

COMMONWEALTH OF KENTUCKY  
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

CONSIDERATION OF THE IMPLEMENTATION )  
OF SMART GRID AND SMART METER ) CASE NO.  
TECHNOLOGIES ) 2012-00428

I N D E X

	<u>Page No.</u>
BACKGROUND .....	1
DISCUSSION .....	5
EISA 2007 Smart Grid Information Standard .....	5
EISA 2007 Smart Grid Investment Standard .....	8
Customer Privacy .....	11
Opt-Out .....	14
Customer Education .....	7
Dynamic Pricing .....	19
Distribution Smart Grid Components .....	22
Cybersecurity .....	26
Cost Recovery .....	30
How Natural Gas Companies Might Participate in Electric Smart Grid .....	32
SUMMARY OF FINDINGS .....	33
ORDERING PARAGRAPHS .....	34
APPENDIX	

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ORDER

BACKGROUND

By Order dated October 1, 2012, the Commission initiated this administrative proceeding to consider the implementation of Smart Grid and Smart Meter technologies, and time-of-use, or dynamic, pricing ("Opening Order"). The Opening Order provided that this administrative proceeding would also include a determination as to whether the Smart Grid Investment Standard and the Smart Grid Information Standard as set forth in the Energy Independence and Security Act of 2007 ("EISA 2007") should be adopted.<sup>1</sup> In particular, the purpose of the instant administrative matter would address all aspects of a Smart Grid system from hardware and software issues to reliability improvement, cost recovery issues, and dynamic pricing. All of Kentucky's jurisdictional electric

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<sup>1</sup> The EISA 2007 Smart Grid Investment Standard and the Smart Grid Information Standard were part of standards considered by the Commission in Case No. 2008-00408, *Consideration of the New Federal Standards of the Energy Independence and Security Act of 2007* (Ky. PSC Oct. 6, 2011). The Commission, however, ultimately deferred consideration of these two standards until the completion of this administrative proceeding.

utilities<sup>2</sup> and the five largest jurisdictional gas utilities<sup>3</sup> (“Gas LDCs”) were made parties to this proceeding.

The Opening Order also incorporated into the record of this matter certain documents which had been filed in Administrative Case No. 2008-00408 and a report, along with supporting documents, developed by the Kentucky Smart Grid Roadmap Initiative.<sup>4</sup> The Opening Order also established a procedural schedule for the processing of this administrative proceeding. The procedural schedule provided deadlines for, among other things, the filing of individual or joint testimony, two rounds of discovery, and two informal conferences.

The following parties petitioned for and were granted intervention in this proceeding: the Community Action Council for Lexington-Fayette, Bourbon, Harrison, and Nicholas Counties, Inc. (“CAC”); Kentucky Industrial Utility Customers, Inc. (“KIUC”); and the Attorney General of the Commonwealth of Kentucky, by and through his Office of Rate Intervention (“AG”).

Joint testimonies were filed by Big Rivers and its three distribution cooperative members; EKPC and its 16 distribution cooperative members; LG&E and KU; and

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<sup>2</sup> The jurisdictional electric utilities are Big Rivers Corporation (“Big Rivers”), Big Sandy Rural Electric Cooperative Corporation, Blue Grass Energy Cooperative Corporation, Clark Energy Cooperative, Inc., Cumberland Valley Electric, Inc., Duke Energy Kentucky, Inc. (“Duke Kentucky”), East Kentucky Power Cooperative, Inc. (“EKPC”), Farmers Rural Electric Cooperative Corporation, Fleming-Mason Energy Cooperative, Inc., Grayson Rural Electric Cooperative Corporation, Inter-County Energy Cooperative Corporation, Jackson Energy Cooperative, Jackson Purchase Energy Corporation, Kenergy Corp., Kentucky Power Company (“Kentucky Power”), Kentucky Utilities Company (“KU”), Licking Valley Rural Electric Cooperative Corporation, Louisville Gas and Electric Company (“LG&E”), Meade County Rural Electric Cooperative Corporation, Nolin Rural Electric Cooperative Corporation, Owen Electric Cooperative, Salt River Electric Cooperative Corporation, Shelby Energy Cooperative, Inc., South Kentucky Rural Electric Cooperative Corporation, and Taylor Rural Electric Cooperative Corporation.

<sup>3</sup> The Gas LDCs are Atmos Energy Corporation (“Atmos”), Columbia Gas of Kentucky, Inc. (“Columbia”), Delta Natural Gas Company (“Delta”), Duke Kentucky, and LG&E.

<sup>4</sup> See Opening Order, Appendix A.

Atmos, Columbia, and Delta. Individual testimonies were filed by Duke Kentucky, Kentucky Power, and CAC.

An informal conference was conducted on April 19, 2013, to discuss the need for, and feasibility of, uniform standards for Smart Grid Investment and Smart Grid Information; to identify the process for determining reasonable standards and programs for the implementation of Smart Grid Investment, Smart Grid Information, reliability improvements, and dynamic pricing; and to assess the willingness of all parties to work in a collaborative manner to identify such reasonable standards and programs. Discussions at the April 19, 2013 informal conference resulted in an agreement among the parties to engage in a collaborative effort to address the issues raised in this administrative proceeding. On May 20, 2013, the parties to this proceeding, with the exception of KIUC, submitted Joint Comments setting forth a recommendation of the topics the collaborative would address, a proposed schedule going forward, and the manner in which the intervening parties and Commission Staff would participate in the collaborative process. The Joint Comments also recommended that the Commission not require adoption of the Smart Grid Investment Standard and the Smart Grid Information Standard.

On July 17, 2013, the Commission issued an Order in this proceeding requiring the parties to collaboratively address the following topics: 1) EISA 2007 Smart Grid Information and Smart Grid Investment Standards; 2) customer privacy; 3) opt-out provisions; 4) cybersecurity; 5) customer education; 6) dynamic pricing; 7) advanced metering infrastructure (“AMI”) and automated meter reading (“AMR”) deployment; 8) cost recovery for smart technology deployments; and 9) participation by natural gas

companies in the electric Smart Grid. In addition, the Commission found that those topics should include issues relating to the recovery of costs of obsolete equipment.

The parties, with the exception of KIUC, implemented the collaborative process by holding monthly meetings to discuss each of the nine topics. The meetings began in August 2013 and concluded in June 2014. The collaborative effort culminated with the filing of a report on June 30, 2014, of the jurisdictional electric utilities and the Gas LDCs (collectively "Joint Utilities") addressing in detail and containing findings and recommendations on each of the nine issues referenced above. The report also contained comments from the AG and the CAC.

