



EAST KENTUCKY POWER COOPERATIVE

April 20, 2007

HAND DELIVERED

Ms. Elizabeth O'Donnell
Executive Director
Public Service Commission
211 Sower Boulevard
Frankfort, KY 40602

RECEIVED

APR 20 2007

**PUBLIC SERVICE
COMMISSION**

Re: ~~Administrative Case No. 2006-00045~~

Dear Ms. O'Donnell:

Case No. 2007-00165

Please find enclosed for filing with the Commission in the above-referenced case the proposed wholesale electric tariff of East Kentucky Power Cooperative, Inc. ("EKPC"), and a proposed member system retail tariff format, for a pilot real-time pricing program for large commercial and industrial loads, designated as Exhibits WAB-1 and WAB-2 to the enclosed original and ten copies of the prepared testimony of William A. Bosta, EKPC Manager of Pricing. EKPC's tariff is submitted pursuant to the directive of the Commission in its order in this case dated December 21, 2006, and EKPC proposes to make this tariff effective four months after the receipt of the Commission's approval of the program. The program is designed to have an initial term of three years, with annual reports to the Commission.

Also enclosed, in support of the proposed EKPC real-time pricing program, are an original and ten copies of prepared testimony of Michael T. O'Sheasy, Vice-President of Christensen Associates Energy Consulting, LLC.

Please direct any questions about this filing to me, or to Mr. Bosta, at EKPC headquarters.

Very truly yours,

Charles A. Lile
Senior Corporate Counsel

Enclosures

Cc: Parties of Record

4775 Lexington Road 40391
P.O. Box 707, Winchester,
Kentucky 40392-0707

Tel. (859) 744-4812
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<http://www.ekpc.coop>

1 COMMONWEALTH OF KENTUCKY
2 BEFORE THE PUBLIC SERVICE COMMISSION

RECEIVED

APR 20 2007

3
4 In the Matter of:

PUBLIC SERVICE
COMMISSION

CONSIDERATION OF THE)
REQUIREMENTS OF THE FEDERAL)
ENERGY POLICY ACT OF 2005)
REGARDING TIME-BASED METERING,)
DEMAND RESPONSE AND)
INTERCONNECTION SERVICE)

CASE NO.

~~2006-00045~~ 2007-00165

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6
7 PREPARED TESTIMONY OF WILLIAM A. BOSTA
8 ON BEHALF OF
9 EAST KENTUCKY POWER COOPERATIVE, INC.
10 AND ITS MEMBER DISTRIBUTION SYSTEMS
11
12

13 Q. Please state your name and address.

14 A. My name is William A. Bosta, East Kentucky Power Cooperative (EKPC), 4775
15 Lexington Road, Winchester, Kentucky 40391.

16 Q. By whom are you employed and in what capacity?

17 A. I am employed by East Kentucky Power Cooperative, Inc. as Manager of Pricing.

18 Q. As background for your testimony, please briefly describe your educational
19 background and work responsibilities at East Kentucky Power Cooperative.

20 A. I have a Bachelor's Degree in Economics from Virginia Tech, Blacksburg, Virginia and a
21 Master's Degree in Industrial Management from Lynchburg College, Lynchburg,
22 Virginia. My professional career began as an Economist with the engineering consulting
23 firm of Hayes, Seay, Mattern & Mattern in Roanoke, Virginia. I then worked in the rates
24 and regulatory area for two AEP subsidiaries, Appalachian Power Company in Roanoke,
25 Virginia and Indiana Michigan Power Company in Ft. Wayne, Indiana. In 1993, I
26 accepted a position in Regulatory Affairs at Kentucky Utilities Company in Lexington,

1 Kentucky and was subsequently promoted to Director of Regulatory Management for
2 LG&E Energy in Louisville, Kentucky following the merger of KU Energy and LG&E
3 Energy in 1998. In May 2001, I was offered an opportunity to join the EKPC System as
4 Pricing Manager and in June 2001 I assumed my current position. As Pricing Manager, I
5 am responsible for rate and regulatory matters and issues at the Company and provide
6 support services for all sixteen cooperatives on these issues. I report directly to the Vice
7 President of Power Supply.

8 **Q. Have you previously testified before the Public Service Commission?**

9 A. Yes.

10 **Q. What is the purpose of your testimony?**

11 A. The purpose of my testimony is to outline EKPC's approach to meeting the
12 Commission's directive to establish a Pilot Program for Real-Time Pricing (RTP) for
13 large commercial and industrial customers served by our Member Systems. I will also
14 comment on the timing of the proposed Pilot Program. An additional witness for EKPC,
15 Mr. Michael O'Sheasy of Christensen Associates Energy Consulting, will provide a
16 description of the benefits of the RTP product design that we are proposing,
17 characterizing its value to customers and providers.

18 **Q. Are you sponsoring any exhibits in this proceeding?**

19 A. Yes. I am sponsoring the EKPC Wholesale RTP Tariff identified as Exhibit WAB-1 and
20 the proposed Retail RTP Tariff identified as Exhibit WAB-2.

21 **Q. Would you please identify what the Commission required of EKPC in its Order
22 dated December 21, 2006 ?**

23 A. Page 13 of the Commission's Order outlined the requirements. Specifically, the
24 Commission stated:

1 “To gain information and attempt to ascertain the viability and effectiveness of real-time
2 pricing for larger customers, the Commission will require that pilot programs be
3 developed and offered to such customers. The Commission, therefore, directs Kentucky
4 Power, KU and LG&E to develop voluntary pilot real-time pricing programs for their
5 large commercial and industrial customers. Big Rivers and EKPC are directed to work
6 with each other, in conjunction with their member distribution cooperatives, to develop
7 one or more voluntary real-time pricing pilot programs to be offered by a representative
8 but selective group of members to their large commercial and industrial customers.”

9 **Q. Did EKPC work with Big Rivers on this project?**

10 A. Yes. EKPC and Big Rivers had discussions about the pilot program throughout the
11 preparation period. Each utility ultimately elected to establish separate approaches and
12 pilot programs.

