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## Energy Supply (ES) Technical Work Group

### List of Volunteers for Priority Policy Options for Analysis

Option #	Policy Option	Straw Proposal Volunteers
ES-1	Advanced Fossil Fuel Technology Incentives, Support, or Requirements	<ul style="list-style-type: none"> <li>• Wayne Penrod(1);</li> <li>• Tom DeBaun(2);</li> <li>• Andy Hawkins(2);</li> <li>• Brad Loveless (4)</li> </ul>
ES-2	Nuclear Capacity	<ul style="list-style-type: none"> <li>• Ken Frahm(1);</li> <li>• Colin Hansen;</li> <li>• Tom DeBaun(3);</li> </ul>
ES-3	Transmission System Upgrading	<ul style="list-style-type: none"> <li>• Tom DeBaun(1);</li> <li>• Colin Hansen(1);</li> <li>• Stuart Lowry;</li> <li>• Ken Frahm(2);</li> <li>• Andy Hawkins(3);</li> <li>• Brad Loveless (3)</li> </ul>
ES-4	Renewable Portfolio Standard (RPS)	<ul style="list-style-type: none"> <li>• Emil Ramirez(1);</li> <li>• Frank Wewers(1);</li> <li>• Brad Loveless(1);</li> <li>• Nancy Jackson,</li> <li>• George Thullesen;</li> <li>• John Grimwade;</li> <li>• Monica Cameron(2);</li> <li>• Tim Gelvin(2);</li> <li>• Colin Hansen(2)</li> </ul>
ES-5	CCSR Incentives, Requirements and/or Enabling Policies	<ul style="list-style-type: none"> <li>• George Thullesen;</li> <li>• Colin Hansen;</li> <li>• Brad Loveless (4)</li> </ul>
ES-6	Technology-Focused Initiatives, Including Grant Programs	<ul style="list-style-type: none"> <li>• Jeff Kennedy(1);</li> <li>• Wayne Penrod(2);</li> <li>• Ken Frahm(3);</li> <li>• Mike Riedel(3)</li> </ul>
ES-7	Research and Development for CCSR	<ul style="list-style-type: none"> <li>• Jeff Kennedy(2);</li> <li>• George Thullesen;</li> <li>• Brad Loveless (4)</li> </ul>
ES-8	Technology Research and Development	<ul style="list-style-type: none"> <li>• Mike Riedel(1);</li> <li>• Jeff Kennedy(3)</li> </ul>
ES-9	Green Power Purchases and Marketing	<ul style="list-style-type: none"> <li>• Stuart Lowry;</li> <li>• John Grimwade</li> </ul>
ES-10	Energy Efficiency Resource Portfolio Standard	<ul style="list-style-type: none"> <li>• Nancy Jackson;</li> <li>• Stuart Lowry;</li> <li>• John Grimwade;</li> <li>• Emil Ramirez(2);</li> <li>• Brad Loveless(2);</li> <li>• Monica Cameron(3);</li> <li>• Tim Gelvin(3);</li> </ul>

Option #	Policy Option	Straw Proposal Volunteers
ES-11	General Education to Public on Energy Supply Options	<ul style="list-style-type: none"> <li>• Monica Cameron(1);</li> <li>• Tim Gelvin(1);</li> <li>• Mike Riedel(2);</li> <li>• George Thullesen;</li> <li>• Emil Ramirez(3);</li> </ul>
ES-12	Efficiency Improvements and Repowering Existing Plants	<ul style="list-style-type: none"> <li>• Andy Hawkins(1);</li> <li>• Colin Hansen;</li> <li>• Wayne Penrod(3);</li> <li>• Brad Loveless (4)</li> </ul>

**Summary List of Pending Priority Policy Options for Analysis**

Policy No.	Policy Option	GHG Reductions (MMtCO <sub>2</sub> e)			Net Present Value (Million \$)	Cost-Effectiveness (\$/tCO <sub>2</sub> e)	Level of Support
		2015	2025	Total (2010–2025)			
ES-1	Advanced Fossil Fuel Technology Incentives, Support, or Requirements	<i>Not Yet Quantified</i>					Pending
ES-2	Nuclear Capacity	<i>Not Yet Quantified</i>					Pending
ES-3	Transmission System Upgrading	<i>Not Yet Quantified</i>					Pending
ES-4	Renewable Portfolio Standard (RPS)	<i>Not Yet Quantified</i>					Pending
ES-5	CCSR Incentives, Requirements and/or Enabling Policies	<i>Not Yet Quantified</i>					Pending
ES-6	Technology-Focused Initiatives, Including Grant Programs	<i>Not Yet Quantified</i>					Pending
ES-7	Research and Development for CCSR	<i>Not Yet Quantified</i>					Pending
ES-8	Technology Research and Development	<i>Not Yet Quantified</i>					Pending
ES-9	Green Power Purchases and Marketing	<i>Not Yet Quantified</i>					Pending
ES-10	Energy Efficiency Resource Portfolio Standard	<i>Not Yet Quantified</i>					Pending
ES-11	General Education to Public on Energy Supply Options	<i>Not Yet Quantified</i>					Pending
ES-12	Efficiency Improvements and Repowering Existing Plants	<i>Not Yet Quantified</i>					Pending

