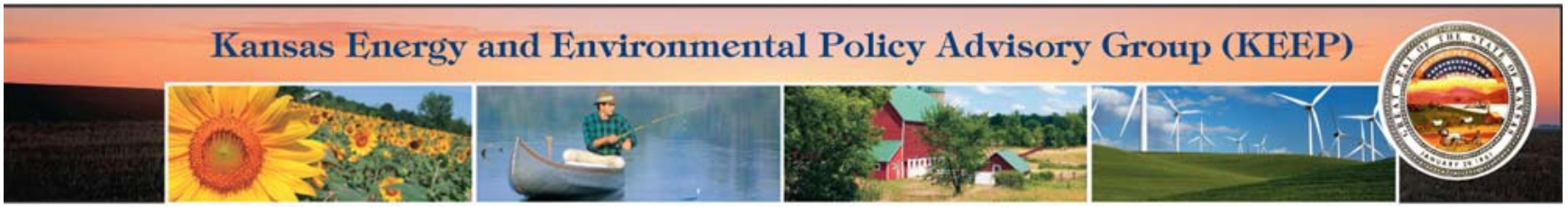

Draft Catalog of State Actions
Energy Supply (ES) Technical Work Group (TWG)

A catalog of state-level, greenhouse gas (GHG)-reducing actions and policy options prepared by the Center for Climate Strategies (CCS), Kansas Energy and Environmental Policy Advisory Group (KEEP), and others based on actions undertaken or considered by Kansas and other states, including regional, state, local, and private actions.

Important Note: The state actions are numbered in this catalog solely for convenience in referencing them. Their numbers do NOT reflect a ranking or prioritization of the actions.

Key to Future Rankings of Options in the Tables That Follow

Potential GHG Emission Reductions*	Potential Cost or Cost Savings*,†
High (H): At least 1.0 million metric tons of carbon dioxide equivalent ($MMtCO_2e$) per year by 2020	**High (H)**: $50 per metric ton of CO_2e (tCO_2e) or above
Medium (M): From 0.1 to 1.0 $MMtCO_2e$ per year by 2020	**Medium (M):** $5–$50/tCO_2e
Low (L): Less than 0.1 $MMtCO_2e$ per year by 2020, or 1.0 $MMtCO_2e$ by 2050	**Low (L):** Less than $5/$tCO_2e$
Uncertain (U): Not able to estimate at this time	**Uncertain (U):** Not able to estimate at this time
	Negative (Neg): Net cost savings

*Several measures may overlap in terms of emission reductions and/or cost impacts. Estimates assume measures would be implemented independently from other measures.
† Costs are denoted by a positive number. Cost savings (i.e., "negative costs") are denoted by a negative number.

Definition of "Priorities for Analysis"

- **High:** High-priority options will be analyzed first.
- **Medium:** Medium-priority options will be analyzed next, time and resources permitting.
- **Low:** Low-priority options will be analyzed last, time and resources permitting.

Option No.	GHG Reduction Policy Option	Potential GHG Emission Reductions	Cost per Ton	Externalities, Feasibility Considerations	Priority for Analysis	Notes/Related Actions in Kansas
ES-1	**EMISSIONS POLICIES AND OVERARCHING ITEMS**					
1.0	Overarching Items					• Kansas is a member of the Midwestern Greenhouse Gas (GHG) Reduction Accord. • Kansas is an observer of the Western Climate Initiative. • Kansas Administrative Order 08-03 establishes KEEP.
1.1	GHG Cap and Trade					• Kansas is a member of the Midwestern GHG Reduction Accord, which is exploring regional cap-and-trade policies. • Kansas is an observer of the Western Climate Initiative, which is exploring cap-and-trade policies.
1.2	Carbon/GHG Tax					
1.3	Generation Performance Standards and/or Mitigation Requirements for Electricity					

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1.4	Integrated Resource Planning (IRP)					• Sunflower Electric and Kansas Electric Power Cooperative (KEPCo) are required to submit integrated resource plans (IRPs) to federal agencies (i.e., Western Area Power Administration [WAPA]) as a requirement of participating in hydropower preference allocations. • In July 2008, the Kansas Corporation Commission (KCC) declined to implement mandatory standards for fuel source diversity and increasing the efficiency of fossil fuel generation, including IRPs (KCC Docket 07-GIME-578-GIE).
1.5	Voluntary GHG Commitments					• Kansas is a member of the Midwestern GHG Reduction Accord. • Kansas Executive Order 08-03 established KEEP to develop recommendations for a climate action plan. • In February 2008, Westar, Inc., and the Kansas Department of Health and Environment (KDHE) signed an agreement to voluntarily reduce GHG emissions, including carbon dioxide (CO_2). Under the agreement, Westar will perform a companywide inventory of its GHG emissions. It will also conduct a comprehensive evaluation of net GHG reduction measures, including carbon capture

