Exhibit No.:	
Issues:	Commitment to Complete Wind Energy Assessments in Missouri
Witness:	Rick Anderson
Sponsoring Party:	Missouri Department of Natural Resources' Outreach and Assistance Center, Missouri Energy Center
Type of Exhibit:	Testimony
Case No.:	ER-2004-0570

EMPIRE DISTRICT ELECTRIC COMPANY ELECTRIC RATE CASE

DIRECT TESTIMONY

OF

RICK ANDERSON

MISSOURI DEPARTMENT OF NATURAL RESOURCES

ENERGY CENTER

September 20, 2004

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI
TESTIMONY OF
RICK ANDERSON

MISSOURI DEPARTMENT OF NATURAL RESOURCES
ENERGY CENTER

CASE NO. ER-2004-0570

(This page intentionally left blank.)

Q. Please state your name and address.

A. My name is Rick Anderson. My business address is Missouri Department of Natural Resources, Energy Center, 1659 East Elm Street, P.O. Box 176, Jefferson City, Missouri 65102-0176.

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

A. I am employed by the Missouri Department of Natural Resources as an energy policy analyst for the Missouri Energy Center, a division of state government with its executive office located in Jefferson City, Missouri.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of the Missouri Department of Natural Resources, an intervenor in these proceedings.

Q. Please describe your educational background and business experience.

A. My post-secondary education has focused on Natural Resources Management, resulting in a Bachelor of Science in Forestry from Michigan State University in 1974 and a Masters of Science in Water Resources Management from the University of Wisconsin-Madison in 1980. Since 1980, I have been employed by the Missouri Department of Natural Resources (hereafter referred as DNR). After serving two years as staff in DNR's Public Information Office, I served as DNR's Budget Officer from 1982 until 1994 when I moved to the Missouri Energy Center within DNR. At the Energy Center my work has focused on energy policy issues. Current duties focus on renewable energy, with specific emphasis on wind energy.

Q. What is the purpose of your direct testimony in these proceedings?

A. The purpose of my testimony is to focus on the development of wind energy resources in the Empire District Electric Company (hereafter referred as Empire) service territory. The Energy Center is seeking commitment by Empire to provide funding for wind resource assessments to determine the feasibility of building and operating wind powered electric generation systems in Missouri.

Q. Please describe the relationship between Empire's current commitment to wind-based electric generation and the proposed rate increase.

A. Empire is proposing an electric rate increase seeking a $38.2 million annual revenue increase, a majority of which is directed toward residential and commercial customers. Of the $38.2 million annual revenue increase proposed by Empire, $30.7 million or over 80 percent of the revenue increase is targeted towards residential and commercial customers. And a substantial component of this rate increase is the cost of natural gas as a fuel to generate electricity by Empire's current generation system. Economical alternative forms of electric generation, including wind energy, should be fully considered by Empire to diversify their generation mix. To rely on coal and natural gas as the sole source of generation into the future may lead to substantially higher utility costs due to price volatility.

Q. What are the benefits to consumers from renewable energy sources?

A. The Missouri Governor's Energy Policy Council cited economic and environmental benefits of renewable resources and recommended that Missouri aggressively pursue their production and use. I served as staff support to the Council. The Council's June 1, 2003 report stated: "Renewable energy sources in the Midwest are playing an increasing role in providing energy needs. Diversifying energy sources in Missouri will provide numerous benefits by:

- reducing our vulnerability to volatile oil markets,

- improving grid reliability through on-site generation,
- increasing the competitiveness and reliability of businesses and energy systems,
- offering economic benefits from the development of renewable energy industries and keeping more of our energy dollars in the local economy, and
- improving the environment from reduced emissions that harm public health."

Clean domestic energy choices for power generation, including solar, wind and biomass, can improve efficiencies and reduce expenditures on transmission and distribution equipment by siting these technologies close to the point of consumption, where possible.

Other Midwest states have begun to realize the economic benefits from the development of renewable energy industries.

Q. Does Missouri have renewable energy resources?

A. Yes. As an agriculturally productive state, Missouri has substantial land area available for energy crops and crop waste that can be used for bioenergy production. If one-half of the energy content of these available biomass resources were used in technology that is as efficient as the average American electric generation plant, the Energy Center estimates that the net energy produced would be 15.2 million megawatt hours (MWh). This assumes that biomass fuel can be economically transported to plants capable of burning such fuel. This compares to 76.6 million MWh generated in Missouri in 2000, or 20% of our current generation.

