EAST KENTUCKY POWER COOPERATIVE

January 12, 2009

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PUBLIC SERVICE COMMISSION

Mr. Jeff Derouen
Executive Director
Kentucky Public Service Commission
211 Sower Boulevard
Frankfort, Kentucky 40601

Re: Case No. 2008-00408

Dear Mr. Derouen:

East Kentucky Power Cooperative, Inc. (EKPC), submits this filing in the above-referenced case on its own behalf and on behalf of its member systems: Big Sandy RECC, Blue Grass Energy Cooperative, Clark Energy Cooperative, Cumberland Valley Electric, Farmers RECC, Fleming-Mason Energy Cooperative, Grayson RECC, Inter-County Energy Cooperative, Jackson Energy Cooperative, Licking Valley RECC, Nolin RECC, Owen Electric Cooperative, Salt River Electric Cooperative, Shelby Energy Cooperative, South Kentucky RECC, and Taylor County RECC. Please find enclosed an original and ten copies of the testimonies of Julia J. Tucker, Isaac S. Scott, and Robert J. Camfield.

Very truly yours,

David A. Smart
General Counsel

Enclosures
Cc: Parties of Record

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COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

CONSIDERATION OF THE NEW FEDERAL STANDARDS OF THE ENERGY INDEPENDENCE AND SECURITY ACT OF 2007	))))	**CASE NO. 2008-00408**

DIRECT TESTIMONY OF JULIA J. TUCKER ON BEHALF OF EAST KENTUCKY POWER COOPERATIVE, INC.

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

A. My name is Julia J. Tucker and my business address is East Kentucky Power Cooperative (EKPC), 4775 Lexington Road, Winchester, Kentucky 40391. I am Director of Power Supply Planning for EKPC.

Q. Please state your education and professional experience.

A. I received a Bachelor of Science Degree in Electrical Engineering from the University of Kentucky in 1981. I received my Professional Engineer license from the State of Kentucky (Registration No. 15532) in 1988. I completed 18 hours towards a Masters of Business Administration degree. I have maintained my Continuing Education requirements for my P.E. license. I have been employed in various engineering, planning, and management roles with East Kentucky Power for over 23 years.

Q. Please provide a brief description of your duties at EKPC.

A. I am responsible for all generation / resource planning functions at East Kentucky Power, including generation dispatch, mid-term planning, long term resource

planning, contingency planning, load forecasting, load research and demand side planning.

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

A. The purpose of my testimony is to address on behalf of EKPC and its member systems one of the standards contained in the Energy Independence and Security Act of 2007 ("EISA 2007"), which amends the Public Utility Regulatory Policies Act of 1978 ("PURPA"). My testimony focuses on Section 532(a)(16) of EISA 2007 which relates to integrated resource planning by electric utilities.

Q. *What are the requirements of Section 532(a)(16)?*

A. Section 532(a)(16) states "Each electric utility shall (A) integrate energy efficiency resources into utility, State, and regional plans; and (B) adopt policies establishing cost-effective energy efficiency as a priority resource."

Q. Please describe what tariffs, practices, or policies EKPC and its member systems currently have in place which are responsive to the requirements of Section 532(a)(16)?

A. A Kentucky Administrative Regulation (807 KAR 5:058) deals specifically with Integrated Resource Planning (IRP) by electric utilities. The regulation is comprehensive and inclusive of cost-effective energy efficiency measures. The Commission has defined a methodology by which they systematically review each utility's long range plans and offer suggestions and recommendations. While the Commission does not formally approve the utility's IRP, it does offer meaningful suggestions. Therefore, when the utility brings an action before the

Commission that does require official action, the Commission's recommendations on the utility's IRP filing can be addressed in a formal manner.

Q. Does EKPC and its member systems believe these tariffs and programs are responsive to the requirements of Section 532(a)(16)?

A. Yes. EKPC believes the current IRP filing process meets and/or exceeds the EISA 2007 standard.

Q. Please quantify the impact on customers of EKPC and its member systems, in terms of consumption patterns and cost, of the Section 532(a)(16) requirement on each customer class?

A. The expected impact on customers for integrating energy efficiency into the utility's plans are explained in detail in the IRP filings. EKPC utilizes DSManager to evaluate programs and in that analysis the various tests identified in the EISA Standards Manual (Participant Test, RIM Test, TRC Test, and Program Administrator Cost Test) are analyzed.