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						and sequestration, as well as EE programs. Upon approval from KDHE and potential regulatory approval for cost recovery, Westar will implement the reduction measures at each of its applicable generating units. • In March 2007, Kansas City Power & Light (KCP&L), the Sierra Club, and the Concerned Citizens of Platte County (CCPC) agreed on a set of initiatives to offset CO_2 emissions, particularly with respect to KCP&L's proposed new coal-fired powerplant in Missouri. KCP&L agreed to pursue offsets for GHGs associated with its new plant through significant investments in EE and renewable energy. The agreement allows for carbon offsets throughout KCP&L's system, which may include CO_2 reductions at the La Cygne power plant in Kansas.
1.6	Technology Research and Development					
ES-2	**RENEWABLE ENERGY**					
2.1	Renewable Portfolio Standard (RPS)					• Voluntary RPS to meet 10% of Kansas energy demand with wind power by 2010 and 20% by 2020. • Since December 2006, nearly 1,000 megawatts (MW) of potential

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						new wind power was announced by a number of the state's leading utilities. The new Smoky Hill Wind Project, along I-70 in Lincoln and Ellsworth Counties, was developed by TradeWind Energy, LLC, a Kansas developer, and will be owned by Enel North America, Inc. It features 100 MW of wind generation to be divided among Sunflower Electric, Kansas City Board of Public Utilities, and Midwest Energy. • The state's largest utility, Topeka-based Westar, announced on February 26, 2007, a request for proposals (RFP) for 500 MW of renewable energy. This was followed by a joint announcement on March 20 by KCP&L and the Sierra Club of a commitment of another 400 MW of wind generation. Westar plans to have about 300 MW of the development installed by the end of 2008. KCP&L already owns the Spearville Wind Energy Facility in Ford County that was put into operation in Fall 2006. • These announcements will ensure Kansas utilities will meet a voluntary goal of 1,050 MW of wind by 2010, as announced by Governor Sebelius during the State of the State address in January 2007. This equals about

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						10% of nameplate electric generation capacity for the state's utilities. The utilities agreed to a commitment of a 20% voluntary goal by 2020.
2.2	Grid-Based Renewable Energy Incentives and/or Barrier Removal					• Executive Order 08-01 establishes the Governor's Kansas Wind Working Group (WWG), which will educate stakeholder groups with current information on wind energy markets, technologies, economics, policies, prospects, and issues. The WWG will be supported by the Energy Programs Division of the KCC, the lieutenant governor's office, and Wind Powering America (WPA). WPA is collaborating with state partners and their stakeholders through its WWG network, now operating in some 30 states. WPA will provide technical assistance, objective analysis, up-to-date information and education, and seed funding for the Kansas WWG. • HB 2038 provides income tax credits for investment in new renewable cogeneration facilities and for certain biofuel storage and blending equipment.

Option No.	GHG Reduction Policy Option	Potential GHG Emission Reductions	Cost per Ton	Externalities, Feasibility Considerations	Priority for Analysis	Notes/Related Actions in Kansas
2.3	Distributed Renewable Energy Incentives and/or Barrier Removal					• Kansas has a property tax exemption for property with renewable energy equipment. • HB 2038 provides income tax credits for investment in new renewable cogeneration facilities and for certain biofuel storage and blending equipment. • The Renewable Energy Electric Generation Cooperative Act provides for creation of a cooperative by five or more people . Members of these cooperatives must operate generation facilities that use renewable resources and must have a capacity of at least 100 kilowatts (kW) of electricity.
2.4	Green Power Purchases and Marketing					• Green power purchases were offered by Westar in 1999, but discontinued due to low participation.
2.5	Pricing Strategies to Promote Renewable Energy (e.g., Net Metering)					
2.6	Renewable Energy Development Issues (Zoning, Siting, etc.)					• The Kansas Energy Council (KEC) developed the *Wind Energy Siting Handbook* in 2005, with suggestions for developing local guidelines. • The Electric Generation Facility Siting Act Amendments of 2000 exempt all renewable generation