Finding that additional discovery was needed to further develop the record on the complex issues addressed by the June 30, 2014 report ("Report"), the Commission established a supplemental procedural schedule that provided for two rounds of discovery and set a hearing date. On November 25, 2014, after additional discovery was conducted, the Commission issued an Order finding that the record has been sufficiently developed for the Commission to render a decision based on the evidentiary record without the need for a formal hearing. The November 25, 2014 Order then established a deadline for the parties to this proceeding to, either individually or jointly, notify the Commission in writing whether the formal hearing should be held as scheduled or whether the matter could be submitted to the Commission for a determination based on the evidentiary record. In the event the parties recommended that no formal hearing be held, the November 25, 2014 Order established a deadline allowing the parties an opportunity to submit a brief, either individually or jointly. The November 25, 2014 Order also scheduled two dates for a meeting in which the

Commission would take public comments. The first public meeting was conducted on December 16, 2014, and the second on December 17, 2014.

On December 3, 2014, the parties to this matter submitted a joint statement stating their belief that a formal hearing for this matter was not necessary and that the case could be submitted to the Commission for a decision based upon the existing evidentiary record.

On February 27, 2015, the Joint Utilities filed a brief unanimously recommending that the EISA 2007 Smart Grid Investment and Smart Grid Information Standards should not be adopted by the Commission. The Joint Utilities assert that adopting the former standard would require them to make uneconomical investments, and adopting the latter standard would be largely redundant, while potentially stifling useful innovation in smart-technology proposals. The brief further summarized the Joint Utilities' positions on the nine issues that were addressed in their Report.

## DISCUSSION

### EISA 2007 Smart Grid Information Standard

The Joint Utilities state in the Report that they continue to believe that “[e]ach utility’s unique circumstances and the pace of technological change make it unnecessary, and likely counterproductive, to impose uniform, one-size-fits-all standards, such as the EISA 2007 Smart Grid Information and Investment Standards.”<sup>5</sup> The Joint Utilities state that the better approach is to use the Commission’s existing authority to ensure the prudence of utility operations and investments.<sup>6</sup>

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<sup>5</sup> Report at 6.

<sup>6</sup> *Id.*

The EISA 2007 Smart Grid Information Standard for electric utilities requires that electric suppliers provide to purchasers of electricity direct access to time-based wholesale and retail price information, purchaser usage information, updates of price and usage information, day-ahead projections, and information concerning sources of generation, including associated greenhouse gas emissions.

This standard also requires electric utilities to provide consumers access to their customer-specific information at any time through the Internet and by other means elected by the utility, with other interested persons able to access only non-customer specific information.<sup>7</sup>

The Joint Utilities unanimously recommend that the Commission not adopt the EISA 2007 Smart Grid Information Standard. They state that adoption of the standard would require utilities to make uneconomical investments to provide customers direct access to a wide array of information, including price and usage information, without considering the costs or benefits of the provision of the information.<sup>8</sup>

Kentucky is not a restructured state in which customers may select an electricity supplier other than their incumbent utility, nor may customers utilize the services of aggregators.<sup>9</sup> The Joint Utilities point out that time-based or time-of-use (“TOU”) pricing programs are currently voluntary and are not widely available to all customers.<sup>10</sup>

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<sup>7</sup> Opening Order at 4–5.

<sup>8</sup> Report at 77.

<sup>9</sup> Aggregators are entities that bring together, and negotiate on behalf of, large groups of consumers for reduced rates for goods or services or improved terms and/or conditions of service, especially in the energy sector

<sup>10</sup> Report at 78.

With regard to customer-specific information and privacy issues, the Joint Utilities state that they each have an internal customer privacy policy or practice currently in effect,<sup>11</sup> and that there does not appear to be a need to adopt this standard or develop a similar standard at this time.

As previously stated, the Joint Utilities recommend that the Commission continue to use its existing review processes and authority to ensure that utilities are providing customers with the information they need in economical ways. They believe that this will allow the Commission to continue to have oversight over the information provided to customers, yet still recognize each utility's individual characteristics, including the utility's unique costs and benefits of providing various information in certain ways to each utility's customers.<sup>12</sup> The Joint Utilities identified a list of terms and substantive items which they believe the Commission may consider useful when reviewing Smart Grid or customer privacy proposals.<sup>13</sup>

The AG states that he does not oppose the "economical use of smart technologies,"<sup>14</sup> but agrees with the Joint Utilities that the Commission should not adopt the EISA 2007 Smart Grid Information Standard.<sup>15</sup> The CAC provided no comments regarding the Smart Grid Information Standard.<sup>16</sup>

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<sup>11</sup> *Id.* at 11.

<sup>12</sup> *Id.* at 78.

<sup>13</sup> *Id.* at 1.

<sup>14</sup> *Id.* at 80.

<sup>15</sup> *Id.*

<sup>16</sup> *Id.*



The Commission will not require adoption of the EISA 2007 Smart Grid Information Standard or a similar standard. We will, however, require the utilities to provide certain basic information to their customers. Customers should be able to access their own information at any time through the internet or by other cost-effective means of communication selected by the utility. At a minimum, customers should be able to access historical information regarding their electricity or natural gas usage, expressed in each utility's respective billing units, as well as the customers' current applicable tariff rate. Additionally, the utilities should endeavor to provide customers this information in as close to real time as practical.

In addition, the Commission accepts the Joint Utilities proposal to adopt the "voluntary-checklist approach"<sup>17</sup> set forth in the Customer Privacy section of the Report. The Commission's decision is discussed in further detail in the Customer Privacy section later in this Order.

#### EISA 2007 Smart Grid Investment Standard

The EISA 2007 Smart Grid Investment Standard for electric utilities provides that each state consider requiring electric utilities to demonstrate that certain factors with regard to investing in a Smart Grid system were considered before the utilities invested in non-advanced grid technologies.

The standard also requires each state to consider rate recovery of Smart Grid capital expenditures, operating expenses, and other costs related to the deployment of Smart Grid technology, including a reasonable return on the capital expenditures, as

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<sup>17</sup> *Id.* at 15.

well as recovery of the remaining book value of obsolete equipment replaced with Smart Grid deployment.<sup>18</sup>

As previously stated, the Joint Utilities do not support the adoption of the EISA Smart Grid Investment Standard, but rather believe that the Commission should exercise its existing authority to review Smart Grid investments.<sup>19</sup>

Based on the testimony and the responses to data requests in this case, most electric utilities have migrated to AMR or AMI meters and functionality, or are in the process of doing so.

