

Kansas Energy Plan 2007

Kansas Energy Chart Book

Kansas Energy Council
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Kansas Energy Plan 2007

[Note: Current chapters were developed during the 2006 planning cycle; additional chapters will be developed in this and future year's planning cycle. A full outline of the Kansas Energy Plan is available on the Kansas Energy Council web site (http://www.kec.kansas.gov/energy_plan.htm).]

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Chapter 3: Fossil Fuels—Coal Gasification—Integrated Gasification Combined Cycle (IGCC) Coal Power Plants

For additional charts and graphs related to coal-based electricity, please refer to the *Kansas Energy Chart Book*, Chapter 3 (http://kec.kansas.gov/chart_book/).

GOAL: Increase opportunities to generate electricity through integrated gasification combined cycle (IGCC) coal power plants, in association with carbon dioxide capture and storage capabilities.

Developing low-emission energy-generation technologies is an essential component of a comprehensive, long-range strategy to meet the state's future energy needs.

Topic/Issue Description

Coal is the world's most abundant and widely distributed fossil fuel resource. Some 23% of the world's primary energy needs are met by coal and 39% of the world's electricity is generated from coal. About 70% of world steel production depends on coal feedstock.

The U.S. has the world's largest coal reserves, which analysts believe are sufficient for the next 200 to 250 years.¹ In Kansas, coal is used to generate 74% of the electricity consumed, compared to 52% nationally. For the foreseeable future, coal is forecasted to remain one of the lowest-cost electric power sources in Kansas and the rest of the country.

However, coal-fired power plants are responsible for 60% of U.S. sulfur dioxide emissions, 33% of U.S. mercury emissions, and 25% of U.S. nitrogen oxide emissions. In addition to these pollutants, U.S. coal-fired power plants are also responsible for more than 33% of the nation's greenhouse gas (carbon dioxide) emissions. Worldwide, burning coal produces about 9 billion metric tons of carbon dioxide each year that is released to the atmosphere, about 70% of this being from power generation. Other estimates put carbon dioxide emissions from power generation at one quarter to one third of the world total of over 27 billion metric tons of CO₂ emissions.

The use of coal for electrical generation is growing worldwide. U.S. utility companies have announced their intention of building more than 100 new coal plants over the next 10 to 15 years. Currently, China is building the equivalent of one large coal-fired plant each week.

¹ Steve Quinn, October 15, 2006, "U.S. coal plant boom poses big environmental, economic questions" (Associated Press story).

Given the expected 60-year life span of these plants, this new coal-fired generation could collectively release an enormous amount of carbon dioxide as well as other pollutants into the atmosphere. Development of integrated gasification combined cycle (IGCC) coal power plants in association with carbon dioxide capture and storage—not just in Kansas, but worldwide—is a vital component of any strategy to reduce emissions of greenhouse gases and other pollutants into the atmosphere.

In IGCC systems, coal is not combusted directly (as it is in conventional coal-fired plants). Instead, the coal reacts with oxygen and steam to form a so-called syngas (primarily hydrogen) and solid slag (containing much of the traditional pollutants). After additional cleaning, the syngas is burned in a gas turbine to generate electricity and to produce steam to power a steam turbine.

IGCC plants have been tested as a means of using coal and steam to produce hydrogen and carbon monoxide, which are then burned in a gas turbine with secondary steam turbine (i.e., combined cycle) to produce electricity. If the gasifier is fed with oxygen rather than air, the flue gas contains highly concentrated CO₂ that can readily be captured, at about half the cost of capture from conventional plants. Ten oxygen-fired gasifiers are operational in the U.S., including one in Coffeyville, Kansas.²

Captured carbon dioxide (CO₂) gas is being used, on a commercial basis, for enhanced oil recovery in West Texas, where today over 1,800 miles of pipelines connect oilfields to a number of carbon dioxide sources in the region. In North Dakota, at the Great Plains Synfuels Plant, roughly 5,000 metric tons per day of CO₂ is piped 320 kilometers into Canada for enhanced oil recovery. Overall in the U.S., 32 million metric tons of CO₂ is used annually for enhanced oil recovery, about 10% of this from anthropogenic sources.

Another way to sequester CO₂ involves injection into deep, unmineable coal seams where it is adsorbed to displace methane (natural gas). This is another potential value-added use or disposal strategy. Currently, the economics of enhanced coal bed methane extraction are not as favorable as enhanced oil recovery, but the potential is considered to be large.

The scale of envisaged future CO₂ disposal far exceeds current use; however, current practices demonstrate the practicality and safety of sequestration on a

² Coffeyville Resources in Coffeyville, Kansas, uses partial oxidation gasification technology to produce approximately 413,200 short tons of ammonia, two-thirds of which is further upgraded to 663,300 short tons of Urea Ammonium Nitrate Solution (UAN) per year. The Coffeyville gasifier converts low-priced petroleum coke into a hydrogen rich synthesis gas (similar to high-BTU coal). The syngas is then converted into anhydrous ammonia; the ammonia is further upgraded into UAN in a fully integrated plant licensed from Weatherly.

small scale. Research on geologic sequestration, particularly in deep saline aquifers and depleted oil and gas fields, is ongoing. In both, the CO₂ is expected to remain as a supercritical gas for thousands of years, with some trapping by dissolution and mineral precipitation. Large-scale storage of CO₂ from power generation will require an extensive pipeline network similar in scale to the existing natural gas pipeline network.

The advantages of IGCC coal power plants that have carbon capture and storage capabilities justify the policy to support this form of generation, once the feasibility of the technologies has been demonstrated (see discussion of FutureGen below).

Existing Policies and Programs

1. FutureGen is a project of the U.S. Department of Energy to build a “near zero-emissions” coal-fired power plant that intends to produce hydrogen and electricity while using carbon capture and storage. FutureGen will be a 275-megawatt power plant expected to take ten years to build and whose cost will be shared: \$620 million by the Department of Energy and \$250 million by a large industrial consortium. It will be operated as a research facility. When operational, the prototype will be the cleanest fossil fuel fired power plant in the world and will establish the technical and economic feasibility of producing electricity and hydrogen from coal, while capturing and sequestering the carbon dioxide generated in the process at an operating rate of one million metric tons per year. The DOE originally predicted it would demonstrate the IGCC and carbon capture and storage technology and have commercial designs available by 2012, but it is likely this was an overly optimistic prediction.
2. The Kyoto Protocol is an agreement made under the United Nations Framework Convention on Climate Change. Countries that ratify this protocol commit to reduce their emissions of carbon dioxide and five other greenhouse gases, or engage in emissions trading if they maintain or increase emissions of these gases. As of August, 2006, 165 countries and other governmental entities have ratified the agreement. The United States and Australia, though signatories, have not ratified the agreement.
3. Kansas House Substitute for Senate Bill 303 (passed in the 2006 Legislative session) provides (1) Kansas tax credits for expansion of existing IGCC plants; (2) property tax exemption for any new or expanded IGCC plant; and (3) KDFR revenue bonds for financing of new or expanded IGCC plants.

Policy and Program Recommendations Requiring Legislative Action

1. The Governor and the Legislature shall determine if and how State- and consumer-funded support should be structure to stimulate IGCC coal power plants, in association with carbon dioxide capture and storage.

a. Description

The Legislature is encouraged to investigate the need for additional incentives (e.g., State tax credits, KDFFA financing) to stimulate the development of IGCC coal power plants, in association with carbon dioxide capture and storage, and, if deemed necessary, to approve such incentives.

b. Recommended Actions

i. Responsible parties

Governor, Legislature.

ii. Legislative action

Enabling legislation may be necessary.

iii. Budget Requirements

Some State funding may be necessary, depending on incentives enacted.

iv. Implementation Timeline

Immediately following effective date of enabling legislation.

c. Implications of the proposal

Pros

- i. Reduces emissions of regulated pollutants.
- ii. Reduces emissions of carbon dioxide.

Cons

- i. Tax credits decrease State revenues and, thus, reduce funding for other items in the State general budget.
- ii. May increase price of electricity for ratepayers whose utility is awarded additional basis points. (Note: unlike tax incentives or KDFFA financing, granting an automatic higher rate of return on

utility investment in IGCC coal power plants would increase ratepayer bills.)

