

Approved: April 29, 2005

Date

Carl Dean Holmes

MINUTES OF THE HOUSE COMMITTEE ON UTILITIES.

The meeting was called to order by Chairman Carl D. Holmes at 9:06 a.m. on February 14, 2005 in Room 231-N of the Capitol.

All members were present except: Representative Bonnie Huy - Excused
Representative Judy Morrison - Excused
Representative Judy Showalter - Excused

Committee staff present: Mary Galligan, Legislative Research
Dennis Hodgins, Legislative Research
Mary Torrence, Revisor of Statutes
Jo Cook, Administrative Assistant

Conferees appearing before the committee: Mary Torrence, Kansas Revisor of Statutes, Topeka, KS
Charles Benjamin, Sierra Club, Lawrence, KS
Steve Miller, Sunflower Electric, Hays, KS
Tom Stuchlik, Westar Energy, Topeka, KS
Michael Osterhaut, Composite technology Corp, Lenexa, KS
David Springe, Citizens' Utility Ratepayer Board, Topeka, KS
Larry Holloway, Kansas Corporation Commission, Topeka, KS
Joe Franz, Garden City, KS
Burton Crawford, Kansas City Power & Light, Kansas City, MO

Others attending: See Attached List

HB 2263 - Kansas electric transmission authority

Chairman Holmes opened the debate on **HB 2363**. Mary Torrence, Assistant Revisor of Statutes, provided an overview of the bill, outlining the details of each section.

Charles Benjamin, appearing on behalf of the Kansas Chapter of the Sierra Club, spoke in support of **HB 2263 (Attachment 1)**. Mr. Benjamin stated that the bill is market driven, if there is no market for the wind generated electricity, then there would be no need of wind generation facilities.

Steve Miller, appearing on behalf of Sunflower Electric, the Kansas Electric Power Cooperative, Kansas Electric Cooperatives, and Midwest Energy, testified in support of **HB 2263 (Attachment 2)**. Mr. Miller told the committee that the legislation was patterned after the Wyoming Transmission Authority and had the input of utilities and regulators during its preparation. He said that the cooperatives believe the bill represents the collective thinking and represents a policy that should be enacted.

Tom Stuchlik, Executive Director for Transmission Services for Westar Energy, addressed the committee in support of **HB 2263 (Attachment 3)**. Mr. Stuchlik stated that the bill does not apply to transmission improvements necessary for reliability and the Southwest Power Pool has the authority to make that determination. They support the bill because it provides a process by which projects can be evaluated and constructed.

Michael Osterhout, North American Sales Manager for the Composite Technology Corporation, testified in support of **HB 2263 (Attachment 4)**. Mr. Osterhout shared information about the company and that they work with a multitude of entities to help expedite information of high performance advanced technology components into the national transmission system and to create a supremely reliable and consumer friendly trans-American transmission grid.

Larry Holloway, Chief of Energy Operations for the Kansas Corporation Commission, testified in a neutral position on **HB 2263 (Attachment 5)**. Mr. Holloway stated that the legislation would create a new government entity that could weigh the trade offs of transmission upgrades and regional economic benefits as well as make the policy decisions.

CONTINUATION SHEET

MINUTES OF THE HOUSE COMMITTEE ON UTILITIES, Room 231-N, Statehouse, at 9:06 a.m. on February 14, 2005

Mr. Joe Franz addressed the committee in a neutral capacity on **HB 2263** (Attachment 6). Mr. Franz shared concerns he had with the current electric grid system and how this bill would help Kansas.

Burton Crawford, Deregulation Issues Manager for Kansas City Power & Light, spoke in a neutral position on **HB 2263** (Attachment 7). Mr. Crawford told the committee that the bill correctly recognizes that expansion of the nation's transmission system has not kept pace with the development of regional electricity markets. He also outlined four concerns they had with the bill.

David Springe, Consumer Counsel for the Citizens' Utility Ratepayer Board, addressed the committee in opposition to **HB 2263** (Attachment 8). Mr. Springe stated they were concerned about what the circumstances would be that warranted the need for an independent transmission authority that would building transmission.

The conferees responded to questions from the committee. Chairman Holmes closed the hearing on **HB 2263**.

Mary Galligan, Assistant Director of Legislative Research, distributed a memo (Attachment 9) detailing information requested on legislation introduced in Tennessee that provides tax incentives for broadband deployment.

The meeting adjourned at 10:53 a.m.

The next meeting is Tuesday, February 15, 2005 at 9:00 a.m.

HOUSE UTILITIES COMMITTEE GUEST LIST

DATE: February 14, 2005

NAME	REPRESENTING
Harry Holloway	KCC
John Hine	
Pavel Sprunge	Carb
Ally Davis	K. Lunenburg Association
Lance Boyd	Aquila
Kimberly Spencer	Aquila
Bruce GRAHAM	KEPC
Tom Stuehl	Westar Energy
Mark Schreiber	Westar Energy
DAN HEJTMANER	KTCA
TOM DAY	KCC
Paul Snider	SBC
HARRY BERG	MIDWEST ENERGY
BURTON CRAWFORDS	KCP&L
Sandy Braden	Great Plains/KEPC
LARRY MARULLO	KCP&L
Joseph Franz	Neutral
Charles Benjamin	KS Sierra Club
Christie Shively	
Craig Volland	KS Sierra Club

Testimony before the Kansas House Utilities Committee in **Favor** of **H.B. 2263** to create
the Kansas Electric Transmission Authority
February 14, 2005

Charles M. Benjamin, Ph.D., J.D.

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On behalf of the Kansas Chapter of the Sierra Club

Thank you Mr. Chairman, and members of the Committee, for the opportunity to speak, on behalf of the Kansas Chapter of the Sierra Club, in favor of H.B. 2263 that would create the Kansas Electric Transmission Authority. You have the unique opportunity as public servants to cast a vote that could potentially transform Kansas.

Dr. Lee Allison, who heads up the Kansas Energy Council, has reported to this Committee several times over the last few years the disturbing economic fact that in the late 1990's Kansas moved from being a net energy exporting state to being a net energy importing state. No longer does Kansas export coal from the southeast part of the state. The Hugoton natural gas fields are 2/3 depleted. The state's predominant form of oil production is from stripper wells; hardly enough to even meet the needs of Kansans.

When Kansas was a net energy exporting state, Kansas also imported dollars. Those dollars circulated through the Kansas economy and produced jobs and economic vitality in the state. Unfortunately, ever since Kansas become a net energy importing state Kansas became a state that exported its dollars for energy. Those dollars, estimated at \$1.89 billion in 2004 alone, are leaving the state. Those dollars are not producing jobs and economic vitality in Kansas.

There is hope that Kansas can again become a net energy exporter and importer of dollars to revitalize the Kansas economy. That hope lays not under the ground but in the winds that blow through Kansas. The fact is that Kansas has one of the best, if not the best, wind energy potential in the world. However, it is only potential. What prevents that potential from being tapped is the lack of electrical transmission lines in that area of the state that has the greatest wind energy potential – western Kansas. That is because utility companies have traditionally put their generating capacity and their transmission lines near the “load.” In Kansas that “load” is predominately the Wichita and northeast Kansas. What is needed are more transmission lines in western Kansas in order to tap into the enormous wind energy potential in western Kansas.

On November 2, 2004, Colorado's voters gave Kansas an opportunity to begin the process of exporting electricity made from wind turbines and importing dollars from

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Colorado to Kansas. Colorado voters imposed upon themselves a mandate that 10% of their electricity will come from renewable resources by 2015. Estimates I have seen are that 10% of Colorado's electric demand would amount to approximately 2,000 megawatts of wind energy. Some of that wind energy will come from eastern Colorado. However, the wind energy experts I talk to tell me that western Kansas has a far better wind resource than eastern Colorado. If we can get the transmission lines in place in time, and solve some interconnection problems, Kansans can be in a position to exploit this opportunity. H.B. 2263 could be the vehicle to make that happen.