Q. Should the Section 532(a)(16) requirements be considered for adoption by the Commission?

A. No. Kentucky already meets this standard through Kentucky's existing IRP process.

Q. Can EKPC and its member systems identify any alternative standard the Commission should consider in lieu of the EISA 2007, Section 532(a)(16) requirements?

A. EKPC and its member systems are not aware of any alternative standard that the Commission should consider in lieu of the Section 532(a)(17) requirements.

Q. Does this conclude your testimony?

A. Yes, it does.

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AFFIDAVIT

STATE OF KENTUCKY)
)
COUNTY OF CLARK)

Julia J. Tucker, being duly sworn, states that she has read the foregoing prepared testimony and that she would respond in the same manner to the questions if so asked upon taking the stand, and that the matters and things set forth therein are true and correct to the best of her knowledge, information and belief.

Julia J. Tucker

Subscribed and sworn before me on this 9th day of January, 2009.

Peggy S. Griffin
Notary Public

My Commission expires: December 8, 2009

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

CONSIDERATION OF THE NEW FEDERAL STANDARDS OF THE ENERGY INDEPENDENCE AND SECURITY ACT OF 2007	))))	**CASE NO. 2008-00408**

DIRECT TESTIMONY OF ISAAC S. SCOTT ON BEHALF OF EAST KENTUCKY POWER COOPERATIVE, INC.

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

A. My name is Isaac S. Scott and my business address is East Kentucky Power Cooperative ("EKPC"), 4775 Lexington Road, Winchester, Kentucky 40391. I am the Manager of Pricing for EKPC.

Q. Please state your education and professional experience.

A. I received a B.S. degree in Accounting, with distinction, from the University of Kentucky in 1979. After graduation I was employed by the Kentucky Auditor of Public Accounts. While at the Auditor's Office, I performed audits of numerous state agencies and was responsible for the payroll portion of centralized audits, the results of which formed the basis of the State Auditor's opinion letter on Kentucky's Annual Financial Statements. In December 1985, I transferred to the Kentucky Public Service Commission ("Commission") as a public utilities financial analyst, concentrating on the electric and natural gas industries. In August 2001, I became manager of the Electric and Gas Revenue Requirements Branch in the Division of Financial Analysis at the Commission. In this position I

supervised the preparation of revenue requirement determinations for electric and natural gas utilities as well as determined the revenue requirements for the major electric and natural gas utilities in Kentucky. I retired from the Commission effective August 1, 2008. In November 2008, I became the Manager of Pricing at EKPC.

Q. Please provide a brief description of your duties at EKPC.

A. As Manager of Pricing, I am responsible for rate-making activities which include designing and developing wholesale and retail electric rates and developing pricing concepts and methodologies. I report directly to the Senior Vice President of Power Supply.

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

A. The purpose of my testimony is to address on behalf of EKPC and its member systems one of the standards contained in the Energy Independence and Security Act of 2007 ("EISA 2007"), which amends the Public Utility Regulatory Policies Act of 1978 ("PURPA"). More specifically, my testimony focuses on Section 532(a)(17) of EISA 2007 which relates to rate design modifications to promote energy efficiency investments by electric utilities.

Q. What are the requirements of Section 532(a)(17)?

A. Section 532(a)(17) states "The rates allowed to be charged by any electric utility shall (i) align utility incentives with the delivery of cost-effective energy efficiency; and (ii) promote energy efficiency investments." The section also states that when complying with this requirement state regulatory authorities shall

consider six policy options. The Commission listed these policy options in Appendix B to its November 13, 2008 Order in this proceeding.

Q. Can you describe what tariffs, practices, or policies EKPC and its member systems currently have in place which are responsive to the requirements of Section 532(a)(17)?

A. Yes. EKPC and its member systems have for over 20 years been supportive of and offered a variety of energy efficiency programs. At the wholesale level, EKPC has established tariffs promoting the national *Energy Star* standards for homes and manufactured homes through the Touchstone Energy Home Program and Touchstone Energy Manufactured Home Programs and offers a direct load control program for water heaters and air conditioners. EKPC has also assisted its member systems with the development and deployment of various energy efficiency programs. At the retail level, the member systems are offering and promoting a variety of energy efficiency tariffs and programs to their member-consumers. Exhibit ISS-1 presents a summary of these programs.

Q. Why does EKPC and its member systems believe these tariffs and programs are responsive to the requirements of Section 532(a)(17)?

