Duke Energy®

139 East Fourth Street, R 25 At II
P O Box 960
Cincinnati, Ohio 45201-0960
Tel: 513-419-1837
Fax: 513-419-1846
dianne.kuhnelll@duke-energy.com

Dianne B Kuhnell
Senior Paralegal

**VIA OVERNIGHT DELIVERY**



November 5, 2008

Ms. Stephanie Stumbo
Executive Director
Kentucky Public Service Commission
211 Sower Boulevard
Frankfort, Kentucky 40602-0615

Re: Case No. 2007-300

Dear Ms. Stumbo:

Enclosed please find an original and twelve copies of the direct testimony of John G. Bloemer and David E. Freeman to be filed in the referenced case pursuant to the Commission's Order of October 14, 2008.

Please date-stamp the extra two copies of each of the copies of the testimony and return in the enclosed envelope.

Sincerely,

Dianne B. Kuhnell
Senior Paralegal

cc: Parties of Record

**COMMONWEALTH OF KENTUCKY**

**BEFORE THE PUBLIC SERVICE COMMISSION**

| | | |
|---|---|---|
| IN THE MATTER OF THE | ) | |
| CONSIDERATION OF THE | ) | |
| REQUIREMENTS OF THE FEDERAL | ) | |
| ENERGY POLICY ACT OF 2005 | ) | Case No. 2007-300 |
| REGARDING FUEL SOURCES AND | ) | |
| FOSSIL FUEL GENERATION | ) | |
| EFFICIENCY | ) | |

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# DIRECT TESTIMONY OF

# JOHN G. BLOEMER

# ON BEHALF OF

# DUKE ENERGY KENTUCKY

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November 7, 2008

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## I. INTRODUCTION AND PURPOSE

**Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND POSITION WITH THE COMPANY.**

A. My name is John G. Bloemer, and my business address is 139 East Fourth Street, Cincinnati, Ohio 45202. I am employed by Duke Energy Business Services, LLC as Director of Analytical Engineering for Duke Energy Corporation's ("Duke Energy") affiliated companies, including Duke Energy Kentucky, Inc. ("Duke Energy Kentucky").

**Q. PLEASE DESCRIBE BRIEFLY YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUNDS.**

A. I received an A.A.S. in Electronics Technology, and a B.S. in Mathematics from Northern Kentucky University in 1977 and 1978, respectively. I also earned a M.S. degree in Electrical Engineering M.S. ("EE") from The University of Cincinnati in 1980. I have attended many seminars, workshops and forums on generation resource planning, emission compliance planning, electric system dispatch and optimization, and other business, and electric and gas utility related topics. Throughout my career, I have also given technical presentations in venues as those mentioned above.

I began working for The Cincinnati Gas & Electric Company ("CG&E") in 1980 in the System Protection section of the General Engineering Department. I worked in Generation Planning or Resource Planning areas within CG&E and then Cinergy Corp. ("Cinergy") for about 17 years, and was the manager of Resource Planning for Cinergy at the time I took a position in another area in 1999. I have held a number of technical

positions primarily in the Engineering, Business Development, and Generation/Resource Planning areas throughout my career with CG&E, Cinergy, and now Duke Energy. I was promoted to my current position in April of 2006.

**Q. PLEASE DESCRIBE YOUR DUITES AND RESPONSIBILITIES AS DIRECTOR OF ANALYTICAL ENGINEERING.**

A. Generally, Analytical Engineering ("AE") provides technical assessment and analyses related to the application of new generation and emission control technologies, and high-level emission compliance planning related to compliance with rules and regulations such as the recently vacated Environmental Protection Agency ("EPA") Clean Air Mercury Rule ("CAMR"), which was intended to address power plant mercury emissions, and the Clean Air Interstate Rule ("CAIR"), which was primarily intended to address the interstate transport of SO2 and NOx emissions. AE also supports the development of Integrated Resource Plans ("IRPs") filed in the various jurisdictions that Duke Energy serves, by providing capital cost estimates and economic screening analysis for the supply-side generation options and emission control options considered in the IRP. Power plant siting and early power plant project development activities are also undertaken in AE from time-to-time. Finally, AE provides technical support and consulting service to Legal, Policy, Communications, and other areas of Duke Energy on an as-needed basis. My duties are to coordinate and prioritize these activities, as well as assist with the execution and analysis of AE's assignments.