What H.B. 2263 is not an attempt to supplant the utility companies who have traditionally erected transmission lines. If the utility companies want to put up the transmission lines than nothing in H.B. 2263 prevents them from doing so. Instead, the Kansas Transmission Authority would act only as a last resort if there was a demonstrated need for transmission lines and no utility was willing or able to meet that need.

H.B. 2263 is also market driven. If there is no market for the electricity to be produced from wind turbines than no wind turbines will be erected and there will be no need for transmission lines. Furthermore, the bond market will not lend the Kansas Development Finance Authority funds to allow the Kansas Electric Transmission Authority to build transmission lines unless the bond market is convinced that the bonds will be paid off.

We do have some suggestions for amending H.B. 2263.

New Section 4 (b), page 2, lines 34-43, and page 3, lines 1-6: Sierra Club favors transparency and openness in government. Therefore, we would prefer not to add further exceptions to the Kansas Open Meetings Act (KOMA) found at K.S.A. 75-4317 et seq.

New Section 5 (b), page 3, lines 14-28: Sierra Club favors transparency and openness in government. Therefore, we would prefer not to add further exceptions to the Kansas Open Records Act found at K.S.A. 45-215 et seq.

Section 13, page 9, line 43 and page 10, lines 1-11: This section requires that any funding to the authority from the state's general fund must be paid back within 60 months or five years. We think this requirement may make the Authority unworkable. Any new organization with a public purpose needs start-up funds. The legislature should give the authority a reasonable amount of seed money. The whole idea is to have the authority assume risks that private utilities have heretofore been unwilling to do. It will take several years for revenue to start flowing into the authority. Alternately, given that the state is short of funds for outright grants, the authority could be given a longer time to repay, such as 120 months or ten years.

Thank you for your time and attention. We urge your passage of this legislation. I would be happy to stand for comments.

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**TESTIMONY SUBMITTED TO THE
HOUSE UTILITIES COMMITTEE
IN SUPPORT of HB2263**

Presented by Steve Miller, Sunflower Electric, on behalf of:

**KANSAS ELECTRIC POWER COOPERATIVE, INC. – Topeka, KS.
KANSAS ELECTRIC COOPERATIVES, INC. – Topeka, KS.
MIDWEST ENERGY, INC. – Hays, KS.
SUNFLOWER ELECTRIC POWER CORPORATION – Hays, KS.**

February 14, 2005

Thank you, Mr. Chairman and members of the Committee for providing the electric cooperatives in Kansas the opportunity to speak today on House Bill 2263.

As we noted in our previous testimony on House Bill 2045, the electric power industry has been in quite a state of turmoil in recent years as it has tried to find ways to improve access to, and reduce constraints in, the regional transmission system.

Two persistent questions the industry struggles with are where are transmission infrastructure improvements needed, and, who is going to pay for them?

Like HB 2045, this legislation you are considering today will not necessarily resolve those issues, but we are excited that this legislation has a goal of not only ensuring continued reliability, but also diversifying and expanding the Kansas economy through the facilitation of improvements to the state's electric transmission infrastructure.

As you are aware, this is not a new idea. This legislation was patterned after the Wyoming Transmission Authority. While there may be others I'm not aware of, I was able to determine that Montana, North and South Dakota are actively working to create this kind of organization in their states.

In South Dakota, Senate Bill 149 contains much of the same language as the bill we're reviewing today. Its sponsors have said this proposal is based, in large part, on the bill that was successfully passed into law last year in Wyoming.

Further west, the Montana Transmission Authority (MTA), which is similar to one created by the Wyoming Legislature last year, is being considered by the Montana Legislature. The MTA would have the power to issue up to \$750 million of revenue bonds to finance the projects. The breadth of the bill gives the Montana Transmission Authority the power to "facilitate, plan, finance, site, construct, develop, acquire, own, rent, lease, maintain, upgrade and operate new electrical energy transmission facilities and related supporting infrastructures." The proposed law would allow for joint ventures, but would limit the authority's power if a private entity is willing to construct transmission facilities or provide certain services.

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North Dakota Governor, John Hoeven, thought this concept was important enough to include in his 2005 State of the State address. He said:

“Our single greatest challenge is the ability to move power to markets outside North Dakota.

A transmission authority could jump start that process and expedite the kinds of large investments we need to expand our current transmission capacity. Increased capacity is essential if we hope to build new coal-based power plants and develop wind farms across North Dakota.

This session, we will advance a bill to establish a North Dakota Transmission Authority within the state Industrial Commission to promote investments in new transmission lines across North Dakota and beyond.

The authority would serve as a catalyst for new investment, and provide low cost financing to help North Dakota's generation be competitive with local generation in surrounding states.

It would also serve as a partner to investors, providing access to public sector financing not available otherwise, and helping to develop right-of-way for new transmission.

But the reality is, our opportunity for growth from energy development extends far beyond just the wind farms and power plants themselves. Envision, if you will, industrial parks developed around our power plants - accessing our low cost energy and available water resources for value-added processing or manufacturing.

We are, in fact, bringing two of our targeted industries together - energy and value-added agriculture - to create new opportunity.”

Chairman Holmes solicited input from other states, utilities, regulators and others as this bill was being prepared for your consideration. After reviewing the final document, the electric cooperatives in Kansas have concluded the bill before you today represents our collective thinking in Kansas, and we believe it represents a policy that should be enacted.

For this reason, we are here today to urge you to support HB 2263.

Testimony on HB 2263 before the
House Utilities Committee By
Tom Stuchlik, Executive Director, Transmission Services
Westar Energy, Topeka, KS
February 14, 2005

Chairman Holmes and members of the committee, I am Tom Stuchlik, executive director transmission services for Westar Energy.

About two and a half weeks ago, I updated this committee on the current status of the transmission service in Kansas. I explained the challenges faced by the utility industry and its regulators to maintain and upgrade the electric transmission system on a regional basis.

House Bill 2263 does not apply to transmission improvements necessary for reliability. If the Southwest Power Pool (SPP) identifies a project, which is needed for reliability, the SPP, with its recent FERC certification as a Regional Transmission Organization (RTO), has the authority to order it built. If transmission improvements are necessary to serve Kansas retail customers, Kansas's utilities have and will continue to budget for and build them. House Bill 2263 provides a backstop mechanism for projects that don't meet the above criteria and which are speculative in nature. An example of this type of project might be one that the SPP has determined as not necessary for reliability reasons but has identified the beneficiaries of the project. However, some beneficiaries cannot balance the cost of their share of the project with the estimated benefits. The Authority might be able to support the completion of the project by assisting with funding the difference. Westar Energy supports this bill because it provides a process by which these projects can be evaluated and constructed, if desired.

Our support contains a bit of crystal ball gazing. We remain uncertain about the future development of SPP's overall cost allocation model and the SPP generation interconnection process. SPP is currently discussing these issues and is anticipating making a partial filing with FERC in March. There is always some uncertainty with new regulatory and regional processes and cost allocation models and further study or changes may need to be considered in the bill. For example, the combination of the yet-to-be-released regional cost allocation models and this bill could allow surrounding state entities to take a wait and see attitude towards participation in proposed transmission projects until Kansas decides whether to individually build and ultimately have Kansas customers fully fund a project.

Finally, cost recovery for these speculative projects must be identified. Westar Energy believes in the recovery principle of cost causation. We would expect those that benefit from the project pay their proportional share.

Thank you for the opportunity to address you again. I will stand for questions at the appropriate time.

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Testimony in Support of House Bill No. 2263

By Michael L. Osterhout, Lenexa, KS
North American Sales Mgr.
Composite Technology Corporation
Irvine CA

February 14, 2005

Good morning Honorable Representatives, guests. I am Michael Osterhout, a resident of Lenexa, Kansas, currently the North American Sales Manager for Composite Technology Corporation of Irvine, California. Representing myself, and Composite Technology Corporation, we applaud the intent and purpose of House Bill number 2263, and officially register our wholehearted support for passage of this important measure.

