innovative rate programs replied that their Commissions would be supportive of utilities that applied for such rates. Respondents from these states indicated that their Commissions were particularly interested in receiving proposals for pricing programs targeting residential customers; however, these respondents also implied that they were wary of the costs associated with developing and implementing such programs.

The only non-favorable response to this question was received from the State of Washington Utilities and Transportation Commission. The respondent noted that the Commission had expressed unfavorable views towards time-differentiated electricity rates and attributed this fact to problems that arose during Puget Sound Energy’s (PSE) pilot time-of-use billing program that was ended early because most participants’ bills were slightly higher than the bills for similar non-participating customers. Several other respondents were familiar with the results of PSE’s pilot program and mentioned their disappointment in the reasons for the pilot’s early termination. However, these respondents also noted that the closure of PSE’s program represented an opportunity to analyze the root causes behind the problems experienced by the program in order to determine how best to structure similar programs for the future energy marketplace.

***Trend 2 – Time-Differentiated Pricing Experiments and Investigations are Common and Are Focused Primarily upon CPP and RTP Rate Structures for C&I Customers***

More than half of the survey respondents (56%) indicate that utilities in their respective states are conducting time-differentiated pricing experiments or investigations. Most of the experiments are focused on critical peak pricing programs and real-time pricing programs for C&I customers; however, the three investor-owned utilities in California are also offering experimental critical peak pricing programs for residential customers. The primary goal of these experimental programs is to see whether or not customers change energy usage patterns in response to the receipt of more precise price signals from their electricity provider.

The Commissions that are conducting pricing investigations are primarily seeking to identify policies and procedures that facilitate the adoption of more advanced meters, communications technology and automated meter reading capabilities. They are also analyzing the costs associated with constructing the metering and communications infrastructure necessary to support the deployment of time-differentiated rates in order to evaluate the cost effectiveness of various pricing programs. Such investigations are due primarily to the fact that many Commissions recognize that enabling technology costs have been decreasing in recent years; however, the Commissions worry that the costs might still be too high for programs, especially CPP and RTP, to be cost effective.

It should also be noted that the experimental RTP programs all consist of a two-part tariff which effectively lowers consumers’ marginal cost for using electricity. The typical two-part tariff follows the following structure:

$$\text{Bill}_{\text{Real-Time}} = \text{Bill}_{\text{CBL}} + \sum_{i=1}^n \left[ \left( \text{KWH}_{\text{Real Time}_i} - \text{KWH}_{\text{CBL}_i} \right) * \text{RTP}_i \right]$$

where CBL is the Customer Baseline Load.

In the existing pilot programs across the country, the CBL is calculated according to customers’ previous year’s energy use. However, the application of this approach has not been standardized and

several respondents noted that uncertainty regarding the best method for identifying appropriate CBLs is a potential obstacle to the development and implementation of two-part tariffs. Future investigations will likely focus on ways to better define and calculate CBLs in order to overcome this obstacle.

### ***Trend 3 – CPP and RTP Rate Structures Are Generating Interest within the Regulatory Community***

CPP and RTP options are considered innovative and in need of further examination by nearly half (48%) of the Commissions surveyed. In addition, eight of the eleven states (73%) with utilities currently piloting or conducting time-differentiated pricing experiments have pilot programs examining CPP and/or RTP options.

Numerous reasons were given for why these two pricing options are generating regulatory interest. Many respondents indicated that their Commissions are interested in providing customers with more accurate price signals as a means of managing loads during peak demand times. These respondents provided examples of current CPP and RTP programs, including Electricite de France's (EDF) CPP program and Georgia Power's RTP program, they believe are generating excellent demand response as a result of customers' receipt of accurate price signals. EDF's program uses intuitive signals (red, white and blue days) to communicate the price level to be experienced on any given day. Customers know the number of each type of day that can be called in a given season, but they don't know which day type will be called except on a day-ahead basis. The simplicity and low costs associated with this program caused several respondents to cite the program's model as having a high probability of success in engaging the residential customer class.

Another reason respondents gave for the interest in CPP and RTP programs was their Commissions' interest in providing customers with more pricing options, especially innovative options that afford customers the opportunity to save money on their electric bills while also assisting utilities in managing loads during peak demand times. These respondents cited research indicating that customers react favorably to the idea of expanded pricing options, especially if customers have the ability to choose whether or not to participate in the various programs, i.e. the programs are voluntary in nature.