CCSR = carbon capture, storage, and reuse; GHG = greenhouse gas; MMtCO<sub>2</sub>e = million metric tons of carbon dioxide equivalent; \$/tCO<sub>2</sub>e = 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.

## ES-1. Advanced Fossil Fuel Technology Incentives, Support, or Requirements

### Policy Description

The “Policy Description” is a part of the Straw Proposal. This section should provide a **brief** summary of the proposed policy option. The following provides the text of the sub-options from the ES TWG catalog, as well as the related Kansas programs and actions listed in the ES TWG catalog. This information can be used as a starting point in developing the “Policy Description”.

#### 1.1 Advanced Fossil Fuel Technology (e.g., IGCC, CCSR, Advanced Pulverized Coal, CFB) Incentives, Support, or Requirements

Advanced fossil technologies include more efficient, and thus lower-emitting, generation technologies. Advanced fossil technologies combined with carbon capture and sequestration or reuse (CCSR) may have the potential to significantly lower CO<sub>2</sub> emissions associated with fossil fuel-based electricity generation. Advanced fossil technologies that could be considered include integrated gasification combined-cycle (IGCC), advanced pulverized coal, and advanced circulating fluidized-bed (CFB) technology.

Policies to encourage the development of these technologies may include mandates or incentives to use advanced coal technologies for new coal plants, such as a mandate that requires new fossil fuel-fired power plants to achieve a specific low net CO<sub>2</sub> emission rate. Alternatively, a mandate might require that all or a portion of new coal plants be of a certain type, such as IGCC. Incentives may take the form of direct subsidies or assistance in securing financing, and/or off-take agreements. A combination of mandates and incentives is also possible.

Policies to encourage CCSR could include a state agency or department within an existing agency tasked with promoting CCSR, evaluation studies to identify geologically sound reservoirs, R&D funding to improve CCSR technologies, and/or financial incentives or mandates to capture and store or capture and reuse carbon.

#### Related Kansas Programs/Actions

- KSA 2007 Supp. [79-233](#) exempts any carbon capture, storage and recovery (CCSR) equipment from all property taxes. KSA 2007 Supp. [79-32,256](#) provides additional tax incentives for CCSR.
- KSA 2007 Supp. [79-32,228](#) – [32,232](#) and [79-32,238](#) – [32,241](#) provide tax credits and KSA 2007 Supp. [74-8949a](#) authorizes Kansas Development Finance Authority financing for building and expanding integrated gasification combined-cycle (IGCC) plants.
- 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.

## Policy Design

The “Policy Design” is the other part of the Straw Proposal. The “Goals” represent the **numerical** targets that the TWG feels are attainable by the end of the policy period (2020), and will provide sufficient carbon benefits. The “Timing” bullet is a place for the TWG sub-group to insert an incremental target, or multiple incremental targets. The “Parties Involved” bullet includes a list of organizations (specific or otherwise) that could be affected by this proposed option, or are parties to the implementation of the option.

**Goals:**

**Timing:**

**Parties Involved:**

**Other:**

## ES-2. Nuclear Capacity

- KEEP #3 Guidance: ES-2 (*Nuclear Capacity*) should also look at efficiency and other technological improvements

### Policy Description

#### 2.1 New Nuclear Capacity

Nuclear power has historically been a low-GHG source of electricity. However, no new commercial reactor has come on line in the United States since 1996 due to extremely high capital costs, the absence of any plan or technology for permanent disposal of nuclear waste, and risks to public safety exemplified by high-profile accidents at Three Mile Island and Chernobyl. The current Administration has been supportive of nuclear expansion, emphasizing its importance in maintaining a diverse energy supply and its reputation for producing electricity with negligible pollutant emissions during operation. Congress has also offered significant financial subsidies for new nuclear plants in an effort to jump-start the industry, including limitations on liability for nuclear accidents.