13 **Q. Has EKPC narrowed the availability of the Pilot Program to a select number of
14 Member Systems?**

15 A. Not at this time. Due to the EKPC rate case (Case No. 2006-00472) and the pass-through
16 cases for the sixteen Member Systems, as well as the time involved in developing the
17 proposed pilot program, for the time being EKPC has left open the availability of the
18 program to all of its Member Systems. Following Commission approval of the proposed
19 pilot program, EKPC intends to educate and inform all Member Systems about the
20 detailed aspects of the pilot program and narrow the availability to those Member
21 Systems with customers that would be most interested in the RTP concept.

22 **Q. What will EKPC and its Member Systems derive from the Pilot Program?**

23 A. The RTP pilot program will enable EKPC and its Member Systems to determine the
24 extent to which real-time pricing fulfills the EPACT mandate to deliver demand response

1 and provide benefits to both participating RTP customers, RTP service providers and
2 non-participating customer via system benefits. The pilot will help to determine whether
3 large customers will elect to use, take advantage of, and derive benefit from this type of
4 pricing mechanism. The pilot approach provides time for EKPC and the Member
5 Systems to make program adjustments and gauge success before providing RTP on a
6 permanent basis.

7 **Q. Are there any restrictions for eligibility?**

8 A. Yes. EKPC and its Member Systems have limited the availability to customers with peak
9 demands of 1,000 KW or more. In addition, customers must have an MV-90 metering
10 system in place or be willing to pay for the incremental costs of installing and
11 maintaining such a system. Customers must be able to benefit from hourly price signals.
12 Customers must stay on the RTP Tariff for at least one year and only firm load customers
13 are eligible. If the RTP customer causes a local distribution system upgrade, the
14 customer will be responsible for the cost of the upgrade. Customers served under the
15 Interruptible Rider are not eligible for this pilot. Customers must possess a personal
16 computer with Internet access. These restrictions or requirements are recommended in
17 order to make the Pilot more manageable and to ensure that non-participants do not
18 subsidize participants. All conditions of eligibility are shown in Exhibits WAB-1 and
19 WAB-2.

20 **Q. What are the major elements of the RTP Tariff?**

21 A. As indicated by Mr. O'Shealy, the RTP Tariff consists of two main parts. Part one
22 consists of billing the customer under the standard tariff using the historical Customer
23 Baseline Load ("CBL") amounts. This enables EKPC and its Member Systems to
24 recover the embedded cost of serving the customer. Part two is a credit or charge based

1 on the real-time price at each hour, multiplied by the difference between the actual load
2 in that hour and the CBL in that hour. The customer pays if he uses more than his CBL,
3 or is credited if he reduces load as compared to his CBL.

4 **Q. Could you elaborate on how the first part of the Tariff will work?**

5 A. Certainly. Let's assume that calendar year 2006 is the CBL period and that the customer
6 is being billed in March 2008. The first part works as follows:

	<u>Billing Determinant</u>	<u>Rate</u>	<u>Amount</u>
	(1)	(2)	(3) = (1)*(2)
Customer Charge	1	\$ 1,069	\$ 1,069
Billing KW Demand in March, 2006	5,000	\$ 5.39	\$ 26,950
Energy KWH (70% load factor)	2,555,000	\$ 0.03	\$ 76,650
Standard Bill			\$ 104,669

7
8 Under Part One of the RTP Tariff, the customer would be billed in March 2008 based on
9 the rates in effect in March 20008 (plus the then current FAC and Environmental
10 Surcharge factors) multiplied by the demand and energy recorded in the CBL for March
11 2006. The CBL billing demand will be based upon an assumed power factor as set forth
12 in the standard tariff.

13 **Q. How will the second part of the RTP Tariff be calculated?**

14 A. First, the actual load in each hour will be compared to the CBL for that hour. The
15 difference will then be multiplied by the marginal cost-based price at that hour. For
16 example, if the actual load increases to 6,000 kWh from the baseline amount of
17 5,000 kWh in an hour of low RTP prices, the customer pays for the incremental 1,000
18 kWh at the day-ahead RTP price for that respective hour. If the price is \$.03/kWh, the
19 incremental energy charge is \$30 (+1,000 kWh x \$.03) for that hour. If, on the other

1 hand, at a higher price, the customer might respond by reducing usage to 4,000 kWh from
2 the baseline amount of 5,000 kWh. For example, if the price is \$.10/kWh, the customer
3 receives a credit of \$100 for that hour based on the 1,000 kWh of decremental load (-
4 1,000 kWh x \$0.10/kWh).

5 **Q. There are two additional components to the RTP bill, the Administration Fee and**
6 **the Power Factor Adjustment. Would you please first describe the purpose of the**
7 **Admin Fee?**

8 A. RTP entails some additional administrative costs relative to the standard tariff. These
9 costs include billing expenses, the cost of posting day-ahead prices to a website and
10 related data management costs, as well the possibility of some incremental labor costs.
11 The purpose of the Administration Fee is to defray these costs. The fee is a simple flat
12 amount per customer-month.

13 **Q. Would you please describe the Power Factor Adjustment and compare its**
14 **application under RTP to the power factor adjustment applied in the standard**
15 **tariff?**

16 A. The customer's retail RTP bill reflects power factor in exactly the same way that it does
17 under the standard tariff. The actual metered peak demand of the current billing period is
18 adjusted upward if the current actual power factor is less than the minimum required
19 power factor level (e.g. 90%). Under RTP, this adjustment appears as a separate charge.
20 Therefore, the difference between the power factor-adjusted current peak demand and the
21 current actual demand, is priced at the standard tariff demand charge and added to the bill
22 in a separate line.

23 **Q. How will the RTP price be transmitted to the customer?**

1 A. EKPC will develop a Real-Time Pricing (RTP) website that will be accessed by
2 customers via the Internet. Prices will be posted to the internet by 4:00 p.m. ET for the
3 twenty-four hour period beginning with the hour ending 1:00 a.m. of the following day.