Additionally, the electric utilities' systems include Smart Grid technologies such as Distribution Automation ("DA") features, volt/volt-ampere-reactive ("volt/var") programs and Supervisory Control and Data Acquisition ("SCADA") systems.

As the Joint Utilities note, they have all deployed smart technologies, but in different ways and degrees.<sup>20</sup> The record reflects that the Joint Utilities have adequately demonstrated that system investments are tied to issues relating to cost and how to incorporate components that are compatible with the current distribution system. They have also demonstrated that they are attempting to improve system reliability as they make investment decisions.

Although not stated directly in the Report, the Joint Utilities imply that adoption of the EISA 2007 Smart Grid Investment Standard would require them to seek a certificate of public convenience and necessity ("CPCN") for Smart Grid investments. In the

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<sup>18</sup> Opening Order at 4.

<sup>19</sup> Report at 6.

<sup>20</sup> *Id.* at 77.

discussion in the Cost Recovery section of the Report, the Joint Utilities argue that, while CPCN proceedings may be needed for some smart technology deployment, CPCN authorization is not necessary for all smart technology investment.<sup>21</sup>

The AG concurs with the Joint Utilities that the Commission should not adopt the EISA 2007 Smart Grid Investment Standard. CAC provided no comments with regard to the adoption of this standard.

The Commission believes that the record in this case demonstrates that the deployment of Smart Grid technology, whether in the form of smart meters or DA, varies from utility to utility, as are the reasons for the investment decisions that are made. Some of the investments in existing Smart Grid technology were made after the utilities had obtained a CPCN, and some were not. The Commission has not found any of the investments to be unreasonable.

While the Commission supports the intent of the EISA 2007 Smart Grid Investment Standard, we will not require its adoption. The Commission does not find it practical for each jurisdictional utility to be required to obtain a CPCN for every Smart Grid or meter investment decision. The Commission does find that each of the Joint Utilities should develop internal procedures and policies regarding Smart Grid investments. Such procedures and policies should include a description of their systems, their planning goals, and explanations of how such investments will be considered. This will be discussed in more detail in the discussion of Distribution Smart Grid Components.

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<sup>21</sup> *Id.* at 76.

In support of our decision, the Commission notes the steps the distribution cooperatives take in developing their Construction Work Plans (“CWPs”). The CWPs set forth straightforward design criteria and explain the basis for each project included therein.

With regard to CPCNs, the Commission finds it appropriate for jurisdictional electric utilities to obtain CPCNs for major AMR or AMI meter investments and distribution grid investments for DA, SCADA or volt/var resources. In the past, when addressing requests for CPCNs for AMR and AMI meters, the Commission has noted its concern regarding a number of meter related issues such as cost, compatibility with current system equipment and software, and unplanned obsolescence.

#### Customer Privacy

In the Executive Summary of the Report (“Executive Summary”), the Joint Utilities take the position that it is not necessary for the Commission to mandate a new customer privacy standard that includes the customer data provisions of the EISA 2007 Smart-Grid Information Standard.<sup>22</sup>

In their Report, the Joint Utilities propose a list of terms and substantive items for utilities to consider when reviewing customer privacy policies and practices.<sup>23</sup> The Joint Utilities state that the Commission may find this information “useful when addressing smart-grid or other customer-privacy-related utility proposals.”<sup>24</sup> According to the Joint Utilities, this voluntary checklist approach will ensure that utilities have the flexibility they

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<sup>22</sup> *Id.* at 1 and 9–16.

<sup>23</sup> *Id.*

<sup>24</sup> *Id.* at 1–2 and 9.

need to continue to provide safe, reliable, and economical service while protecting their customers' privacy.<sup>25</sup> As previously stated, the Joint Utilities noted in their Report that each member of the Joint Utilities has a voluntary customer privacy policy or practice in force.<sup>26</sup> In their brief, the Joint Utilities state that federal and state legal protections are already in place concerning customer information and that government and industry groups are working to develop even more robust voluntary standards for utilities.<sup>27</sup> In addition, the Joint Utilities state that Kentucky's utilities have gone beyond the legal requirements to ensure that only appropriate use is made of customer information.<sup>28</sup> The Joint Utilities, therefore, assert that a new mandatory customer privacy standard, including the requirements set forth by the EISA 2007 Smart Grid Information Standard, is unnecessary.<sup>29</sup>

The AG recommends that the Commission adopt a statewide mandated customer privacy standard. The AG further recommends that the standard provide for significant civil penalties for non-compliance and include a universal opt-in policy that would prevent a utility from disclosing consumer information unless the customer elects to allow such disclosure.<sup>30</sup>

CAC states that it supports utilities' efforts to maintain customer privacy. However, CAC believes that aggregated customer information is often helpful to it in its

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<sup>25</sup> *Id.* at 15.

<sup>26</sup> *Id.* at 11.

<sup>27</sup> Brief of the Joint Utilities (filed Feb. 27, 2015) at 6.

<sup>28</sup> *Id.*

<sup>29</sup> *Id.*

<sup>30</sup> Report at 2 and 15.

effort to provide assistance to low-income customers in paying their bills and in its mission as an advocate for low-income customers. CAC believes that information should be readily available to it for these purposes and in regulatory proceedings. Also, since utilities benefit from its low-income assistance, CAC recommends that the utilities absorb the costs of providing this information.<sup>31</sup>

The Commission agrees that each utility should have a customer privacy policy and will accept the proposal set forth in the Report. Although the Commission will not mandate the adoption of a particular standard, the Commission finds that each utility should formalize its customer privacy policy and include it as part of its internal procedures. Each utility should incorporate appropriate items from Section VI and Section VII of the Customer Privacy section of the Report.<sup>32</sup> The Commission also finds that each utility's customer privacy policy (or a descriptive summary of that policy) should be available on the utility's website. Through independent research of the websites of the jurisdictional electric utilities, the Commission notes that each investor-owned utility ("IOU") has an established privacy policy accessible via its website, but only a few of the cooperatives have a privacy policy available on their websites.

Also, aggregated customer information should be available to CAC to assist it in its effort to provide assistance to low-income customers in paying their bills and in its mission as an advocate for low-income customers. That information, however, should be provided only at the request of CAC after it provides a reasonable basis for requesting the information.

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<sup>31</sup> *Id.* at 2.

<sup>32</sup> *Id.* at 11–14.