Also, the Governor's Energy Policy Council in its June 2003 report, which the Energy Center helped staff and prepare, noted that Missouri has an average daily summer solar radiation comparable to the vast majority of the United States including the state of Florida, making solar energy in Missouri an untapped opportunity. As the cost of traditional fossil fuels

increases and the cost of solar energy declines, solar energy for electrical power generation and water heating continue to become more cost-effective as a means to help meet peak electrical demand.

Q. Does Missouri have wind energy resources?

A. Yes. To help assess Missouri's wind energy potential, the Energy Center contracted with the firm TrueWind Solutions, Inc. for the development of new high-resolution wind energy maps of Missouri. At a resolution of 25 kilometers x 25 kilometers, the 1987 national wind maps provided only a gross indication of general areas with potentially productive wind sites. Advances in weather forecasting have resulted in substantial improvement in computerized models of the atmosphere. Not only has this affected weather forecasting, it has also resulted in new ways to predict wind energy patterns that result in a new generation of maps that are much more detailed.

The maps that are currently available are interim-final work products of TrueWind Solutions and are subject to independent validation by the National Renewable Energy Laboratory (NREL) and consulting meteorologists. Validation is scheduled to be completed in the fall of 2004. According to TrueWind Solutions staff, the validation process usually results in only minor changes to interim wind maps.

The maps apply new atmospheric modeling methods that result in new insights into Missouri's wind energy resources. Building on the capability of the new modeling methods is a major improvement in resolution with each cell in the model set at 0.2 kilometers x 0.2 kilometers, there are over 15,000 data cells on the new map for each cell on the wind maps prepared in the 1980s. These changes result in maps that are able to more precisely predict the wind resource.

The maps prepared in the 1980s predicted that Missouri's best wind energy resources were likely to be found on well-exposed ridges in southern Missouri. The new maps predict that the largest areas with the highest average wind speeds are to be found in northwest Missouri. While in general, similarly exposed locations to the south and east have progressively lower average wind speeds, the map indicates there are numerous smaller areas with utility-scale potential in the Empire District's service territory.

Throughout the Midwest, wind power substantially increases as the distance from the ground increases. For example, the wind power density measured at 100 meters is much better than at 50 meters. While Missouri's wind resources are not as robust as what is found in some states, we do have the potential for development at some locations in the state. The wind maps can be viewed on the Department of Natural Resources' web page at http://www.dnr.mo.gov/energy/renewables/wind-energy.htm#maps.

Q. How are these maps used?

A. These new high-resolution wind maps can be used by Missouri utilities and property owners to guide 'prospecting' for useful wind resource levels. To make site-specific measurements that can be used to guide wind resource development, the Energy Center proposes to have wind energy instruments installed on existing communication towers that are located on or near land in the Empire District's service territory that the wind resource maps predict to have a substantial wind resource. Instrumentation at three levels, typically 50, 100 and 120 – 150 meters will provide information on the wind patterns found across the range of distances above ground level where a utility-scale wind turbine's rotors would be in operation.

The Energy Center requests that Empire provide funding in the amount of $80,000 to contract with a consulting wind energy meteorologist to conduct wind energy assessments at

a minimum of 2 sites in the Empire service territory. Wind energy assessments should be consistent with the American Wind Energy Association's Standard Procedures for Meteorological Measurements at a Potential Wind Turbine Site (AWEA Standard 8.1 – 1986 or successor standards). Selection of the sites should be consistent with the best wind energy resources identified in the Department of Natural Resources' recently published wind map of the state of Missouri. The cost for each site assessment is estimated to be approximately $40,000. Costs would include the wind measuring equipment, installation costs, lease payments for the use of existing tall towers (such as communication towers when located on or near sites predicted to have a strong wind resource) and consultant analysis of the data.

Q. Is wind energy economically viable?

A. Yes. Because of the improved efficiency of wind turbines and government policies encouraging wind energy investments, wind-driven electrical generation is the fastest growing source of new electrical generation capacity in the United States. Recent technological improvements have made it possible to generate energy from wind levels previously considered insufficient.

The federal production tax credit for renewable energy was 1.9 cents/kWh (1.5 cents/kWh adjusted for inflation). This tax credit expired on December 31, 2003. Federal legislation under consideration at the time of this filed direct testimony (S. 1637), would extend the production tax credit until January 1, 2007. Unlike some other electric generation technologies, wind energy contracts are often for 10 or more years, resulting in a known price for energy that can serve as a hedge against price volatility. As a result of these factors, utility companies are deciding to build, or contract for the energy from wind farms, because it is consistent with their business objectives.