- iii. If market conditions change (e.g., the Federal government enacts CO₂ regulation), additional State subsidies may become excessive.

Policy and Program Recommendations Requiring Administrative Action

1. The Governor and the Legislature shall determine if and how State- and consumer-funded support should be structure to stimulate IGCC coal power plants, in association with carbon dioxide capture and storage.

[See above discussion under Recommendations Requiring Administrative Action.]

Policy and Program Recommendations Requiring Action by the Kansas Corporation Commission

1. The Kansas Corporation Commission should consider the advantages associated with of IGCC coal power plants, combined with carbon capture and sequestration, when evaluating applications or requests to approve decisions by jurisdictional utilities to invest in new generation or enter purchase power agreements for IGCC coal power plants. As part of this broader consideration, the KCC will require utilities to demonstrate that competitive bids were solicited and the most responsible selection was made for the purchased power or investment.

Note: This proposal positions the State to take advantage of IGCC and carbon capture and storage technologies, if the FutureGen prototype demonstrates their feasibility.

a. Description

This legislation would enable the KCC to consider the value of lower-emissions coal generation and carbon capture and storage when evaluating investments in or purchase power agreements (PPAs) from jurisdictional utilities for integrated gasification combined cycle (IGCC) coal power plants, in association with carbon dioxide capture and storage capabilities.

It is recognized that, without this consideration, PPAs for IGCC coal power plants may not be cost competitive relative to existing pulverized coal-fired generation.

With this policy, the State recognizes the potential benefit to Kansans of reduced pollutants and greenhouse gas emissions attributable to integrated gasification combined cycle (IGCC) coal power plants, in association with carbon dioxide capture and storage capabilities, and declares that it is appropriate for the Kansas Corporation Commission to approve rates for electricity generated by these technologies, even if those rates are higher than what they would have been with full reliance on conventional coal-fired generation.

b. Recommended Actions

i. Responsible parties

Kansas Corporation Commission; electric utilities (this policy provides for the future adoption of these technologies by Kansas electric utilities).

ii. Legislative action

No legislation is necessary.

iii. Budget Requirements

No state funds required.

iv. Implementation Timeline

Effective January 2007, the KCC is encouraged to implement this broader consideration.

c. Implications of the proposal***Pros***

- i. Reduced emissions of regulated pollutants.
- ii. Reduced emissions of carbon dioxide
- iii. Increased ability to use higher-sulfur Kansas coal in IGCC systems.
- iv. Suitability of the state's geologic formations (e.g., depleted oil and gas reservoirs) for carbon sequestration.
- v. Does not require additional state funding or result in additional loss of tax revenues.

Cons

- i. Increases price of electricity to ratepayers whose utilities invest in IGCC power plants with carbon capture and storage.
- ii. May disadvantage the state economically in the absence of federal carbon regulation.
- iii. Uncertainties associated with feasibility of carbon capture and storage.

Policy and Program Recommendations for Ongoing Study

(None)

Chapter 6: Wind Energy—Commercial and Community Wind

For additional charts and graphs related to wind energy, please refer to the *Kansas Energy Chart Book*, Chapter 6 (http://kec.kansas.gov/chart_book/).

GOAL: Develop 1,000 MW of wind-powered generation in Kansas by 2015.

Developing low-emission energy-generation technologies is an essential component of a comprehensive, long-range strategy to meet the state's future energy needs.

Topic/Issue Description

Kansas has abundant wind-energy resources. Along with North Dakota and Texas, Kansas is ranked as having the best potential nationwide for the development of wind-generated electricity.

Currently Kansas has 364 MW of installed wind capacity, and based solely on its wind resource, the State could generate much more wind-based electricity.³ Many point to the vast development potential in the western part of the state; however, significant transmission upgrades and investment would be required to accommodate large-scale wind development in western Kansas.

In addition to being abundant and renewable, wind has the advantage of being clean—that is, wind-based electricity produces no emissions of regulated pollutants (such as SO₂, NO_x, or mercury) or currently unregulated carbon dioxide (CO₂).

In her January 21, 2005, letter to Kansas Corporation Commission Chair Brian Moline, Governor Kathleen Sebelius articulated her goal of developing the state's wind resource:

“As part of my goals to promote wind energy development in appropriate areas of the state, I believe it is appropriate to establish a vision for Kansas. I am challenging our electric industry to have 1,000 megawatts (MW) of renewable energy capacity installed in Kansas by 2015.”

Governor Sebelius asked the KCC to “look at the full range of benefits that renewable energy brings to Kansas and how those relate to additional investment that may be needed to meet the goal ... outlined for our electric industry.” In response to this request, KCC staff conducted an in-depth analysis of the benefits and costs of the Governor's “challenge.”

³ A February 2002 Report of the U.S. PIRG Education Fund and State Public Interest Research Groups, *Generating Solutions: How States Are Putting Renewable Energy into Action* references Kansas in Appendix C as having 1,675,895 million kWh of wind potential.

The KCC benefit cost analysis shows that *additional* wind-generated electricity in Kansas is likely to be more expensive than electricity from the state's existing power plants, in spite of substantial federal and state incentives available for wind development (see list of existing policies below). Although the price of wind-generated electricity from the Gray County Wind Farm and Elk River Wind Farm was competitive for Aquila and Empire, utilities that relied more heavily on gas-fired generation, most utilities primarily rely on relatively inexpensive coal-fired and nuclear generation, and, thus, the cost of wind-generated electricity tends not to be competitive in most situations.⁴

However, the benefit cost analysis also shows that if the advantages the State derives from increasing its reliance on clean energy sources (e.g., reduction in health-related costs associated with airborne emissions) are factored into the equation, then wind is cost-effective in many instances.

It is important to note that the above advantages do not include the avoidance of carbon dioxide emissions, which are strongly correlated with global climate change. Although the U.S. currently has no policies or regulations to control carbon dioxide emissions, a recently released study compiled by Sir Nicholas Stern, former chief economist of the World Bank, suggests that the economic consequences of climate change could be devastating and calls for immediate government action, including a recommendation for 30% reduction of carbon emissions by 2020.⁵ In light of the expected federal regulation of carbon dioxide emissions, the economic advantages of wind would be expected to be even greater.

In summary, under current conditions, *additional* wind-generated electricity in Kansas generally will cost utilities, and thus ratepayers, more than electricity generated from existing power plants. Nonetheless, the advantages wind brings in terms of being a renewable and clean energy source, which can help reduce the state's reliance on fossil fuel resources, provide ample justification for a state policy to support additional wind development.

Existing Policies and Programs

2. The Federal Production Tax Credit (PTC) has been the most significant factor in U.S. wind energy development since its adoption in the Energy Policy Act of 1992. Originally set at a value of \$0.015/kWh, it automatically adjusts for inflation and now amounts to \$0.019/kWh. Typically extended for short

⁴ Discussion of relative costs of is based on data from the Kansas Corporation Commission staff cost-benefit analysis made available to the KEC staff for assistance in developing this section.

⁵ More information about the *Stern Review on the Economics of Climate Change* is available at the BBC web site (<http://news.bbc.co.uk/2/hi/business/6098362.stm>).

intervals, it is currently set to expire at the end of 2008. Use of the tax credit requires significant eligible tax liability, tending to make wind attractive to (and to some extent restricting it to) large corporate developers.

3. Accelerated Cost Recovery, or depreciation, is available for most wind farm costs for federal tax purposes.
4. Kansas Property Tax Exemption is available for “all property actually and regularly used predominantly to produce and generate electricity utilizing renewable energy resources or technologies.”
5. Kansas Sales Tax Exemption [K.S.A. 79-3606(cc)] provides sales tax exemptions on certain sales of tangible personal property or services. An exemption certificate must be acquired from the state.
6. Kansas Job Creation Tax Credit [K.S.A. 79-32,160a] provides an income tax credits under specific circumstances for projects that create at least five new jobs.
7. Kansas Parallel Electric Generation Services Act [K.S.A. 66-1,184], which passed in 2001, requires an electric utility to pay no less than 150% of the utility’s monthly system average cost of energy per kWh to customers with excess energy to sell.
8. A group of Kansas laws were amended in 2003 to allow the formation of renewable energy co-ops consisting of five or more persons that produce at least 100 kW of energy (includes many but not all of the following: K.S.A. 17-4655 through 17-4681).
9. The Energy Policy Act (EPACT) of 2005 directs the federal government to increase its renewable energy use, to the extent economically feasible and technically practicable, to not less than 3% in FY07-09, 5% in FY10-12, 7.5% in FY13 and each fiscal year thereafter. Note: This will quickly make federal agencies large purchasers of renewable energy. Much of the demand will likely be met through Green Tags and Renewable Energy Certificates.
10. The U.S. Department of Agriculture provides competitive grants up to \$250,000 for energy efficiency improvements or \$500,000 for renewable energy systems (not to exceed 25% of the total project cost. Loan guarantees are also available to a maximum of \$10 million.

