



## Catalog of State Actions Agriculture, Forestry, and Waste Management Technical Work Group

A catalog of state-level, GHG-reducing actions and policy options based on actions undertaken or considered by state, local, and private actors.

### Key to Future Rankings of Options in the Following Tables

Potential GHG Emission Reductions*	Potential Cost or Cost Savings* <sup>†</sup>
<b>High (H):</b> At least 1.0 million metric tons of carbon dioxide equivalents (MMtCO <sub>2</sub> e) per year by 2020	<b>High (H):</b> \$50 per MtCO <sub>2</sub> e or above
<b>Medium (M):</b> From 0.1 to 1.0 MMtCO <sub>2</sub> e per year by 2020	<b>Medium (M):</b> \$5–\$50/tCO <sub>2</sub> e
<b>Low (L):</b> Less than 0.1 MMtCO <sub>2</sub> e per year by 2020, or 1 MMtCO <sub>2</sub> e by 2050	<b>Low (L):</b> Less than \$5/tCO <sub>2</sub> e
<b>Uncertain (U):</b> Not able to estimate at this time	<b>Negative (Neg):</b> Net cost savings
	<b>Uncertain (U):</b> Not able to estimate at this time

\* Several measures may overlap in terms of emissions reductions and/or cost impacts. Estimates assume measures would be implemented independently from other measures.

<sup>†</sup> 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 Emissions Reduction	Cost per Ton	Other Considerations: Jobs, Fuel Imports, Externalities, Feasibility	Priority for Analysis	Notes/Related Actions in Kansas
AFW-1	<b>AGRICULTURE—PRODUCTION OF ENERGY AND MATERIALS</b>					
1.1	Expanded Utilization of Biomass Feedstocks for Electricity, Heat, or Steam Production*					<ul style="list-style-type: none"> <li>Westar released an RFP for 500 MW of renewable energy.</li> <li>Executive order 08-04: KEC instructed to collect and compile information on available and currently utilized renewable energy resources in Kansas.</li> </ul>
1.2	In-state Liquid Biofuels Production*					<ul style="list-style-type: none"> <li>Bioenergy Research Grant Program recommended to spur development of cost-efficient renewable fuels. Goal for Kansas to produce 20% of nation's alternative fuel needs.</li> </ul>
1.3	Manure Digesters/Other Waste Energy Utilization					
1.4	Improving Energy Capture from Corn and Biomass Heat					
1.5	Expand Production/Use of Bio-based Materials and Chemicals					

Option No.	GHG Reduction Policy Option	Potential GHG Emissions Reduction	Cost per Ton	Other Considerations: Jobs, Fuel Imports, Externalities, Feasibility	Priority for Analysis	Notes/Related Actions in Kansas
1.6	Improved Commercialization of Biomass Conversion Technologies					
<b>AFW-2</b>	<b>AGRICULTURE—LIVESTOCK</b>					
2.1	Manure Management and Utilization					
2.2	Changes in Animal Feed					
2.3	Technology Improvements to Increase Water Conservation					
<b>AFW-3</b>	<b>AGRICULTURE—CROP PRODUCTION</b>					
3.1	Soil Carbon Management*					<ul style="list-style-type: none"> <li>KSU Soil Carbon Center leads research on soil carbon sequestration. Many Kansas farmers involved in no-till practices.</li> </ul>
3.2	Nutrient Management					
3.3	Technology Improvements to Increase Efficiency					
3.4	Water Management					
3.5	Drainage Management					
<b>AFW-4</b>	<b>AGRICULTURE—LAND USE CHANGE</b>					

Option No.	GHG Reduction Policy Option	Potential GHG Emissions Reduction	Cost per Ton	Other Considerations: Jobs, Fuel Imports, Externalities, Feasibility	Priority for Analysis	Notes/Related Actions in Kansas
4.1	Land Use Management that Promotes Permanent Cover*					<ul style="list-style-type: none"> <li>• Kansas mayors agree to adopt and enforce land-use policies that reduce sprawl, preserve open space and create compact, walkable urban communities.</li> </ul>
4.2	Preserve Open Space/Agricultural Land					
<b>AFW-5 AGRICULTURE—FARMING PRACTICES</b>						
5.1	Increase On-Farm Energy Production and Efficiency*					<ul style="list-style-type: none"> <li>• KS FCIP responsible for administering grant program aimed at reducing building energy use.</li> <li>• Kansas mayors agree to make energy efficiency a priority through building code improvements.</li> </ul>
5.2	Promotion of Farming Practices that Achieve GHG Benefits					
5.3	Programs to Support Local Farming/Buy Local					
5.4	Promotion of Urban Agriculture, Community Gardens, and Green Roofs					