The Commission finds the AG's recommendation to adopt a statewide privacy standard that provides for civil penalties and requires opt-in to be inappropriate. If necessary, utility customers may seek civil penalties through individual court actions. Further, the Commission believes that the utilities' existing customer privacy policies should be sufficient to address any issues regarding the use of their individual information, and that aggregate information provided to entities such as CAC will be to the benefit, rather than the detriment, of utility customers.

### Opt-Out

In the Executive Summary, the Joint Utilities state that requiring utilities to offer opt-out from smart meters "has potentially significant cost and operational impacts for utilities and customers"<sup>33</sup> and that such requirements are generally not beneficial.<sup>34</sup> They further note that allowing a customer to opt out of using a smart meter will inhibit the customer's ability to participate in and obtain timely information about usage.<sup>35</sup> The Joint Utilities recommend that the Commission evaluate the issue of opting out on a case-by-case basis.<sup>36</sup>

The Joint Utilities state that the two primary objections some customers raise about smart meters are that smart meters will adversely affect their health and that smart meters invade their privacy.<sup>37</sup> In the Report, the Joint Utilities provide a brief

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<sup>33</sup> *Id.* at 2.

<sup>34</sup> *Id.*

<sup>35</sup> *Id.* at 26.

<sup>36</sup> *Id.* at 2.

<sup>37</sup> *Id.* at 17.

rebuttal to each concern.<sup>38</sup> In addition, the Commission notes that the AG states that very few independent scientific results have been produced demonstrating that smart meters are either unsafe or dangerous to human health.<sup>39</sup>

To support their argument regarding the potential negative effects of allowing customers to opt out of smart meters, the Joint Utilities cite some of the potential costs and operational impacts in the Report.<sup>40</sup>

In addition to the information provided in the Report, the Commission notes the issues identified in Farmers RECC's response to a Staff data request regarding the impact of opt-outs from AMI deployment:

- Metering: A utility would be required to purchase special meters that would not have the current AMI capability.
- Billing: A utility would be required to establish special meter reading routes and cycles to accommodate opt-out customers. Additional administrative time and other costs would be incurred to manage the billing for these customers.
- Manual meter reading: A utility would incur additional costs to dispatch meter readers to travel to, and read the meter of, each opt-out customer.
- Outage notification: Information on whether opt-out customers were being affected by service outages would also be limited to either the customer notifying the utility or through a personal visit.

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<sup>38</sup> *Id.* at 17–18.

<sup>39</sup> *Id.* at 27.

<sup>40</sup> *Id.* at 20–23.



- Voltage/Current system modeling: Opt-out customers would be more difficult to include in these types of studies due to the lack of data.
- System reliability/Blinks: Opt-out customers would no longer be a part of this trouble-shooting capability, as no data could be supplied from their meters.<sup>41</sup>

The Joint Utilities state that they did not address AMR metering in the Report.<sup>42</sup> AMR meters only allow for one-way communication, and the Joint Utilities have defined the term “smart meter” as a meter that allows two-way communication. Therefore, AMR meters would not fall within their definition of a “smart meter.” However, the Joint Utilities contend that no opt-out should be allowed for AMR meters and state that a number of utilities have already deployed AMR systems.<sup>43</sup>

The Joint Utilities oppose opt-outs of any kind for digital meters with no communications capabilities because such meters function in a manner essentially identical to older electromechanical meters. They do not believe electromechanical meters are being manufactured domestically today.<sup>44</sup> Therefore, they state that any opt-out from a non-communicating digital meter is impracticable at best.<sup>45</sup>

The AG recommends that both technical and informational opt-out should be available to customers, where infrastructure allows.<sup>46</sup>

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<sup>41</sup> Farmer’s response to Commission Staff’s Request for Information (Ky. PSC Sept. 18, 2014), Item 10.

<sup>42</sup> Report at 17.

<sup>43</sup> *Id.*

<sup>44</sup> *Id.* at 18.

<sup>45</sup> *Id.*

<sup>46</sup> *Id.* at 27–28.

CAC recommends that if a utility offers opt-out alternatives, customers should not be penalized for choosing to opt out.<sup>47</sup> In addition, CAC believes that the ability of utilities with smart meter deployments to instantaneously remotely disconnect customers could potentially have negative consequences for low-income customers which should be mitigated.<sup>48</sup>

Due to the potential negative impact on the operational benefits of a Smart Grid, the Commission does not support meter opt-outs, whether they be from digital, AMR or AMI meters. However, almost all of the public comments submitted in this proceeding address concerns with smart meters from either a health or privacy perspective. Therefore, the Commission accepts the Joint Utilities' recommendation to consider opt-out on a case-by-case basis (or more precisely, on a utility-by-utility basis). Each utility will be able to determine the need for an opt-out provision and petition the Commission for consideration. The Commission believes that each utility can best determine the need for an opt-out provision and whether that the proposed opt-out provision will apply to digital, AMR, or AMI meters will be at the utility's discretion.

The Commission finds that any opt-out provision should require those customers that opt out to bear the cost related to that decision — through a one-time fee and/or a monthly charge, as appropriate.

#### Customer Education

The Joint Utilities believe that customer education will increase the success of smart meter deployment. They recommend that each utility deploying smart meters consider using some of the customer-education topics that are addressed in the

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<sup>47</sup> *Id.* at 2 and 28.

<sup>48</sup> *Id.* at 28.

Report.<sup>49</sup> However, most utilities have already migrated to AMR or AMI meters, so initial education efforts for smart meter deployment have, for the most part, already been made.

The Joint Utilities state that customer education on the benefits of smart technology is critical to gaining customer acceptance and use of Smart Grid technology.<sup>50</sup> In addition, they state that customer education tends to increase the benefits from Smart Grid investment, consistent with the Smart Grid Investment Standard's consideration of cost effectiveness.<sup>51</sup>

The Joint Utilities cite the customer education efforts undertaken by Duke Energy, American Electric Power ("AEP") (the parent company of Kentucky Power), and Owen Electric.<sup>52</sup> In addition, the Joint Utilities cite various topics and communication channels that the utilities may utilize for customer-education purposes.<sup>53</sup>

In his testimony, the AG acknowledges the need for customer education but does not include any additional comments in the Report. CAC recommends that customer education should be mandatory as smart meters are deployed.<sup>54</sup>

It is evident from the testimony, responses to data requests, and the Report that utilities are already engaging in customer education concerning safety and some Smart Grid efforts. However, the Commission is uncertain as to the structure of each utility's

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<sup>49</sup> *Id.* at 3.

<sup>50</sup> *Id.* at 29.

<sup>51</sup> *Id.* at 35.

