

**Agriculture, Forestry, and Waste Management (AFW)
Technical Work Group**

Summary List of Draft Priority Policy Options for Analysis

Draft Option No.	Draft Policy Option Name	Straw Proposal Volunteers
AFW-1	Expanded Use of Biomass Feedstocks for Electricity, Heat, or Steam Production	Donna LaCourt & Brian Warner (co-leaders), Lisa Scramlin, Tom Stanton
AFW-2	In-State Liquid Biofuels Production	Donna LaCourt & Brian Warner (co-leaders), Ken Dahlberg, Lisa Scramlin, Tom Stanton
AFW-3	Methane Capture and Utilization from Manure and other Biological Waste	Dana Kirk (lead), Michelle Crook, Tom Stanton
AFW-4	Expanded Use of Bio-based Materials	Lisa Scramlin
AFW-5	Land Use Management that Promotes Permanent Cover	Ken Dahlberg
AFW-6	Forestry and Agricultural Land Protection	Cara Boucher, Steve Shine
AFW-7	Promotion of Farming Practices that Achieve GHG Benefits	Ken Dahlberg
AFW-8	Forest Management for Carbon Sequestration and Biodiversity	Steve Shine, Cara Boucher
AFW-9	Source Reduction, Advanced Recycling, and Organics Management	Matt Flechter
AFW-10	Landfill Methane Energy Programs	Tim Unseld (lead), Tom Stanton

Summary List of Draft Priorities for Analysis—2015 and 2025

Option No.	Policy Option	GHG Reductions (MMtCO ₂ e)			Net Present Value 2009–2025 (Million 2005\$)	Cost-Effectiveness (\$/tCO ₂ e)	Level of Support
		2015	2025	Total 2009–2025			
AFW-1	Expanded Use of Biomass Feedstocks for Electricity, Heat, or Steam Production	TBD	TBD	TBD	TBD	TBD	Pending
AFW-2	In-State Liquid Biofuels Production	TBD	TBD	TBD	TBD	TBD	Pending
AFW-3	Methane Capture and Utilization from Manure and Other Biological Waste	TBD	TBD	TBD	TBD	TBD	Pending
AFW-4	Expanded Use of Bio-based Materials	TBD	TBD	TBD	TBD	TBD	Pending
AFW-5	Land Use Management that Promotes Permanent Cover	TBD	TBD	TBD	TBD	TBD	Pending
AFW-6	Forestry and Agricultural Land Protection	TBD	TBD	TBD	TBD	TBD	Pending
AFW-7	Promotion of Farming Practices that Achieve GHG Benefits	TBD	TBD	TBD	TBD	TBD	Pending
AFW-8	Forest Management for Carbon Sequestration and Biodiversity	TBD	TBD	TBD	TBD	TBD	Pending
AFW-9	Source Reduction, Advanced Recycling, and Organics Management	TBD	TBD	TBD	TBD	TBD	Pending
AFW-10	Landfill Methane Energy Programs	TBD	TBD	TBD	TBD	TBD	Pending
	Sector Totals						
	Sector Total After Adjusting for Overlaps*						
	Reductions From Recent Actions						
	Sector Total Plus Recent Actions						

GHG = greenhouse gas; MMtCO₂e = million metric tons of carbon dioxide equivalent; \$/tCO₂e = dollars per metric ton of carbon dioxide equivalent; TBD = to be determined;

Note that negative costs represent a monetary savings.

* See below for discussion of overlap adjustments

Overlap Discussion

The amount of CO₂ emissions reduced or sequestered and the costs of a policy option within the Agriculture, Forestry and Waste sector may overlap with some of the quantified benefits and costs of policy options within other sectors.

Every effort will be made to determine where those overlaps occur and to eliminate double-counting. As displayed in the chart above, the AFW sector totals will be reduced accordingly.

