



## Catalog of State Actions

### Agriculture, Forestry, and Waste Management

A catalog of state-level, GHG-reducing actions and policy options prepared by the Center for Climate Strategies (CCS) and South Carolina Department of Health and Environmental Control (DHEC) based on actions undertaken or considered by South Carolina and other states, including regional, state, local and private actions.

#### Key to Future Rankings of Options in the Tables that Follow:

Potential GHG Emission Reductions <u>1/</u>	Potential Cost or Cost Savings <u>1/ 2/</u>
<b>High (H):</b> At least 1.0 million metric tons (MMt) carbon dioxide equivalent (CO <sub>2</sub> e) per year by 2020	<b>High (H):</b> \$50 per metric ton CO <sub>2</sub> e (tCO <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
<u>1/</u> Several measures may overlap in terms of emissions reductions and/or cost impacts. Estimates assume measures would be implemented independently from other measures.	
<u>2/</u> Costs are denoted by a positive number. Cost savings (i.e., “negative costs”) are denoted by a negative number.	

#### Definition of “Priorities for Analysis”:

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

#### Notation of Options:

\* **Options marked in bold an asterisk (\*)** indicate some of the related state actions that are approved or underway, as described further in the companion options description document. TWG members are encouraged to provide information on other relevant actions.

## Agriculture, Forestry, and Waste Management (AFW)

Option No.	GHG Reduction Policy Option	Potential GHG Emissions Reduction	Cost per Ton	Ancillary Impacts,	Priority for Analysis	Notes / Related Actions in SC
				Feasibility Considerations		
<b>AFW-1</b>	<b>PRODUCTION OF FUELS, PRODUCTS, AND ELECTRICITY IN AGRICULTURE</b>					
1.1	Expanded Use of Biomass Feedstocks for Electricity, Heat and Steam Production*	H	L-M			<p>Includes both ag. residues and purpose-grown crops.</p> <p>Incentive payment for biomass electricity</p> <p>Tax credit for purchase / installation of equipment to create heat, electricity, power or steam from biomass</p> <p>Low-interest loans for the production of energy from biomass (SC Renewable Energy Revolving Loan Program)</p>
1.2	In-State Liquid Biofuels & Bioproducts Production (Ethanol, Butanol and Biodiesel; incentives for feedstocks and production plants)*	H	L-M	<p>For ethanol, most GHG programs in other States have put an emphasis on cellulosic feedstocks.</p> <p>Industry is investigating the production of</p>		<p>Biodiesel Production Tax Credits.</p> <p>Potential for a biodiesel plant in Aiken County.</p> <p>Ethanol plant in Batesburg (Leesville area pending)</p> <p>Application for Ethanol plant in Dillon.</p>

			<p>butanol and its potential benefits over ethanol.</p> <p>Note that there is overlap with the forestry and waste management sectors in regards to feedstocks for these fuels and products.</p>	<p>Tax credits for R&amp;D into cellulosic ethanol and algae-derived biodiesel.</p> <p>Incentive payment for production of methane gas fuel from biomass.</p> <p>Tax credit for production of ethanol.</p> <p>Tax credit for non-corn based ethanol production and non-soy-based biodiesel production.</p> <p>Tax credit for building / renovating facility for producing renewable fuel.</p> <p>Low-interest loans for the production of transportation fuels from biomass (SC Renewable Energy Revolving Loan Program).</p> <p>Recurring funding for Dept. of Ag. Biofuels Marketing Program.</p> <p>Recurring funding for Dept. of Ag Renewable fuel regulation and testing.</p> <p>Funds to upgrade biodiesel and ethanol testing</p>
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						equipment, Dept. of Ag.
1.3	Manure Digesters/Other Waste Energy Utilization	M	M-H			
<b>AFW-2 AGRICULTURE – LIVESTOCK</b>						
2.1	Manure and Nutrient Management (handling and storage, improve efficiency and application methods)*	L-M	L			<p>-Comprehensive Nutrient Management Plans are required and some have been submitted to the Department.</p> <p>-Manure is applied at agronomic rates and spreaders have to be calibrated.</p> <p>-Many farms have composters for dead bird disposal. Some manure is used in this process. Composted material is applied at agronomic rate.</p> <p>-Due to high costs of commercial fertilizer, many farms are getting approved for manure application.</p>
2.2	Changes in Animal Feed (optimize nitrogen for N <sub>2</sub> O reduction and/or use supplements to reduce CH <sub>4</sub> from enteric fermentation)*	L-M	??			
2.3	Rotational Grazing/Improve Grazing Crops and/or Management*	L	??			Reductions are dependent on the extent of degraded grazing areas.
<b>AFW-3 AGRICULTURE – CROP PRODUCTION</b>						
3.1	Soil Carbon Management (Conservation Tillage, Reduce	L-M	L			Many farmers are participating in the no-till