Steps to encourage nuclear power options in Kansas could include the provision of streamlined siting review at existing nuclear facilities, including a streamlined appeals process. Kansas could develop finance authority to assume the developer role (and potentially an equity ownership role) for new nuclear resources. Under such a scenario, the state would not necessarily need to be an operator of nuclear facilities. Instead, it could serve as a facilitator in developing a new nuclear facility, recognizing the cost and financing burdens such a facility could impose on existing Kansas companies, including those as large as Westar, Inc., and Kansas City Power & Light. Small-scale nuclear power options could also be considered.

#### 2.2 Relicensing/Up-Rating Existing Nuclear Power

Nuclear plant relicensing allows a nuclear power plant to extend the life of the facility for 20 years past its original 40-year license term. This is considered a low-cost and low-emission source of energy because there are limited additional capital costs or additional embodied emissions associated with extending the life of fully depreciated and operating nuclear plants. The Nuclear Regulatory Commission (NRC), the nation's regulatory authority for nuclear power, considers the relicensing program one of its major cornerstones of current regulatory activity. A nuclear power plant uprating is a process whereby a licensee receives approval from the NRC to operate a plant at a higher power level than the level authorized in the original license.

#### 2.3 Research and Development for Nuclear Technological and Efficiency Improvements

This option focuses on R&D efforts related to nuclear power technologies and efficiency improvements. Efficiency improvements refer to increasing generation efficiency at power stations through incremental improvements at existing plants (e.g., more efficient boilers and turbines, improved control systems, or combined-cycle technology). Policies to encourage

efficiency improvements could include incentives or regulations as described in other options, with adjustments for financing opportunities and emission rates of existing plants.

### **Related Kansas Programs/Actions**

- KSA 2007 Supp. [79-230](#) has a property tax exemption for new nuclear facilities built near other nuclear facilities.
- [SB 586](#) (2008) provides electric utilities the ability to recover certain costs related to planning for new nuclear generation capacity.
- Westar is exploring relicensing their current nuclear facilities.

### **Policy Design**

The “Policy Design” is the other part of the Straw Proposal. The “Goals” represent the **numerical** targets that the TWG feels are attainable by the end of the policy period (2020), and will provide sufficient carbon benefits. The “Timing” bullet is a place for the TWG sub-group to insert an incremental target, or multiple incremental targets. The “Parties Involved” bullet includes a list of organizations (specific or otherwise) that could be affected by this proposed option, or are parties to the implementation of the option.

**Goals:**

**Timing:**

**Parties Involved:**

**Other:**

## ES-3. Transmission System Upgrading

### Policy Description

Achievement of reduced GHG emission goals through development of renewable energy resources in Kansas (Policy ES-4, Renewable Portfolio Standard) is highly dependent upon energy deliverability via the electric transmission system. New transmission lines and upgrades to existing lines will be required to provide Kansas renewable energy resources (primarily wind) access to load centers in the state and, to a greater extent, interstate energy markets.

Of potential benefit, transmission system enhancements intended to extract renewable Kansas wind energy may result in additional suitable locations for dispatchable generation capacity additions—base load, intermediate load and peak load—including Nuclear (ES-2) and Advanced Fossil Fuel (ES-6) resources.

Deliverability of physically remote ES-2, ES-4, and ES-6 generation may afford earlier retirement of existing high-GHG emitting resources near concentrated load centers. Such early retirements would be unlikely, absent alternative capacity resource availability through an improved transmission system.

It may be useful to designate renewable energy zones, as suggested in federal legislation presently under consideration. Areas with Class 4 or 5 wind energy potential could be established as preferred areas for transmission system improvements. With approximately 82,264 square miles in the state of Kansas, universal transmission service for renewable resources is not a viable possibility.

Competent intellectual resources dedicated to transmission reliability, operation, planning, and power marketing exist in Kansas in the form of incumbent transmission owners (TO) and a federally sanctioned regional transmission organization (RTO)—Southwest Power Pool, Inc. (SPP). Under the regulatory oversight of the Kansas Corporation Commission (KCC), the Federal Energy Regulatory Commission (FERC), and/or the Kansas Electric Transmission Authority (KETA)—combined with the expertise of incumbent TOs and SPP—protecting the interests of ratepayers and reduction of GHG may be possible with new and upgraded transmission facilities.

Time is of the essence if the transmission system is to be expanded or upgraded to support renewable resource development.

### Related Kansas Programs/Actions

- Kansas Electric Transmission Authority was created to manage transmission issues and upgrades.
- Westar is in the process of siting a [new 765 kV transmission line](#).

