



Governor’s Action Team on Energy and Climate Change

State of Florida

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 2020	High (H): \$50 per tCO ₂ e or above
Medium (M): From 0.1 to 1.0 MMtCO ₂ e per year by 2020	Medium (M): \$15–\$50/tCO ₂ e
Low (L): Less than 0.1 MMtCO ₂ e per year by 2020, or 1 MMtCO ₂ e by 2050	Low (L): Less than \$15/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 emissions 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.

Notation of Options:

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

Option No.	GHG Reduction Policy Option	Potential GHG Emissions Reduction	Cost per Ton	Energy Security, Externalities & Feasibility Considerations	Priority for Analysis	Notes / Related Actions in Florida
AFW-1	AGRICULTURE—PRODUCTION OF ENERGY AND MATERIALS					
1.1	Expanded Utilization of Biomass Feedstocks for Electricity, Heat, or Steam Production	M-H	M-H	<p>Consider potential invasiveness of species when evaluating use of feedstocks.</p> <p>Consider long term impacts on soil fertility.</p> <p>Related to 6.1 and 9.1.</p> <p>Consideration of wildlife habitats/ecosystem services.</p>		<p>EO 07-127 includes a request to establish a Renewable Portfolio Standard that would require utilities to obtain 20% of generation from renewable sources—may include biomass feedstocks.</p> <p>DACS’s Farm to Fuel Initiative promotes the use of Florida crops and agricultural wastes as a source of renewable energy</p>

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1.2	In-State Liquid/Gaseous Biofuels Production	M-H	M-H	<p>In addition to agricultural residues or purpose-grown crops could include algal oil production.</p> <p>Consideration of wildlife habitats/ecosystem services.</p>		<p>Current efforts include</p> <ul style="list-style-type: none"> • Sales tax exemption for fueling equipment • Corporate income tax credit for production and fueling equipment • DACS Florida Farm to Fuel program • FDEP Renewable Energy Technologies Grant Program • Funding to UF IFAS for cellulosic ethanol. <p>New cellulosic ethanol pilot plant being built in Florida.</p>
1.3	Manure Digesters/Other Waste Energy Utilization	M	H	25.2 MW of electricity produced		<p>EO-07-127 RPS request for renewable sources</p> <p>DACS's Farm to Fuel Initiative promotes the use of Florida crops and agricultural wastes as a source of renewable energy</p>
1.4	Improving Energy Capture from Biomass Heat	L-M	M			

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1.5	Expand Production/Use of Bio-based Materials and Chemicals	L	M-H			Can include use of purpose grown crops as well as agricultural residues as feedstocks.
1.6	Improved Commercialization of Biomass Conversion Technologies	M-H	H			
AFW-2	AGRICULTURE—LIVESTOCK					
2.1	Manure Management & Utilization	L-M	M-H	See sub-elements in the Option Descriptions Document.		FDACS in consultation with IFAS and DEP has developed nutrient management BMPs for all Florida agricultural crops.
2.2	Changes in Animal Feed	U or L	U or L			
2.3	Technology Improvements to Increase Water Conservation	L	L-M	Could be recyclable – for example using water runoff from livestock facilities to grow feed crops.		Florida dairies currently meet up to 75% of water needs by reusing/recirculating water.
AFW-3	AGRICULTURE—CROP PRODUCTION					
3.1	Soil Carbon Management	M	M			There is an upcoming paper to be published in Environmental Defense by Sabine Grunwald called “Role of Florida soils in carbon sequestration.”

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3.2	Nutrient Management	M	M-H	<p>Can include commercial nutrients, manure, and wastewater biosolids application.</p> <p>Effectiveness of biosolids application may be limited if there is negative public perception or agencies are not supportive.</p>		FDACS in consultation with IFAS and DEP has developed nutrient management BMPs for all Florida agricultural crops.
3.3	Technology Improvements to Increase Efficiency	M	M	Efficiencies cover full crop production cycle (tilling, planting, cultivation, harvest)		See 3.2
3.4	Water Management	L	M			DEP has a non-point source management program for agriculture. FDACS in consultation with IFAS and DEP has developed nutrient management BMPs for all Florida agricultural crops. BMPs include provisions for efficient water management.

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3.5	Drainage Management	L	L-M			Permitting requirements currently do not allow for standing water. To prevent standing water that promotes anaerobic conditions.
AFW-4	AGRICULTURE—LAND USE CHANGE					
4.1	Land Use Management that Promotes Permanent Cover	M-H	L	Concern with taking land out of production. Consideration of wildlife habitats/ecosystem services.		FDACS in consultation with IFAS and DEP has developed nutrient management BMPs for all Florida agricultural crops.
4.2	Preserve Open Space/Agricultural Land	M	H	Consideration of wildlife habitats/ecosystem services.		See Option Descriptions document for current programs on land acquisition/conservation easements.
AFW-5	AGRICULTURE—FARMING PRACTICES					
5.1	Increase On-Farm Energy Production and Efficiency	L-M	H			

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5.2	Promotion of Farming Practices that Achieve GHG Benefits	L-M	M			DACS's Farm to Fuel Initiative, Florida Statute 570.954 promotes the use of Florida crops and agricultural wastes as a source of renewable energy
5.3	Improved Harvesting Methods to Achieve GHG Benefits	L-M	M			Can include options to address agricultural residue burning in addition to other measures (e.g., efficiency). Covers crop and livestock sectors.
5.4	Programs to Support Local Farming/Buy Local	L-M	M-H			Florida Agricultural Promotional Campaign (FAPC) promotes local farming and agricultural products in Florida
5.5	Promotion of Urban Agriculture, Community Gardens, and Green Roofs	L-M	L-M			
AFW-6	FORESTRY—PRODUCTION OF ENERGY AND MATERIALS					