4 **Q. What is the basis for the day-ahead price?**

5 A. The day-ahead prices are described in Mr. O'Sheasy Exhibit MTO-2.

6 **Q. Would the RTP amounts be subject to the FAC or Environmental Surcharge?**

7 A. No, only the baseline CBL amounts would be subject to those factors. The RTP price
8 contains marginal cost effects of these embedded cost riders.

9 **Q. Why is there a wholesale and a retail RTP Tariff?**

10 A. EKPC sells power at wholesale under a long-term power supply agreement to our
11 Member Systems, who, in turn, serve the retail customer. Customers are located in the
12 service territory of our Member Systems and are served by the Member System in
13 accordance with the Certified Service Territory Act. As a result, both wholesale and
14 retail rates are regulated by the commission and both tariffs are required.

15 **Q. What is the proposed timeframe for the Pilot?**

16 A. EKPC and its Member Systems request that the Tariff become effective four months
17 following the Commission's Order approving an RTP Pilot program. This will enable
18 EKPC to develop the communication tools necessary to convey day-ahead prices to
19 customers, inform and educate our Member Systems about the program, identify Member
20 System candidates for the Pilot, incorporate changes required by the Commission's Order
21 and prepare a series of trial runs prior to implementation. As required by Commission
22 Order, the Pilot will run for three years and EKPC will provide reports to the
23 Commission on an annual basis.

24 **Q. Does this conclude your testimony?**

1 A. Yes.

EAST KENTUCKY POWER COOPERATIVE, INC

CLASSIFICATION OF SERVICE

SCHEDULE RTP-DA

WHOLESALE, REAL-TIME PRICING, DAY AHEAD, PILOT

Availability

Available to all Member Systems (hereinafter called Cooperative Corporations) of East Kentucky Power Cooperative, Inc. (EKPC). The electric power and energy furnished hereunder shall be separately metered for each point of delivery.

The Cooperative Corporation may offer RTP to existing Commercial and Industrial customers only, subject to the conditions below and possible additional conditions in the Cooperative Corporation's retail RTP tariff.

Customers served under the Interruptible Rider are not eligible for this pilot.

Customer must have taken service from the Cooperative Corporation for at least one (1) year.

Customers must be able to benefit from hourly price signals and maintain a peak 15-minute demand not less than 1,000 kW each month.

The customer must currently have the MV-90 metering system in place or be willing to allow the Cooperative Corporation to install and maintain such equipment with interrogation ability for downloads. The customer will be responsible for the incremental costs of installing and maintaining such metering equipment.

Customer must possess a personal computer with Internet service.

Type of service: Firm, three-phase, 60-hz

Rate Structure and Bill Computation:

Structure:

A Cooperative Corporation with RTP customers will remain on its current tariff for all load excluding the incremental load of the RTP customers. The RTP bill for the Cooperative Corporation will contain three components.

- 1. Standard Bill: The EKPC wholesale tariff schedule that currently serves the Cooperative Corporation will be applied to its "Customer Baseline Load" (CBL), the predetermined hourly load profile covering one full year and the set of twelve monthly billing demands for each individual RTP customer.
2. Incremental Energy Charge: The RTP price will be applied to the differences between actual metered load and the CBL - positive or negative - for all hours in the billing period.

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EAST KENTUCKY POWER COOPERATIVE, INC

3. RTP Administration Fee: This fee will cover the costs of providing RTP service, including billing and communications systems, to implement the tariff and for data management.

Bill Computation:

$$\text{RTP Bill}_m = \text{Standard Bill (Std. Bill}_{\text{CLB}m}) + \text{Incremental Energy Charge (IEC}_m) + \text{RTP AF}$$

$$\text{Std. Bill}_{\text{CLB}m} = P_d * K_{\text{CBL}m} + P_e * \sum_{mh} Q_{\text{CBL}h}$$

$$\text{IEC}_m = \sum_{mh} \{P_{\text{RTP}h} * (Q_{Ah} - Q_{\text{CBL}h})\}$$

$$\text{RTP AF} = \text{RTP Admin Fee}$$

where:

- Std. Bill_{CLB_m} is the standard bill calculated using the Cooperative Corporation's underlying schedule of the EKPC wholesale tariff, with the current tariff prices applied to CBL quantities in month *m*, with the equation above being *an example* to cover all eligible schedules of the underlying EKPC standard tariff. The CBL includes any adjustment needed to meet minimum bill requirements.
 - P_d is the current demand charge,
 - $K_{\text{CBL}m}$ is the CBL billing demand for month *m*,
 - P_e is the current energy charge, and includes volumetric charges such as FAC , and application of the Environmental Surcharge which is applied on a percentage basis,
 - $Q_{\text{CBL}h}$ is the CBL kWh in hour *h*
- IEC_m is the Incremental Energy Charge dollar amount in month *m*.
 - $\sum_{mh} \{...\}$ represents the sum across all hours *h* in month *m*,
 - $P_{\text{RTP}h}$ is the hourly RTP price in hour *h*,
 - Q_{Ah} is the actual kWh in hour *h*.

Bill Components:

Standard Bill:

The Cooperative Corporation's schedule of EKPC's standard tariff prices will be applied to the CBL. These tariff prices include the current demand and energy prices, the Fuel Adjustment Charge, the Environmental Surcharge and other applicable riders found in EKPC's Commission-approved tariff sheets. The standard bill will be computed using these prices and CBL values according to the billing algorithm currently in use to compute actual bills for customers on the applicable schedule of the standard tariff.

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Incremental Energy Charge:

The sum across all hours of the billing period of the product of the real-time price for each hour and the incremental load for each hour. Incremental load is the difference between actual metered load and the CBL. This difference can be positive or negative. Negative differences, termed "decremental load", create hourly credits. Actual metered usage cannot go below zero for billing purposes.

Customer Baseline Load (CBL):

Cooperative Corporation agreement on the utility-provided CBL is a precondition for use of RTP-DA.