### Policy Design

**[Does the TWG want to propose numeric quantifiable goals?]**

### Goals:

**Timing:**

**Other Parties Involved:**

**Other:**

## ES-4. Renewable Portfolio Standard (RPS)

- Guidance from KEEP #3: ES-4 (*Renewable Portfolio Standard*) should include adding natural gas to the fuel mix

### Policy Description

A renewable portfolio standard (RPS) is a requirement that utilities must supply a certain percentage of electrical energy from renewable energy sources. Renewable energy sources are defined as wind, hydro, biomass, solar, and methane-capture generating facilities or as further defined in specific state policy including carbon offsets from certified sources. An RPS of 5% would mean that for every 100 MWh that an EU or a "load serving entity" (LSE) supplies to end users, 5 MWh must be generated from renewable resources. Electric Utilities (EUs) can meet this requirement by purchasing or generating renewable-based electrical energy or by purchasing renewable energy certificates (RECs) from eligible renewable energy projects.

RECs are tradable certificates, created for every kWh of verified renewable electricity produced. Anyone should be able to construct or own an eligible renewable facility and earn RECs for the electrical energy that it generates. EUs or LSEs can generate their own RECs or purchase RECs to meet their RPS requirement. In this way, EUs or LSEs may not need to build and operate renewable generating facilities. By providing this flexibility, a market in these credits would be created, leading to lowest-cost renewable energy.

Kansas, the nation's third windiest state, recognizes its vast potential for the development of wind energy resources and has determined that it is in the public's interest to utilize this resource for the purpose of stimulating economic development in the state through the additional jobs and investments in renewable energy; providing for a source of clean, zero emissions electric energy that can offset the harmful emissions from traditional fossil resources; and providing the nation with alternative domestic energy resources to reduce dependence on foreign supplies. Kansas also recognizes that additional costs may be imposed on electric customers should the deployment of renewable resources per the standard prove more expensive than absent this state policy.

Any State specific policy should be designed with the flexibility to adapt to federal policy when it is established without economically penalizing in-state participants.

### Related Kansas Programs/Actions

- Voluntary RPS to meet 10% of Kansas energy demand with wind power by 2010 and 20% by 2020. See KSA 2007 Supp. [66-1,184\(g\)](#).
- Since December 2006, nearly
- 1,000 megawatts (MW) of potential 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 10% of nameplate electric generation capacity for the state's utilities. The utilities agreed to a commitment of a 20% voluntary goal by 2020.

### Policy Design

The ES-TWG recommends that Kansas codify its existing 20% by 2020 voluntary RPS. These requirements would apply to all electric utilities supplying customers in Kansas.

#### Goals:

- No less than 10% by 2011
- No less than 15% by 2016
- No less than 20% by 2020 and thereafter

**[NOTE: these reductions will likely be seen as 'recent actions' and not contribute to additional reductions pursuant to your recommendations. Does the TWG want to consider more stringent targets after 2020?]**

**Timing:** As noted above.

**Parties Involved:** All EUs and LSEs serving customers or load in Kansas.

**Other:** Considerations toward implementation:

- 1) How to meet standard – whether through net installed capacity or net retail MWh delivered to customers?
- 2) RECs must be audited and verified, tracked to avoid double-counting; decisions must be made about sourcing of RECs, whether from in and/or outside Kansas.
- 3) Cost recovery and return on investment should be allowed for regulated utilities.
- 4) Transmission and market constraints must be taken into account by the KCC.
- 5) The state's smallest utilities should be exempted or given extra flexibility to meet standard.
- 6) "Net metering" RECs should count toward utility's compliance obligation.

## ES-5. CCSR Incentives, Requirements and/or Enabling Policies

- Guidance from KEEP #3: Suggestion to combine ES-5 (*CCSR Incentives*) and ES-7 (*CCSR R&D*), but no formal KEEP recommendation

### Policy Description

Carbon capture and storage or reuse (CCSR) is a process that includes separation of CO<sub>2</sub> from industrial and energy-related sources, transport to a storage location, commercial use, or permanent or long-term storage in isolation from the atmosphere. Ideally, the CO<sub>2</sub> from large point sources of emissions, such as fossil-fueled power plants, can be compressed and transported for commercial use in food products or enhanced oil recovery (EOR) of oil or gas. EOR has been tested in Kansas on a limited basis.

If those aren't available, storage in geological formations, most likely the abundant saline aquifer space in Kansas is the next best option. While CO<sub>2</sub> capture from fermentation in ethanol production is relatively simple with the gas being highly concentrated, capture from coal gasification or combustion is complex, expensive, and energy intensive. While integrated gasification combined cycle (IGCC) includes a mechanism to capture concentrated CO<sub>2</sub>, the cost for this is very high. Combusting coal and capturing and concentrating its diffuse CO<sub>2</sub> is being tested at a small scale in numerous trials currently, but this is expensive and requires much additional electricity, and is likely a decade away from commercial-scale applications. A third technique, coal combustion with concentrated O<sub>2</sub>, produces much more concentrated CO<sub>2</sub>, but with similarly high energy and equipment costs.