Respondents also noted that decreasing infrastructure and enabling technology costs have contributed to the regulatory community's increasing interest in CPP and RTP options. However, as was discussed above, the Commissions worry that even though the costs have been decreasing, they might still be too high for programs to be cost effective.

### ***Trend 4 – Regulators Believe that Time-Differentiated Rates Provide Benefits to Markets and Customers***

Most respondents (70%) believe that time-differentiated rates provide tangible benefits to both electricity markets and end-use customers. According to the respondents, regulators believe that time-differentiated rates can help manage loads during peak demand times, mitigate electricity suppliers' market power, reduce transmission congestion, and better align wholesale and retail electricity costs. In addition, regulators believe that time-differentiated rates enable interested customers to more actively participate in electricity markets. The net result of these benefits, according to respondents, is an increase in overall system efficiency that generates a corresponding reduction in costs for all market actors.

***Trend 5 – Regulators Perceive Most of the Resistance to Time-Differentiated Rates as Coming from Customers and Utilities rather than from the Regulatory Community***

Regulators perceive most of the resistance to time-differentiated rates as coming from customers and utilities, not the regulatory community or other interveners. Respondents noted that customers tend to lack a basic understanding of time-differentiated rates and the ways such rates operate. Several respondents cited the example of customers not wanting to wash clothes or dishes in the middle of the night in order to keep their electricity bills low. In addition, several respondents cited the concept of “culture conservation” - basically a situation where people are unwilling/unable to change their routines even if doing so is in their best interest<sup>d</sup>. Furthermore, some customer groups, such as those representing office buildings which are characterized by occupants who are tenants rather than building owners, worry that these types of occupants are not motivated to respond to price signals, so time-differentiated rates will likely have little impact in terms of actual demand reductions. Because of these factors, respondents note, some customer groups view time-differentiated rates as onerous and lacking of benefits that accrue to the customers.

From the utilities’ perspective, survey respondents noted two primary factors that contributed to resistance towards time-differentiated rates. First, utilities are concerned about the time and infrastructure costs associated with transitioning to time-differentiated rates. Second, utilities are hesitant to adopt rate structures that their customers do not understand or think are inconvenient or too complicated. Several respondents questioned why utilities would want to implement more expensive and complex billing rates if they believe the rates will likely irritate customers and the associated development and implementation costs will be unable to be recovered.

***Trend 6 – Regulators Believe a More Compelling Argument for Time-Differentiated Rates Exists Today than in the Past***

Nearly half of the survey respondents (48%) think that a more compelling argument for time-differentiated rates exists today than in the past and provide two basic reasons for why this is.

The first reason relates to time-differentiated rates’ ability to encourage energy conservation via the transmission of accurate price signals to energy users. Respondents noted that the demand for electricity has grown tremendously in recent years causing supply shortfalls, transmission congestion, and other system constraints. By exposing customers to the true costs associated with the generation and transmission of the electricity they use, time-differentiated rates have the potential to enlist customers in the process of managing system demands. Such rates also provide customers with the ability to better manage their energy use during peak demand times in order to achieve financial benefits.

The second reason relates to the restructuring of the electricity industry that has occurred in recent years. Time-differentiated rates better align wholesale and retail electricity markets, thereby creating more efficient and dynamic markets. More efficient markets correspond to lower prices for all market actors, a situation that appeals to many Commissions.

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<sup>d</sup> In order to overcome this objection, many regulators favor a voluntary participation process for customers, so that unnecessary burdens are not placed on those customers who do not want to participate in the programs.

### 3.0 CONCLUSION

While this survey represents a work in progress, the information collected to date indicates that Commissions are becoming aware of innovative pricing options and that regulatory support is growing for the consideration of time-differentiated pricing programs, especially CPP and RTP rate structures. The information also indicates that several barriers, including customers' lack of knowledge about innovative pricing options and questions regarding program cost effectiveness, must be overcome before time-differentiated pricing programs are more widely deployed.

Full results from the survey of the regulatory community concerning innovative rates can be obtained from the AESP Pricing Topic Committee.<sup>e</sup>

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<sup>e</sup> The full report can be requested from Mr. Brent Barkett, Chair AESP Pricing Committee (e-mail: [bbarkett@summitblue.com](mailto:bbarkett@summitblue.com)) or from Elliot Boardman, Executive Director of the AESP.