A. EKPC and its member systems believe the current tariff and program offerings are consistent with the last policy option listed in Section 532(a)(17). When complying with the requirements of Section 532(a)(17), the state regulatory authorities are to consider "offering home energy audits, offering demand response programs, publicizing the financial and environmental benefits associated with making home energy efficiency improvements, and educating

home-owners about all existing Federal and State incentives, including the availability of low-cost loans, that make energy efficiency improvements more affordable." EKPC and its member systems believe what we are doing is generally consistent with this policy option.

Q. Are there other tariffs or programs currently under consideration by EKPC and its member systems that are responsive to the requirements of Section 532(a)(17)?

A. Yes. In the pending general base rate application, Case No. 2008-00409, EKPC has included significant rate design changes in its Phase II rate proposal. Utilizing established cost of service methodologies, EKPC has proposed that its wholesale rates move to a cost-based structure where more of EKPC's fixed costs would be recovered through the demand charge component of rates rather than the energy charge. EKPC's member systems are considering the adoption of cost-based rate structures for their respective retail rates. EKPC and its member systems believe that the adoption of the cost-based rate structure is consistent with the policy options in Section 532(a)(17) that encourage the removal of disincentives to energy efficiency and will allow for the promotion of rate designs that will encourage energy efficiency for customer classes. The cost-based rate structures will send the appropriate pricing signals to the member-consumers. Since the cost-based rate structure moves the recovery of fixed costs from the energy charge, EKPC and its member systems will be better able to promote additional energy efficiency programs without harming the cooperative financially.

Q. Can you explain how a change in rate structure will assist EKPC and its member systems with promoting additional energy efficiency programs without financially harming the cooperatives?

A. Yes. Under the current rate design, a significant portion of fixed costs are to be recovered through the variable energy charge. Thus, fluctuations in the level of kWh sales have a direct impact on the financial condition of the cooperative. Under the current rate design, it will be difficult to promote any energy efficiency program that results in lower kWh sales when the cooperative would not be able to recover its fixed costs. The simplest and most direct solution to this problem is to adopt rate designs based on established cost-of-service methodologies. Fixed costs would be recovered through demand and customer charges, which are not impacted by the level of kWh sales. Making this change in rate design would encourage EKPC and its member systems to promote energy efficiency programs without the risk of financial harm caused by the failure to recover fixed costs. As I mentioned previously, EKPC's proposed Phase II rates reflect this approach to rate design and our member systems are considering the adoption of similar cost-base rate structures, by increasing the customer charges the member systems will recover the fixed costs.

Q. Can EKPC and its member systems quantify the impact on customers, in terms of consumption patterns and cost, of the Section 532(a)(17) requirement on each customer class?

A. Not with any reasonable accuracy. Section 532(a)(17) requires the alignment of utility incentives with the delivery of cost-effective energy efficiency and the

promotion of energy efficiency investments. While the impact of a specific program or rate design may be quantifiable, there is no reasonable approach that could be utilized to determine the impact on consumption patterns and cost associated with the adoption of the Section 532(a)(17) requirement.

Q. Can EKPC and its member systems determine whether there will be a substantially different impact on particular customers within a class resulting from the adoption of the Section 532(a)(17) requirement?

A. Again, not with any reasonable accuracy. While it would be logical to expect different impacts on particular customers within a class resulting from the adoption of the Section 532(a)(17) requirement, EKPC and its member systems could not begin to determine such impacts without identifying the specific program or rate design change and making numerous assumptions.

Q. Should the Section 532(a)(17) requirements be considered for adoption by the Commission?

A. EKPC and its member systems understand that the Commission is required by EISA 2007 to consider the Section 532(a)(17) requirements for adoption. However, EKPC and its member systems would encourage the Commission not to adopt the Section 532(a)(17) requirements. An examination of the policy options listed in Section 532(a)(17) leads EKPC and its member systems to the conclusion that the Commission's previous decisions relating to energy efficiency programs are consistent with the enumerated policy options. KRS 278.285, originally established in 1994, has provided a means for the cost recovery of energy efficiency programs outside of a general rate case and has encouraged the

development and deployment of energy efficient programs. The Commission has also been willing to consider different rate design alternatives and has adopted those alternatives when demonstrated to produce rates that were fair, just, and reasonable. EKPC's pending Phase II rates are an example of such a rate design alternative.

Q. Are there other considerations that lead EKPC and its member systems to recommend against adoption of the Section 532(a)(17) requirements?

