

KANSAS ENERGY PLAN 2004

State Energy Resources Coordination Council

Compiled by
Liz Brosius and M. Lee Allison, Kansas Geological Survey,
and Scott White, Kansas Energy Research Center,
University of Kansas

Published by the Kansas Geological Survey,
in cooperation with the
Kansas Corporation Commission

www.kansasenergy.org

Kansas Geological Survey
Open-file Report 2004-1

Acknowledgments

Many people helped with the production of this report, including staff from the Kansas Geological Survey and Kansas Corporation Commission, as well as SERCC members. Thanks to Soojong Kwak, KCC, and Michael Volker, Midwest Energy, Inc., for preparing the energy consumption forecasts; to Larry Holloway for preparing the electrical production forecasts; and to Tim Carr for preparing the oil and gas production forecasts. Donna Johnson and Jim Urich, Pinnacle Technology, prepared the report on the wind and biomass conference; Patty Clark, Kansas Department of Commerce, prepared the report on the biomass working group; and Tim Carr, KGS, wrote the section on coalbed methane. Thanks also to Jennifer Sims, KGS, for preparation of graphics and cover design; Marla Adkins-Heljeson, KGS, for editorial assistance; and Debbie Douglass and Melany Miller, KGS, for production help.

KANSAS ENERGY PLAN 2004

Table of Contents

Executive Summary	1
Overview	1
Energy Policy and Planning	1
Council Accomplishments and Activities	2
Energy Forecasts	2
Energy Council Recommendations	3
Kansas Energy Overview	4
Importance of Energy to Kansas	4
Kansas Energy Highlights	5
Energy Council Goals and Activities in 2003	12
SERCC Reviews Goals	13
Legislative Action Items	13
Transmission Task Force	13
Kansas Energy Abstract	13
Natural Gas Summit	13
Weekly Updates on Natural Gas Storage	14
Wind and Prairie Task Force	14
2003 Meeting Dates and Locations	15
Committees and Working Groups	15
Web Site	16
Revised Executive Order	16
Production and Consumption Forecasts	16
Net Energy Balance	16
Consumption Forecasts	17
Production Forecasts	18
Energy Council Recommendations for 2004	21
Energy Council Action	22
Legislative Action	22
Priority Study Items	22
References	23
State Energy Resources Coordination Council (SERCC) Members	23
SERCC Internal Committees	24
SERCC External Committees	25
Staff Support for SERCC	26
Appendix 1—Executive Order 2002-4	27
Appendix 2—Kansas Summit on Natural Gas, Summary of Conclusions and Recommendations	29
Appendix 3—SERCC Transmission Task Force, November 19, 2003, Interim Report	35
Appendix 4—SERCC Wind and Prairie Task Force, Letter from Governor Sebelius and Charge	41
Appendix 5—Summary Tables for Consumption Forecasts	44

Executive Summary

Overview

Kansas continued to import a record amount of its energy in 2003. This trend, which began in 1997, has seen energy consumption rates outpace energy production (Figure 1), requiring significant amounts of money to bring in energy resources from out of state. Net imports in 2003 are projected to be 452 trillion Btu, the same as 2002 and considerably larger than any year before. By 2008, due to increasing consumption, Kansas energy imports are forecast to be 566 trillion Btu, which could be valued at \$2.3 billion.

Natural gas production, following years of decline, leveled out in 2003 as a result of higher prices at the wellhead that allowed operators to keep marginal wells active. Oil production had a modest increase for the same reason. On the consumption side, demands for refined petroleum products and electricity grew, requiring more imports of crude oil and more coal for generating electricity.

Energy Policy and Planning

The close tie between energy and the Kansas economy was recognized in the Statewide Economic

Revitalization Plan. Developing a statewide energy policy was identified as an essential requirement for a robust state economy.

Energy planning in Kansas is presently carried out in a piecemeal approach, driven by exigencies and individual initiatives among State Energy Resources Coordination Council (SERCC) members and stakeholders. As of yet, there is no comprehensive, integrated plan to achieve the goals outlined in the Executive Order creating the state energy council. One of SERCC's tasks in 2004 will be to carry on a public discussion of what Kansas needs for effective energy policy and planning.

Council Accomplishments and Activities

In response to the *Kansas Energy Plan 2003* (SERCC, 2003), House Bill 2131 was passed and signed into law in April 2003. This replaced the 1989 thermal-efficiency standards for new commercial and industrial structures with the new standards adopted by the 2003 International Energy Conservation Code. Kansas became the first state in the nation to adopt the new standards.

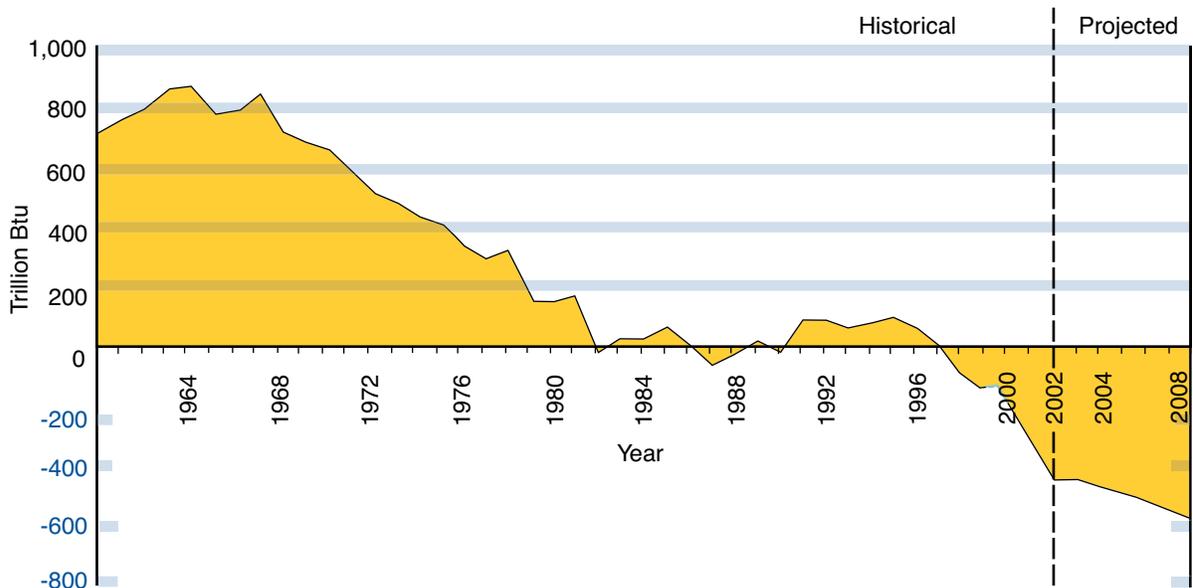


Figure 1—Kansas net energy balance, 1960 to 2000, with projections to 2008. Positive numbers show energy produced in excess of consumption (exports), while negative numbers show energy consumed in excess of production (imports).

The October 2nd Kansas Summit on Natural Gas, organized by SERCC at the request of Governor Sebelius, generated 66 recommendations from participants in response to high natural gas prices and tight supplies. Most of those were long-term solutions, but the most critical short-term one was to free up additional Low-income Home Energy Assistance Program (LIHEAP) funds and to do so earlier in the heating season. Governor Sebelius, in concert with other governors across the country, convinced Health and Human Services to immediately release additional funds. Kansas received more than \$12 million.

SERCC's Transmission Task Force is currently studying transmission issues in Kansas. In 2004, the task force will issue its report regarding constraints on new electricity generation by both wind and fossil fuel and the reliability of the electric transmission grid. At the same time, wind-power projects are waiting for the extension of the federal Production Tax Credit (PTC) before moving forward. Recent wind-energy proposals in the environmentally sensitive Flint Hills/Tallgrass Prairie have been highly controversial. At the request of Governor Kathleen Sebelius, SERCC established a Wind and Prairie Task Force at the end of 2003, to examine and consider all of the key issues involved and recommend fundamental guidelines, principles, and best practices to assist the local decision-making process.

The *Kansas Energy Abstract 2003*, a compilation of data relating to the state's energy-related activities, was published in August by the Kansas Geological Survey, in association with SERCC.

The council, recognizing that energy self-sufficiency, in and of itself, might not be in the best economic interests of the state, adopted the following as an additional goal: *to help ensure Kansans have low-cost, reliable, and sustainable energy, produced in-state to the fullest extent possible.*

Energy Forecasts

Energy production and consumption trends varied in a number of areas in 2003 from previous years in both trends and rates of growth or decline. In 2000 Kansans consumed an average of 385 billion Btu per person, the 17th highest per capita consumption

in the nation. In the same year, Kansans spent an average of \$2,749 per person on energy, the 11th highest per capita expenditures in the nation.

Wind energy continued to generate lots of interest in Kansas during 2003. A national study released in 2002 ranked Kansas as the number one state in potential wind resources. Although no new commercial wind power developments were built in 2003, several received local government approval and more than 12 are in various stages of planning.

With the continued phase-out of the gasoline additive MTBE, ethanol production in the U.S. is expected to increase. In Kansas, ethanol is being produced at five plants around the state, with one plant under construction and at least 10 others in various stages of planning. Ethanol capacity declined in 2003 as a result of the Midwest Grains plant in Atchison being off-line following a September 2002 explosion. The Atchison plant began producing again in mid-December 2003, and a 30-million-gallon-per-year plant in the Gove County town of Campus should be operational by early 2004.

Since January 1999, when oil prices rose above \$25.00 a barrel, oil production in Kansas has been slowly increasing, boosting the state's production by roughly 1 million barrels of oil (BO) each year. Given this trend, oil-production forecasts are higher than last year's forecasts.

As with oil, production of natural gas increased during the second half of 2003, in response to a sharp increase in prices. This increased production has stemmed the decline and stabilized production at about 430 billion cubic feet (bcf) per year, a production level that is forecasted to increase slightly through 2008.

Proven reserves of natural gas from coal seams (coalbed methane) increased significantly in 2003 as a result of exploration and development in parts of the eastern quarter of the state (Cherokee-Forest City basins). Reserves are expected to grow dramatically as drilling spreads across the area. Resource estimates in a six-county area alone now exceed 6.6 trillion cubic feet (tcf) of natural gas (worth over \$26 billion at prices of \$4 per thousand cubic feet, or mcf).

In general, energy consumption is still expected to grow but slower than forecasted in last year's energy plan. Total petroleum consumption is forecasted to increase by a little less than 2.6% per year. The biggest increases will come from consumption of LPG (Liquefied Petroleum Gas), which is projected to increase by 7.1% per year, while consumption of kerosene, motor gasoline, distillate (diesel) fuel, and petroleum lubricants will decline slightly. Natural gas consumption is estimated to have declined about 3.8% in 2003, in response to very high prices and slightly milder weather.

Electricity consumption growth projections are also slightly lower than forecasted last year. Electricity generation is projected to increase 16% from 2002 to 2008. Coal, natural gas, and oil will supply the majority of that with increases of 14%, 47%, and 113% respectively. Renewable energy in the form of wind is expected to have the most growth, as a percentage, increasing from 110 MW in 2002 to 310 MW by 2008, assuming that two 100-MW wind farms will be built over the next five years.

Energy Council Recommendations

The Council divided the state energy plan for 2004 into three components: activities that the Council itself will pursue, items that are ready for and require legislative action, and items the Council needs to study before attempting to take action or make recommendations.

Energy Council Action

1. Develop detailed language for a systems benefit charge. Revenues generated from this proposed source might be strictly limited to funding an effective state energy program.
2. Inventory Kansas energy activities with the intent to improve coordination and cooperation, increase effectiveness, and reduce redundancy. Identify Kansas energy advocates with federal agencies and national and regional associations.
3. Work with existing organizations to implement energy education for the general public and K-12 students. Support education through media programs, and public awareness to the extent possible.

4. Continue to support the Transmission Task Force, review activities and conclusions, and make recommendations.
5. Review options and develop recommendations for organizational approaches to meet state energy-policy-planning needs.
6. Develop a "roadmap" for Kansas renewable energy development, including identification/discussion of pro's and con's. Identify and coordinate with other groups. Support renewable-energy development in Kansas as an element of a responsible energy program, and reduction of state energy import requirements and the associated negative economic issues.
7. Work with the Kansas congressional delegation, executive, and legislative branches, utilities, and private sector to investigate the state's potential with respect to the FutureGen project.
8. Develop guidelines for the siting of wind-energy development in Kansas.

Priority Study Items

1. Review existing programs for Renewable Portfolio Standards (RPS)/Green Tags/Renewable Energy Credits in other regions and evaluate in light of Kansas needs and preferences. Recommend a preferred program to SERCC for consideration.
2. Review strategies and programs to promote energy conservation and efficiency and develop specific policy recommendations for state energy plan.

Legislative Action

One of SERCC's three legislative recommendations in 2003 was signed into law. Of the remaining two recommended actions from 2003, the proposed legislation to limit punitive damages resulting from regulatory mandates in the energy industry, House Bill 2282, requires minor but significant change of language. The other recommendation, House Continuing Resolution 5055, was for legislation to encourage implementation of energy performance contracting for existing, state-owned buildings. The Council recommends that H.B. 2282 and H.C.R. 5055 be reintroduced.

Additional legislation proposed for 2004 is focused on petroleum production, in part a response to the Summit on Natural Gas which aggressively sought out solutions to ensuring an adequate long-term supply of natural gas.

1. Amend the K.S.A. 55-1302 definition of “pool” in order to allow unitization of more than one single and separate natural reservoir if the same are in communication so as to constitute a single pressure system.
2. Amend Article 9 of the Uniform Commercial Code to restore a priority creditor status for sellers of oil and gas production when a purchaser is in bankruptcy. Such an amendment would follow the language of the former K.S.A. 84-9-319, which was repealed in 2000.
3. Promote exploration for and production of coalbed methane gas by extending the period for severance tax exemption under K.S.A. 79-4217(b)(4) from twenty-four (24) months to forty-eight (48) months or more.
4. Increase the price reference points for severance tax exemptions for low-volume gas wells under K.S.A. 79-4717 (b)(1), low-volume oil wells under K.S.A. 79-4917(b)(2), and for utilization of enhanced recovery techniques under K.S.A. 79-4917 (b)(6), in recognition of the cost increases that have occurred since the reference points were established or last revised.
5. Fund support for SERCC activities through the Kansas Geological Survey at the University of Kansas, at the level of \$150,000 for staff and operations, and \$100,000 for contract services.

Kansas Energy Overview

Importance of Energy to Kansas

Gasoline prices, electrical blackouts, and the possibility of natural gas shortages made headlines in 2003, leaving many Americans concerned about energy prices and reliability. While Congress continues to debate the federal energy bill, government experts forecast a steady increase in the nation’s demand for energy.¹

Here in Kansas, the energy picture also is evolving. After years of producing more energy than it consumed, Kansas is now a net energy importer, a trend that became significant in 1997. This is largely due to declines in the state’s oil and gas fields and increasing demand for electricity. Kansas continued to import a record amount of its energy in 2003 from outside the state. Oil and natural gas production leveled out in 2003 as a result of higher prices at the wellhead that allowed operators to keep marginal wells active. On the consumption side, demands for refined petroleum products and elec-

tricity maintained their growth, requiring more crude oil and more coal for generating electricity to be imported.

Given the crucial role of energy in virtually all human activities, it is no surprise that energy has a significant impact on the state economy. In 2001, for example, the direct production and distribution of energy accounted for 4.35% of the Kansas gross state product.² For comparison, agriculture (including farms, livestock, forestry, and fishing) accounted for 4.8% of the gross state product.

The close tie between energy and the Kansas economy also was recognized in the Statewide Economic Revitalization Plan³, unveiled in October 2003 at the Kansas Prosperity Summit. Developing a statewide energy policy was identified as an essential component of revitalizing the state’s economy. The Governor’s Rural Life Task Force also is addressing energy issues; oil and gas production has been a major economic factor in many rural

¹ U.S. total primary energy consumption is projected to increase from 97.7 quadrillion Btu in 2002 to 136.5 quadrillion Btu in 2025 (an average annual increase of 1.5 percent), according to the U.S. Department of Energy, Energy Information Administration’s *Annual Energy Outlook 2004*, <http://www.eia.doe.gov/oiia/aeo/> (viewed December 18, 2003).

² Sum of gross state product (GSP) for fossil fuel production, refining, and electric and gas utilities (\$3.792 billion) compared to total Kansas GSP (\$87.196 billion). Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Accounts Data for 2001, <http://www.bea.doc.gov/bea/regional/gsp/> (viewed December 18, 2003).

³ More information about the plan is available online (<http://kdoch.state.ks.us/busdev/summit.htm>).

areas of the state, and wind power has the potential to become a significant economic force.

The calls for a balanced, comprehensive energy policy for Kansas are broadly based. Such a policy would have to address key components of the Kansas energy mix, including (1) developing new energy sources, especially wind, biomass (ethanol), and coalbed methane; (2) using new techniques to extend the life of existing oil and gas fields; (3) increasing energy efficiency and conservation; and (4) expanding the state's energy infrastructure.

However, as the ongoing debate over wind-energy development in the environmentally sensitive Flint Hills illustrates, finding consensus on the state's energy future won't be easy. As new energy sources are considered and developed, Kansans will have to balance environmental concerns with concerns about energy availability and costs.

As a result of all of the above factors, there is a growing recognition that better energy policy and planning is needed at the state level. Energy is too critical to be left to chance. One only has to compare energy planning to water planning in Kansas to see the problem. Kansas has long been a leader in coordination of water resources. An array of state and local agencies, boards, and programs all deal with water issues in a comprehensive way. The Kansas Water Office, with a good-sized staff of full-time water experts and professionals, supports the Kansas Water Authority and a multi-million dollar budget to coordinate and implement a coordinated state water plan.

Energy planning, in contrast, is carried out by SERCC, an appointed group with no staff and no budget. Both annual energy plans produced by SERCC (the first, in 2003, and the current one) are piecemeal approaches to energy policy, driven by exigencies and individual initiatives among SERCC members and stakeholders. There is, as of yet, no comprehensive, integrated, or coordinated plan to achieve the goals outlined in the Executive Order creating the Council (see Appendix 1).

The lack of an integrated, comprehensive energy plan is also evident within state government, where

there may be dozens of energy-related programs and offices. They are spread among a variety of departments and agencies, not coordinated, nor, in some cases, even aware of what other programs are doing. There is not a conscious prioritization for expenditures of state resources on energy issues. There is no overview of what the state is doing in energy areas nor an idea of how much is being spent overall on energy matters.

One of the tasks of SERCC in 2004 will be to carry on a public discussion of what Kansas needs for effective energy policy and planning. The goal is to have recommendations in the 2005 annual energy plan report. This review will coincide with a review of recommendations from the Governor's Natural Resource Legacy Alliance concerning the role of natural-resources planning and coordination within state government. It is appropriate to carry out studies of both energy and natural resources concurrently, as they are often so closely interrelated.

