

## Catalog of State Actions Agriculture, Forestry, and Waste Management Subcommittee

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 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
<p><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.</p> <p><u>2/</u> Costs are denoted by a positive number. Cost savings (i.e., “negative costs”) are denoted by a negative number.</p>	

#### 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. Subcommittee 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	Other Considerations: Ecosystem Services, Carbon Sequestration, Jobs, Fuel Imports, Externalities, Feasibility	Priority for Analysis	Notes / Related Actions in MI
<b>AFW-1 AGRICULTURE – PRODUCTION OF FUELS AND ELECTRICITY</b>						
1.1	Expanded Use of Biomass Feedstocks for Electricity, Heat, or Steam Production					MI's Biomass Energy Program encourages use of biomass for energy through grants, partnerships, and policies.
1.2	In-state Liquid Biofuels Production					MI Renewable Fuels Commission created to promote alt fuels. MI Renaissance zones offer tax incentives to renewable energy production facilities. Several new biofuel facilities are being located in MI.
1.3	Manure Digesters/Other Waste Energy Utilization					MI Biomass Energy Program funded an Ag Dept study on anaerobic digestion byproducts.
1.4	Improving Energy Capture from Corn and Biomass Heat					
1.5	Expand Use of Bio-based Building Materials					
<b>AFW-2 AGRICULTURE – LIVESTOCK</b>						
2.1	Manure Management					MI Ag Dept allows landowners to earn credits

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						through installing methane digesters.
2.2	Changes in Animal Feed					
2.3	Rotational Grazing (Improve Grazing Crops and/or Management)					
2.4	Utilize Biofilters to Control CAFO Emissions					
2.5	Increase Pasturing and Lower Densities					
2.6	Organic Meat and Milk					
2.7	Technology Improvements to Increase Energy Efficiency					
2.8	Technology Improvements to Increase Water Conservation					
<b>AFW-3</b>	<b>AGRICULTURE – CROP PRODUCTION</b>					
3.1	Soil Carbon Management					MI landowners earn credits through conservation practices such as no-till and strip-till.
3.2	Nutrient Management					
3.3	Technology Improvements to Increase Efficiency					
3.4	Water Management					
3.5	Drainage Management					
3.6	Organic Crop Production					MI State U. has demonstration organic farm
<b>AFW-4</b>	<b>AGRICULTURE – LAND USE CHANGE</b>					

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4.1	Land Use Management that Promotes Grassland Cover					MI landowners earn credits for grass planting and increasing amount of stored carbon on conservation lands.
4.2	Preserve Open Space/Agricultural Land					MI protects more than 3,350,000 acres of farmland through easement grants.
<b>AFW-5 AGRICULTURE – FARMING PRACTICES</b>						
5.1	Reductions in On-Farm Energy Use					MI State U. Farm Energy Audit Program measures dairy farm energy efficiencies
5.2	Promotion of Farming Practices that Achieve GHG Benefits					MI Ag. Environmental Assurance Program teaches farmers to prevent environmental risk
5.3	Programs to Support Local Farming/Buy Local					MI Food Policy Council encourages local & sustainable food growth
5.4	Programs to Promote Organic Farming Practices that Achieve GHG Benefits					MI State U. has demonstration organic farm
5.5	Promotion of Urban Agriculture, Community Gardens, and Green Roofs					
<b>AFW-6 FORESTRY – PRODUCTION OF FUELS AND ELECTRICITY IN FORESTRY</b>						
6.1	Expanded Use of Forest Biomass Feedstocks for Electricity, Heat and Steam Production					See option 1.1.

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6.2	In-state Liquid Biofuels Production					See option 1.2.
6.3	Improved Energy Capture from Wood Waste Combustion					
6.4	Improved Commercialization of Biomass Gasification and Combined Cycle					
<b>AFW-7</b>	<b>FORESTRY – BIOMASS PROTECTION AND MANAGEMENT</b>					
7.1	Forest Protection – Reduced Clearing And Conversion to Nonforest Cover					MI landowners earn credits by increasing carbon stored on non-industrial working forests.
7.2	Urban Forestry					
7.3	Afforestation and/or Restoration of Nonforested Lands with a Diversity of Native Forest Species					MI landowners earn credits for afforestation/reforestation and tree planting.
7.4	Forest Management for Carbon Sequestration and Biodiversity					MI landowners earn credits through reforesting degraded forest land.
7.5	Mitigation of Forest Carbon Sequestration Loss and Emissions Due to Wildfire					
7.6	Mitigation of Forest Loss Due to Insects/Disease					

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<b>AFW-8 FORESTRY – WOOD PRODUCTS AND WASTE</b>						
8.1	Improved Mill Waste Recovery					
8.2	Improved Logging Residue Recovery					
8.3	Expanded Use of <b>New, Used, &amp; Recycled</b> Wood Products for Building Materials					
<b>AFW -9 WASTE MANAGEMENT – WASTE MANAGEMENT STRATEGIES</b>						
9.1	Advanced Recycling and Composting					Mandated recycling of office paper by State Government.
9.2	Promotion of Bioreactor Technology (Advanced Municipal Solid Waste Management Practices)					
9.3	Source Reduction Strategies					
9.4	Resource Management Contracting					
9.5	Waste Coal Recapture					
9.6	Enhanced Management of Organic Waste					
9.7	Promotion of New & Existing Technologies for Waste Energy Conversion					
<b>AFW -10 WASTE MANAGEMENT – LANDFILL GAS STRATEGIES</b>						
10.1	Flare Landfill Methane at non-NSPS (smaller) Sites					

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10.2	Methane and Biogas Energy Programs					
10.3	Landfill Methane Energy Programs					
<b>AFW-11</b>	<b>WASTE MANAGEMENT – WASTEWATER ACTIVITIES</b>					
11.1	Energy Efficiency Improvements					
11.2	Lower Waste Processing Needs (lower water consumption, waste production)					
11.3	Install Digesters and Turbines or Engines					
11.4	Restoration of Soil Organic Carbon from Application of WWTP Biosolids					
11.5	Heat Recovery					
11.6	Algae and Bio-Oils					