### Related Kansas Programs/Actions

- KSA 2007 Supp. [79-233](#) and KSA 2007 Supp. [79-32,245](#) provide property tax incentives for the sequestration of CO<sub>2</sub>, 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 evaluate available technologies that capture and store CO<sub>2</sub> 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<sub>2</sub> 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:
  - 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<sub>2</sub> flooding.
- A partnership between Coffeyville Resources Nitrogen Fertilizers and Blue Source to develop options for the utilization of CO<sub>2</sub> captured from petroleum coke gasification-based ammonia and urea ammonium nitrate production. Particular focus is proposed to develop an enhanced oil recovery project.

## Policy Design

Since CO<sub>2</sub> capture from coal is currently either cost-prohibitive (IGCC) or not available at commercial scale, incentives for both this and geologic injection of CO<sub>2</sub> should be directed at research and development. See ES-7.

**Goals: [Does the TWG want to set non-quantitative goals for this policy? Recommend a specific incentive, requirement or action to enable?]**

**Timing:**

**Parties Involved:**

**Other:**

## ES-6. Technology-Focused Initiatives, Including Grant Programs

### Policy Description

The development of new technologies to efficiently serve the energy needs of this country is essential. Consistent with that objective, the need to address the goal of carbon reduction from existing and new production sources will require meaningful incentives since carbon reduction and/or capture processes will likely add to the cost of that produced energy. A significant investment by the public and private sectors in technology based research and development will be required to further these general policy objectives.

### Related Kansas Programs/Actions

- 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.
- KSA 2007 Supp. [79-32,233](#) - [32,237](#) provides tax incentives for biomass-to-energy plants
- Some Kansas university research centers are focusing on these issues.

### Policy Design

**Goals:** Promote the development of new technologies and improve existing processes, with specific initiatives by the public sector and incentives for private entities. Ultimately, Kansas should be viewed as an innovator in energy production that address carbon reduction and capture. **[Does the TWG want to be more specific, i.e. “Provide tax credits or direct grant funding sufficient to retrofit XX MW of coal-fired generating capacity with biomass co-firing capability and document and publish the benefit and cost results”?]**

**Timing:** Tax incentives and grant programs should become available in 2010 and continue indefinitely.

**Parties Involved:** Agencies of Kansas state government, colleges and universities conducting applicable research programs and private partners.

**Other:**

## ES-7. Research and Development for CCSR

- Guidance from KEEP #3: Suggestion to combine ES-5 (*CCSR Incentives*) and ES-7 (*CCSR R&D*), but no formal KEEP recommendation

### Policy Description

As discussed in ES-5, technological as well as financial barriers exist to implementation of CCSR. While separation, capture, and transport of CO<sub>2</sub> are themselves understood technologies, financially independent, commercially viable examples don't exist in the U.S. In Kansas however, CO<sub>2</sub> EOR and sequestration opportunities may be abundant in our saline aquifers. Further R&D funding to improve CCSR technologies and evaluation studies to identify and map geologically sound reservoirs will be needed for this technology to play a significant role in reducing GHG emissions.

### Related Kansas Programs/Actions

- 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.

### Policy Design

**Goals:** Encourage the mapping and testing of Kansas' saline aquifers for EOR, CO<sub>2</sub> sequestration, or both, particularly in proximity to large, stationary CO<sub>2</sub> sources. **[Does the TWG want to identify specific means of 'encouragement'? Direct appropriation? Tax credits? Augment, seek and secure federal funding?]**

**Timing:** By 2015. **[What is to be accomplished by 2015 – mapping and testing completed?]**

**Parties Involved:** The Kansas Geological Survey, oil and gas developers and producers, and fossil-fueled energy providers.

**Other:**

## ES-8. Technology Research and Development

### Policy Description

Promote technological research and development to capture or reduce greenhouse gas (GHG) emissions in the State of Kansas.

Research and development of technology will be promoted through use of tax credits and a grant program.

Tax credits will be given to energy supply industry entities that undertake or continue technological research and development projects approved by a KEEP committee for the capture and or reduction of GHG. **[Is there an expectation that the KEEP will continue beyond the delivery of the final report?]**

A grant program will be developed to promote technological research and development for the capture or reduction of GHG for individuals, small entities and non-profit organizations. Individuals or small entities or non-profit organizations will submit projects for review and approval from a KEEP committee. When the project is approved by the KEEP committee the applicant will be awarded a grant to assist with project.