Policy and Program Recommendations Requiring Legislative Action

1. The Governor and the Legislature shall determine if and how State- and consumer-funded support should be structured to stimulate wind-energy development.

a. Description

The Legislature is encouraged to investigate the need for additional incentives (e.g., State tax credits, KDFA financing) to stimulate the development of the State's wind energy resource, and, if deemed necessary, to approve such incentives.

b. Recommended Actions

i. Responsible parties

Governor, Legislature.

ii. Legislative action

Enabling legislation may be necessary.

iii. Budget Requirements

Some additional State funding may be necessary, depending on type of incentives enacted.

iv. Implementation Timeline

Immediately following effective date of enabling legislation.

c. Implications of the proposal

Pros

- i. Reduces emissions of regulated pollutants.
- ii. Reduces emissions of carbon dioxide.
- iii. Creates economic development opportunities in rural areas of the state where wind development occurs.

Cons

- iv. Tax credits reduce State revenues and, thus, reduce funding for other items in the State general budget.
- v. May increase price of wind-generated electricity for ratepayers whose utility is awarded additional basis points. (Note: unlike

tax incentives or KDFA financing, granting an automatic higher rate of return on utility investment in wind projects would increase ratepayer bills.)

- vi. If market conditions change (e.g., the Federal government enacts CO₂ regulation), additional State subsidies may become excessive.
- vii. Uncertainty due to uncontrollable variables such as continuation of the federal production tax credit.

Policy and Program Recommendations Requiring Administrative Action

1. The Governor and the Legislature shall determine if and how State- and consumer-funded support should be structured to stimulate wind-energy development.

[See above discussion under Recommendations Requiring Legislative Action.]

Policy and Program Recommendations Requiring Action by the Kansas Corporation Commission

1. The Kansas Corporation Commission should consider the advantages associated with wind-generated electricity when evaluating applications or requests to approve decisions by jurisdictional utilities to invest in new generation or enter purchase power agreements for wind. As part of this broader consideration, the KCC will require utilities to demonstrate that competitive bids were solicited and the most responsible selection was made for the purchased power or investment.

a. Description

This recommendation encourages the KCC to consider the value of wind energy (in terms of its being a renewable and clean energy source) to Kansans in the Commission's formal evaluation of applications or requests to approve decisions by jurisdictional utilities to invest in new generation or enter purchase power agreements for wind-based electricity.

With this policy, the State recognizes the potential benefit to Kansans of reduced pollutants and greenhouse gas emissions attributable to wind development and declares that it is appropriate for the Kansas Corporation Commission to approve rates for electricity generated by clean and renewable sources, even if those rates are higher than what they would have been with full reliance on existing generation technologies.

b. Recommended Actions

i. Responsible parties

Utilities, KCC, wind-project developers.

ii. Legislative action

No enabling legislation is necessary.

iii. Budget Requirements

No state funds are required.

iv. Implementation Timeline

Effective January 2007, the KCC is encouraged to implement this broader consideration.

c. Implications of the proposal

Pros

- i. Reduces emissions of regulated pollutants.
- ii. Reduces emissions of carbon dioxide.
- iii. Creates economic development opportunities in rural areas of the state where wind development occurs.
- iv. Does not require additional state funding or result in additional loss of state tax revenues.

Cons

- i. Increases price of electricity to ratepayers whose utilities incorporate wind into their generation portfolios.
- ii. Uncertainty due to uncontrollable variables such as continuation of the federal production tax credit.

Policy and Program Recommendations for Ongoing Study

(None)

Chapter 9: Energy Conservation and Efficiency

For additional data related to energy efficiency and conservation, please refer to the *Kansas Energy Chart Book*, Chapter 9 (http://kec.kansas.gov/chart_book/).

GOAL: Facilitate cost-effective energy conservation in the public, residential, commercial, and industrial sectors.

Reducing demand for energy through conservation and efficiency improvements is an essential component of a comprehensive, long-range strategy to meet the state's future energy needs.

Topic / Issue Description

Nationally, consumption of electricity is on the rise. According to the North American Electric Reliability Council (NERC), U.S. demand for electricity is expected to increase 20 percent from 2006 to 2015.⁶ Demand for electricity in July and August of 2006 reached record levels.⁷

In Kansas, electric utility customers used 37,022,066 megawatthours in 2004, the most recent year for which we have data.⁸ The state's demand for electricity is predicted to climb by about 2.5 percent annually over the next 10 years. In response to this projected increase in demand, many of the state's utilities have plans to build additional coal-fired power plants.

On the natural gas side, the statewide demand has declined in recent years in response to higher prices. In 2003, the state's consumption of natural gas was 281,346,000 Mcf, a 7.8 percent decrease from 2002 levels, and demand is expected to decline by about 2.0 percent annually through 2009.⁹

All Kansans may benefit from reducing the demand for energy through energy conservation efforts. Reduced demand puts downward pressure on all energy-related prices and defers such energy-related costs as investment in new power plants and extraction equipment. It also reduces health and environmental costs related to the energy-related emission of pollutants and greenhouse gases. And, finally, energy conservation by individual ratepayers can provide them with lower monthly utility bills.

⁶ Wall Street Journal, October 16, 2006: U.S. Electricity Demand is Outpacing New Resources, Report Warns, Rebecca Smith.

⁷ Wall Street Journal, October 16, 2006: Less Power to the People: Ten innovations that will reduce the amount of energy we consume, Rebecca Smith.

⁸ Energy Information Administration web site: http://www.eia.doe.gov/cneaf/electricity/esr/esr_sum.html, Electric Sales, Revenue, and Price, Table 10 (accessed October 23, 2006).

⁹ Kansas Energy Council, 2005, Kansas Energy Report 2006, Appendix 3 (PDF available online: <http://www.kec.kansas.gov/reports.htm>).

Many new and existing Kansas buildings are deficient in cost-effective energy conservation measures (e.g., attic and wall insulation, efficient HVAC systems), resulting in excessive energy use and, consequently, excessive utility bills year round. Cost-effective energy conservation measures—such as upgrading attic insulation to at least R-38 or installing an Energy Star qualified furnace—can reduce energy usage by as much as 20 percent,¹⁰ while providing dollar savings as well. Increased adoption of these measures statewide can have a significant impact on energy consumption in Kansas.

Existing Policies and Programs

1. K.S.A. 66-1227 adopts the International Energy Conservation Code 2003 (IECC 2003) as the applicable thermal efficiency standard for new commercial and industrial structures in Kansas; the law also states that the “state corporation commission has no authority to adopt or enforce energy efficiency standards for residential, commercial, or industrial structures.”
2. K.S.A. 66-1228 requires the builder or seller of a new home to disclose to prospective buyers, upon request or at closing, information regarding the thermal efficiency of the structure using a form outlined in the statute. The timing of the disclosure and the absence of specific information on the disclosure form undermine its effectiveness in informing buyers about the energy efficiency of new houses.
3. Current federal law provides tax credits for homeowners who install certain energy efficiency and conservation measures; however, the credits are set to expire at the end of 2007.
4. Energy Star is a joint program of the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE). In 1992 the EPA introduced Energy Star as a voluntary labeling program designed to identify and promote energy-efficient products to reduce greenhouse gas emissions. Computers and monitors were the first products to be labeled. Through 1995, EPA expanded the label to additional office equipment products and residential heating and cooling equipment. In 1996, EPA partnered with the DOE for particular product categories. The Energy Star label is now on major appliances, office equipment, lighting, home electronics, and more. EPA has also extended the label to cover new homes and commercial and industrial buildings.