Composite Technology Corporation is assuming a significant role in current and ongoing efforts to upgrade our country's electrical transmission infrastructure. Using new proprietary transmission conductor technology, CTC's purpose parallels that of the proposed Kansas Electric Transmission Authority - "...to ensure reliable operation of the integrated electrical transmission system...to diversify and expand the Kansas economy...and to facilitate the consumption of Kansas energy through improvements in the state's electric transmission infrastructure." To these ends CTC works with numerous utilities, regional transmission organizations, independent transmission operators, municipalities, rural electric cooperatives, state governments and commissions, the Department of Energy, Department of Homeland Security, and other federal agencies to help expedite incorporation of high performance advanced technology components into the national transmission system, to create a supremely reliable and consumer friendly Trans-American transmission grid.

Coincidentally, though not accidentally, our step-out efforts to accomplish this visionary mission began in Kansas almost two years ago. The nation's interstate super highway system had its beginning in Kansas in the early 1950's. Now, during this first decade of a new century, CTC's corporate and public vision is to begin the nation's new interstate super transmission highway system in the same manner, in the same place. Kansas.

Over the past two years CTC has optimistically solidified our joint planning with Global American Energy to construct a "Kansas Greenline" across the state; A first step toward development of the Trans-American Grid. We have engaged in positive and constructive dialogue with Jim Ploger, Larry Holloway and other officials and Commissioners of the Kansas Corporation Commission...we have benefited from the council and support of Representatives Tom Sloan, Carl Holmes and other elected state Representatives and Senators who advocate supporting development of Kansas natural wind resources, and upgrading the transmission systems required to support that growth industry.

We continue to participate with the National Wind Coordinating Committee, validating opportunities for wind power generation in Kansas. We maintain constant dialogue and planning with the Southwest Power Pool, the regional transmission organization coordinating interstate and inter-regional power transmission for our area. We are working with the office of the Governor and the Lt. Governor, and with the Kansas Energy Council to fully understand the needs and objectives of Kansas, so we may assimilate those objectives as our own as we begin construction of new Greenline transmission system within the state. Passage of this key legislation can help

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reduce the time for implementing our Kansas Greenline Transmission project from a decade or more, to half that time.

Kansas is not alone in its “grass roots” effort to improve electrical transmission reliability. CTC is currently working with other state task forces and commissions, proposing similar legislation, with similar objectives in mind for their states; improvement of the state transmission grids to ensure electrical reliability for the benefit of their citizens, and to support their state’s prospective economic development opportunities.

For Kansas, this legislation supports and stimulates much needed transmission upgrades by regional utilities and transmission operators, upgrades that will allow for significant diversification and expansion of the Kansas economy – much of which may evolve through the development of wind power generation facilities, alternative energy power plants, and IGCC facilities. Many such facilities are already designed, planned, financed, and ready to construct, but remain “on hold” because of they lack the transmission capability required to deliver the power they can generate.

According to recent SPP reports, wind farm and other alternative energy developers have requested transmission availability from the Southwest Power Pool for almost 3,000 megawatts of new power generation...and that was before the extension of the alternative energy federal tax credit. Currently, the transmission capability in Kansas and regionally is over-subscribed. Existing transmission systems are unable to accommodate significant new power generation from wind farms or any other alternative energy power generation facilities.

Passage of House Bill 2263 is important not only for ensuring the reliable operation of the existing and growing transmission systems in the state, but as a catalyst to stimulate economic growth and diversity from many beneficial new industries. Of course there are the hoped-for wind farm and alternative energy facility developers – but remember that new transmission capabilities, new power generation, lower power rates from non-fossil fuels, cleaner air and a more wholesome living environment brings with it the potential for influencing the establishment of many non-energy related businesses and industries.

Inexpensive clean power, with adequate and reliable delivery systems is a major ingredient for the successful operation of virtually any business or industry. With this legislation – Kansas may begin to fulfill those basic energy needs so appealing to many prospective new businesses, and will certainly gain national respect as a proactive and visionary state, supporting a positive new paradigm for energy resource development, and supporting American energy independence.

Thank you for the opportunity to make these comments today in support of passage of House Bill number 2263.



KANSAS

CORPORATION COMMISSION

KATHLEEN SEBELIUS, GOVERNOR
BRIAN J. MOLINE, CHAIR
ROBERT E. KREHBIEL, COMMISSIONER
MICHAEL C. MOFFET, COMMISSIONER

**BEFORE THE HOUSE UTILITIES COMMITTEE
PRESENTATION OF THE
KANSAS CORPORATION COMMISSION
February 14, 2005
HB 2263**

Thank you, Chairman and members of the Committee. I am Larry Holloway, Chief of Energy Operations for the Kansas Corporation Commission. I appreciate the opportunity to be here today to testify for the Commission on HB 2263.

This bill would form the Kansas Electric Transmission Authority (KETA), which could finance and construct electric transmission facilities, provided other incumbent electric transmission operators chose not to build the facilities identified by the KETA. The KETA is not subject to the oversight of the Kansas Corporation Commission except for the Commission's jurisdiction in regard to wire stringing rules or transmission line siting. The KETA is also given the ability to levy wholesale transmission tariffs if the costs of the constructed facilities are not otherwise recovered through regional transmission tariffs.

The Commission does not oppose or support this bill but does have several concerns. In discussing it, I think it's important to remember that we are looking at three different types of upgrades to transmission systems: reliability, economic and economic development. "Reliability" upgrades are those designed to improve the performance of the system—to make sure the light comes on when the switch is flipped. "Economic" upgrades to the transmission system are those that will result in overall cost savings to electric customers.

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The Commission believes that regional transmission organizations such as the Southwest Power Pool, with oversight of state and federal regulatory commissions, should, will and can properly address transmission upgrades needed for reliability purposes. The SPP is also tackling the issue of “economic” upgrades but the issue of how they will be funded and paid for is much more controversial and is currently being debated at the SPP.

However, none of these efforts will address the other issue that HB2263 addresses—that of whether to implement transmission upgrades that result in higher electricity costs to consumers but which have offsetting regional economic benefits. This legislation would create a new government entity that could weigh these trade offs and make that policy decision.

That said, the Commission believes we should draw the Committee’s attention to certain aspects of the bill. First, it is not clear when, if ever, that the KETA would need the authority to construct electric transmission facilities for reliability purposes. This is clearly the function of the SPP and currently the responsibility of the Commission. There would seem to be no purpose served by creating another government agency with this responsibility. With regard to electric economic upgrades, as I mentioned, this is a topic that is being discussed in the SPP. Any action on this issue taken by the KETA could be premature, and in the end could require Kansas ratepayers to pay for transmission upgrades when the costs of these upgrades may be shared across several states, depending on the outcome of these SPP decisions.

Third, while the Commission recognizes that this legislation does allow the KETA the ability to implement regional economic upgrades that may not otherwise be constructed, policymakers need to be aware that it also allows the KETA to allocate these costs among Kansas wholesale transmission customers. These allocations will likely result in electric customers subsidizing projects remote from their communities for which the economic benefits are indirect at best. This is not to say that this is not an appropriate undertaking for such an authority, but simply to point out that this is essentially the sort of policy determination this new entity would be called upon to address.

**Neutral testimony regarding H.B. 2263
Enacting the Kansas Electric Transmission Authority Act**

By

**Joe Franz
15835 E. Highway 156
Garden City, Kansas 67846
(620) 276-8111
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Before the Kansas House Committee on Utilities

February 14, 2005

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ATTACHMENT 6

Definition of terms:

Regional Transmission Organization: an organization devoted to the base transfer of power for revenue purposes.

Regional Reliability Organization: : an organization devoted to the incremental transfer of power for emergencies and planned power deficiencies necessary for power plant maintenance and/or upgrades, both inbound and outbound.

Security of Transmission: the process by which transmission assets are secured or made available for power transmission at anytime; analogous to capacity reserves for base power transmission or capacity reserved for reliability.

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What's Wrong with the Electric Grid?