**Q. ARE YOU A REGISTERED PROFESSIONAL ENGINEER?**

A. Yes, I am a registered professional engineer in the Commonwealth of Kentucky, Registration No. 14016.

**Q. HAVE YOU TESTIFIED PREVIOUSLY BEFORE THIS COMMISSION?**

A. Yes, on at least two occasions. I do not recall the exact dates, or specific case numbers, but both were related to Kentucky adopting IRP rules, and later the proceeding to review the first IRP filing by the then Union Light, Heat & Power Company ("ULH&P"), now Duke Energy Kentucky.

**Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?**

A. The purpose of my testimony is to provide an overview of Duke Energy Kentucky's electric operations and to discuss Duke Energy Kentucky's position regarding: (1) whether or not the EPACT 2005 fuel source diversity standard should be adopted by the Kentucky Public Service Commission ("Commission") and if not, whether there are any alternative fuel source diversity standards that should be considered; and (2) whether or not the EPACT 2005 fossil fuel generation efficiency standard should be adopted, and if not, whether there are any alternative fossil fuel generation efficiency standards the Commission should consider.

## II. BACKGROUND REGARDING DUKE ENERGY KENTUCKY

**Q. PLEASE DESCRIBE DUKE ENERGY KENTUCKY'S ELECTRIC GENERATION AND DELIVERY SYSTEM.**

A. Duke Energy Kentucky owns, manages, and controls plants, properties, and equipment used and useful for the production, transmission and distribution of electricity to the public in

Northern Kentucky, including various municipalities and unincorporated areas of Kenton, Campbell, Boone, Gallatin, Grant, and Pendleton Counties. Duke Energy Kentucky provides retail electric service to more than 134,000 customers, including residential, commercial, agricultural, and industrial customers, as well as governmental entities.

Duke Energy Kentucky owns two coal-fired generating units, East Bend Unit 2 and Miami Fort Unit 6, and one natural gas and propane fired combustion turbine generating station, Woodsdale Units 1-6. Altogether, these generating facilities are capable of producing approximately 1,077 megawatts ("MWs") of summer generation capability. To transmit and distribute this power, Duke Energy Kentucky owns or operates approximately 107 circuit miles of transmission lines, more than 38 substations, and over 2,078 miles of distribution lines, and is interconnected with two other electric utilities, including Duke Energy Ohio, Inc. Duke Energy Kentucky is a member of the Midwest Independent System Operator ("MISO") and obtains all economy purchased power through MISO.

## III. EPACT 2005 FUEL DIVERSITY STANDARD

**Q. ARE YOU FAMILIAR WITH THE FUEL SOURCE DIVERSITY STANDARD SET FORTH IN THE EPACT 2005?**

A. Yes. The standard proposes that each utility develop a plan to minimize dependence on one fuel source and to ensure that the electric energy it sells to customers is generated using a diverse range of fuels and technologies, including renewable technologies.

**Q. SHOULD KENTUCKY ADOPT ADDITIONAL RULES OR POLICIES TO IMPLEMENT THIS PROPOSED STANDARD?**

A. No, Duke Energy Kentucky does not believe this standard is necessary. Duke Energy Kentucky also believes it conflicts with the least cost planning principles of integrated resource planning, and therefore should not be adopted. In addition, should the Commonwealth of Kentucky decide that some standard of this type is necessary, it already has, through the General Assembly and the Assembly's grant of authority to the Commission, sufficient policies and rules in place that not only promote the interest of having a diverse mix of fuel and generation technology, but also provide necessary balance among the multiple factors that need to be considered in providing reliable service at reasonable prices.

**Q. PLEASE EXPLAIN THE POLICIES AND PROCEDURES CURRENTLY IN PLACE TO ENCOURAGE FUEL DIVERSITY.**

A. The interest in providing electricity to customers through a diverse array of generation resources is important. However, the desire to achieve diversity through fuel sources is but one of many factors that needs to be considered and balanced to ensure customers are receiving an optimal quality of service at a reasonable price.

First, let me say that existing policies and procedures must be working in Kentucky because Kentucky electricity customers currently enjoy rates that are among the lowest in the country. This is despite the recent escalation in commodity prices for coal and other fossil fuels. I believe that any standard that arbitrarily sets forth particular fuel source mix requirements, benchmarks, or even portfolio standards will likely serve to increase costs to customers because it artificially prioritizes one particular generation source over another without regard to economic cost, which ultimately determines rates. That is, it creates

artificial or induced demand due to distorting normal economic market conditions. This is especially true with respect to any attempt to establish a renewable portfolio standard without first conducting formal studies or evaluations to determine the potential and feasibility of economically developing a particular renewable resource in Kentucky. A renewable resource has to *be* there before it can be developed. And, even if it *is* there, it still may not be possible to develop it economically due to competing land use, or other interests, public or private.

