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Cross-Cutting Issues (CCI) Technical Work Group

Summary List of Pending Priority Policy Options for Analysis

Policy No.	Policy Option	GHG Reductions (MMtCO ₂ e)			Net Present Value (Million \$)	Cost-Effectiveness (\$/tCO ₂ e)	Level of Support
		2015	2025	Total (2010–2025)			
CCI-1	GHG Inventories, Forecasting, Reporting, and Registry	<i>Not Yet Quantified</i>					Pending
CCI-2	Statewide GHG Reduction Goals and Targets	<i>Not Yet Quantified</i>					Pending
CCI-3	State, Regional, and Local Governments' and Academic Institutions' GHG Emissions (Lead by Example)	<i>Not Yet Quantified</i>					Pending
CCI-4	Public Education and Outreach	<i>Not Yet Quantified</i>					Pending
CCI-5	Participate in Regional, Multi-State, and National GHG Reduction and Energy Efficiency Efforts	<i>Not Yet Quantified</i>					Pending
CCI-6	Seek Funding for Implementation of KEEP Recommendations	<i>Not Yet Quantified</i>					Pending
CCI-7	Adaptation and Vulnerability	<i>Not Yet Quantified</i>					Pending
CCI-8	Encourage the Creation of a Business-Oriented Organization to Facilitate Investment in Climate-Related Business Opportunities and to Share Information and Strategies, Recognize Successes, and Support Aggressive GHG Reduction Goals	<i>Not Yet Quantified</i>					Pending
CCI-9	Dedicate Greater Public Investment in Climate Data and Analysis	<i>Not Yet Quantified</i>					Pending

GHG = greenhouse gas; KEEP = Kansas Energy and Environmental Policy Advisory Group; MMtCO₂e = million metric tons of carbon dioxide equivalent; \$/tCO₂e = dollars per metric ton of carbon dioxide equivalent.

Note: The numbering used to denote the above pending priority policy options is for reference purposes only; it does not reflect prioritization among these important draft policy options.

CCI-1. GHG Inventories, Forecasting, Reporting, and Registry

Policy Description

Greenhouse gas (GHG) emission inventories and forecasts are essential for understanding the magnitude of all emission sources and sinks (both man-made and natural), the relative contribution of various types of emission sources and sinks to total emissions, and the factors that affect trends over time. Inventories and forecasts also help to inform state leaders and the public on statewide trends, opportunities for mitigating emissions or enhancing sinks, and verifying GHG reductions associated with implementation of action plan initiatives.

A GHG emissions inventory for Kansas could be implemented through one of two models. The current emissions inventory for criteria pollutants¹ in Kansas is conducted via surveys that the Kansas Department of Health and Environment (KDHE) provides to regulated air pollution sources. The pollutant emissions data are provided to KDHE where the data are reviewed and quality assured. The data are then submitted annually to the U.S. Environmental Protection Agency (EPA). At that point, the data receive additional quality assurance review and are incorporated into the national database containing all state and tribal emissions data. (There is a significant delay on EPA's part in preparing a national inventory using the state information.) The data are then posted on EPA's Web site for review and use by any interested parties.

The EPA proposed GHG registry rule would require GHG emitters above a certain threshold to submit emissions data directly to EPA. The data would be reviewed and placed in a national database. The Cross-Cutting Issues (CCI) Technical Work Group (TWG) believes it is desirable for the GHG inventory and sink development process to be performed by KDHE, with assistance from the Kansas Corporation Commission (KCC) and the Kansas Geological Survey (KGS). Inventory and forecast efforts should be ongoing, reflecting improvements to the accuracy and completeness of data collected over time and should avoid duplicative reporting.

GHG reporting reflects the measurement and reporting of GHG emissions at a statewide, sector, or subsector level to support tracking and management of emissions. GHG reporting can help sources identify emission reduction opportunities and reduce risks associated with possible future GHG mandates by moving source reporters up the learning curve. Tracking and reporting of GHG emissions can also help in the construction of periodic state GHG inventories. GHG reporting is typically a precursor for sources to participate in GHG reduction programs, opportunities for recognition, and a GHG emission reduction registry, as well as to secure "baseline protection" (i.e., credit for early reductions). Further, collaboration with other states in the development of a GHG reporting program can influence the development of GHG reporting practices throughout the region and nation and build consistency and reciprocity with other state or regional GHG reporting programs.

A GHG registry enables uniform measurement and recording of GHG emission reductions in a central repository. Typically, a registry also includes transaction ledger capability in order to

¹ Criteria pollutants are regulated under the National Ambient Air Quality Standards (NAAQS).

support tracking, management, and ownership of emission reductions. Registries can help encourage sources to undertake GHG reduction efforts, enable potential recognition for such actions, provide baseline protection, and support the crediting of GHG mitigation actions. A registry can also provide a mechanism for regional, multi-state, and cross-border cooperation.