The CBL is to be developed by EKPC using one complete calendar year of customer-specific hourly firm historical load data. Upon agreement by all parties, the CBL remains in place permanently and is adjusted to match up day-types (weekdays and weekends) with the respective calendar year. Additional calendar matching modifications will be made, as necessary, for holidays.

Modifications to the CBL can be made by the utility to reflect permanent removal of major, customer-owned electrical equipment or significant conservation or efficiency enhancements made by one of the Cooperative Corporation's retail customers. Any such modifications must be approved by all parties.

RTP Price:

The Day-Ahead RTP Price reflects day-ahead marginal costs on an hourly basis as determined by East Kentucky Power Cooperative, Inc. The RTP Price consists of the following components:

1. EKPC's day-ahead hourly marginal generation cost, including estimated variable fuel cost, variable O&M cost and the variable emission allowance cost of the marginal generating unit, or purchased power cost, as applicable.
2. EKPC's estimated marginal reliability cost, as applicable
3. EKPC's estimated marginal transmission cost, as applicable
4. Losses
5. Risk Adder for wholesale supplier

The Fuel Adjustment Charge applies to the CBL but not to incremental energy which is charged or credited based on the RTP price.

The Environmental Surcharge applies to the CBL only, with the RTP price reflecting variable environmental costs only.

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RTP Administration Fee:

EKPC will charge a monthly RTP Administration Fee of \$150 per month per retail customer.

Special Provisions:

Price notification:

The retail customer will be notified in accordance with procedures set forth in the RTP tariff of the Cooperative Corporation.

Term of Service:

EKPC shall provide RTP service to the Cooperative Corporation under this pilot program subject to the time limit of the pilot program. Terms of eligibility for individual customers are outlined in the RTP tariff for the Cooperative Corporation.

General Terms and Conditions:

Customer service must comply with general rules and regulations of EKPC on file with the Public Service Commission of Kentucky.

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RURAL ELECTRIC COOPERATIVE CORPORATION

CLASSIFICATION OF SERVICE

SCHEDULE RTP-DA – REAL-TIME PRICING-DAY AHEAD - PILOT

Availability of Service:

Available to existing Commercial and Industrial customers located in our service territory, subject to the established rules and regulations of the member system (co-op name), hereinafter called Cooperative Corporation.

Customers served under the Interruptible Rider are not eligible for this pilot.

Customer must have taken service from the Cooperative Corporation for at least one (1) year.

Customers must be able to benefit from hourly price signals and maintain a peak 15-minute demand not less than 1,000 kW each month.

The customer must currently have the MV-90 metering system in place or be willing to allow the Cooperative Corporation to install and maintain such equipment with interrogation ability for downloads. The customer will be responsible for the incremental costs of installing and maintaining such metering equipment.

Customer must possess a personal computer with Internet service.

Type of service:

Firm, three-phase, 60 Hertz.

Rate Structure and Bill Computation:

Structure:

A customer who chooses RTP-DA will pay a bill with four components.

1. Standard Bill: The customer's standard tariff will be applied to the "Customer Baseline Load" (CBL), a predetermined hourly load profile covering one full year and set of twelve monthly billing demands.
2. Incremental Energy Charge: The RTP price will be applied to the differences between actual metered load and the CBL – positive or negative – for all hours in the billing period.
3. RTP Administration Fee: This fee will cover the costs of providing RTP service, including billing and communications systems to implement the tariff and for data management.
4. Power Factor Adjustment: This bill component permits charging for power factor in exactly the same manner as the standard retail tariff. The adjustment is a separate charge.

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Bill Computation:

$$\text{RTP Bill}_m = \text{Standard Bill (Std. Bill}_{\text{CLB}m}) + \text{Incremental Energy Charge (IEC}_m) + \text{RTP AF} + \text{Power Factor Adjustment (PFA)}$$

$$\text{Std. Bill}_{\text{CLB}m} = P_d * K_{\text{CBL}m} + P_e * \sum_{mh} Q_{\text{CBL}h}$$

$$\text{IEC}_m = \sum_{mh} \{P_{\text{RTP}h} * (Q_{Ah} - Q_{\text{CBL}h})\}$$

$$\text{RTP AF} = \text{RTP Admin Fee}$$

$$\text{PFA} = P_d * (K_{Am} * \{(PF_{\text{MIN}}/PF_{Am}) - 1\})$$

where:

- Std. Bill_{CBLm} is the underlying standard tariff bill, with the current tariff prices applied to CBL quantities in month *m*, with the equation above being *an example* to cover all eligible underlying standard tariffs. The CBL includes any adjustment needed to meet minimum bill requirements.
 - P_d is the current demand charge,
 - $K_{\text{CBL}m}$ is the CBL billing demand for month *m*,
 - P_e is the current energy charge, and includes volumetric charges such as FAC , and application of the Environmental Surcharge which is applied on a percentage basis,
 - $Q_{\text{CBL}h}$ is the CBL kWh in hour *h*
- IEC_m is the Incremental Energy Charge quantities in month *m*.
 - $\sum_{mh} \{...\}$ represents the sum across all hours *h* in month *m*,
 - $P_{\text{RTP}h}$ is the hourly RTP price in hour *h*,
 - Q_{Ah} is the actual kWh in hour *h*.
- PFA is the Power Factor Adjustment Charge.
 - K_{Am} is the actual metered demand recorded in month *m*,
 - PF_{MIN} is the minimum power factor limit that does not trigger a power factor adjustment under the current standard tariff,
 - PF_{Am} is the actual meter power factor for the month measured coincident with the K_{Am} measurement.

Bill Components:

Standard Bill:

The customer's standard tariff prices will be applied to the CBL. These tariff prices include the current demand and energy prices, the Fuel Adjustment Charge, the Environmental Surcharge and other applicable riders found in the Commission-approved tariff sheets. The standard bill will be computed using these prices and CBL values according to the billing algorithm currently in use to compute actual bills for customers on the applicable standard tariff.