<sup>52</sup> *Id.* at 29–31.

<sup>53</sup> *Id.* at 31–35.

<sup>54</sup> *Id.* at 36.

customer-education policy or practice. The Commission, therefore, has determined that each utility should formalize its customer-education policy or practice with regard to Smart Grid and smart meters as part of its internal procedures manual.

At a minimum, the policy should address the appropriate education activities for deployment of smart meters and other Smart Grid components (including DA, volt/var and SCADA). The requirement will allow each utility to develop educational materials that apply to its own system.

Dynamic Pricing<sup>55</sup>

In the Report's Executive Summary, the Joint Utilities state that their collective experience is that residential dynamic pricing programs have had low participation and have sometimes resulted in energy-consumption increases.<sup>56</sup> The Joint Utilities contend that they should not be required to create and offer dynamic rate offerings, but should be allowed to do so voluntarily, subject to Commission approval.<sup>57</sup>

As defined in the Report, dynamic pricing refers to pricing that varies according to the time at which the energy is consumed, is normally tied to energy prices in the wholesale market or to system peaks, and is delivered to customers through time-based rates or tariffs.<sup>58</sup> The Report describes several forms of dynamic pricing, including time-

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<sup>55</sup> In the Opening Order establishing this case, dynamic pricing was defined to include time-of-use pricing, critical peak pricing, real-time pricing, and credits for consumers with large loads that enter into pre-established peak load reduction agreements that reduce a utility's planned load capacity obligations. See further definition in the Appendix to this Order.

<sup>56</sup> Report at 3.

<sup>57</sup> *Id.*

<sup>58</sup> *Id.* at 37.

of-use (“TOU”) or time-of-day (“TOD”) pricing, both variable and fixed critical-peak pricing (“CPP”), peak-time rebate (“PTR”) and real-time pricing (“RTP”).<sup>59 60</sup>

Although there has not been significant customer participation, several utilities continue to offer some form of dynamic pricing options, such as on peak/off peak TOD rates. The Joint Utilities provide a discussion of the experiences of Duke Energy, the parent company of Duke Kentucky, in North Carolina, South Carolina, and Ohio, and the experiences of Kentucky Power, KU/LG&E, Owen Electric and Jackson Energy.<sup>61</sup> In addition, the Report lists the residential dynamic pricing programs available in Kentucky<sup>62</sup> and those offered by AEP and Duke Energy in other jurisdictions.<sup>63</sup>

The Report also includes a discussion of issues that need to be addressed when considering dynamic pricing. The rate and tariff issues include: opt-in/opt-out, rate structure, contract terms, waiting periods to switch rates, complexity, criteria for participation and hold-harmless trial periods.<sup>64</sup> Also discussed in the Report are technology considerations that the customer and utility must address, customer education and marketing. Other considerations, including cost, equity, and economic justification, are also discussed.<sup>65</sup>

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<sup>59</sup> *Id.* at 37–38.

<sup>60</sup> Some utilities, such as AEP, do not consider TOD rates to be dynamic pricing.

<sup>61</sup> Report at 38–41.

<sup>62</sup> *Id.*, Appendix B at 85–86.

<sup>63</sup> *Id.*, Appendix C at 87.

<sup>64</sup> Report at 41–42.

<sup>65</sup> *Id.* at 42–43.

Noting that the results of dynamic pricing are mixed at best, the AG states that the Commission should not require mandatory residential TOU rates and that such rates should be no more than an option for residential ratepayers.<sup>66</sup> In the Report, the AG also adopted all of the positions set forth by CAC.<sup>67</sup>

According to CAC, the potential impact on low-income customers is a concern because these customers typically do not fully understand the complexities of dynamic pricing or they lack the technology to fully take advantage of such rates. As a result, participation in dynamic-pricing programs could inadvertently result in higher bills. CAC therefore recommends that dynamic pricing should not be required for residential customers and that efforts should be undertaken to prevent any inadvertent increases in bills for low-income customers who may choose to take advantage of voluntary pricing options. CAC also states that the rates of customers not participating in dynamic pricing should not be negatively impacted by dynamic pricing offerings.<sup>68</sup>

The Commission is on record as noting its consistent support of dynamic pricing. At one point in Administrative Case 2008-00408, the Commission stated its hope to ultimately develop some dynamic pricing options for utility customers. In its Opening Order initiating this case, the Commission likewise stated its intent to consider issues relating to dynamic pricing. However, the Joint Utilities argue that utilities should not have an obligation to create dynamic rate offerings, but should have the option to do so

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<sup>66</sup> *Id.* at 3 and 44.

<sup>67</sup> *Id.*

<sup>68</sup> *Id.* at 3–4 and 45. As noted earlier, a definition of each form of dynamic pricing can be found in the Appendix to this Order.

subject to Commission approval. The AG and CAC support this position. All parties agree that customer participation in dynamic pricing should be voluntary.

The Commission believes that a strong economic argument cannot currently be made for mandatory dynamic pricing tariffs in Kentucky, and there is uncertainty what impact dynamic pricing tariffs may have on energy consumed or on utility revenues. However, the Commission notes that its general intent is to incentivize consumers to decrease usage, move usage to off-peak hours, and/or reduce energy bills, all of which will likely reduce a utility's revenues.

The Commission, therefore, will not require that a broad array of dynamic pricing proposals be developed. The Commission strongly encourages the jurisdictional electric utilities to develop some pilot programs for consideration. It seems appropriate, at a minimum, that the jurisdictional electric utilities could develop and offer "on-peak/off-peak" TOD tariffs (including seasonal TOD tariffs). In fact, TOU and TOD rates are currently offered by some of Kentucky's jurisdictional electric utilities, as reflected in Appendix B of the Report.

The Commission finds that any dynamic pricing offering should be voluntary for customer participation, and efforts should be made to mitigate negative impacts on low-income customers through customer education or any other reasonable and cost-effective method.