Policy Design

Goals: KDHE will establish and adequately fund a state GHG emissions inventory function, a GHG emissions forecasting function, and a GHG reporting function. This GHG-focused functional area within KDHE will assist reporting entities with GHG reporting requirements. KDHE will determine the appropriate funding mechanism and, in collaboration with stakeholders, will work to establish an effective and efficient GHG registry program for Kansas.

Timing: A GHG inventory & forecasting function within KDHE will be fully operational within one year of an approved regional or nationwide GHG program.

A GHG reporting function within KDHE will be fully operational within 18 months of a federal regulation directing states to implement such a program, or adoption by the Governor of a Kansas Energy and Environmental Policy Advisory Group (KEEP) recommendation to implement such a regional program.

A GHG registry function will reside with a KDHE-approved and -supported nationwide entity, such as The Climate Registry, whose primary focus remains on GHG emission registry and not compliance. This registry should have the ability to perform management and ownership of allowances as well as to track the allowances. Kansas is a member of The Climate Registry, and should continue its active participation in this organization to ensure the state stays focused on its registry mission.

Parties Involved: KDHE, KCC, other state agencies, and appropriate stakeholders.

Other: None identified.

CCI-2. Statewide GHG Reduction Goals and Targets

Policy Description

In states that have established GHG reduction goals, the comprehensive, stakeholder-based climate action planning process typically serves to identify and quantify policies and measures for achieving these goals. In states that have not specified goals prior to the planning process, the establishment of goals is often considered after the initial quantification results for other policy options are established. The most fundamental issue to be addressed in establishing goals is whether they are set based on the most current scientific estimates of what is needed to stabilize carbon dioxide (CO₂) levels to a safe level, or on best estimates of what can be achieved through the policies and measures adopted by an organization such as the KEEP. Most state and regional planning efforts have adopted long-term goals using the first concept, adopting long-term “aspirational” goals. The long-term goals perhaps are less critical, as any process with a 40-year timeline will include pauses along the way to evaluate progress and reset goals based on new scientific information.

The short-term goals tend to be within a time horizon that most people can envision. Therefore, the economic, technological, and social consequences of the goals are more tangible. Because of these consequences, there are various feasibility limitations and schedules of compliance for emission sources that are required in order to achieve these short-term goals. In addition, the economic modeling that is performed to evaluate the impacts of GHG reduction strategies has much greater validity over the shorter time spans. It is also easier to attempt to quantify the cumulative effects of GHG reduction strategies aimed at different sectors to come up with a “reasonable” or “achievable” short-term goal.

Policy Design

Goals: Long-term goals established by recent state and regional planning efforts have ranged from 60% to 85% GHG emission reductions by the year 2050 below a base year level. More recent efforts have used 2005 as the base year. The CCI TWG proposes a long-term goal of an 80% reduction in GHG emissions for Kansas from a base year of 2005.

Short-term goals established by recent planning efforts have had a much broader range of base years, end years, and percentage reductions. Many fall within the range of 15%–25% emission reductions from a base year of 2005 by calendar year 2020. With that range in mind, the CCI TWG believes that additional information being developed by the other KEEP TWGs is critical to make an informed decision regarding a short-term goal. The TWGs are establishing GHG reduction goals for different strategies within their respective sectors. As these are reviewed and decided upon by the KEEP, a better understanding of an appropriate short-term goal for Kansas will emerge.

With regard to establishing a short-term target, the CCI TWG recognizes that GHG reductions within certain energy-intensive sectors, such as cement production, may be more difficult to achieve. However, several existing measures already being implemented on the federal level will result in significant decreases in GHG emissions from certain sectors, and Kansas offers unique

opportunities for reductions and offsets in other sectors. The sectors with the most promise for reduction include transportation; residential, commercial, and industrial (RCI) energy use; agriculture; and waste management. Examples include fuel efficiency standards for automobiles in the transportation sector; energy efficiency outreach and demand management programs for the RCI sector; utilization of biomass for energy production; enhanced oil recovery with CO₂ from ethanol plants; and a renewable portfolio standard. As a result of the potential with these and other sectors, a short-term target of reducing GHG emissions by ___% below 2005 levels by 2015 is suggested. It is assumed that these reductions will be reasonably available in sufficient amounts to meet the short-term targets.

For a mid-term goal, sectors such as electricity generation and cement production, will have opportunities as technological advances occur. In addition, the activities described for recommended options will have matured and will be providing additional benefits. A mid-term target of ___% reduction in GHG emissions from a baseline year of 2005 by 2025 is recommended.

