



KANSAS CORPORATION COMMISSION

Kansas State Energy Program 1999 Annual Report

From the Chair

The Kansas Energy Program had another great year in FY 1999. This report highlights the progress that can be made in energy education and energy efficiency when Kansas private citizens, university researchers, private businesses, schools, hospitals and local, state and federal governments get together to work towards a common goal. The program funded over 40 different activities last year including education, transportation, renewable energy, industrial, buildings and special projects. There are two primary areas the program funds – general grants and the Institutional Conservation Program. The general grant program funds wind, biomass and solar energy; alternative vehicles; energy education; energy efficiency; and building codes. The Institutional Conservation Program helps schools and hospitals become more energy efficient. The FY 1999 ICP projects will produce annual energy savings of over \$175,000. These savings directly reduce operating budgets, thereby translating into new teachers, supplies and a general improvement in the quality of education and patient care. I want to thank everyone who participated in the FY 1999 program for their outstanding work. I hope that the Kansas Energy Program continues to enhance the energy economy in Kansas in the future.

John Wine
Chair, KCC
January 25, 2000



Jim Ploger, State Energy
Program Manager

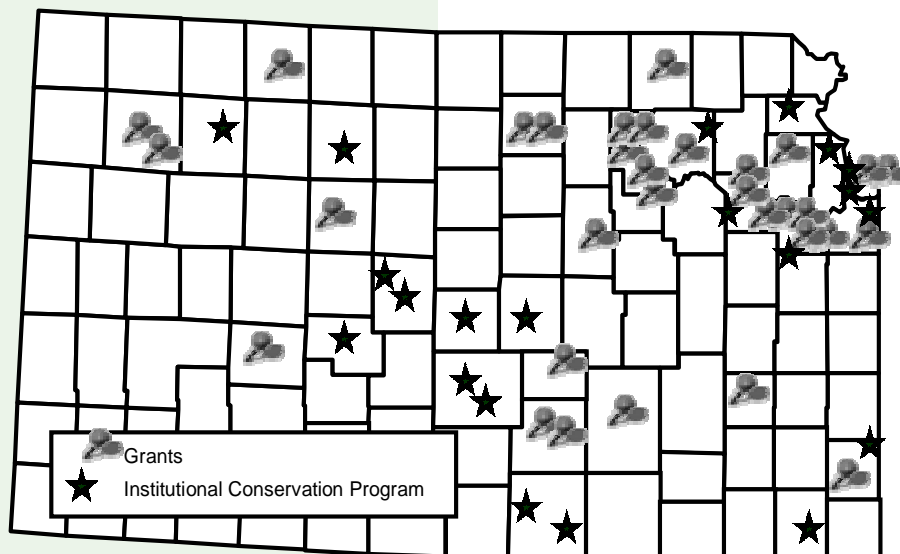
Kansas Energy Program
Kansas Corporation
Commission
1500 SW Arrowhead Rd.
Topeka, KS 66604
(785) 271-3170
j.ploger@kcc.state.ks.us
www.kcc.state.ks.us

Overview of the Kansas Energy Program

State Energy Program Grants look to the future. In 1999, 21 grants were awarded to Kansas companies and organizations. Many of these grants support statewide energy

activities such as the Energy Extension Service, Kansas Energy Education Foundation and the Home Energy Rating System. The grants support a broad range of education, program development and demonstrations in the areas of: Education, Transportation, Utilities, Industrial, Special Projects, and Buildings. The **Institutional Conservation Program**

(ICP) helps nonprofit hospitals and schools throughout the state to upgrade their older, energy inefficient, facilities. The program offers funds that usually cover 50 percent of the design, purchase and installation costs for energy efficient systems. The maximum award to a single institution is \$50,000 per year. In 1999, \$611,201 was awarded to 20 Kansas institutions. The Kansas **Alternative Fuels Program** was established in 1991 to promote the use of alternative fuels such as natural gas, propane, ethanol, and electricity in on and off road vehicles. Partly as a result of these efforts, Kansas City was officially designated as the 67th member in the Department of Energy's Clean Cities program. Kansas City maintains a fleet of 250 alternative fuel vehicles and plans to have 900 in use by the year 2000. Strong city-wide alternative fuels programs are also in place or being planned for Manhattan, Wichita, Topeka and Fort Riley. The Energy Programs Section also sponsors the annual **Solar BikeRayce**. Over 50 high schools and organizations from throughout the United States and Canada design, build and test solar and battery assisted bicycles and *s-class* solar vehicles. The teams then compete in a 62 mile race. In this popular event high school students build working PV assisted vehicles. This year's race will be held May 19-21, 2000 at Heartland Park in Topeka.



State Energy Program Grants 1999 Summaries

Education

Energy Extension Service

Kansas State University
Manhattan (785) 532-6026

The Kansas Energy Extension Service (EES) continues to provide energy information and educational resources for the Kansas energy consumer. Ask Energenie, a weekly energy related question-and-answer column, provides consumers with up-to-date energy-savings ideas and facts for homes and businesses. Ask Energenie is distributed to 67 daily or weekly newspapers in Kansas and several out of state. A recent survey of newspaper editors indicated the question-and-answer format was most effective for this kind of information. Editors said they use the columns because they “contained good information and were beneficial to their readers.”

In addition, the column is mailed to all 105 Cooperative Extension county offices across Kansas. Extension agents may use the column directly in a newsletter or lift material to use in their weekly newspaper column or radio program. Ask Energenie is also available on the web at http://www.oznet.ksu.edu/dp_nrgy/EngExt/ENERGENI/ASKGENIE.HTM.

Energy Extension staff are preparing additional Kansas-specific publications targeted toward residential consumers and persons involved with the housing market. Last year’s publications included two eight-page pamphlets: *Energy-Efficient Windows* and *Selecting a Home Heating System*. This year, several new publications are being developed including *Residential Insulation Options*, *Selecting a Home Cooling System*, *Residential Foundation Insulation*, and *Air-Sealing a Home*.