Kansas Energy Highlights

In 2000 (the latest year for which such data are available), Kansans consumed an average of 385 billion Btu per person, the 17th highest per capita consumption in the nation. In the same year, Kansans spent an average of \$2,749 per person on energy, the 11th highest per capita expenditures in the nation (EIA, 2003), and a significant proportion of their total per capita income of \$29,141 in 2002.⁴ As Figure 2 illustrates, petroleum had the largest share of Kansas energy consumption in 2000, with coal (imported to fire the state's power plants) and natural gas coming in second and third, respectively.

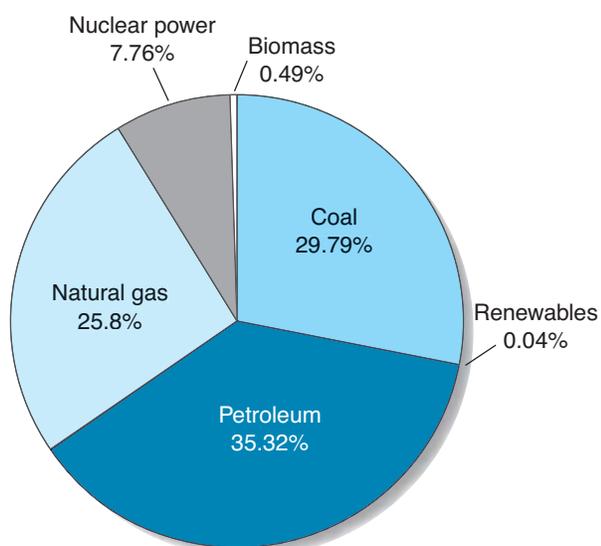
In spite of long-term declining production, natural gas and petroleum remain the dominant energy resources in Kansas, accounting for most of the primary energy produced in the state (Figure 3). Several years of recent oil and natural gas production data are summarized in Table 1.

Other energy sources such as wind, ethanol, and coalbed methane (natural gas from coal), though currently still a small part of the Kansas energy picture, show great promise, as does the use of

⁴ Per capita income data (2002) from U.S. Department of Energy, Energy Information Administration's online Petroleum Primer, <http://tonto.eia.doe.gov/oog/info/state/ks.html> (viewed December 18, 2003).

Table 1. Kansas Oil and Gas Production and Number of Producing Wells, 1995–2003 (Kansas Geological Survey, 2003). * Data for 2003 is incomplete.

Year	Oil Production (bbls)	Wells	Gas Production (mcf)	Wells
1995	45,595,451	42,871	735,317,887	15,436
1996	43,763,190	49,052	735,592,177	16,677
1997	41,290,342	47,041	691,002,753	16,835
1998	36,412,432	44,477	608,190,420	16,879
1999	33,990,143	41,406	567,657,602	16,866
2000	35,143,779	42,182	533,460,391	17,173
2001	34,088,950	41,461	484,519,467	17,454
2002	33,339,740	41,016	453,151,729	17,963
2003*	22,492,952	39,779	279,584,502	18,639



Total Kansas Energy Consumption, 2000: 1,117.2 trillion Btu

Figure 2—Kansas Primary Energy Consumption by Fuel Source, 2000. *Kansas Energy Abstract 2003*, Fig. 8 (Brosius and White, 2003).

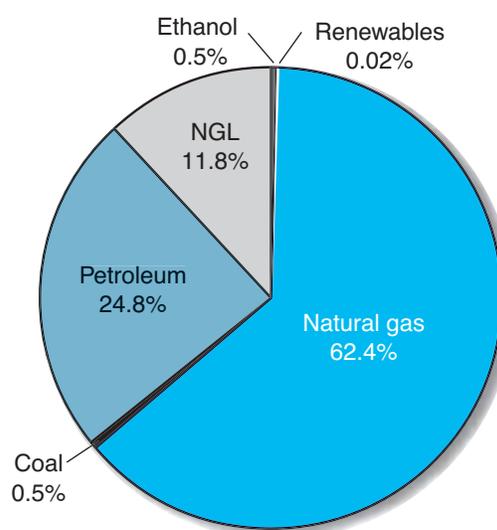


Figure 3—Kansas Primary Energy Production, 2001. *Kansas Energy Abstract 2003*, Fig. 2 (Brosius and White, 2003).

carbon dioxide flooding for enhanced oil recovery. These are discussed below in more detail.

Wind Energy

Wind energy continued to generate lots of interest in Kansas during 2003. Studies have consistently ranked Kansas in the top three states for potential wind resources, and a study released in 2002 ranked Kansas as the number one state in potential wind

resources.⁵ However, Kansas is currently 9th nationally in wind-energy production.

Since the first commercial wind farm was completed in Gray County in 2001, with 170 turbines generating enough electricity to power 33,000 households, interest has spread to other parts of the state. Many see wind energy as a key player in reducing the state's net energy imports and revitalizing local economies throughout the state.

⁵ Morrison, Katherine, and Cassidy, Alison, 2002, *Generating Solutions - How states are putting renewable energy into action: U.S. PIRG Education Fund and the State Public Interest Research Groups*, February 2002 (report available online at <http://www.uspirg.org/>).

Critics, however, are concerned that many of the economic benefits from wind development do not accrue to Kansas because most wind developers are based out-of-state, are exempt from property taxes, and bring in equipment and facilities manufactured elsewhere. SERCC, in the 2003 energy plan (SERCC, 2003), identified wind-turbine manufacturing as an industry to try to bring to Kansas.

Although no new projects were constructed during 2003, several received local governmental approval to move ahead. The following large-scale projects (100 MW or greater) have either received approval or are being considered around the state (Figure 4):

- In Ford County, commissioners in September unanimously approved a conditional use

permit for a 100+ turbine project near Spearville. If constructed, this project of wind developer EnXco could produce as much as 200–300 MW of power.⁶

- The Butler County Commission in December re-approved the 100-MW Elk River Wind Project near Beaumont after having a previous decision remanded in a court decision.⁷
- In Cloud County, the board of commissioners unanimously approved the draft of a wind-energy project with Zilkha Renewable Energy Midwest.⁸
- The Orion Company of California is exploring the development of a wind farm in Riley County.⁹
- JW Prairie Windpower, a Lawrence-based subsidiary of the German JW-group, is propos-

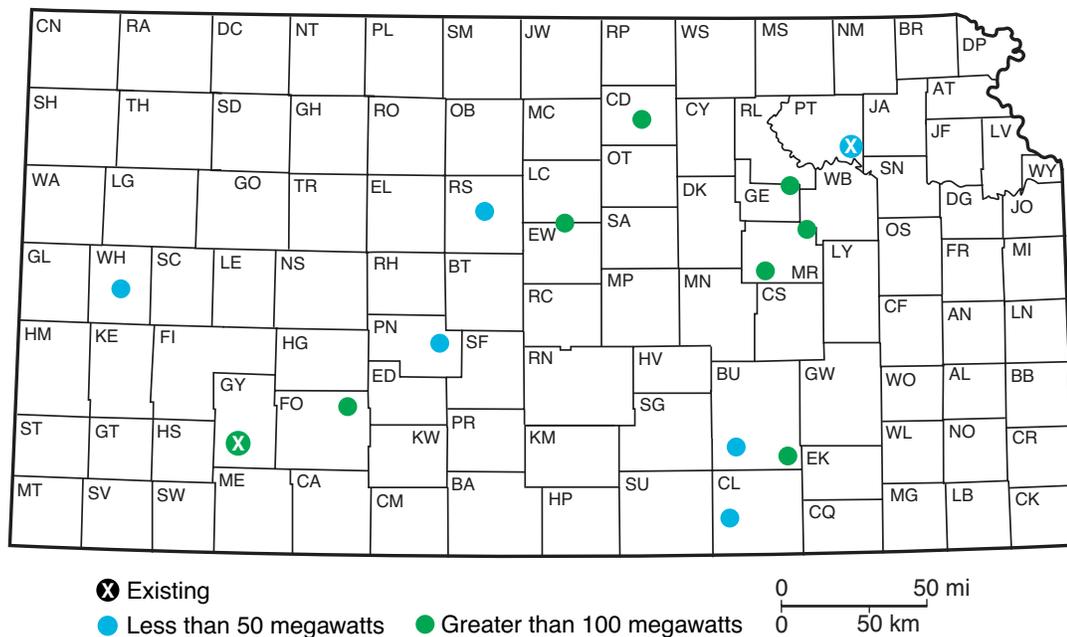


Figure 4—Existing and planned wind energy projects in Kansas, as of December 2003. There are currently two existing wind projects in Kansas and at least 12 others in various stages of planning. Due to electrical transmission constraints, it is likely that only a few of the large (100 MW+) planned projects can be built without improvements to the transmission system.

⁶ Gerber, Rebecca Aistrup, “Company proposes Spearville wind farm,” *Dodge City Globe*, 25 April 2003; Swanson, Eric, “County Commission delays decision on dividing planning department,” *Dodge City Globe*, 16 September 2003.

⁷ Fuson, Eden, “Butler Co. judge rejects wind farm approval,” *Wichita Eagle*, 25 November 2003; Fuson, Eden, “Butler Co. approves wind farm—again,” *Wichita Eagle*, 17 December 2003.

⁸ “County board approves draft of wind energy agreement,” *Concordia Blade-Empire*, 1 October 2003.

⁹ Preston, Amy, “Companies set collective sights on Riley County for wind farm,” *Kansas State Collegian*, 31 October 2003.

ing the 100-200 MW Munkers Creek Wind Farm in Morris and Wabaunsee counties near Alta Vista.¹⁰

- Renewable Energy Systems (RES) is planning the 30-MW Sunflower Wind Farm in Wichita County near Leoti.¹¹
- Kansas Wind Power is considering a large wind project in the Ellsworth and Lincoln County area and could begin constructing in 2004 the first phase of their Municipalities Project, which will site multiple small projects near towns with Municipal Electric Utilities (Augusta, Larned, Russell, and Winfield), which as a whole will generate 30-100 MW of power.¹²

Given limitations in the state's electrical transmission system, it is very unlikely that all of these projects will be constructed in the near future. SERCC's Transmission Task Force is currently studying transmission issues in Kansas and will issue its report in the coming year (see discussion below, p. 13).

At the same time, all projects are waiting for the extension of the federal Production Tax Credit (PTC) before moving forward. The tax credit, which provides 1.5¢ per kWh-produced from wind-energy systems, is part of the federal energy bill that failed to pass Congress in 2003. Other factors limiting development include finding utilities to purchase the electricity (called "power-purchase agreements") and receiving zoning approval by local governments, when applicable.

Although proposed wind farms are generally welcomed in western Kansas, recent wind-energy proposals in the environmentally sensitive Flint Hills/Tallgrass Prairie have been highly controversial. In response to this issue, Governor Kathleen Sebelius asked SERCC to establish a task force to examine and consider all of the key issues involved and recommend fundamental guidelines, principles, and best practices that can be utilized by local governments, landowners, project developers, and

other interested stakeholders to site future wind-energy projects in the Flint Hills/ Tallgrass Prairie part of the state. The task force's primary goal is to develop recommendations that will help decision-makers find an appropriate balance that promotes the state's wind-energy potential and preserves those natural ecosystems and places of scenic beauty, like the Flint Hills and the Tallgrass Prairie, that cannot be easily replaced (see discussion of the task force below, p. 14).

Biomass Energy and Ethanol

Biomass energy, by definition, is energy produced from biomass resources—that is, from organic material such as wood, crops and crop residues, and animal manure, to name a few. At present, the biomass energy source generating the most attention in Kansas is ethanol.

Ethanol, also known as ethyl alcohol or grain alcohol, is commonly produced from feedstocks such as corn, milo, oats, barley, and wheat that contain starches that are relatively easy to convert into sugar. Ethanol made from cellulosic biomass materials (grasses, trees) is called bioethanol.

The continued phase-out of the gasoline additive MTBE, and the increased use of ethanol in its stead, is expected to boost U.S. ethanol production. In Kansas, ethanol is being produced at five plants around the state, with one plant under construction and at least one other proposed (Figure 5). The Atchison-based MGP Ingredients alcohol and ethanol plant came back on-line this fall, after shutting down in September 2002 due to operating problems;¹³ and a 30-million gallon per year ethanol plant in Campus (Gove County) is scheduled to begin production early in 2004.¹⁴ A 20-million gallon per year ethanol plant proposed for the town of Garnett in Anderson County is on hold, pending the results of a stock offering.¹⁵ In addition, 10 other ethanol plants are in various stages of planning.¹⁶

¹⁰ Moline, Matt, "Turbines reap year-round crop," *Topeka Capital-Journal*, 16 September 2003.

¹¹ American Wind Energy Association's "New Wind Projects in Kansas" web-site, <http://www.awea.org/projects/kansas.html> (viewed December 18, 2003).

¹² Personal communication with Troy Helming, Kansas Wind Power CEO, December 2003.

¹³ "Atchison distillery producing finished alcohol again," *The Kansas City Business Journal*, 15 December 2003.

¹⁴ Western Plains Energy LLC web-site, <http://westernplainsenergy.biz/wpe.html> (viewed December 18, 2003).

¹⁵ Bauer, Amy, "Ethanol plant needs investors," *The Topeka Capital-Journal*, 11 October 2003.

¹⁶ Griekspoor, Phyllis Jacobs, "Kansas-grown fuel at the pump," *Wichita Eagle*, 22 October 2003.

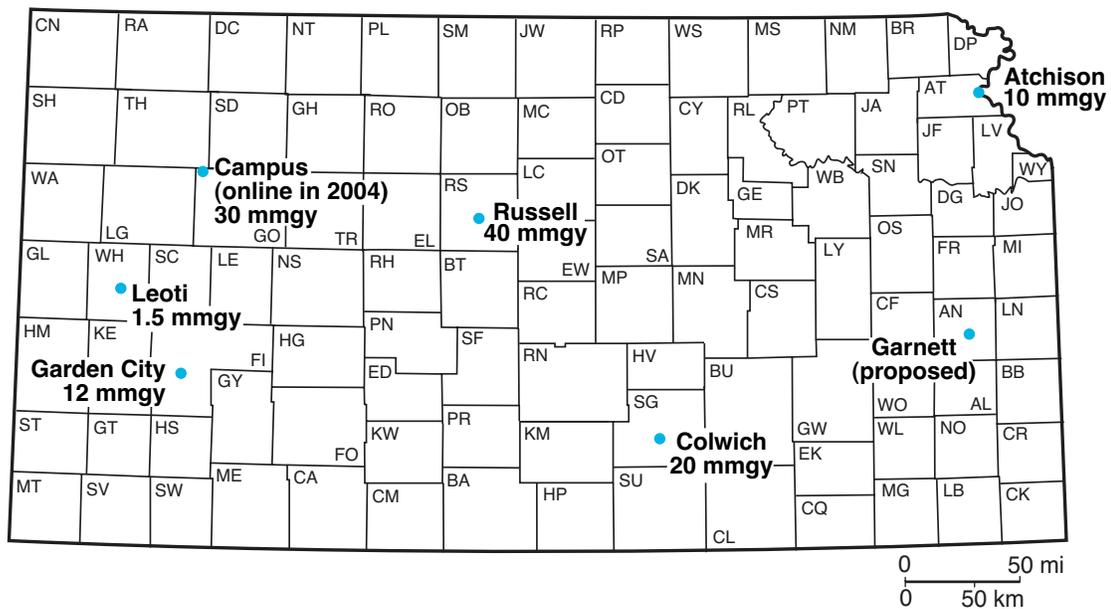


Figure 5—Existing and proposed ethanol plants in Kansas, as of December 2003. Five ethanol plants are currently operating in Kansas. A sixth plant in Gove County is scheduled to begin production early in 2004, and another is proposed for Garnett. Ten other ethanol plants are in various stages of planning. Production capacity is noted in million gallons per year (mmgy).

Kansas Bio-Energy Working Group

The importance of the biomass product and energy sector to the state’s energy future was underscored by the formation of the Kansas Bio-Energy Working Group, which held its initial meeting in August at the Kansas Department of Commerce in Topeka. Charged with the task of bringing a more strategic focus to bio-based energy production in Kansas, Lt. Governor/Secretary of Commerce John Moore asked the group for economic research on the potential for bio-energy production. The group’s goal is to provide the state “an objective framework from which to prioritize its public policy and investments to create a renewable energy industry, utilizing economic development as a tool.” The parameters of the study will take the following under consideration:

- Resource availability (current and future)
- Transportation costs (or raw product inputs and outputs)
- Economically viable site locations
- Environmental effects and incentives
- Oil/petroleum price triggers indicating profitability for biomass energy substitutes
- State and national energy policies
- Comparison to other state incentive programs and other national energy policies.

The evolving group consists of a number of governmental, academic and industry representatives, and staff in the Agricultural Marketing Division, Kansas Department of Commerce. Commerce has statutory obligations to establish and serve as a catalyst for industrial agriculture in the state.

Kansas Wind & Biomass Energy Conference

The 2003 Kansas Wind & Biomass Energy Conference was held on September 29–30 at the Wichita Airport Hilton. Sponsored by the Kansas Corporation Commission’s Energy Program, the U.S. Department of Energy’s Wind Powering America initiative, and many other sponsors, the one-and-one-half-day conference focused on the opportunities and issues surrounding renewable energy resources in Kansas.

Conference topics included current legislation and the economic impact of development. The first day was devoted to an overview of renewable-energy resources within Kansas, culminating in a roundtable discussion of current renewable-energy events by members of the House and Senate Energy and Agricultural committees. The second day was devoted to parallel tracks in wind and biomass energy. Over 50 nationally and regionally recog-

nized individuals in wind and biomass energy presented at the conference. Some of the topics discussed were what landowners need to know about leasing to wind developers; current ethanol plant development in Kansas; the 2003 U.S. Farm Bill; job creation in the wind industry, and the current state of development of Kansas' wind potential.

Over 300 people attended the conference, many from out of state. Attendees included developers, business representatives, city and county economic development staff and planners, legislators, students, teachers, landowners, state agency staff, and federal and state officials.

Enhanced Oil Recovery and Linked Energy Systems

On December 4, 2003, after more than four years of study and preparation, researchers from the University of Kansas and a group of partners from the state's oil industry began injecting carbon dioxide (CO₂) into a Russell County oil field. Researchers hope that the CO₂, which will come from the recently constructed U.S. Energy Partners ethanol plant near Russell, will flush out more oil.

This technique, known as CO₂ Enhanced Oil Recovery (CO₂ EOR), involves pumping liquid CO₂ into a depleted oil reservoir about 3,000 feet underground. There, CO₂ will mix with remaining oil and push it to two nearby wells, where it will be pumped to the surface. Much of the CO₂ will remain behind in the deep rock layers, permanently sequestered from the atmosphere and reducing greenhouse gas emissions, as more fully described below.

This joint industry-government-research project involves Murfin Drilling Co., Inc., and its partners John O. Farmer, Inc. and White Eagle Exploration, Inc.; Kinder-Morgan CO₂ Company, L.P.; U.S. Energy Partners, LLC; EPCO Carbon Dioxide, Inc.; U.S. Department of Energy; Kansas Department of Commerce; and the Kansas Geological Survey and Tertiary Oil Recovery Project, both part of the University of Kansas. Seed money was provided by the Kansas Technology Enterprise Corporation (KTEC).