The warnings were certainly there. In 1998, former utility executive John Casazza predicted that “blackout risks will be increased” if plans for deregulating elec-

distribution that covers the United States and Canada is essentially a single machine—by many measures, the world’s biggest machine. This single network is physically

than within them. (The capacity of the transmission lines between the interconnects is also far less than the capacity of the links within them.)

Prior to deregulation, which began in the 1990s, regional and local electric utilities were regulated, vertical monopolies. A single company controlled electricity generation, transmission, and distribution in a given geographical area. Each utility generally maintained sufficient generation capacity to meet its customers’ needs, and long-distance energy shipments were usually reserved for emergencies, such as unexpected generation outages. In essence, the long-range connections served as insurance against sudden loss of power. The main exception was the net flows of power out of the large hydropower generators in Quebec and Ontario.

This limited use of long-distance connections aided system reliability, because the physical complexities of power transmission rise rapidly as distance and the complexity of interconnections grow. Power in an electric network does not travel along a set path, as coal does, for example. When utility A agrees to send electricity to utility B, utility A increases the amount of power generated while utility B decreases production or has an increased demand. The power then flows from the “source” (A) to the “sink” (B) along all the paths that can connect them. This means that changes in generation and transmission at any point in the system will change loads on generators and transmission lines at every other point—often in ways not anticipated or easily controlled (Figure 2).

To avoid system failures, the amount of power flowing over each transmission line must remain below the line’s capacity.

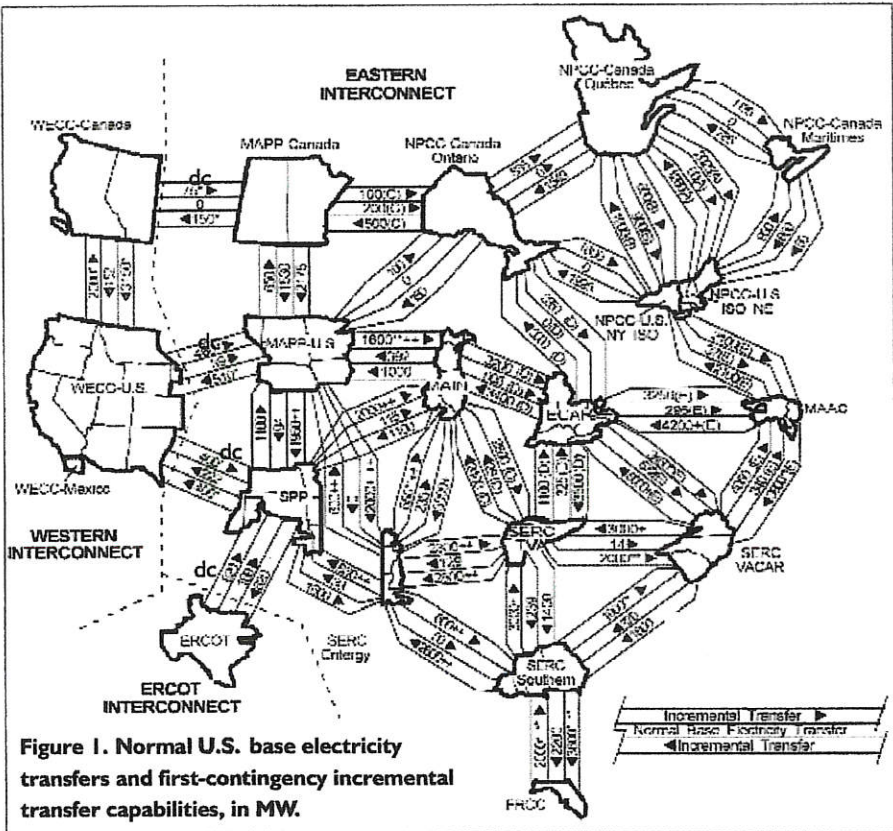


Figure 1. Normal U.S. base electricity transfers and first-contingency incremental transfer capabilities, in MW.

North American Electric Reliability Council

tric power went ahead. And the warnings continued to be heard from other energy experts and planners.

So it could not have been a great surprise to the electric-power industry when, on August 14, a blackout that covered much of the Northeast United States dramatically confirmed these warnings. Experts widely agree that such failures of the power-transmission system are a nearly unavoidable product of a collision between the physics of the system and the economic rules that now regulate it. To avoid future incidents, the nation must either physically transform the system to accommodate the new rules, or change the rules to better mesh with the power grid’s physical behavior.

Understanding the grid’s problems starts with its physical behavior. The vast system of electricity generation, transmission, and

and administratively subdivided into three “interconnects”—the Eastern, covering the eastern two-thirds of the United States and Canada; the Western, encompassing most of the rest of the two countries; and the Electric Reliability Council of Texas (ERCOT), covering most of Texas (Figure 1). Within each interconnect, power flows through ac lines, so all generators are tightly synchronized to the same 60-Hz cycle. The interconnects are joined to each other by dc links, so the coupling is much looser among the interconnects

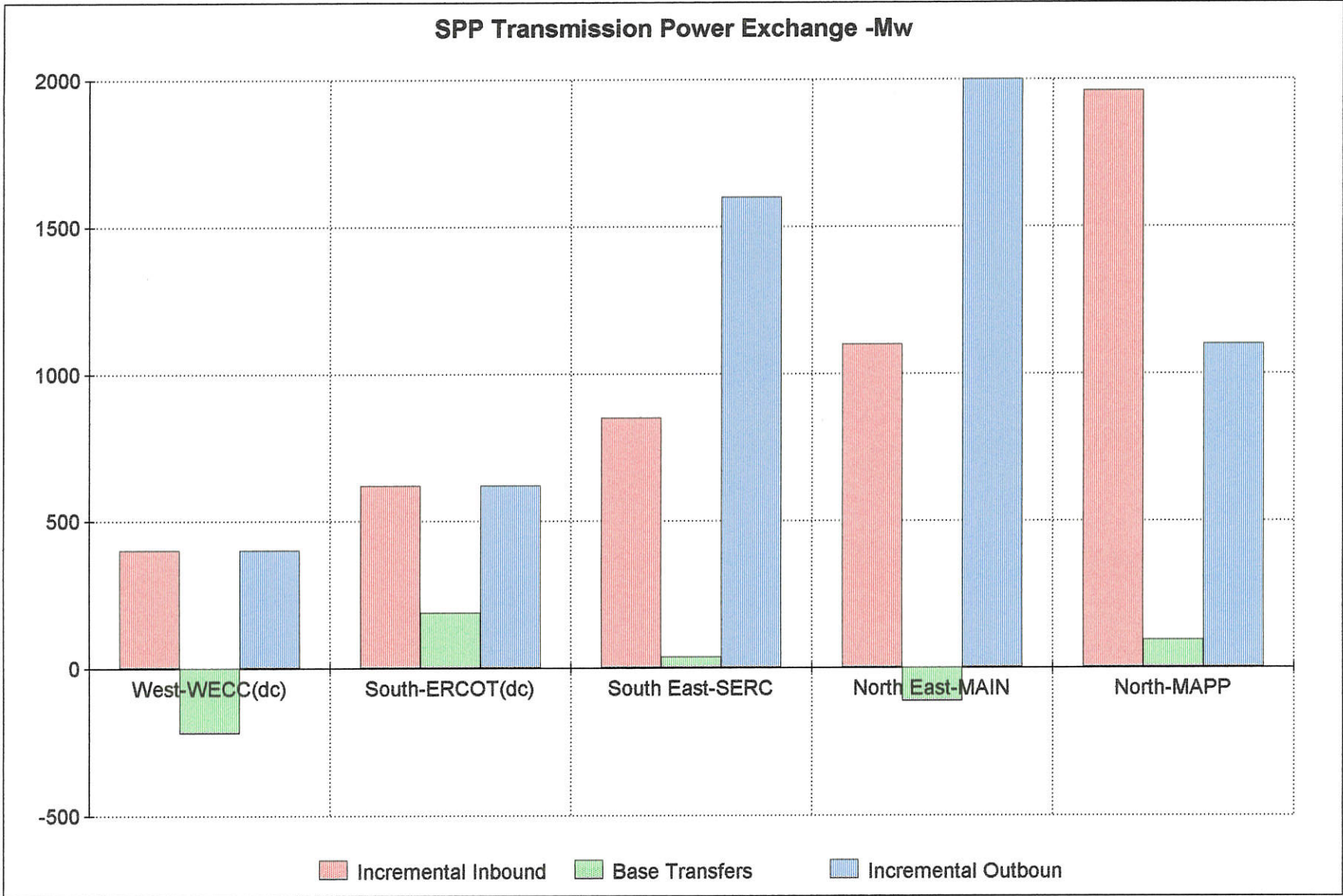
TABLE I. CAPACITY LIMITS FOR ELECTRICAL TRANSMISSION LINES

Voltage (kV)	Length (miles)	Maximum capacity (GW)
765	100	3.8
	400	2.0
500	100	1.3
	400	0.6
230	100	0.2
	400	0.1