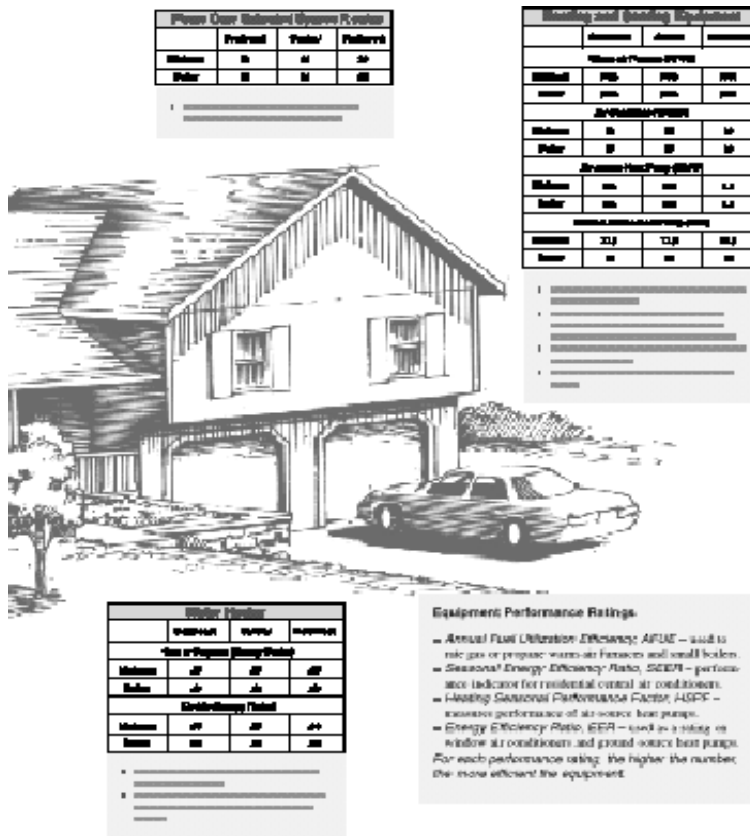
Current publication efforts serve two needs. First, these publications provide new homebuyers and builders with current information on key features effecting new-home energy use. Publications

are distributed to builders, bankers, real estate agents, and others involved in new-home construction or marketing. Information provided includes minimum requirements needed to meet the Model Energy Code and recommendations describing when it is cost-effective to go beyond minimum code compliance. This directly supports the KCC’s Buildings Codes and Standards project.

These publications also provide assistance to owners of existing homes. Homeowners need a source of unbiased energy efficiency information. These publications provide details on specific technologies and techniques that save energy. While much of this information is available from other sources, EES publications provide the consumer with information and tools that foster good decisions based on Kansas’s climate, locally available fuels and fuel prices.

Energy Extension Service provides a telephone answer line for Kansas’s energy questions. Energy Extension staff receive over 400 calls annually on nearly every conceivable energy topic. Common topics include selecting home appliances, weatherization tips, use of alternative and renewable energy, and indoor air quality. Specialists may provide the caller with immediate answers but because of the unique nature of some calls, often specialists must research the topic and return calls.

Internet resources used to respond to commonly asked questions are organized on the EES web site in a Link-Library at http://www.oznet.ksu.edu/dp_nrgy/LinkLibrary/index.html. Consumers and Cooperative Extension agents can access the library to answer common questions. The Energy Extension Service is often the first responder for Kansas’s energy information. ❖



An example page from one of the KSU Energy Extension Services publications.

Internet resources used to respond to commonly asked questions are organized on the EES web site in a Link-Library at http://www.oznet.ksu.edu/dp_nrgy/LinkLibrary/index.html. Consumers and Cooperative Extension agents can access the library to answer common questions. The Energy Extension Service is often the first responder for Kansas’s energy information. ❖

Kansas Energy Education

*Kansas Energy Education Foundation
Lawrence (785) 832-8866*

The Kansas Energy Education Foundation (KEEF) planned to participate in the National Energy Education Development's project to commemorate the 25th anniversary of the 1973 Oil Embargo. Unfortunately, after plans were well underway in Kansas, the national program was cancelled. However, this did not slow down the program in Kansas.

The original program was to be an Energy Summit consisting of a four-hour skit performed by students at the high school level with videotape provided by NEED and outside consultants. KEEF modified the skit into 1-hour, 2-hour, 3-hour, or 4-hour programs that could be selected at the teacher's discretion.

In addition, KEEF teacher, Nancy Lonergan, developed a multi-disciplinary program for elementary students. This program included one session each in reading, writing, interviewing, geography, vocabulary, math, graphing, and art all relating to the oil embargo and its effects on everyday life in the United States. It is one of a few programs on the Oil Embargo specifically designed for younger students. This was far and away the most popular program used by teachers in the state. Thanks to our State Energy Program, students from Andover to Atwood learned the lessons of the Oil Embargo without having to experience them first hand. These programs are available from KEEF. ❖

“... students from Andover to Atwood learned the lessons of the Oil Embargo without having to experience them first hand like their parents in 1973.”

- Kansas Energy Education Foundation

Restructuring Survey

*Washington State University
Portland (785) 271-3170*

The State of Kansas participated in the Utility Restructuring Survey conducted by Washington State University. The U.S. Department of Energy funded the overall development of the survey. The states paid only for the telephone survey itself. In Kansas 400 calls were completed. There was a 57% cooperation rate and the results are accurate +/- 5%. The survey asked questions about deregulation, utility restructuring, renewable energy and the state's role in various activities. A complete copy of the report is available by calling the Energy Office.

In general over 70% of the respondents indicated that deregulation has had positive effects on industry and they think that electric deregulation will have the same positive impact. Fifty percent think that with deregulation their electricity prices will be somewhat lower and almost everyone thinks that the price of electricity and the quality of customer service are the two most important factors in choosing a provider. Solar and wind power were chosen

as the primary sources of renewable energy for the state and over 66% were willing to pay more on their electricity bill every month for renewable generation. Over 85% of the people surveyed want the state to develop renewable energy and continue to regulate utilities for pollution while over 65% want the state to have energy efficient building codes and keep utility rates low for low-income households. ❖

Energy in the Year 2000

*Pinnacle Technology, Inc.
Lawrence (785) 832-8866*

Deregulation (restructuring) of the electric utilities will quickly change the energy production, distribution and consumption landscape in Kansas. An effective and efficient State Energy Program (KSEP) is vital to help guide Kansas consumers and businesses successfully through these changing times. Against this backdrop of growing needs for services, KSEP must contend with limited, and decreasing, funding primarily derived from Oil Overcharge Funds and U.S. Department of Energy grants.

In a proactive effort to prepare for the future, KSEP hired Pinnacle Technology to review KSEP's operations and generate a 5-year business plan recommending

steps KSEP must take to ensure continued quality service for all Kansas citizens. The review included the following activities: Overview of federal deregulation policy; Overview of state deregulation activity; Overview of KSEP; Development of a general fact sheet about KSEP; Development of a general fact sheet about deregulation; Summary of a survey regarding Kansans' views toward utility deregulation; citizen focus groups to assess what the state needs to do as deregulation approaches; Interviews with other energy organizations in Kansas and key individuals involved in energy to discover what they would like KSEP to do in the future and how KSEP can improve its current operations; and Surveys of other state energy offices in states with deregulation in place or with legislation pending.