A. Yes. The third policy option listed in Section 532(a)(17) requires the Commission to consider "including the impact on adoption of energy efficiency as 1 of the goals of retail rate design, recognizing that energy efficiency must be balanced with other objectives." EKPC and its member systems believe the adoption of energy efficiency should be a consideration, but not a goal, of retail rate design. The goal of rate design, either wholesale or retail, should be rates that are fair, just, and reasonable, as provided in KRS 278.030. The Commission already has the flexibility to consider the adoption of energy efficiency in rate design, as KRS 278.030(3) provides that the classification of a utility's service, patrons, and rates may take into account the nature of the use, the quality used, the quantity used, the time when used, the purpose for which used, and any other reasonable consideration. EKPC and its member systems want to stress that we are not opposed to the development, promotion, and deployment of cost-effective energy efficiency programs. We simply believe the Commission already has the authority to achieve the intent of the Section 532(a)(17) requirements and does not need to adopt the standard.

Q. Can EKPC and its member systems identify any alternative standard the Commission should consider in lieu of the EISA 2007, Section 532(a)(17) requirements?

A. EKPC and its member systems are not aware of any alternative standard that the Commission should consider in lieu of the Section 532(a)(17) requirements. However, in the event the Commission believes some standard relative to Section 532(a)(17) should be adopted, EKPC and its member systems would suggest the standard provide the Commission with the same level of flexibility it already has exercised in previous decisions. The adoption of energy efficiency should be a consideration in rate design, not a goal; the goal of rate design should continue to be the establishment of rates that are fair, just, and reasonable. We strongly suggest the Commission avoid any standard that relies on a "one size fits all" approach to energy efficiency programs and rate designs to promote energy efficiency.

Q. Does this conclude your testimony?

A. Yes, it does.

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

CONSIDERATION OF THE NEW FEDERAL STANDARDS OF THE ENERGY INDEPENDENCE AND SECURITY ACT OF 2007	))))	**CASE NO. 2008-00408**

AFFIDAVIT

STATE OF KENTUCKY)
)
COUNTY OF CLARK)

Isaac S. Scott, being duly sworn, states that he has read the foregoing prepared testimony and that he would respond in the same manner to the questions if so asked upon taking the stand, and that the matters and things set forth therein are true and correct to the best of his knowledge, information and belief.

Isaac S. Scott

Subscribed and sworn before me on this 9th day of January, 2009.

Peggy S. Griffin
Notary Public

My Commission expires: December 8, 2009

LISTING OF ENERGY EFFICIENCY TARIFFS AND PROGRAMS OFFERED BY EKPC MEMBER SYSTEMS

Big Sandy Rural Electric Cooperative Corporation

Direct Load Control of water heaters and air conditioners tariff ("DLC")

Blue Grass Energy Cooperative Corporation

DLC; Button-Up weatherization ("Button-Up"); high efficiency water heaters; Touchstone Energy Home ("TE Home"); energy audits; Tune-Up HVAC maintenance; dual fuel air source heat pumps; manufactured home Tune-Up

Clark Energy Cooperative

DLC; Touchstone Energy Home tariff ("TEH tariff"); Touchstone Energy Manufactured Home tariff ("TEMH tariff"); geothermal heating and cooling ("geothermal"); Button-Up; high efficiency water heaters; TE Home; air source heat pumps; electric thermal storage ("ETS"); Touchstone Energy Manufactured Home ("TE Manufactured")

Cumberland Valley Electric

DLC; Geothermal; Button-Up; high efficiency water heaters; TE Home; air source heat pumps; ETS

Farmers Rural Electric Cooperative Corporation

DLC; Geothermal; Button-Up; energy audits; ETS; insulation and weatherization programs

Fleming-Mason Energy

DLC; Geothermal; Button-Up; ETS

Grayson Rural Electric Cooperative Corporation

DLC; TEH tariff; geothermal; Button-Up; high efficiency water heaters; TE Home; air source heat pumps; ETS

Inter-County Energy Cooperative

DLC; TEH tariff; geothermal; Button-Up; high efficiency water heaters; TE Home; air source heat pumps; ETS; TE Manufactured; Tune-Up HVAC maintenance

Jackson Energy Cooperative

DLC; TEH tariff; TEMH tariff; geothermal; Button-Up; high efficiency water heaters; TE Home; air source heat pumps; ETS; TE Manufactured; Tune-Up HVAC maintenance