	Summer Fallow, and Increase Winter Cover Crops)*					program. Each farm eligible for up to \$40,000 in incentives for no-till farming.
3.2	Nutrient and Water Management	L-M	L			
3.3	Promotion of Silvipasture*	??	??			Combines silviculture (growing trees) with livestock pasturing to achieve carbon benefits and potentially benefits for the grazing livestock (shade).
<b>AFW-4 AGRICULTURE – LAND USE MANAGEMENT</b>						
4.1	Land Use Management that Promotes Grassland Cover (e.g., convert cropland to grassland or prevent conversion of grassland to croplands)*	??	??			Cost-sharing programs available for landowners to manage forestland. These include the Forest Renewal Program, Stewardship Incentives Program, Conservation Reserve Program, Forest Land Enhancement Program, Wildlife Habitat Incentive Program, Environmental Quality Incentive Program, and others. Through these programs landowners can receive advice from foresters, biologists, soil scientists, and other experts along with cost sharing that pays, on average, about 40% of the cost of site preparation, planting, soil stabilization, wildlife habitat improvement, and

						some intermediate management practices.
4.2	Preserve Open Space/Agricultural Land*	M	H	Indirect benefits can include smarter development when these lands are located in urban growth areas.  It should be noted that lands held in perpetual conservation easements continue to offer GHG benefits long after the policy period (e.g. after the 2020 time-frame).		Conservation Land Bank (CLB) and various land trusts (100,000 acres protected through easements or purchase through CLB)
4.3	Conversion of Croplands to Forests/ Protection of Previous Cropland to Forest Conversions*	??	??			See Notes under 4.1. Are significant croplands (e.g. low productive) available for conversion under 4.1 or 4.2?
4.4	Utilization of Currently Impaired Agricultural Lands	??	??			
<b>AFW-5 AGRICULTURE – FARMING PRACTICES</b>						
5.1	Reductions In On-Farm Energy Use (Conversion from Diesel Farm Equipment to LNG/CNG or Hybrid technology)	M	Neg-L			
5.2	Organic Farming*	??	??	Net GHG impacts difficult to determine without systematic studies of specific cropping systems.		The South Carolina Organic Certification Assistance Program is a cost share program that assists the organic grower with costs of becoming certified under the National Organic Program. Clemson Sustainable Ag. Advisory Committee; Carolina Farm

					Stewardship Association.
5.3	Programs to Support Local Farming/Buy Local*	L-M	??		<p>-Seeds of Hope, a local farmers market program in Columbia, has weekly markets at 12+ sites USDA. lists 63 markets in the state in growing season.</p> <p>-SC Agribusiness Development Program is responsible for new products that add value to the state’s agricultural markets.</p> <p>- SC DOA has the “Certified SC Grown” marketing program promoting in-State agricultural products.</p>
<b>AFW-6 PRODUCTION OF FUELS, PRODUCTS, AND ELECTRICITY IN FORESTRY</b>					
6.1	Expanded Use of Biomass Feedstocks for Electricity, Heat and Steam Production*	M-H	L-H		<p>There is a current USFS program for reducing wildfire hazard and putting the biomass toward beneficial use.</p> <p><i>See incentive, tax credit, and loan programs described for AFW 1.1</i></p>
6.2	In-State Liquid Biofuels & Bioproducts Production*	H	L-M		<p>Note the overlap in feedstocks with the agriculture and waste management sectors.</p> <p><i>See tax credit, loan</i></p>