¹⁰ U.S. EPA and DOE Energy Star web site: http://www.energystar.gov/index.cfm?c=heat_cool.pr_hvac and http://www.energystar.gov/index.cfm?c=home_sealing.hm_improvement_sealing (accessed October 23, 2006).

5. Statewide, a number of municipalities and at least one county have adopted ordinances addressing, to varying degrees, energy efficiency and conservation in residential structures. Several Kansas cities have adopted the International Residential Code (IRC), which addresses energy efficiency in Chapter 11. Three cities (Fairway, Leawood, and Overland Park) have adopted either the 2000 or 2003 version of the International Energy Conservation Code (IECC).¹¹ To ensure public safety, the City of Hays in 1995 established building codes on combustion safety and ventilation air. A partnership with Midwest Energy was established to help implement these codes and has led to significant improvements in safety and energy efficiency in new residential construction.
6. The Division of Facilities Management in the Kansas Department of Administration has adopted the 2003 International Energy Conservation Code (IECC) as its standard for all new state-owned facilities. Compliance with these standards will be a contractual requirement and will be enforced by the Division of Facilities Management.
7. Several Kansas utilities offer energy conservation services to their customers, including energy audits and rebates for heating systems, water heaters, and appliances. For example, Midwest Energy has been offering audits since the 1980s and, in response to the 1995 adoption of stronger building codes by the City of Hays, developed a program of energy conservation services for its residential and small commercial customers to improve the safety of structures and, possibly, their energy use. In addition to audits, Midwest Energy offers blower door tests, residential energy ratings, guidance related to HVAC (Heating, Ventilation, and Air Conditioning) sizing, infrared scanning, and suggested lighting design.¹² Some services are partially financed by modest customer fees, with the remainder of the costs covered by the utility and passed along to all ratepayers (resulting in about a 10- to 15-cent increase on monthly bills). Based on a survey of its customers, Midwest Energy concludes that their energy services program increases overall customer satisfaction.
8. The Kansas Weatherization Assistance Program (WAP), operated by the Kansas Housing Resources Corporation, provides housing improvements that increase energy efficiency in households with income up to 150% of the federal poverty level or 60% of the state median income, whichever is higher. WAP has historically been funded solely through federal funds (15% of the LIEAP funds from the U.S. Department of Energy). In Fiscal Year 2007, State of Kansas general funds were appropriated to supplement the program.

¹¹ Based on 2006 International Code Council data base for Kansas: <http://www.iccsafe.org/government/> (accessed October 27, 2006).

¹² Midwest Energy, Inc. web site: <http://www.mwenergy.com/energyservices.html> (accessed October 23, 2006).

9. The Facilities Conservation Improvement Program (FCIP), administered by the Kansas Energy Office, is designed to streamline the acquisition and installation of energy conservation measures by public agencies. FCIP enables public agencies (e.g., the state, municipalities, counties, and schools) to locate qualified contractors and access financing for planning and implementing conservation projects quickly and easily. It facilitates tax-exempt financing and access to lower interest rates, making projects more economical and reducing the pay-back period. Public entities enter into an agreement with a private energy service company (ESCO). The ESCO identifies and evaluates energy-saving opportunities and recommends a package of improvements to be paid for through the projected energy savings. The ESCO guarantees that customer savings meet or exceed annual payments to cover all project costs—usually through a contract having a term of between ten and fifteen years. If actual savings don't materialize, falling below the annual payments made to cover the project cost, the ESCO pays the difference. To help ensure savings over the term of the contract, the ESCO offers staff training and long-term maintenance services.

10. In November 2006, the Kansas Housing Resources Corporation (KHRC) launched KEEP, a statewide loan program to promote energy conservation and reduce home heating costs. This new program allows low- and moderate-income homeowners to obtain low-interest loans to energy conservation home improvements. With \$2 million in State funding, the program funds half of the loan amount at zero interest (the other half is provided by Sunflower Bank), up to a maximum of \$7,500.

11. In August 2006, the Kansas Corporation Commission opened a generic investigation (Docket No. 07-GIME-116-GIV), *In the Matter of the General Investigation of Complying with Section 1252 of the Energy Policy Act of 2005 related to Smart Metering Technology*. This investigation focuses on the appropriateness of “utilities providing and installing time-based meters and communications devices,” and solicits comments from all jurisdictional electric utilities to the following questions:
 - What is the current status of smart metering technology used in service by Kansas utilities? What types of meters are used by different types of customers today?

 - What types of advanced metering and communication devices are available on the market today that could be used to assist utilities in demand response programs?

 - In terms of general policy, should Kansas utilities be required to begin offering smart metering technology to all customer classes, implement time-based rates, and initiate other broadly available demand response programs?

Additionally, the docket investigates the adoption of the following standards contained in the Public Utility Regulatory Policy Act revisions in the Energy Policy Act of 2005:

Standard 1. “...each electric utility shall offer each of its customer classes, and provide individual customers upon customer request, a time-based rate schedule under which the rate charged by the electric utility varies during different time periods and reflects the variance, if any, in the utility’s costs of generating and purchasing electricity at the wholesale level. The time-based rate schedules shall enable the electric consumer to manage energy use and cost through advanced metering and communications technology.”

Standard 2. ...”Each electric utility subject to subparagraph (A) [Standard 1] shall provide each customer requesting a time-based meter capable of enabling the utility and customer to offer and receive such rate, respectively.”

In September 2006, the Kansas Corporation Commission opened a generic investigation (Docket No. 07-GIMX-247-GIV), *In the Matter of a General Investigation Regarding Energy Efficiency Programs*. Among the many questions raised about energy efficiency programs, this document contains the following questions about rate design—specifically, so-called decoupling:

May the Commission authorize a “decoupling” of revenue requirements from usage in order to remove disincentives for energy efficiency? (Section 9c, p. 6).

Is “decoupling” of revenue requirements from sales volumes a necessary or desirable mechanism to remove disincentives for energy efficiency programs? What are the pros and cons of such a mechanism? If decoupling is not implemented, is it appropriate and desirable to have an *ex post* mechanism to recover lost margins from sales not made due to energy efficiency investments? What are the pros and cons of this approach?” (Section 15d, p. 11).

12. Current state law, K.S.A. 66-177(e), permits the Kansas Corporation Commission to grant an additional 50 to 200 basis points on the utility’s allowed rate of return on utility investments in renewable energy and energy conservation and energy efficiency. This higher rate of return may be allowed if it is determined, after public hearing, that these programs or measures provide “a reduction in energy usage by its customers in a cost-effective manner.”
13. The U.S. Environmental Protection Agency and the Department of Energy have developed a National Action Plan for Energy Efficiency, the goal of which is “to

create a sustainable, aggressive national commitment to energy efficiency through gas and electric utilities, utility regulators, and partner organizations.”¹³ Chief among the recommendations released in July 2006 are the recognition of energy efficiency as a high-priority energy resource and a long-term commitment to implementing energy efficiency through stable funding and the alignment of utility incentives with delivery of cost-effective energy efficiency programs.

The existing energy conservation policies and programs described above are limited in scope, in terms of their eligibility requirements, overall size, and geographic coverage. Therefore, the current set of programs does not, on its own, represent a comprehensive effort to achieve cost-effective energy conservation on a statewide basis.

¹³ EPA, National Action Plan for Energy Efficiency Web Site:
<http://www.epa.gov/cleanrgy/actionplan/eeactionplan.htm> (accessed October 24, 2006).

Policy and Program Recommendations Requiring Legislative Action

1. Establish Statewide Utility-operated Energy Education and Conservation Promotion Programs

a. Description

As a first step towards increasing energy conservation in the state, the state's electric utilities would be required to provide all of their customers with information about energy conservation opportunities and options, including information on energy-related services that are locally available.

Key features of this proposal are (1) that all of the state's electric utilities participate; (2) that it is designed to increase general awareness and understanding of conservation opportunities; (3) that it is designed to further direct consumers so they may increase their understanding of particular conservation opportunities that are specific to their energy-use situations; (4) that separate "curricula" will be developed for the general public, K-12 students, local governments, as well as for the residential, commercial, and industrial utility classes, as well as the transportation sector; (5) that energy conservation information for residential customers will initially focus on the conservation measures listed in the Energy Efficiency Disclosure Form (see Attachment A), and (6) that the conduct of the utility-operated programs, including the release and content of all informational and promotional materials, will conform with standards developed by the Kansas Energy Office and advisory group (see Recommended Actions, below).