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6.1	Expanded Use of Forest Biomass Feedstocks for Electricity, Heat, and Steam Production	H	M	Consideration of wildlife habitats/ecosystem services. Concerns about how much woody biomass is available for energy production.		Florida Department of Agriculture promotes the development of woody biomass. See also 1.1 above
6.2	In-state Liquid/Gaseous Biofuels Production	M-H	M-H	Consideration of wildlife habitats/ecosystem services.		See 1.2 above
6.3	Improved Energy Capture from Wood Waste Combustion	M	M-H	Most wood waste is already being used.		
6.4	Improved Commercialization of Biomass Conversion Technologies	M	M-H			
6.5	Expanded Use of New, Used, & Recycled Wood Products for Building Materials	M	M-H	Concerns associated with treated wood re-usage.		
AFW-7	FORESTRY—BIOMASS PROTECTION AND MANAGEMENT					

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7.1	Forest Protection— Reduced Clearing And Conversion to Non-forest Cover	M-H	M			Florida has aggressively pursued the acquisition of conservation lands over the past 25 years preserving more than 2M acres with the Preservation 2000 and Florida Forever programs. Recent 16,000 forest project in Dixie County.
7.2	Urban Forestry	L-M	L			The Urban & Community Forestry Program in DACS works in promoting urban forestry and provides grants. Energy savings from shade and wind reduction drive emissions reductions more than carbon sequestration.
7.3	Afforestation and/or Restoration of Non-forested Lands	H	L-M			

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7.4	Forest Management for Carbon Sequestration	M-H	L	Consideration of wildlife habitats/ecosystem services.		Includes silvicultural practices in addition to state and private forests. Silviculture BMPs developed by DACS, DEP, and IFAS related to water quality protection and water conservation. There can be some short rotation management practices that achieve long-term sequestration in the form of forest products.
7.5	Mitigation of Forest Carbon Sequestration Loss and Emissions Due to Wildfire	M	L-M			Florida's wildlands fire prevention program is organized by the Division of Forestry in DACS and executed by water management districts, DEP, the Fish & Wildlife Conservation Commission, as well as federal land managers.
7.6	Mitigation of Forest Loss Due to Insects/Disease	L	M			All land managing agencies in Florida use prescribed fire and other means in order to prevent insect and/or disease outbreaks.
AFW-8	FORESTRY—WOOD PRODUCTS AND WASTE					

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8.1	Improved Mill Waste Recovery	L-M	L-M	Most mill waste already being used		
8.2	Improved Logging Residue Recovery	M	M-H			
AFW-9	WASTE MANAGEMENT—WASTE MANAGEMENT STRATEGIES					
9.1	Expanded Use of MSW Biomass (Including Yard and Hurricane Waste Biomass) Feedstocks for Electricity, Heat, and Steam Production	M	M			Related to 1.1 and 6.1. Note also the relationship to the Energy Supply Sector given the State's waste to energy plants. Existing statutory prohibitions promote separate collection of yard waste biomass.
9.2	In-State Liquid/Gaseous Biofuels Production	M	H			Related to 1.2 and 6.2
9.3	Advanced Recycling and Composting	M-H	H	Markets for recovered materials will determine feasibility.		DEP administers a Waste Reduction program which includes recycling grants to local government; a loan program for recycling businesses; and a recycling business assistance center. Florida counties must implement a recycling program with a minimum 30% MSW reduction objective.

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9.4	Promotion of Bioreactor Technology (Advanced Municipal Solid Waste Management Practices)	H	H			DEP and the UF Hinkley Center for Solid and Hazardous Waste Management currently funding three demonstration projects in Florida. See www.bioreactor.org
9.5	Source Reduction Strategies	L-M	M			The Pollution Prevention Program and the waste reduction section are involved with the implementation of waste reduction strategies throughout the state.
9.6	Resource Management Contracting	M	M			
9.7	Enhanced Management of Organic Waste	M	H			
9.8	Improved Commercialization of Biomass Conversion Technologies	M	H			
AFW-10 WASTE MANAGEMENT—LANDFILL GAS STRATEGIES						
10.1	Utilize or Flare Landfill Methane at non-NSPS (smaller) Sites	L-M	M-H	Actions of the Public Service Commission are an externality.		DEP regulates through permits
10.2	Methane and Biogas Energy Programs	M-H	M-H			Promoted by the Hinkley Center at UF

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10.3	Landfill Methane Energy Programs	M	L-M	Actions of the Public Service Commission are an externality.		Florida is a partner in the EPA's Landfill Methane Outreach Program
AFW-11	WASTE MANAGEMENT—WASTEWATER ACTIVITIES					
11.1	Wastewater Treatment Plant (WWTP) Biosolids for Energy Production	M-H	M-H			Note also that WWTP biosolids could be utilized under 3.1 Nutrient Management
11.2	Energy Efficiency Improvements at WWTPs and/or Potable Water Plants	L	Neg-L			
11.3	Lower Waste Processing Needs (lower water consumption, waste production)	L	L			DEP seeks to reduce waste process through various programs (wastewater & waste) and best management practices
11.4	Install Digesters and Turbines or Engines	M	M-H			
11.5	Algae and Bio-Oils	M	M			Note: could also be addressed under 1.2.