Sample GHG Reduction Targets

GHG reduction targets take different forms in state, regional, national, and international proposals. For example:

- Intergovernmental Panel on Climate Change (IPCC)—Originally called for reductions of 80% below 2000 levels by 2050. (The IPCC now thinks it underestimated.)
- Boxer-Lieberman-Warner (110th Congress)—Reduce GHG emissions by 4% below 2005 levels by 2012, 19% by 2020, and 71% by 2050.
- Markey (110th Congress)—Reduce GHG emissions to 2005 levels by 2012, 20% below 2005 levels by 2020, and 85% below 2005 levels by 2050.
- Midwestern Governors Association (ongoing)—MGA is modeling targets of 15%, 20%, and 25% below 2005 levels by 2020, and 80% by 2050.
- Minnesota—Reduce GHG emissions to 15% below 2005 levels by 2015, 30% by 2025, and 80% by 2050 (enacted in statute, 2007).
- Illinois—Reduce GHG emissions to 1990 levels by 2020 and 60% below 1990 levels by 2050 (established by executive order, 2007).
- Colorado—Reduce GHG emissions to 20% below 2005 levels by 2020 and 80% by 2050 (established by executive order, 2008).
- Washington State—Reduce GHG emissions to 1990 levels by 2020, 25% below 1990 levels by 2035, and 50% below 1990 levels by 2050 (enacted by statute, 2007).
- Oregon—Halt the growth of GHG emissions by 2010, reduce GHG emissions to 10% below 1990 levels by 2020, and to 75% below 1990 levels by 2050 (enacted by statute, 2007)

Timing: Defer to KDHE.

Parties Involved: Defer to KDHE.

Other: None identified.

CCI-3. State, Regional, and Local Governments' and Academic Institutions' GHG Emissions (Lead by Example)

Policy Description

Governmental agencies in Kansas at all levels have important roles to play in modeling behaviors that reduce GHG emissions. State, county, and local governments as well as academic institutions have very high-visibility operations throughout the state that citizens often associate with best practices. Such should be the case with reducing GHG emissions. Some activities along these lines are already underway, and the state government should publicize these efforts as well as encourage new initiatives and support those with technical support and expertise.

Kansas governmental agencies, local governments and academic institutions should pursue aggressive GHG assessment and reduction strategies that integrate energy efficiency and renewable energy. By installing the most efficient technology and tapping local power sources, governments can reduce their own GHG emissions, create a significant opportunity for businesses to create and install efficient and/or renewable technologies, create a tested pool of Kansas-specific best practices, build communities' sense of pride in their governments, and spur residents and businesses to pursue energy efficiency and renewable energy. As energy costs continue to increase, these efforts should return substantial savings to governments and academic institutions. Various municipal and county governments in Kansas as well as academic institutions are already developing climate action plans as described below, and these ongoing efforts could be easily integrated into a statewide approach.

Policy Design

Goals: The state government should establish a target for overall GHG emission reductions for itself as well as for other governmental jurisdictions/academic institutions in order to lead by example. Such a target would partly be decided upon based on the audit described below.

Each state and local government agency, school district, and college/university, in consideration of its current and projected building stock, will lead by example and do the following:

- Determine and quantify its current and projected energy consumption and associated GHG emissions from such consumption.
- Develop and propose a climate action plan to reduce its GHG emissions associated with its building stock commensurate with the statewide GHG reduction goals established by the state government. Such plans should include detailed integration of energy efficiency measures as well as potential for the integration of renewable energy sources. Pollution prevention principles should be applied to GHG emission reduction strategies. New state buildings should be built to a LEED (Leadership in Environmental Energy and Design) Silver standard or equivalent, and local governments/academic institutions should be encouraged to achieve the same standard. Other best practices, like mandating ENERGY STAR appliances, should be followed.
- Provide the plan to the appropriate state agency.

- Report annually state and local government agency, school district, and college/university progress toward their GHG reduction goals in buildings to the appropriate state agency with established reporting protocols.

Each state and local government agency, school district, and college/university will, in consideration of its current and projected transportation stock:

- Quantify and establish the same goals for transportation stock described above for its building stock.
- Provide the plan to the appropriate state agency.
- Report annually state and local government agency, school district, and college/university progress toward their GHG reduction goals in transportation to the appropriate state agency.

The state, in conjunction with local governments and academic institutions, should develop appropriate incentives to promote these endeavors and identify opportunities to promote green power purchasing and/or generation by state and local agencies.

The state should offer assistance and expertise to local governments and academic institutions in gathering baseline data, and drafting and implementing climate action plans.

Timing: This process should start within a year of adoption of these recommendations by the Kansas legislature.

Parties Involved: State agencies to be named later.

Other: Some effort should be made to summarize and present information on existing climate action plans by various institutions/businesses in the state (e.g., state universities). These plans will be made publicly available (over the Internet or as part of an outreach package) to serve as templates for entities that wish to develop their own plans.