Data from *Transmission Planning for a Restructuring U.S. Electricity Industry*, by Eric Hirst and Brendan Kirby, June 2001, prepared for Edson Electric Institute, Washington, DC.

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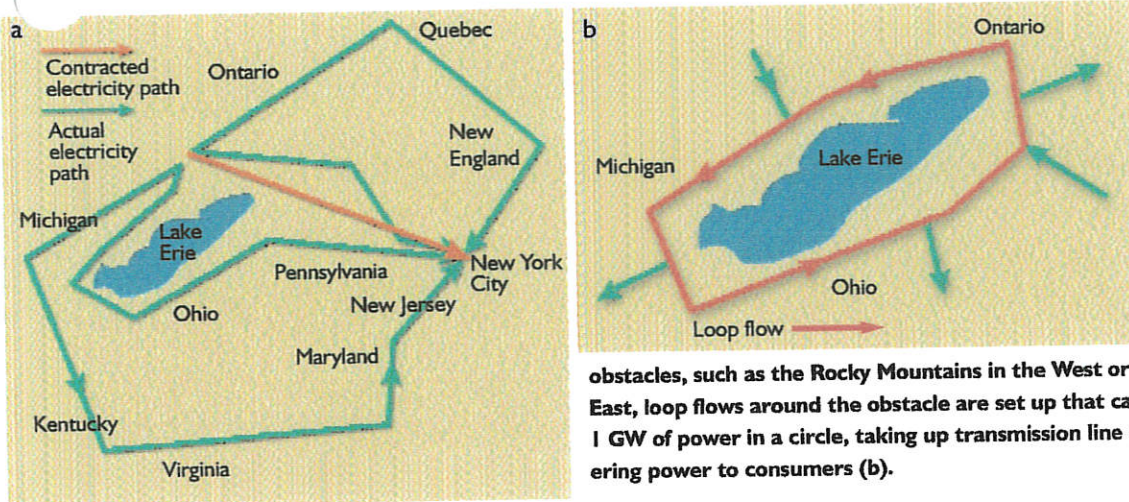


Figure 2. Electric power does not travel just by the shortest route from source to sink, but also by parallel flow paths through other parts of the system (a). Where the network jogs around large geographical

obstacles, such as the Rocky Mountains in the West or the Great Lakes in the East, loop flows around the obstacle are set up that can drive as much as 1 GW of power in a circle, taking up transmission line capacity without delivering power to consumers (b).

Exceeding capacity generates too much heat in a line, which can cause the line to sag or break or can create power-supply instability such as phase and voltage fluctuations. Capacity limits vary, depending on the length of the line and the transmission voltage (Table 1). Longer lines have less capacity than shorter ones.

In addition, for an ac power grid to remain stable, the frequency and phase of all power generation units must remain synchronous within narrow limits. A generator that drops 2 Hz below 60 Hz will rapidly build up enough heat in its bearings to destroy itself. So circuit breakers trip a generator out of the system when the frequency varies too much. But much smaller frequency changes can indicate instability in the grid. In the Eastern Interconnect, a 30-mHz drop in frequency reduces power delivered by 1 GW.

If certain parts of the grid are carrying electricity at near capacity, a small shift of power flows can trip circuit breakers, which sends larger flows onto neighboring lines to start a chain-reaction failure. This happened on Nov. 10, 1965, when an incorrectly set circuit breaker tripped and set off a blackout that blanketed nearly the same area as the one in August.

After the 1965 blackout, the industry set up regional reliability councils, coordinated by the North American Electric Reliability Council, to set standards to improve planning and cooperation among the utilities. A single-contingency-loss standard was set up to keep the system functioning if a single unit, such as a generator or transition line, went out. Utilities built up spare generation and transmission capacity to maintain a safety margin.

In 1992, the economic rules governing the grid began to change with passage of the Energy Policy Act. This law empowered the Federal Energy Regulatory Commission (FERC) to separate electric power generation from transmission and distribution. Power deregulation—in reality, a change in regulations—went slowly at first. Not until 1998 were utilities, beginning in California, compelled to sell off their generating capacity to independent power producers, such as Enron and Dynergy.

The new regulations envisioned trading electricity like a commodity. Generating companies would sell their power for the best price they could get, and utilities would buy at the lowest price possible. For this concept to work, it was imperative to compel utilities that owned transmission lines to carry power from other companies' generators in the same way as they carried their own, even if the power went to a third party. FERC's Order 888 mandated the wheeling of electric power across utility lines in 1996. But that order remained in litigation until March 4, 2000, when the U.S. Supreme Court validated it and it went into force.

In the four years between the issuance of Order 888 and its full implementation, engineers began to warn that the new rules ignored the physics of the grid. The new policies "do not recognize the single-machine characteristics of

the electric-power network," Casazza wrote in 1998. "The new rule balkanized control over the single machine," he explains. "It is like having every player in an orchestra use their own tunes."

In the view of Casazza and many other experts, the key error in the new rules was to view electricity as a commodity rather than as an essential service. Commodities can be shipped from point A through line B to point C, but power shifts affect the entire single-machine system. As a result, increased long-distance trading of electric power would create dangerous levels of congestion on transmission lines where controllers did not expect them and could not deal with them.

The problems would be compounded, engineers warned, as independent power producers added new generating units at essentially random locations determined by low labor costs, lax local regulations, or tax incentives. If generators were added far from the main consuming areas, the total quantity of power flows would rapidly increase, overloading transmission lines. "The system was never designed to handle

TABLE 2. AVERAGE PRICE OF ELECTRIC POWER IN THE U.S., 1994-2002 (cents/kWh)

Year	Cost of power	Cost of fuel	Cost of power minus cost of fuel
1994	6.91	1.23	5.68
1999	6.64	1.24	5.40
2000	6.81	1.61	5.20
2001	7.32	1.58	5.74
2002	6.97	1.28	5.69

Energy Information Administration

Table 2. Prior to the implementation of Federal Energy Regulatory Commission Order 888, which greatly expanded electricity trading, the cost of electricity, excluding fuel costs, was gradually falling. However, after Order 888, and some retail deregulation, prices increased by about 10%, costing consumers \$20 billion a year.

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long-distance wheeling,” notes Loren Toole, a transmission-system analyst at Los Alamos National Laboratory.

At the same time, data needed to predict and react to system stress—such as basic information on the quantity of energy flows—began disappearing, treated by utilities as competitive information and kept secret. “Starting in 1998, the utilities stopped reporting on blackout statistics as well,” says Ben Carreras of Oak Ridge National Laboratory, so system reliability could no longer be accurately assessed.

Finally, the separation into generation and transmission companies resulted in an inadequate amount of reactive power, which is current 90 deg out of phase with the voltage. Reactive power is needed to maintain voltage, and longer-distance transmission increases the need for it. However, only generating companies can produce reactive power, and with the new rules, they do not benefit from it. In fact, reactive-power production reduces the amount of deliverable power produced. So transmission companies, under the new rules, cannot require generating companies to produce enough reactive power to stabilize voltages and increase system stability.