Licking Valley Rural Electric Cooperative Corporation

DLC; TEH tariff; TEMH tariff; geothermal; Button-Up; TE Home; air source heat pumps; TE Manufactured

Nolin Rural Electric Cooperative Corporation

DLC; TEH tariff; TEMH tariff; geothermal; Button-Up; high efficiency water heaters; TE Home; air source heat pumps; TE Manufactured; commercial geothermal

Owen Electric Cooperative

DLC; TEH tariff; TEMH tariff; geothermal; high efficiency water heaters; TE Home; air source heat pumps; TE Manufactured; energy audits; dual fuel air source heat pumps

Salt River Electric

DLC; TEH tariff; geothermal; Button-Up; high efficiency water heaters; TE Home; air source heat pumps; TE Manufactured

Shelby Energy Cooperative

DLC; TEH tariff; geothermal; Button-Up; high efficiency water heaters; TE Home; air source heat pumps

South Kentucky Rural Electric Cooperative Corporation

DLC; Geothermal; Button-Up; TE Home; air source heat pumps; ETS; TE Manufactured; energy audits; Tune-Up HVAC maintenance

Taylor County Rural Electric Cooperative Corporation

DLC; TEH tariff; geothermal; Button-Up; high efficiency water heaters; TE Home; air source heat pumps; ETS, energy audits

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

CONSIDERATION OF THE NEW FEDERAL STANDARDS OF THE ENERGY INDEPENDENCE AND SECURITY ACT OF 2007	))))	**CASE NO. 2008-00408**

DIRECT TESTIMONY OF ROBERT J. CAMFIELD ON BEHALF OF EAST KENTUCKY POWER COOPERATIVE, INC.

Q. Please state your name, title, and business address.

A. My name is Robert J. Camfield. I serve in the capacity of Vice President for Christensen Associates Energy Consulting LLC ("CAEC"), a wholly owned subsidiary of Laurits R. Christensen Associates, Inc. My business address is 4610 University Avenue, Madison, Wisconsin, 53705.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of East Kentucky Power Cooperative, Inc. ("EKPC")

Q. What is the scope of your testimony?

A. EKPC has engaged CAEC to describe EKPC's view and position on various provisions of the Energy Independence and Security Act 2007 ("EISA 2007"). The purpose of my testimony is to present to the Kentucky Public Service Commission ("Commission") EKPC's perspective regarding EISA 2007, and to assist the Commission in its deliberation of the issues identified in its Order of November 13, 2008. The specific provisions of EISA 2007 that I focus on include two new standards that are incorporated into the Public Utilities

Regulatory Policies Act of 1978 ("PURPA") and one non-PURPA standard. These are as follows:

- Consideration of smart grid Investments.
- smart grid Information.
- Incentives for recovery, use, and prevention of industrial waste energy.

Q. What qualifies you to present testimony on the topics that you identify above?

A. I am an energy economist and my experience focuses mainly on wholesale electricity markets, cost analysis and valuation, and regulatory economics. The scope of my professional work includes asset valuation and cost of capital, transmission pricing, electricity demand and load forecasting, cost assessment, and wholesale contracts and negotiation. For major service providers, I have assessed the benefits and costs of transmission expansion plans, and prepared demand-side resource strategies that involve industrial waste heat. I have served on forecast review committees, expert panels on wholesale market design, and regional forecast groups.

My clients include electric utilities, cooperatives, consumer advocacy groups, regulatory agencies, municipalities, industrial customers of electric utilities, law firms, commodity traders, electric industry associations, transmission companies, generation companies, RTOs, distribution companies, and industry research groups. I have testified and made appearances on behalf of clients in evidentiary proceedings and other formal regulatory settings on a range of topics including transmission congestion, corporate performance, cost of capital and rate of return, cost escalation, power supply contracts, load

and energy forecasting, marginal costs and cost allocation, tariff design and utility rate phase-in plans, cost benchmarking, and generation supply plans.

My previous assignments include the assessment of demand-side strategies and the management of electric and gas rate cases, contract terms for renewable resources, power supply solicitations, and electricity market restructuring in Central Europe. I have initiated or been involved in several innovations including two-part tariffs for transmission services, web-based self-designing retail electric products, marginal cost-based cost allocation methods, and the development of principles for efficient pricing of distribution services. I have served as a member of the economics committee of the National Association of Regulatory Utility Commissioners and on an advisory panel for EPRI. I have published reports, chapters in technical books, and articles in noted journals such as *The Electricity Journal, IEEE Transactions on Power Systems*, and the *Council on Large Electric Systems*. I served as Program Director of the Edison Electric Institute's *Market Design and Transmission Pricing School* 1999-2008. I have held the position of chief economist for a regulatory agency, and system economist for a large, integrated electric service provider. I hold a masters degree in economics from Western Michigan University, and I am a graduate of Interlochen Arts Academy.