The goal of this analysis was to establish a coordinated approach to energy, with no duplication of effort and to identify methods to leverage funding whenever possible. There was general agreement between individuals and groups interviewed, citizen focus groups, and recommendations from other states. Based on the interviews and research conducted on behalf of the Energy Program, a series of recommendations were made to enhance the agency's operation in the future. A copy of the report is available from the Energy Office. ❖

Transportation

Solar Car

*Kansas State University
Manhattan (785) 532-5506*

The Kansas State University Solar Car Racing Team is a group of approximately 60 students that are involved in the design, construction, testing, and racing of Solar Cars. Most team members are engineering students with some business majors helping in accounting and marketing. The team was formed in 1995 and the first car was raced in SunRayce 1997. Apollo is the name of the car that was raced from Washington D.C. to Orlando during the summer of 1999. Using the knowledge and experience gained racing the first car, Apollo placed in the top ten and was recognized as the most improved team over the two year period.

The team's success was a direct result of hard work and strong supporters. In addition to their rigorous engineering classes, the electrical and mechanical engineering students spent countless hours in the evenings and on weekends building a high quality car that could survive the 1400 mile race. Generous corporate and governmental sponsors provided the team with cash and in-kind donations.

The team faced a great challenge when the weather was uncooperative for the entire race. The energy limited vehicles crept along as every day of racing was marked by cloudy skies and rain. The large battery pack enabled the car to continue racing (though at a very slow speed) even when the sun did not shine.

The team compiled four podium finishes in the ten day race. The final stage of the race was won as Apollo set the highest average speed (36.2 mph) for any single race day. The team finished well on the third day of racing despite a one hour delay that resulted when a Ford Thunderbird hit Apollo. The Thunderbird cut across the road in front of the solar car and impacted the right front side, causing major damage to the nose and fairing. While making repairs, waiting for safety inspectors, and cooperating with local highway patrolmen, two teams were able to pass the K-State team



Kansas State University's solar car

and take the lead. Nevertheless, Apollo caught the leaders and finished first for the day.

The Kansas State Team is currently preparing for SunRayce '01 and Formula Sun; a grand prix style race to be held at Heartland Park in May. A great home field advantage will help the team as they continue to improve the car and their strategies. Team engineers are also busy working on the design of a new car for the next SunRayce. This successful project has generated fantastic publicity for Kansas State and Kansas while providing the students with an educational experience that is without equal. ❖

Ethanol Vehicle

*University of Kansas
Lawrence (785) 864-2989*

The University of Kansas 2000 Ethanol Vehicle Challenge Team is converting a 1999 Chevrolet 5.3L Gen III V8 engine to run on E85.

E85 is a blend of 15% gasoline and 85% denatured ethanol, which can be made from agricultural by-products from the Kansas farming industry. In order for the Team to accomplish its task, modifications must be made to the engine, fuel system, and emission system. The Team has decided to increase the compression ratio and use a more aggressive camshaft to maximize engine performance and efficiency. E85 is corrosive in nature. Therefore, the team must replace the stock fuel system with one that is compatible with E85. This is accomplished by replacing the fuel lines, fuel pump, fuel filter, and fuel injectors. New fuel maps, which control the air-to-fuel ratio of the engine, must be developed because of engine modifications and properties of E85. To achieve optimal flexibility in programming these new fuel maps, a Motec racing computer will be used instead of the stock computer. One of the interesting design challenges in using E85 as a fuel in

passenger vehicles is its inability to ignite at temperatures below 40° F. To overcome this obstacle, a cold start system will be installed to preheat the air and fuel prior to startup. To improve emissions, a special catalytic converter will be installed. This converter will use three separate catalysts to accommodate the different exhaust gases produced when burning E85. The 2000 Ethanol Vehicle Challenge competition will be held in various locations



The University of Kansas ethanol truck

throughout Canada between May 13 and May 20, 2000. Fourteen teams from universities in the US and Canada will be competing in nine separate events. The events include performance, emissions, fuel efficiency, and cold start. This provides a brief review of some of the challenges that are facing the University of Kansas 2000 Ethanol Vehicle Challenge Team. For more details on the students, vehicle, the competition and how you can help, see the KU EVC web site at: <http://www.engr.ukans.edu/~evc9798>. ❖

Solar BikeRayce Video

*Crowder College
Kansas City (800) 458-2898*

Three videos explaining how a school gets involved in the Solar BikeRayce were developed by Crowder College. Crowder was chosen since they manage the national Solar BikeRayce. Each video explains a different aspect of participation. Two are currently complete, the overview of the Solar BikeRayce and the video for students on how to raise funds to support their team. One video, still in production, details how to build a solar bike. ❖

Solar BikeRayce

*Kansas Energy Program
Topeka (785) 271-3170*

For the second year in a row, Kansas has hosted the national Solar BikeRayce at Forbes Field in Topeka. Thirty-seven bikes were involved in the race, including 5 from Kansas. Teams from Concordia, Halstead (mens & women's team), Axtell and Colby participated. One team travelled from Japan to race. The bike race is a solar assisted race, meaning that besides pedaling, your team can also use solar power and batteries to help the racer. More information can be found at www.solarbike.org.

In addition to the bike race, there is an s-class car race. This race is for solar/electric cars. Eighteen teams participated with seven of those teams representing Kansas schools. These included Paola, Hanston (2 teams), Concordia, Colby, Onaga and Axtell. Some of the reason for the high Kansas participation is due to another state event, the Kansas Electrally, www.pinnalet.com/ker.



The electric car and team from Paola High School

The national event will be hosted by Kansas again, but this year it will be held at Heartland Park in Topeka. The Formula Sun Solar BikeRayce will run May 19 - 21 and will be followed by the Formula Sun Grand Prix, May 21 - 25. Volunteers are always needed for the event or just come and check out the bikes and cars and cheer your team to victory. ❖

Wichita Rideshare

*Wichita Metropolitan Transit Authority
Wichita (316) 265-1450*



Waiting for the start of the solar bike race

During the past year, Wichita Transit has initiated efforts to bring new technology into the delivery of public transportation services in the Wichita regional area. While the Wichita Regional Rideshare Program continues to provide the area with free carpool matching assistance to industry and the general public, we have been pushing the technology envelope in an effort to identify ways of increasing the efficiency and effectiveness of all transportation services. To that end, Wichita Transit has, with the help of the KCC, embarked on a journey that has led us to a number of Intelligent Transportation Systems (ITS) options that may be applicable to our variety of programs. Included for consideration is Advance Vehicle Location (AVL) systems, Global Positioning Systems (GPS), on-vehicle computer interface - including mobile data terminals, real-time state of the art automated bus and paratransit (van) scheduling and rideshare matching software programs, electronic registering fareboxes, automated stop announcements, vehicle identification systems for the blind, automatic passenger counters, electronic fare cards, automated performance tracking, etc. Tran-

State Energy Program Grants

sit planners have been working with federal, state and local officials and engineers to learn about the new national ITS standards and current experiences from users. Implementation of any of these technologies should result in efficiencies in service delivery and safety. As we enter the new millennium, Wichita Transit will be positioned to take advantage of the new technologies that will be available to the transit industry - thanks in part to continued KCC support. ❖

Utilities

Solar Demonstration

*Kansas Department of Wildlife & Parks
Pratt (316) 672-0742*

The Department of Wildlife and Parks has been in the process of installing solar lighting received under the Kansas State Energy Grant program in several state parks. The following are locations and description of the lights.