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						facilities, except nuclear, from siting requirements. • Siting of wind resources has been controversial in some situations in Kansas; for example, the executive order placing a moratorium in the Flint Hills raised objections in the Ellis County and Ellsworth County areas.
2.7	Technology-Focused Initiatives (Biomass Co-Firing, Energy Storage for Renewable Energy Generation, Fuel Cells, etc.), Including Grant Programs					• The 2007 Kansas Renewable Energy & Energy Efficiency Conference, held September 25–26, had over 500 attendees. Multiple concurrent sessions on various energy topics were facilitated by over 40 energy experts from Kansas and throughout the country. Topics included efficiency and conservation, new technologies, wind and solar energy, biofuels, public education and loan programs, and federal policy updates. Another Renewable Energy Conference will be held in September 2008.
2.8	Research and Development for Renewable Technologies					
ES-3	**ENERGY EFFICIENCY**					
3.1	Environmental Portfolio Standard (EPS)					

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3.2	Utility Energy Efficiency Incentives or Other Barrier Removal					• HB 2632 included language that would allow utilities to capitalize and earn a return on EE investments in order to put such investments on a par with traditional supply investments. • KCC is currently considering two dockets, which it will hear discussion on in August 2008. o Docket No. 08-GIMX-442-GIV considers what benefit-cost tests should be applied to potential EE programs o Docket No. 08-GIMX-441-GIV considers cost recovery, incentives, and margin recovery associated with EE programs, both demand-side management and demand response (DR).
3.3	Consumer Energy Efficiency Incentives or Other Barrier Removal					

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3.4	Combined Heat and Power (CHP) Standards, Incentives, and/or Barrier Removal					• HB 2038 provides a property tax exemption for certain waste heat utilization systems. • The Renewable Energy Electric Generation Cooperative Act provides for creation of a cooperative by five or more people . Members of these cooperatives must operate generation facilities that use renewable resources and must have a capacity of at least 100 kilowatts of electricity.
3.5	Public Benefits Charge					
3.6	Co-Location or Integration of Energy-Producing Facilities					• The integration proposed by Sunflower Electric at the Holcomb facility is an example of efforts to encourage the more efficient utilization of heat and energy by encouraging the co-location of those facilities.

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ES-4	**FOSSIL FUEL AND NUCLEAR ELECTRICITY**					
4.1	Advanced Fossil Fuel Technology (e.g., IGCC, CCSR, Advanced Pulverized Coal, CFB) Incentives, Support, or Requirements					• HB 2419 provides incentives for carbon sequestration by allowing any carbon capture, storage and recovery (CCSR) equipment to be exempt from all property taxes. • SB 303 provided tax credits and Kansas Development Finance Authority financing for building and expanding integrated gasification combined-cycle (IGCC) plants, but the bill died in committee. • The 2007 Kansas Energy Plan recommends that the KCC consider the value of lower-emission-coal generation and CCSR technologies when evaluating investments or purchase power agreements for IGCC with CCSR.
4.2	New Nuclear Capacity					• HB 2038 has a property tax exemption for new nuclear facilities built near other nuclear facilities. • SB 586 provides electric utilities the ability to recover certain costs related to planning for new nuclear generation capacity.
4.3	Relicensing/Up-rating Existing Nuclear Power					

Option No.	GHG Reduction Policy Option	Potential GHG Emission Reductions	Cost per Ton	Externalities, Feasibility Considerations	Priority for Analysis	Notes/Related Actions in Kansas
4.4	Efficiency Improvements and Repowering Existing Plants					
4.5	Technology-Focused Initiatives					
ES-5	**FUEL PRODUCTION, PROCESSING, AND DELIVERY**					
5.1	Oil and Gas Production: GHG Emission Reduction Incentives, Support, or Requirements					• Several oil and gas production companies operating in Kansas are participating in EPA's Gas STAR program, a voluntary program to report and reduce methane emissions.
5.2	Natural Gas Transmission and Distribution					• Several oil and gas production companies operating in Kansas are participating in EPA's Gas STAR program, a voluntary program to report and reduce methane emissions.
5.3	Oil Refining: GHG Emission Reduction Incentives, Support, or Requirements					
5.4	Coal Production: GHG Emission Reduction, Incentives, Support, or Requirements					