Q. Does Empire currently invest in wind energy?

A. No. As of December 31, 2003, Empire reports that they do not currently generate electricity from wind energy resources. (Data Request, MDNR-24, Todd Tarter, Empire District Electric Company, August 10, 2004)

Q. Does Empire currently invest in any alternative form of electric generation?

A. Yes. Empire reports that as of December 31, 2003, the company generated a total of 2,345,470 MWH of base load electricity of which 58,118 or 1.3 percent of total generation was produced from its Ozark Beach hydro-electric facility (MDNR-24, Kristi Tacket, Empire District Electric Company, August 10, 2004).

Q. Has Empire examined the potential for wind energy generation in Missouri?

A. No. Empire states that they have not conducted or have had conducted on their behalf, any formal evaluations or studies of wind energy potential in Missouri as of December 31, 2003. Empire has expressed an interest in wind energy development, but this has been restricted to discussions with wind energy developers in Kansas (MDNR-26, Blake Mertens, Empire District Electric Company, August 10, 2004). In the absence of any formal evaluation of wind energy potential in Missouri, Empire should fully examine the potential for alternative energy development to meet future supply and demand needs within their Missouri service area.

Q. Are there Missouri utilities that currently invest in wind energy?

A. Yes. Aquila Networks, Inc. is diversifying their energy resource mix by including wind energy. Aquila has a 16 percent ownership share (0.12 MW) of the Jeffrey Energy Center wind turbines and purchases power on long term contract from the 110 MW Gray County Wind Farm. Both sources are located in Kansas. Aquila provides the wind energy that

Springfield City Utilities and Boone County Electric Cooperative make available to their customers.

Q. Is Aquila Networks, Inc. assessing wind energy potential in their Missouri service territory?

A. Yes. In PSC case number ER-2004-0034, Aquila, Inc. agreed in the Unanimous Stipulation and Agreement to commit $75,000 to evaluate the potential development of wind energy generation in its Missouri service territory.

Q. Has the State of Missouri supported the wind assessment project by Aquila Networks, Inc.?

A. Yes. On August 9, 2004, the U.S. Department of Energy announced its intent to award $37,500 to the Missouri Department of Natural Resources, Energy Center to conduct a wind energy assessment project with Aquila, Inc. and Ameren Services.

Q. What funding level would be required to adequately support wind energy assessment by Empire presented by your testimony?

A. As noted earlier in my testimony, Empire is targeting the largest proportion of this rate increase to its residential and small commercial electric customers. In order to help Empire and its residential and commercial electric customers face these rising energy costs relating to higher fuel costs, Empire should conduct a comprehensive examination of the wind energy resources in its Missouri service territory.

Empire provides electric service to approximately 156,918 customers in Missouri; approximately 131,914 are residential customers and 23,324 are commercial customers. The Energy Center requests that Empire provide a one-time funding amount of $80,000 to conduct the wind energy assessment project.

Q. Please explain the estimated cost per customer to implement the wind energy assessment project.

A. If the cost to complete the wind energy assessment were allocated to all Missouri electric customers with the exception industrial customers served by Empire, the estimated cost per customer per month would be approximately $0.04 presuming the cost of the project were allocated over a 12-month period.

Q. Does this conclude your testimony?

A. Yes. Thank you.

STATE OF MISSOURI
PUBLIC SERVICE COMMISSION

In the Matter of Empire District Electric Company and Its Tariff Filing to Implement A General Rate Increase for Electric Service	)))	Case No. ER-2004-0570

AFFIDAVIT OF RICK ANDERSON

STATE OF MISSOURI)
) ss.
COUNTY OF COLE)

Rick Anderson, being duly sworn on her oath, hereby states that he has participated in the preparation of the foregoing Testimony in question and answer form; that the answers in the foregoing Testimony were given by him; that he has knowledge of the matters set forth in such answers; and that such matters were true and correct to the best of his knowledge, information and belief.

Rick Anderson

Notary Public

KAY A. JOHANNPETER NOTARY PUBLIC SEAL STATE OF MISSOURI

My commission expires:

KAY A. JOHANNPETER
Notary Public - Notary Seal
STATE OF MISSOURI
Moniteau County
My Commission Expires: Aug. 4, 2007

Subscribed and sworn before me this 17th day of September 2004.