The program standards will include information about (1) how to access energy conservation services, such as energy audits, throughout the state; (2) financing energy conservation improvements; (3) existing government programs, such as the state's Weatherization Assistance Program and energy efficiency loan program (KEEP). Other details of the standards, including a consideration of relevant targets and goals, will be developed during the initial planning phase by the advisory group. The advisory group may form separate committees to develop the different "curricula."

Once the planning phase is completed and guidelines have been developed, jurisdictional utilities will be responsible for developing and delivering their own energy education and conservation promotion programs that comply with statewide guidelines.

Municipal utilities and cooperatives will also be responsible for delivering energy education and conservation promotion programs that comply with statewide guidelines. However, it will be the responsibility of the Kansas Energy Office, either by contracting with the state associations (Kansas

Electric Cooperatives and/or Kansas Municipal Utilities) or with a non-profit or educational entity, to develop programs for the municipal utilities and cooperatives that are consistent with the guidelines.

The proposed program does not require or prohibit utilities from developing additional energy efficiency and conservation services charged to customers on a fee-for-service basis.

In order to monitor the effectiveness of this program, measurable goals (defined as a percentage of energy consumption) should be established. The Kansas Energy Office will consult with the advisory group prior to adopting baseline data and goals, data-collection methodology, and reporting formats. Reports should be generated annually by the utilities and presented to the Kansas Energy Council, the Kansas Energy Office, and the Legislature.

b. Recommended Actions

i. Responsible parties

The Kansas Corporation Commission will have oversight on the implementation of these educational and promotional programs offered by jurisdictional utilities.

The Kansas Energy Office will work with the advisory group to develop program guidelines during the planning phase. During the implementation phase, the Kansas Energy Office will monitor the implementation of the programs developed by (or for) the municipal utilities and cooperatives.

All Kansas electric utilities will be required to provide, to all classes of customers, energy education and conservation promotion programs that are consistent with statewide program guidelines.

ii. Legislative action

Legislation is needed that requires all electric utilities to implement energy education and conservation promotion programs that are consistent with statewide standards and that also directs the Kansas Energy Office at the KCC to manage this program for the municipal utilities and cooperatives.

iii. Implementation timeline

The statewide programs will be implemented in two phases, with a separate budget for each phase. Phase 1, the planning phase, will

begin on July 1, 2007, and Phase 2, the implementation, will begin on July 1, 2008.

iv. Budget requirements

State funding of \$50,000 is estimated for the Phase 1 planning and development of the statewide program guidelines. The budget requirements for Phase 2 will be determined after the planning effort is completed. Costs incurred by the jurisdictional utilities may be reviewed by the KCC as part of the standard rate case procedures.

v. Advisory group

During Phase 1, an advisory group will work with the Kansas Energy Office to develop the statewide requirements and guidelines for the utility-operated energy education and conservation promotion programs. The advisory group will consist of (1) one representative from the municipal electric utilities, (2) one representative from the electric cooperatives, (3) two representatives from the investor-owned electric utilities, (4) two representatives from natural gas utilities (investor-owned and municipal), (5) one representative from the Citizens' Utility Ratepayer Board (CURB), (6) one representative from Kansas State University Engineering Extension, (7) two representatives from the KCC, (8) one representative from Kansas Housing Resources Corporation, and (9) one representative from the KU Transportation Center.

c. Implications of Proposal

Pros

- i. Increases utility customer awareness of opportunities for saving energy (and, thus, money), and of particular energy conservation measures that are available to them and the potential energy savings and net dollar savings they may deliver.
- ii. Increases utility customer awareness of the availability of energy conservation measures in their community.
- iii. Increases utility customer awareness of options for financing energy conservation improvements (or of accessing free services if they meet income guidelines).
- iv. May decrease statewide demand for electricity and natural gas, putting downward pressure on prices both now and in the future.
- v. May defer utility investments in new generation.

- vi. Provides emission reductions generally associated with adoption of energy conservation practices.
- vii. May increase utility customer satisfaction and goodwill toward the utility.

Cons

- i. Requires state funds.
- ii. Requires additional staffing resources at the Kansas Energy Office.

2. Amend Existing Laws Relating to Energy Efficiency Disclosure on New Homes

a. Description

To ensure Kansas homebuyers receive timely, useful information about the energy performance of new homes, K.S.A. 66-1227 and K.S.A. 66-1228 need to be amended in several significant ways.

Currently, K.S.A. 66-1228 requires the person selling a previously unoccupied new residential structure to disclose to the buyer or prospective buyer, prior to closing or upon request, information regarding the thermal efficiency of the structure (single or multifamily units, three floors and under). However, because such information is important to prospective buyers, the existing law needs to be amended to require that realtors provide this disclosure on all new houses at the time of listing, in addition to closing. Having energy efficiency information available to prospective buyers at listing is comparable to having mileage rating stickers when prospective buyers look at new cars.

In addition, K.S.A. 66-1228 needs to be amended to remove the disclosure form from the body of the law in order to allow the form to be revised by the Kansas Energy Office at the Kansas Corporation Commission. The form needs to be revised to (1) present the energy efficiency information in a quantitative and comparative way (see sample of revised disclosure form in Attachment A) and (2) to reflect latest national and international codes and standards.

K.S.A. 66-1227 adopts the International Energy Conservation Code 2003 (IECC 2003) as the applicable thermal efficiency standard for new commercial and industrial structures in Kansas and states that the “state corporation commission has no authority to adopt or enforce energy efficiency standards for residential, commercial, or industrial structures.” This law needs to be amended to (1) allow standards for commercial and industrial structures to be routinely updated through the Rules and Regulations process and (2) include a provision authorizing the Kansas Energy Office at the KCC to propose guidelines through the Rules and Regulations process for local residential energy efficiency standards (see administrative recommendation 1, below).

These amendments to K.S.A. 66-1227 and 66-1228 will ensure that Kansas consumers receive useful, quantitative data about the energy performance of new houses.

b. Recommended Actions**i. Responsible parties**

Homebuilders cooperate with realtors to provide form at listing of new homes.

Kansas Energy Office staff will update form as needed to reflect current national and international standards.

ii. Legislative action

Amend K.S.A. 66-1228 and 66-1227, as described above.

iii. Budget requirements

No additional State funding required.

iv. Implementation timeline

Initiated upon effective date of enabling legislation.

c. Implications of Proposal***Pros***

- i. Provide timely, quantitative information about the energy efficiency of new housing.
- ii. Raises homebuyer awareness of energy efficiency issues.
- iii. Raises homebuilder awareness of energy efficiency issues.
- iv. Allows the form to be updated as deemed appropriate by KCC.

Cons

- i. Program success requires active participation of homebuilders and realtors without any provision for enforcement.

Policy and Program Recommendations Requiring Administrative Action

1. Encourage Local Units of Government to Adopt Minimum Energy Efficiency Standards for New Construction

The Kansas Energy Office (KEO) should conduct a statewide survey of local county and municipal ordinances to ascertain the current status of energy efficiency codes and code enforcement. If the KEO deems it is necessary, based on the results of the survey, then it would develop workshops and offer training on energy efficiency codes and practices.

The KEO would also work with a task force, consisting of representatives of local government and homebuilders, to develop model energy efficiency codes.

Municipalities and counties with building codes are encouraged to adopt ordinances that require new residences to meet minimum energy efficiency standards. Specifically, municipalities and counties could:

1. incorporate the 2003 or 2006 version of the International Energy Conservation Code (IECC) in their next code update;
2. require submission of the Kansas Energy Efficiency Disclosure Form (see Attachment A) in the application for building permits (single or multi-family, three floors and under) and specify that posting requirements of the disclosure form be similar to those for posting building permits;
3. incorporate energy efficiency items in their code inspections, to verify information provided on Kansas Energy Efficiency Disclosure Form;
4. provide information about the Kansas Energy Efficiency Disclosure Form as a reference for homebuyers, homebuilders, and real estate agents; and/or
5. adopt ordinances that make issuance of an occupancy permit contingent upon meeting minimum energy efficiency standards.