The net result of the new rules was to more tightly couple the system physically and stress it closer to capacity, and at the same time, make control more diffuse and less coordinated—a prescription, engineers warned, for blackouts.

In March 2000, the warnings began to come true. Within a month of the Supreme Court decision implementing Order 888, electricity trading skyrocketed, as did stresses on the grid (Figure 3). One measure of stress is the number of transmission loading relief procedures (TLRs)—events that include relieving line loads by shifting power to other lines. In May 2000, TLRs on the Eastern Interconnect jumped to 6 times the level of May 1999. Equally important, the frequency stability of the grid rapidly deteriorated, with average hourly frequency deviations from 60 Hz leaping from 1.3 mHz in May 1999, to 4.9 mHz in May 2000, to 7.6 mHz by January 2001. As predicted, the new trading had the effect of

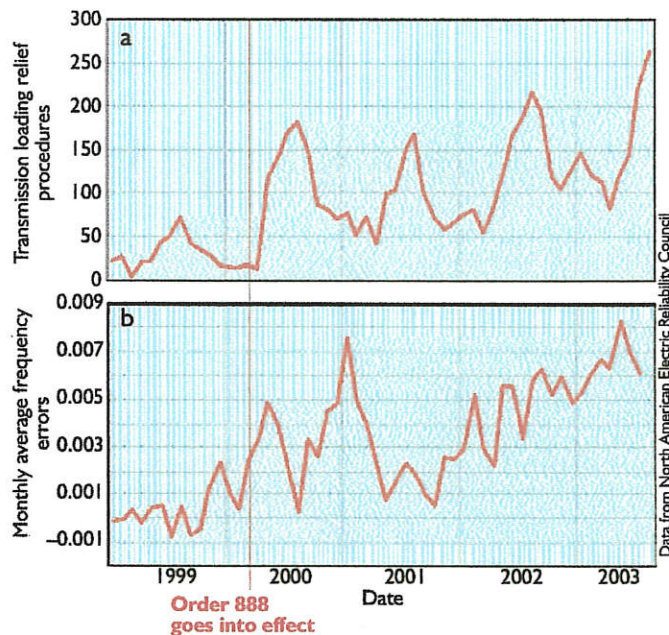


Figure 3. After wholesale electricity trading began in earnest following Federal Energy Regulatory Commission's Order 888, stress on the transmission grid jumped and continued to climb, as shown by the transmission loading relief procedures (a) and the monthly average frequency errors (b).

overstressing and destabilizing the grid.

“Under the new system, the financial incentive was to run things up to the limit of capacity,” explains Carreras. In fact, energy companies did more: they gamed the system. Federal investigations later showed that employees of Enron and other energy traders “knowingly and intentionally” filed transmission schedules designed to block competitors’ access to the grid and to drive up prices by creating artificial shortages. In California, this behavior resulted in widespread blackouts, the doubling and tripling of retail rates, and eventual costs to ratepayers and taxpayers of more than \$30 billion. In the more tightly regulated Eastern Interconnect, retail prices rose less dramatically.

After a pause following Enron’s collapse in 2001 and a fall in electricity demand (partly due to recession and partly to weather), energy trading resumed its frenzy in 2002 and 2003. Although power generation in 2003 has increased only 3% above that in 2000, generation by independent power producers, a rough measure of wholesale trading, has doubled. System stress, as measured by TLRs and frequency instability, has soared, and with it, warnings by FERC and other groups.

Major bank and investment institutions such as Morgan Stanley and Citigroup stepped into the place of fallen traders such as Enron and began buying up power plants. But as more players have entered and trading margins have narrowed, more trades are needed to pay off the huge debts incurred in buying and building generators. Revenues also have shrunk, because after the California debacle, states have refused to substantially increase the rates consumers pay.

As their credit ratings and stock prices fell, utility companies began to cut personnel, training, maintenance, and research. Nationwide, 150,000 utility jobs evaporated. “We have a lot of utilities in deep financial trouble,” says Richard Bush, editor of *Transmission and Distribution*, a trade magazine.

The August 14 blackout, although set off by specific chance events, became the logical outcome of these trends (Figure 4). Controllers in Ohio, where the blackout started, were overextended, lacked vital data, and failed to act appropriately on outages that occurred more than an hour before the blackout. When energy shifted from one transmission line to another, overheating caused lines to sag into a tree. The snowballing cascade of shunted power that rippled across the Northeast in seconds would not have happened had the grid not been operating so near to its transmission capacity.

How to fix it

The conditions that caused the August 14th blackout remain in place. In fact, the number of TLRs and the extent of frequency instability remained high after August 14 until September’s cool weather reduced stress on the grid. What can be done to prevent a repetition next summer?

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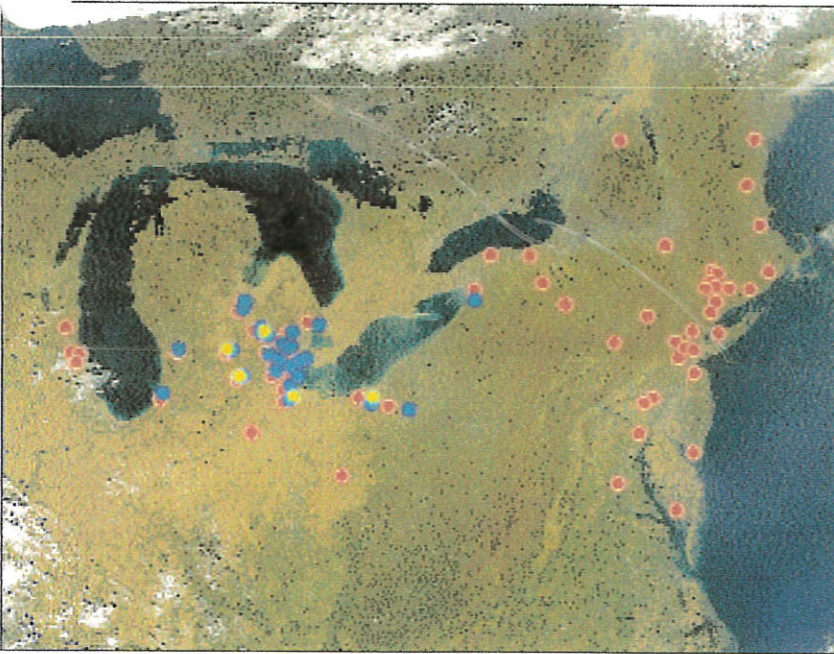


FIGURE 4. BLACKOUT SEQUENCE OF EVENTS, AUGUST 14, 2003

- 1:58 p.m.** The Eastlake, Ohio, generating plant shuts down. The plant is owned by First Energy, a company that had experienced extensive recent maintenance problems, including a major nuclear-plant incident.
- 3:06 p.m.** A First Energy 345-kV transmission line fails south of Cleveland, Ohio.
- 3:17 p.m.** Voltage dips temporarily on the Ohio portion of the grid. Controllers take no action, but power shifted by the first failure onto another power line causes it to sag into a tree at 3:32 p.m., bringing it offline as well. While Mid West ISO and First Energy controllers try to understand the failures, they fail to inform system controllers in nearby states.
- 3:41 and 3:46 p.m.** Two breakers connecting First Energy's grid with American Electric Power are tripped.
- 4:05 p.m.** A sustained power surge on some Ohio lines signals more trouble building.
- 4:09:02 p.m.** Voltage sags deeply as Ohio draws 2 GW of power from Michigan.
- 4:10:34 p.m.** Many transmission lines trip out, first in Michigan and then in Ohio, blocking the eastward flow of power. Generators go down, creating a huge power deficit. In seconds, power surges out of the East, tripping East coast generators to protect them, and the blackout is on.

