

MINUTES

SPECIAL COMMITTEE ON ENERGY AND ENVIRONMENTAL POLICY

August 20, 2008

Room 783—Docking State Office Building

Members Present

Senator Carolyn McGinn, Chairperson
Representative Carl Holmes, Vice-Chairperson
Senator Jay Emler
Senator Janis Lee
Senator Roger Reitz
Representative Forrest Knox
Representative Terry McLachlan
Representative Tom Sloan
Representative Joshua Svaty

Staff Present

Mary Galligan, Kansas Legislative Research Department
Raney Gilliland, Kansas Legislative Research Department
Cindy Lash, Kansas Legislative Research Department
Melissa Doeblin, Office of the Revisor of Statutes
Mike Corrigan, Office of the Revisor of Statutes
Sean Ostrow, Office of the Revisor of Statutes
Renae Hansen, Committee Assistant/Secretary

Others Present

See attached list.

Morning Session

Senator Carolyn McGinn, Chairperson, gave opening remarks to the Committee and guests. Chairperson McGinn noted that she would like to hear about all potential energy sources and look at the cost effectiveness of each of those sources. She commented that she would like to have a collaborative effort from all those involved.

Vice-Chairperson Carl Holmes noted that the United States currently uses 320 million barrels of crude oil a day. The U.S. has 4 percent of the world's population and consumes 25 percent of the energy used. He stated that the longer we wait to resolve the energy issue, the more difficult the solution will be and that the U.S. should take action before energy shortfalls become a crisis. Representative Holmes noted several pieces of legislation that were enacted that have helped to further energy industry growth in Kansas:

- Incentives for cellulosic ethanol production. A cellulosic ethanol plant is being built in Hugoton, with a \$70 million federal grant;
- Incentives for expansion of the only integrated coal gasification nitrogen fertilizer plant in the U.S. located in Coffeyville. Approximately \$1 billion has been spent in the last three years for expansion due to the new incentives; and
- Incentives for oil and gas pipeline expansion. Three years from now, we will have 1.1 million barrels of oil traveling through Kansas each day from Canada as a result of new tax incentives; new natural gas pipelines will be constructed from Wyoming, Northwest Colorado, and Utah to bring liquid natural gas through Kansas into Bushton.

Finally, there is an ethanol plant in Liberal, the first in the nation, that is capturing CO₂ and sending it to Texas for tertiary oil recovery. He noted that there are lots of positive things happening, but we have lots of work left to do to move forward.

Chairperson McGinn noted that the members of the Committee will be looking at what is happening in the world and here in the U.S. and Kansas so that an assessment can be made on which direction should be taken in the future. She noted the excellent conferees for this meeting.

Timothy Carr, PhD, Emeritus Scientist at the Kansas Geological Survey, and Marshall Miller, Chairman of Energy at West Virginia University ([Attachment 1](#)). Dr. Carr noted the amount of energy used currently by the U.S. in comparison to the rest of the world and described future needs for energy based on the current trends of increasing usage in developing countries, such as China, India, most of Latin America, and the rest of Asia. He stated that the opening of the Gulf of Mexico for drilling is a 7 to 10 year solution to our energy needs. He commented that the U.S. is one of the only developed nations that does not directly support oil and gas research. He also presented a slide presentation ([Attachment 2](#)) entitled "Energy at a Cross Roads." He noted that the big increase in demand for oil will be in the developing world and not the existing industrialized nations. He commented that a large impact in female health could be made by eliminating wood cook stoves and using propane for cooking and heating. He commented that transitions are slow, noting that it took half a century for coal to replace wood as an energy source after it was discovered. Dr. Carr noted the projected increases in U.S. gasoline usage will increase the demand for oil by 3 million barrels a day from the current 80 million barrels a day. He also noted that the residential electricity use has increased by five times over the savings that we have made using energy efficient appliances. He discussed the use of gas and oil by Kansas and the production of both energy sources in Kansas. Dr. Carr noted that in order to make an impact on the energy used in the U.S. it would require tens of thousands of wind generators. He said that all options used have to be technically sound, economically sustainable, and significant in scale in order to make a difference.

