



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* [†]
High (H): At least 1.0 million metric tons of carbon dioxide equivalents (MMtCO ₂ e) per year by 2025	High (H): \$50 per metric ton of carbon dioxide equivalent (tCO ₂ e) or above
Medium (M): From 0.1 to 1.0 MMtCO ₂ e per year by 2025	Medium (M): \$5–\$50/tCO ₂ e
Low (L): Less than 0.1 MMtCO ₂ e per year by 2025, or 1.0 MMtCO ₂ e by 2050	Low (L): Less than \$5/tCO ₂ e
Uncertain (U): Not able to estimate at this time	Negative (Neg): Net cost savings
	Uncertain (U): Not able to estimate at this time

* Several measures may overlap in terms of emission reductions and/or cost impacts. Estimates assume measures would be implemented independently of 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 Emissions Reduction	Cost per Ton	Other Considerations: Jobs, Fuel Imports, Externalities, Feasibility	Priority for Analysis	Notes/Related Actions in Kansas
AFW-1	AGRICULTURE—PRODUCTION OF ENERGY AND MATERIALS					
1.1	Expanded Utilization of Biomass Feedstocks for Electricity, Heat, or Steam Production*					<ul style="list-style-type: none"> • Westar released an RFP for 500 megawatts (MW) of renewable energy. • Executive Order 08-04: Kansas Energy Council (KEC) instructed to collect and compile information on available and currently utilized renewable energy resources in Kansas. • Sunflower Integrated Bioenergy Center, producing electricity methane from anaerobic digestion of manure, as well as by-products of biodiesel and ethanol production.

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
1.2	In-state Liquid Biofuels Production*					<ul style="list-style-type: none"> 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. Sunflower Integrated Bioenergy Center, producing ethanol and biodiesel in a closed-loop process that includes an algae reactor and reuses many of the by-products from the fuel-making process.
1.3	Manure Digesters/Other Waste Energy Utilization					<ul style="list-style-type: none"> Sunflower Integrated Bioenergy Center, producing electricity methane from anaerobic digestion of manure, as well as by-products of biodiesel and ethanol production.
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					
AFW-2	AGRICULTURE—LIVESTOCK					
2.1	Manure Management and Utilization					
2.2	Changes in Animal Feed					
2.3	Technology Improvements to Increase Water Conservation					
AFW-3	AGRICULTURE—CROP PRODUCTION					
3.1	Soil Carbon Management*					<ul style="list-style-type: none"> Kansas State University (KSU) Soil Carbon Center leads research on soil carbon sequestration. Many Kansas farmers involved in no-till practices.
3.2	Nutrient Management					
3.3	Technology Improvements to Increase Efficiency					
3.4	Water Management					
3.5	Drainage Management					
3.6	Biotechnology Applications for GHG Mitigation					

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-4 AGRICULTURE—LAND-USE CHANGE						
4.1	Land-Use Management That Promotes Permanent Cover*					<ul style="list-style-type: none"> Kansas mayors agree to adopt and enforce land-use policies that reduce sprawl, preserve open space, and create compact, walkable, urban communities.
4.2	Preserve Open Space/Agricultural Land					
AFW-5 AGRICULTURE—FARMING PRACTICES						
5.1	Increase On-Farm Energy Production and Efficiency*					<ul style="list-style-type: none"> Kansas Facility Conservation Improvement Program (FCIP) responsible for administering grant program aimed at reducing building energy use. Kansas mayors agree to make energy efficiency a priority through building code improvements.
5.2	Promotion of Farming Practices That Achieve GHG Benefits					
5.3	Programs To Support Local Farming/Buy Local					

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
5.4	Promotion of Urban Agriculture, Community Gardens, and Green Roofs					
AFW-6 FORESTRY—PRODUCTION OF ENERGY AND MATERIALS						
6.1	Expanded Use of Forest Biomass Feedstocks for Electricity, Heat, and Steam Production*					<ul style="list-style-type: none"> • Westar released an RFP for 500 MW of renewable energy. • Executive Order 08-04: KEC instructed to collect and compile information on available and currently utilized renewable energy resources in Kansas.
6.2	In-state Liquid Biofuels Production*					<ul style="list-style-type: none"> • 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.
6.3	Improved Energy Capture from Wood Waste Combustion					
6.4	Improved Commercialization of Biomass Conversion Technologies					

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
6.5	Expanded Use of New, Reused, and Recycled Wood Products for Building Materials					
AFW-7	FORESTRY—BIOMASS PROTECTION AND MANAGEMENT					
7.1	Forest Protection—Reduced Clearing and Conversion to Non-Forest Cover					
7.2	Urban Forestry*					<ul style="list-style-type: none"> Kansas mayors agree to maintain healthy urban forests, promote tree planting, and increase shading.
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					
AFW-8	FORESTRY—WOOD PRODUCTS AND WASTE					

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
8.1	Improved Mill Waste Recovery—Utilization of Sawmill Residues and Emissions					
8.2	Improved Logging Residue Recovery					
8.3	Silviculture Improvements					
AFW-9	WASTE MANAGEMENT—WASTE MANAGEMENT STRATEGIES					
9.1	Expanded Use of Yard Waste Biomass Feedstocks for Electricity, Heat, and Steam Production*					<ul style="list-style-type: none"> • Westar released a request for proposals (RFP) for 500 MW of renewable energy. • Executive order 08-04: KEC instructed to collect and compile information on available and currently utilized renewable energy resources in Kansas.
9.2	In-State Liquid Biofuels Production*					<ul style="list-style-type: none"> • 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.

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
9.3	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					
9.7	Enhanced Management of Organic Waste					
9.8	Improved Commercialization of Biomass Conversion Technologies					
AFW-10	WASTE MANAGEMENT—LANDFILL GAS STRATEGIES					
10.1	Flare Landfill Methane at Non-NSPS (Smaller) Sites					
10.2	Methane and Biogas Energy Programs*					<ul style="list-style-type: none"> Kansas mayors agree to increase use of clean renewable energy. such as landfill methane and waste-to-energy technology.
10.3	Landfill Methane Energy Programs					

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-11 WASTE MANAGEMENT—WASTEWATER MANAGEMENT ACTIVITIES						
11.1	Wastewater Treatment Plant Biosolids for Energy Production*					<ul style="list-style-type: none"> • Kansas mayors agree to explore opportunities to increase pump efficiency and recover wastewater treatment methane for energy production.
11.2	Energy Efficiency Improvements*					<ul style="list-style-type: none"> • KS FCIP responsible for administering grant program aimed at reducing building energy use. • Kansas mayors agree to make energy efficiency a priority through building code improvements.
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					