One widely supported answer is to change the grid physically to accommodate the new trading patterns, mainly by expanding transmission capacity. The DOE and FERC, as well as organizations supported by the utilities, such as the Electric Power Research Institute and the Edison Electric Institute, advocate this approach. In reports before and after the blackout, they urged expanding transmission lines and easing environmental rules that limit their construction. The logic is simple: if increased energy trading causes congestion and, thus, unreliability, expand capacity so controllers can switch energy from line to line without overloading.

To pay the extensive costs, the utilities and the DOE advocate increases in utility rates. "The people who benefit from the system have to be part of the solution here," Energy Secretary Spencer Abrams said during a television interview. "That means the ratepayers are going to have to contribute." The costs involved would certainly be in the tens of billions of dollars. Thus, deregulation would result in large cost increases to consumers, not the savings once promised (Table 2).

But experts outside the utility industry point to serious drawbacks in the build-more solution other than increasing the cost of power. For one, it is almost impossible to say what level of capacity will accommodate the long-distance wholesale trading. The data needed to judge that is now proprietary and unavailable in detail. Even if made available to planners, this data

refers only to the present. Transmission lines take years to build, but energy flows can expand rapidly to fill new capacity, as demonstrated by the jump in trading in the spring of 2000. New lines could be filled by new trades as fast as they go up.

The solution advocated by deregulation critics would revise the rules to put them back into accord with the grid physics. "The system is not outdated, it is just misused," says Casazza. "We should look hard at the new rules, see what is good for the system as a whole, and throw out the rest." Some changes could be made before next summer, and at no cost to ratepayers. For one thing, FERC or Congress could rescind Order 888 and reduce the long-distance energy flows that stress the system. Second, the data on energy flows and blackouts could again be made public so that planners would know what power flows are occurring and the reliability records of the utilities. Other changes, such as rehiring thousands of workers to upgrade maintenance, would take longer and might require rewriting regulations and undoing more of the 1992 Energy Act.

These changes also would have costs, but they would be borne by the shareholders and creditors of the banks and energy companies who bet so heavily on energy trading. With cash flows dwindling and debt levels high, many of these companies or their subsidiaries might face bankruptcy if energy trading is curtailed. The decision will ultimately fall to Congress, where hear-

ings are scheduled for the fall. However the decision turns out, what is nearly certain is that until fixed, the disconnect between the grid's economics and physics will cause more blackouts in the future.

Further reading

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6-1

**Testimony before the House Utilities Committee
House Bill No. 2263**

**Burton Crawford
Manager, Deregulation Issues
Kansas City Power & Light Company
February 14, 2005**

Kansas City Power & Light Company sincerely appreciates the efforts of the Chairman and this committee's efforts to foster development of the transmission system. We believe HB 2263 correctly recognizes that expansion of the nation's transmission system has not kept pace with the development of regional electricity markets and it attempts to create one additional mechanism for getting transmission built.

KCP&L does has concerns with the bill as written, which include:

- (1) The potential to increase costs for Kansas electric consumers relative to the benefits received;
- (2) The cost recovery mechanism;
- (3) Potential conflicts with regional transmission development and operations; and
- (4) Ownership of transmission

(1) The potential for increased costs

One purpose of the bill is to "facilitate the consumption of Kansas energy through improvements in the state's electric transmission infrastructure" (Section 1(b)). There are undoubtedly many potential transmission projects that would meet this purpose, but could do so at a cost that exceeded the benefits to the state's electric consumers.

Suggested following language that could be included in the bill would provide for an additional limitation on what projects could be built through this mechanism.

"The authority shall exercise the rights and powers granted to it in this act only with respect to transmission facilities that have been demonstrated to provide a net benefit to Kansas electric consumers. Such net benefits shall be verified by the state corporation commission"

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(2) The cost recovery mechanism

. As written, if the authority cannot recover its costs from the Southwest Power Pool (which is certainly the case if the authority does not become a member of the Southwest Power Pool), costs will be assessed on "Kansas wholesale transmission customers". The bill needs to define who these customers are.

Depending on how Kansas's wholesale customers are defined, a portion of Kansas's electric consumers may end up paying for a share of the authority's system while they do not benefit. KCP&L feels that it is important to keep the responsibility for costs with those that benefit from the projects and would like to see language added to the bill that ensures that only those that benefit pay.

(3) Potential conflicts with regional transmission development and operations

As a transmission owner in the Midwest region, the Kansas transmission authority needs to abide by the same operating, maintenance, and reliability rules as other transmission-owning entities. As such, the Kansas transmission authority should become a member of the Southwest Power Pool.

As a benefit of SPP membership, a portion of the authority's transmission system costs would be recovered through the SPP regional tariff. This would allow for partial recovery of the authority's costs from transmission customers outside of Kansas, thus reducing the cost impact of new transmission facilities on Kansas's electric consumers.

(4) Ownership of transmission

The types of projects that may be built as a result of this bill could be built by existing utilities. Historically, regional-type projects have not been built due to the uncertainty of cost recovery. To the extent that the state would guarantee costs recovery, existing utilities could be used to build and own these projects. A provision for existing utilities to build and own these transmission projects, but funded through the authority's cost recovery mechanisms is a preferred solution.

KCP&L understands that changes are still in the works for the bill, and will be happy to provide additional input when these changes are incorporated into the bill.

Thank you for your time. I would be happy to answer any questions that you have.

Presented by Burton Crawford
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Citizens' Utility Ratepayer Board

Board Members:

Gene Merry, Chair
A.W. Dirks, Vice-Chair
Francis X. Thorne, Member
Nancy Wilkens, Member
Carol I. Faucher, Member
David Springe, Consumer Counsel



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HOUSE UTILITIES COMMITTEE

H.B. 2263

Testimony on Behalf of the Citizens' Utility Ratepayer Board

By David Springe, Consumer Counsel

February 14, 2005

Chairman Holmes and members of the committee:

Thank you for this opportunity to offer testimony on H.B. 2263. The Citizens' Utility Ratepayer Board is opposed to this bill for the following reasons:

CURB testified on HB 2045 before this Committee recently, a bill similar to HB 2263. While CURB did not support HB2045, CURB did believe that the intent of the bill was good, that being to create some mechanism or proceeding to determine if and when certain transmission facilities should be built if there is a dispute as to the need for the transmission or the assignment of costs for the transmission project. As described, HB 2045 attempted to address situations where transmission could be built for "economic" reasons, but was not needed for reliability purposes. One of CURB's main concerns with HB 2045 was that the cost of building the transmission projects would simply be charged to all retail electric consumers regardless of whether the consumer specifically benefited from, or even used the transmission construction.

This bill, HB 2263 presents a far more expansive mechanism to build transmission in the state. Since Southwest Power Pool will require transmission be built for reliability purposes, and can get transmission built for economic purposes (with the noted that there can be disputes over building transmission for economic purposes), CURB questions under what circumstances we would need an independent transmission Authority to "further insure for reliable operation of the integrated electrical transmission system". (Section 1(b) at page 1 line 17)

CURB believes the operable language in this bill is that the Authority will build transmission to "diversify and expand the Kansas economy and facilitate the consumption of Kansas energy through improvements in the state's electric transmission infrastructure."

While this is a long and somewhat complicated bill, CURB believes the following passages explain the bill and highlight CURB's concerns:

- The Authority that will build transmission when no "private entity" will. (See Section 7(b)(1)) at page 6 line 7 through page 7 line 8)
- The Authority "shall not be subject to supervision or regulation by the state corporation commission", except for wire stringing and transmission line siting. (Section 8(a) at page 7 lines 26-31)

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- The Authority is authorized to issue KDFA bonds to build the transmission, and to pay its administration and operating costs. (See Section 9(c) at page 8 lines 25-43)
- The Authority may exercise the power of eminent domain. (Section 8(b) at page 7 line 32)
- Any Authority costs not recovered through SPP tariffs will be recovered “through assessments against Kansas wholesale transmission customers in a manner reasonably consistent with the method used by other transmission providers for similar transmission services”. (See Section 7(a)(16) at page 5 lines 26-36)
- The wholesale transmission customers paying such assessment “shall recover it through the wholesale customers retail rates”. (See Section 7(a)(16) at page 5 lines 26-36)

This language does not require that the “Kansas wholesale transmission customers” that will be assessed costs by the Authority are actually using the transmission lines built by the Authority. What is meant by the “manner reasonably consistent with the method used by other transmission providers for similar transmission services” is also unclear.