In my opinion and based upon my experience, Kentucky's existing suite of rules and regulations, such as those pertaining to Integrated Resource Planning, Applications for Certificates of Public Convenience and Necessity ("CPCN"), Power Plant Siting, and Fuel Adjustment Clauses, and the statute regarding Demand Side Management provide the Commission, and utilities, ample means both to promote fuel diversity and to balance cost to customers.

At present, Duke Energy Kentucky's resources, including both owned and those available through MISO, are sufficient to serve the Company's retail electric load in Kentucky. Currently, Duke Energy Kentucky's own generation capacity is nearly equally divided between coal, and natural gas and propane fuel sources. However, the actual energy generated from this capacity mix is more heavily weighted toward coal due to fuel costs and the economic dispatch of this capacity. The market price for coal, despite recent volatility and upward price pressure, continues to be the most cost-effective fuel source for base generation. If at some point in time natural gas or propane fueled generation capacity can be

more economically dispatched than coal, the energy generated from this existing capacity will change as a result.

**Q. IS THERE ANOTHER STANDARD THAT THE COMMISSION SHOULD CONSIDER ADOPTING TO PROMOTE FUEL SOURCE DIVERSITY?**

A. As I have briefly discussed above, and as Duke Energy Kentucky Witness David Freeman states in his testimony, Duke Energy Kentucky believes the current Integrated Resource Planning regulations, CPCN requirements, and other existing rules currently provide the Commission and utilities with all that is necessary to promote the interest in obtaining fuel diversity, and no additional standard is necessary. Nonetheless, if the Commission has the desire to pursue this further, before any "fuel diversity" or "renewable standard" is considered, I firmly believe there should be a statewide feasibility study performed to determine level at which any additional resources or other "fuel" types, such as wind, solar, hydroelectric, etc., not only actually exist in Kentucky, but are also economically possible to develop to provide reliable, cost-effective, and deliverable electricity in Kentucky. It would not further the public interest to establish any standard that requires a particular mix of fuel sources, including renewables, without the flexibility to consider resource and development cost, reliability, and deliverability to customers in a particular utility's service territory. Otherwise, the standard will do little more than increase electricity supply costs for utilities and ultimately customers.

**Q. DOES DUKE ENERGY KENTUCKY BELIEVE FUTURE CARBON DIOXIDE ($CO_2$) EMISSION, ALSO KNOWN AS "CLIMATE CHANGE," REGULATIONS WILL PLACE A SIGNIFICANT ECONOMIC PENALTY ON COAL GENERATION SUCH THAT A FUEL DIVERSITY STANDARD SHOULD BE ADOPTED?**

A. Although future $CO_2$ emission restrictions are likely, and will eventually substantially increase the costs of all fossil fueled generation, it is not a foregone conclusion that coal-fired generation will lose its economic advantage over gas-fired generation or other various forms of energy. There are many variables related to "Climate Change" legislation and/or associated regulations that need to be taken into account, including scope, timing, and possible compliance alternatives available for meeting future carbon restrictions along with the pace of on-going clean coal technology developments. Duke Energy continues to believe that any federal legislation or regulation that mandates $CO_2$ emission reductions will be structured so as to not cause economic disaster for any particular region of the country, or for coal burning utilities and their customers in general. There appears to be a broad consensus that coal is an abundant, local, relatively inexpensive fuel and is a key component in the energy equation in this country today, and will remain so for decades to come. Although $CO_2$ regulation will mean increased equipment and operating costs for all companies and businesses that rely upon fossil fuel, or electricity, these costs will ultimately be absorbed over time in the same way that utilities and other companies have been required to meet other environmental and regulatory requirements during the last several decades.

Despite these historical cost increases, coal has remained the least-cost, base load fuel in Kentucky and the Midwest.

Duke Energy Kentucky continues to take a proactive role in preparing for a future with expanded carbon regulations and has already began to participate in studies to explore carbon sequestration at its East Bend generating station and carbon capture studies within the Commonwealth of Kentucky.

In summary, Duke Energy Kentucky is actively taking steps to ensure that coal will be a clean as well as affordable option for producing power now and in the future.

## IV. EPACT GENERATION EFFICIENCY PLAN

**Q. ARE YOU FAMILIAR WITH THE GENERATION EFFICIENCY STANDARD SET FORTH IN THE EPACT 2005?**

A. Yes. The EPACT of 2005 Energy Efficiency Standard specifies that "Each utility shall develop and implement a 10-year plan to increase the efficiency of its fossil fuel generation."