Table 1. MCAC policies: biomass supply and demand assessment

Biomass Resource	Annual Biomass Supply (dry tons)	Notes
Logging residue	869,468	Source: <i>Biomass, Biofuels and Bioenergy: Feedstock Opportunities in Michigan</i> , Robert E. Froese, February 2007. Includes residue that is currently available and unutilized.
Thinning residue	1,875,978	Source: <i>Biomass, Biofuels and Bioenergy: Feedstock Opportunities in Michigan</i> , Robert E. Froese, February 2007. Includes residue that is currently available and unutilized.
Urban wood waste	1,311,382	Source: <i>Biomass, Biofuels and Bioenergy: Feedstock Opportunities in Michigan</i> , Robert E. Froese, February 2007. Includes residue that is currently available and unutilized.
Primary mill residue (unused)	45,000	2005 NREL Report. Derived from the USDA Forest Service's Timber Product Output database for 2002, includes mill residues burned as waste or landfilled.
Secondary mill residue	95,000	2005 NREL Report. Includes wood scraps and sawdust from woodworking shops— furniture factories, wood container and pallet mills, and wholesale lumberyards. Estimated using number of businesses from the U.S. Census Bureau, 2002 County Business Patterns and assumptions on the wood waste generated.
Agricultural residue	3,953,000	2005 NREL Report. Estimated using 2002 total grain production, crop to residue ratio, moisture content, and taking into consideration the amount of residue left on the field for soil protection, grazing, and other agricultural activities.
Switchgrass		2005 NREL Report estimates 1,599,000 tons of switchgrass could be grown on CRP lands.
Willow or hybrid poplar		2005 NREL Report estimates 1,554,000 tons of willow or hybrid poplar could be grown on CRP lands.
Poultry litter	258,471	Estimated from number of layers and turkeys from 2004 Michigan Agricultural Statistics and tons of litter per bird from <i>Feasibility Study for Use of Poultry Litter to Create Biomass Energy</i> , Michigan Biomass Energy Program and West Michigan Co-Gen LLC.
Municipal solid waste (MSW) fiber		
Wood pulp		
Yard and landscape waste debris		
Total Annual Biomass Supply	8,408,299	

NREL = National Renewable Energy Laboratory; USDA = U.S. Department of Agriculture; CRP = Conservation Reserve Program.

Table 2. MCAC policies: biomass supply and demand assessment, continued

Policy Requiring Biomass	Annual Biomass Demand (dry tons)	Notes
AFW-1 Expanded Use of Biomass Feedstocks for Electricity, Heat, or Steam Production	To be quantified	Produce 12.5% of total in-state electric generation from sustainable biomass feedstock by 2025.
AFW-2 In-State Liquid Biofuels Production	To be quantified	Achieve 10% use of renewable fuels by 2012 and 25% by 2025
TLU	TBD	
RCI	TBD	
Total Annual Biomass Demand	TBD	

TLU = Transportation and Land Use; TBD = to be determined; RCI = Residential, Commercial, and Industrial.

AFW-1. Expanded Use of Biomass Feedstocks for Electricity, Heat, or Steam Production

Policy Description

Increase the amount of agriculture and forest biomass available on a sustainable basis for generating electricity and displacing the use of fossil energy sources. Expand the utilization of biomass feedstock in production systems that:

- Utilize high-efficiency conversion processes (including promoting co-location with heat- and steam-using facilities);
- Generate useful forms of energy that displace maximum quantities of fossil fuel use;
- Minimize net greenhouse gas emissions, and using best available control technologies achieve net reductions in all harmful emissions;
- Maintain the sustainability of feedstock supply and other natural resources; and
- Utilize integrated feedstocks via integrated manufacturing (including co-location of manufacturing facilities) to capture higher value products, along with green-house gas emissions reductions and energy efficiencies.

Clarify life cycle analysis expectations and definitions of carbon neutrality/balance to support decision making related to investments in biomass for electric, heat and steam production.

Policy goals should be evaluated hand-in-hand with the impact of other green-house gas policy options and their cumulative impact on the sustainability of feedstock, food and other commodity supplies, and other natural resources.