More widespread adoption of energy efficiency codes for residential buildings will not only improve the energy efficiency of new housing stock, but should also provide homeowners with significantly lower energy bills (which may be offset by possibly higher home sale prices). Local codes will also raise homebuyer and homebuilder awareness of energy efficiency issues.

2. Encourage Utility Implementation of PAYS® (Pay As You Save) and PAYS-type Pilot Programs

Kansas utilities are encouraged to implement pilot programs to demonstrate the effectiveness of financing energy conservation improvements through a PAYS® and PAYS-type financing system.

The Pay-As-You-Save, or PAYS®, system is designed to give building owners and tenants a way to finance the purchase and installation of energy conservation measures with no upfront expense or direct debt obligation.¹⁴ PAYS® was first piloted by two New Hampshire utilities in 2003.¹⁵ In its essence, PAYS® allows the participant to pay for the energy conservation improvements through an additional, tariffed charge on the participant's utility bill. The PAYS® charge is based on the useful life of and savings attributable to specific energy efficiency measures (not to exceed 75% of the expected savings), and appears on monthly utility bills for a prescribed period of time (not to exceed 75% of the life of the measure). The PAYS® charge is specifically designed to stay with the meter for the duration of the repayment period. If the participant moves, the PAYS® charge is passed on to the next owner/tenant, provided transfer of ownership/tenancy occurs prior to the end of the repayment period. To qualify for PAYS®, a qualified utility-sponsored energy audit must be performed and all proposed conservation projects are subject to inspection prior to initiation of PAYS® financing. Only permanently affixed conservation measures (e.g., insulation, HVAC, windows and doors) qualify for PAYS® funding. PAYS®-based tariffs would require regulatory approval.

A PAYS-type system could require the same standards for evaluating and financing as PAYS®, but the payments would be tied to the participating customer, not to the meter. Furthermore, rather than being a “banker,” the utility's role could be that of a conservation loan facilitator. To facilitate loans through a PAYS-type pilot program, the utility would probably engage in two basic steps. In the first step, the utility would perform (or facilitate the performance of) an energy audit. The audit would include, in addition to the performance of standard audit tests and inspections, the development of a customer-specific “Energy Action Plan,” which estimates dollar savings and the costs to achieve those savings; thus, identifying conservation measures that are likely to be cost-effective for that customer to install. The Plan would also contain “bid sheets” detailing installation costs, along with a list of utility-approved installation

¹⁴ PAYS web site: <http://www.paysamerica.org/index.html>.

¹⁵ GDS Associates, Inc., 2003, *Process Evaluation of the Pilot “Pay As You Save” (PAYS) Energy Efficiency Program: As delivered by the New Hampshire Electric Cooperative and Public Service Company of New Hampshire*, December 2003 (<http://www.gdsassociates.com>).

contractors. In the second step, the utility would offer its customers a prearranged credit program through the utility's bank (or a participating bank) and represent to the bank loan officer the net savings that are likely to result from installing the proposed energy conservation improvements. Qualified customers can choose to repay the loan either by (1) making payments directly to the bank, or (2) making loan payments through the monthly utility bill (possibly using the PAYS® method for setting the size and term of the loan repayment). In the PAYS-type pilot, all customers (with the exception of low-income customers) would pay the full cost of the energy audit through the audit fee. Options for paying the audit fee include (1) direct payment by the customer at the conclusion of the audit (or possibly at a later date), (2) payment through a levelized monthly charge appearing on the customer's monthly bill, perhaps over a 36-month period, and (3) payment through the inclusion of the audit fee as part of the energy conservation loan principle.

Both the PAYS® and the PAYS-type pilot programs should be linked to the State's new low-income energy efficiency loan fund and the Weatherization Assistance Program, both operated by the Kansas Housing Resources Corporation. Depending on their income levels, utility customers who don't qualify for financing under the bank's underwriting rules may be eligible for a low-interest loan or for free weatherization assistance.

Small pilot programs would test the effectiveness of these promising financing systems and allow policy makers and utilities to evaluate for future, possibly broader applications. Utilities would be encouraged to initiate pilot programs by June 2007.

Policy and Program Recommendations Requiring Action by the Kansas Corporation Commission

(none)

Policy and Program Recommendations Requiring Ongoing Study

1. Monitor the Kansas Corporation Commission’s Ongoing Energy Efficiency Investigations to Determine Need for Further Investigation of Rate Design and Other Energy Efficiency Issues

The Kansas Corporation Commission due, in part, to the discussions and early draft recommendations of the Kansas Energy Council, opened two generic dockets in the fall of 2006 to examine a wide range of energy conservation and efficiency topics, including rate design and whether the KCC has the authority to require utilities to provide energy efficiency programs (see discussion of Docket Nos. 07-GIME-116-GIV and 07-GMIX-247-GIV under “Existing Policies and Programs). Because these topics are of ongoing interest to the Council, the KEC will monitor the KCC’s findings, decisions, and subsequent actions with respect to the questions raised in these dockets to determine whether further investigation may be warranted.

Note: Because of the wide range of questions raised in these dockets, the KCC is encouraged to render determinations on the separate topics, on or before October 1, 2007, in order to allow time for the Council to prepare legislative recommendations for the 2008 session.

ATTACHMENT A:

KANSAS ENERGY EFFICIENCY DISCLOSURE

As required by KSA 66-1228

Kansas law requires the person building or selling a previously unoccupied new residential structure to disclose to the buyer or a prospective buyer, at listing and prior to closing, information regarding the thermal efficiency of the structure (single or multifamily units, three floors and under).

Common Address or Legal Description of Residence: _____

Part 1: Builder *must* describe the following energy efficiency elements of this house:

	Actual Value	Energy Star*
Wall Insulation R-Value	_____	18
Attic Insulation R-Value	_____	42
Foundation Insulation R-Value		
Basement Walls	_____	10
Crawlspace Walls	_____	15
Slab-on-Grade	_____	8
Floors over Unheated Spaces R-Value	_____	30
Window U-Value	_____	.34
Water Heater		
Gas or Propane (Energy Factor)	_____	.60
Electric (Energy Factor)	_____	.92
Heating and Cooling Equipment		
Warm-Air Furnace (AFUE)	_____	.93
Air Conditioner or Heat Pump - Cooling (SEER)	_____	14
Air-Source Heat Pump (HSPF)	_____	8.5
Ground-Loop Heat Pump – Heating (COP)	_____	3.9
Ground-Water Heat Pump – Cooling (EER)	_____	22
Ground-Water Heat Pump – Heating (COP)	_____	4.4

Part 2: Builder *may* provide the following additional information about this house:

_____ This residence has been/will be built to meet the energy-efficiency standards of the International Energy Conservation Code of 2006 (IECC 2006).

_____ This residence has received a Home Energy Rating (HERS) index score of 100 or less based on an energy audit performed in accordance with the Mortgage Industry National Home Energy Rating Systems Standards (July 1, 2006) by a rater certified by Residential Energy Services Network (RESNET).

At Listing:

Seller Signature: _____ Date: _____

Seller Name and Address: _____

At Closing:

Buyer Signature: _____ Date: _____

Buyer Signature: _____ Date: _____

*See reverse for more information on existing standards and explanation of abbreviations.

ATTACHMENT A:

R-value = Thermal Resistance Rating of insulation materials. The higher the R-value, the better the material resists heat flow (i.e., the better it insulates).

U-value = Heat Loss Rating of windows. The lower the U-value, the less the window loses heat (i.e., the better it prevents heat loss).

Equipment Performance Ratings (the higher the number, the more efficient the equipment)

AFUE = Annual Fuel Utilization Efficiency: used to rate gas or propane warm-air furnaces and small boilers.

SEER = Seasonal Energy Efficiency Ratio: performance indicator for residential air conditioners and air source heat pumps.

HSPF = Heating Seasonal Performance Factor: measures heating performance of air-source heat pumps.

EER = Energy Efficiency Ratio: used to rate window air conditioners and ground-loop or ground-water heat pumps in the cooling mode.

COP = Coefficient of Performance: used to rate ground-loop or ground-water heat pumps in the heating mode.

Energy Star qualified homes are at least 15% more energy efficient than homes built to the 2006 International Energy Conservation Code (IECC). Energy Star is a joint program of the U.S. Environmental Protection Agency and Department of Energy.