**Q. WHAT IS GENERATION EFFICIENCY?**

A. Generation efficiency is typically described in terms of heat rate, which is the British Thermal Units of fuel input required to produce one net kilowatt-hour of electricity output. The lower the heat rate of a unit, the greater the efficiency of the unit in converting fuel energy to electric energy. Measurement of the heat rate typically takes into account all systems required to produce electricity and collect wastes or by-products from combusting the fuel. Although I will not list all of the systems that make up a typical modern coal-fired unit, generally this type of unit would include systems like fuel unloading and handling, fuel

preparation (coal pulverizing), combustion air handling, boiler water treatment and handling, the boiler and all of its water/steam pathways, combustion pathways and heat transfer surfaces, the steam turbine-generator and its related systems, cooling towers and related systems, and pollution control equipment. All of these systems generally require auxiliary power and energy to operate, or otherwise have an impact on the efficiency of the entire energy conversion system.

**Q. DOES DUKE ENERGY KENTUCKY BELIEVE THE COMMISSION SHOULD ADOPT ADDITIONAL RULES OR POLICIES TO IMPLEMENT THE EPACT 2005 EFFICIENCY STANDARD?**

A. No. Generation efficiency is a generating unit, a company-specific, and an independent system operator (like MISO) issue that requires flexibility in resource commitment, operation, maintenance, and equipment upgrade decisions. A rigid and mandated plan to achieve a particular level of efficiency improvement is inappropriate for Kentucky. Because generation efficiency can be affected by so many different factors, including unit commitment, operation, equipment upgrades, and installation of environmental compliance equipment, a strict efficiency standard would likely discourage worthwhile investments or increase costs in other areas, driven only by the pursuit of generating unit efficiency. Moreover, given the ambiguous EPA regulations surrounding New Source Review (NSR), significant upgrades to a generating unit may impose additional costs in order to make the unit comply with New Source Performance Standards (NSPS). Such investments would make the efficient investment uneconomical and if required to be implemented to meet an "efficiency improvement plan," would adversely impact rate payers.

Finally, as I have outlined above related to the fuel source diversity issue, I believe the Commission already has adequate authority to ensure that utilities are providing reliable and efficiency electric generation. The Commission can conduct an investigation at any time and has the ability to require reporting by utilities. The Commission could also review the efficiency of the utility's generating units in connection with a general rate case, an IRP proceeding, or the regular Fuel Adjustment Clause proceedings. Therefore, an additional statewide requirement for utilities to implement a ten-year generation efficiency improvement plan is neither necessary nor in the best interests of stakeholders.

**Q. COULD YOU PLEASE FURTHER DESCRIBE SOME OF THE "MANY DIFFERENT FACTORS" THAT MAY IMPACT HEAT RATE OR UNIT EFFICIENCY THAT YOU MENTIONED ABOVE?**

A. Yes. A generating unit's heat rate, or efficiency, is impacted by a variety of conditions of operation of the unit, not all of which are maintenance-related. For example, a unit's most efficient operating level is typically at or near full load. If, for system reasons, the unit must operate below this load point or follow load going up-and-down on a minute-by-minute basis, overall efficiency is adversely impacted. Duke Energy Kentucky sometimes experiences this with the Woodsdale Generating station. Woodsdale consists of six simple cycle combustion turbine units and is committed and dispatched by MISO at extremely low loads (sometimes 5 MW per unit) to meet spinning reserve requirements. This is because of Woodsdale's ability to respond quickly to rapid load changes across the MISO footprint quicker than a base load coal unit. Operation in this manner has a negative impact on the

unit's heat rate, or efficiency, but provides reliability and operational value to the system by way of its operational flexibility.

In addition, fossil fuel generation efficiency can be adversely affected by adding equipment needed to further reduce air emissions, reduce water discharge temperature restrictions, and improve handling of wastes or by-products. The presence of pollution control equipment generally requires auxiliary power and diverts either mechanical and/ or thermal energy that would otherwise be directly used for producing electricity, or electrical energy itself that would have been sent out for customer use. The trend of reduced power plant efficiency resulting from increasing environmental compliance requirements appears likely to continue for several years. Also, if $CO_2$ capture becomes a requirement, auxiliary loads will increase dramatically, greatly reducing generating efficiency. A requirement to increase efficiency would create conflicting objectives and could penalize utilities and discourage the investment in environmental compliance equipment because of the resulting negative impact on heat rate and efficiency.

**Q. HOW CAN THE HEAT RATE BE IMPROVED TO INCREASE GENERATION EFFICIENCY?**

A. There are generally two types of heat rate improvement projects that may be performed. The first type generally involves periodic maintenance to the existing equipment that makes up the unit to correct wear and degradation that the components experience during normal operation. Such projects typically involve both capital and operation and maintenance expenses. This type can be considered a recurring or non-sustainable heat rate

improvement, as the equipment will wear and degrade once again in operation after the investment has been made. Any economically justified projects of this type are usually performed during regularly scheduled maintenance outages. Examples include steam turbine overhauls, burner tip replacements, and air heater or condenser washes.