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RURAL ELECTRIC COOPERATIVE CORPORATION

Incremental Energy Charge:

The sum across all hours of the billing period of the product of the real-time price for each hour and the incremental load for each hour. Incremental load is the difference between actual metered load and the CBL. This difference can be positive or negative. Negative differences, termed "decremental load", create hourly credits. Actual metered usage cannot go below zero for billing purposes.

Customer Baseline Load (CBL):

Customer agreement on a utility-provided CBL is a precondition for use of RTP-DA.

The CBL is to be developed by the utility using one complete calendar year of customer-specific hourly firm historical load data. Upon agreement by all parties, the CBL remains in place permanently and is adjusted to match up day-types (weekdays and weekends) with the respective calendar year. Additional calendar matching modifications will be made, as necessary, for holidays.

Modifications to the CBL can be made to reflect permanent removal of major, customer-owned electrical equipment or significant conservation or efficiency enhancements made by the customer. Incorporation of any such modifications into the CBL must be approved by all parties.

RTP Price:

The Day-Ahead RTP Price reflects day-ahead marginal costs on an hourly basis as determined by East Kentucky Power Cooperative, Inc. The RTP Price consists of the following components:

1. EKPC's day-ahead hourly marginal generation cost, including estimated variable fuel cost, variable O&M cost and the variable emission allowance cost of the marginal generating unit, or purchased power cost, as applicable.
2. EKPC's estimated marginal reliability cost, as applicable
3. EKPC's estimated marginal transmission cost, as applicable
4. Losses
5. Risk Adder

The Fuel Adjustment Charge applies to the CBL but not to incremental energy, which is charged or credited based on the hourly RTP price.

The Environmental Surcharge applies to the CBL only, with the RTP price reflecting variable environmental costs only.

Power Factor Adjustment:

The actual power factor for each individual RTP customer will be measured at the time of the current month's 15-minute peak demand for the customer. If the

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actual power factor is less than the standard tariff power factor limit, then the Power Factor Adjustment, described above, will apply.

RTP Administration Fee:

The Cooperative Corporation will charge a monthly RTP Administration Fee of \$150 per month.

Special Provisions:

Price notification:

Prices will be posted to the Internet and become firm at 4:00 p.m. ET of the prior business day. (Friday's notice will be *firm* for Saturday and *estimates* for Sunday and Monday will be posted. These estimates for Sunday and Monday will become firm unless an update is provided by 4:00 p.m. ET of the prior day. This methodology also applies for holidays.) The Cooperative Corporation is not responsible for a customer's failure to receive and act upon hourly RTP prices. If a customer cannot access these prices, it is the customer's responsibility to inform EKPC so that the prices may be provided.

Upgrades to local distribution cost:

In the event that incremental RTP load growth causes a local distribution upgrade to serve the RTP customer, the customer will be responsible for these costs. The customer can do so in the normal manner currently allowed for services beyond standard requirements as set forth by the Cooperative Corporation.

Term of Contract:

Minimum service term of one year. The customer must provide written notice of intended departure 90 days before contract termination. Contract duration is subject to the time limit of the pilot program.

Customers who terminate service under this tariff after the initial one (1) year period shall be ineligible to return to the pilot program. Prospective customers may not participate in the program after the conclusion of the second year of the pilot program.

General Terms and Conditions:

Customer service must comply with general rules and regulations of the Cooperative Corporation on file with the Public Service Commission of Kentucky.

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**TESTIMONY
OF
MICHAEL T. O'SHEASY**

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8 ON BEHALF OF
9 EAST KENTUCKY POWER COOPERATIVE, INC.
10 AND ITS MEMBER DISTRIBUTION SYSTEMS
11
12

13 Q. Please state your name, business address, and occupation.

14 A. Michael T. O'Sheasy, 5001 Kingswood Drive, Roswell, Georgia 30075. I am a
15 Vice-President with Christensen Associates Energy Consulting, LLC.

16 Q. State briefly your education background and experience.

17 A. I received a Bachelors degree in Industrial Engineering from the Georgia Institute
18 of Technology in 1970. In 1974, I earned a Masters degree in Business
19 Administration from Georgia State University. From 1971 to 1975, I was
20 employed by the John W. Eshelman Company – a division of the Carnation
21 Company – as a plant superintendent in their Chamblee, Georgia operation. From
22 1975 to 1980, I worked for the John Harland Corporation, initially as an assistant
23 plant manager, and then as a plant manager in their Jacksonville, Florida plant,
24 and finally as their plant manager in Miami, Florida. I joined Southern Company
25 Services in 1980 as an engineering cost analyst and progressed through various

1 positions to the position of supervisor, during which time I began serving as an
2 expert witness in costing. I have testified as Gulf Power Company's cost of
3 service witness and have provided other support to Gulf in matters before the
4 Florida Public Service Commission. In 1990, I became Manager of Product
5 Design for Georgia Power Company, and I have testified before the Georgia
6 Public Service Commission as an expert witness on rate design and pricing. I
7 retired from Georgia Power Company on May 1, 2001, and became a consultant
8 with Christensen Associates Energy Consulting at that time.

9 **Q. What is the purpose of your testimony in this proceeding?**

10 A. I have been engaged by East Kentucky Power Cooperative (EKPC) to assist them
11 in developing a Real-Time Pricing (RTP) Pilot program in response to the
12 Commission's Order in case 2006-00045. The purpose of my testimony is to
13 explain the purpose of RTP and describe aspects of the RTP tariff design,
14 including an explanation of a standard bill, a Customer Baseline Load (CBL), and
15 the composition of the real-time price.

16 **Q. What is your experience with real-time pricing?**

17 A. I was the original architect of Georgia Power Company's very successful RTP
18 program. I was an original witness testifying for its approval and have testified
19 on this topic on many occasions. I have consulted with many utilities throughout
20 the United States and the world assisting these utilities with implementation of
21 RTP.

22 **Q. Are you sponsoring any exhibits?**

1 A. Yes, Exhibit MTO-1 presents my experience and related papers that I have
2 authored on the subject of RTP. Exhibit MTO-2 provides the components of the
3 RTP price for the EKPC Pilot program.