Note that this option has linkages and potential overlaps with Energy Supply options ES-1: Renewable Portfolio Standard, ES-7: Integrated resource planning (IRP), including CHP, ES-10: Technology-focused initiatives (biomass co-firing, energy storage, fuel cells, etc.) including research, development & demonstration, and ES-13: Combined Heat and Power (CHP) standards, incentives and/or barrier removal. This AFW option focuses on biomass supply.

Policy Design

Goals:

Produce 12.5% of total in-state electric generation from sustainable biomass feedstock by 2025.

Timing: See goal above.

Parties Involved: Agricultural interests; forestry interests; public utilities; environmental/sustainability interests; food processing industries; primary and secondary forest products industries; utility customers/ host facilities capable of utilizing combined heat and power outputs of biomass fueled energy conversion systems; Michigan manufacturers of biomass fueled energy conversion systems; municipalities; relevant state regulatory authorities

Comment [smr1]: MCAC would like a definition for "sustainable" from the TWG. Check language used in TLU-1.

Comment [RSA2]: Added linkages to other options.

Comment [RSA3]: The MCAC noted that this is a very large number: 12.5% of 25,000 MW is over 3,000 MW.

Comment [RSA4]: This goal is not incremental to current biomass electricity generation. We need to include data on how much biomass is currently contributing to MI's electricity generation.

(MDEQ, MPSC) and the Departments of Agriculture, Natural Resources, Labor and Economic Growth; the Michigan Economic Development Corporation

Other: Co-benefits include production of heat and steam from biomass that can be utilized through co-location of facilities. Growth in the use of biomass fuels needs to be linked to the health of Michigan's agricultural, food processing, and forest products industries, and to sustainable agricultural and forest management practices.

Implementation Mechanisms

Increase permanent forestland cover (including improved stocking of under-stocked stands) across the state on 1 million acres through afforestation and reforestation by 2025.

Enhance investments in mechanisms with clear points of entry for non-industrial private forest landowners to obtain assistance to facilitate increased participation in forest management.

Promote local, regional and state markets so private and public landowners have outlets for a variety of products (traditional and/or ecosystem service based) to provide income streams and incentive to manage forestlands, promote carbon sequestration and reduce GHG emissions.

- For example, promote enrollment in agriculture and forest carbon trading markets.

Look for opportunities and provide necessary resources to improve forest health and productivity on State-owned forests as described in the State Forest Management Plan and supporting projects identified by the Michigan Forest Finance Authority.

Develop, implement and promote use of Woody Biomass Harvesting Guidelines, Best Management Practices for Water Quality, applicable forestry and agriculture generally accepted management practices.

Policies should be carefully designed to promote only sustainable agricultural and forestry practices which maintain and improve soil productivity and result in the greatest net reductions in greenhouse gas emissions. Available biomass should be utilized for its highest value purposes, which in addition to energy may include uses for food, fiber, and chemical feedstocks. Financial incentives, if any, should be carefully targeted to reward uses that achieve the maximum value from biomass consumed and achieve market transformation goals.¹

Michigan does not presently have a comprehensive inventory of biomass resources. Preliminary indications do show a potential for doubling the contribution of biomass resources to provide useful electricity and thermal energy.² Accompanying any policies intended to promote the additional use of biomass for energy, adequate resources should be dedicated to completing and

¹ "Market transformation" incentives are designed to engender permanent changes in specific target markets, so that financial incentives can be removed in a reasonably short time and the market will maintain the new higher-efficiency behavior. See <http://www.cce1.org/cee/mt-primer.php3>.

² See *Michigan's 21st Century Electric Energy Plan, Appendix II – Chapter 4 (January 2007)*. See <http://www.dleg.state.mi.us/mpsc/electric/capacity/energyplan>.

maintaining a comprehensive biomass inventory for Michigan, and appropriate sustainability indicators³ should be used to track changes in the inventory over time.

Related Policies/Programs in Place

The Michigan Department of Labor and Economic Growth's 'Energy Office' has created a Biomass Energy Program to encourage increased production and use of energy derived from Michigan's biomass resources through program policies, public and private partnerships, information dissemination, and state project grants. For more information on this program, go to http://www.michigan.gov/cis/0,1607,7-154-25676_25753---,00.html

Michigan Department of Agriculture has provided outreach to expand awareness and availability of renewable energy generating treatment technologies.