Option No.	GHG Reduction Policy Option	Potential GHG Emission Reductions	Cost per Ton	Externalities, Feasibility Considerations	Priority for Analysis	Notes/Related Actions in Kansas
5.5	Coal-to-Liquids and Gas-to-Liquids Production: GHG Emission Reduction Incentives, Support, or Requirements					
5.6	Low-GHG Hydrogen Production Incentives and Support					
5.7	Enhanced Oil Recovery Using CO_2					• The National Energy Technology Laboratory is working with the University of Kansas (KU), the Kansas Geological Society, and others on an enhanced oil recovery project with CO_2 in Kansas.
ES-6	**CARBON CAPTURE AND STORAGE OR REUSE**					
6.1	CCSR Incentives, Requirements and/or Enabling Policies (Administration, Regulation, Liability, Incentives)					• HB 2419 (Carbon Dioxide Reduction Act) provides property tax incentives for the sequestration of CO_2, beginning with Fiscal Year 2008. • EPA has put out a proposed rule on the Underground Injection Control Program for Carbon Dioxide Geologic Sequestration Wells. • Kansas Geological Survey is a partner in the Southwest Regional Partnership on Carbon Sequestration (SWP). SWP was developed as a part of the U.S. Department of Energy's effort to respond to global climate change. The SWP has been challenged to

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						evaluate available technologies that capture and store CO_2 in the southwest region. The SWP includes portions of Arizona, Colorado, Kansas, Nevada, New Mexico, Oklahoma, Texas, Utah and Wyoming. Participants include the coal, oil, and gas industries; electric utilities; the Navajo Nation; nongovernmental organizations; universities; and U.S. federal agencies. • The use of sequestered CO_2 to enhance oil recovery is of great interest due to the rise in the price of crude oil. Wellfields that were once marginal may be brought back to production. Some of these efforts include: o An ongoing project at the University of Kansas Energy Research Center (ERC), which includes research by the KU Tertiary Oil Recovery Project, the Kansas Geological Survey, and the ERC for enhanced oil recovery in Kansas using miscible-CO_2 flooding. o A partnership between Coffeyville Resources Nitrogen Fertilizers and Blue Source to develop options for the utilization

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						of CO_2 captured from petroleum coke gasification-based ammonia and urea ammonium nitrate production. Particular focus is proposed to develop an enhanced oil recovery project.
6.2	R&D for CCSR					• Various carbon sequestration research efforts exist in Kansas, including KU ERC and Kansas State University's Soil Carbon Center. • Carbon reuse opportunities are proposed by Sunflower Electric for the Holcomb facility. Utilization of flue-gas for the enhanced production of algae for integration with the production of high-value products. Has potential application in many industrial facilities that use conventional fossil fuel.
ES-7	**OTHER ENERGY SUPPLY OPTIONS**					
7.1	Transmission System Upgrading					• Kansas Electric Transmission Authority was created to manage transmission issues and upgrades.
7.2	Reduction of Transmission and Distribution Line Losses					

Option No.	GHG Reduction Policy Option	Potential GHG Emission Reductions	Cost per Ton	Externalities, Feasibility Considerations	Priority for Analysis	Notes/Related Actions in Kansas
7.3	General Distributed Generation Support (Interconnection Rules, Net Metering, etc.)					• K.S.A. 66-1238 required KCC to establish standard provisions for interconnection with renewable energy generators. See also K.S.A. 66-1,184 • Utilities are required to pay 150% of the monthly system average cost per kilowatt-hour for customer-supplied renewable generation, up to 200 kW. See also K.S.A. 66-1,184 for exceptions.
7.4	Environmental/GHG Emissions Disclosure					
7.5	Landfill Gas Recovery					• Kansas has a property tax exemption for land used to collect, refine, transport, or treat landfill gas and for the gas itself.
7.6	Waste to Energy					• Anaerobic digesters can recycle agricultural and ethanol by-products as fuels and as feedstock for other bioenergy facilities as are proposed by Sunflower Electric for the Holcomb facility.
7.7	N_2O Reduction Co-Benefit					
7.8	Smart Grid Systems					

Option No.	GHG Reduction Policy Option	Potential GHG Emission Reductions	Cost per Ton	Externalities, Feasibility Considerations	Priority for Analysis	Notes/Related Actions in Kansas
7.9	Consider Expanded Hydroelectric Power Opportunities					• Kansas has many reservoirs that discharge a lot of water each year, which could offer small-scale hydropower opportunities. • Kansas has one hydropower facility, the Bowersock Mills & Power Company facility at Lawrence on the Kansas River. The Bowersock facility is comprised of 7 hydroelectric turbines and is capable of producing 2.5 MW.
ES-8	**EDUCATION AND OUTREACH**					
8.1	General Education to Public on Energy Supply Options					• Some energy generation facilities in Kansas provide educational public tours, such as the Bowersock hydro facility.
8.2	Work Force Development Education to Support Energy Supply Options and Economic Development					• The community college system in Kansas could be a model to develop and deploy educational and technical curricula to support work force development needs associated with potential actions.