Researchers plan to pump about one truckload (about 20 tons) of liquefied CO₂ per day into the

subsurface for about six months, then alternate injections of CO₂ with water for the next four years. About half of the CO₂ will come back to the surface with the oil that is produced; the other half will remain in the subsurface. In commercial-scale projects, the CO₂ would be separated from the produced oil and re-injected into the oil reservoir to start the process over again.

Because of the reservoir's geology, the results from the demonstration project will not be known immediately, and peak production as a result of CO₂ EOR may take a few years. If CO₂ EOR proves successful at the Russell site, researchers believe it has great potential at other sites around the state, resulting in the production of millions of barrels of additional oil over several years.

In addition to its potential to dramatically boost the state's oil production, the project also could provide a way to capture and sequester CO₂ that otherwise would be released into the atmosphere. Because of the possible role of CO₂ in global climate change, such underground disposal, or sequestration, is viewed as environmentally preferable. In the future, CO₂ emissions may be restricted by federal mandates and electric utilities and other large CO₂ producers may be required to recover CO₂ from their flue gas and find alternatives to venting it to the atmosphere. CO₂ sequestration is viewed as having excellent potential to be a viable option.

The Russell demonstration project is also significant in its linking of the oil-field project, the ethanol plant, and Russell's recently completed power plant. In this linked energy system, waste heat from the electrical power plant is transferred to the ethanol plant, where it is used in the fermentation process of starches from locally grown grain. That fermentation produces ethanol, which is used as an additive in fuels. A byproduct of fermentation is CO₂, which is captured and trucked to the demonstration site for EOR.

Linked energy systems not only save energy, but also provide new revenue streams for each industry by turning byproducts into commodities. By creating business relationships between industries that historically have had little interaction, they pave the way for future innovative projects. This is the first time CO₂ from an ethanol plant has been used

in this manner and the first CO₂ sequestration project of its kind.

Coalbed Methane Development

Across eastern Kansas from Oklahoma to Nebraska, Pennsylvanian-age coal and organic shale are increasingly important, but unconventional, commercial sources for natural gas (often referred to as coalbed methane). This gas is actually bound within the buried coal or shale and is released by pumping the trapped water from the coal and decreasing the pressure within the coal. Over the past three years, almost 1,000 new wells have been drilled and numerous existing wells reconverted for coalbed and organic shale gas in eastern Kansas (Figure 6).

In Kansas, individual coal and shale intervals are thin (typically less than 3 feet); however, numerous beds can be targeted and produced in a single well. More than 20 coal or organic shale seams are present in many areas, resulting in cumulative thicknesses that are consequential compared to other U.S. producing basins.

While current annual production of coalbed methane, approximately 7–8 billion cubic feet, is a relatively small percentage of total Kansas production (453 billion cubic feet), production is rapidly increasing (Figure 7). Current development and production is concentrated in a four-county area in southeastern Kansas (Labette, Montgomery, Neosho, and Wilson counties), but exploration and production is expanding northward and westward, particularly along pipelines. Unconventional gas production in southeast Kansas has added many millions of dollars to the local economies through production activity, landowner royalties, and addition to the property tax base.

Resource assessment places the amount of deep coal in eastern Kansas (i.e., deeper than 100 ft depth) at 53 billion tons, a conservative number because only coals within a short radius of drill holes are counted (Newell et al., 2002). Most of the coals in eastern Kansas are less than 2,500 feet deep, so they are available for development at relatively modest costs. Production data of gas from the various coals is still limited and varies among coal and shale beds and across the region. However,

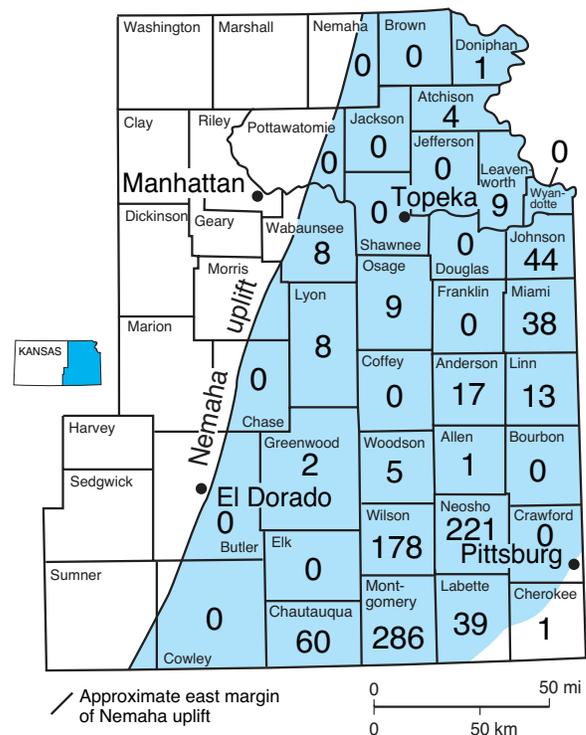


Figure 6—Portion of Kansas with potential for coalbed methane (unconventional natural gas) development and number of new wells drilled per county, as of March 2003.

many of the horizons are producing at rates of 100–200 cubic feet of gas per ton of coal and more. This calculates to estimated reserves of 5–10 trillion cubic feet (tcf) of natural gas in eastern Kansas. However, more detailed analyses found that coal gas resource estimates (original gas in place) for Chautauqua, Elk, Montgomery, Labette, Wilson, and Neosho counties alone are more than 6.6 tcf. The potential for eastern Kansas as a whole is significantly larger. For comparison, production from the Hugoton gas field in southeast Kansas, the largest gas field in North America, totals 28 tcf.

Petroleum Refining

Petroleum refining continues to be a significant contributor to the Kansas economy. The three refineries now operating in the state—Farmland Industries (Coffeyville), Frontier Refining & Marketing (El Dorado), and NCRA (McPherson)—also provide approximately 1,200 jobs and benefit the state’s oil and gas industry by providing a

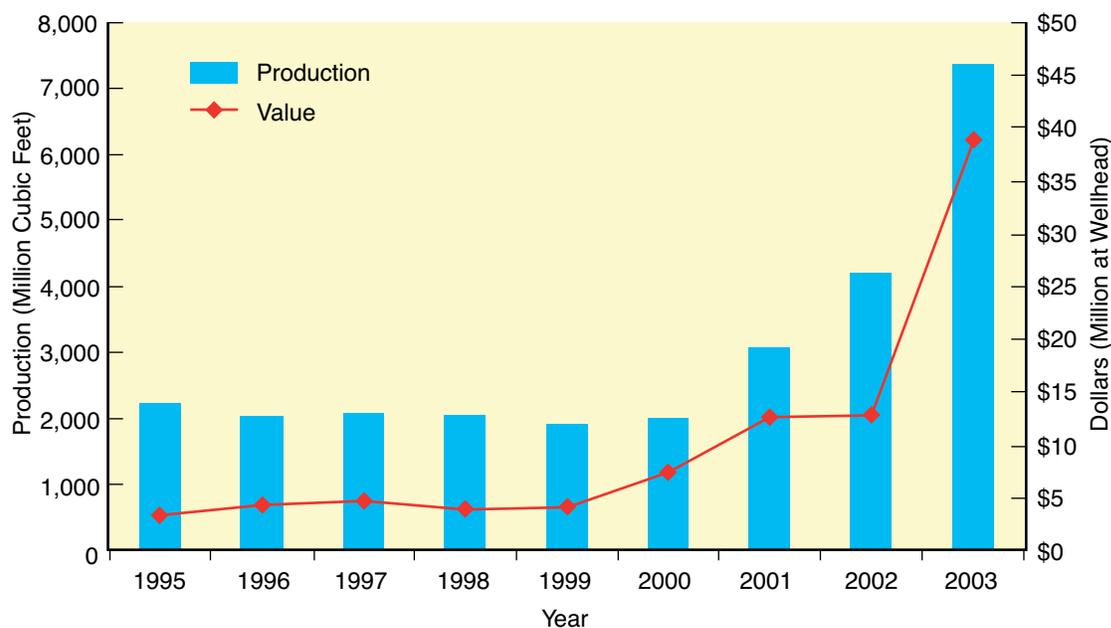


Figure 7—Annual coalbed methane (unconventional natural gas) production and wellhead value for a four-county area of southeast Kansas (Labette, Montgomery, Neosho, and Wilson). Total production in 2003 is estimated at 7.4 billion cubic feet and has a wellhead value of \$39 million. Production in 2003 is conservatively estimated based on actual production through August. Wellhead value is estimated using reported wellhead prices from the U.S. Department of Energy, Energy Information Administration.

nearby market for their production. They produce approximately 280,000 barrels per day (or about 11.8 million gallons) of finished petroleum products, primarily gasoline, diesel, and propane. Even with the loss of four refineries in the past 20 years, the state's refining capacity has remained steady through expansions and improvements and exceeds current petroleum consumption (which was about 219,000 barrels, or 9.2 million gallons, per day in 2000).¹⁷ Because Kansas oil production is about 90,000 barrels per day, refineries must import the majority of their crude oil (about 200,000 barrels per day) from out of state. However, approximately 61,000 barrels per day of value-added, finished petroleum products can be exported out of state.

Kansas refineries are currently investing hundreds of millions of dollars in order to meet federal mandates for ultra-low sulfur gasoline, beginning in 2004, and low-sulfur diesel fuel, beginning in 2006. These mandates were first made by the U.S. Environmental Protection Agency under the Clinton administration, with the ultra-low sulfur gasoline mandate being made in 1999 and the low-sulfur diesel fuel mandate in 2000. Both proposals were later approved by the Bush administration, which required gasoline sulfur content to be lowered from 300 parts per million (ppm) to 30 ppm beginning in 2004. Diesel fuel sulfur content will be lowered from 500 ppm to 15 ppm, beginning in 2006.¹⁸

Energy Council Goals and Activities in 2003

The State Energy Resources Coordination Council (SERCC) was established in September 2002 by Executive Order 2002-04. The council delivered its first state energy plan to the Governor and Legislature on January 13, 2003. The *Kansas*

Energy Plan 2003 recognized that Kansas had become a net importer of energy (after nearly a century of being a leading energy exporter) and that a return to energy self-sufficiency would likely entail (1) extending the life of the state's oil and gas

¹⁷ Kansas petroleum consumption data is taken from U.S. Department of Energy, Energy Information Administration's Petroleum Profile—Kansas, available online at <http://tonto.eia.doe.gov/oog/info/state/ks.html> (viewed January 5, 2004).

¹⁸ For more information, see the EPA's web site (<http://www.epa.gov/otaq/fuels.htm>).

fields, (2) increasing conservation and efficiency, and (3) developing new energy sources, of which the most promising in the near term appear to be wind, ethanol, and coalbed methane (natural gas from coal seams, also called unconventional natural) (SERCC, 2003).

SERCC Reviews Goals

Executive Order 2002-04 specified several tasks for the State Energy Resources Coordination Council, including that of making Kansas energy self-sufficient and an energy exporter (see Appendix 1). The council, recognizing that energy self-sufficiency, in and of itself, might not be in the best economic interests of the state, adopted the following as an additional goal: *to help ensure Kansans have low-cost, reliable, and sustainable energy, produced in-state to the fullest extent possible.*

Legislative Action Items

Among the recommendations included in the *Kansas Energy Plan 2003* were three legislative action items. One of these, House Bill 2131, was signed into law in April 2003. This amendment to K.S.A. 66-1227 and K.S.A. 66-1228 replaced the 1989 thermal efficiency standards for new commercial and industrial structures with the new standards adopted by the 2003 International Energy Conservation Code. Kansas became the first state in the nation to adopt the new standards. SERCC's two other legislative recommendations (House Bill 2282 and House Concurrent Resolution 5055) did not make it out of their respective committees by the 2003 legislative turnaround date.

Transmission Task Force

One of the council's top priorities in 2003 was the establishment of a Transmission Task Force (TTF) to study the electrical transmission network and recommend improvements that would support expanded wind-energy development and improve the flow of electricity within and outside of Kansas. As a result of the August blackout in the northeast U.S., the task force was also asked to review the reliability of the electricity grid in Kansas. The TTF was formed by the SERCC Chair on September 26, 2003, and began meeting in October (see listing of members on p. 25). A charge to the task force provided detailed instructions (see Appendix 3). At

the SERCC meeting on November 19, TTF Chair Earnie Lehman outlined the following interim findings of the task force:

- The current transmission system in Kansas is reliable and adequate.
- Economic development (aside from new generation projects) is not currently hindered by reliability or electricity cost concerns.
- Improvement and expansion of the Kansas transmission system is governed by a process largely outside of state control.
- The process for considering transmission system expansion and improvements does not work very well.
- Transmission system expansions and improvements are hindered by uncertainty as to how and from whom the costs will be collected.

This interim report is included as Appendix 3. Additional information about the TTF and its ongoing work can be accessed on the SERCC web site (www.kansasenergy.org).

Kansas Energy Abstract

The *Kansas Energy Abstract 2003*, a compilation of data relating to the state's energy-related activities, was published in August by the Kansas Geological Survey, in association with SERCC. This publication grew out of a SERCC working document and contains tables and figures showing data on the major sources of energy in Kansas, as well as historical and current data on energy production, consumption, expenditures, and state and national prices. The Kansas Energy Abstract was distributed to SERCC members, the Governor's office, and Senate and House Utilities Committee members. It is available from the KGS as Technical Series 18 (Brosius and White, 2003).

Natural Gas Summit

On October 2, at the request of Governor Kathleen Sebelius, SERCC organized the Kansas Summit on Natural Gas to discuss ways to mitigate natural gas price increases, supply constraints, and consumer impacts. The day-long summit was held at Washburn University in Topeka and drew approximately 150 participants, including energy producers and suppliers, legislators, state agency staff, and consumer advocates. Following a morn-

ing of presentations on the natural gas situation and its economic impacts on Kansas, participants attended one of four breakout sessions to develop recommendations on how to reduce consumption, increase production, lessen impacts on residential consumers and businesses, and educate Kansans about natural gas issues. These 66 recommendations to SERCC and other conclusions were summarized in a SERCC report that was submitted to Governor Sebelius on November 5 (see Appendix 2). More information about the Kansas Summit on Natural Gas is available on the SERCC web site (www.kansasenergy.org).

Most of the recommendations generated by summit participants were long-term solutions, but a few could be enacted in the near term. The most critical one was to provide additional assistance to those Kansans most vulnerable to higher heating costs. The Council asked the Governor to work with Congress and the federal government to free up additional Low-income Home Energy Assistance Program (LIHEAP) funds and to do so earlier in the heating season.

LIHEAP helps eligible families pay the costs of heating and insulating their homes in the winter, and cooling their homes in the summer. More than four million low-income households nationwide receive assistance each year.

Governor Sebelius, in concert with other governors across the country, convinced U.S. Health and Human Services (HHS) Secretary Tommy Thompson to immediately release additional funds. Secretary Thompson released \$598 million to states to help low-income citizens with their heating bills under the LIHEAP. A total of \$272.8 million was to be released immediately, completing first quarter allocations; an additional \$325.1 million was to be released on January 1, 2004, representing the states' full second quarter requests. Kansas received more than \$12 million.

In conjunction with the natural gas summit, and also at the request of the Governor, SERCC developed a brochure on rising natural gas prices and tips to reduce home heating bills, based on materials previously prepared by the Kansas State University, Engineering Extension. Nearly 30,000 copies of the brochure were distributed at the State of Kansas

booth at the Kansas State Fair and also through the Kansas Department of Social and Rehabilitation Services (SRS), Kansas Department of Aging and other social service agencies. The brochure was prepared by Kansas Geological Survey staff and publication was paid for by the Kansas Corporation Commission, Kansas Department of Revenue, and SRS.

Weekly Updates on Natural Gas Storage

As rising natural gas prices and tightened supplies raised concerns nationally and in Kansas, SERCC began preparing weekly updates on the amount of gas in storage nationwide and distributing via email. These updates, prepared by Kansas Geological Survey scientist Dr. Timothy Carr, included the latest figures on gas in storage as well as Carr's interpretation of the data. The more recent weekly reports are posted on the SERCC website (www.kansasenergy.org).

Wind and Prairie Task Force

On December 5, Governor Sebelius directed the SERCC to form a task force to study and make recommendations about the process of siting wind-energy projects in the Flint Hills. The Governor expressed her desire to preserve the last untitled areas of Tallgrass Prairie while continuing to encourage wind power development in appropriate areas.

Responding to the Governor's directive, SERCC established a Wind and Prairie Task Force which is charged by SERCC to:

- identify and analyze relationships between areas of tallgrass prairie most appropriate for preservation and areas most appropriate or desired for wind development;
- recommend guidelines, principles, and best practices to be utilized at the local level to help site wind-energy projects;
- recommend voluntary guidelines or model agreements for land leases for wind-energy development;
- recommend voluntary local siting guidelines for wind-energy development;
- develop tools that can be used in the decision-making process to site wind-energy projects;

- identify policies or authorizations needed by local government to address multi-county or regional issues; and review efforts for land trusts and other mechanisms to preserve the prairie.

The Governor's letter and the charge to the task force are included as Appendix 4.

Jerry Lonergan, President of Kansas, Inc., and Jerry Karr, former State Senator from Emporia, will co-chair the Wind and Prairie Task Force. Other task force members will be announced in early January 2004.

The Governor has asked that the task force complete its study and report its recommendations by May 31, 2004. Updates on the Wind and Prairie Task Force will be posted on the SERCC web site (www.kansasenergy.org). Those wanting to be notified about meetings, hearings, and other task force activities can subscribe to the task force email listserve by sending an email message to listserver@neptune.kgs.ku.edu, with the subject "subscribe wptf" ("subscribe wptf" can also be put in the body of the message).

2003 Meeting Dates and Locations

The following meetings of the SERCC occurred in 2003:

- February 28, 2003, Kansas Corporation Commission, Wichita
- May 7, 2003, KDHE Central Office, Topeka
- September 11, 2003, Kansas Corporation Commission, Wichita
- October 15, 2003, Kansas Corporation Commission, Topeka
- November 19, 2003, Kansas Municipal Utilities, McPherson

Meeting agendas and notes are posted on the SERCC web site (www.kansasenergy.org).

Committees and Working Groups

Sector Committees

The sector committees established in 2002 — Petroleum, Utilities, and Renewable Energy— continued to work together throughout 2003 to review issues and make recommendations for the 2004 energy plan. The committees and their mem-

bers are listed below (contact information is listed below, beginning on p. 23).

Petroleum Committee

David Dayvault, Chair
Spencer Depew
Lee Gerhard
Galen Menard
Stan Zaremba

Utilities Committee

Barry Hart, Chair
Colin Hansen
David Phelps
David Springe
Michael Volker

Renewable Energy Committee

Alex Silver, Chair
Donna Johnson
Richard Nelson
Greg Krissek
Bruce Snead
Kyle Wetzel

Working Group on Energy Incentives

In addition, another committee, the Working Group on Energy Incentives, began meeting in the fall of 2003 to study and develop recommendations regarding incentives for new forms of energy generation. The working group initial discussions focussed on the advantages and disadvantages of a System Benefit Charge (SBC), which they defined as "a volumetric charge assessed on the end-use utility customer's bill to fund energy-related activities in a manner beneficial to Kansas." The working group will continue its effort in 2004 to develop recommendations on energy incentives.