CCI-4. Public Education and Outreach

Policy Description

Kansas should develop a comprehensive GHG outreach program that educates all elements of society (e.g., the public, business, industry, academia, and government) about the nature and severity of the climate change problem, their role in contributing to GHG emissions, and strategies for reducing GHG emissions. In many cases, these strategies have co-benefits, including reducing other air pollutants, cost savings, energy security, and conservation of natural resources. Outreach efforts should build upon existing work preformed by federal, state, tribal, and local government agencies, utility companies, schools, and profit and nonprofit organizations to provide inclusive information on GHGs to encourage Kansans to make “greener” choices.

Just as industry has a responsibility to improve efficiency and reduce GHGs, the general public has a role in maintaining Kansas as a great place to live. A 2008 survey of the Kansas City Metropolitan Area by the Mid-America Regional Council indicates that people want to do “the right thing” for the environment, but messaging is often lost in the shuffle of our busy lives and overshadowed by economic concerns. Often the message is controversial, and the actions we could be taking to reduce GHGs are rejected. The controversy surrounding climate change could be removed by focusing on time- and cost-saving actions all Kansans can take to reduce GHGs and other pollutants.

Policy Design

Many activities that provide GHG emission information to the general public already exist in various stages of implementation. The CCI TWG recommends that a committee be designated to serve primarily as a coordination point for GHG outreach activities. The first task of the committee would be to evaluate the final KEEP GHG reduction strategies and determine which strategies have an outreach component that is integral to their being effectively implemented. The committee should ensure that either a representative of the agency responsible for implementing the strategy is represented on the committee, or that coordination with that agency is established. The second task of the committee is to create an overarching message for a GHG education program for the general public. Awareness of the climate change problem and how it could affect Kansans is critical if the public is expected to make the types of lifestyle changes required to make the needed GHG emission reductions.

Goals: Promote actions that reduce GHG emissions to Kansans using the following objectives as guidelines:

- *Objective One*—Establish a Kansas Energy and Environmental Outreach Committee composed of members representing all levels of government, business, industry, and the energy sector. The committee should evaluate the GHG reduction strategies selected by KEEP members to determine which require an outreach component to ensure effective implementation. The committee could then assist as necessary with the development of outreach materials (Web-based tool kits) tailored for the general public. This process can be applied for a statewide general public campaign in KEEP sectors where an outreach

component is required and in state and local governments, schools, and nonprofit and for-profit organizations.

- *Objective Two*—Launch a statewide GHG awareness campaign. The committee would establish what kinds of GHG reduction strategies and other environmental strategies (e.g., clean air) should be included in an overarching GHG message. The committee should seek partnerships with groups in KEEP-analyzed sectors and various other sectors that have and have not already implemented GHG strategies to help launch a coordinated GHG education program for the general public. The overarching message could take the form of a Web-based pledge, with options for individuals or groups to voluntarily commit to reducing GHG emissions. Tool kits would also be developed for the various sectors to implement their choices, better preparing Kansas to adapt to the effects of a changing climate. The KEEP Web site (www.ksclimatechange.us) would be of great importance as a central location to find information or contact a subject matter expert about GHG emission reduction efforts, such as winterizing homes, optimizing energy efficiency, and using public transportation and bike trails. Advertisement of the site and its content should be a major component of this objective.

Timing: Stakeholders for the committee and funding sources for the planning activities should be identified within 6 months of adoption of this KEEP recommendation by the Governor.

Parties Involved: Possible stakeholders include (but are not limited to) state and local agency environmental outreach staff, academic institutions like the University of Kansas (KU), Kansas State University (KSU), the state's community college system, K-12 institutions, the Kansas Association for Conservation for Environmental Education, nonprofit entities and for-profit organizations like utility companies. Many more are expected to be identified.

Other: Utilize and build upon existing initiatives where appropriate. Some effort will be made to summarize and present information on existing climate action plans by various institutions/businesses in the state (e.g., state universities). These plans will be made publicly available (over the Internet or as part of an outreach package) to serve as templates for entities that wish to develop their own plans.

CCI-5. Participate in Regional, Multi-State, and National GHG Reduction and Energy Efficiency Efforts

Policy Description

Regional and multi-state organizations have formed in several parts of the country to reduce GHG emissions. Examples are the Northeast States Regional Greenhouse Gas Initiative (<http://www.rggi.org/>), the Midwestern Regional Greenhouse Gas Reduction Accord (<http://www.midwesterngovernors.org/govenergynov.htm>), and the Western Climate Initiative (<http://www.westernclimateinitiative.org/Index.cfm>). A regional cap-and-trade regulatory system is being evaluated for participation by affected sources in Kansas as one of the potential strategies for reducing CO₂ emissions from large emitters in Kansas, and as described in the Midwestern Accord, to which Kansas became a signatory in 2007 (<http://www.midwesternaccord.org/>).