It should be noted that it is usually neither feasible nor economic to attempt to bring equipment all the way back to original efficiency levels. With steam turbines, for example, leading stage turbine blade rows are replaced from time-to-time as maintenance items during turbine overhauls. Replacing all of the blades on the turbine during each maintenance outage would result in the maximum performance improvement, but at too great a cost, particularly where replacing just a select few blade rows accounts for most of the performance benefit. Therefore, significant additional cost would yield little realized additional benefit, which would deteriorate anyway within a few years of operation.

The second type of efficiency improvement generally involves significant improvements in, or modifications to, the original design basis of the process in question. Projects of this sort typically involve significant capital expenses and typically give rise to a baseline improvement in the performance of the particular system or systems and the unit. For these projects, the design of the unit, sub-system, or process must be improved. This often requires multidisciplinary engineering design activities and issuances of new documentation, such as drawings, performance curves, and operating/maintenance manuals. Major changes to the structure or facilities may be necessary to accommodate the new technology being applied.

Economic opportunities for achieving fundamental process improvements are limited. Some examples include: upgrade of the complete steam turbine to modern "dense pack" technology, applying advanced controls to electrical components, or conversion of an entire steam-cycle process from operating at sub-critical conditions to operating at supercritical conditions (basically a replacement of the boiler pressure parts and steam turbine/high energy piping systems, which is an extreme and very costly example.) These types of projects can achieve improvements in heat rate generally in the range of 3% to 6% (not percentage points of efficiency, but percent improvement in original heat rate) that may be sustained. Once again, however, after the initial retrofit or upgrade, the efficiency will gradually degrade during normal operation as a result of normal wear-and-tear of the unit and its component sub-systems, equipment, and parts.

Finally, this second class of efficiency improvement retrofit projects is capital and labor intensive. They generally can range in cost from ten million dollars for a new steam turbine to hundreds of millions of dollars for a boiler conversion, and can require unit outage time of months or even years to implement. In addition, these types of major projects may trigger EPA NSR analysis. It is possible that, in order to execute these types of projects, additional cost would be incurred to comply with the latest pollution control requirements to make the unit comply with NSPS. If the efficiency improvement project triggers NSR upgrades, the economic benefit of improving the efficiency of the unit may be outweighed by the total cost of the project, including other upgrades to meet NSPS.

**Q. IS THERE AN ALTERNATIVE FOSSIL GENERATION EFFICIENCY STANDARD THAT THE COMMISSION SHOULD CONSIDER ADOPTING?**

A. As stated previously, Duke Energy Kentucky believes the Commission already has adequate resources and utilities have adequate incentive through rate treatment in making sure the companies continue to provide efficient and reliable generation service to customers. The Commission can conduct an investigation at any time and has the ability to require reporting by utilities. The Commission could also review the efficiency of the utility's generating units in connection with a general rate case, an IRP proceeding, or the regular Fuel Adjustment Clause proceedings. In addition, the Commission can initiate a complaint against a utility if it determines that the utility's service is unreasonable, insufficient, or inadequate. The Commission has the requisite authority to order a utility to correct any deficiency. Therefore, a statewide requirement for utilities to implement a ten-year efficiency plan is neither necessary nor in the best interests of stakeholders.

## V. CONCLUSION

**Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

A. Yes.

VERIFICATION

State of Ohio )
) SS:
County of Hamilton )

The undersigned, John G. Bloemer, being duly sworn, deposes and says that: I am employed by the Duke Energy Corporation affiliated companies as Director, Analytical Engineering; that on behalf of Duke Energy Kentucky, Inc., and says that I have personal knowledge of the matters set forth in the foregoing testimony, and that the answers contained therein are true and correct to the best of my knowledge, information and belief.

John G. Bloemer, Affiant

Subscribed and sworn to before me by John G. Bloemer on this 28th day of October, 2008.