The Working Group considered gasoline as already having a system benefit charge in the taxes that are collected to fund highway construction and maintenance. Neither propane nor fuel oil was seen as having very large revenue potential. Collection and recovery from utilities (electricity and natural gas), however, was seen as practical and efficient.

The Working Group outlined a possible SBC at \$0.0005 per kWh on applicable volumes. No charge would apply on the first 300 kWh consumed in a month, in order to minimize or eliminate impacts on

low-income consumers. No charge would apply for consumption over 2,000,000 kWh in a month, to minimize impacting rate-sensitive industries. Such a SBC would raise about \$12 million per year and cost the typical residential customer \$0.25 per month.

The postulated SBC on natural gas would be \$0.01 per thousand cubic feet (Mcf) delivered but only applied to the first 10 Mcf. The typical residential cost would be \$0.08 per month.

Questions were raised about how the SBC funds could be spent. It was stated that if utility customers were paying the charge they should see the dominant benefit. The Working Group suggested limiting funds for state energy planning to no more than 5% of revenues, and no less than 20% for renewable energy R&D and project subsidies.

The recommendation adopted by SERCC for study in 2004 was to more precisely define and limit what funds could be used for. It was expected that this would result in a lower proposed charge.

Working Group on Energy Incentives

Michael Volker, Chair
David Springe
Bruce Snead
Richard Nelson
Donna Johnson
Alex Silver

Web Site (www.kansasenergy.org)

The SERCC web site provides information about the energy council and its activities. A subset of the Kansas Energy Information Network (KEIN, funded

by the Kansas Corporation Commission and managed by the KU Energy Research Center at the Kansas Geological Survey), the web site contains information about the council's meetings and other activities, as well as copies of its publications, including the annual energy plans.

Revised Executive Order

Governor Sebelius advised the SERCC early in 2003 of her intention to revise Executive Order 2002-04 that established SERCC, in order to emphasize the role of SERCC as the principal energy planning and policy arm of state government. The importance of energy on the state economy and well-being was underscored repeatedly through the regional Prosperity Summits, controversies over wind development and preservation of prairie, increasing development of coalbed methane in eastern Kansas, and national events such as the natural gas crisis and the northeast U.S. electricity blackout. Increasingly, it is recognized that the State of Kansas must take a more coordinated approach to dealing with energy.

Also, concern was expressed that council makeup did not include enough representation for renewable energy and energy conservation and efficiency interests. Some of that criticism was addressed by the 2002 formation of the SERCC Emerging Energy Committee (subsequently renamed the Renewable Energy Committee), which added five renewable energy experts. However, these committee members do not have a vote on SERCC decisions. It is expected that a revised Executive Order will be issued by the Governor in early 2004 and will include changes in membership categories.

Production and Consumption Forecasts

Net Energy Balance

In 2002 (the last year of available data), Kansas imported a record amount of energy, continuing a trend that became significant in 1997 (see Figure 1). More than 452 trillion Btu of energy was imported that year, with the same amount projected for 2003. Using an average cost of \$4.00 per million Btu, this amounts to \$1.8 billion required to bring in energy from outside Kansas.

Given current production and consumption forecasts, net energy imports are projected to be even higher in the coming years—470 trillion Btu in 2004, 517 trillion Btu in 2006, and 566 trillion Btu in 2008. Again, based on an average cost of \$4.00 per million Btu, this means that by 2008 Kansans could be spending as much as \$2.3 billion to make up the energy shortfall. Although the forecasted imbalance is smaller than what was predicted last

year (due to the expected increases in oil and gas production), it is nonetheless significant.

Consumption Forecasts

In general, energy consumption in Kansas is still expected to grow (Figure 8). However, because the recovery from the current economic slump has been slower than expected, projections of consumption growth are somewhat dampened compared to last year's forecast (SERCC, 2003). On the other hand (as the tables in Appendix 5 illustrate), rates of growth are not dramatically changed. As with last year's forecast, the current forecasts assume that (1) economic growth will return to a more normal level, (2) population will continue to grow more slowly than in previous decades, and (3) technological and regulatory impacts will affect consumption. The third assumption is most evident in the projection of natural gas consumption for electricity generation in Kansas and the rest of the nation (see Appendix 5).

Total petroleum consumption is forecasted to increase by a little under 2.6% per year. In 2004, 2006, and 2008, petroleum consumption is expected to be 82,866 thousand barrels, 86,323 thousand barrels, and 90,291 thousand barrels, respectively.

The biggest increases will come from consumption of LPG (Liquefied Petroleum Gas), which is projected to increase by 7.1% per year, while consumption of kerosene, motor gasoline, distillate (diesel) fuel, and petroleum lubricants will decline slightly.

Natural gas consumption is estimated to have declined about 3.8% in 2003, in response to very high prices and slightly milder weather. Although prices may remain high during the 2003–2004 heating season, they are expected to decline in the longer term. With economic growth and normal weather, consumption growth is expected to be about 1.6% per year through 2016. Natural gas consumption was 306 billion cubic feet in 2002. In 2004, 2006, and 2008, Kansas gas consumption is projected to be 298 billion cubic feet, 307 billion cubic feet, and 316 billion cubic feet, respectively.

Electricity consumption growth projections are also slightly lower than forecasted last year. The rate of growth is almost unchanged from the prior forecast, but the slower recovery does impact the nominal consumption projection. Kansas consumption in 2004, 2006, and 2008 is projected to be 39 billion kWh, 41 billion kWh, and 43 billion kWh, respectively.

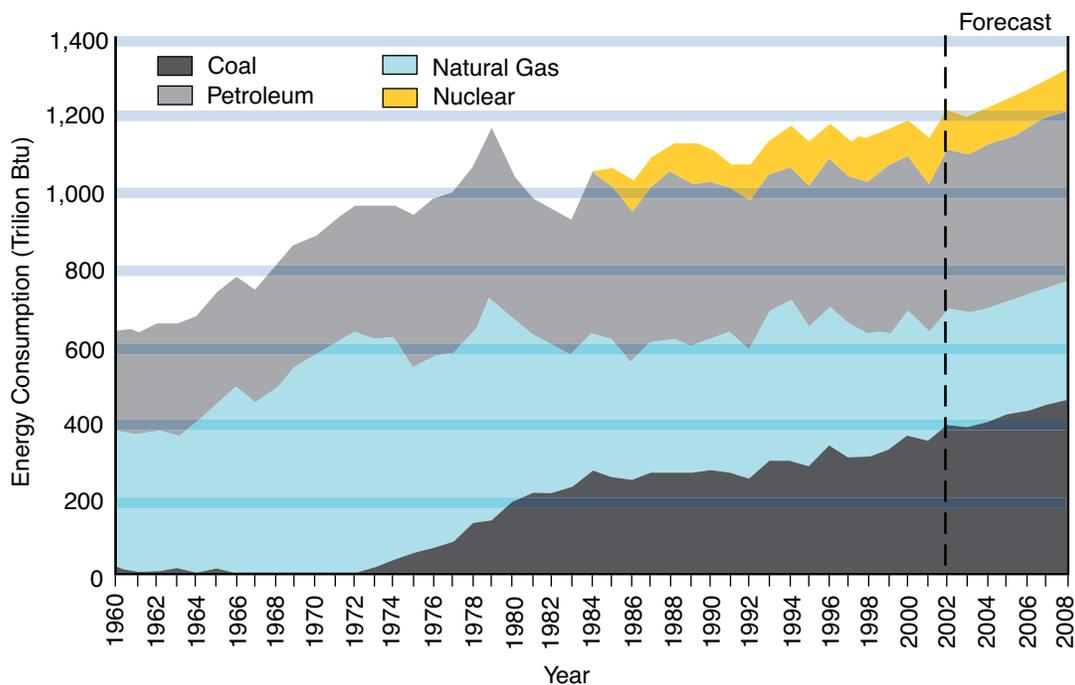


Figure 8—Kansas energy consumption, 1960 to 2002, with projections to 2008.

Coal consumption for 2004, 2006, and 2008 is forecast to be 21,800 short tons, 22,800 short tons, and 23,800 short tons, respectively. The coal consumption forecast is based on the Kansas Corporation Commission's (KCC) forecast for electric utility consumption plus a 1% adjustment. Based on historical consumption data, it was assumed that utility coal consumption accounted for 99% of Kansas coal consumption. Therefore, forecast data are 1.01 times that of the KCC numbers.

Production Forecasts

Energy production in Kansas is expected to be nearly flat over the next five years (Figure 9). Total energy production is forecast at 759 trillion Btu, 760 trillion Btu, and 760 trillion Btu for the years 2004, 2006, and 2008, respectively.

Oil

Since February 2000, when oil prices first rose above \$25.00 a barrel, oil production in Kansas has been slowly increasing, boosting the state's production slightly over the last three years (Figure 10). Given this trend, this year's oil production forecasts

are higher than last year's (SERCC, 2003). Assuming prices stay above \$25.00, oil production for 2004, 2006, and 2008 is forecast to be 34 million BO, 34.5 million BO, and 35 million BO, respectively. (Note: Figure 10 shows monthly, not annual, production.)

Natural Gas

As with oil production, Kansas natural gas production increased during the second half of 2003, in response to sharp increase in prices. The increased prices appear to have stemmed the decline and stabilized production at about 450 billion cubic feet (bcf) per year (Figure 11). Given the expected higher prices, Kansas production of natural gas is forecast to remain steady at 450 bcf through 2008. (Note: Figure 11 shows monthly, not annual, production.)

Electricity

Electricity generation is forecast to continue increasing over the next five years (Figure 12). Total generation is expected to increase from 47.1 million MWh in 2002, to 54.5 million MWh in

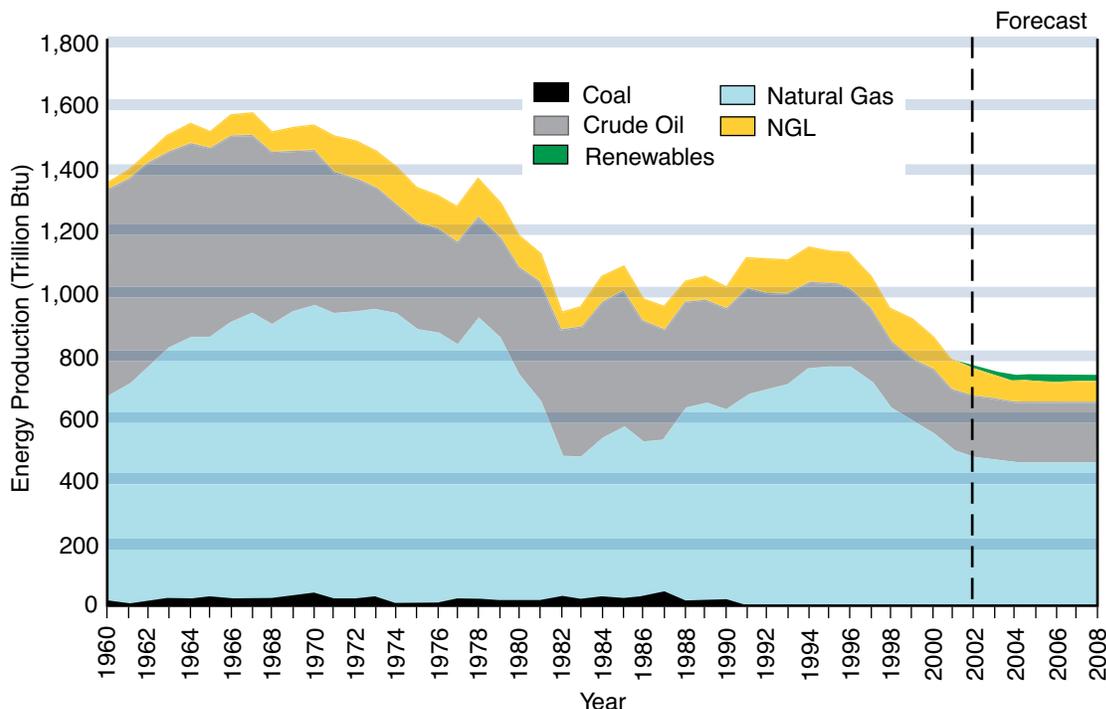


Figure 9—Kansas energy production, 1960 to 2002, with projections to 2008. Renewables includes ethanol, wind, and hydroelectric, as well as other renewable energy sources.

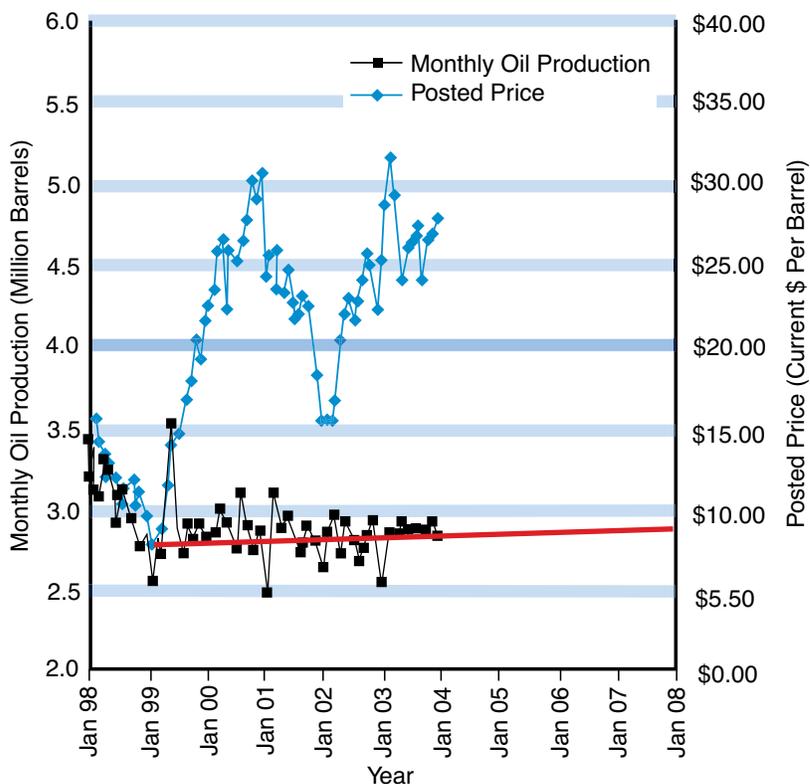


Figure 10—Kansas monthly oil production and monthly posted price, January 1998 to January 2003, with production projections through 2008. Production projections indicated by red line. Production data are current through August 2003 and come from online data bases at the Kansas Geological Survey (Kansas Geological Survey, 2003). The production data are sales volumes reported to the Kansas Department of Revenue. Price is current through December 2003 and is the adjusted monthly average price per barrel of 42 U.S. gallons for merchantable crude oil purchased and delivered into pipelines or facilities authorized by Koch Supply & Trading, L.P. in central Kansas (<http://www.kochoil.com/>).

2008, an overall increase of 16% increase for the period. Coal, natural gas, and oil will fuel the majority of this increased generation. Renewable energy in the form of wind is expected to have the most growth, as a percentage, increasing from 110 MW in 2002 to 310 MW by 2008. Wind’s expanding role will still be a relatively small portion of the overall electrical generation. Forecasts assume that two 100-MW wind farms will be built over the next five years. Nuclear generation is not expected to change during this period.

Ethanol

Ethanol forecasts are based on capacity, rather than production. At this time, only the capacity of a

given ethanol plant is known, not how much fuel they produced in a given year. Ethanol capacity declined in 2003 as a result of the Midwest Grains plant in Atchison being off-line following the September 2002 explosion. The Atchison plant began producing again in mid-December 2003, and a 30-million-gallon-per-year plant in the Gove County town of Campus should be operational by early 2004 (see Figure 4). Another 40 million gallons of capacity is expected on-line by 2005 and an additional 40 million gallons to be available by 2007. Ethanol capacity in 2004, 2006, and 2008 is projected to be 108.5 million gallons, 153.5 million gallons, and 193.5 million gallons, respectively (Figure 13).

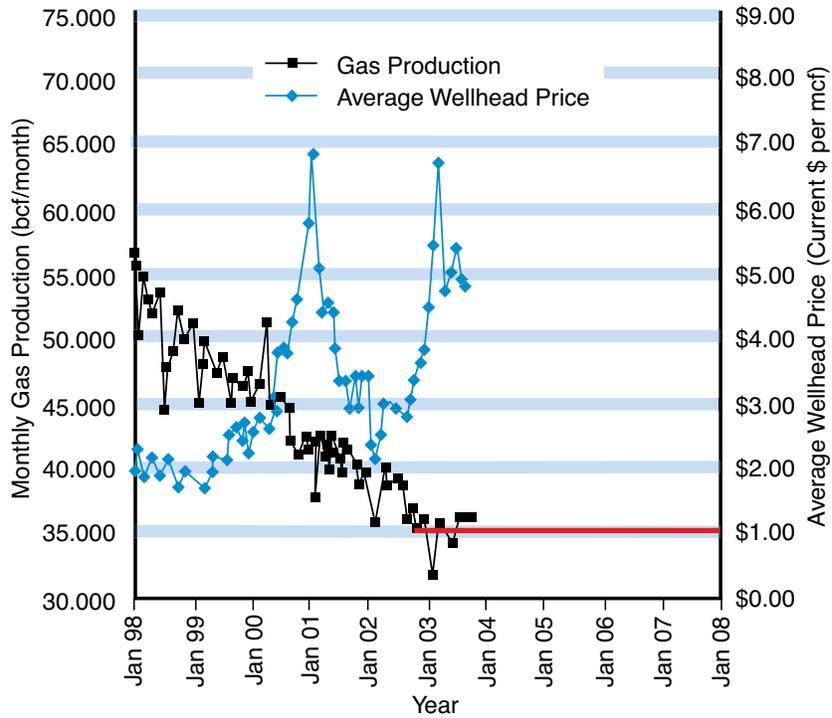


Figure 11—Kansas monthly natural gas production and monthly posted price, January 1998 to January 2003, with production projections through 2008. Production projections indicated by red line. Production data are current through August 2003 (bcf = billion cubic feet) and come from online data bases at the Kansas Geological Survey (Kansas Geological Survey, 2003). The production data are sales volumes reported to the Kansas Department of Revenue. Price is current through August 2003 and is the adjusted monthly average wellhead price for one thousand cubic feet as reported by the Energy Information Administration of the U.S. Department of Energy (http://www.eia.doe.gov/pub/oil_gas/natural_gas/data_publications/natural_gas_monthly/current/pdf/table_04.pdf).