The Michigan Department of Environmental Quality promotes renewable energy through E&O, P2 programs, loans, and annual AgriEnergy conferences.

The Michigan Public Service Commission establishes rates, terms and conditions of service for electric generators interconnected with the public utility grid. See <http://www.michigan.gov/customergeneration>.

Agricultural biomass producers should be encouraged to obtain MAEAP (Michigan Agriculture Environmental Assurance Program) certification. Forestry biomass producers should be encouraged to participate in appropriate certification programs (e.g. sustainable forestry certifications such as, The Sustainable Forestry Initiative or Forest Stewardship Council, etc...). For details on MAEAP, see www.michigan.gov/mda/0,1607,7-125-1567_1599_25432-12819--,00.html

The Michigan Public Service Commission has commenced a formal rulemaking proceeding in Case No. U-15239 to revise the state's Electric Interconnection Standards Rules. The intention is to make the interconnection procedures more predictable and smoother. A revised set of rules is being filed as a starting point for the formal rulemaking process.[fn] Also, utility rates, terms, and conditions of service for interconnected generators are being reviewed by the MPSC Staff and concerns, issues, or barriers that might affect such facilities will be addressed in the rate case process.

Similar processes are underway at the Federal Energy Regulatory Commission (FERC) for improving the interconnection process for larger generators seeking interconnection with the electric transmission grid.

³ "Sustainability indicators" are measures of "stocks, inventories or qualities of economic, social, ecological or institutional assets over time." They are typically developed using "dynamic iterative processes and dialogue among non-expert citizen participants, government bureaucrats and technical experts [which]...allows participants to define locally-relevant aspects of sustainability from their unique perspectives, anchored by their own values" (László Pintér, Peter Hardi, Peter Bartelmus, International Institute for Sustainable Development, 2005, pp. 2, 5; <http://www.iisd.org/measure/>). See also <http://www.sustainabilityindicators.org/>.

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWG]

Additional Benefits and Costs

TBD – [as needed and approved by the TWG]

TWG Suggestion:

Feasibility Issues

TBD – [as needed and approved by the TWG]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until MCAC meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCAC]

AFW-2. In-State Liquid Biofuels Production

Policy Description

Increase the sustainable in-state production and use of liquid biofuels from agriculture and/or forestry feedstock and/or municipal solid and other wastes to displace the use of fossil fuel. Promote the development of technologies and production systems that:

- Improve the embedded energy content of biomass fuels;
- Maintain the sustainability of feedstock supply and other natural resources;
- Minimize net greenhouse gas emissions, and using best available control technologies achieve net reductions in all harmful emissions; and
- Utilize integrated feedstocks via integrated manufacturing (including co-location of manufacturing facilities) to capture higher value products, as well as green house gas emission and energy efficiencies.

Advanced refining in ethanol plants should be encouraged to produce higher value chemical products to further reduce the use of fossil fuels for the production of those materials.

Clarify life cycle analysis expectations and definitions of carbon neutrality/balance to support decision making related to investments in biomass for liquid biofuels production.

Policy goals should be evaluated hand-in-hand with the impact of other green house gas policy options and their cumulative impact on the sustainability of feedstock, food and other commodity supplies, and other natural resources.

Note that this option has linkages and potential overlap with TLU-1: Promote Low-Carbon Fuel Use in Transportation. This AFW option focuses on the feedstocks needed for biofuels production.

Comment [RSA5]: The MCAC would like specific language on what sustainability means; Check TLU-1 language.

Policy Design

Goals: Achieve 10% use of renewable fuels by 2012 and 25% by 2025.⁴

Timing: See goal above.

Parties Involved: Agricultural interests; forestry interests; food processing industries; primary and secondary forest products industries; auto industries; fuel industries; environmental/sustainability interests; relevant state regulatory authorities (MDEQ, MPSC), and the Departments of Agriculture, Natural Resources, Labor and Economic Growth, the Michigan Economic Development Corporation.