4 **Q. What exactly is real-time pricing?**

5 A. Real Time Pricing (RTP) is an electricity rate structure in which retail energy
6 prices change very frequently, usually hourly, and with short notice, usually day-
7 ahead. These hourly prices are designed to reflect the supplier's expected hourly
8 marginal cost of providing incremental load. These hourly costs can also reflect
9 market costs, such as power purchases. RTP is the most efficient means to price
10 electricity to retail customers.

11 **Q. What do you mean by efficient?**

12 A. RTP is a tool to signal to retail users the utility's next day expected marginal cost
13 of providing incremental load. RTP assists the customer to make an energy usage
14 decision based upon the utility's true cost of providing incremental energy. RTP
15 also recognizes and allows for the fact that the value of energy is specific to each
16 user and is dynamic. Additionally, large system benefits may be achieved by
17 offering RTP to customers. A few customers on RTP may provide benefits to the
18 utility as RTP price response becomes a system resource. RTP will inherently
19 reorder customers into cooperative teammates producing win-win solutions; one
20 participant voluntarily forgoes consumption while another eagerly consumes.

21 **Q. Can you elaborate on these benefits of RTP?**

22 A. Through RTP price response, the overall system reliability can be improved.
23 Retail consumers can now back off usage when wholesale prices are high,

1 ultimately providing a dampening effect upon a run-up in wholesale prices. The
2 utility can become less dependent upon outside power purchases and may avoid
3 dispatching costly generation such as combustion turbines. RTP customers are
4 often able to lower their cost of energy but in a manner that is beneficial to the
5 utility. Participants have an incentive to innovate with economic energy
6 efficiency programs and equipment. RTP should, in the long run, be the least
7 expensive firm pricing product that a utility can offer.

8 **Q. What is the benefit to retail customers of providing day-ahead hourly pricing**
9 **in the fashion of a two-part RTP program?**

10 A. The primary benefit is that it enables the electricity system to function more
11 efficiently. Arguably, electricity is the most volatile publicly traded commodity
12 in the world. Hourly unit cost can change by a multiple of 100 within a 24-hour
13 period. This volatility is driven in large part by electricity's unique
14 characteristics:

- 15 1) It cannot be stored to any great degree. It must be produced when
16 demanded.
- 17 2) It is not easily transported over great distances.
- 18 3) Most customers expect the product to be available whenever
19 requested. A busy signal is unacceptable; in fact, the physics of the
20 product would not permit it.
- 21 4) It is ubiquitous. It is woven into the fabric of nearly every aspect of
22 our lives.

23

1 Most customers cannot accept the hourly cost risk of electricity. Therefore,
2 utilities have historically absorbed this cost risk themselves and have offered
3 relatively stable rates with commensurate premiums. If, however, this cost risk
4 can be shared with willing customers, the corresponding price offered to these
5 customers can be less.

6 This is what Real-Time Pricing is all about: sharing the underlying cost risks onto
7 willing customers at an otherwise cheaper rate on an expected basis. It is on an
8 expected basis because there can be certain times in which the RTP prices average
9 more than traditional tariffs, whereby the utility absorbs the risk. But, over the
10 course of time, RTP should be cheaper.

11 **Q. How is RTP different from a traditional tariff?**

12 A. RTP is not a traditional tariff. It does not signal to a customer the cost of
13 electricity based upon embedded costs. Rather, it bases the incremental price
14 signal upon marginal cost so that the customer can make a “real-time” decision as
15 to whether his value of using a kWh is greater than the actual “real-time” cost of a
16 kWh. More efficient consumption decisions are therefore made than had the price
17 signal been based upon embedded, and therefore fixed, cost.

18 However, the utility has also incurred costs in the past that are not reflected in
19 RTP prices. Examples of these costs include overheads, certain distribution costs
20 and regulatory assets. These costs, too, must be compensated with commensurate
21 revenue. With traditional tariffs, these cost components are typically rolled into
22 the bundled prices. But with a two-part RTP tariff, they are collected through a
23 “standard bill” based upon a customer baseline load (CBL) and a traditional

1 tariff.

2 The proposed RTP tariff contains two parts. The first part uses a CBL to collect
3 embedded costs and the second part, with changes in usage subject to incremental
4 RTP prices, covers the cost of marginal load.

5 **Q. Is the first part of the two-part RTP bill, which you referred to as the**
6 **standard bill, based upon a fixed load shape and standard embedded rates?**

7 A. Yes, a CBL is a customer-specific hourly load responsibility that is used along
8 with the utility's standard embedded tariff for the customer in order to develop the
9 "standard bill" portion for the RTP customer. This standard bill is the first part of
10 the customer's two-part RTP bill. The CBL is established for each hour of a
11 customer's historical year, or 8,760 hours for a calendar year. For example, an
12 RTP customer will see a monthly bill amount equal to the product of the billing
13 determinants in that historical month of the CBL multiplied by the current rates in
14 effect.

15 **Q. Upon what load is the second part of the RTP bill based and upon what**
16 **prices is it related?**

17 A. Any deviation of the customer's current hourly consumption from the customer's
18 CBL, whether an increase above the CBL (increments) or a decrease from the
19 CBL (decrements) will be applied against the specific hour's RTP prices.

20 **Q. So will decrements create an hourly bill credit?**

21 A. Yes, and this is the power of RTP and why it encourages demand response
22 especially when the cost of providing electricity is high.

23 **Q. What are the components of the incremental RTP price?**

1 A. There are five components: (1) system lambda which includes variable fuel,
2 variable O&M and variable emission allowance costs of the marginal generating
3 unit, or a purchase if it is the marginal resource (note that lambda is, on average,
4 the largest overall component of the RTP price), (2) reliability cost, (3)
5 transmission cost, (4) losses, and (5) a risk adder. These components are
6 explained in further detail in Exhibit MTO-2.