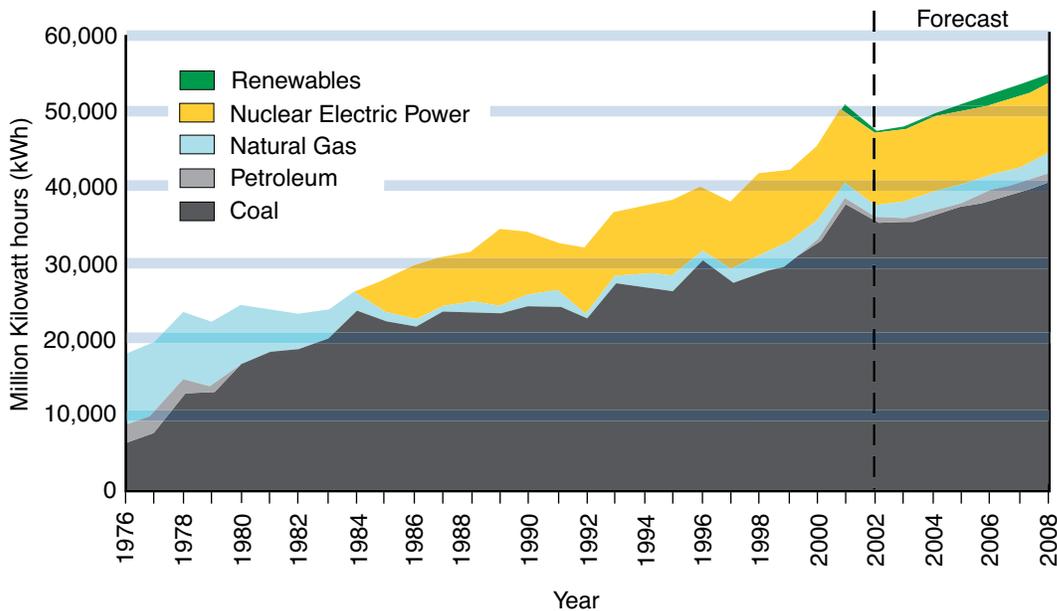


Figure 12—Kansas electrical generation, 1960 to 2008. Data through 2002 are based on historical data from the Energy Information Administration; numbers after 2002 are SERCC forecasts.

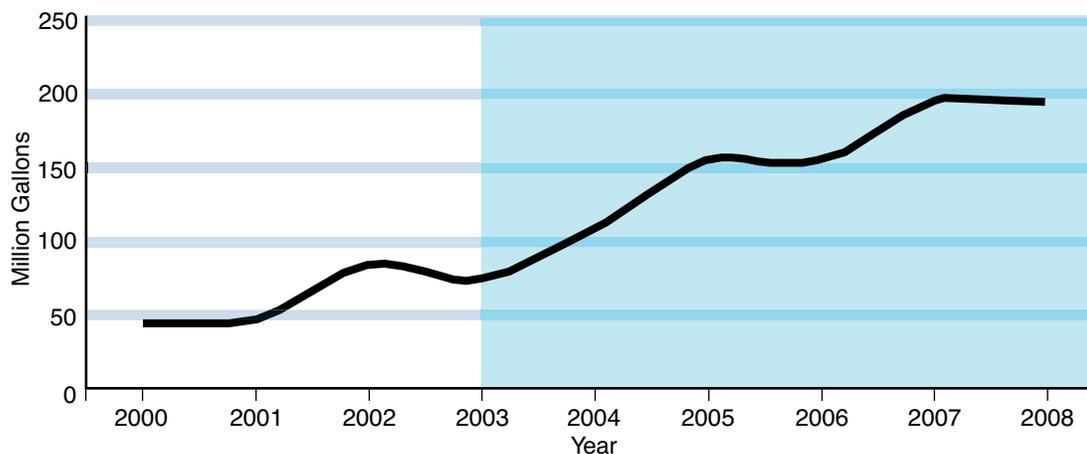


Figure 13—Kansas ethanol capacity, 2000–2008. The 2003 decline was due to the Midwest Grains plant in Atchison being off-line most of the year. Historical data from Renewable Fuels Association web site (<http://www.rfa.org>).

Energy Council Recommendations for 2004

The Council divided the state energy plan for 2004 into three components: activities that the Council itself will pursue, items that are ready for and require legislative action, and items the Council needs to study before attempting to take action or make recommendations.

The SERCC plan for 2004 is ambitious. Ongoing activities in electric transmission, systems benefit charges, and renewable energy initiatives will continue. A new effort is already underway on wind development and preservation of the Tallgrass Prairie. Additional efforts will be organized on public education and possible competition for the FutureGen power plant project. One of the larger issues that SERCC will examine during 2004 is just how energy policy and planning should be undertaken to effectively meet the needs of citizens, business, and government. SERCC's attention will be increasingly dedicated to renewable energy, especially wind power and biomass (particularly ethanol), which appear to have great potential but lag behind long-established energy sectors in infrastructure and incentives.

The specific legislative items recommended are designed to increase oil and gas production in the state. The Summit on Natural Gas, held in October,

resulted in a list of 66 recommendations to improve the natural gas supply and mitigate the impact of high prices on consumers. The Council's Petroleum Committee focused on those recommendations that had consensus and that realistically would have the most immediate and important impacts on increasing production and thus contribute to an adequate supply for consumers. In many cases, both oil and gas production are affected.

A proposal from the Working Group on Renewable Incentives regarding a systems benefit charge did not get sufficient Council support to bring forward as potential legislation this year. This concept will be revised and reconsidered during 2004.

The last legislative item is directed to both the Legislature and the Governor. The Council is concerned about its directive to develop a comprehensive state energy plan but with having to beg and borrow resources to achieve this goal. The proposal for \$150,000 of funding would cover the current level of staff support for SERCC. The Council would like to be able to draw on other expertise and capabilities for specialized studies and analyses and so recommends an additional \$100,000 for contract services.

In its first energy plan (2003), the Council recommended three legislative items; all were drafted into bills or continuing resolutions by the House Utilities Committee. One of these was signed into law (see discussion of legislative action, p. 13). Of the remaining two recommended actions from 2003, the proposed legislation to limit punitive damages resulting from regulatory mandates in the energy industry, House Bill 2282, requires minor but significant change of language. The other recommendation, House Continuing Resolution 5055, was to encourage implementation of energy performance contracting for existing, state-owned buildings. The Council recommends that H.B. 2282 and H.C.R. 5055 be reintroduced.

Energy Council Action

The following list is an overview of the actions the Council plans to pursue in 2004. Some of these actions are continuing efforts and their status is indicated in the bracketed notes.

1. Develop detailed language for a proposed systems benefit charge limited to funding an effective state energy program. [Under review by the Working Group on Energy Incentives.]
2. Inventory Kansas energy activities with the intent to improve coordination and cooperation, increase effectiveness, and reduce redundancy. Identify Kansas energy advocates with federal agencies and national and regional associations.
3. Work with existing organizations (e.g., Kansas Association for Conservation and Environmental Education, KACEE, and the Kansas Independent Oil and Gas Association education foundation) to implement energy education for the general public and K–12 students. Support education through media programs, and public awareness to the extent possible.
4. Continue to support the Transmission Task Force, review activities and conclusions, and make recommendations.
5. Review options and develop recommendations for organizational approaches to meet state energy-policy-planning needs.
6. Develop a roadmap for Kansas renewable energy development, including identification/discussion of pro's and con's. Identify and

coordinate with other groups. Support renewable energy development in Kansas as an element of a responsible energy program, and reduction of state energy import requirements and the associated negative economic issues.

7. Work with the Kansas congressional delegation, executive, and legislative branches, utilities, and private sector to investigate the state's potential with respect to the FutureGen project. [A FutureGen committee or working group will be appointed by the SERCC chair early in 2004]
8. Develop guidelines for the siting of wind-energy development in Kansas. [This has been assigned to the SERCC Wind and Prairie Task Force. A report to the SERCC and Governor is due at the end of May 2004.]

Legislative Action

1. Amend the K.S.A. 55-1302 definition of “pool” in order to allow unitization of more than one single and separate natural reservoir if the same are in communication so as to constitute a single pressure system.
2. Amend Article 9 of the Uniform Commercial Code to restore a priority creditor status for sellers of oil and gas production when a purchaser is in bankruptcy. Such an amendment would follow the language of the former K.S.A. 84-9-319, which was repealed in 2000.
3. Promote exploration for and production of coalbed methane gas by extending the period for severance tax exemption under K.S.A. 79-4217(b)(4) from twenty-four (24) months to forty-eight (48) months or more.
4. Increase the price reference points for severance tax exemptions for low-volume gas wells under K.S.A. 79-4717 (b)(1), low-volume oil wells under K.S.A. 79-4917(b)(2), and for utilization of enhanced recovery techniques under K.S.A. 79-4917 (b)(6), in recognition of the cost increases that have occurred since the reference points were established or last revised.
5. Fund support for SERCC activities through the Kansas Geological Survey at the University of Kansas, at the level of \$150,000 for staff and operations, and \$100,000 for contract services.

Priority Study Items

1. Review existing programs for Renewable Portfolio Standards (RPS)/Green Tags/Renewable Energy Credits in other regions and evaluate in light of Kansas needs and preferences. Recommend a preferred program to SERCC for consideration. [This is assigned to the SERCC Working Group on Energy Incentives]
2. Review strategies and programs to promote energy conservation and efficiency and develop specific policy recommendations for state energy plan.

References

- Brosius, Liz, and White, Scott, compilers, 2003, Kansas Energy Abstract: Kansas Geological Survey, Technical Series 18, 79 p.
- Kansas Geological Survey, 2003, Oil and Gas Data Bases: <http://www.kgs.ku.edu/PRS/petro/interactive.html> (viewed December 2003).
- Newell, K. David, Brady, Lawrence L., Lange, Jonathan P., and Carr, Timothy R., 2002, Coalbed gas play emerges in eastern Kansas basins: Oil & Gas Journal 2002, 6 p.
- SERCC, 2003, Kansas Energy Plan 2003: Kansas Geological Survey, Open-file Report 2003-3, 46 p.

State Energy Resources Coordination Council (SERCC) Members

* Lee Allison, Chair
Kansas Geological Survey
1930 Constant Avenue
Lawrence, KS 66047
785-864-2108
Fax: 785-864-5317
lallison@kgs.ku.edu

David Dayvault
Grant Thornton LLP
8300 Thorn Drive
Wichita, KS 67226
316-383-3221
Fax: 316-383-3274
ddayvault@gt.com
Term of appointment: June 30, 2006
Petroleum Committee, Chair

Spencer Depew
Depew & Gillen
151 North Main
Wichita, KS 67202
316-265-9621
Fax: 316-265-3819
spencer@depewgillen.com
Term of appointment: June 30, 2004
Petroleum Committee

Lee Gerhard
Gerhard and Associates
1628 Alvamar Drive
Lawrence, KS 66047
785-550-3988
leeg@sunflower.com
Term of appointment: June 30, 2004
Petroleum Committee

Colin Hansen
Kansas Municipal Utilities
101 1/2 North Main
McPherson, KS 67460
620-241-1423
Fax: 620-241-7829
chansen@kmunet.org
Term of appointment: June 30, 2005
Utilities Committee

Barry Hart
Kansas Electric Cooperatives, Inc.
7332 SW 21st Street
P.O. Box 4267
Topeka, KS 66615
785-478-4554
Fax: 785-478-4852
bhart@kec.org

* Denotes permanent Council position.

Term of appointment: June 30, 2005
Utilities Committee, Chair

Galen Menard
National Cooperative Refinery Assn.
1391 Iron Horse Road
P.O. Box 1404
McPherson, KS 67460
620-241-2340
Fax: 620-241-5562
gmenard@ncrarefinery.com
Term of appointment: June 30, 2005
Petroleum Committee

David Phelps
Westar Energy
800 Kansas Avenue
Topeka, KS 66601
785-575-1612
Fax: 785-575-8173
dave_phelps@wr.com
Term of appointment: June 30, 2005
Utilities Committee

J. Alex Silver
Black & Veatch
11401 Lamar
Overland Park, KS 66211
913-458-8626
Fax: 913-458-2934
silverja@bv.com
Term of appointment: June 30, 2006
Renewable Energy Committee, Chair

*David Springe
Citizens Utility Ratepayer Board
1500 SW Arrowhead Road
Topeka, KS 66604
785-271-3239
Fax: 785-271-3116
d.springe@kcc.state.ks.us
Utilities Committee

Michael Volker
Midwest Energy, Inc.
1330 Canterbury Road
P.O. Box 898
Hays, KS 67601
785-625-1476
Fax: 785-625-1484

mvolker@mwenergy.com
Term of appointment: June 30, 2006
Utilities Committee

* Brian Moline, Vice Chair
Kansas Corporation Commission
1500 SW Arrowhead Road
Topeka, KS 66604
785-271-3100
Fax: 785-271-3354
b.moline@kcc.state.ks.us

Stan Zarembo
Zaroco Inc.
718 E. 1300 Road
Lawrence, KS 66046
785-843-6086 x200
Fax: 785-843-3082
stan@zaroco.com
Term of appointment: June 30, 2006
Petroleum Committee

SERCC Internal Committees

Renewable Energy Committee Members

J. Alex Silver, Chair
Black & Veatch
11401 Lamar
Overland Park, KS 66211
913-458-8626
Fax: 913-458-2934
silverja@bv.com

Donna Johnson
Pinnacle Technology Inc.
619 East 8th Street, Suite D
Lawrence, KS 66044
785-832-8866
Fax: 785-749-9214
www.pinnaclet.com
donna@pinnaclet.com

Greg Krissek
United Bio Energy, LLC
P.O. Box 9610
Wichita, Kansas 67205
316-616-3532
Fax: 316-616-3793
Greg.Krissek@UnitedBioEnergy.com

Richard Nelson
Engineering Extension Programs
133 Ward Hall, KSU
Manhattan, KS 66506
785-532-6026
Fax: 785-532-6952
rnelson@ksu.edu

Bruce Snead
Engineering Extension Programs
133 Ward Hall, KSU
Manhattan, KS 66506
785-532-6026
Fax: 785-532-6952
bsnead@oznet.ksu.edu

Kyle Wetzel
K. Wetzel and Company Inc.
P.O. Box 4153
Lawrence, KS 66046-1153
785-838-3771
kwetzel@kwetzel.com

Working Group on Energy Incentives

Michael Volker, Chair
David Springe
Bruce Snead
Richard Nelson
Donna Johnson
Alex Silver

SERCC External Committees

Transmission Task Force

Earnie Lehman, Chair
Midwest Energy, Inc.
1330 Canterbury Road
P.O. Box 898
Hays, KS 67601-0898
785-625-1400
Cell: 785-623-6827
Fax: 785-625-1494
elehman@mwenergy.com

Rick Anderson
McPherson Board of Public Utilities
400 E. Kansas
McPherson, KS 67460
620-245-2531

Fax: 316-245-2529
ricka@mepcity-bpu.com

David Heinemann
3826 S.W. Cambridge Court
Topeka, Kansas 66610
785-267-5033
daveh123@cox.net

Doug Henry
Westar Energy, Inc.
P.O. Box 208
Wichita, KS 67201
316-261-6343
Fax: 316-261-6769
doug_henry@wr.com

Larry Holloway
Kansas Corporation Commission
1500 SW Arrowhead Road
Topeka, KS 66604-4027
785-271-3222
Fax: 785-271-3354
l.holloway@kcc.state.ks.us

Douglas S. Kinsinger, CCE
Greater Topeka Chamber of Commerce
120 SE 6th Avenue, Suite 110
Topeka, KS 66603-3515
785-234-2644, ext. 223
Fax: 785-234-8656
dkinsinger@topekachamber.org

Gene L. Merry
Citizens' Utility Ratepayer Board
Coffey County Commission
308 Neosho, Suite 308
Burlington, KS 66839
620-364-2615
Fax: 620-364-3051
gmerry@kans.com

Kyle Wetzel
K. Wetzel and Company Inc.
P.O. Box 4153
Lawrence, KS 66046-1153
785-838-3771
kwetzel@kwetzel.com

Wind and Prairie Task Force

Appointments will be announced in January 2004.

Jerry Lonergan, Co-chair
Kansas Inc.
632 S.W. Van Buren
Suite 100
Topeka, KS 66603
785-296-1460
Fax: 785-296-1463
jerry.lonergan@ksinc.state.ks.us

Gerald (Jerry) Karr, Co-chair
1155 N. Highway 99
Emporia, KS 66801-7920
620-343-1607

Staff Support for SERCC

Liz Brosius, Kansas Geological Survey
Scott White, Kansas Geological Survey, KU
Energy Research Center
Debbie Douglass, Kansas Geological Survey
Larry Holloway, Kansas Corporation Commission
M. L. Korphage, Kansas Corporation Commission
James Ploger, Kansas Corporation Commission
Soojong Qwak, Kansas Corporation Commission
Brenda Schirmer, Kansas Corporation Commission
Timothy Carr, Kansas Geological Survey, KU
Energy Research Center
Jeremy Bartley, Data Access and Support Center,
Kansas Geological Survey
Rex Buchanan, Kansas Geological Survey

Appendix I: Executive Order 2002-4

EXECUTIVE ORDER NO. 2002-04

Establishing the State Energy Resources Coordination Council

WHEREAS, Article 1 § 3 of the Constitution of the State of Kansas vests the supreme executive power of the state in the Governor; and

WHEREAS, Energy production is one of the core foundations of our state's economy; and

WHEREAS, The production of energy benefits the long term economic and employment health of the state; and

WHEREAS, The formation of public policy is dependent upon accurate and timely information being made available to Kansas policy makers; and

WHEREAS, Improved coordination of the State's energy resources is an essential element in improving the quality of services provided to the people of Kansas;

NOW THEREFORE, pursuant to the authority vested in me as Governor of the State of Kansas, I hereby establish the State Energy Resources Coordination Council.

(1) The State Energy Resources Coordination Council shall:

- (a) Collect and compile information pertaining to the availability, production and use of energy in the state;
- (b) Based on such data, formulate an initial comprehensive state plan for the coordination of the management, conservation, and development of energy resources;
- (c) Such a state plan shall include sections corresponding with:
 - (i) Estimates of energy consumption by Kansas residents for the next 12, 36 and 60 months by energy category;

- (ii) Estimates of energy production by energy source for the next 12, 36 and 60 months by energy category;
- (iii) Estimates of energy purchased by retail marketers in excess of domestic production for the next 12, 36 and 60 months by energy category;
- (d) The Council shall annually review and modify as necessary the state energy plan.
- (e) The Council shall advise of trends identified in relation to energy production, consumption and any tax or revenue implications;
- (f) The Council shall recommend:
 - (i) Appropriate means to increase the productive life of Kansas energy resources;
 - (ii) Appropriate means to increase the state's self reliance on its own energy sources through:
 - Increased efficiency in the use of its resources,
 - Identification of potential energy resources, and
 - Identification of policy and tax issues that adversely impact self- reliance.
 - (iii) Ways to avoid loss of tax revenues and employment opportunities related to energy resource management;
 - (iv) Policies to increase the export of energy from Kansas; and
 - (v) Other policies or actions related to energy resource management as they may evolve.
- (g) The Council shall annually report their findings and recommendations. The first annual report of the Council shall be provided to the Kansas Corporation Commission, the Governor and the Legislature by January 13, 2003.