Perry State Park - Solar light and pole being installed at one campground for security and one at the entrance to another camping area. Two more lights are being installed at the new Romtec vault toilet areas.

Tuttle Creek State Park - Solar light and pole to light a walking bridge over Iron Creek.

Crawford State Park - Solar light and poles to light a fishing dock at campground #1 and a courtesy dock at the south boat ramp.

Cedar Bluff State Park - Solar light and pole to light boat ramp and parking lot at Toronto Point.

Toronto State Park - Solar light and pole to light boat ramp and parking lot at Toronto Point.

Prairie Dog State Park - Solar power battery charger for the orad counter.

Pomona State Park - Two at boat ramp #2, two at boat ramp #3 and one at the trailer dump station near the entrance of the park. ❖



Solar lighting is used to illuminate the pumping station at Pomona State Park



Solar lights at the Overland Park Golf Course parking lot

Solar Lighting

*City of Overland Park
Overland Park (913) 895-6000 x 6108*

The City of Overland Park is continuing its efforts to be proactive in providing a healthy environment for its residents. For the past several years, the city has experimented with alternative energy sources. With support from the Energy Office, this past year the city installed photovoltaic lights in the Overland Park Golf Club parking lot. The lights use solar panels to collect the sun's energy. That energy is stored in deep cell batteries that provide the power for the lights. In addition to being environmentally enhancing, this project will save taxpayers money. Traditional lighting would have cost \$21,000 plus approximately \$790 annually for electricity. The total cost for the solar lights was \$25,000. This additional cost will be absorbed after 5 years of operation and after that time, the city will save about \$800 per year in electricity. Kansas City Power & Light and the Kansas State University Pollution Prevention Institute provided technical expertise for the project. ❖

Wind Power Education

Wichita State University &
Kansas Electric Utilities Research Program
Wichita/Topeka (316) 978-6334

Wichita State University (WSU) is building a wind energy kiosk. The kiosk's function includes: engaging the public, demonstrating wind energy principles and potential, and underscoring the wind energy commitments of state organizations. The kiosk is a structure that interfaces a small (400W) wind turbine, a computer based information system, and additional sub-components. Visitors to the kiosk can interactively view a brief multi-media presentation that highlights the basics of wind energy, identifies current and accumulated turbine power output, and estimates the equivalent output from a larger turbine or a wind farm. Additional wind energy information, from electrical utilities, government labs, and various educational sources, will be provided via brochures and world wide web links. The kiosk will be located at the Matfield Green rest stop off I-35 Highway. This project was also supported by the Kansas Electric Utilities Research Program.

Electric Power From Biomass and Wastes

Coriolis/Kansas State University/
Heritage Technologies
Lawrence (785) 841-1906

In 1997, approximately 1.3% of America's 776,000 MW of electrical generating capacity was fueled by biomass or waste resources. With the support of the Energy Office, Kansas Electric Utilities Research Program, Western Regional Biomass Energy Program and the Electric Power Research Institute, this project developed the tools and evaluated the costs for using biomass as a fuel for power generation. Switchgrass and black locust were the two crops examined for the state. The state was divided into 6 regions based on climate, the production of each crop, potential yields for each region and a cost of production were determined. The lowest average regional cost of switchgrass was \$24.11/dry ton or \$1.52/MBtu and black locust was \$40.20/dry ton or \$2.38/MBtu. These costs are applicable to the southeast region of Kansas. The modeling studies found that electricity prices for power from switchgrass are \$0.050 to \$0.085, as opposed to the cost of coal fired electricity from \$0.025 to \$0.028 per kWh. The final conclusions were that in order for co-firing switchgrass to be an option for Kansas utilities, two economic criteria should be in place. First the closed loop biomass production tax credit of \$0.015/kWh is necessary from the federal government and second the utility needs to have a green pricing program available to its customers who wish to buy renewable energy and are willing to pay a premium price. ❖



Kansas ranks third in the nation for available wind for energy (turbine at Jeffrey Energy Center - Western Resources)

Industrial

Water Quality

Coriolis
Lawrence (785) 841-1906

Development of renewable biomass energy in Kansas will require parallel efforts to reduce edge of field cost and to identify and penetrate higher value energy markets. Strategies for reducing cost include: 1) harvesting land enrolled in the federal Conservation Reserve Program, and 2) monetizing environmental benefits of switchgrass production, such as erosion control, mitigation of agricultural chemicals and nutrients, and improved wildlife habitat. The most promising option for a higher value market is using pelletized switchgrass for residential or small commercial space and water heating in a fashion similar to several European countries. They deliver biomass pellets in grain trucks to individual homes where they are blown into a bulk storage bin and augered into a boiler. The system has features similar to propane and Kansas researchers believe such systems could compete with propane on a regional basis. Work continues on assessing the actual environmental benefits of switchgrass production in cooperation with federal, state, and county agencies, focusing on the Perry Basin in northeast Kansas. ❖



This report was prepared by:
Pinnacle Technology, Inc.
619 East 8th Street, Ste D
Lawrence, KS 66044
(785) 832-8866
www.pinnaclelet.com
info@pinnaclelet.com

Disclaimer: This material was prepared with the support of the U.S. Department of Energy (DOE) Grant No. DE-FG48-97R802102. However, any opinions, findings, conclusions, or recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of DOE.

Solid Waste Reduction

*Kansas Surplus Exchange
Topeka (785) 235-8640*

The Kansas Surplus Exchange's mission is to ease the burden on landfills and to help local service agencies conserve resources by serving as a clearinghouse for usable surplus furniture, equipment and supplies donated by community businesses. By recycling these items, energy is saved in manufacturing new equipment and furniture. These business items are then available for a minimal charge to any nonprofit group classified as a 501(c)3 organization. The items are picked-up at the donor's place of business, sorted, repaired and distributed to nonprofit groups. The recycling of surplus business and manufacturing materials will help extend the life of landfills, help charitable causes and contribute to businesses that benefit from the tax-deductible donation. ❖

Getting ready to leave to pick-up equipment for the Surplus Exchange



Two new workshops promoting use of PowerDOE®, a whole-building energy simulation tool, were held in Topeka. Skills learned will allow engineers to better evaluate energy implications of building and HVAC system designs. In addition, building energy simulation is one compliance path for code compliance.

One new-building case study is underway. Manhattan is planning a new fire station to serve both the regional airport and a business park. The city is committed to making the project energy-efficient and sustainable. Building design features, including orientation, space layout, and window placement, are being evaluated using PowerDOE® early in the design process. Ongoing evaluation of the design process will help assure the city meets its goals of maximum energy and environmental performance. Future activities include training targeted toward city and county building code inspectors on advantages of energy code adoption at the local levels. Local adoption and enforcement of energy codes will provide greater impact on building energy use than the current compliance path.