Members of the Committee were given the opportunity to ask questions of Dr. Carr.

Senator Janis Lee asked what the future is for solar photovoltaic technology. Dr. Carr noted that there is a need to conduct significant research into the conversion process. He stated it has a

niche potential in some areas but does not think it will be a major contributor to our power balance. Dr. Carr noted that if the efficiency can be increased in solar cells, other energy sources could be replaced with this source. He noted it would take a huge investment from the electric utilities for a smart grid that could adjust for lack of sunshine. He noted that laws of thermodynamics cannot be repealed dealing with the storage of produced energy. He also noted that battery technology is coming along and the capacity and ability of batteries is increasing, but we need to work on storage technology.

Representative Holmes commented on the cost of production of energy per kilowatt hour from solar: 50 cents a kilowatt hour for the focused molton solar used in Sandia; 20-25 cents a kilowatt hour for photovoltaic. He noted the busbar price on current energy sources is 2 cents per kilowatt hour for coal, newly constructed wind is 9 cents per kilowatt hour, and natural gas is 11 cents a kilowatt hour. Representative Holmes stated that he learned at the Sandia labs that many people in engineering are foreign-born and as a result cannot work in national laboratories because of security issues, leading to a real need for American-born scientists and engineers. He asked Dr. Carr to expand on this issue. Dr. Carr noted that he had engineers doing post-graduate work from China and India with SAT scores around 1,500. The closest American-born student had an SAT score around 1,100. He noted that students from foreign countries come to the U.S. for training, then go home. Eventually, the universities will get better in other nations; he noted that universities in some developing nations are quite strong already. He noted that it is a tough question as to how to attract American students to the engineering field. He suggested starting very early in the educational process with the math and science, and adding federal funds for that purpose. Also, the fact that income for those fields will be higher will make a difference in the number of students attracted to the field. He noted that he wished there were a stronger pool of candidates in engineering from the U.S.

Representative Holmes inquired about the implication of Russia becoming a large energy exporter to the rest of the world and the impact that has upon the U.S. Dr. Carr noted that in terms of security issues, Germany gets 50 percent of its natural gas from Russia, and many of the Eastern European countries get 100 percent of their supply from Russia. He commented that certainly if you control energy, you can have a major geopolitical and economic impact on the rest of the world.

Representative Holmes inquired why the cost of liquid natural gas (LNG) imports were not increasing as expected. Dr. Carr noted that the natural gas prices might decline because of investments made in unconventional gas (shale gases and coal bed methane gases). He also commented that there is a competitive disadvantage for the various uses of LNG around the world as many places are willing to pay more for it as an energy source for cooking.

Representative Holmes inquired about the chart on world energy that illustrates an increase between now and 2030 in liquid fuel use. He wanted to know if those are realistic figures and where those products would come from. Dr. Carr noted that the figures are based on income, numbers of vehicles, and demand. He commented that we are starting to see people hitting the price-resistant point; in this country, the number of miles driven fell for the first time, because of the price of gasoline. He does not know if that forecast is accurate, because a straight line extrapolation of trends was used.

Senator McGinn asked for a clarification on the increase of Hugoton Field gas production. Dr. Carr noted that there is an increase in production in the State of Kansas but not necessarily in the Hugoton Field. She also asked about the difference in processing costs of coal bed methane gas extraction. Dr. Carr commented that there is a difference in the drilling and completion and the technology used in how it is produced, but noted that those wells are not the big producers and you must have thousands of them to get enough product to be useable. The whole idea is to drill them as efficiently and cheaply as possible.

Representative Svaty asked the conferee if he would comment on one of his conclusory statements, "First we must avoid wishful thinking and uncritical advocacy of publicly-preferred solutions." Dr. Carr noted that he was referring to the wind and solar ads that are airing currently, and that five years ago it was ethanol. He commented that any energy system we use is dirty, expensive, and difficult. He stated the public always wants the price to come down immediately.