(2) The Council shall consist of 13 members as follows:

- (a) The State Geologist, or designee;
- (b) The Chairperson of the Kansas Corporation Commission, or designee;
- (c) The Consumer Counsel of the Citizens' Utility Ratepayer Board, or designee;
- (d) 10 members appointed by the Governor including:
 - (i) An energy economist serving on the faculty of a state educational institution;
 - (ii) An individual knowledgeable in tax and revenue issues related to energy use or production;
 - (iii) A representative of oil producers;
 - (iv) A representative of natural gas producers;
 - (v) A representative of investor-owned generators of electricity;
 - (vi) A representative of rural electric cooperative;
 - (vii) A representative of municipally owned or operated electric utilities;
 - (viii) A representative of generators of electricity from renewable energy resources;

(ix) A representative of refiners of petroleum products;

(x) A representative of marketers of petroleum products.

(e) Of the members first appointed by the Governor subsequent to this Executive Order, four shall serve terms of four years, four shall serve terms of three years, and two shall serve terms of two years, and thereafter terms shall be for four years.

(f) All other members shall serve terms consistent with their terms of office, employment or appointment.

(3) The Governor shall annually select a Chairperson and Vice-Chairperson from among the members. The Council may elect other officers among its members and may establish any committees deemed necessary to discharge its responsibilities.

(4) The Council shall meet as frequently as necessary to discharge its responsibilities.

(5) Members of the Council shall not receive compensation, subsistence allowance, mileage or associated expenses. Officers or employees of state agencies who are appointed to the Council shall be authorized to participate on the Council as part of their duties and may claim subsistence allowance, mileage or associated expenses as permitted by law.

This document shall be filed with the Secretary of State as Executive Order No. 2002-04 and shall become effective immediately.

Appendix 2—Kansas Summit on Natural Gas, Summary of Conclusions and Recommendations*

The Kansas Summit on Natural Gas was organized by the State Energy Resources Coordination Council (SERCC) at the request of Governor Sebelius, to bring together stakeholders to discuss natural gas supply constraints, higher prices, and the impacts these are likely to have on Kansans this winter and into the future. The summit was held in Topeka on October 2, 2003, at the Washburn University Memorial Union (see program below). Approximately 150 people attended the daylong summit to hear presentations from national and state experts and to work together to develop recommendations for future action. This report highlights some of the conclusions and recommendations that emerged from the summit.

Short-term Outlook and Recommendations

Price

Over the summer many Kansans, like consumers across the country, saw a sharp increase in the price of natural gas on their monthly bills. These higher prices are likely to continue through the winter heating season, resulting in higher heating bills for all Kansans and especially impacting those with low or fixed incomes. This will put additional pressure on already strained social service and home-heating assistance programs.

Individuals can reduce consumption (and thereby their heating bills) by implementing conservation and low-cost energy efficiency measures, such as lowering thermostat settings, plugging leaks, adding insulation. SERCC produced and widely distributed a brochure, prepared in cooperation with KSU Energy Extension, describing actions that consumers can take to lower energy bills.

Production

Higher prices have stimulated natural gas production (up 2.5% in the first half of 2003, following a decline of 3% in 2002). However, this will have little effect on the supply and price of natural gas in the short term, as existing production capacity is not capable of meeting the increasing demand for

natural gas (which the U.S. Energy Information Administration projects to increase 50% in the next 20 years).

Storage

Due to high levels of injection into storage over the past months, natural gas supplies are within the five-year average range. As of October 10, 2003, natural gas in storage was 2,944 bcf (billion cubic feet), compared to a low of 623 bcf on April 11, 2003, following last year's heating season. By the end of the storage season (November 1, 2003), natural gas storage is projected to be at least 3,025 bcf (and could be higher if recent higher rates of storage continue). Whether this supply will be sufficient to meet demand throughout the winter heating season depends on the weather (see Figure 1). The record demand for natural gas to put into storage has helped keep prices high and drawn natural gas away from some price-sensitive industries such as fertilizer manufacturing.

Recommendations

Because little can be done in the short term to increase production or decrease demand (and thereby reduce the price of natural gas), most of the recommendations developed by the summit attendees address longer-term changes (see below). However, the following recommendations target actions that can be taken immediately to mitigate the impact of higher natural gas prices this winter.

- Increase federal funding for LIHEAP (Low Income Home Energy Assistance Program) allocations and arrange for timelier disbursements (i.e., before onset of cold weather). Contact Kansas Congressional delegation to urge action during this year's budgetary process.
- Encourage greater cooperation and communication among social service agencies (state and local) and utilities for most effective delivery of LIHEAP and weatherization services.
- Promote multi-sector educational efforts to inform Kansans about high natural gas prices and conservation techniques to reduce energy bills.

* This report, which was submitted November 5, 2003, is also available from the Kansas Geological Survey: Open-file Report 2003-62.

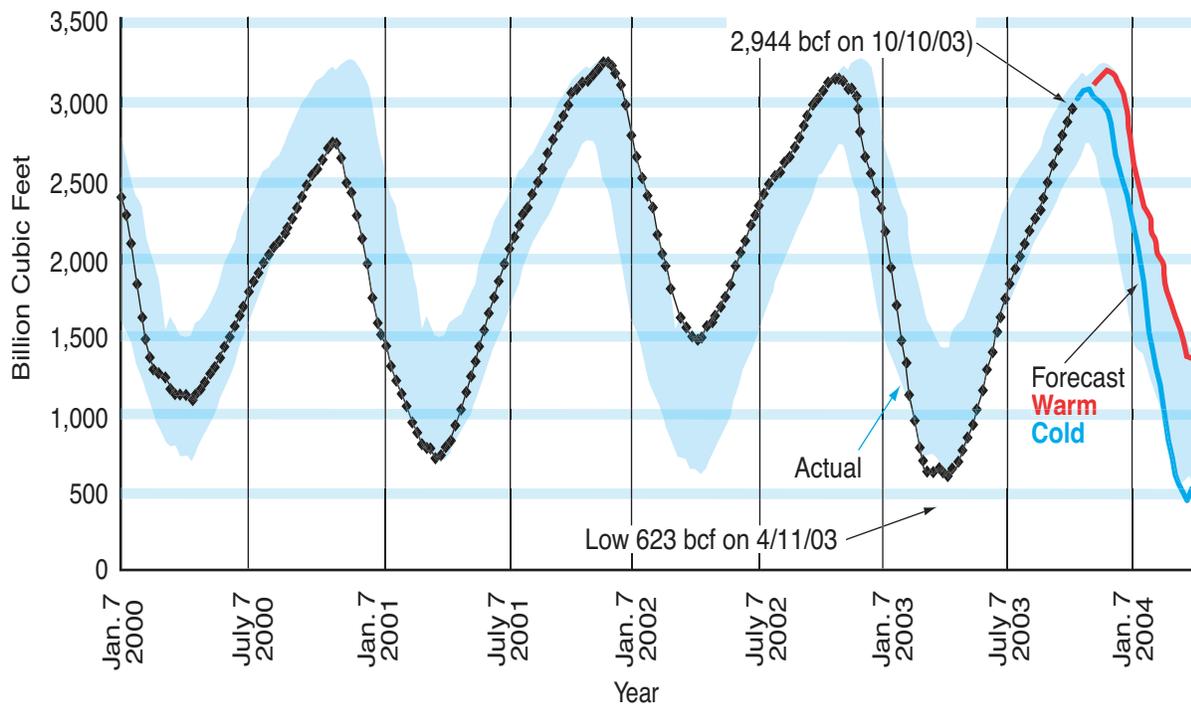


Figure A1—Monthly U.S. natural gas storage, 2000–2003, with projections for the first half of 2004. Colored band shows the normal storage range from previous four years. Projected withdrawal rates for the 2003–2004 heating season are based on withdrawals during the colder than normal 2002–2003 (blue line) and warmer than

Long-term Outlook and Recommendations

This year’s tight natural gas supplies and higher prices are expected to continue for at least the next few years. Resolving the current natural gas issues will involve a variety of changes, including bolstering natural gas supplies (from domestic production and imports), reducing demand through conservation and energy-efficiency efforts, and greater reliance on alternative fuels (including renewable energy resources).

Currently, SERCC is reviewing all the recommendations brought forward during the natural gas summit for inclusion in its *2004 Kansas Energy Plan*. The following recommendations were developed during four breakout sessions, addressing ways to (1) reduce consumption, (2) increase production, (3) lessen impacts on consumers, and (4) educate Kansans about natural gas issues. They are arranged topically, without ranking or priority, and without assessment or comment.

SERCC

- Sponsor additional stakeholder meetings on energy issues.

Consolidate and Fund Kansas Energy Planning Efforts

- Consolidate state energy functions.
- Establish an Energy Policy Office at the Kansas Corporation Commission that has adequate staffing to compile complete energy usage data for all Kansas customers and catalog energy programs in use nationwide.
- Establish a cabinet-level Secretary of Energy.
- Establish funding mechanism for energy planning effort and actions, such as a systems benefit charge (SBC).
- Provide funding for SERCC and energy plan through systems benefit charge (SBC) or other source.
- Explore the possibility of a Universal Service Fund or Systems Benefit Charge to benefit Kansas state conservation and/or low-income assistance efforts.
- Develop a Kansas Renewable Resources Action Plan (KRRAP) for all renewables as part of the state’s long-term energy vision.
- Determine the impacts of a Renewable Portfolio Standard (RPS) on Kansas for all renewable resources.

Home Heating and Low-income Consumers

- Lobby federal policymakers for additional Low Income Home Energy Assistance Program (LIHEAP) funding and timelier disbursement of LIHEAP payments.
- Review and potentially revise the Cold Weather Rule. Examine in particular those disconnection / reconnection policies regarding owners and tenants.
- Expand and promote to other utilities the existing Kansas Gas Service billing program to target excessive customer gas usage and develop histories of customer shutoffs by specific dwelling.
- Convene a working group of utilities, Kansas Corporation Commission staff and emergency service providers to analyze shut-off data by neighborhood and target outreach efforts to those areas. After a third payment default shut-off at a rental dwelling, require the landlord to co-sign for reconnection. Train gas inspectors to report on furnace efficiency as well as just the safety of the appliance.
- Limit the amount of bad debt that can be written off, particularly from repeated excessive usage at the same customer dwelling.
- Seek direct state appropriations to assist low-income customers with high heating bills.

Changes to Tax Law

- Clarify Kansas law so that conservation investments and services are treated equally to that of producing and transporting energy.
- Consider increasing volume threshold on severance tax. Presently the effective tax rate is viewed as excessive by Kansas industry, which inhibits production.
- Encourage the development of a new state income tax return check off to fund conservation and assistance efforts.
- Increase tax incentives for conservation improvements.
- Establish tax policies to encourage energy efficiency rather than production and consumption
- Reduce tax levy on large gas consumers in Kansas so they are competitive with other states. Presently taxes in Kansas force large gas consumers to leave the state.

- Investigate the entire tax structure on gas production to determine ways to encourage expansion and production.

Encourage Energy Conservation and Efficiency

- Dedicate a revenue source for conservation loans and grants especially targeted to low-income homeowners and renters.
- Expand the offering of energy efficiency bonds by the Kansas Development Finance Authority to commercial and industrial customers.
- Train house builders and contractors to serve as home energy raters.
- Expand upon the use of unclaimed utility refunds and deposits for conservation and assistance programs.
- Work with utilities to promote those rate designs that encourage increased customer conservation.
- Develop Integrated Resource Planning for all sources considering sustainability.

Encourage Cooperation Between State Energy Assistance Programs, Agencies

- Increase social agency/utility cooperation/communication for effective LIHEAP and weatherization services
- Provide a state clearinghouse of information on conservation and assistance programs and promote better coordination of information between state agencies, utilities, emergency service providers and other stakeholders.

Expand Educational Efforts

- Promote multi-sector education efforts.
- Provide expanded customer education to customers on the probable high cost of natural gas and potential conservation techniques to reduce energy bills. Educate customers in Kansas about the value of effective conservation programs, such as those focusing on attic insulation, air infiltration and furnace efficiency.

Changes to Oil and Gas Regulations (KCC)

- Encourage KCC to continue their supportive position on pipeline construction.

- Fast-track pending regulatory changes through temporary regulation process and continue efforts to streamline the regulatory process.
- Raise statutory price caps on severance tax exemptions for incremental production.
- Change the process for appealing gathering rates. The present system inhibits producers.)
- Consider changing responsibility for plugging abandoned wells. It is now with the current or last operator/lease owner. This is a disincentive to new investment.
- Expand the KCC authority to allow for unitization.
- Extend the exemption from severance tax in coal-bed methane production beyond the present two years. The present two-year exemption is not sufficient to encourage investment.
- Consider increasing time period between recertification of low-producing wells to qualify for exemption. Presently it is required annually.
- Investigate ways to reduce cost of access to interstate transmission lines. At present the cost prevents access by some producers. A change requires FERC action.
- Consider severance tax exemptions for low-BTU gas, as well as for technology used to treat low-BTU gas, to promote development.
- Investigate ad valorem exemptions to metering low-volume wells. The present cost of metering is excessive and causes premature well abandonment.
- Allow regulatory changes for temporary abandonment of certain wells in prorated fields.
- Change testing requirements to reduce costs.

Utilities and Rate Structures

- Write specific Kansas Corporation Commission rules and regulations to define conservation measurements, demand side management (DSM) efforts, ten-year load forecasts and all power supply alternatives as set forth in House Substitute for Senate Bill 263 for determination of future ratemaking principles.
- Encourage utility rate structures modifications to recognize demand side management (DSM) and low income consumers.

- Municipal generation – allow aggregation for efficiency investments
- Encourage demand side management (DSM) by utilities by either carrot or stick or both
- Encourage demand side management (DSM) through rate structures.
- Encourage appropriate rate design.
- Establish utility rates structures and programs to encourage efficiency, not consumption
- Fund more utility technicians that might be able to assist customers with energy conservation ventures.
- Encourage utilities to provide greater assistance to customers on energy efficiency issues.
- Encourage greater utility flexibility and creativity in enforcing the Cold Weather Rule.

Hugoton Natural Gas Field

- Re-examine horizontal drilling restrictions in Hugoton field. Consider regulatory changes.
- Provide incentives to encourage investments in existing prorated gas fields (Hugoton, Panoma, Greenwood). Implement programs that will encourage producer reinvestment in Kansas. Compare Kansas incentives to other states to assure they are competitive.
- Investigate testing requirements for minimum production wells in the Hugoton and other prorated fields.
- Consolidate field operations among companies to optimize operation in the Hugoton.
- Investigate changes in regulation to continue production at Hugoton. Industry and the KCC should continue their discussion on regulatory changes needed to extend the life of the field.
- Remove or change method of determination for gas allowables in declining prorated fields (Hugoton, Panoma, and Greenwood).
- Consider allowing additional infield drilling in the Hugoton and associated fields.

Next Steps

In the next month, SERCC members will review all the recommendations from the natural gas summit as they develop their final recommendations for inclusion in the *2004 Kansas Energy Plan*. Adopted recommendations will be divided into those for legislative action, for SERCC action, and for further study.

**Kansas Summit on Natural Gas
Program**

October 2, 2003, 8:00 a.m.–4:00 p.m.
Washburn University Memorial Union, Topeka, KS

8:00 Registration

8:30 Plenary Session

Introductory remarks—*Lee Allison, moderator, SERCC Chair, Kansas Geological Survey Director*

8:40 Welcome—*Dr. Jerry Farley, President, Washburn University*

8:50 Challenges and goals—*Governor Kathleen Sebelius*

9:00 Session I: Overview of natural gas supply and price

U.S. perspective—*Patty Morrison, Assistant Secretary, U.S. Department of Interior*

Outlook for the Natural Gas Industry—*Paul Wilkinson, American Gas Association*

Where does our gas come from and where does Kansas gas go?—*Tim Carr, Kansas Geological Survey*

How does the natural gas system work?—*Brad Dixon, Vice President, Western Region, Kansas Gas Service*

10:15 Q & A

10:30 Break (15 min)

10:45 Session II: Economic impacts on Kansas

Residential and smaller commercial consumers—*David Springe, Citizens' Utility Ratepayer Board (CURB)*

Industrial and larger commercial consumers —*Richard W. Schuck, Energy Support Providers, LLC*

Agriculture and agricultural consumers—*Carole Jordan, Director of Rural Development & Legislative Initiatives, Kansas Department of Agriculture*

11:45 Q & A

11:55 Breakout sessions and objectives—*Lee Allison, moderator*

12:00 Lunch—Pick up box lunches in lounge

12:45 Concurrent Breakout Sessions—panels and roundtables

Breakout Session I (Vogel Room): What can we do to reduce consumption or demand?—*Bruce Snead, KSU Engineering Extension, moderator*

Conservation and efficiency—*Bruce Snead, KSU Engineering Extension*

Energy Services—*Brian Dreiling, Midwest Energy*

Fuel switching by utilities and industry—*Richard W. Schuck, Energy Support Providers, LLC*

Role of renewables in electricity, heating—*Richard Nelson, KSU Engineering Extension*

Breakout Session II (Kansas Room): Can we increase natural gas production, transmission, storage and supply?—*Dick Hayter, KSU College of Engineering, moderator*

Production, transmission, or storage bottlenecks or restrictions—*Jim Harder, Southern Star Central*

Regulatory effects—*M. L. Korphage, Director of the Conservation Division, Kansas Corporation Commission*

Tax policies—*Steve Stotts, Director of Taxation, Kansas Department of Revenue*

Kansas gas production opportunities—*Steve Dillard, Kansas Independent Oil & Gas Association (KIOGA)*

Breakout Session III (Washburn B): How can we lessen the impacts on residential consumers and businesses?—*Colin Hansen, Kansas Municipal Utilities, moderator*

Assistance programs – *Paul Johnson, Kansas Public Assistance Coalition*

Utility programs for consumers—*Jim Bartling, manager public affairs, Atmos Energy*

Federal programs—*Norma Phillips, Kansas Housing Resources Corporation, Weatherization*

Effects on agriculture—*Steve Irsik, Rancher, Farmer, Dairyman, and Chair of Lt. Governor’s Mini Economic Summit*

Breakout Session IV (Shawnee Room): How do we educate Kansans about natural gas issues?—

Denise Manning, Atmos Energy, moderator

Government—*Marge Petty, Kansas Corporation Commission*

News Media—*Steve Everly, Kansas City Star*

Utilities—*Lori Webster, communications manager, Kansas Gas Service*

Education—*Shari Wilson, Kansas Association for Conservation and Environmental Education*

2:30 Break (30 min)

3:00 Plenary Session—*Lee Allison, moderator*

Reports by breakout session moderators:

Reducing demand—*Bruce Snead, KSU Engineering Extension*

Increasing supply—*Dick Hayter, KSU College of Engineering*

Providing assistance to consumers—*Colin Hansen, Kansas Municipal Utilities*

Educating Kansans—*Denise Manning, Atmos Energy*

Summary of next steps, concluding remarks—*Lee Allison, moderator*

4:00 Adjourn

Appendix 3—SERCC Transmission Task Force, November 19, 2003

Interim Report

Interim Findings

- The current transmission system in Kansas is reliable and adequate.
- Economic development aside from new generation is not hindered by reliability or electricity cost concerns.
- Expansion of the Kansas transmission system is governed by a process outside of state control.
- The process for considering transmission system expansion does not work very well.
- The willingness to expand the transmission is hindered by uncertainty as to how and from whom the costs of expansion will be collected.