Since 2007, participating states in the Midwestern Accord have appointed representatives to four advisory groups to identify what the region should do to secure its energy future and to address climate stewardship. These four groups are focusing on energy efficiency, renewable electricity and advanced coal with carbon capture, the bioeconomy and transportation, and a regional cap-and-trade system. The advisory groups are working to develop recommendations to enhance the Greenhouse Gas Advisory Group's "Roadmap" as well as other recommendations that can be implemented (e.g., quantifying the amount of energy each state could save through energy efficiency alone).

Cap and Trade

"Cap and trade" refers to a system whereby market forces, acting upon the price of an emissions commodity (such as sulfur dioxide, nitrogen oxides, or CO₂ credits) determine whether it is less expensive to reduce emissions at a source or to invest cash in credits sufficient to offset emissions relative to an emission ceiling or "cap" established by regulation over some time period and over some spatial distribution and emissions source mix. Investment monies, in theory, are reinvested in the development of lower-polluting technologies that ultimately work to reduce overall emissions across the broad source mix. Regional or multi-state cap- and- trade programs have the potential to be more efficient than other cap- and- trade programs at the individual state or partner level due to economies of scale and market depth.

Federal legislation proposing a nationwide cap-and-trade system has been introduced in Congress for several years, including 2009. The most recent comprehensive legislative proposal would essentially mandate a stay on further development of regional and state cap-and-trade activities for 5 years. Although this legislation will most likely be amended significantly, the possibility exists that a federal GHG reduction system will be implemented that excludes or marginalizes state and regional cap-and-trade-systems. Under such a scenario, ancillary, complementary policies to reduce GHGs will become increasingly important, and individual states and regional organizations will need to address their unique interests, particularly with respect to economics, adaptation, and mitigation.

Policy Design

Goals: Kansas' economic and environmental interests must be represented in the development of both federal and regional GHG reduction schemes. Kansas should support federal legislation that harmonizes federal requirements with those of regional and state efforts.

Kansas should encourage support for federal legislation that allows states to participate in regional GHG reduction and planning efforts without penalty, particularly the MGA's Energy Initiatives, since Kansas is a signatory to the Midwestern Accord. Care should be taken to avoid unnecessary or duplicative requirements on regulated sectors.

Regional cap-and-trade programs, as opposed to a Kansas-only program, have the potential to be more efficient by including multiple sectors in multiple states, with reduction or offset opportunities on a more significant scale.

Timing: Design of a cap-and-trade system under the MGA's support for the Midwestern Accord is due for completion by September 2009, along with publication of a roadmap for compliance. The KEEP process parallels many of the same CO₂ reduction evaluation processes of the Accord. Therefore, the KEEP should be aware of the timing and ramifications of this parallel effort, since Kansas is a signatory to the Accord.

Parties Involved: MGA, KEEP, Kansas Governor's office, MGA Joint Advisory Groups, EPA.

Other: None identified.

CCI-6. Seek Funding for Implementation of KEEP Recommendations

Policy Description

To implement the policies adopted by the KEEP, the state of Kansas will have to seek funding from various sources. Based on its evaluation of the funding mechanisms listed below, the CCI TWG recommends three principles for funding KEEP policies: (1) equity of funding, meaning that the funding mechanism should target the sector whose emissions the policy is mitigating; (2) each funding mechanism the KEEP recommends must account for economic impacts, including costs to businesses, communities, or individuals; and (3) each funding mechanism must foster environmentally sustainable economic growth. The summaries below briefly describe these options, issues related to them, and examples of potentially appropriate GHG reduction strategies.

Carbon Tax

This funding mechanism would generate revenue by taxing all carbon-based fuels, such as coal, fuel oil, gasoline, diesel and natural gas, that produce GHG emissions. This tax would be levied in proportion to a fuel's carbon content, and would be largely added to the price of coal, natural gas, and petroleum products. Therefore, the tax would be ultimately incorporated into the price of electricity, fuels, and any products that utilize energy in their production. Because the tax would not inherently incentivize carbon capture or sequestration, adding some incentives would be beneficial to promote commercially viable technologies, as well as CO₂ pipeline/transport infrastructure. These incentives could be funded with the revenue from the carbon tax.

Auction of Allowances Under a Cap-and-Trade Program

This funding mechanism would be implemented under a GHG cap-and-trade program. Under such programs, allowances to emit GHGs can be allocated to the sources of emissions through an auction. Some programs offer all allowances for auction, while others give a certain percentage of allowances to the sources under the cap and auction the balance. Under the existing and proposed cap-and-trade programs, only the largest GHG-emitting facilities would be regulated.