Representative Knox asked a followup to Representative Svaty's question, by asking how large the political influence on the entire problem is. Dr. Carr noted politics can play a big role, but it is not his area of expertise. He noted that the ultimate political action, war, can have a tremendous impact on the cost and demand for energy sources.

Dave Newell, Assistant Scientist, Petroleum Geology, Stratigraphy, Kansas Geological Survey, testified on unconventional sources of natural gas in Kansas, such as coal bed methane activity and production (Attachment 3). Dr. Newell noted this technology and type of extraction has been important in Kansas since 2000. He stated that Kansas is kind of a latecomer to this production. Committee members were told that there are big reserves in the west from Montana down to Arizona and New Mexico. Kansas coal bed methane production is in the eastern one-third of the state, with the majority of that in south-eastern Kansas. The Committee learned that the economics of a gas field is dependent on its proximity to a pipeline. In 2007, Kansas had 41 billion cubic feet (bcf) of coal bed methane production, with a \$10 million per bcf sale price. The proceeds are being injected into the economy of the local communities. He noted, typically, only large companies are involved in coal bed methane gas production because of the extensive costs up-front for the extraction. In contrast to coal bed methane, with conventional gas wells the best day for production is the first day of production. With coal bed methane extraction, the production increases to a peak, then gradually declines.

Mr. Newell stated that shale gas production was closely related to coal bed methane gas production. Currently, shale gas is being developed in southeast Oklahoma but it is getting close to Kansas. In Oklahoma, the oil has progressed to such a state that the gas is being expelled from the shale. Whereas, the Kansas shale still has large amounts of oil, which blocks the pores. These engineering and geological problems put productivity out in the future.

Chairperson McGinn asked about abandoned wells. Dr. Newell noted that sometimes abandoned wells are found because the methane gas is making its way to the surface as operators are dewatering the coal.

Vice-Chairperson Holmes asked for some details on two points on the last slide about the potential of enhanced gas recovery and CO₂ sequestration. Dr. Newell noted that in Kansas, these issues are still being studied. He noted pump CO₂ into the coal seam, the CO₂ has a greater affinity to attach to the coal than methane does. This means there could be the potential to increase productivity of the coal bed well while sequestering CO₂. However, this leads to an additional cost to gather the CO₂ and to purify it to a useable state. In addition, there is the cost of distributing CO₂ to the individual wells; it may take dozens or hundreds of wells to hold the CO₂. Nevertheless, it may be economically feasible as you get the additional methane off the well. Plus, there is the possibility of selling the CO₂ credits.

Representative Holmes asked what steps the Legislature could take to bring about CO₂ sequestration during the production of methane. Dr. Newell suggested tax credits for infrastructure to distribute the CO₂, and tax credits for the incremental amount of methane produced. Dr. Carr suggested funding the first project; once you show the economic viability for this, others will follow. He noted that this extraction process has been conducted via pilot projects in the San Juan Basin and in North Dakota. Because each of the seams of coal vary in chemical makeup, what it takes chemically to extract the methane varies. Their results may not be comparable to what Kansas could expect.

Representative Tom Sloan asked if the CO₂ injection has been analyzed in the laboratory as a way to use CO₂ and not use water for the coal dewatering process. Dr. Newell noted that the CO₂ would start knocking off the methane without significant depressurization of the coal. However, he noted there were a number of problems because of the molecular differences of CO₂ and methane.

Chairperson McGinn asked about the cost in the process of extracting methane gas from the coal beds. Dr. Carr noted that the big problem is it takes several months to de-water the coal and the rate of production is much lower than the traditional gas well in the beginning.

Representative Holmes inquired about who or what entity would get the carbon credit for this process. Dr. Newell noted that his first reaction would be the CO₂ producer, but it might be a point of contractual negotiation with the coal bed methane extractor.