Introduction

The Transmission Task Force (TTF) was formed by the Chairman of the State Energy Resources Coordinating Council on September 26, 2003. Since its formation, the TTF has met as follows:

- October 3—Organizational meeting
- October 23—Refine TTF charge into specific policy issues
- November 4—Preliminary reports and background
- November 14—Prepare interim report

The charge to the TTF was summarized as follows:

1. Identify capacities, needs, limitations, and opportunities in the Kansas electric transmission system.
2. Determine the reliability of the Kansas transmission system and its susceptibility to disruption and outages.
3. Recommend solutions to removing constraints, developing transmission capacity, and ensuring reliability of the transmission system in Kansas.

As a result of subsequent discussions, the TTF seeks to recharacterize its charge as development of a state transmission infrastructure plan. Ideally, this plan would be an essential component of an overall state energy strategy to be developed by the SERCC. The plan would incorporate not only a

blueprint for state action, but also articulate the state's role in policy development at the regional and national level. Developing such a plan requires an examination of four policy issues and some review.

The policy issues include:

1. Consideration of ownership options for transmission system additions and improvements as well as the existing transmission system.
2. What is the role of the public sector in directly facilitating development of new transmission associated with new generation?
3. Should some preference be given to local generation fuel resources in prioritizing access to the transmission system?
4. Help develop Kansas public policy position in regional and national energy arenas regarding transmission and related issues.

The TTF determined that it should assess the current Kansas transmission system in several areas:

- current and near-term reliability status,
- perceived reliability and cost effects on economic development,
- current transmission planning and generation interconnection process,
- available transmission capacity
- non-government regional transmission reliability and planning initiatives, and state-sponsored initiatives,
- an assessment of the effects of recent Kansas legislation affecting electric utilities and
- an assessment of new national energy legislation, when passed.

These assessments provide support for the TTF's eventual policy recommendations and infrastructure plan.

Current and Near-term Reliability Status

The TTF has been unable to identify any portions of the Kansas transmission system subject to persistent reliability problems. Neither utilities nor the KCC staff has detected operational reliability

problems occasioned by transmission constraints. The TTF will further address long term system reliability. The TTF also sought to identify major industrial development projects within the last five years in which electricity cost and reliability were a substantial factor in the decision whether or not to locate in the state of Kansas. TTF member Doug Kinsinger polled Kansas economic development groups through the Kansas Chamber of Commerce and Industry (KCCI). No respondent indicated a lost project because of high rates or substandard reliability, and several respondents were complimentary to their host utilities.

However, there are definite constraints limiting the ability of the existing transmission system to accommodate new transmission service or any large scale generating facility. This is because the transmission system is heavily loaded in most of Kansas and neighboring states. In Oklahoma, for example, there are reports of merchant generation plants being unable to move energy to their intended customers for lack of sufficient transmission capacity. Although no major new transmission projects have been committed to or funded, several have been identified, and utilities such as Aquila and Midwest Energy are expected to make incremental improvements and expand their interconnection capabilities.

While the TTF has not identified an immediate concern with transmission reliability, the current transmission system operates with relatively high energy losses. High transmission losses in western Kansas are often attributed to heavy and unscheduled flows of energy due to power attempting to move from west to east across Nebraska. Additionally, transmission energy losses for Kansas utilities have increased in recent years as the volume of wholesale transactions has increased. While higher losses may not affect reliability, they do create higher costs for the ultimate consumer. There may be instances where transmission system upgrades and improvements could lead to lower energy losses on the transmission system and lower overall costs for Kansas electric customers.

Current Transmission Planning and Generation Interconnection Process

Access to the transmission system is governed by complex rules, policies and procedures predomi-

nantly promulgated by the Federal Energy Regulatory Commission (FERC) and administered by regional power pools regulated by the FERC. In Kansas, several transmission owners are members of the Southwest Power Pool (SPP) for transmission purposes. Sunflower Electric Cooperative and Aquila are members of the Mid-American Power Pool (MAPP). Under current proposed SPP rules all needs for additional transmission service, even for a utility serving its own retail customers must be processed by the power pool. The process is relatively simple where a utility is seeking to expand transmission facilities or increase its use of existing transmission facilities to meet the needs of its customers.

However, the process is more complicated for wholesale customers seeking new transmission service or for new generators seeking to interconnect with the transmission system. For example, any party that seeks to add a generator to the transmission system, whether it be a utility or not, whether it be fossil-fueled or wind-powered, must go through a two stage process: 1) determine facilities needed to connect the new generation to the transmission system and 2) determine transmission system improvements needed to move energy from the new generator to its customers.

Tom Stuchlik, P.E., Executive Director Transmission Services for Westar, presented an SPP briefing to the TTF that covered this and related topics in more detail. That briefing has been posted at the SERCC website.

The SPP would like to process both stages of requests in approximately 240 days (8 months), though it is rarely able to move this fast. Causes for the delays are many, though several stand out.

- Many requests are preemptive and do not reflect a high probability of materializing.
- Multiple requests relate to service to the same customer from multiple potential sources, or to multiple potential customers from the same source.
- Requests are processed one at a time in the order that they are received.

The costs of remedying preexisting bottlenecks are assigned to almost every new transmission service request and are often regional in nature. For

example, a constraint on an SPP member's system in Arkansas has shown up as an improvement that must be paid for by a Kansas SPP member seeking to change transmission service arrangements for some of its Kansas customers.

Available Transmission Capacity

The TTF needs to assess this issue. Based on current knowledge, any new generation will be tagged with significant transmission costs. Sunflower recently advised the TTF chairman that no transmission request by any customer for service from any portion of its proposed Holcomb 2 plant has been approved without tens of millions of dollars of required transmission investment. There may be limited opportunities to add small amounts of wind generation adjacent to substations on transmission lines at little cost, but the amounts are in the tens of megawatts rather than the 100 MW and larger quantities most commonly proposed.

There is a misperception that new generation should be able to tie into transmission with little or no required new transmission investment. In the past, when utilities planned for generation and transmission on an integrated basis, it was common for utilities to build transmission capacity to accommodate not just currently planned but future power plants. Now, utilities must respond to transmission requests without knowing in advance where or when most new generation will be located.

Paying for Additional Transmission Capacity

Under the old system prevalent before open access transmission policies were adopted in the early and mid 90's, the utility paid for all transmission construction and included such costs in rates to its customers. In today's environment who pays for such investment and how they pay is a contentious issue. The entity requesting transmission service may not be buying or selling any energy to the utility, working instead with third parties.

The TTF has yet to discuss this issue in depth, though it is a part of two of the four policy issues identified above.

Few would challenge the proposition that improvement costs should be paid either by those who

“caused” the costs, or those who benefit from the service. Utilities owning the transmission lines that connect generation to wholesale or retail customers are reluctant to invest in transmission improvements. The issue is more complex than just the inconvenience of undergoing a lengthy and complicated federal, and possible state, rate proceeding. It also involves the uncertainty of future transmission regulatory policy, uncompensated use of the current transmission system, and the difficulty in procuring right of way and siting transmission lines. Generation developers are often short of capital or unwilling to invest capital far in advance of receiving revenues for selling energy. Wholesale customers (electric utilities who purchase generation) face the same rate constraints as the utilities providing the intermediate transmission service. This impasse, and the lack of a clear regulatory signal for how future transmission system improvements will be funded, is a major impediment to adding generation.

Regional and Neighbor State Initiatives

Inevitably, most reliability issues transcend state boundaries. This is driven primarily by the physics of interconnected transmission systems wherein the electrons follow the path of least resistance rather than state boundaries or the path assumed in the related financial transaction. It is also driven by federal regulation of most wholesale electric transactions, the interstate nature of many of the transactions, the existing regional power pool framework with entities such as MAPP and SPP, and federal regulatory and statutory pressure on utilities to devolve transmission planning and operational responsibilities to Regional Transmission Organizations (RTO's). These factors create challenges and opportunities for Kansas policy-makers. Task Force member Gene Merry reviewed how nearby states are responding.

The largest regional effort is not state-sponsored at all. The Midwest Independent System Operator (MISO) is an independent entity governed by a board that represents neither transmission system owners nor generators and sprawls across 14 states. MISO and the SPP sought to merge, and for several years it was believed that MISO would become the RTO of choice for all Kansas utilities. MISO even commissioned a study of transmission system reliability and improvements that will be reviewed by the TTF. More recently, prospective MISO

participants have been disillusioned by sharply escalating operational costs and a growing sense that MISO has become too large and too distant from those it seeks to serve.

A second alternative available to Kansas is reported by a prospective participant to have just disappeared. TRANSLink Development Company LLC sought to aggregate transmissions systems across an 11 state area into a single independent transmission company. The company envisioned an accommodating approach offering utilities the alternatives of ownership and operation, operation only, ownership of additions only and more. The primary reason for TRANSLink's failure is believed to be regulatory resistance in states other than Kansas.

State-specific Comments

Colorado and Minnesota appear to be doing the best job of addressing transmission bottlenecks at the state level. Texas does well, but its utilities are mostly state, not federal jurisdictional because of its isolated transmission system. No state on the interconnect transmission system is openly challenging Federal Energy Regulatory Commission (FERC) authority. Most states continue to use a certificate of service application process through state utility commissions prior to authorizing construction of facilities.

Arkansas—Legislature passed legislation to review planning guide for electric utilities order #1 03-070R. No known interstate transmission planned. Independent power producers have expressed interest in new generation, though Arkansas no longer has excess capacity in its transmission system.

Iowa—Midwest Electric Transmission Companies formed a multi-state policy advocacy group to review transmission. They have no independent study going on in Iowa. They have had some new wind power added but very little fossil fuel generation. On December 27, 2002 the Iowa Utilities Board opened an inquiry into the aging transmission and distribution infrastructure of Interstate Power & Light Co. (Interstate) and Mid American Energy (Mid-American) in Iowa. This was an informal collaboration proceeding. No transcripts were kept.

Minnesota—The Minnesota Statutes in August 2001 were revised to include the requirement

electric transmission owning utilities in the state of Minnesota file a biennial transmission planning report. In 2003, new statutes associated with Biennial Transmission Filing Rulemaking adopted the process of soliciting public input into subsequent biennial planning reports, including the requirement for public planning meetings in different parts (zones) of the state. With the public participation and elimination of redundant individual certificate of need procedure, the state planning process is designed to provide a more expeditious review and certificate of transmission projects in the public interest. In the past year Minnesota and Iowa started a municipal electric utility transmission group to allow cities a forum to address their concerns and have them included in the big picture of electrical energy planning.

Missouri—On November 3, 2003, Missouri PSC held a roundtable meeting. The first half of the day was to be dedicated to current generation, current transmission, new generation, new transmission, integrated resource plan and future needs through the end of the decade. The second half of the day was to be spent on rate making.

Missouri utilities are buying some new wind generation from Kansas. For example, 60 MW of the Gray County wind farm are dedicated to Aquila's Missouri electric customers. State policymakers show interest in encouraging construction of new generation, and are looking at adopting Kansas legislation on plant siting and transmission guidelines. Missouri advocates no priority for renewable energy over fossil-fueled generation in providing transmission access. The state takes no position on whether the SPP should become an RTO.

Oklahoma—Oklahoma officials state they are working on state coordinated plan on transmission with Arkansas, Louisiana, Missouri and possibly Kansas, but Texas doesn't seem to have much interest. Interestingly, none of the referenced states echoed Oklahoma's statement. Oklahoma has been in the forefront of adding merchant generation, though very little that is wind-powered. The state's natural gas supply is also declining. Transmission cost recovery would be based on FERC service guidelines. Two PUC commissioners had early dreams to make Oklahoma the merchant energy production capital of nation. Transmission costs

have halted that dream. They support the SPP becoming an RTO.

Colorado—Based on website information, Colorado has several transmission projects recently built or in application process, from start to finish without delays takes about 18 months. One particular transmission project near Telluride had opponents suggesting the proposed 69kv line should have portions underground, limit the height of above ground structures to 60 feet and mitigate environmental impacts. The utilities involved say some of the conditions will impede the company's ability to provide safe, reliable and economic service to the public. The costs of the project will be recovered through the normal FERC process. The TTF will research Colorado more thoroughly.

Texas—Unlike Kansas and other states, Texas is large enough to preserve most of the benefits of interconnected, multi-utility transmission systems while keeping roughly 85% of its transmission isolated from other states. State jurisdiction oversees the Electricity Reliability Council of Texas (ERCOT), an entity akin to the FERC jurisdictional SPP. ERCOT has recently reviewed electric system constraints and needs within the ERCOT region. This is a very comprehensive report detailing bottlenecks in transmission and recommendations to address transmission constraints. Texas resources dwarf those available to Kansas.

Nebraska—All electric utilities in Nebraska are publicly-owned and exempt from FERC jurisdiction. Most utilities had planned to combine their transmission operations under TRANSLink.

Effects of Recent Kansas Legislation

The Kansas Legislative Research Department and the KCC provided summaries of state legislation affecting utilities in recent years. Those most pertinent to transmission reliability and accommodating new generation include:

- 1999 SB 45—Renewable energy real property tax exemption.
- 2000 Sub. For SB 243—Repeals siting act for all non-nuclear generation.
- 2001 HB 2226—Property tax exemptions for independent power producers (IPP's).

- 2001 HB 2268—Allows the Kansas Corporation Commission to allow utilities to recover Construction Work in Process (CWIP) for investments in generation and transmission, even if the project may not be finished until some time in the future.. Expands property tax exemptions.
- 2003 Sub. For SB 104 —Predetermination by the KCC of ratemaking treatment for new transmission and generation facilities.
- 2003 HB 2018—Authorizes the Kansas Development Finance Authority (KDFA) to issue revenue bonds for new or acquired transmission facilities.
- 2003 HB 2130—Expands the benefits to be considered in reviewing transmission line siting applications, allows pass-through of regulatory imposed transmission costs.

The TTF will study the effects of this impressive list of legislation. Its immediate reaction is that little has happened. If true, the TTF will specify what impediments remain.

Effects of National Energy Legislation

The Energy Policy Act of 2003 cleared the House-Senate Conference Committee on November 17 and is expected to be sent to the President within a week. The Act extends production tax credits of approximately 1.8 cents per kWh that drive continued renewable energy, particularly wind farm development. The Act does not set a Renewable Portfolio Standard, considered by many to be essential to increasing the growth rate of the wind energy industry.

The Act also promotes investment in critical electric transmission capacity and efficiency measures by directing the Federal Energy Regulatory Commission (FERC) to do an incentive rate rulemaking and provide for participant funding; provides for expedited siting processes on both federal and private lands; and provides for the use of advanced transmission technologies.

The Task Force has not been able to review this legislation as a group, and will comment further at a later time.

Next Steps

- Assess long-term transmission reliability.
- Assess available transmission capacity.
- Identify and evaluate pros and cons of various methods of funding transmission system improvements.
- Identify best in class transmission planning processes.
- Determine the transmission components of the SERCC's state energy plan.
- Determine possible regulatory and legislative initiatives.

Appendix 4—SERCC Wind and Prairie Task Force Letter from Governor Sebelius and Charge

December 2, 2003

Lee Allison, Chairman
State Energy Resources Coordinating Council
Kansas Geological Survey, University of Kansas
1930 Constant Ave.
Lawrence, KS 66047

Dear Lee:

I am writing today to formally request that a special task force of the State Energy Resources Coordinating Council (SERCC) be appointed to study and make recommendations relating to the siting of Windpower Projects in the Flint Hills/Tallgrass Prairie region of our state.

As you know, for the past decade studies have consistently ranked Kansas in the top three states for potential wind resources. A study released in 2002 ranked Kansas as the number one state in potential wind resources when existing transmission availability was factored in. The development of our state's wind energy potential could play a role in helping to turn our state back into an energy exporter, enhance economic development and promote future energy security and independence.

At the same time, we all recognize the beauty of the Flint Hills. We also recognize that the Flint Hills contain approximately two-thirds of all the remaining resource of unplowed tallgrass prairie in the world, and is the only area with landscape expanses of tallgrass prairie. This is a true treasure of national and international proportion, and as Kansans we fully understand we are the stewards of this treasure.

Today, we find many of our communities and citizens struggling to make tough choices as they work to enhance the opportunities provided by the development of our state's wind energy resources while striving to meet our responsibilities of being good stewards of some of our most precious and beautiful natural resources. As Governor, I believe the state has a role to play in assisting our communities and citizens by developing tools and resources that can help them in the decision-making process. In my view, a special S.E.R.C.C. Task Force is the appropriate state entity for the development of such tools and resources.

The Task Force should thoroughly examine and consider all of the key issues involved and recommend fundamental guidelines, principles, and best practices that can be utilized by local governments, landowners, project developers, and other interested stakeholders to site future wind energy projects in this environmentally sensitive region of the state. As it studies the issues involved, the Task Force should solicit input and information from a wide variety of experts, as well as the general public. The Task Force's primary goal should be to develop recommendations that will help decision-makers find an appropriate balance that promotes our state's wind energy potential

and preserves those natural ecosystems and places of scenic beauty, like the Flint Hills and the tallgrass prairie that cannot be easily replaced.

The Task Force should be composed of individuals from a wide variety of backgrounds and experiences that will ensure adequate consideration and analysis of all relevant issues. I ask that the Task Force complete its study and report its recommendations back to me no later than May 31, 2004. It is my sincere hope that decision-makers will allow time for this process to work. My Administration is hopeful that some consensus can be reached about the delicate balance between encouraging economic development of environmentally sensitive energy resources and the protection of the prairie.

Thank you very much for your attention to this request and for your service to the people of Kansas.

Sincerely,

Kathleen Sebelius
Governor of the State of Kansas

Background

The State Energy Resources Coordination Council is the energy-planning and policy arm of state government. SERCC's *Kansas Energy Plan 2003* identified wind power as having potential to be a significant energy source in Kansas.

Parts of the Flint Hills have high potential for wind energy. The presence of electric transmission lines crossing the Flint Hills between the state's two largest population centers also makes the region suitable for the siting of wind turbines to produce electricity.

Commercial wind-energy development is relatively new in Kansas, and landowners and local governments are still learning about the issues and concerns involved in siting increasingly larger turbines.

Concerns have been raised that wind-energy development may further fragment remaining untilled Tallgrass Prairie, impact wildlife, and create visual and auditory nuisances to neighbors. Each county in the Flint Hills region is following a steep learning curve to understand and resolve a complex set of questions and issues.

It is appropriate to step back from the contentious debates of specific proposals to consider broad principles and guidelines, to develop expertise, and to provide planning tools for all parties so as to better make informed decisions.