Reducing residential and commercial demand with Consumer Energy Efficiency Incentives would be an example of a policy option that meets the principles recommended by the CCI TWG. Actions should be introduced gradually and should include a safety valve mechanism to prevent excessive escalation of prices. Participation in carbon auctions should be limited to sources that are regulated under the cap-and-trade program to ensure that speculation and market gaming is avoided.

GHG reductions or caps should apply only to fuel/combustion-related emissions, and not to process-related emissions. A benchmarking provision by industry sector is a recommended approach for establishing efficiency standards for each sector.

Fuel Taxes

This funding mechanism is a subset of the carbon tax discussed above. Directed toward raising funds to address the transportation component of GHG emissions, it would generate revenue

through a tax, surcharge, or toll on the use of liquid fuels at fueling stations. Public transportation subsidies would be an example of a policy option that meets the principles recommended by the CCI TWG.

Federal Grants

Many of the options under consideration by the KEEP would potentially qualify for federal grant programs. The American Recovery and Reinvestment Act (ARRA) of 2009 (H.R. 1), enacted in February 2009, established a new investment tax credit to encourage the development of a U.S.-based renewable energy manufacturing sector. The energy provisions of the ARRA represent an unprecedented opportunity to fund Kansas' expansion into the clean energy economy. The ARRA energy dollars benefit investments in renewable technologies, such as wind, solar, geothermal, smart grid, etc. For the private sector, the stimulus contains several tax credits for everyone from large wind and solar developers to individuals who want to put up solar panels or small wind turbines. For the public sector, it provides additional dollars for Clean and Renewable Energy Bonds and Qualified Energy Conservation Bonds, which are available to counties, municipalities, and other local entities. The stimulus also funnels dollars into state energy offices for weatherization and energy efficiency programs.

Additional competitive grant dollars are available for energy storage technology, smart grid improvements, and transmission upgrades. The competitive grant funds require the Governor to certify that state policies include integrated resource planning, rate design that reimburses energy efficiency, residential and commercial energy efficiency building codes, rate recovery for smart grid investments, and time-based pricing. As of this writing, Kansas does not have any of these regulatory or legislative policies. Kansas can pursue these competitive grants for such activities as weatherization and energy efficiency, CO₂ sequestration research, smart grid improvements, and transmission upgrades.

Legislative Appropriation

This funding mechanism would allow the legislature to directly fund KEEP policies or programs. Public education about the role each citizen plays in producing and reducing GHG emissions would be an example of a policy option that meets the principles recommended by the CCI TWG.

Policy Design

Goals: Seek funding sources for the implementation of KEEP recommendations.

Timing: Kansas should address the issue of obtaining funding for the KEEP recommendations as soon as possible. The funding mechanism and timing will vary with the type of activity and such factors as progress on the federal level in passing legislation or promulgating regulations. Comprehensive climate change legislation on the federal level that might include a carbon tax would not likely be implemented before 2012 or 2013. A cap-and-trade program would most likely see a similar time frame for implementation.

A fuel tax would more likely be a state initiative, and could be put in place as quickly as 2011, with the current schedule for completion of the KEEP planning process and recommendations to the Governor for legislative action. Federal grants for energy conservation and diesel retrofits

that would improve the efficiency of diesel engines are available now and are being pursued by the KCC and KDHE. These will most likely be continued in future years. Legislative appropriations for such activities as outreach are linked to the completion of the planning process as described above, and could be proposed for the 2011 legislative session.

Parties Involved: State government will lead the strategy of generating investment and financial support. Other sectors, including local government, industry, services, agriculture, consumers, and higher education, will be involved.

Other: None identified.

CCI-7. Adaptation and Vulnerability

Policy Description

Because of the buildup in the atmosphere of long-lived GHGs that already has occurred, states will experience the effects of climate change for years to come, even if immediate action is taken to reduce future GHG emissions. As such, it is essential that Kansas develop a strategy to manage and adapt to the projected impacts of ongoing climate change, particularly where the state is most vulnerable.

In Kansas today, climate change is clearly being observed not only in measurable variables, such as temperature and precipitation records, but also in more indirect impacts, such as changes phenology in crops (e.g., later planting dates for winter wheat) and natural vegetation, but also in changes in bird migration patterns and species distribution (sources).² Such evidence that the climate is changing and the observed changes closely follow the patterns expected if these changes are the consequence of GHGs. Given this state of knowledge, it is likely that further climate changes can be expected if human activities continue to emit GHGs. Even if we reduce emissions, it is very likely that the climate will continue to see changes as the Earth adjusts its energy balance to a new stable state.