Martin Dubois, Project Manager, Hugoton Assets Management Project (HAMP), Improved Hydrocarbon Recovery, LLC, Lawrence, Kansas ([Attachment 4](#)), presented a power point on the current status of the Hugoton Field. He noted that with the improved recovery efficiency, an additional 10-14 years supply could be gained using the recovery processes currently available. He estimated using the current depletion techniques that the Hugoton/Panoma wells will be depleted completely by 2050. He stated that under the current project, it is estimated that recovery will be in the 75-80 percent range. Dr. Dubois stated that if new technologies can be applied, it might be possible to get that number up to 85-90 percent recovery. Dr. Dubois presented a number of slides depicting the current status of recovery production for natural gas fields in Kansas, showing prior and post-production figures. He noted that determining exactly where the gas is being extracted from is a key issue in predicting the economic status/extrapolation of the additional extraction processes. Dr. Dubois noted that it is difficult to assess if the gas is being extracted from new pockets or is accelerating the depletion of existing pockets. Making those determinations will be a key in accessing the total economic value to the State of Kansas.

Vice-Chairperson Holmes noted that one slide showed that there were no Hugoton infield wells in Oklahoma, and asked if that meant there is only one well to 640 acres in Oklahoma. Dr. Dubois noted that the assumption was correct. Representative Holmes asked if the people in Oklahoma had discussed modifications to their rules. Dr. Dubois noted that there was talk of changing the rules but there was sufficient opposition to not have that happen. He also noted that Kansas is likely not pulling any gas across the line from Oklahoma, except for possibly a small amount right at the border. Dr. Dubois also responded that some of the wells might be drawing from zones that have higher hydrogen sulfide content, but that was not part of his study.

The meeting was recessed for lunch.

Afternoon Session

The meeting resumed at 1:30 p.m.

Dr. Daniel O'Brian, Associate Professor, Kansas State University, Colby, Kansas ([Attachment 5](#)), presented a PowerPoint presentation on "The Status of the Kansas Ethanol Industry." He noted that macro-economics have had a slowing effect on the number of ethanol plants that have actually come online compared to the number that had made construction announcements. He noted that the best place for ethanol plants would be where there is irrigated corn and access to livestock feeders to dispose of the by-product. Additionally, Dr. O'Brian offered a white paper ([Attachment](#)

6) entitled, "Kansas Ethanol Production and its Effect on Crops, Livestock, Trucking, and a Community."

Senator Lee inquired about the 33 percent of U.S. corn production (4,100 billion bushels) which would be used by the ethanol industry. She asked if it was feed stock, rather than corn for human consumption. Dr. O'Brian said that most was feedstock and noted that 1.6 billion bushels is still going to high fructose sugar production and direct food consumption.

Representative Sloan asked about the issue of water use. Dr. O'Brian noted there would be an increase in water usage for crop production due to more acreage being planted and, therefore more irrigation. Concerning water usage in the ethanol plant, one-third of the water used is process water and two-thirds is used in heating and cooling. He thinks only the process water is "used up." He commented that 40 million gallons of water used by an ethanol plant is equal to the amount used by 2-3 center pivots on a 125-acre pivot.

Representative Sloan asked whether the non-process water is closed looped. Dr. O'Brian deferred to Mr. Krissik. Representative Sloan asked about the long-term economic viability of the ethanol plants. Dr. O'Brian noted that they are classic margin operators. He said the smaller plants that have all the debt paid off survive longer and are probably okay, although their opportunity for returns is not tremendous. If a plant does not have its debt paid off, then it becomes "survival of the fittest."

Representative Holmes commented on the amount of water used by an ethanol plant based on his conversation with officials from a plant in Liberal. He noted that three gallons of water are used for every gallon of ethanol produced — one gallon of water goes to one feedlot which lowers the consumption of water at the feedlot, one gallon is used for irrigation on site, and one gallon evaporates. In comparison, it takes 20-40 gallons of water to process one gallon of gasoline.