Technology research and development is necessary for the preservation of a reliable electricity supply under the carbon constraints that are being contemplated as a matter of public policy. A signal technology will not accomplish the broad objectives: rather, technologies of various types and that now exist at various points along the technology development curve will require consideration.

### Related Kansas Programs/Actions

*None Listed*

### Policy Design

**Goals:** Have at least ten viable projects approved conducting research and development of technology to capture or **['Capture' is covered under other policies – limit to 'reduce'? 'sequester'?]** reduce GHG by the end of the policy period 2020.

**Timing:** Have KEEP approval committee in place by mid 2010; approve at least one project a year over the ten year policy period.

**Parties Involved:** KEEP approval committee and applicants from industry, individuals, small entities, non-profit organizations.

**Other:** Have at least one capture or reduction project put into practical application reducing GHG.

## ES-9. Green Power Purchases and Marketing

### Policy Description

Green power refers to electricity produced by wind, solar, biomass, and hydroelectric generating resources. Green power purchasing programs are state or utility programs that allow consumers to purchase a percentage of the consumer's electric power requirements sourced through renewable resources. Providers of green power programs will obtain green resources either through the generation of green power from eligible renewable resources or through the purchase of green tags or Renewable Energy Credits, RECs (the renewable attributes of power generation). One REC is generated for each MWh of renewable energy generated. Green programs are designed to ensure that a quantity of electricity or RECs equal to their purchase will contribute to the development and support of renewable resources or other programs that provide opportunities for consumers to purchase or support green power regardless of whether those renewable resources are the least cost alternative. Generally voluntary, these programs can be implemented on a local, statewide or regional basis. These programs are distinct from carbon offset markets.

### Related Kansas Programs/Actions

- Green power purchases were offered by Westar in 1999, but discontinued due to low participation. A new green power purchase program is in development at Westar.

### Policy Design

Increase opportunity for utility consumers in Kansas to purchase or financially support green power initiatives regardless of whether these renewable resources are the least cost alternative. In addition the policy design shall allow utilities and other electric providers to credit energy provided under green power program participation to credit such power toward achieving state or federal Renewable Portfolio Standards (RPS).

**Goals:** Green Power Programs shall be allowed to contribute up to 50% of the utility's green power requirements specified in the RPS. The percentage contribution of the Green Purchase and Marketing programs would be specific to each utility or retail electric provider.

**Timing:** Utilities shall voluntarily conduct market surveys with their customers to determine customers' interest in purchasing a percentage of their energy through Green Power Programs. A report of survey results and an analysis of the potential for customer participation in Green Power Programs along with an assessment of customer cost impact shall be provided to the Kansas Corporation Commission within 120 days of the completion of the survey.

**Parties Involved:** The Kansas Corporation Commission would, for entities under their jurisdiction, need to approve Green Power and Marketing programs and allow recovery of the costs necessary to implement such programs; the utilities would need to design and market programs that provide opportunity for consumers to purchase and/or support green energy; consumers would need to provide the financial support necessary to incent the installation of green power and meet the programs pro rata share of the RPS goal.

**Other:**

## ES-10. Energy Efficiency Resource Portfolio Standard

- Guidance from KEEP #3: ES-10 (*Energy Efficiency Resource Portfolio*) should include incentives for energy efficiency

### Policy Description

An EERS requires electric and sometimes natural gas utilities to reduce demand by a set percentage or to reduce retail electric sales in kWh by a set percentage. Utilities can meet this requirement through end use energy efficiency improvements (residential, commercial, industrial, agricultural, and institutional) as well as transmission and distribution upgrades that save energy, and combined heat and power systems. Ratepayers benefit from avoided or forestalled construction of new power plants, and lower utility bills for those who directly participate in available energy efficiency programs. In the Midwest, states that have adopted this policy mechanism include Minnesota (1.5% annual energy savings), Illinois (1% annual energy savings by 2011, 2% annual energy savings by 2015), and Ohio (1% annual energy savings by 2014, 2% annual energy savings by 2019).

The Kansas Energy Council commissioned a 2008 study by Summit Blue Consulting, which collected and analyzed demand side management (DSM) program results from 24 utilities and energy agencies in the Midwest and across North America. Quoting directly from that report (E-1, E2):

- The achievement of significant DSM savings is influenced by several factors including: the regulatory environment under which utilities and agencies operate, how DSM projects are funded, how the issue of lost revenues is addressed, the provision of financial incentives for DSM performance, and other factors.
- British Columbia, Connecticut, California, Iowa, Massachusetts, Minnesota, and Vermont all achieved about 1% or more reductions in annual energy sales due to DSM programs in 2006 (or 2005). The electricity market structure is not a determining variable in DSM performance; most of the high achievers operated under a traditional market structure, but California is partially restructured. Nor does year that programs began appear to be a strong influence on savings achieved. All states achieving high DSM savings set significant mandated goals for utilities' DSM programs. Other success factors include financial incentives for cost-effective DSM (Minnesota, Vermont), adjustments for lost revenues caused by DSM programs (California), and the use of the Total Resource Cost (TRC) test or societal test for cost-effectiveness rather than the Ratepayer Impact Measure (RIM) test (British Columbia, California, Iowa, Minnesota, Vermont).