NOTARY PUBLIC

My Commission Expires:

NOTARY PUBLIC STATE OF OHIO

ANITA M. SCHAFER
Notary Public, State of Ohio
My Commission Expires
November 4, 2009

**COMMONWEALTH OF KENTUCKY**

**BEFORE THE PUBLIC SERVICE COMMISSION**

| | | |
|---|---|---|
| IN THE MATTER OF THE: | ) | |
| CONSIDERATION OF THE | ) | |
| REQUIREMENTS OF THE FEDERAL | ) | Case No. 2007-300 |
| ENERGY POLICY ACT OF 2005 | ) | |
| REGARDING FUEL SOURCES AND | ) | |
| FOSSIL FUEL GENERATION | ) | |
| EFFICIENCY | ) | |

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# DIRECT TESTIMONY OF

# DAVID E. FREEMAN

# ON BEHALF OF

# DUKE ENERGY KENTUCKY

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November 7, 2008

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## I. INTRODUCTION AND PURPOSE

**Q. PLEASE STATE YOUR NAME, BUSINESSADDRESS OCCUPATION.**

A. My name is David E. Freeman and my business address is 139 East Fourth Street, Cincinnati, OH 45202. I am employed by Duke Energy Business Services Inc. as Midwest Integrated Resource Planning Director for Duke Energy Corporation's Midwest regulated utility operating companies, including Duke Energy Kentucky, Inc ("Duke Energy Kentucky or the Company").

**Q. PLEASE DESCRIBE BRIEFLY YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUNDS.**

A. In 1992, I received a Masters of Business Administration from the University of Cincinnati with a major in Quantitative Analysis and a minor in Finance. In 1985, I received a Bachelor of Science in Engineering from the University of Cincinnati with a major in Mechanical Engineering. In 1978, I received an Associate's Degree in Civil and Environmental Engineering Technology from the University of Cincinnati. I have approximately thirty years experience in the utility industry. I have been employed by Duke Energy Business Services since the merger between Duke Energy and Cinergy Corp. in 2006. Prior to that, I worked for Cinergy Corp. and the Cincinnati Gas & Electric Company. I was appointed to my current position as Midwest Integrated Resource Planning Director on July 1, 2008. Throughout my thirty years of experience, I have held many positions of increasing responsibility. Most recently, I have held positions in Global Risk Management from January 2005 through June 2008. Prior to that, I was a Senior Engineer

involved with post analysis cost evaluations, after-the-fact interchange costing, and performance analytics for Power Services from October 2000 through December 2004. From October 1998 through October 2000, I held various trading positions related to power, natural gas, and transmission markets in Cinergy Marketing and Trading and Cinergy Power Marketing and Trading. I was an Analyst/Strategist in the Cinergy Power Marketing and Trading Group from August 1997 through September 1998. I was a Supervisor in Resource Planning from January 1995 through July of 1997.

**Q. PLEASE DESCRIBE YOUR DUTIES AND RESPONSIBILITIES AS MIDWEST INTEGRATED RESOURCE PLANNING DIRECTOR.**

A. As Midwest Integrated Resource Planning Director, I am responsible for planning for the long-term capacity needs of the Duke Energy Indiana, Inc. and Duke Energy Kentucky systems by minimizing the long-run cost of providing reliable, economic, and efficient electrical services to meet the forecasted needs of our customers. My responsibilities include preparing and filing Integrated Resource Plans ("IRPs") in accordance with state regulations.

**Q. ARE YOU A REGISTERED PROFESSIONAL ENGINEER?**

A. Yes, I am a registered professional engineer in the State of Ohio.

**Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?**

A. The purpose of my testimony is to provide an overview of Duke Energy Kentucky's IRP planning and to discuss Duke Energy Kentucky's position regarding whether or not the EPACT 2005 fuel source diversity standard should be adopted by the

Commission, and if not, whether there are any alternative fuel source diversity standards that should be considered.

## II. DUKE ENERGY KENTUCKY'S IRP PROCESS

**Q. PLEASE GIVE A BRIEF OVERVIEW OF DUKE ENERGY KENTUCKY'S CURRENT INTEGRATED RESOURCE PLANNING PROCESS.**

A. Stated very simply, the IRP process involves taking a myriad of resource options, and, through screening and analysis, methodically funneling them down to an optimal combination of feasible and economic alternatives that will reliably meet the anticipated future customer loads. More specifically, the IRP process involves a number of steps: (1) development of planning objectives and assumptions; (2) preparation of an electric load forecast; (3) identification and screening of potential electric demand-side resource options; (4) identification of, screening of, and performing sensitivity analysis around the cost-effectiveness of potential electric supply-side resources; (5) identification of, screening of, and performing analysis around the cost-effectiveness of potential environmental compliance options; (6) integration of the demand-side and supply-side and environmental compliance options; (7) performing final sensitivity and scenario analyses on the integrated resource alternatives; and (8) selecting an optimal plan based on quantitative and qualitative factors (such as risk, reliability, technical feasibility, and other qualitative factors).