Charge to the Task Force

The SERCC Wind and Prairie Task Force is established to carry out the Governor's goal of assisting local communities in their decision-making processes relating to siting of wind- energy projects in the Flint Hills region and helping resolve potential conflicts between economic development and preservation of the Tallgrass Prairie.

The Task Force is charged to:

1. Identify and analyze relationships between areas of tallgrass prairie most appropriate for preservation and areas most appropriate or desired for wind development;
2. Recommend guidelines, principles, and best practices to be utilized at the local level to help site wind-energy projects;
3. Recommend voluntary guidelines or model agreements for land leases for wind-energy development;

4. Recommend voluntary local siting guidelines for wind-energy development;
5. Develop tools that can be used in the decision-making process to site wind- energy projects;
6. Identify policies or authorizations needed by local government to address multi-county or regional issues; and
7. Review efforts for land trusts and other mechanisms to preserve the prairie.

The WPTF should consider this document to be a starting point. The task force is encouraged to use its expertise to make sure the proper questions are being asked and to pursue the issues in whatever direction they need to go.

The WPTF is to accept public and expert comments in such a way as to minimize confrontation and polarization. The goal is to demonstrate procedures that can serve as models to most effectively hear different views, share information, and build consensus or at least understanding for decision-making.

Specific Questions

In order to carry out the charge, the task force will need to answer the following questions that are specific to the Flint Hills/ Tallgrass Prairie:

- What is the extent and nature of Tallgrass Prairie lands?
- Where are the areas of electricity transmission and other types of development in the Flint Hills/Tallgrass Prairie?
- What areas of Prairie have the highest need for preservation
- What areas of Prairie are most susceptible to wind-energy development?

- What are the potential impacts of wind development on wildlife, viewshed, and soundscape?
- Where are the major electricity transmission corridors in the Flint Hills/Tallgrass Prairie? What is the existing and anticipated future capacity on the transmission lines? How much additional wind-generated electricity can be accommodated by the system?
- What state resources are currently available to assist local government, landowners, and wind developers to make informed decisions?
- What are the potential impacts of wind-energy development on tourism values in the Flint Hills/Tallgrass Prairie, and how might nature-based tourism be enhanced?

Timetable

The Governor directed that the WPTF complete its study and report its recommendations to her by May 31, 2004. The WPTF will set its own schedule as necessary to meet its charge. Progress reports will be made at each regularly scheduled meeting of SERCC and as otherwise necessary.

Organization

WPTF is tasked with developing and evaluating policy recommendations that are based on technical, economic, and social considerations. The WPTF may establish subcommittees and draw on outside expertise as necessary to achieve its goals.

The Wind and Prairie Task Force is established as an arm of the State Energy Resources Coordination Council, as authorized by Executive Order 2002-4, and operates under rules and guidelines applicable to official bodies of the State of Kansas.

Appendix 5—Summary Tables for Consumption Forecasts

The consumption forecasts were developed in a three-step process. First, the historical annual growth rate of the energy consumption was calculated. To ensure stability in historical growth rates, outliers (anomalies in the data) were deleted throughout the data-filtering process. Second, the historical data were divided into two different sizes, a full sample and a truncated sample. The full sample incorporates all available historical data, whereas the

truncated sample utilizes only the recent consumption data. As noted above, more recent history is considered a better barometer for the future, especially considering some of the structural changes that have occurred recently in the energy markets. Finally, the historical data were modeled and projected into the future. A number of statistical techniques were utilized, including both static (actual values) and dynamic (previously forecasted) models.

Table A1—Summary of Kansas petroleum products consumption, 1990 to 2001, with projections to 2016 (thousands of barrels). Historical production data (through 2001) are from U.S. Department of Energy, Energy Information Administration. Note: 1999 value for kerosene consumption is estimated.

Year	Total Petroleum Products		LPG		Kerosene		Distillate		Gasoline		Residual Fuel	
	Consumption	Percent Change	Consumption	Percent Change	Consumption	Percent Change	Consumption	Percent Change	Consumption	Percent Change	Consumption	Percent Change
1990	77,702		15,565		27		16,697		28,627		229	
1991	71,152	-8.4%	13,293	-14.6%	25	-7.4%	15,624	-6.4%	28,041	-2.0%	128	-44.1%
1992	75,302	5.8%	16,816	26.5%	32	28.0%	14,895	-4.7%	27,821	-0.8%	178	39.1%
1993	67,099	-10.9%	8,269	-50.8%	37	15.6%	16,016	7.5%	28,480	2.4%	369	107.3%
1994	65,725	-2.0%	7,754	-6.2%	18	-51.4%	14,687	-8.3%	29,073	2.1%	187	-49.3%
1995	65,939	0.3%	4,924	-36.5%	29	61.1%	18,223	24.1%	29,402	1.1%	31	-83.4%
1996	72,912	10.6%	10,422	111.7%	37	27.6%	16,570	-9.1%	30,927	5.2%	289	832.3%
1997	75,567	3.6%	14,557	39.7%	59	59.5%	16,375	-1.2%	30,696	-0.7%	257	-11.0%
1998	75,831	0.3%	14,121	-3.0%	50	-15.3%	15,930	-2.7%	32,001	4.3%	269	4.7%
1999	86,287	13.8%	21,741	54.0%	36	-28.0%	15,660	-1.7%	33,550	4.8%	570	111.9%
2000	79,321	-8.1%	17,401	-20.0%	36	0.0%	14,849	-5.2%	31,894	-4.9%	937	64.4%
2001	73,907	-6.8%	11,122	-36.1%	41	13.9%	15,550	4.7%	30,297	-5.0%	1,301	38.8%
2002	79,855	8.0%	18,636	67.6%	39	-4.5%	15,462	-0.6%	30,245	-0.2%	1,328	2.1%
2003	81,308	1.8%	19,960	7.1%	37	-4.5%	15,375	-0.6%	30,193	-0.2%	1,356	2.1%
2004	82,866	1.9%	21,377	7.1%	36	-4.5%	15,288	-0.6%	30,140	-0.2%	1,385	2.1%
2005	84,535	2.0%	22,895	7.1%	34	-4.5%	15,202	-0.6%	30,089	-0.2%	1,414	2.1%
2006	86,323	2.1%	24,520	7.1%	33	-4.5%	15,116	-0.6%	30,037	-0.2%	1,444	2.1%
2007	88,239	2.2%	26,261	7.1%	31	-4.5%	15,030	-0.6%	29,985	-0.2%	1,475	2.1%
2008	90,291	2.3%	28,126	7.1%	30	-4.5%	14,945	-0.6%	29,933	-0.2%	1,506	2.1%
2009	92,489	2.4%	30,122	7.1%	28	-4.5%	14,861	-0.6%	29,881	-0.2%	1,537	2.1%
2010	94,841	2.5%	32,261	7.1%	27	-4.5%	14,777	-0.6%	29,830	-0.2%	1,570	2.1%
2011	97,360	2.7%	34,552	7.1%	26	-4.5%	14,693	-0.6%	29,778	-0.2%	1,603	2.1%
2012	100,057	2.8%	37,005	7.1%	25	-4.5%	14,610	-0.6%	29,727	-0.2%	1,637	2.1%
2013	102,943	2.9%	39,632	7.1%	24	-4.5%	14,528	-0.6%	29,676	-0.2%	1,671	2.1%
2014	106,032	3.0%	42,446	7.1%	23	-4.5%	14,446	-0.6%	29,625	-0.2%	1,706	2.1%
2015	109,338	3.1%	45,460	7.1%	22	-4.5%	14,364	-0.6%	29,574	-0.2%	1,742	2.1%
2016	112,876	3.2%	48,687	7.1%	21	-4.5%	14,283	-0.6%	29,523	-0.2%	1,779	2.1%

Table A1, continued.

Year	Petroleum Lubricants Consumption Forecast	Percent Change	Asphalt Consumption Forecast	Percent Change	Aviation Gasoline Consumption Forecast	Percent Change	Aviation Jet Fuel Consumption Forecast	Percent Change	Other Pet Prods Consumption Forecast	Percent Change
1990	1,036		3,875		136		3,701		7,809	
1991	927	-10.5%	3,721	-4.0%	124	-8.8%	3,296	-10.9%	5,973	-23.5%
1992	944	1.8%	3,715	-0.2%	142	14.5%	4,164	26.3%	6,595	10.4%
1993	962	1.9%	3,635	-2.2%	151	6.3%	3,617	-13.1%	5,563	-15.6%
1994	1,005	4.5%	4,741	30.4%	142	-6.0%	1,981	-45.2%	6,137	10.3%
1995	987	-1.8%	3,911	-17.5%	146	2.8%	2,414	21.9%	5,872	-4.3%
1996	959	-2.8%	3,581	-8.4%	177	21.2%	2,009	-16.8%	7,941	35.2%
1997	1,012	5.5%	2,115	-40.9%	247	39.5%	2,130	6.0%	8,119	2.2%
1998	1,061	4.8%	2,699	27.6%	199	-19.4%	2,157	1.3%	7,344	-9.5%
1999	1,071	0.9%	2,358	-12.6%	240	20.6%	3,476	61.1%	7,585	3.3%
2000	1,055	-1.5%	2,470	4.7%	215	-10.4%	3,234	-7.0%	7,230	-4.7%
2001	967	-8.3%	4,157	68.3%	196	-8.8%	2,259	-30.1%	8,017	10.9%
2002	962	-0.5%	2,527	-39.2%	196	0.2%	2,386	5.6%	8,073	0.7%
2003	957	-0.5%	2,585	2.3%	197	0.2%	2,519	5.6%	8,130	0.7%
2004	951	-0.5%	2,644	2.3%	197	0.2%	2,660	5.6%	8,187	0.7%
2005	946	-0.5%	2,705	2.3%	198	0.2%	2,809	5.6%	8,244	0.7%
2006	941	-0.5%	2,767	2.3%	198	0.2%	2,966	5.6%	8,302	0.7%
2007	936	-0.5%	2,831	2.3%	198	0.2%	3,133	5.6%	8,360	0.7%
2008	931	-0.5%	2,896	2.3%	199	0.2%	3,308	5.6%	8,418	0.7%
2009	926	-0.5%	2,963	2.3%	199	0.2%	3,493	5.6%	8,477	0.7%
2010	921	-0.5%	3,031	2.3%	200	0.2%	3,689	5.6%	8,536	0.7%
2011	916	-0.5%	3,101	2.3%	200	0.2%	3,895	5.6%	8,596	0.7%
2012	911	-0.5%	3,172	2.3%	200	0.2%	4,114	5.6%	8,656	0.7%
2013	906	-0.5%	3,245	2.3%	201	0.2%	4,344	5.6%	8,717	0.7%
2014	901	-0.5%	3,320	2.3%	201	0.2%	4,587	5.6%	8,778	0.7%
2015	896	-0.5%	3,396	2.3%	202	0.2%	4,844	5.6%	8,839	0.7%
2016	891	-0.5%	3,474	2.3%	202	0.2%	5,115	5.6%	8,901	0.7%

Table A2—Summary of Kansas natural gas consumption, 1990 to 2001, with projections to 2016 (thousand mcf). Historical production data (through 2001) are from U.S. Department of Energy, Energy Information Administration. *Fuel consumption forecast includes fuel delivery losses, which comprise lease fuel, pipeline fuel, and plant fuel; these losses were assumed to grow 2.5% per year throughout the forecast period.

Year	Kansas																	
	Total Gas			Residential			Commercial			Industrial			Utility			Fuel		
	Consumption	Percent Change	Forecast	Consumption	Percent Change	Forecast*												
1990	352,779		71,327		56,045		116,915		26,978		81,514							
1991	370,557	5.0%	74,825	4.9%	58,571	4.5%	123,517	4.5%	36,122	5.6%	77,522	33.9%						-4.9%
1992	343,217	-7.4%	71,522	-4.4%	53,973	-7.8%	130,807	-7.8%	13,981	5.9%	72,933	-61.3%						-5.9%
1993	391,605	14.1%	84,896	18.7%	56,023	3.8%	139,032	3.8%	21,636	6.3%	90,019	54.7%						23.4%
1994	418,017	6.7%	74,156	-12.7%	52,253	-6.7%	187,979	-6.7%	27,279	35.2%	76,350	26.1%						-15.2%
1995	368,341	-11.9%	75,846	2.3%	53,122	1.7%	129,515	1.7%	27,945	-31.1%	81,914	2.4%						7.3%
1996	362,964	-1.5%	85,376	12.6%	57,229	7.7%	110,294	7.7%	22,607	-14.8%	87,458	-19.1%						6.8%
1997	338,227	-6.8%	69,415	-18.7%	41,483	-27.5%	115,552	-27.5%	25,822	4.8%	85,955	14.2%						-1.7%
1998	326,671	-3.4%	70,217	1.2%	41,788	0.7%	110,881	0.7%	36,894	-4.0%	66,891	42.9%						-22.2%
1999	302,926	-7.3%	68,146	-2.9%	38,952	-6.8%	97,254	-6.8%	35,890	-12.3%	62,684	-2.7%						-6.3%
2000	312,363	3.1%	70,589	3.6%	39,647	1.8%	108,625	1.8%	33,509	11.7%	59,994	-6.6%						-4.3%
2001	272,487	-12.8%	70,182	-0.6%	38,127	-3.8%	92,771	-3.8%	23,267	-14.6%	48,140	-30.6%						-19.8%
2002	306,077	12.3%	71,002	1.2%	38,812	1.8%	108,065	1.8%	23,126	16.5%	65,071	-0.6%						35.2%
2003	294,515	-3.8%	70,941	-0.1%	38,589	-0.6%	93,453	-0.6%	24,802	-13.5%	66,730	7.2%						2.5%
2004	298,418	1.3%	70,880	-0.1%	38,367	-0.6%	94,140	-0.6%	26,599	0.7%	68,431	7.2%						2.5%
2005	302,500	1.4%	70,819	-0.1%	38,147	-0.6%	94,832	-0.6%	28,527	0.7%	70,176	7.2%						2.5%
2006	306,774	1.4%	70,758	-0.1%	37,928	-0.6%	95,530	-0.6%	30,594	0.7%	71,965	7.2%						2.5%
2007	311,249	1.5%	70,697	-0.1%	37,710	-0.6%	96,232	-0.6%	32,811	0.7%	73,799	7.2%						2.5%
2008	315,938	1.5%	70,636	-0.1%	37,493	-0.6%	96,940	-0.6%	35,189	0.7%	75,681	7.2%						2.5%
2009	320,854	1.6%	70,575	-0.1%	37,278	-0.6%	97,652	-0.6%	37,739	0.7%	77,610	7.2%						2.5%
2010	326,011	1.6%	70,514	-0.1%	37,064	-0.6%	98,370	-0.6%	40,474	0.7%	79,588	7.2%						2.5%
2011	331,422	1.7%	70,454	-0.1%	36,851	-0.6%	99,094	-0.6%	43,407	0.7%	81,617	7.2%						2.5%
2012	337,105	1.7%	70,393	-0.1%	36,639	-0.6%	99,822	-0.6%	46,552	0.7%	83,698	7.2%						2.5%
2013	343,075	1.8%	70,332	-0.1%	36,428	-0.6%	100,556	-0.6%	49,926	0.7%	85,831	7.2%						2.5%
2014	349,350	1.8%	70,272	-0.1%	36,219	-0.6%	101,296	-0.6%	53,544	0.7%	88,019	7.2%						2.5%
2015	355,950	1.9%	70,211	-0.1%	36,011	-0.6%	102,041	-0.6%	57,424	0.7%	90,263	7.2%						2.5%
2016	362,896	2.0%	70,151	-0.1%	35,804	-0.6%	102,791	-0.6%	61,586	0.7%	92,564	7.2%						2.5%

Table A3—Summary of Kansas electricity consumption, 1990 to 2001, with projections to 2016 (thousands of barrels). Historical production data (through 2001) are from U.S. Department of Energy, Energy Information Administration.

Year	Kansas Total Gas Consumption		Residential Consumption		Commercial Consumption		Industrial Consumption		Other Consumption	
	Forecast	Percent Change	Forecast	Percent Change	Forecast	Percent Change	Forecast	Percent Change	Forecast	Percent Change
1990	27,149		9,515		9,169		8,087		378	
1991	28,152	3.7%	9,933	4.4%	9,551	4.2%	8,284	2.4%	384	1.7%
1992	27,069	-3.8%	8,873	-10.7%	9,400	-1.6%	8,451	2.0%	346	-10.0%
1993	28,808	6.4%	9,986	12.5%	9,753	3.8%	8,702	3.0%	367	6.0%
1994	29,614	2.8%	10,131	1.4%	10,111	3.7%	9,001	3.4%	371	1.3%
1995	30,357	2.5%	10,356	2.2%	10,273	1.6%	9,356	3.9%	372	0.1%
1996	31,291	3.1%	10,672	3.1%	11,005	7.1%	9,231	-1.3%	383	3.0%
1997	32,270	3.1%	10,862	1.8%	11,424	3.8%	9,365	1.5%	618	61.5%
1998	34,140	5.8%	11,832	8.9%	12,073	5.7%	9,762	4.2%	473	-23.5%
1999	33,820	-0.9%	11,347	-4.1%	11,822	-2.1%	10,215	4.6%	436	-7.8%
2000	35,921	6.2%	12,528	10.4%	12,511	5.8%	10,222	0.1%	660	51.3%
2001	35,847	-0.2%	12,062	-3.7%	12,787	2.2%	10,569	3.4%	429	-35.0%
2002	36,813	2.7%	12,351	2.4%	13,184	3.1%	10,831	2.5%	448	4.4%
2003	37,807	2.7%	12,646	2.4%	13,593	3.1%	11,099	2.5%	468	4.4%
2004	38,827	2.7%	12,948	2.4%	14,016	3.1%	11,375	2.5%	488	4.4%
2005	39,875	2.7%	13,258	2.4%	14,451	3.1%	11,656	2.5%	510	4.4%
2006	40,953	2.7%	13,575	2.4%	14,900	3.1%	11,945	2.5%	532	4.4%
2007	42,060	2.7%	13,899	2.4%	15,363	3.1%	12,241	2.5%	556	4.4%
2008	43,197	2.7%	14,232	2.4%	15,841	3.1%	12,545	2.5%	581	4.4%
2009	44,366	2.7%	14,572	2.4%	16,333	3.1%	12,856	2.5%	606	4.4%
2010	45,567	2.7%	14,920	2.4%	16,840	3.1%	13,174	2.5%	633	4.4%
2011	46,802	2.7%	15,277	2.4%	17,363	3.1%	13,501	2.5%	661	4.4%
2012	48,070	2.7%	15,642	2.4%	17,903	3.1%	13,835	2.5%	690	4.4%
2013	49,374	2.7%	16,016	2.4%	18,459	3.1%	14,178	2.5%	721	4.4%
2014	50,714	2.7%	16,399	2.4%	19,032	3.1%	14,529	2.5%	753	4.4%
2015	52,090	2.7%	16,791	2.4%	19,624	3.1%	14,889	2.5%	786	4.4%
2016	53,505	2.7%	17,192	2.4%	20,233	3.1%	15,258	2.5%	821	4.4%