7 **Q. Let's return to the "standard bill". Please elaborate on the purpose of the**
8 **"standard bill."**

9 A. The standard bill enables RTP customers to be revenue neutral for their CBL load.
10 This enables the utility to recover its embedded costs, which the standard tariff is
11 designed to cover. The standard bill also provides the customer with a price
12 guarantee for its CBL load since it is priced through a standard tariff.

13 **Q. How is the CBL developed?**

14 A. When a customer first volunteers for the RTP tariff, a CBL for that customer is
15 created based on their previous year's electric usage, divided into hourly
16 increments. From this point forward, the CBL remains in place and can be
17 changed only by mutual agreement of all parties concerned. The idea of retaining
18 the original CBL is to encourage the customer to change his usage pattern in
19 response to the day-ahead real-time prices, which are based on the utility's
20 marginal cost. High RTP prices may induce load reduction. This incentive
21 remains in place for years to come by providing competitive energy prices via the
22 RTP costing mechanism for any changes in load (from the CBL).

23 **Q. Once established, will the CBL ever change?**

1 A. With rare exceptions, the answer is no. Modifications to the CBL can be made
2 should the customer's load permanently drop below his CBL, *i.e.*, the permanent
3 and documented change in a customer's operation manifested by the removal of a
4 major use of electricity which was previously in the CBL or as the addition of
5 conservation features in which the original less efficient usage was in the original
6 CBL. Changes to a customer's CBL must be mutually agreed upon by the
7 customer and the Company.

8 **Q. Would there be a problem with raising the CBL for RTP customers?**

9 A. Yes. Besides the fact that you would be changing established rules, it would
10 destroy much of the benefit of RTP to customers. In general, customers volunteer
11 for the risk of hourly RTP prices because, for most hours of the year, they are less
12 expensive than standard embedded rates. Consequently, they may bring new load
13 and/or invest in load response capability, which is economically justified by lower
14 RTP prices. If one were to raise the CBL automatically and remove the
15 possibility of purchasing electricity at lower incremental RTP prices, the customer
16 would lose the benefit which originally justified expansion and/or load response
17 capability. RTP customers might migrate back to standard tariffs and EKPC
18 could lose a valuable resource – Demand Response – harming both RTP
19 participants and non-participants. In addition, it is not necessary for the utility to
20 collect embedded rate revenue for the incremental load. Marginal cost-based RTP
21 prices are sufficient to cover the cost of this incremental load over time, obviating
22 the need to alter the CBL.

23 **Q. Would there be a problem with lowering the CBL for RTP customers?**

1 A. Yes. Because the average RTP price is usually less than the standard embedded
2 rate, EKPC could experience revenue erosion for the displaced CBL load. This
3 would mean that EKPC could not recover its fixed cost obligations for the
4 displaced CBL load unless non-participants' rates were raised or EKPC's margins
5 eroded.

6 **Q. Can new customers volunteer for the RTP tariff?**

7 A. No, EKPC has determined that this would not be desirable for the pilot program.
8 This pilot will study how customers respond to RTP in Kentucky in terms of load
9 response, bill impacts, and overall satisfaction. Additionally the pilot will enable
10 EKPC and participating members to work through the administrative details,
11 metering, and billing requirements of RTP prior to its availability on a broad
12 scale. I believe that EKPC is being practical in not complicating the
13 administration of the RTP Pilot with the challenges of developing CBLs for
14 customers lacking billing history. Eventually, it may be feasible to allow new
15 customers onto RTP, just as other utilities with much more RTP administration
16 experience like Georgia Power, Duke Power, and Progress Energy do.

17 **Q. If an existing customer migrates to RTP with a high CBL and doesn't**
18 **envision much growth in usage, can he derive any benefit from being on**
19 **RTP?**

20 A. Yes, this type of customer could realize substantial benefits through price
21 responding. Price responding below the CBL during hours of high RTP prices
22 will result in credits which will lower his overall per unit cost (cents/kWh). Early
23 in RTP program development elsewhere, this feature became clear to many

1 customers who then migrated to RTP. For example, imagine a year in which RTP
2 prices averaged 3 cents/kWh for 8,660 hours and 30 cents/kWh for 100 hours.
3 Also, imagine a customer with a 100 percent CBL priced under the standard tariff
4 at a price of 4 cents/kWh. If the customer price responds by shifting a kWh from
5 the high-priced to the low-priced hour, he experiences a 27 cent per kWh saving.
6 Using the example above, a 1 MW customer with a 100 percent load factor would
7 have a standard bill of \$350,000 (1,000 kW x 8,760 x \$.04). By reducing usage
8 by 50 percent in the 100 expensive hours and shifting them to other hours, this
9 customer could save \$13,500, about 4 percent of their bill (-500 kWh x 100 hours
10 x \$.30/kWh + 500 x 100 x \$.03 = -\$15,000 + \$1,500 = -\$13,500). The example
11 demonstrates that customers flexible enough to shift or reduce usage during the 30
12 cents/kWh hours, will significantly reduce their overall cost per kWh.

13 **Q. Is there an open-market parallel to this issue of CBL setting?**

14 A. In a more competitive marketplace, the cost charged for a CBL would be at least
15 the risk of offering a fixed price guarantee for the CBL-defined load. Therefore,
16 the standard bill for a CBL would involve a financial contract guaranteeing a
17 fixed price for contracted quantities at contractually defined times. Any
18 additional incremental cost, such as administrative cost, would be added into the
19 risk-based cost of the financial instrument. These cost components would then
20 become the floor below which the provider would not fall in setting a price. The
21 provider would then charge a price above this floor at whatever the market would
22 bear. Hopefully, from the provider's perspective, this market price would cover
23 his fixed cost. The market price could, depending upon product value and any

1 inherent advantages which this provider possessed over other providers, be even
2 greater than that necessary to cover his fixed cost for certain time periods.
3 The bottom line is that an open market does indeed offer two-part pricing. (This
4 is actually where RTP originated.) The main differences are: 1) regulators
5 determine the price of the first part in a regulated environment, while the forces in
6 the market such as amount of competition, substitutes, and the negotiating skills
7 of the buyer and seller determine the price of the first part in an open market; and
8 2) the magnitude of the first part in a regulated environment is set through
9 approved rules and procedures, while in an open market, the magnitude of the
10 first part is simply agreed to by the buyer.