Comment [RSA6]: Added note on linkages to other options.

Comment [RSA7]: The MCAC would like the addition of specific language about achieving a net carbon/GHG reduction.

⁴ The goals of 10% by 2012 and 25% by 2025 are both included in the Michigan Renewable Fuels Commission final report. The goal of 25% by 2025 is included in the Midwestern Governors Association Energy Platform.

Other: Growth in the use of biomass fuels needs to be linked to the health of Michigan's agricultural, food processing, and forest products industries, and to sustainable agricultural and forest management practices.

Implementation Mechanisms

Increase permanent forestland cover (including improved stocking of under-stocked stands) across the state on 1 million acres through afforestation and reforestation by 2025.

Enhance investments in mechanisms with clear points of entry for non-industrial private forest landowners to obtain assistance to facilitate increased participation in forest management.

Promote local, regional and state markets so private and public landowners have outlets for a variety of products (traditional and/or ecosystem service based) to provide income streams and incentive to manage forestlands, promote carbon sequestration and reduce GHG emissions.

- For example, promote enrollment in agriculture and forest carbon trading markets.

Look for opportunities and provide necessary resources to improve forest health and productivity on State-owned forests as described in the State Forest Management Plan and supporting projects identified by the Michigan Forest Finance Authority.

Develop, implement and promote use of Woody Biomass Harvesting Guidelines, Best Management Practices for Water Quality, applicable forestry and agriculture generally accepted management practices.

Appropriate land use policies and practices which protect and enhance Michigan water quality, habitat, and other relevant ecological services must be incorporated in conjunction with any policies to expand the use of biofuels. Available biomass should be utilized for its highest value purposes, which in addition to energy may include uses for food, fiber, and chemical feedstocks. Financial incentives, if any, should be carefully targeted to reward uses that achieve the maximum value from biomass consumed and achieve market transformation goals.⁵

Michigan does not presently have a comprehensive inventory of biomass resources. Preliminary indications do show a potential for doubling the contribution of biomass resources to provide useful electricity and thermal energy.⁶ Accompanying any policies intended to promote the additional use of biomass for energy, adequate resources should be dedicated to completing and maintaining a comprehensive biomass inventory for Michigan, and appropriate sustainability indicators⁷ should be used to track changes in the inventory over time.

⁵ "Market transformation" incentives are designed to engender permanent changes in specific target markets, so that financial incentives can be removed in a reasonably short time and the market will maintain the new higher-efficiency behavior. See <http://www.cce1.org/cee/mt-primer.php3>.

⁶ See *Michigan's 21st Century Electric Energy Plan, Appendix II – Chapter 4 (January 2007)*. See <http://www.dleg.state.mi.us/mpsc/electric/capacity/energyplan>.

⁷ "Sustainability indicators" are measures of "stocks, inventories or qualities of economic, social, ecological or institutional assets over time." They are typically developed using "dynamic iterative processes and dialogue among non-expert citizen participants, government bureaucrats and technical experts [which]...allows participants to define locally-relevant aspects of sustainability from their unique perspectives, anchored by their own values" (László

Creation of feedstock portfolios that highlight feedstock type, location, current usage and availability to facilitate facility sighting in an economically and ecologically sustainable manner.

Research and development and outreach to promote enhanced feedstock yields and production in an ecologically and economically sustainable manner.

Structuring of incentives to enable partnerships to develop biofuel facilities and current forest product manufacturers to increase capital investment pools, promote energy conversion efficiencies and integrated use of feedstocks to promote optimization of production of value added products.

Development of Centers of Excellence for the promotion of technology development and transfer to improve supply chain efficiency in order to promote bioenergy development while strengthening current forest and agricultural sector performance.

Encouraging the adoption of advanced technology in existing corn-based ethanol plants to improve their production of ethanol per bushel of corn, capture their CO₂ emissions, and install equipment to separate corn oil from their production process to be used for bio-diesel blending.