Previous workshop evaluations indicate state-of-the-art design information is needed to assist engineers and architects in designing more efficient buildings. A workshop is being developed to provide design skills to allow smarter energy-efficient designs.

Three workshops designed for mortgage lenders, real estate agents and builders were offered in Topeka, Hays and Overland Park to explain and teach underwriting guidelines for energy efficient mortgages (EEMs) that reward energy efficient construction. Builders who can demonstrate a minimum level of energy efficiency as verified by a home energy rating can qualify their buyers for larger mortgages, and, with some loan programs, finance 100 percent of the added cost of the energy enhancements.

The workshops were taught by Buzz Howard of Mortgage Training Services, Sacramento, CA and Russ Rudy of Kansas Building Science Institute, Manhattan, KS, on March 17-19, 1998. Rudy illustrated the flaws in building construction that can cause even very expensive new homes to perform poorly and showed how the flaws can be fixed or prevented. Howard explained FHA, VA and conventional financing options for energy efficient mortgages (EEMs) and showed how to access and underwrite these loans. ❖

Special Projects

Building Codes

<i>Coriolis</i>	<i>Lawrence</i>	<i>(785) 841-1906</i>
<i>Kansas State University</i>	<i>Manhattan</i>	<i>(785) 532-4994</i>
<i>Kansas Building Science Institute</i>	<i>Manhattan</i>	<i>(785) 537-2425</i>

The Kansas Corporation Commission's Buildings Energy Standards Program continues to support commercial and residential energy code education and adoption with the goal of increasing energy efficiency in new buildings. Previous program efforts have focused on training residential builders, engineers, and architects to comply with the Model Energy Code and ASHRAE/IESNA Standard 90.1 – 1989.

A study, currently underway, is designed to determine the level of code compliance by assessing the performance of recently constructed commercial and residential buildings. Improving building performance is the real proof of a successful building energy code program. A second stage of the study will determine those features of new buildings that most commonly cause actual energy use to be higher than code compliance levels. This evaluation will assist Kansas energy policy makers in determining future code activities.



Clean Cities Program

Greater Kansas City Area (816) 531-7283

On November 18, 1998 Kansas City was designated as the 67th Clean Cities coalition by the U.S. Department of Energy. This program is one of the most dynamic and broad based coalitions in the country with seventy signatories to the Clean Cities plan including the mayors of Kansas City, Kansas and Missouri and the Governors of the two states. Partnerships were established among government, industry, public and private sectors interested in maintaining clean air, developing alternative fuel infrastructure markets and sites and reducing the regions dependence on foreign oil imports. The mission of the coalition is to aid in improving the region's air quality, increase national security, and promote economic opportunity in the area by expanding the use of cleaner-burning alternative fuels and vehicles. The recognition by the U.S. Department of Energy is the beginning of this region's commitment to sustaining its air quality into the 21st century. It also establishes the area as the alternative fuels central hub for infrastructure and corridor development. ❖

"... you play a critical role in helping our Nation reach its energy security and clean air goals. Kansas City is a vital link in the nationwide network of Clean Cities ..."

-Dan Riecher, Assistant Secretary, Department of Energy

work with certified Kansas Energy Star Raters to aid in verifying Model Energy Code compliance and in determining the cost-effectiveness and feasibility of energy efficiency upgrades/modifications. Rater training took place several times over the last year. The training was provided to people from Kansas, Colorado, Nebraska, Missouri, and Arkansas. The US EPA Kansas City Support Office participated in one training session to provide an introduction to EPA's Energy Star Homes Program. The Kansas Energy Star web site was completed (<http://www.ink.org/public/kesp>). Radio advertisement airtime was purchased with 34 radio stations across the state and ads began airing in June. Newspaper advertisement space was purchased through eleven newspapers across the state and the ads were

launched in May. KBSI promoted Kansas Energy Star at the 1999 Affordable Comfort Conference. Kansas Energy Star sponsored the Kansas Bankers Association's Real Estate Conference in Wichita. Contracted through the Kansas Building Science Institute, Buzz Howard of Mortgage Training Services was one of the keynote speakers. Kansas Energy Star received "accredited" status from the National Mortgage Industry Accreditation Committee in November. ❖

Buildings

Home Energy Ratings System (HERS)

Kansas Department of Commerce & Housing
Topeka (785) 296-2686

The Home Energy Ratings System (HERS) is a nationally recognized set of methods and devices used to assess energy efficiency in homes and businesses. It alerts owners of new and existing structures to the most likely locations where energy leaks occur. It is also a measuring stick for mortgage companies for loan calculations. In the past year, the Kansas HERS program accomplished the following activities. The Nebraska's Energy Office adopted the Kansas Energy Star Rater Training and Certification Program through the Kansas Building Science Institute. A Raters Recertification round and retreat was held. The retreat provided training on the Energy Efficient Mortgage (EEM) process. The Kansas Low Income Housing Tax Credit (LIHTC) Program implemented a requirement that all LIHTC project prospects



Energy efficient building training sessions

Building Energy Efficiency Media Program

Kansas Building Science Institute
Manhattan (785) 537-2425

The Kansas Building Science Institute (KBSI) has produced a monthly radio program on residential energy efficiency in conjunction with KKSU Radio, a public radio station operated by Extension Communications at Kansas State University. Hosted by Caroline Tetschner, the show airs as a part of KKSU's "Sound Living" program at 1:32 p.m.

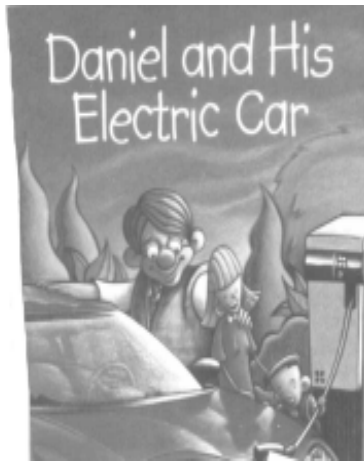
The purpose of the show is to increase consumer awareness of the benefits of energy efficient residential construction. Topics have included insulation types and techniques, innovative construction products and methods, high efficiency heating and cooling options and building a healthy house.