#### Distribution Smart Grid Components

The Joint Utilities state that distribution Smart Grid components can provide benefits to customers and add value to utilities' distribution systems.<sup>69</sup> However, they

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<sup>69</sup> *Id.* at 4.

cite a number of items which can impact customers that utilities should consider before investing in Smart Grid systems.<sup>70</sup> These items include technological obsolescence, prepaid metering, and remote connection and disconnection of utility service.<sup>71</sup> The Joint Utilities contend that adding more regulation such as that represented by the EISA 2007 Smart Grid Investment Standard is unnecessary.<sup>72</sup> They claim that the Commission already has the authority through review of base rates, CPCN authority, and other mechanisms to ensure that utilities make prudent investments.<sup>73</sup>

As technologies have demonstrated value or have been determined to be advisable, the Joint Utilities have deployed smart technologies in their distribution systems.<sup>74</sup> Currently, all of the Joint Utilities have deployed some form of Smart Grid technology.<sup>75</sup>

A summary example of some Smart Grid deployment discussed in the report includes:

- Kentucky Power has deployed AMR, DA — Circuit Reconfiguration, Volt/VAR Optimization, and SCADA.<sup>76</sup>

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<sup>70</sup> *Id.*

<sup>71</sup> *Id.*

<sup>72</sup> *Id.* at 4 and 56.

<sup>73</sup> *Id.*

<sup>74</sup> *Id.* at 46.

<sup>75</sup> *Id.* at 47.

<sup>76</sup> *Id.* at 47–48.



- Duke Kentucky has installed four self-healing systems as part of its normal reliability improvement process.<sup>77</sup>

- LG&E and KU have deployed four SCADA systems (KU, LG&E electric, LG&E gas, and downtown Louisville), and have installed about 90,000 AMR meters (electric and gas) across their service territories. LG&E is currently deploying approximately 1,500 AMI meters and related infrastructure in its downtown Louisville network as part of a project to gather enhanced engineering information for network planning.<sup>78</sup>

- Jackson Purchase Energy Corporation has illustrated the value of Smart Grid deployments in its system with DA and Voltage Conservation.

- Other smart technology components that are utilized include:

- Switches and valves (Duke Kentucky);
- Voltage stabilization (Kentucky Power);
- Meters (Duke Kentucky); and
- Communications and SCADA (LG&E/KU).<sup>79</sup>

- 15 distribution cooperatives offer prepaid metering as a voluntary option to their consumers.<sup>80</sup>

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<sup>77</sup> *Id.* at 48.

<sup>78</sup> *Id.*

<sup>79</sup> *Id.* at 52–53.

<sup>80</sup> *Id.* at 48–49.

The AG did not comment on Smart Grid components. CAC states that it is open to “fair and limited”<sup>81</sup> prepaid metering, but notes its concerns with prepaid metering and remote disconnection.<sup>82</sup>

As the Commission stated earlier, its findings and the requirements set forth in this section are coupled with the decision regarding the EISA 2007 Smart Grid Investment Standard. The Commission will require that each of the jurisdictional electric utilities develop internal procedures regarding Smart Grid investments that include a description of their systems, their planning goals, and an explanation of how such investments will be considered a Smart Grid plan.

Requiring each utility to develop a Smart Grid plan should not be burdensome. As noted earlier, the steps the distribution cooperatives take in developing their CWPs set forth straightforward design criteria and explain the basis for each project included in the CWP. The Commission will not apply the formal CPCN process to each utility investment decision, but needs to ensure that the jurisdictional electric utilities define and develop a strategy that can guide their investment decisions. Until recently, the distribution cooperatives were required to submit their CWPs for Commission review and receive a CPCN before starting construction. The IOUs have not been subjected to that requirement. As such, they have invested in AMR and AMI meters, DA, SCADA and other Smart Grid deployment without prior Commission oversight. With the deployment of smart technology that may directly impact the service provided to

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<sup>81</sup> *Id.* at 57.

<sup>82</sup> *Id.*

customers becoming more prevalent, the Commission believes that a requirement to develop internal procedures regarding Smart Grid investment is reasonable.

### Cybersecurity

In the Executive Summary of the Report, the Joint Utilities state that all stakeholders' interests are aligned and that utilities should take reasonable measures to prevent cyber-attacks. However, they state that existing mandatory and voluntary cybersecurity standards, frameworks, and guidelines are sufficient, and that adding regulations or rules serves to weaken utilities' ability to thwart cyber-attacks. They state that the focus should be on the ability to evolve with emerging threats and not on compliance with cybersecurity standards. They believe an effective cybersecurity process is one that is continuously evolving based on emerging threat intelligence. As a result, they assert that additional requirements at the state level are not necessary or advisable.<sup>83</sup>

As the Joint Utilities note, some members are subject to mandatory cybersecurity standards to protect the Bulk Electric System.

These include the Critical Infrastructure ("CIP") Standards developed by the North American Electric Reliability Corporation ("NERC"), approved by the Federal Energy Regulatory Commission ("FERC"), and administered and enforced by NERC and its regional entities, including the SERC Reliability Corporation ("SERC").<sup>84 85</sup>

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<sup>83</sup> *Id.* at 4.

<sup>84</sup> *Id.* at 59.

<sup>85</sup> SERC has jurisdiction over all of Kentucky except the easternmost portion, which is under the jurisdiction of the Reliability First Corporation.

The Joint Utilities cite and discuss the eight CIP standards that apply to cybersecurity,<sup>86</sup> as well as the voluntary cybersecurity guidelines developed by the National Institute of Standards and Technology.<sup>87</sup>

The Joint Utilities also provide a discussion of the tools that comprise the “Guide to Developing a Cyber Security and Risk Mitigation Plan,” developed by the National Rural Electric Cooperatives Association and the Cooperative Research Network (“CRN”). The purpose of the CRN guide is to enable cooperatives to strengthen their security posture and allow for continuous improvement.<sup>88</sup>

Finally, the Joint Utilities cite the “Cyber Security Risk Assessment and Risk Mitigation Plan Review for the Kentucky Public Service Commission” (“Guernsey Report”) that shows that oversight activities are being conducted for utilities not subject to mandatory requirements.<sup>89</sup>

The Guernsey Report offered a focused assessment and general guidance on areas of utility operations that may be susceptible to cyber threats for Kentucky’s smaller electric cooperatives and other similarly situated entities. Although participation in the Guernsey cybersecurity assessment was voluntary and limited to only six electric cooperatives, the intent was to develop a document that could be a starting point for further evaluation and improvement of utility operations. Twenty one topical areas were identified in the Guernsey Report for the purpose of evaluating the general effectiveness of utility operations and identifying opportunities for improvement in mitigating cyber

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<sup>86</sup> Report at 59–60.

<sup>87</sup> *Id.* at 60–61.

<sup>88</sup> *Id.* at 61.

<sup>89</sup> *Id.* at 62.

risks. Since release of the Guernsey Report, the Kentucky Association of Electric Cooperatives has spearheaded a workgroup to further develop operating procedures and work practices to address cybersecurity threats for its membership.