11 **Q. In a regulated market, would it be appropriate to permit a customer to select**
12 **the “magnitude” of the first part of the two-part RTP pricing?**

13 A. No. Doing so could create revenue erosion that might shift revenue requirements
14 onto non-participants.

15 **Q. Are you in favor of RTP beginning as a pilot for EKPC?**

16 A. Yes, this is how we began at Georgia Power Company in 1992. A Pilot enables
17 the utility to adjust to the administration of RTP with a limited number of
18 participants, understand the potential load response, and effectively market and
19 inform its customers of the intricacies of RTP. I agree with the Commission’s
20 intent to move gradually into RTP.

21 **Q. Does this conclude your testimony?**

22 A. Yes.

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Exhibit MTO – 1

Michael (Mike) T. O'Sheasy
Vice President, Retail Pricing and Solutions
Christensen Associates Energy Consulting LLC

Mike O'Sheasy is a Vice President of Christensen Associates Energy Consulting LLC of Madison, Wisconsin. He retired from Georgia Power Company, an operating company in the Southern Company system, as the Manager of Product Design. His responsibilities include pricing strategy development and future rate planning; rate research, design, and evaluation; and the preparation and filing of retail rates.

Mike was the architect of the Real Time Pricing program at Georgia Power which is the largest program in the United States. Other leading edge innovation championed by Mike include: Flat Bill, Price Protection Products, Multiple Load Management, Interruptible Exchange Service, Multiple Account Management, and Daily Energy Credits. He has consulted with many utilities including Public Service of Oklahoma, Duke Power Company, Salt River Project, Kansas City Power & Light, PP&L, Ohio Edison, Illinois Power, Wisconsin Electric Power Company, South Carolina Electric and Gas and others on pricing issues.

Mike joined Southern Company Services in 1980 as an engineering cost analyst and progressed throughout various positions in the Marketing and Regulatory Support Department, specializing in allocated cost of service studies. While at SCS, he was selected for the Southern's Superlative Award. He has testified before various Commissions as an expert witness on both costing and pricing. Mike has received industry awards, including EPRI Innovator Awards and the Product Champion Award. He has published numerous articles on pricing in national magazines including the *TAPPI Journal*, *Public Utilities Fortnightly*, *Electric Perspectives*, *EPRI Journal*, *Energy Pulse*, *Energy Customer Management*, and the *Electricity Journal*. He has a national reputation for pricing innovation and has been interviewed in *USA Today*, the front page of the *Wall Street Journal*, *Newsweek*, National Public Radio and CNN FN. His reputation internationally has earned him consulting projects on four continents.

1 **Related Professional Papers:**

2
3 "Is Real-Time Pricing a Panacea? If So, Why Isn't It More Widespread?" *The Electricity Journal*,
4 December 2002.

5
6 "RTP Customer Demand Response – Empirical Evidence on How Much Can You Expect," in *Electricity*
7 *Pricing in the Transition* A. Faruqi and K. Eakin, eds., Kluwer Academic Publishers, 2002 (with Michael
8 O'Sheasy).

9
10 "The New Pricing Organization," EPRI International Pricing Conference, co-authored with Robert
11 Camfield, 2000.

12
13 "Roll the Dice, Set a Price," *Public Utilities Fortnightly*, May 15, 1999.

14
15 "5-cent Sundays...The Future of Electricity Prices?" *Electric Perspectives*, January/February 1999.

16
17 "Real-Time Pricing – Supplanted by Price-Risk Derivatives," *Public Utilities Fortnightly*, March 1, 1997.

18
19 "Customers Can Buy Low, Sell High," *The Electricity Journal*, February 1998.

20
21 "Real-Time Pricing for Purchased Electricity: An Innovative Pricing Option for Electricity as Used by the
22 Pulp and Paper Industry", *TAPPI Journal*, April 1996.

23
24 "Reaping the Benefits of RTP: Georgia Power's RTP Evaluation Case Study," Volumes 1 and 2, Electric
25 Power Research Institute (EPRI), December 1995.

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Exhibit MTO – 2

Michael (Mike) T. O’Sheasy
Vice President, Retail Pricing and Solutions
Christensen Associates Energy Consulting LLC

RTP Price Component Composition

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1. Lambda: Fuel, variable O & M and variable emission allowance costs from marginal generating unit hourly cost or a purchase if that is the marginal resource.
 2. Losses: physical losses from the point at which lambda is measured to the customer’s meter (normally 3-9% of lambda).
 3. Marginal transmission cost: EKPC will compute its marginal cost of new transmission. Transmission planning considers peak loads as well as ambient temperature conditions. The transmission component in RTP will be inserted whenever the next day’s load requirements approach the load capability of the system while considering the expected temperatures.
 4. Reliability (also referred to as Outage) cost: Integrated resource planning considers reserve levels necessary to achieve a specified level of reliability on an expected basis. Each hour of a year will have a certain probability of demand requirements which exceed resource capability; however, this probability in most hours is insignificant. However, in a few critical hours the probability is notable. The objective of good resource planning is to constrain these hours to tolerable limits while balancing the overall cost of resources and reserves. Within a regulated marketplace, a good means to project reliability cost is to compute the annual value of lost load per kWh (VOLL) and multiply by the hour’s loss of load probability (LOLP). For pilot purposes, the cost of reliability, which is the cost of the marginal supply resource for EKPC, will be driven by the next day’s expected reserve levels. Typically this component is expected to occur in relatively few hours.
 5. Risk adder: this is required by:
 - a. The risk which the utility takes by forecasting its marginal cost a day ahead and making it a firm price.
 - b. A contribution towards distribution cost driven by incremental RTP sales
 - c. A contribution towards A & G driven by incremental RTP sales.
 - d. A contribution to the utility’s overall fixed cost of the system.

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The risk adder will be 5 mills/kWh included in the RTP price at retail for all hours.