Option No.	GHG Reduction Policy Option	Potential GHG Emissions Reduction	Cost per Ton	Other Considerations: Jobs, Fuel Imports, Externalities, Feasibility	Priority for Analysis	Notes/Related Actions in Kansas
<b>AFW-6 FORESTRY—PRODUCTION OF ENERGY AND MATERIALS</b>						
6.1	Expanded Use of Forest Biomass Feedstocks for Electricity, Heat and Steam Production*					<ul style="list-style-type: none"> <li>Westar released an RFP for 500 MW of renewable energy.</li> <li>Executive order 08-04: KEC instructed to collect and compile information on available and currently utilized renewable energy resources in Kansas.</li> </ul>
6.2	In-state Liquid Biofuels Production*					<ul style="list-style-type: none"> <li>Bioenergy Research Grant Program recommended to spur development of cost-efficient renewable fuels. Goal for Kansas to produce 20% of nation's alternative fuel needs.</li> </ul>
6.3	Improved Energy Capture from Wood Waste Combustion					
6.4	Improved Commercialization of Biomass Conversion Technologies					
6.5	Expanded Use of New, Used, & Recycled Wood Products for Building Materials					
<b>AFW-7 FORESTRY—BIOMASS PROTECTION AND MANAGEMENT</b>						

Option No.	GHG Reduction Policy Option	Potential GHG Emissions Reduction	Cost per Ton	Other Considerations: Jobs, Fuel Imports, Externalities, Feasibility	Priority for Analysis	Notes/Related Actions in Kansas
7.1	Forest Protection—Reduced Clearing And Conversion to Non-forest Cover					
7.2	Urban Forestry*					<ul style="list-style-type: none"> <li>Kansas mayors agree to maintain healthy urban forests, promote tree planting, and increase shading.</li> </ul>
7.3	Afforestation and/or Restoration of Non-forested Lands					
7.4	Forest Management for Carbon Sequestration					
7.5	Mitigation of Forest Carbon Sequestration Loss and Emissions Due to Wildfire					
7.6	Mitigation of Forest Loss Due to Insects/Disease					
<b>AFW-8</b>	<b>FORESTRY—WOOD PRODUCTS AND WASTE</b>					
8.1	Improved Mill Waste Recovery					
8.2	Improved Logging Residue Recovery					
8.3	Silviculture Improvements					
<b>AFW-9</b>	<b>WASTE MANAGEMENT—WASTE MANAGEMENT STRATEGIES</b>					

Option No.	GHG Reduction Policy Option	Potential GHG Emissions Reduction	Cost per Ton	Other Considerations: Jobs, Fuel Imports, Externalities, Feasibility	Priority for Analysis	Notes/Related Actions in Kansas
9.1	Expanded Use of Yard Waste Biomass Feedstocks for Electricity, Heat, and Steam Production*					<ul style="list-style-type: none"> <li>Westar released an RFP for 500 MW of renewable energy.</li> <li>Executive order 08-04: KEC instructed to collect and compile information on available and currently utilized renewable energy resources in Kansas.</li> </ul>
9.2	In-State Liquid Biofuels Production*					<ul style="list-style-type: none"> <li>Bioenergy Research Grant Program recommended to spur development of cost-efficient renewable fuels. Goal for Kansas to produce 20% of nation's alternative fuel needs.</li> </ul>
9.3	Advanced Recycling and Composting					
9.4	Promotion of Bioreactor Technology (Advanced Municipal Solid Waste Management Practices)					
9.5	Source Reduction Strategies					
9.6	Resource Management Contracting					

Option No.	GHG Reduction Policy Option	Potential GHG Emissions Reduction	Cost per Ton	Other Considerations: Jobs, Fuel Imports, Externalities, Feasibility	Priority for Analysis	Notes/Related Actions in Kansas
9.7	Enhanced Management of Organic Waste					
9.8	Improved Commercialization of Biomass Conversion Technologies					
<b>AFW-10 WASTE MANAGEMENT—LANDFILL GAS STRATEGIES</b>						
10.1	Flare Landfill Methane at non-NSPS (smaller) Sites					
10.2	Methane and Biogas Energy Programs*					<ul style="list-style-type: none"> <li>• Kansas mayors agree to increase use of clean renewable energy such as landfill methane and waste to energy technology.</li> </ul>
10.3	Landfill Methane Energy Programs					
<b>AFW-11 WASTE MANAGEMENT—WASTEWATER MANAGEMENT ACTIVITIES</b>						
11.1	Wastewater Treatment Plant Biosolids for Energy Production*					<ul style="list-style-type: none"> <li>• Kansas mayors agree to explore opportunities to increase pump efficiency and recover WWT methane for energy production.</li> </ul>

Option No.	GHG Reduction Policy Option	Potential GHG Emissions Reduction	Cost per Ton	Other Considerations: Jobs, Fuel Imports, Externalities, Feasibility	Priority for Analysis	Notes/Related Actions in Kansas
11.2	Energy Efficiency Improvements*					<ul style="list-style-type: none"> <li>• KS FCIP responsible for administering grant program aimed at reducing building energy use.</li> <li>• Kansas mayors agree to make energy efficiency a priority through building code improvements.</li> </ul>
11.3	Lower Waste Processing Needs (lower water consumption, waste production)					
11.4	Install Digesters and Turbines or Engines					
11.5	Algae and Bio-Oils					