Although KKSU's programming is normally pre-recorded, many of the residential energy shows have been produced with a live call-in question and answer format. Listeners have called in from all over the state with their questions about residential energy efficiency. ❖

Weatherization

Topeka Community Action
Topeka (785) 235-9561

KCC funds were used to continue the Energy Education Program (EEP) where low-income occupants receive energy conservation information. Participants personal energy consumption habits are reviewed, a walk through inspection of the home is done to determine what energy saving steps can be taken and what repairs need to be done. Follow-up visits are made to measure the impact of the changes. Forty-six families were enrolled in the EEP program. In addition, 16 Energy Conservation/Winterization workshops were held. Energy conservation methods were discussed and home winterizing materials such as caulk, pipe insulation and window plastic were distributed. Community Action also developed an energy education packet for both primary and intermediate grades. The packets contain a teacher's lesson plan, a book to be read to the class and 25 copies of coloring books and puzzles for each child. The lessons are designed for a 1 hour session and are available to all Kansas schools free of charge upon written request. ❖



Part of an energy education package available from Community Action or KEEF

Energy Conservation Measures

Kansas Jaycees Cerebral Palsy Foundation
Augusta (316) 775-2421

The Kansas Jaycees' Cerebral Palsy Ranch updated heating/AC units in 2 buildings and replaced outdated single pane windows and rundown, ill-fitting doors in 5 of their 6 buildings. One of the buildings receiving a new heating/AC unit had previously been serviced by a 40+ year old converted heater and window AC units. Not only is this building now able to adequately and effectively cool the Ranch's disabled campers, but with sufficient heating, the building was able to house flood victims from the fall '98 local disaster. This building also had a west-facing porch converted to a built-on room, using 10 crank-style windows from trailer houses. The new double pane, argon-filled, low E film windows haven't been in place long enough to accurately measure the savings, but there is already a very noticeable difference in the room's temperature, according to Executive Director Debbie Strohm. "This grant

"This grant has made such a huge impact on our energy usage, we are no longer faced with simply throwing an excessive amount of money at the electric and gas companies to make our campers comfortable and keep our facilities from freezing. ... The new, more efficient unit cut energy costs for the building over 40%.."

***-Executive Director Debbie Strohm
Kansas Jaycees Cerebral Palsy Foundation***

has made such a huge impact on our energy usage, we are no longer faced with simply throwing an excessive amount of money at the electric and gas companies to make our campers comfortable and keep our facilities from freezing." The other building receiving a new heating/AC unit previously had a 25-year old unit. The new, more efficient unit cut energy costs for the building over 40%! That building also received two new windows on exposed sections, replacing leaking windows with broken gas seals. The remaining portion of the KCC funding was used to replace older single pane windows and badly-warped doors that were so hard to shut, they often were left open, overworking the building's air-conditioning systems. ❖

Building Retrofitting

Land Institute
Salina (785) 823-5376

The Land Institute is renovating the Matfield Green School, as its primary facility for their Rural Community Studies program. The program promotes education and research projects that offer imagination and information to help minimize dependence upon non-renewable resources and maximize possibilities for cultural innovation and adaptation. With continuing grant assistance from the Kansas Corporation Commission, The Land Institute has completed both the heating and cooling systems at its Matfield Green facility. This year's project was the installation of the unique cooling system, using ground water to cool circulated air, backed up by a small (residential-sized) auxiliary compressor which mainly provided dehumidification. This system allows year around use of the facility by The Land Institute and also allows them to offer space for meetings of other non-profit organizations and community groups. ❖

Kansas Institutional Conservation Program

Kansas Corporation Commission
(785) 271-3184

The Institutional Conservation Program (ICP) provides financial assistance to schools and hospitals constructed before 1989 to improve energy efficiency. The institutions can request assistance to implement energy conservation measures that were identified in their Technical Analysis. Matching funds are required.

During FY 1999, twenty-two schools and hospitals were funded to install equipment to improve energy efficiency. The net result of the ICP grant is to lower an institution's energy usage and free-up valuable resources needed to provide for other needs. The remainder of this report highlights the activities by the different institutions as they undertake energy conservation. ❖

Institutional Conservation Program

1999 Summaries

Atchinson Catholic Elementary

Atchinson

Anticipated Annual Savings

\$2,875

Heating modifications were done during the winter of 1998-99, so it is not yet possible to compare a year of performance with a past year. We are satisfied, nevertheless, that a substantial improvement has been effected. Before the modifications we sometimes needed to have the doors of the Upper School Building wide open during the cold of winter because some areas of the building had to be overheated in order to heat other areas even minimally. The new heating controls appear to have solved this problem.

The lighting system modifications have been extremely well received by parents, teachers, students, and maintenance personnel. There are new gas vapor lights in the gymnasium; these replaced very noisy and far too bright older lights. The change is wonderful! There are new lights in all the classrooms, workrooms, assembly rooms and hallways. All new lights are fluorescents of the same size, replacing older lights of many different sizes. Now the maintenance people need only one style of replacement bulb for most lights in the building. As in the case of heating system modifications, these modifications have been completed only within the past two months, so a comparison of energy usage cannot yet be made.” - Fr. Gerard Senecal, O.S.B. ❖

“The savings have provided the opportunity to spend funds for students, rather than for equipment utility costs..”

- Superintendent Parker , Chase

Bishop Ward High School

Kansas City

Anticipated Annual Savings

\$12,307

This project has yet to be started pending acquisition of matching funds by Bishop Ward High. An extension of the grant is being requested.❖

“We have seen a considerable savings in our budget line item for energy, due in large part to completion of ICP grant projects..”

- Superintendent Nelson, Claflin

Chase-Raymond USD 401

Chase

Anticipated Annual Savings

\$5,130

The boiler system was upgraded in the high school and grade school. The classroom environments are much better; staff have commented about the classrooms being more conducive for student learning. The head of maintenance is very pleased with the new equipment, “ I get far fewer complaints from the teaching staff.” The grant allowed the school district to accomplish upgrades that would never have been possible otherwise. The savings have provided the opportunity to spend funds for students, rather than for equipment utility costs. ❖

Claflin USD 354

Claflin

Anticipated Annual Savings

\$4,311

USD 354 was again fortunate to receive an ICP Grant in the amount of \$11,829 for Cycle 20 for the following ECM projects at Claflin Elementary School: Setback Controls, Ceiling (Attic) Insulation, and Occupancy Lighting Controls. Estimated total cost was \$20,708, and the project came in within budget, which is very important to a small school district.

The district greatly appreciates the benefits received from completion of energy saving projects such as these and those previously completed. In a time of very tight, and even declining budgets for our district, we would not be able to even talk about the possibility of completing such projects without the assistance provided through such grants.

With the completion of these projects at our elementary building, we have started the process of evaluating and applying for an additional grant which would allow us to consider doing some of the same type of conservation projects at our secondary building. It is a structure built in 1964, and we are confident that we can conserve energy through such efforts. We have seen considerable savings in our budget line item for energy, due in large part to completion of ICP grant projects. - Superintendent Nelson. ❖

Cushing Memorial Hospital

Leavenworth

Anticipated Annual Savings

\$9,105

Due to the large demand for skilled electrical contractors in Northeast Kansas, Cushing Memorial has had difficulty finding one to begin installation of the lighting upgrades and occupancy sensors. The high demand for skilled workmen has also contributed to additional costs for this project. The variable air volume conversion for the ICU/ER is under construction and will be completed by September 1, 1999. The lighting upgrades and occupancy sensors will be installed as contractors become available. The total estimated cost of this project was \$64,285 with a payback time of 4.7 years. The additional costs will lengthen the payback time, but Cushing Memorial is delighted with results to date. ❖

“Many positive comments about the new lighting were heard from students, teachers, and other employees of the school district..”