## APPENDIX A – SURVEY INSTRUMENT

### STATE REGULATORY ACTIVITY ON TIME-DIFFERENTIATED ELECTRICITY PRICING PROGRAMS

**BACKGROUND:** The Pricing Topic Committee of the Association of Energy Services Professionals (AESP) is producing a status report on trends in the use of time-differentiated electricity rates. The focus of this year’s report is on state regulatory activity concerning current and future innovative rates on a state-by-state basis.

For the purposes of the report, time-differentiated rates include:

- Time-of-use (TOU) rates – Prices that vary by fixed time period within a day or across seasons.
- Real-time pricing (RTP) – Prices that vary with wholesale prices or costs of production.
- Critical-peak pricing (CPP) – Prices that reflect changes in wholesale prices, costs of production, or system conditions. The prices are dispatched to a predetermined level for a fixed time period with limits set on the number of times this rate can be called.
- Other forms of time-differentiated pricing such as extreme day pricing, in which prices are set to a “high” pre-specified value on a limited number of critical days with high market prices, production costs, or critical system conditions.

We have developed a short survey and are contacting state utility commissions to inquire whether any new, innovative rates of this type are being considered or are under investigation in their jurisdictions. Accordingly, we would like to ask you (or the most appropriate person) a few questions.

#### CURRENT STATUS QUESTIONS:

**Question 1:** The focus of our survey is on trends; i.e., changes in rates and pricing in your jurisdiction. However, it would be helpful to know if any utilities in your state have time-differentiated pricing programs. Please identify any utilities that have adopted or proposed these rates in the last two years.

\*\*\* If programs do exist, ask the respondent if s/he can provide additional information; i.e., pricing schedules and differentials, etc. \*\*\*

Utility #1: \_\_\_\_\_

	Very Large C/I	Commercial	Residential
Time-of-use Rates	_____	_____	_____
Real-time Pricing	_____	_____	_____
Critical-peak Pricing	_____	_____	_____
Interruptible / Curtailable Rates	_____	_____	_____
Others	_____	_____	_____

Utility #2: \_\_\_\_\_

	Very Large C/I	Commercial	Residential
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Time-of-use Rates	_____	_____	_____
Real-time Pricing	_____	_____	_____
Critical-peak Pricing	_____	_____	_____
Interruptible / Curtailable Rates	_____	_____	_____
Others			

**Question 2:** Has the Commission or Staff expressed any views for or against time-differentiated rates? YES / NO

If yes – please explain. Please attach copies of relevant filings.

**Question 3:** Has any other party or customer group lobbied for time-differentiated rates in your state? YES / NO

If yes – please explain. Please attach copies of relevant filings.

**Question 4:** Are any utilities in your state currently piloting or conducting time-differentiated pricing experiments? YES / NO

If yes – please explain. Please attach copies of relevant filings.

**Question 5:** Are there any investigations of time-differentiated rates being undertaken in your state? YES / NO

If yes – please explain.

**\*\*\* Ask Question 6 only if no programs were listed in Question 1 \*\*\***

**Question 6:** Would the Commission be supportive of utilities that applied for time-differentiated rates? YES / NO

**Question 7:** Do you know of any activities regarding time-differentiated rates in other states that we should explore?

**OPINION QUESTIONS:**

These questions are not meant to reflect on any State position; instead, they are meant to elicit the opinions of people involved in the regulatory community. There will be no attribution of answers and no citations. The information will be presented only in the aggregate. These questions are meant to extract innovative ideas and potential industry trends.

**Question 8:** What retail pricing options/products do you consider innovative and in need of further examination?

**Question 9:** What are the primary benefits of investigating the introduction of time- differentiated rates in your area?

**Question 10:** Where does most of the resistance, if any, toward introducing time-differentiated rates originate: the regulators, the utilities, various customer classes, or interveners?

**Question 11:** What do you believe are the primary barriers, if any, to further implementation of time-differentiated rates?

**Question 12:** Is there a more compelling argument for time-differentiated rates today than in the past? Why?

**Question 13:** Do you believe there is an industry trend towards more time-differentiated rates?

YES / NO – If yes, who/what are the forcing factors in this trend:

- a) Utilities proposing new rates - \_\_\_\_\_
- b) Commissions focused on creating efficient markets - \_\_\_\_\_
- c) Customers seeking to manage electricity costs - \_\_\_\_\_
- d) Higher price volatility - \_\_\_\_\_
- e) Desire to manage risks associated with restructuring - \_\_\_\_\_
- f) Other - \_\_\_\_\_

**Question 14:** To what extent does the cost of building the metering and communication infrastructure to support time-differentiated rates influence the discussion of such rates in your jurisdiction?