The paradox of the bill is that if no other entity is willing to build the transmission line, it would seem to indicate there is not a need for the line or it is not economic. If the Authority builds the line anyway, for economic development purposes, the same entities that did not need the line in the first place probably will not sign up to use it. If no one signs up to use the line, (or the line is less than fully subscribed) it is impossible to recover the 100% of the costs of the line (and other administrative costs of the Authority), *unless* those costs are simply assigned outright to *every* Kansas wholesale transmission customer, regardless of the use of the line.

CURB would also note that the bill amends K.S.A. 66-1237 to include assessments from the Kansas Transmission Authority in the charges that are presumed prudent and passed directly to retail customers. (Section 14 at page 10 lines 18-43)

As noted in testimony on HB 2045, CURB would support the creation of a process at the Kansas Corporation Commission to deal with disputes related to transmission construction. However, as with HB 2045, CURB cannot support the creation of independent Authority to build transmission for economic development purposes unless there is some specific language that costs for Authority projects can only be recovered from those that actually use the transmission built. CURB cannot support the mechanism in this bill that appears to make retail electric customers in the state the catch-all financiers for the economic development projects built by the Authority.

February 14, 2005

To: House Committee on Utilities
From: Mary Galligan, Assistant Director for Information Management
Re: Tennessee Broadband Deployment Bills

During testimony this week on HB 2043, a conferee mentioned a Tennessee bill that would provide tax incentives for broadband deployment. A summary of the provisions of Tennessee bills addressing that issue follows. The summary was taken from the Tennessee General Assembly's website (<http://www.legislature.state.tn.us/>). The bills have been introduced and referred to Committee.

Bill Summary for HB0416, HB0591, SB0386 and SB0186¹

[These] bill[s] would give a telecommunications carrier, cable operator, or affiliate of such carrier or operator a **franchise tax credit** and an **excise tax credit** with respect to the entity's investment in any year. The credit would be an amount equal to:

1. 10 percent of the cost of equipment used to deploy broadband technology in counties with a population density of 100 to 500 per square mile according to the last federal census; and
2. 15 percent of the cost of equipment used to deploy broadband technology in counties with a population density of 100 or less per square mile according to the last federal census.

The aggregate credit taken in any tax year would be limited to 50 percent of the taxpayer's sum total of tax liabilities under the franchise and excise tax laws before any other credits have been applied.

[These] bill[s] would allow for the credit being computed by an entity that is organized as a general partnership and would otherwise qualify for the credit. In such cases the following would apply:

1. The credit would be computed as if the general partnership were subject to the franchise and excise tax laws.
2. With respect to the general partnership tax year during which a credit is so computed, a partner in such general partnership that is subject to franchise or excise tax and that directly holds a first tier ownership interest in such general

¹ Tennessee has a companion bill system. Identical bills are introduced in each house. In this instance, two sets of bills are identical, so four bills contain the same provisions.

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partnership may take a percentage of such credit against such partner's franchise or excise tax liability in an amount equal to the total amount of such credit for the general partnership multiplied by such partner's percentage interest in the general partnership on the last day of such general partnership tax year which includes the last day of such partner's tax year.

3. The credit passed through from the general partnership to the first tier partner would, in the hands of the first tier partner, be subject to applicable provisions and limitations otherwise provided. However, in no case would the credit be taken by a business entity unless it was a partner in the general partnership and subject to franchise or excise tax at the time the credit was earned by the general partnership.
4. In the case of tiered general partnerships, the credit would be passed through each general partnership tier using the principles described above, by treating each general partnership that holds an interest as a partner in such tiered partnership structure as an entity that is subject to franchise and excise tax.

Text of one of the bills is enclosed for your review.

If you have questions or need additional information, please feel free to contact me.

MG/sp

Enclosure

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Filed for intro on 02/03/2005
SENATE BILL 186
By McLeary

HOUSE BILL 591
By Curtiss

AN ACT to enact the "Tennessee Broadband Technology Incentive Act of 2005", and to amend Tennessee Code Annotated, Title 65 and Title 67, relative to providing incentives for deployment of broadband technology in Tennessee.

BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF TENNESSEE:

SECTION 1. This chapter may be known and shall be cited as the "Tennessee Broadband Technology Incentive Act of 2005".

SECTION 2. Tennessee Code Annotated, Section 67-4-2109, is amended by adding the following new subsection:

(g) With respect to the investment in any year by a telecommunications carrier, as defined in 47 U.S.C. §153(44), or a cable operator, as defined in 47 U.S.C. §522(5), or an affiliate of such telecommunications carrier or cable operator, after June 30, 2005, and before July 1, 2015, there shall be allowed a credit against the sum total of the taxes imposed for such year by the Franchise Tax Law, compiled in this part, and by the Excise Tax Law, compiled in part 20 of this chapter.

(1) Such credit shall be an amount equal to:

(A) Ten percent (10%) of the cost of equipment used in the deployment of broadband technologies in Tier Two areas; and

(B) Fifteen percent (15%) of the cost of equipment used in the deployment of broadband technologies in Tier Three areas.

(2) The aggregate credit established by this section taken in any one tax year shall be limited to an amount not greater than fifty percent (50%) of the taxpayer's sum total of tax liabilities, before any other credits have been applied,

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(F) Notwithstanding any law to the contrary, the credit provided in this subsection may be computed by an entity that:

- (i) is organized as a general partnership, and
- (ii) would otherwise qualify for the credit provided in this section.

Such credit shall be computed as if the general partnership were subject to the Franchise Tax Law, compiled in this part, and the Excise Tax Law, compiled in Part 20 of this chapter. With respect to the general partnership tax year during which a credit is so computed, a partner in such general partnership which is subject to franchise or excise tax and that directly holds a first tier ownership interest in such general partnership may take a percentage of such credit against such partner's franchise or excise tax liability in an amount equal to the total amount of such credit for the general partnership multiplied by such partner's percentage interest in the general partnership on the last day of such general partnership tax year which includes the last day of such partner's tax year. The credit passed through from the general partnership to the first tier partner under this section shall, in the hands of the first tier partner, be subject to applicable provisions and limitations otherwise provided by this section; provided however, that in no case shall the credit be taken by a business entity unless it was a partner in the general partnership and subject to franchise or excise tax at the time the credit was earned by the general partnership. In the case of tiered general partnerships, the credit shall be passed through each general partnership tier using the principles described herein, by treating each general

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imposed by the Franchise Tax Law, compiled in this part, and by the Excise Tax Law, compiled in part 20 of this chapter.

(3) For purposes of this subsection (g):

(A) "Tier One areas" mean counties with a population density of more than or equal to five hundred (500) per square mile of land area according to the latest U.S. Census.

(B) "Tier Two areas" mean counties with a population density of one hundred (100) to five hundred (500) per square mile of land area according to the latest U.S. Census.

(C) "Tier Three areas" mean counties with a population density of less than or equal to one hundred (100) per square mile of land area according to the latest U.S. Census.

(D) "Equipment used in the deployment of broadband technologies" means any equipment capable of being used for or in connection with the transmission of information at a rate, prior to taking into account the effects of any signal degradation, that is not less than one hundred forty-four (144) kilobits per second in at least one direction, including, but not limited to digital equipment, fiber optics and related equipment, provided however, equipment used in the deployment of broadband technologies shall not include copper cable, coaxial cable or analog equipment.

(E) "Affiliate" means any entity that would be treated as related to the respective telecommunications service provider or cable operator under the principles of either Section 267(b) or Section 707(b) of the Internal Revenue Code.

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