The International Energy Conservation Code (IECC), developed by the International Code Council, sets standards for energy efficiency in homes and commercial and industrial buildings. It is revised on a three-year cycle, with a supplement issue midway through each cycle.

The HERS Index is a scoring system established by the Residential Energy Services Network (RESNET) in which a home built to the specifications of the HERS Reference Home (based on the 2006 International Energy Conservation Code) scores a HERS Index of 100, while a net zero energy home scores a HERS Index of 0. The lower the score, the more energy efficient a home is in comparison to the HERS Reference Home. Each 1-point decrease in the HERS Index corresponds to a 1% reduction in energy consumption compared to the HERS Reference Home. Thus a home with a HERS Index of 85 is 15% more energy efficient than the HERS Reference Home and a home with a HERS Index of 80 is 20% more energy efficient.

RESNET Standards ensure that accurate and consistent home energy ratings are performed by accredited home energy rating systems nationwide; increase the credibility of the rating systems with the mortgage finance industry; and promote voluntary participation in an objective, cost-effective, sustainable home energy rating process. This accreditation process will be used by the mortgage industry to accept home energy ratings and by the states to assure accurate, independent information upon which a state may recognize the home energy ratings as a compliance method for state building energy codes; as qualification for energy programs designed to reach specific energy saving goals; and as a way to provide its housing market the ability to differentiate residences based on their energy efficiency. The Mortgage Industry National Home Energy Rating Systems Standards (July 1, 2006) can be found at http://www.natresnet.org/standards/mortgage/RESNET_Standards-2006.pdf.

Chapter 10: Energy Use in the Transportation Sector

For additional charts and graphs related to transportation energy use, please refer to the *Kansas Energy Chart Book*, Chapter 10 (http://kec.kansas.gov/chart_book/).

GOAL: To reduce the number of vehicle miles traveled (VMT).

GOAL: To encourage the efficient use of vehicles.

Reducing overall vehicle miles traveled and increasing the efficiency with which vehicles are operated are essential components of a comprehensive, long-range strategy to meet the state's future energy needs.

Topic/Issue Description

Between 1980 and 1997, the total Vehicle Miles Traveled (VMT) in the United States increased 63 percent, and was more than double what it was in 1970. In addition, VMT growth continually exceeds population growth, and, between 1980 and 1997, it was also greater than employment and economic growth. The Federal Highway Administration (FHWA) predicts that the light-duty VMT will grow at an annual rate of more than 2 percent for the next 20 years, leading to a 53 percent increase in vehicle miles traveled.

This steady growth in VMT strains the existing roadway network and increases emissions and congestion, particularly in the urban areas. Strategies to reduce VMT are key to reducing the environmental impact of greater dependence on automobiles.

The growth of VMT in Kansas is consistent with the national VMT growth: every year the rate of VMT continues to increase. Factors such as greater work commutes, urban sprawl, and induced traffic all contribute to the state's VMT growth. Between 1982 and 1996, Kansas City had a population increase of 23 percent, while the vehicle miles traveled in the area increased by 79 percent.

Changing driver behavior with respect to driving habits and speed can also reduce fuel usage. Although individual vehicles reach their optimal fuel efficiency at different speeds (or range of speeds, gas mileage generally decreases rapidly at speeds above 60 mph. In general, each 5-mph increase in speed increases fuel consumption by 7–23% (or the equivalent of paying \$0.20 per gallon more for gas, assuming price is \$2.31).¹⁶

With respect to the trucking industry, reducing the amount of time that trucks idle is another significant step toward reducing fuel usage. Argonne National Lab estimates trucks idle about 6 hours a day. Idle reduction technologies can save an estimated

¹⁶ Driving More Efficiently: U.S. Department of Energy and Environmental Protection Agency www.fueleconomy.gov website (<http://www.fueleconomy.gov/feg/driveHabits.shtml>).

838 million gallons of diesel fuel nationally each year. Reduced idling time will also result in reduced nitrous oxide, carbon monoxide, and carbon dioxide emissions.¹⁷

Existing Policies and Programs

1. The Kansas State Vanpool Program (K.S.A. 75-46a03) is a transportation program for state employees “to promote conservation of petroleum resources, reduce traffic and parking congestion, and diminish air pollution by facilitation the creation of self-supporting commuter vanpools in which state employees living and working in similar locations may ride to and from their places of employment.” The Secretary of Administration sets the passenger fee for each vanpool so that it is self-supporting. Currently, the program consists of 21 vehicles owned and registered by the state, transporting approximately 250 people daily.
2. The Kansas City Area Transit Authority (KCATA) operates 37 park-and-ride locations along various bus routes throughout Kansas City. The University of Kansas opened a new park-and-ride facility at the edge of campus in Lawrence to provide for connection to a campus circulator service and potentially as a transfer point for regular city service and for bus service between Johnson County and Lawrence.
3. K.S.A 8-1558 states that it is a violation of State law to speed as little as one mile per hour over the posted speed limit. However, State statute also states that speed violations of 10 mph (or less) over the speed limit in 55- to 70-mph zones will not count as moving violations on individual’s driving records.
4. The Energy Policy Act of 2005 provides for federal income tax credits for the purchase of hybrid electric vehicles. The tax credit for hybrid vehicles applies to vehicles purchased or placed in service on or after January 1, 2006. The amount of the credit for a given model varies and the full credit diminishes once the manufacturer has sold 60,000 hybrid vehicles. According to the IRS, “consumers seeking the credit may want to buy early since the full credit is only available for a limited time.”¹⁸
5. Corporate Average Fuel Economy (CAFE) program, regulated by the National Highway Traffic Safety Administration (NHTSA) and the Environmental Protection Agency (EPA), aims to reduce energy consumption by increasing the fuel economy of cars and light duty trucks.

¹⁷ Except where noted otherwise, this section is based on data from Energy Use in the Transportation Sector: Prepared for the Kansas Energy Council (KEC), by the KU Transportation Center, June 15, 2006, available on the KEC web site (<http://www.kec.kansas.gov/reports.htm>).

¹⁸ Internal Revenue Service, Hybrid Cars and Alternative Motor Vehicles: <http://www.irs.gov/newsroom/article/0,,id=157632,00.html> (updated November 22, 2006).

Policy and Program Recommendations Requiring Legislative Action

(None)

Policy and Program Recommendations Requiring Administrative Action

1. Conduct Statewide Planning Conference on VMT Reduction

The KU Transportation Center should conduct a statewide planning conference that will focus on strategies and technologies to reduce VMT in the state. The conference presenters will be experts in areas related to transit planning, sustainable transportation, intelligent transportation systems, and other strategies that can potentially contribute to reduced VMT and provide opportunities for dialogue among transportation planners in the state.

2. Develop Plan for Increased Park-and-Ride Facilities

The Kansas Department of Transportation (KDOT) should lead a study to develop a prioritized list of strategic park-and-ride locations on the state highway system, to determine costs associated with development of Park and Ride facilities at strategic locations on the state highway system, and to identify finance options in Kansas to support a park and ride system. An advisory committee should assist in the study of process with representatives from Metropolitan Planning Organizations (MDOs) and urban transit agencies. (Complete by September 2007).

Based on the results of the study, KDOT should develop legislation (if necessary) to promote and provide a finance mechanism for development of park and ride lots. (Complete by December 2007).

3. Include Energy Efficiency Information in Driver Education

Public education and awareness is an important way to influence driver behavior. The Kansas Department of Revenue should include energy efficiency information in the state driver's license examination booklet and test.

The following are sample questions may be included in the Driver's Examination.

1. At what speed does the fuel economy start decreasing?
 - a. 55 mph
 - b. 60 mph
 - c. 65 mph
 - d. 70 mph
 (Correct answer: b)

2. What is the reduction in fuel efficiency for every 5 mph driven over 60 mph?
 - a. 1-3%
 - b. 3-7%

- c. 7-20%
- d. None

(Correct answer: c)

3. When can you achieve maximum fuel efficiency?
- a. Idling
 - b. Traveling between 35-60 mph
 - c. Traveling between 50-70 mph
 - d. Traveling over 60 mph

(Correct answer: b)

4. Develop Strategy to Reduce Truck Idling

The Kansas Department of Transportation (KDOT) should work with the trucking industry to develop a strategy to reduce truck idling.