Representative Holmes asked a question concerning use of the Kansas feed grain supply. The slide shows 566 million bushels produced in Kansas with 153 million used for ethanol and 158 million used for livestock. This would suggest Kansas is exporting a lot of feed grain. Dr. O'Brian said livestock use was possibly understated, and that Kansas is fairly balanced on use versus production, or perhaps may export some feed grain.

Representative Svaty asked if Kansas was in a better or worse position than other states to weather this time period. Dr. O'Brian noted that there is no place in Iowa you can go without being 20 miles from an ethanol plant. The number of plants makes competition very intense. In Kansas, the competition is between livestock and ethanol plants and we may be better able to weather a problem.

Senator Reitz asked Dr. O'Brian where ethanol will be in 20 years. Dr. O'Brian offered a report to the Research Department that tries to pull apart what has happened in the market. Much will depend on the policy environment: if subsidies continue and if the price of grain stays high, it will support ethanol for the foreseeable future.

Representative Knox asked if farmers are making any more profit, given the high price of corn. Dr. O'Brian noted that the income is up, but production costs have increased, as well.

Dr. Ronald Madl, Bio-processing and Industrial Value Added Program, Co-Director, Center for Sustainable Energy, Kansas State University ([Attachment 7](#)), presented "The Role of Ethanol." Dr. Madl noted that Mike Woolverton had a big input in his slide presentation. He discussed mandates in the federal energy bill in December, 2007. He noted that approximately 23 percent of our crop is being converted to bio-ethanol. Dr. Madl also discussed some of the harvest issues that

are being investigated, such as crops that are being used for both grain and cellulosic ethanol production.

Dr. Madl noted that the U.S. is experiencing a 30-year lower level of stocks of soybeans. Worldwide, a 60-year low in production is occurring for wheat. He commented that weather will increasingly become an issue in the energy vs. food production debate worldwide.

Senator Lee asked for an explanation of the federal policy and the numbers it is distributing on the reduction in greenhouse gas emissions. Dr. Madl noted that this reduction is from the ethanol residue versus the base energy used which is gasoline. Senator Lee commented that it will invariably have some kind of impact.

Representative Holmes asked which produces more ethanol: corn or switchgrass. Dr. Madl said it is difficult to say, because you have to figure in fertilizer differences and other inputs such as the water requirements for each.

Representative Sloan asked if the cellulosic process works better with a wet feedstock or a dry feedstock. Dr. Madl noted the biggest cost is the deconstruction step in producing ethanol. An argument could be made to grind it before you add enzymes, but there is no straightforward answer. Representative Sloan also asked about the research being done on the pelleting process to be used for the cellulosic process. Dr. Madl noted that what is being discussed is a much larger cube pellet than feed pellets, about a six-inch square.

Dr. Richard Nelson, Associate Professor and Head of the Kansas Industrial Extension Service, Kansas State University ([Attachment 8](#)), offered a slide presentation on the "Status of Bio-Diesel and Bio-Ethanol." He noted that Kansas is unique in that it has the ability to diversify how the land is used in order to maximize the amount of crop derived for use in ethanol production, while using many different currently available technologies.

Representative Knox asked how much land is available for ethanol that is not currently crop land. Dr. Nelson said they are studying this issue now. He said it would be necessary to determine which land is not being used currently, and what type of production it could support.

Representative Sloan asked about the use of hay and diverting the point of sale of the crop. Dr. Nelson noted that the sale of the crop will happen where the highest price market prevails.

Representative Svaty asked what caused the huge spike in tallow grease on the spreadsheet provided by Dr. Nelson. Dr. Nelson noted that it is an outlier in his data.

Senator Lee inquired where Conservation Reserve Program (CRP) land is in the plan. Dr. Nelson commented that he does not want to put CRP land into play. There was a reason why it was taken out of production, and he thinks the yield there would be low. He noted that this land has sequestered carbon for a number of years, and it is like a champagne cork, if you place it back into production, it puts the carbon back in the air.