- Fairfield School District

Fairfield USD 310

Langdon

Anticipated Annual Savings

\$10,220

The ICP grant program allowed facility upgrades at three Fairfield schools during FY99. Lighting upgrades were completed at Fairfield East Elementary School and Fairfield High School. At Fairfield West Elementary School lighting upgrades, ceiling insulation, a high efficiency boiler, and environmental control modifications were installed. All of the projects have been completed with the exception of the new boiler for West Elementary. It is installed, but a valve needs to be replaced before certification. Completion is anticipated in early December. The total cost of the projects was estimated at \$80,839, and it appears they will be within budget. The expected payback time to the district is only 7 years, 9 months. The ongoing savings provided by these upgrades will be of benefit to the school district for years to come.

Upon resumption of classes in Fall 99 many positive comments about the new lightning were heard from students, teachers, and other employees of the school district. With the advent of winter we are sure the new boiler will be equally appreciated. ❖

DeSoto USD 232

DeSoto

Anticipated Annual Savings

\$2,980

Lighting upgrades were done in three schools: Woodsonia Elementary, Lexington Trails Middle School, and DeSoto Kindergarten. The upgrade at Woodsonia Elementary is complete. The quality of the learning environment improved with the quality of the lighting, and we are looking forward to upgrading the other two schools. We had participated in the ICP grant program eight years ago, and I was impressed with the smoothness with which it is now conducted. The staff of the State Energy Program was very helpful in answering my questions and explaining the grant procedures. I think this is an excellent program. - Denis D. Johnson, Director of Facilities. ❖

“The staff of the State Energy Program was very helpful in answering my questions and explaining the grant procedures. I think this is an excellent program..”

- Denis Johnson, Director of Facilities, DeSoto

Hayden High School

Topeka

Anticipated Annual Savings

\$4,270

Hayden High School recently completed an extensive lighting renovation throughout the academic and activity facilities. The grant was funded in part through the Kansas Institutional Conservation Program. The principal buildings affected by the renovation are between 30 and 40 years old and have been significantly impacted by the improvements. The classrooms and hallways are brighter, more conducive to learning, and more attractive. Additionally, we have seen improved cost and energy efficiency in our electric service since the project was completed. The students and staff are very pleased at the enhancements provided to our school through this renovation. ❖



Hutchinson Hospital

Hutchinson

Anticipated Annual Savings

\$27,415

We completed two projects in 1999, a boiler burner replacement project and a cooling system modification. Both projects were completed in early/late summer, therefore, we do not have significant documentation of savings that we anticipate the projects will bring to our organization. We project that the boiler burner replacement will have a payback of 8.48 years and the cooling system modification will have a payback of 2.71 years. Thus when averaging the two projects, the payback is 4.24 years.

Downsizing of the boiler burner replacement project will allow for greater efficiency since it reduces the frequency of start/stop times allowing the boiler to idle and approximately cycle. The boiler burner project is also connected to our Honeywell reporting system allowing us to monitor the boiler operation via computer rather than require actual personnel time for the inspections. In regards to the cooling system modification, it allows for “free cooling” to the chiller operation. With the upgrade it also has allowed us to stabilize the condenser water temperature which allows the unit to operate at greater efficiency. We are very pleased with the two installations and anticipate that the payback period will be met or exceeded. ❖

“The administration and staff report that the new lighting is “wonderful”. There is less eyestrain along with a brighter atmosphere for learning and work. The rooms and hallways are not so dreary and unfriendly..”

- Dr. Don Wells, Superintendent, Mulvane

Lawrence USD 497

Lawrence

Anticipated Annual Savings

\$1,183

Lawrence USD #497 used its ICP grant to upgrade the lighting in Sunset Hills Elementary School (1955). Bond money, recently approved by the electorate, was used as matching funds. The grant helped extend the bond money so lighting upgrades could also be made to Kennedy Elementary (1960) and Schweidler Elementary (1957). Thanks, in part, to the ICP grant many Lawrence students have an improved learning environment. ❖

McPherson USD 418

McPherson

Anticipated Annual Savings

\$5,007

“Washington Elementary School in USD 418 is the school that utilized the ICP grant money. We were able to replace four obsolete heating and air conditioning units. We have already experienced lower utility bills and greater comfort in the areas these units cool. We expect having to spend less money on repair parts and less district maintenance man-hours making repairs. Another very important gain with this project is that we now are able to provide the recommended amounts of fresh air to the classrooms where with the old system we were not.”— *Ward Nippert, Director of Buildings and Grounds.* ❖

Mulvane USD 263

Mulvane

Anticipated Annual Savings

\$1,745

The energy grant enacted with the cooperation of the district Board of Education gave us lighting and energy savings. We will monitor the kilowatt-hours used each month and compare it to prior years to track improvements in efficiency. The anticipated savings will be from the improved lighting that reduces the need for some lamps. Also the high tech ballast and bulb types reduce electricity requirements. The installed sensors will also reduce electricity by turning off lights in rooms not in use. The administration and staff report that the new lighting is “wonderful”. There is less eyestrain along with a brighter atmosphere for learning and work. The rooms and hallways are not so “dreary” and “unfriendly”.

The outside lighting is brighter and more efficient. The increased lighting enhances security and draws attention to the facility, which makes the building less attractive to vandals and thieves. The staff is very appreciative of the work that was done and to those who made the grant possible. The energy grant will make the school a better place for everyone.— *Dr. Don Wells, Superintendent.* ❖



Institutional Conservation Program

Nickerson USD 309

Hutchinson

Anticipated Annual Savings

\$3,405

The ICP funds received last year were used to replace original classroom lights at Nickerson Elementary. The replacement lights are not only more efficient, the light output is greater and bulbs last longer. We have been very satisfied with the results. Local patrons, students, teachers, administrators, and custodians have all indicated how much the lighting is improved. Teachers have indicated how much better the atmosphere is for student reading/writing.

We are anticipating approximately a 30% saving in electric consumption while having better light output. We also expect bulbs and ballast to last longer with the new fixtures.

Everyone familiar with the “before” and “after” is very pleased with the results. Thank you again for your help. ❖



Improvements in lighting and heating make the conditions for learning better at Sacred Heart

Palco-Damar-Zurich USD 309

Palco

Anticipated Annual Savings

\$6,574

In August, USD #309 completed the projects funded by the ICP Energy grant program. Energy inefficient and outdated lighting in the grade school (1922) and the high school were replaced with new energy efficient lights. Ceilings were replaced and insulation added as energy conservation measures. As teachers and students returned to school this fall, many positive comments were heard about the “bright new look”, with classrooms and hallways being much brighter and more attractive. In a few months, as winter winds howl through the plains, they will enjoy much warmer surroundings provided by the conservation measures taken by the district.