Policy and Program Recommendations Requiring Action by the Kansas Corporation Commission

(None)

Policy and Program Recommendations Requiring Ongoing Study

(None)

Chapter 11: Energy Use in the Agricultural Sector

For additional charts and graphs related to agricultural energy use, please refer to the *Kansas Energy Chart Book*, Chapter 11 (http://kec.kansas.gov/chart_book/).

GOAL: Reduce fuel consumption and increase carbon sequestration by encouraging farms to adopt no-till cultivation practices.

Topic / Issue Description

Energy costs made up about 23% of U.S. crop production expenses from 2000 to 2003, compared with just 6% for livestock production. However, livestock operations experience higher energy costs indirectly through higher feed costs, which make up about 60% of all production costs. In Kansas, rising energy prices have hit Kansas irrigated crop producers especially hard.¹⁹

Based on 2002 data, the most recent available, direct energy consumption by the U.S. agricultural sector comprised only 1.1% of the nation's total energy consumption. Thus, reducing energy use in agricultural activities will have minimal impact on overall energy consumption in Kansas, even though about 94% of the state's land is used for agricultural production and wildlife habitat.

In addition, it is important to recognize that Kansas agricultural producers already tend to use energy efficiently because fuel and other energy-related costs associated with crop and livestock production significantly affect net profits. Total energy usage in agriculture has fallen about 28% since the late 1970s.

Nonetheless, energy use in crop production can be substantially reduced through the adoption of no-till or reduced-till cultivation and residue management. No-till, as the name suggests, means leaving the residue from last year's crop undisturbed until planting. Other conservation tillage systems include ridge-till and mulch-till. In ridge-till, planters using specialized attachments scrape off the top two inches of the four- to six-inch ridges formed at cultivation before placing the seed in the ground. Mulch-till is a full-width tillage system that usually involves only one or two tillage passes, leaving at least a third of the surface covered with residue. On the other end of the spectrum is conventional or intensive-till, a full width tillage system in which field residue covers less than 15% of the soil.²⁰

¹⁹ Except where otherwise noted, data in this section comes from *Energy Use in the Kansas Agricultural Sector: Report Submitted to the Kansas Energy Council*, June 15, 2006, by Terry Kastens, Kevin Dhuyvetter, James Mintert, Richard Nelson, and Xianghong Li; and from *Staff Analysis of the KEC Background Report: Energy Use in the Kansas Agricultural Sector*, August 2006, by Debra Baker and Tom Lowe. Both reports are available on the KEC web site (<http://www.kec.kansas.gov/reports.htm>).

²⁰ Based on information from the education brochure, *What's Conservation Tillage?*, produced by the Conservation Technology Information Center (www.ctic.purdue.edu).

No-till substitutes herbicides for tillage to kill weeds. Studies conclude that fuel costs per harvested acre on no-till farms are about 67–75% of those associated with continuous or reduced tillage.

Adoption of no-till cultivation provides the following additional benefits:

- decreased soil erosion;
- increased use of field buffer strips;
- improved timing of applications;
- decreased runoff due to rainfall and, thus, reduced herbicide runoff;
- increased retention of organic matter in the soil, which improves soil health and productivity, while increasing infiltration of rainwater;
- increased watershed health (because no-till more closely mimics undisturbed hydrologic conditions, while decreasing erosion).

Another benefit of no-till is the increased ability to sequester carbon in the soil, which can reduce greenhouse gases. Plants convert CO₂ and water to organic matter, removing a significant greenhouse gas from the atmosphere. In addition, there is an evolving market to pay producers for carbon credits to offset CO₂ emissions from other sectors of society.

Despite these benefits, since 1990 the rate of conversion to no-till has been relatively slow in Kansas and in the rest of the surrounding states. In addition to a reluctance to change from traditional farming practices, adoption of no-till has also been hindered by the need for equipment modifications and for more information on crop rotations to maximize production.

Existing Policies and Programs

Numerous federal and state programs already exist to promote soil conservation, protection of water quality, flood management, habitat enhancement, and other objectives. State and federal cost-share dollars are available for many practices that contribute to energy reduction and carbon sequestration, in addition to addressing the natural resource concerns for which they were originally developed.

In 2004, the state initiated a watershed-based management strategy, the Kansas Watershed Restoration and Protection Strategy (WRAPS). WRAPS integrates existing conservation programs and practices based on watershed plans.

With this program, local entities develop plans to address watershed conditions and concerns, which in turn guide establishment of goals and objectives to restore watersheds to a more properly functioning condition. Implementation of these goals and objectives is largely accomplished through programs and practices administered under the conservation programs just mentioned.

A major focus of the WRAPS program is to develop watershed plans that will reduce the amount of sedimentation occurring in public water supply reservoirs. The

majority of these watersheds are primarily rural, and land use is predominately agricultural.

When working with producers to encourage them to adopt practices that will reduce sedimentation and other sources of pollution, the challenge is always to demonstrate how making a change in practices will improve the producers' profit. While they may agree that reducing sedimentation and prolonging the life of reservoirs is a worthy goal, few producers are willing to change behavior or practices solely for those reasons.

Many of the conservation programs promote farming practices that also result in energy savings and carbon sequestration. And they offer cost share dollars to the producer to adopt them. However, these additional benefits are rarely mentioned in the program literature.

An example of this is the widely known and very successful Conservation Reserve Program or CRP, which began in 1986. Its purpose is to remove marginal and highly erodible land from crop production and convert it to perennial native grass cover.

Obvious benefits of enrolling this marginal land include wildlife habitat improvement, water and air quality improvement, and erosion control. What is not currently considered is the carbon sequestration benefits of native perennial grass cover, and reduced energy costs back due to lack of cultivation of the ground. Cost share and rental agreement contracts are offered to landowners to establish the grass cover and to offset the income lost from taking the land out of production.

Currently, about 1.6 million acres of CRP contracts will expire in the next several years. Due to changes in the program qualifications, not all of these acres will be eligible to re-enroll with the existing rental payments. It is expected that about 54% of these acres will either be grazed or broken out into cropland again.

If the acres are converted to cropland, many of the environmental benefits will be lost unless they are converted to no-till residue management. These producers should be encouraged to either keep the land in CRP or adopt management practices that will maximize energy reduction, carbon sequestration, and natural resource concerns.

The WRAPS program can be instrumental in promoting conservation practices that accomplish all of this. For example, if acres in CRP are identified in a watershed plan as being important to achieving or maintaining watershed goals, increased targeting of existing programs to work with specific producers can be done to either maintain the acres in grassland or to encourage management practices on the cropped or grazed land that maximizes energy savings, carbon sequestration and overall watershed function.

There is an emerging market for "carbon credits" as various entities are beginning to use them to offset carbon emissions into the atmosphere. The CCX is hoping to trade

U.S. credits in Europe where many companies are located in countries that have signed the Kyoto Protocol.

In October, 2006 the Kansas Farmers Union announced an agreement had been reached with the Chicago Climate Exchange (CCX) to allow the Farmers Union to enroll eligible producer acreages into blocks of credits that will be traded by the exchange.

Policy and Program Recommendations Requiring Legislative Action

(None)

Policy and Program Recommendations Requiring Administrative Action

1. Encourage greater adoption of no-till agriculture through the expansion of the existing Kansas Watershed Restoration and Protection Strategy (WRAPS).

Plans are underway to expand the existing WRAPS program in the following ways:

1. The additional benefits of carbon sequestration and energy conservation will be emphasized in desired WRAPS goals.
2. Linkages between WRAPS projects and energy carbon trading program offered by the Chicago Climate Exchange and the Kansas Farmer's Union will be established to create an additional financial incentive for converting to no-till.
3. Information will be provided to producers through the WRAPS program demonstrating energy and cost savings associated with no-till agriculture.
4. Land scheduled to come out of the CRP program will be targeted by WRAPS projects as opportunities for no-till.

Enhanced coordination of existing programs has the potential to reduce agricultural energy consumption, improve resource management and watershed health, positively impact global warming, and provide additional income to producers.

Policy and Program Recommendations Requiring Action by the Kansas Corporation Commission

(None)

Policy and Program Recommendations for Ongoing Study

(None)