Greg Krissek, Director of Government affairs, ICM, Inc. ([Attachments 9 and 10](#)), Colwich Kansas, spoke to the Committee on "The Next Generation of Fuel Ethanol Technology." Mr Krissek noted that grain sorghum would fit into the graphs that show the biofuels volume needed to meet the 2007 Energy Policy mandate. Mr. Krissek believes that the real impact on the cost of food comes from the fuel necessary to get that food to market. He noted there has not been a new ethanol plant financed since last November due to commodity costs and the tightening of credit. He described the methods his company is using to break down grain kernels for various uses, such as food protein needs, feed protein, and cellulosic ethanol.

Representative Holmes asked about the relationship between wholesale unleaded gasoline and wholesale ethanol. Mr. Krissek noted that there has been \$0.54 to \$0.51 blenders tax credit from the federal government. The concern at this point is how to get more of the benefit of the price difference to the consumer at the pump.

Representative Sloan mentioned that a station in Lawrence is going through a terminal to get its ethanol, and it is not being blended until it goes through the pump to the consumer.

Senator McGinn led a discussion of what issues were to be taken up in the future with the Committee and how to task the staff for future meetings.

Senator McGinn noted the one-day meeting today was to get the Committee started and to have an opportunity to get Committee members' input on what to hear for the following meetings.

Senator McGinn would like to hear about fuel prices, what the trends are in the global market, and what is driving gasoline prices.

Representative Holmes provided a list of ideas:

- Have representatives of the three refineries in Kansas come in and talk about their expansion efforts.
- Have a representative of the Coffeyville facility discuss gasification for anhydrous ammonia and creating natural gas through gasification.
- Bring in blenders and pipeline companies that are blending at the terminals.
- Have a presentation by the operators of the filling station at Lawrence with blending at the pump.
- Have representatives of KIOGA and EIOGA discuss their expansion into ethanol.
- Have a representative of Trans-Canada come in and discuss its two pipelines to the Kansas/Nebraska terminal and the two pipelines leaving.
- Have a presentation on the natural gas pipeline to be built from Alaska to the lower 48 states.
- Have a presentation on the potential for the police departments to use CNG for fueling their vehicles.
- Have a presentation on converting algae to liquid fuels from NREL or ASDEC.
- Have a presentation on the NREL/MRI algae research in Colorado.

Representative Svaty asked if there were any problems with respect to the pipelines being built in Kansas, and if there is anything the Legislature could do to remove obstacles. He would like to hear from those companies.

Representative Sloan offered these ideas:

- Bring in vehicle fleet managers to learn what they see on the horizon, e.g. research on truck engines.

- Ask the Kansas Geological Survey to discuss research opportunities, matching funds for federal grants, and how to maximize federal dollars to extend production.
- Information on propane, as it is the fuel of choice for some constituents. What are the prospects for propane as refining changes?

Senator Lee suggested presentations on:

- CO₂ sequestration opportunities and where that fits in the picture;
- National and international look on natural gas potential; and
- How does the large natural gas find in Texas plays into greenhouse gas and natural gas emissions and how they affect the environment.

Representative Knox suggested information on the geopolitical energy situation of the world - where does Kansas fit, and how limited are our actions. Regarding greenhouse gas, he wants to hear both sides of the controversy over the degree to which man-made CO₂ contributes to climate change.

Senator McGinn wants to have someone discuss the three circles of economy, environment, and energy dependence.

Senator McGinn noted, that per member availability, the Committee will meet October 2 and 3. She noted the Committee will wait until after the election, but before Thanksgiving, to meet in November.

Chairperson McGinn thanked all conferees and staff.

The meeting was adjourned at 4:28 pm.

Prepared by Renae Hansen
Edited by Raney Gilliland and Cindy Lash

Approved by Committee on:

October 3, 2008
(Date)