Although no model can provide a definitive outcome of what lies ahead for climate change, we do have some knowledge of how these energy adjustments will take place in the future and how these might affect local climate conditions. This knowledge provides some information that could be useful for planning the future. For example, although the precipitation response over the Kansas regions due to changes in GHG concentrations is highly uncertain, there is much more certainty that temperatures will increase in the next few decades. Such partial knowledge about future expectations of climate change can be very useful for a variety of economic sectors and communities.

Policy Design

Goals: Kansas is at risk for major economic and social disruption as a result of ongoing climate change. The state needs to assess its climate-related vulnerabilities, analyze the risks, and develop a response plan, by creating one group that can help centralize related experience and other related planning processes already underway (disaster management, water management, etc.).

This policy will work in conjunction with CCI-9, the climate study data and assessment project.

Timing: Initial one year planning process, with yearly updates (see CCI-9)

² Brunsell, Nathaniel, Johannes Feddema, Trish Jackson, Aubrey Jones, and Kelly Logan, *Climate Change Hits Home: The Risks to Kansas*, November 2008. Available at: <http://www.climateandenergy.org/ImageDownload.asp?Path=%2F%5FFileLibrary%2FFileImage%2F&FileName=ClimateStudyFinal.pdf>.

Parties Involved: The Kansas State Water Office, KDHE, Kansas National Guard, Kansas Department of Agriculture, Kansas Department of Wildlife and Parks, Governor's office, Kansas State Conservation Commission, Kansas Insurance Department, Division of Emergency Management, Kansas Highway Patrol, Rural Water Association, Kansas Department of Transportation, Kansas Cooperative Extension Service, faculty with related expertise from state universities and community colleges, state and local government representatives, environmental groups (Audubon, Nature Conservancy, Sierra Club, Tallgrass Prairie Ranchers, etc.), and other interested stakeholders.

The climate adaptation and vulnerability planning process will need to take into account and integrate with other ongoing planning processes (water management, disaster planning, etc.)

Other: None identified.

CCI-8. Provide Support to a Business-Oriented Organization to Facilitate Investment in Climate-Related Business Opportunities and to Share Information and Strategies, Recognize Successes, and Support Aggressive GHG Reduction Goals

Policy Description

While reducing GHG emissions in Kansas will prove challenging, the mandate to do so in a rapidly changing energy environment will lead to numerous economic opportunities for Kansas that public-private partnerships should help shape and encourage. Kansas should position itself to leverage its strengths in parallel with pursuit of GHG emission reductions in order to capitalize upon these opportunities. For example, wind technology development requires strong wind, open space, and strong manufacturing capabilities. Kansas possesses all of these attributes and is viewed as having the third highest wind energy potential of any state in the nation. Further development of Kansas-specific projects and resources where GHG reductions are a co-product include: (1) improvements in overall energy efficiency; (2) construction of a new, smarter transmission grid; (3) improvements in local agricultural efficiency; and (4) more direct oversight of irrigation operations. Effective pursuit of these and other opportunities will have a positive impact upon the welfare of Kansans and the Kansas economy as a whole, while serving to create a thriving “green jobs” market.

Public-private or private-public partnerships are also critical to the advancement of these types of endeavors. Kansas boasts an innovative business and technical community in the field of clean technology that has created, and will continue to create, opportunities that have a beneficial impact, not only upon Kansas, but throughout the country and even the world. Kansas is fortunate to have a portfolio of investment incentives (Kansas Technology Enterprise Corp [KTEC]) that greatly encourage private-sector investment. In a highly competitive market, state incentives like these play a critical role in the success of attracting private investors. Provided that public and private investment strategies are properly executed, Kansas is well situated to take advantage of its unique resources, while commensurately developing a new and substantial job market for the state.

Policy Design

Goals: Engage KTEC in a proposal to facilitate investment and secure necessary funding.

Timing: Defer to appropriate governmental resources/departmental management offices.

Parties Involved: KTEC.

Other: None identified.

CCI-9. Dedicate Greater Public Investment in Climate Data and Analysis

Policy Description

Kansas' unique environmental profile—especially water management issues—requires the state to stay on top of local and regional climate data and projections, in order to ensure its long-term economic well-being. Kansas needs a climate change clearinghouse to gather, analyze, and distribute climate data. A state climate data and analysis center would develop and provide objective, state-specific information to government, business, and the public regarding climate data, analysis, assessment of options and directions, identification of trends, development or improvement of computer modeling, and other information. These data will be essential for vulnerability and adaptation planning in the face of ongoing climate change. Following are specific factors pointing to the need for greater public investment in climate data and analysis.

Large-Scale Climate Models Cannot Capture Necessary Local Information

Global climate models cannot accurately capture the local level climate information that state government, business, local leaders, and emergency preparedness experts need to make informed decisions. The findings of climate models need to be tested against actual observations of the Kansas climate, as measured by sources such as the National Oceanic and Atmospheric Administration's Global Historical Climate Network sites.