**Q. WHAT TYPES OF RESOURCE ALTERNATIVES ARE CONSIDERED IN DUKE ENERGY KENTUCKY'S INTEGRATED RESOURCE PLANNING PROCESS?**

A. We consider a multitude of options and combinations of options, including energy efficiency[1] programs (both conservation and demand response programs), environmental compliance alternatives, and supply-side alternatives (such as peaking units, combined cycle units, coal-fired units, integrated gasification combined cycles (IGCC), renewable resources, and purchases) in our IRP process.

In determining the final plan, other factors are considered such as flexibility, risk, availability of equipment, constructability, and transmission constraints.

## III. EPACT 2005 FUEL DIVERSITY STANDARD

**Q. ARE YOU FAMILIAR WITH THE FUEL SOURCE DIVERSITY STANDARD SET FORTH IN THE EPACT 2005?**

A. Yes. The standard proposes that each utility develop a plan to minimize dependence on one fuel source and to ensure that the electric energy it sells to consumers is generated using a diverse range of fuels and technologies, including renewable technologies.

**Q. SHOULD KENTUCKY ADOPT THIS STANDARD?**

A. No, Duke Energy Kentucky does not believe this standard is necessary and it should not be adopted. The Commonwealth of Kentucky, through the General Assembly,

[1] The term "energy efficiency," as used in this testimony, includes both energy efficiency/ conservation and demand response measures

and its grant of authority to the Commission, has sufficient policies and rules already in place that promote the interest of having a diverse mix of fuel and generation technology and accomplish the goal of the EPACT 2005 Fuel Diversity Standard. Moreover, the current Kentucky policies and procedures provide the necessary balance among the multiple factors that need to be considered in providing reliable service at reasonable prices. Specifically, Kentucky's rules for Integrated Resource Planning by electric utilities, rules for Applications for Certificates of Public Convenience and Necessity ("CPCN"), Fuel Adjustment Clauses ("FAC") and law regarding Demand Side Management[2] provide the Commission, as well as utilities, with excellent tools to appropriately balance the interest in fuel diversity with maintaining a reliable and cost-effective supply of electricity for customers.

**Q. PLEASE EXPLAIN HOW THE CURRENT KENTUCKY INTEGRATED RESOURCE PLANNING REGULATIONS ACCOMPLISH THE GOAL OF THE EPACT 2005 FUEL DIVERSITY STANDARD.**

A. 807 KAR 5:58 and its subsections require each electric utility to file an IRP every three years. The Integrated Resource Planning regulations set forth specific requirements for the utilities to evaluate in its IRP, including but not limited to projected load growth, as well as the resources planned to be implemented to meet that growth. The regulations also require the utility to submit a "Resource Assessment and Acquisition Plan" that must "include the utility's resource assessment and acquisition plan for providing an adequate and reliable supply of electricity to meet forecasted electricity requirements at the lowest possible cost."

[2] Kentucky Statute 278 010(17) defines Demand-side management as "any conservation load management, or other utility activity intended to influence the level or pattern of customer usage or demand, including home energy assistance programs "

This plan must examine all potentially cost-effective resource options, including but not limited to, expansion of existing generation facilities, coordination with other utilities in constructing and operating new units, and an assessment of non-utility generation, demand-side management, cogeneration opportunities and renewable technologies. This resource assessment necessarily includes an examination of possible fuel sources to meet projected demand in an economical manner.

**Q. PLEASE EXPLAIN HOW DUKE ENERGY KENTUCKY CONSIDERS AND RECOMMENDS THE MOST APPROPRIATE METHOD TO ENSURE ITS ELECTRIC ENERGY SOLD TO KENTUCKY CUSTOMERS IS GENERATED USING A DIVERSE RANGE OF FUELS AND TECHNOLOGIES.**

A. Duke Energy Kentucky believes that continuing to use an Integrated Resource Planning process is the most appropriate method by which electric generating utilities can analyze whether their generating resources are sufficiently diverse in terms of fuels and technologies to meet the goals of reliable, cost-effective supply of power to customers. Duke Energy Kentucky uses sophisticated models for its IRP process. These models identify the least cost supply resources that could be used to satisfy future electric demand under a variety of constraints including cost, reliability concerns, and the recognized need for a diverse mix of fuel and technologies. Through the IRP process, Duke Energy Kentucky analyzes its existing and long-range generation plans which include fuel diversity, energy efficiency and demand-side management opportunities and use of renewable resources. This plan is submitted to the Commission for its review and comment. Both the Commission and

interested stakeholders have an opportunity to offer alternatives to Duke Energy Kentucky's IRP proposals. Although the Commission does not issue orders formally approving the IRP, the Commission Staff does issue a report evaluating the Company's plan and makes recommendations.