Q. Please summarize the conclusions of your review of the EISA 2007 standards and criteria, and recommendations regarding EIA Section 1307(a)(16) referred to as smart grid Investments?

A. I recommend that the Commission not adopt a formal smart grid regulatory review standard, as proposed. As an alternative, I would recommend that the Commission consider establishing a collaborative process with the utilities and other stakeholders to monitor smart grid developments, to identify promising new technologies and concepts, and to potentially engage in pilot programs on a voluntary basis that appear to offer net benefits. For this discussion, positive net benefits refers to the condition where the prospective cost savings for generation and transmission services are greater than the costs of the technology including implementation, and the costs associated with the risks and uncertainty of future net benefits.

I believe there are several reasons favoring this alternative. First, smart grid technologies and information systems consist of five major categories including Sensing and Measuring, Advanced Control Methods, and Improved Interfaces and Decision Support. The full envelope of smart grid technologies discussed below are largely complementary to, rather than substitution for, conventional power system equipment and facilities. Going forward, conventional technologies will likely remain the central expenditure of power delivery including transmission and distribution. Hence, a formal regulatory review involving technology selection that implies technology substitution possibilities is not necessarily applicable.

Second, power delivery facilities, as with generation, are indivisible in capability and expenditure. This means that ongoing expansion of capacity occurs in rather lumpy increments and, as a consequence, it is unlikely that many opportunities where smart grid technologies substitute for conventional

technologies exist, although a known, working smart grid technology may delay the deployment of a major conventional technology. As I mention, the nature of smart grid investments are informational with a focus operations. This is inherently more complementary to conventional technologies, than substitutes.

Third, evidence suggests that the Commission's current policy of monitoring industry developments and voluntary adoption is working satisfactorily. The smart grid envelope includes an array of electronic technologies, information systems, and concepts that, as a whole, may potentially offer at some point substantial benefits in the form of lower electric bills and improved reliability for retail consumers. As these technologies reach fruition, EKPC and member systems incorporate them into power delivery as necessary and appropriate. As an example, EKPC and its members along with customers are putting forth efficient market-based pricing programs that will utilize interval meters.

Fourth, smart grid technologies geared to reliability and, in particular, real-time operations will increasingly need to operate across electric utility service providers to realize effectiveness. In turn, such interoperability will require regional solutions that will assuredly involve the various organization that, together, comprise the Energy Reliability Organization (ERO). In short, smart grid to a substantial extent will be regional in nature. In short, the net benefits to local smart grid investments will likely be manifested outside the host utilities territory.

Fifth, the burden of demonstrating, within formal regulatory processes before the Commission, that occasional small scale investments in smart grid technologies and concepts of one type or another provide net benefits is substantial, for both the Commission and utilities.

Sixth, high resource costs, substantial siting limitations, and an increasingly larger array of substitute possibilities available to consumers present utilities with strong incentives to minimize total costs. As a result of the incentives that are inherently present within today's energy markets with rising costs and increasing range of potential substitutes, the Commission can be assured that Smart grid technologies which provide positive net benefits will be adopted by service providers where appropriate.

Q. As you have discussed Section 1307(a)(17), smart grid Information, calls for the Commission to consider requiring electric utilities to make available, where practicable, time-based wholesale market price information to retail consumers. What is your perspective and recommendation regarding smart grid Information?

A. The EISA 2007 provision of time-based price information, as contained in Section 1307(a)(17), recognizes that the economic costs of power systems in the short term can vary greatly according to time and location. This follows from two key properties of power systems. First, electricity cannot be readily stored, such that inventories cannot be used dampen the variation in marginal costs over time. Second, the pattern of power flows within transmission network follow physical laws. Accordingly, economic costs and wholesale market prices can be highly differentiated among network locations. This