Summit Blue found that median residential and commercial and industrial electric EE program savings is about 0.6% -0.7% of baseline sales annually while high savings Midwest electric utilities save 0.9% - 1.0% of baseline sales per year.

## **Related Kansas Programs/Actions**

*None Listed*

## **Policy Design**

Based in part on the Summit Blue DSM Potential Study and Plan, the ES-TWG recommends that Kansas electric utilities ramp up to an annual reduction of 1% of projected baseline sales by 2015 and thereafter.

### **Goals:**

- 0.4% of baseline sales by 2011
- 0.6% of baseline sales by 2012
- 0.8% of baseline sales by 2013
- No less than 1% of baseline sales by 2015 and thereafter

**Timing:** As noted above.

**Parties Involved:** All EUs and LSEs serving customers or load in Kansas.

### **Other:**

- Note critical overlap with ES-11, General Education to Public on Energy Supply Options.
- TWG or KEEP may consider adding natural gas requirement.

Notes toward consideration of implementation:

- The group's inclination is toward utility rather than third-party administered programs. Utilities have long-standing relationships with and are uniquely positioned with an effective avenue for regularly and consistently reaching all customer classes. Utilities also have an intimate daily awareness of the specific need for and access to the various means available to acquire needed supply resources.
- EERS must be cost-effective; five different cost-effectiveness tests will be assessed and applied; of these, the societal perspective is preferred determinant of cost-effectiveness.
- Policy shall direct Commission to develop rules which allow utilities to be incented to make investments in energy efficiency that make EE investments favorable over traditional supply investments. Such rulemaking shall provide a methodology for utilities to be able to recover costs incurred in EE program design and implementation and management, a methodology for the recovery of lost margins due to reduced customer energy usage; and a means for utilities to earn an incentive return that is financially better than investments in traditional supply investments.
- Policy must allow for programs for all types of customers.

- Plans must include analysis of the potential for energy efficiency and must include performance standards in terms of energy and capacity savings.
- Plans must include measurement and verification of actual program results.
- While 1% appears to be an appropriate overall state goal, individual utilities may find it difficult to meet. Therefore, the Kansas EERS might provide for bilateral contracts to permit utilities to procure some efficiency savings from other utilities or third-party efficiency providers.

## ES-11. General Education to Public on Energy Supply Options

### Policy Description

There will be direct and indirect effects on GHG emissions if the public or specific groups are well informed about aspects of the technical, economic, and/or environmental dimensions of energy supply and usage options. Public education and outreach efforts should build upon existing work being done by federal, state and local agencies, utility companies, and nonprofit organizations. Approaches can include public announcements, forums, educational programs, materials, websites, educational curricula, tours of energy facilities, and others. Education should focus on quality assured scientific data and energy economics that provides the public, business and industry with the information needed to make intelligent and timely decisions regarding energy usage, selection and/or optional efficiency improvements. No one option that is adopted for the energy supply sector would be focused on any more than other options with this educational program.

**\*OR\***

Public education and outreach relevant to the energy supply sector is essential in cultivating support and justification for policies designed to reduce GHG emissions. Providing quantitative (technical) and qualitative (subjective) information regarding the social, environmental, and economic dimensions of energy supply fosters a broad awareness of climate change issues to the electricity consumer. Such direct and indirect awareness is essential in engaging consumers in actions that modify human behavior and is the foundation for the long-term success in the mitigation activities proposed by the KEEP Advisory Group. **[NOTE: Are these mutually exclusive? Can they be merged?]**

### Related Kansas Programs/Actions

- Some energy generation facilities in Kansas provide educational public tours, such as the Bowersock hydro facility.

### Policy Design

The policy recommendations for public education and outreach within the energy supply sector shall integrate with a diverse group of stakeholders, represent the various entities within the energy supply industry, and embody a variety of educational approaches with the primary purpose of building upon and coordinating with existing outreach efforts to establish an energy information network. However, this policy option must be flexible and open to the introduction of new ideas throughout the planning, implementation, and evaluation process. Furthermore, the energy supply sector shall work in collaboration with other KEEP technical work groups that are designing public education and outreach policies for overall coordination of efforts, quality/cost assurance, and to establish a comprehensive policy option.