To date, the school district has not been able to do an energy audit to compare present energy usage to previous years. However, they will soon be comparing both electrical and natural gas savings, according to Superintendent James A. Deinas, who voiced the district’s “appreciation for the funds that allowed for this project, and of the savings we will enjoy in the future.” ❖

Sacred Heart Elementary

Larned

Anticipated Annual Savings

\$595

“Thank you so much, especially for the lighting. Our old lights were an eyesore, to say the most! They were hard to clean, hard to

change, and although we were use to them, really didn’t do as good a job as we thought they were doing. The light now seems so much softer, and really modernizes the rooms. They are also a breeze to keep clean and easy to change. I appreciate all your effort in helping us make our school a better place for our children, and realize that people often take these kind of things for granted. You have

made a difference, and I thank you for your dedication.”—*Lee Durler, Head Teacher*

Insulation for the school’s hot water heater was also installed. The students of Sacred Heart Elementary will have a warm, well lit environment and plenty of hot water for the winter months thanks to the ICP grant program. The savings provided by the improvements can be allocated to other important educational efforts. ❖

St. Patrick Catholic School

Parsons

Anticipated Annual Savings

\$2,574

The FY99 energy grant enabled St. Patrick to upgrade part of the lighting system in the school. Future plans are to finish the lighting upgrade and drop the ceilings in the classrooms. Both will add energy efficiency as St. Patrick prepares to air-condition the facility. Modifications to the heating system are currently in progress. In total, these improvements will allow for comfortable year-round usage of the building, and a better learning environment for St. Patrick’s students. ❖

St. John Holy Family School

Kansas City

Anticipated Annual Savings

\$5,634

St. John/Holy Family School is a parochial school located in the heart of ethnic Strawberry Hill in Kansas City. In the fall and winter months the school principal, Mary Staley, would say a prayer each morning hoping that the school's boiler would work yet another day. After a particularly bad "Hail Mary" morning, the frustrated principal took a risk, something she is known to do. She did some research and found out that maybe the school could qualify for the Kansas Institutional Conservation Program grant.

Being in the inner city, the staff is use to dealing with many problems on a daily basis. One less problem the staff and students will deal with this school year is the inefficient boiler and improper lighting. The school qualified for the grant and is now enjoying the benefits. The students are comfortable and the lighting is helping the students to see and do better work. One kindergarten student recently exclaimed, "purple does look different than blue in the light!" What a difference energy efficiency can make to a small urban school. ❖

"The students are comfortable and the lighting is helping the students to see and do better work. One kindergarten student exclaimed 'purple does look different than blue in the light!'."

- St. John Holy Family School, Kansas City

Sheridan County Hospital

Hoxie

Anticipated Annual Savings

\$10,538

The ICP grant was used to replace the steam boiler, and upgrade lighting and occupancy lighting controls in our facility. Although we have not had time to do a formal study of the figures, we have definitely seen a decrease in our energy usage. The employees were pleasantly surprised at the increased amount of light, especially in some of the previously dark hallways. Patients thought we had painted the walls a lighter color.

We have received many positive comments about the use of timers as everyone could see the automatic savings this would bring. The maintenance people are happy with the improvements they have seen and the benefit to the facility as a whole. They feel it has increased safety in some areas as well. We are very pleased that we were able to participate in this program. ❖

Sumner Regional Medical Center

Wellington

Anticipated Annual Savings

\$22,038

The Medical Center is installing a building automation system that will monitor air handlers, pumps, boilers, air conditioning, and filters 24 hours a day. The system is linked to a weather monitoring system on the center's roof. This combination will allow the system to automatically regulate heating and air conditioning. Previously, all pumps, air handlers, etc. were adjusted by hand. The system is now proactive, rather than reactive, allowing for more constant temperature control and energy savings. Maintenance personnel are notified immediately of any malfunction within the system for proper corrective action to be taken.

Medical Center administrator, Ted Wyglendowski, says, "The anticipated cost of the system was \$98,000, but to our delight it is going to come in about \$10,000 under budget. We anticipate completion in late November. I wish to express my sincere thanks to the Kansas State Energy program. Without their help these improvements would not have been possible." ❖

Wamego City Hospital

Wamego

Anticipated Annual Savings

\$18,344

The FY1999 ICP Grant enabled Wamego City Hospital to implement a natural gas conversion project that will have a great impact on utility costs for the hospital. The hospital is converting from electric heat and hot water to less costly natural gas. The project installed new gas service to the older section of the hospital. New high efficiency hot water boilers are the heart of the system, and the old surgery rooftop heating units have been replaced with new air handling units and ductwork. The entire scope of the project upgrades aging equipment throughout the hospital.

The project came in slightly above estimates due to upgrades to the original design. A four-pipe water system was installed instead of a two-pipe system as originally designed. This gives better control and is far more efficient during widely fluctuating temperatures which are frequent in Kansas during spring and autumn months. Although it added to the cost of the project, it also increased the expected savings to \$18,344 with a payback of 8.2 years. We feel the savings may be even greater than anticipated with recently rising energy costs. ❖

Kansas Energy Program
Kansas Corporation Commission
1500 SW Arrowhead Road
Topeka, KS 66604-4027
143-72

CALL FOR FY 2001 GRANT APPLICATIONS

All proposals for energy program grants are due to the Energy Program office by March 15, 2000. A written proposal and budget are required for the energy program grants and are submitted to Jim Ploger, Energy Program - KCC, 1500 SW Arrowhead Rd, Topeka, KS 66604. Application forms for the Institutional Conservation Program can be obtained by contacting Lori Forster at the above address. Requests for applications are due January 31, and completed applications must be received by April 28, 2000. Grants are for a 1 year period beginning July 1, 2000 and all applicants will be notified regarding their application by June 30, 2000. Cost sharing is required for the ICP program and encouraged for the grant program. ❖

Alternative Fuel Vehicle Incentives

Senate Bill 45 was signed into law in May 1999 (K.S.A. 79-32,201). Any taxpayer who makes expenditures for a qualified alternative-fueled motor vehicle or alternative-fuel fueling station shall be allowed a credit against the income tax imposed by article 32 of chapter 79 of the Kansas Statutes. The law allows 50% of the incremental cost or conversion cost for any qualified alternative-fueled motor vehicle placed in service on or after January 1, 1996 and before January 1, 2005 with caps based on vehicle weight. The full text of the law can be found on the KCC website at <http://www.kcc.state.ks.us/energy/energy.htm> and further details can be obtained from Otto Sitz (785) 271-3117. ❖