means that substantial cost savings and overall gains in market efficiency can potentially be realized through marginal cost-based pricing programs, including real time pricing and critical peak pricing, where load decreases during high load and high cost periods can obtain major cost savings and mitigate the need for capacity. To this end, EKPC and its member systems are initiating a real time pricing pilot program, and have implemented a Direct Load Control program. These programs provide retail consumers with economic cost information for EKPC. These programs mitigate high costs associated with near-term conditions, and incorporate relevant information regarding economic cost and tight supply-demand balance. The programs obtain market efficiency on the appropriate costs and conditions. In contrast, wholesale market data is removed from the local markets served by EKPC. Indeed, wholesale market prices, to a large extent, are driven by variation in electricity demand of the Eastern markets, and may be much different in level and variation of local economic costs. As a result, wholesale market information may be highly inaccurate, if not misleading, vis-vis the costs of the incumbent service provider, which is the relevant information. Second, it is burdensome to consumers to receive information that is not relevant to them, and it is also burdensome to service providers to present this information. Therefore, I recommend that the Commission not adopt the proposed Smart grid Information standard.

Q. Would you please summarize briefly the provisions of EISA 2007 that pertain to smart grid, with a focus on smart grid technologies?

A. Yes. A quick summary of the provisions that are important in this proceeding can be found in Appendix B of the Commission's Order in Case No. 2008-

00408. One provision concerns the investment decisions of PURPA-covered utilities: "Each state shall consider requiring, prior to undertaking investments in non-advanced grid technologies, that an electric utility of the state demonstrate to the state that the electric utility considered an investment in a qualified smart grid system based on appropriate factors..." A second provision requires that "All electricity purchasers shall be provided direct access... to information from their electricity provider such as: *prices...usage... (and) sources*" of electricity. Information is to be provided "to the extent practicable", according to EISA 2007. The underlying text for these provisions can be found in Sections 1307(a)(16) and (17).

Q. Does the EISA 2007 provide a definition of the term "smart grid"?

A. Yes, Section 1301 of the EISA 2007 offers a set of ten points that provide a definition of what the smart grid term encompasses. The definition consists of *actions* by which the grid can be modernized, rather than *technologies* that can be used to make the grid smart. Without enumerating them here, these actions can be characterized as improving the control of grid operations in both the energy supply and delivery and in end use efficiency by customers. Related actions include development of uniform technology standards and reducing barriers to adoption of new technologies, practices and services.

Q. *Is this a definition that is used universally?*

A. Not entirely, although it is well recognized. Some in the industry think about the smart grid chiefly from the perspective of grid monitoring and management. Others focus on the customer end, sometimes inappropriately equating smart metering with the smart grid. Smart metering is, of course, just one possible component of the smart grid.

Q. If the Commission is to review investments in the smart grid by PURPA-covered utilities, is there a reference for what constitute smart grid technologies, either in EISA 2007 or elsewhere?

A. EISA 2007 does not appear to be precise but it did create a smart grid Advisory Committee and Task Force to facilitate such definition. Under the auspices of the U.S. Department of Energy, the National Energy Technology Laboratory ("NETL") has begun a "Modern Grid Initiative" that has issued documents providing information on smart grid technology.

Q. How is this information categorized?

A. The NETL classifies smart grid technologies into five categories. These areas are 1) Integrated Communications, 2) Sensing and Measuring, 3) Advanced Components, 4) Advanced Control Methods, and 5) Improved Interfaces and Decision Support. The NETL sets out its classification in its paper "A Systems View of the Modern Grid", which includes appendices on these categories.

Q. How does NETL characterize Integrated Communications?

A. Integrated communications connects suppliers and users of electricity in a national and rapid network. A key supporting element is uniform standards for use by users, vendors and operators. NETL identifies one component of the grid, substation automation, that aspires to the concept, thanks to a set of standards developed by the International Electrotechnical Commission (IEC). In contrast, no such standards exist for the user side in the areas of automated meter reading or demand response or in distribution automation. Technologies of interest include broadband over power line, wireless technologies (of which NETL identifies nine types) and other technologies, notably Internet2, the next generation of Internet communication and Fiber to the Home ("FTTH").

Q. What constitute smart grid technologies in the Sensing and Measurement Category?

A. These technologies record power flows or power information at all stages of the electricity supply process. These include customer metering, wide-area monitoring systems and dynamic line rating technology for the transmission grid. (This last area includes measurement of line sag and current-carrying capacity.) Also included in this category are advanced protection systems that serve to conduct fault testing, for example. At the customer end, technologies relate to residential customer networks and advanced metering are included.