### Goals:

**Timing:** Begin the educational programming and outreach process upon endorsement of policy option.

**Parties Involved:**

- KEEP Advisory Group, Technical Work Groups, and RCI-3 & CCI-4 Volunteers
- General Public (Electricity Consumers, Businesses, and Low-Income Assistance)
- Energy Supply Organizations (Utility Companies, Cooperatives, Energy Facilities, and Renewable Energy & Energy Efficient Facilities)
- Federal, State, and Local Government Agencies
- Policymakers (Legislators, Regulators and Executive Branches)
- Community-based Organizations (Community Leaders, Municipalities, Service Clubs, Social Affinity Groups, For-Profit/Not-for-Profit Organizations)
- Future Generations (Primary, Secondary, Post-Secondary Educational Institutions - Community Colleges, Technical Colleges, Colleges and Universities)
- Communication Channels (Print Media, Broadcast Media, Outdoor Media, Communication Media)

**Other:**

## ES-12. Efficiency Improvements and Repowering Existing Plants

- Guidance from KEEP #3: *Efficiency Improvements and Repowering Existing Plants* should be a new option (ES-12)

### Policy Description

The average startup date for coal fired generation units in Kansas is 1967. The average age for all fossil fuel fired units in Kansas with greater than 20 MW generation capacity is 36 years. The state's utilities will likely be faced with the decision of retirement or repowering of a number of old, less efficient units within the time frame of this planning process. The opportunity to replace aging units with more efficient in-state generation could offer a significant reduction in GHG emissions from this sector. Furthermore, the existing coal-based generation may benefit from additional technologies and upgrades to make their fuel burning more efficient, resulting in more electric output for the amount of fuel burned. However, certain existing regulatory policies, such as New Source Review (NSR), deter some efficiency improvements. NSR is the general term applied to the permitting requirements of new stationary sources or modifications of existing stationary sources under the Clean Air Act. NSR encompasses the Prevention of Significant Deterioration (PSD) permitting requirements for attainment areas and the NSR permitting requirements for nonattainment areas. It should be noted that utilities can use emissions netting under the NSR program which may allow for modifications without triggering NSR.

Generation efficiency improvements refer to increasing generation efficiency at power stations through incremental improvements at existing plants (e.g., more efficient boilers and turbines, improved air and feedwater heaters, condensers, or improved power plant control systems). An efficiency upgrade results in lower GHG emissions at the same or a higher level of electrical output.

Repowering existing power plants refers to the engineering and installation of technologies that enable switching to lower emitting fuels such as natural gas in place of coal or oil or biomass-based carbon neutral fuels such as switchgrass.

Power replacement refers to the replacement of an existing plant with another plant of similar or different technologies. Replacement plants using new, modern design are inherently more efficient than the older generation technologies in terms of GHG emissions per unit of fuel consumed.

Policies to encourage generation efficiency improvements, repowering of existing plants, or power plant replacement(s) could include both incentives and regulations. This policy evaluation would be part of an overall plan identifying cost-effective options for reducing system CO<sub>2</sub> and other GHG emissions to applicable regulatory levels or limits on a short-term and long-term basis, requiring utilities to pursue cost-effective options for reducing their emissions profile through measures identified above, and creating financial incentives that reward such emission reductions.

## Related Kansas Programs/Actions

*None Listed*

### Policy Design

**Goals:** A 5% improvement in the overall fossil fuel generation GHG intensity in Kansas by 2025 as a result of efficiency improvements and repowering existing fossil fuel units. This 5% improvement applies to existing fossil based generation and should be evaluated based on the GHG generation intensity measured as lbs<sub>CO2</sub>/MWh.

To reach this goal, utilities should evaluate efficiency upgrades, repowering, and/or plant replacements against other generation options. This evaluation should include all renewable generation replacement options and consider potential GHG compliance costs such as a market-based procurement of emissions allocations or other “costs of carbon”.

In addition, a stakeholder group should be formed to evaluate potential policy deterrents, such as NSR, to determine if modifications should be advocated to help achieve desired climate benefits.

**Timing:** Efficiency can be improved incrementally over shorter periods of time (1-5 yrs), while repowering and replacements can take many years to plan and implement.

**Parties Involved:** This recommendation applies to all Kansas utilities. For regulated utilities, efficiency upgrades, repowering, and power plant replacement would likely be evaluated through a KCC review. For unregulated generators, these projects would be economically driven based on market forces. For municipals, their local boards or commissions would evaluate these projects. Major upgrades that trigger NSR permitting would involve KDHE. Stakeholder meetings for evaluating policy deterrents should include utility representatives, KCC and KDHE staff.

**Other:** None.