The Joint Utilities state that none of its group takes cybersecurity lightly.<sup>90</sup> However, they argue that more requirements may be counterproductive because cyber-attacks are constantly evolving and a focus on compliance could create a false sense of security.<sup>91</sup>

The AG recommends that the Commission require compliance with the mandatory and voluntary standards, guidelines and resources cited in the Report.<sup>92</sup> The AG also recommends that the Joint Utilities use the best foreseeable measures possible to secure their cybersecurity.<sup>93</sup> To support its position, the AG cites comments from several cybersecurity experts and from a Chairman's forum on cybersecurity hosted by the Commission.<sup>94</sup> CAC states that utilities should work diligently to take reasonable measures to prevent and defeat cyber-attacks.<sup>95</sup>

The Commission agrees with the Joint Utilities that a mature, effective cybersecurity process is one that is continuously evolving to address new cyber threats. However, the Commission believes that each utility should have some form of cybersecurity plan in place beyond the FERC or NERC mandatory standards.

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<sup>90</sup> *Id.* at 63.

<sup>91</sup> *Id.* at 62.

<sup>92</sup> *Id.* at 5 and 64.

<sup>93</sup> *Id.*

<sup>94</sup> *Id.* at 63–64.

<sup>95</sup> *Id.* at 5 and 64.

Therefore, the Commission will require that the Joint Utilities develop internal procedures addressing cybersecurity.

Having met with representatives of each of Kentucky's major jurisdictional electric, gas, and water utilities to discuss cybersecurity, the Commission is generally aware of the effort the Joint Utilities have taken (and are taking) to address cyber threats.<sup>96</sup> Each utility particularly cited the confidential and sensitive nature of their plans to address cyber issues. Given the sensitivity of cybersecurity concerns, the utilities should be allowed to keep their procedures confidential.

The Commission, therefore, will not require each utility's actual internal procedure be filed; rather each utility will be required to certify the development of cybersecurity procedures. The utilities will then be required to make a presentation describing their procedures to the Commission (and the AG, should he wish to attend). In addition, the Joint Utilities will be required to continue to make cybersecurity presentations every two years to the Commission through the Track Meeting process.

All utilities are advised to develop, maintain and enforce a management approved written cybersecurity policy that addresses known and reasonably foreseeable cybersecurity risks. The policy and any subsequent procedures developed should incorporate essential elements of each utility's system that may be susceptible to cyber threats in conjunction with plans for hazard mitigation, emergency response and recovery and other relevant continuity of service arrangements.

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<sup>96</sup> The AG was invited and participated in person or by phone in each meeting.

## Cost Recovery

The Joint Utilities state that since each utility is deploying smart technology “under different circumstances, in different ways, at different paces, and to different extents,”<sup>97</sup> there cannot be one specific approach to addressing cost recovery.<sup>98</sup> The Joint Utilities believe that all the utilities should be able to propose, and the Commission should consider, any form of cost recovery including traditional base rates, existing cost recovery mechanisms (e.g., demand-side management riders), and new riders or surcharge mechanisms.<sup>99</sup> They also believe that utilities proposing smart technology deployments that necessitate retiring existing utility assets with unrecovered book life should take the cost of those retirements into account in their cost-benefit analyses and be able to recover that cost if the deployment is prudent.<sup>100</sup> Finally, the Joint Utilities state that additional proceedings or criteria for Smart Grid deployments are unnecessary because existing cost recovery and other review proceedings and mechanisms are sufficient.<sup>101</sup>

In the Report, the Joint Utilities state that there must be reasonable assurance of cost recovery of prudent investments and of the remaining book costs of replaced equipment for utilities to invest in Smart Grid technologies to improve the service and information their customers receive.<sup>102</sup> They state that there is nothing novel about this

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<sup>97</sup> Report at 5.

<sup>98</sup> *Id.*

<sup>99</sup> *Id.* at 5 and 70.

<sup>100</sup> *Id.*

<sup>101</sup> *Id.*

<sup>102</sup> *Id.* at 70.

concept, whether for smart technologies or other utility investments.<sup>103</sup> The Joint Utilities cite the manner in which they have been allowed to recover smart technology costs in Kentucky and other jurisdictions in which they operate.<sup>104</sup> In particular, they discuss the cost recovery authorized for Taylor County RECC, Shelby Energy, and South Kentucky RECC for major meter change outs.<sup>105</sup>

The AG does not oppose the economical and cost-effective investment in smart technologies, but reserves judgement on his ultimate position based on a case-by-case review of cost recovery requests as they occur. CAC provided no comments on this topic.<sup>106</sup>

The Commission is sensitive to the Joint Utilities' concern regarding the cost recovery of reasonable smart technology investment and recovery of the remaining cost of replaced facilities and equipment. The Commission currently has the authority to reasonably address smart technology investment issues, and we conclude that the requirement to develop internal procedures regarding Smart Grid investment will assist both the utilities and the Commission in addressing cost-recovery concerns. To the extent that investments are in accordance with a Commission-approved internal Smart Grid investment policy, there should be a strong presumption that the investment was reasonable. Therefore, except for the development of an internal Smart Grid investment policy, the Commission will not impose any additional review of such

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<sup>103</sup> *Id.*

<sup>104</sup> *Id.* at 70–74.

<sup>105</sup> *Id.* at 71–73.

<sup>106</sup> *Id.* at 5 and 76.



investments. Smart Grid investments will therefore be treated like any other investment or expense.

#### How Natural Gas Companies Might Participate in Electric Smart Grid

The Joint Utilities state that Kentucky's Gas LDCs have pioneered deployment of automated and smart technologies because they have deployed SCADA in their distribution systems and AMR in meter reading for many years.<sup>107</sup> They assert that the Gas LDCs have already achieved associated efficiencies and that they have less to gain from smart technology deployment than the electric utilities.<sup>108</sup>

Neither the AG nor CAC provided any comments with regard to this issue in the Report.

The Commission recognizes that Smart Grid and smart meter issues are predominantly confined to the electric industry. We also agree that operational savings from further Smart Grid investment is not likely to be achieved by the Gas LDCs. The Commission further notes that, with one exception, the Gas LDCs do not offer TOU or dynamic pricing structures.<sup>109</sup>

The Commission will require the Gas LDCs to comply with the customer privacy, consumer education, and cybersecurity internal procedures requirements contained herein. The broad issues in these three areas apply to both electric and gas utilities.

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<sup>107</sup> *Id.* at 6 and 64.

<sup>108</sup> *Id.*

<sup>109</sup> LG&E's TS-2 transportation service reduces the transportation rate to commercial and industrial customers by \$.50 per Mcf during the months of April through October.