Q. What does the term "Advanced Components" encompass?

A. This technology area includes such fields as power electronic devices such as static VAr compensators, superconductivity technology, distributed generation, distributed storage devices and complex systems such as micro grids.

Q. What is included in "Advanced Control" methods?

A. This area consists of a set of distributed intelligent agents to manage power, analytical tools consisting of computer hardware and software for information processing and operational applications such as outage management.

Q. Lastly, how does NETL describe "Improved Interfaces and Decision Support"?

A. This category, with the acronym IIDS, includes technologies that improve grid "visualization" and decision support. These can include software and controls that provide information to decision makers charged with system management. The theme of this technology area appears to be information synthesis.

Q. How would you characterize the development state of these various technologies?

A. Generally, it appears that for all categories, the technologies are at uneven stages of development, with some being in their infancy and rapid change occurring in some areas and little development in others. In one case the NETL laments the absence of funding in some areas of transmission grid information technology.

That smart grid technologies, at least with the exception of interval metering, is largely developmental is evidenced by Section 1304(b)(4) where the law states "...The Secretary shall establish a smart grid regional demonstration initiative..." and again in Section 1305(a) where the law states "...The Director of the National Institute of Standards and Technology shall have primary responsibility to coordinate the development of a framework that includes protocols and model standards for information management to achieve interoperability..."

Q. What do you infer from the state of the technology at present, for purposes of evaluating how the Commission should proceed?

A. Smart grid technologies are undergoing rapid advance. Investment in new technologies during times of rapid technological and institutional change harbor comparatively high risks associated with potential net benefits. An investment of latest technology complementing conventional technology may appear to offer positive net benefits. However, it may also be the case that the technology in question could be superseded by an improved technology in the not too distant future. Alternatively, the technology might appear promising but unproven.

In brief, it is unusually difficult to gauge, after the fact, whether or not benefits outweigh the costs, where the benefits are based on the expected value of the potential outcomes. Results may not be available for several years. Even then, utilities and regulators would seemingly need to construct the counter factual case of what the outcome, measured as total system costs, would have been under conventional technologies. While the utility must evaluate such issues on a regular basis, it would be difficult to accurately gauge results in a systematic, consistent and timely review by regulators.

Q. Would you please provide the Commission with EKPC's perspective on industrial waste heat?

A. Yes. Industrial waste heat refers to investment actions and technologies that capture heat produced by industrial manufacturing processes to generate electricity. As a general rule, the industrial sectors that utilize energy most intensively are also the sectors with the greatest potential for waste heat capture. These industries include chemicals, food process, petroleum, forest products, and primary and secondary metals. It is commonly recognized that, because of inherent thermal inefficiencies, only a modest share of the energy input is utilized within the industrial process. The remainder is lost to the atmosphere and, for years, industries have attempted to capture and recycle heat. This involves a number of well known technologies such as mechanical and thermal compression, condensing economizers, heat pumps, and cogeneration for electricity. Nationally, a longstanding successful application is the combined heat and power facilities on university campuses. Also, pumping stations of pipelines can be attractive sites for waste heat capture for electricity generation.

Generally speaking, the recapture of heat for electricity generation is focused on the use of hot exhaust gases where temperatures may be in excess of 700 degrees. My experience demonstrates that economically attractive applications of waste heat capture for power generation are highly specific to the host technology and site characteristics. The commercial arrangements underlying waste heat capture for electricity can vary. Technology vendors may be the investors that install the facility at the host site and claim the electricity output, which is then is sold to the incumbent electric utility or within wholesale electricity markets. The host is compensated for its heat input to the process.

EKPC encourages industrial waste heat recapture for electric power generation and, in fact, has a cogeneration tariff in place. Consequently, EKPC does not recommend the adoption of the proposed industrial waste heat standard.

Q. Does this conclude your testimony?

A. Yes, it does.

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

CONSIDERATION OF THE NEW FEDERAL STANDARDS OF THE ENERGY INDEPENDENCE AND SECURITY ACT OF 2007	))))	**CASE NO. 2008-00408**

AFFIDAVIT

STATE OF WISCONSIN)
)
COUNTY OF DANE)

Robert J. Camfield, being duly sworn, states that he has read the foregoing prepared testimony and that he would respond in the same manner to the questions if so asked upon taking the stand, and that the matters and things set forth therein are true and correct to the best of his knowledge, information and belief.

Subscribed and sworn before me on this 7th day of January, 2009.

Notary Public

My Commission expires: June 3, 2012