As shown in the Company's recently filed IRP, Duke Energy Kentucky's generation system currently utilizes both coal and natural gas to generate electricity to serve customers. Additionally, Duke Energy Kentucky continues to review and evaluate opportunities to expand its resource pool from both a fuel and technology perspective all the while balancing the ultimate cost.

**Q. ARE THERE OTHER STATE POLICIES OR REGULATIONS THAT PROVIDE THE COMMISSION WITH AUTHORITY TO ADDRESS FUEL SOURCE DIVERSITY?**

A. Yes. The Commission has several tools at its disposal that address the interest in achieving a diverse supply of fuel. For example, before a utility can begin construction or acquisition of a new generating facility it must establish that the new generating facility is necessary and in the public interest. This is done through a CPCN filing before the Commission. The utility must provide, among other things, the estimated cost for operating the new generating facility, and typically utilities submit an IRP analysis showing that a proposed generating facility is the least cost alternative to serve expected load. Duke Energy Kentucky made such a filing when the Commission authorized Duke Energy Kentucky to acquire three generating stations from Duke Energy Ohio, Inc. in Case No. 2003-00252. The Commission has authority to deny a CPCN application if the Commission determines that the

proposed generating facility would not provide adequate fuel diversity, would not be as efficient as other generating technologies, or could be avoided by use of renewables.

The FAC regulation authorizes the Commission to review utilities' fuel costs periodically. If the Commission determines that a utility uses fuels that are too costly or is not operating its generating facilities efficiently, resulting in a fuel rate that is unjust and unreasonable, the Commission can approve the appropriate fuel rate.

Finally, the Commission has jurisdiction to approve utilities' energy efficiency plans. To the extent energy efficiency programs are successfully implemented, the utility's reliance upon a particular fuel source such as coal or natural gas for generation is reduced. In this sense, Duke Energy Kentucky considers energy efficiency as a "fifth fuel" source. The Commission can approve such programs if the Commission determines that the programs are reasonable and cost effective.

**Q. BESIDES FUEL SOURCE DIVERSITY, WHAT OTHER FACTORS MUST BE CONSIDERED WHEN PLANNING GENERATION RESOURCES?**

A. When utilities are considering future electric generating resource options, including purchase power or energy efficiency alternatives, they have a number of constraints to consider beyond achieving a diverse fuel supply. First, as I previously mentioned, a basic overriding principle to resource planning is that any plan must satisfy the objective of providing a least-cost resource mix. Achieving a least-cost mix requires a delicate balance of a number of considerations including reliability and

environmental considerations. The generation resource must match the characteristics of a utility's future load requirements, whether it be peaking, intermediate, or base load requirements. Any of these needs could make a particular generation source, and consequently fuel source, more appropriate and consequently more reliable than another. Due to the variability of these considerations, any adoption of a strict or prescriptive fuel diversity standard is impractical at best and contrary to the public interest at worst.

**Q. IS THERE ANOTHER STANDARD THAT THE COMMISSION SHOULD CONSIDER ADOPTING TO PROMOTE FUEL SOURCE DIVERSITY?**

A. Duke Energy Kentucky believes the current Integrated Resource Planning regulations and CPCN requirements provide the Commission and utilities with all that is necessary to promote the interest in obtaining fuel diversity and no additional standard is necessary. Nonetheless, before any standard is considered, there should be a feasibility study performed to determine whether any additional resources, such as wind, solar, hydroelectric, etc, are not only possible, but reliable, cost-effective, and deliverable in Kentucky. It would not be in the public interest to establish any standard that requires a particular mix of fuel sources, including renewables, without any flexibility to consider resource cost, reliability, and deliverability to customers in a particular utility's service territory. Otherwise, the standard will do little more than increase costs for both utilities and customers.

## IV. CONCLUSION

**Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

A. Yes.

VERIFICATION

STATE OF OHIO )
) SS:
COUNTY OF HAMILTON )

The undersigned, David E. Freeman being duly sworn on his oath, says that: I am employed by Duke Energy Corporation affiliated companies as Director, Integrated Resource Planning for Duke Energy Business Services, LLC; that on behalf of Duke Energy Kentucky, Inc., and says that I have personal knowledge of the matters set forth in the foregoing testimony, and that the answers contained therein are true and correct to the best of my knowledge, information and belief.

David E. Freeman, Affiant

Subscribed and sworn to before me by David E. Freeman on this 27th day of October, 2008.

NOTARY PUBLIC

ADELE M. DOCKERY
Notary Public, State of Ohio
My Commission Expires
January 5, 2009

My Commission Expires: 1/5/2009

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