## SUMMARY OF FINDINGS

1. Neither the EISA 2007 Smart Grid Information Standard nor the Smart Grid Investment Standard should be adopted.

2. The Joint Utilities should provide customers access to historical information regarding their energy use and tariff rate and should endeavor to provide this information to customers in as close to real-time as practical. Furthermore, the Joint Utilities should provide aggregated information to CAC upon its reasonable request.

3. The Joint Utilities should develop internal procedures governing customer privacy, customer education, and cybersecurity as set forth in this Order.

4. Within 60 days of the date of this Order, the Joint Utilities should file with the Commission their internal procedures governing customer privacy and customer education.

5. Within 60 days of the date of this Order, the Joint Utilities should certify to the Commission that they have developed internal cybersecurity procedures.

6. Dynamic pricing requirements should not be mandated, but the jurisdictional electric utilities should strongly consider the development of voluntary pilot programs and tariffs.

7. Provisions allowing customers to opt out of smart meter deployments should be considered as they are proposed by individual utilities.

8. The jurisdictional electric utilities should be required to develop internal procedures regarding Smart Grid investments to include but not be limited to a

description of their systems, their planning goals, and explanations of how such investments will be considered.

9. The jurisdictional electric utilities should identify Smart Grid investments in each rate case.

10. Utility investments in Smart Grid and unrecovered book value of replaced equipment should be treated like any other investment or expense, and afforded full rate recovery following a request for recovery, discovery, and Commission approval, if reasonable.

IT IS HEREBY ORDERED that:

1. Neither the EISA Smart Grid Information Standard nor the EISA 2007 Smart Grid Investment Standard shall be adopted.

2. The Joint Utilities shall develop policies and procedures that provide customers access to historical information regarding their energy use and tariff rate and shall endeavor to provide this information to customers in as close to real-time as practical. Furthermore, the Joint Utilities shall provide aggregated information to CAC upon its reasonable request.

3. The Joint Utilities shall develop internal policies and procedures governing customer privacy, customer education, and cybersecurity as set forth in this Order.

4. Within 60 days of the date of this Order, the Joint Utilities shall file with the Commission their internal procedures governing customer privacy and customer education.

5. Within 60 days of the date of this Order, the Joint Utilities shall certify to the Commission that they have developed internal cybersecurity procedures.

6. The jurisdictional electric utilities shall not be required to develop Dynamic Pricing programs and tariffs, but they are encouraged to do so.

7. Customer participation in any Dynamic Pricing program or tariff shall be voluntary.

8. Provisions allowing customers to opt out of smart meter deployments shall be considered as they are proposed by individual utilities.

9. The jurisdictional electric utilities shall be required to develop internal policies and procedures regarding Smart Grid investments as described in this Order.

10. Within 60 days of the date of this Order, the jurisdictional electric utilities shall file with the Commission their internal procedures regarding Smart Grid investments.

11. The jurisdictional electric utilities shall identify Smart Grid investments in each rate case.

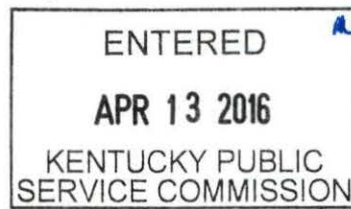
12. Utility investments in Smart Grid and unrecovered book value of replaced equipment shall be treated like any other investment or expense, and afforded full rate recovery following a request for recovery, discovery, and Commission approval, if reasonable.

13. Any documents filed in the future pursuant to ordering paragraphs 4, 5, and 10 herein shall reference this case number and shall be retained in the utility's general correspondence file.

14. The Executive Director is delegated authority to grant reasonable extensions of time for the filing of any documents required by this Order upon the showing of good cause for such extension.

15. This case is hereby closed and removed from the Commission's docket.

By the Commission



ATTEST:

A handwritten signature in blue ink that reads "Dawn D. Gurnell".

Acting Executive Director

Case No. 2012-00428

## APPENDIX

### APPENDIX TO AN ORDER OF THE KENTUCKY PUBLIC SERVICE COMMISSION IN CASE NO. 2012-00428 DATED **APR 13 2016**

Dynamic Pricing defined:<sup>110</sup>

Dynamic pricing refers to pricing that varies according to the time at which the energy is consumed. It is normally tied directly or indirectly to prices in the wholesale market or to system conditions (peaks) and normally is delivered to a customer via time-based rates or tariffs. There are several different kinds of dynamic pricing.

A. Time-of-Use (“TOU”) or Time-of-Day (“TOD”) — TOU or TOD rates typically divide a day into two or three groups of hours that have different rates associated with them. For example, a utility might divide the day into peak, intermediate, and off-peak rates, with different hours assigned to each rate, e.g., late evening through early morning would typically be off-peak hours. Each day may have one or two peak periods and may have as many as three intermediate periods. The hours assigned to each pricing period may change seasonally, as well; for example, a summer-peaking utility may have summer TOU periods and different non-summer TOU periods. The rates associated with each period might also change seasonally.

TOU or TOD rates may vary by season, but typically the design is predictable and easy for the customer to understand. Because these rates do not reflect varying cost conditions, they are ordinarily characterized as having little dynamism.

B. Critical-Peak Pricing (“CPP”) — There are two types of CPP rates: variable and fixed. Fixed CPP rates are identical to TOU rates with the added feature that during certain days of the year, which are prescribed by tariff, there are a relatively small number of critical-peak hours that have a markedly higher rate than the standard TOU peak rate. Like TOU rates, fixed CPP rates do not reflect varying cost conditions, making them equally lacking in dynamism as TOU rates. Variable CPP rates, however, add an element of dynamism that TOU and fixed CPP rates do not have because the critical-peak periods are not established by tariff; rather, the implementing utility typically may call a critical peak no more than a certain number of times for certain maximum durations during a year, and may do so on an established amount of notice to customers, usually anywhere from half an hour to several hours.

C. Peak-Time Rebate (“PTR”) — PTR rates usually involve establishing a baseline amount of usage for a customer or group of customers and then rewarding those customers with rebates for using less than the baseline amount of energy during peak periods. As with CPP rates, the peaks can be established by tariff or can be called by the utility upon established notice to customers.

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<sup>110</sup> Report at 37–38.

D. Real-Time Pricing (“RTP”) — RTP rates are the most dynamic of the dynamic-pricing options. Under RTP, customers pay rates linked to the hourly market price for electricity. Customers typically receive hourly prices on a day-ahead or hour-ahead basis.

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