						<i>programs, and research funding provisions described for AFW 1.2</i>
6.3	Improved Energy Capture from Wood Waste Combustion*	L	??			Capture of CO <sub>2</sub> possible for increasing the carbon benefit (e.g. production of carbonates)?
6.4	Improved Commercialization of Biomass Gasification and Combined Cycle*	L-H	??			USC is installing a biomass gasification system to supply steam to the campus.
<b>AFW-7</b>	<b>FORESTRY – BIOMASS PROTECTION AND MANAGEMENT</b>					
7.1	Forest Protection – Reduced Clearing and Conversion to Nonforest Cover*	H	M	Indirect benefits can include smarter development when these lands are located in urban growth areas.  It should be noted that lands held in perpetual conservation easements continue to offer GHG benefits long after the policy period (e.g. after the 2020 time-frame).		A change in Federal tax law is in place, only for land put into a conservation easement in 2006 and 2007, which lets the property owner offset half his tax liability for 15 years.
7.2	Urban Forestry*	L-M	Neg-L			Tree City USA: forty SC cities participating.
7.3	Afforestation/Restoration*	H	M			SC Forestry Commission uses several state and federal cost-share programs and technical assistance for landowners.
7.4	Forest Management for Carbon Sequestration (Waste Recycling, Density Management, Expand Use of Genetically Preferred Species, Modified Biomass Removal Practices, Fire Management)*	H	??			Assistance available to pay partial costs of prescribed burning, reforestation, stand improvement, and other practices. Some poultry litter and municipal sludge is utilized as forest fertilizer.

						<p>21,000 acres of forestland will be included in a program to restore the longleaf pine. SC will implement the use of improved seedlings for higher production. For example, Arborgen and Cellfor are developing tree varieties to capture more carbon. SC forestry commission offers assistance and guidance for those seeking to perform prescribed burns to mitigate wildfire risk. Programs such as "Firewise Communities" educate homeowners about wildfire prevention and provide wildfire hazard assessments.</p> <p>There is a current USFS program for reducing wildfire hazard and putting the biomass toward beneficial use.</p>
<b>AFW-8 FORESTRY - WOOD PRODUCTS AND WASTE</b>						
8.1	Improved Mill Waste Recovery*	L	L			Almost all forest products mills use waste for steam or energy, or sell waste to mills that do, so all is utilized.
8.2	Improved Logging and Other Residue Recovery	L	??			
8.3	Expanded Use of Engineered Wood Products*	L-M	??	Covers both building materials and other wood products (finished wood products).		<p>State and regional trade associations interested in promoting 'Southern Yellow Pine' over competitors.</p> <p>Bill before the Governor</p>

requiring all new State buildings to meet LEED or Green Globe standards.

AFW-9 WASTE MANAGEMENT – WASTE MANAGEMENT STRATEGIES						
9.1	Advanced Recycling and Composting*	H	L-M			<p>Recycled Market Development Advisory Council is a source of recent actions for Advanced Recycling. Another promoter of business recycling is the “Smart Business Program.” DHEC is also issuing a new rule covering composting due out in late July; it covers wood waste only.</p> <p>Dept. of Commerce is considering incentives for recycling, especially business recycling. DOC also considering waste-to-energy options and compost options.</p>
9.2	Promotion of Bioreactor Technology (Advanced Municipal Solid Waste Management Practices)	L-M	L			
9.3	Source Reduction Strategies	H	??			
9.4	Resource Management Contracting	L	??			
9.5	Waste Coal Recapture*	??	??			If waste coal is not available in SC; this option should be deleted.
9.6	Prevent Landfilling of Unprocessed Organic Material*	M-H	L-M			Note overlap with 9.1.

AFW-10 WASTE MANAGEMENT – LANDFILL GAS STRATEGIES						
10.1	Flare Landfill Methane at non-NSPS (smaller) Sites*	L-M	H			Various local governments are running non-NSPS flares.
10.2	Methane & Biogas Energy Programs*	??	M-H			This option refers to biogas energy programs outside of the MSW waste stream (e.g. food processors, other generators of organic wastes)
10.3	Landfill Methane Energy Programs*	M-H	Neg-L			-SC Alternative Energy bills establish tax incentives for industrial purchase of equipment to use landfill gas. -Legislature passed S.1245, providing manufacturers with tax credits for 25% of cost of landfill gas energy equipment. A state-owned utility is currently producing approximately 20 MW of electricity in SC from landfill methane gas. SC has six existing landfill methane to energy facilities. One facility provides power directly for manufacturing processes. More are in the pipeline.
AFW-11 WASTE MANAGEMENT – WASTEWATER MANAGEMENT ACTIVITIES						
11.1	Energy Efficiency Improvements*	M-H	Neg-L			In addition to efficiency projects, includes on-site power (solar, micro-hydro

						power). South Carolina offers tax incentives for residential / business purchase of solar heating and cooling systems – tax credit of 25% of installation cost - \$3500 annual tax credit limit. (Amount over the tax can be rolled over to subsequent years.)
11.2	Programs to Lower Waste Water Processing Needs	L	??			
11.3	Install Digesters and Turbines or Fuel Cells	L-M	M-H			