- For example, a major precipitation gradient runs down the center of Kansas—annual rainfall can be over 40 inches in the eastern half of the state, and as little as 6 inches in parts of the western half. Water management will be critical in efforts to mitigate climate change.
- Soil depth also varies widely across the state (such as the Flint Hills, compared to out on the High Plains). This factor affects soil moisture retention, which is an important issue facing agriculture and livestock management, given projections of rising average yearly temperatures.
- Local land-use decisions, such as irrigation and reforestation of grassland, can affect the climate in certain areas over time. These patterns are difficult to capture in large-scale climate models.

Climate Change Poses Significant Environmental Risks for Kansas

Kansas faces significant environmental risks from ongoing climate change. These changes in the environment will affect a wide range of Kansas' economic sectors and industries. Some examples of potential impacts of climate change are altered freeze-thaw cycles and changing storm intensities and frequency (affecting flood severity, drought extent and intensity) and types of winter precipitation (e.g., snow versus ice or sleet). These climate changes can affect a large number of human activities—for example, the breakdown of building and road surface materials, transportation networks, and electrical transmission and distribution systems; increased fire hazards; shifts in crop productivity and selection and in pest reproduction and survival rates; and reliability of local wind patterns. These changes can also have direct economic impacts—increased need for road maintenance, disaster declarations related to ice storms and tornados, fluctuations in farming productivity and in the ability to produce electricity with wind and

hydropower. A major secondary impact can occur in the insurance industry, with increased claims for damaged residential and commercial property, crops, etc.

The exact relation of climate to industry varies significantly from region to region. It is largely dependent on the types of human activities pursued in an area, and the level of development in an area (e.g. road network types, housing types, and the types of crops/farming practiced). Thus significant local knowledge is required to better understand how changes in the climate can impact a community.

A 2007 study done by KU climatologists³ projected that over the next century, climate change poses significant risks for Kansas, and that eastern and western Kansas will be affected in very different ways. If CO₂ and other GHG emissions continue to increase as projected by the middle-of-the-road IPCC "AIB" scenario,⁴ then by 2100:

- Temperatures in Kansas will rise in all seasons, in all parts of the state. Southwest Kansas could see increases as high as 8°F.
- Higher summer temperatures will create more heat waves. The number of cooling-degree days (the days when people run their air conditioning) will increase by as much as 50%. Higher summer nighttime temperatures will also stress livestock and crops.
- Freezing days will decrease during the winter. By 2060, winter temperatures will mostly stay above freezing. The number of heating-degree days (the days when people run their heaters) will decrease by about 25%. This will reduce winter heating needs, but a potential lack of hard freezes means that insects will thrive and diseases will increase among plants, animals, and humans.
- The weather will become more variable. Yearly precipitation totals will stay about the same, but precipitation patterns will most likely shift, becoming less predictable and less frequent, and broken up by longer periods of dry weather. There will be fewer snow events. Individual rainstorms will become more intense when they occur, most likely leading to more flooding.
- Temperatures will rise and evaporation rates will increase, but yearly precipitation probably will not increase to meet the need for additional water.
- Western Kansas is likely to become warmer and drier. Soil moisture will decrease, putting more pressure on irrigation. During the summer, water need (the measure of how much water plants need for growth) will increase as much as eight inches.
- Eastern Kansas will become warmer and wetter. However, the higher temperatures will offset any increases in precipitation, due to the increase in evaporation rates. The result could actually be an overall drying effect. Less water will be available for rivers and reservoirs in winter, and plant stress will increase in summer.

⁴ The IPCC AIB scenario is "a globalized, technologically advanced world in which energy production includes a broad portfolio of fossil-fuel and non-fossil-fuel sources." (See <http://www.globalcarbonproject.org/misc/carbonrends.htm>.)

- Drought patterns are already intensifying across the state. The greatest decrease in winter moisture is taking place in western Kansas. The greatest increase in spring moisture is occurring in eastern Kansas.

Policy Design

Goals: Establish a Kansas climate change clearinghouse that will (1) facilitate state researchers' coordination of ongoing efforts to gather and analyze global, regional, and local climate data, and (2) distribute the information to state government, business, local leaders, emergency preparedness experts, and the public.

Timing: Within one year of the Governor's adoption of KEEP recommendations.

Parties Involved: Faculty at KU and KSU, KSU Soil Carbon Center, CRESIS at KU, KU Atmospheric Sciences Group, Wichita State Statistics Group, Kansas State Climatology Office, Kansas state agencies, KTEC, the energy sector, and other businesses.

Other: Participants in the clearinghouse will be able to seek grants in order to raise additional funds for research and outreach.