Encouraging advanced refining in ethanol plants to produce higher value products such as fine chemicals and acids to further reduce the use of fossil fuels for the production of those materials.

Provide financial incentives to research the production of bio-oils from algae or other organisms grown in wastewater effluents (would reduce carbon, nitrogen and phosphorus).

Measure/analyze life-cycle carbon effects of implementation. Measure/analyze competition with food production.

Related Policies/Programs in Place

The Michigan Renewable Fuels Commission was established under Public Act 272 of 2006 is tasked with developing recommended policies and strategies to promote research, development, production and distribution of alternative fuels in Michigan.

Michigan Renaissance Zones were established Under Public Acts 270 and 273 of 2006 to allow for 10 additional zones to offer tax incentives to renewable energy production facilities, including agricultural processing facilities.

A number of ethanol and bio-diesel production facilities have located, or are planning to locate, in Michigan. Maps of these facilities can be found at:

http://www.michigan.gov/documents/mda/EthanolMap_186352_7.pdf and
http://www.michigan.gov/documents/mda/BiodieselMap_183689_7.pdf.

Agricultural biomass producers should be encouraged to obtain MAEAP (Michigan Agriculture Environmental Assurance Program) certification. Forestry biomass producers should be encouraged to participate in appropriate certification programs (e.g. sustainable forestry certifications such as, The Sustainable Forestry Initiative or Forest Stewardship Council, etc...). For details on MAEAP, see

www.michigan.gov/mda/0,1607,7-125-1567_1599_25432-12819--,00.html

Pintér, Peter Hardi, Peter Bartelmus, International Institute for Sustainable Development, 2005, pp. 2, 5; <http://www.iisd.org/measure/>). See also <http://www.sustainabilityindicators.org/>.

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWG]

Additional Benefits and Costs

TBD – [as needed and approved by the TWG]

Feasibility Issues

TBD – [as needed and approved by the TWG]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until MCAC meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCAC]

AFW-3. Methane Capture and Utilization from Manure and other Biological Waste

Policy Description

Reduce the amount of methane emissions from organic waste materials such as livestock manure, food processing residuals, and other agricultural organic residuals by installing anaerobic digesters and gasification systems. Methane generated from anaerobic digesters and gasifiers can be used to offset fossil fuel-based energy production and the associated GHG emissions (to date, most of these projects have been implemented at dairies and swine operations). In addition the co-products created by these technologies, such as stable fertilizer products and building materials, implementation will result in reduced GHG emissions by replacing traditional fossil fuel based materials.

Encourage and promote the use of anaerobic digestion and gasification for energy recapture of organic waste materials other than municipal solid waste at landfills (e.g., food processing waste, plant material, fish offal, ethanol syrup stillage, paunch manure, animal mortalities and biodiesel glycerin). These projects will help reduce the emission of greenhouse gases while producing renewable energy. Co-mingling organic waste with manure in anaerobic digesters and gasification systems can substantially increase biogas production while providing a sustainable method for treatment and disposal. These technologies make a two-fold contribution to climate protection: the usual unchecked discharge of methane into the atmosphere is prevented, and the burning of fossil fuels is replaced with renewable energy (biogas).

Policy Design

Goals: Reduce greenhouse gas emission from handling, treatment and storage of livestock manure and organic waste (see note) by 15% by 2015 and 25% by 2025 through the adaption of anaerobic digestion and gasification technologies.

Timing:

Parties Involved: Agricultural interests; food processing industries; environmental/sustainability interests; biofuels industries; municipalities; public utilities; users of CHP; state agencies and regulatory authorities (MDA, MDEQ, NRCS, MPSC).

Other:

Implementation Mechanisms

Audit Michigan producers of organic waste (non-manure) to determine the mass/volume and material characteristics of waste deemed acceptable for treatment by anaerobic digestions. A detailed audit needs to be conducted to determine the mass or volume of organic wastes (non-manure) that are good candidates for anaerobic digestion or gasification.

Promote policy and/or incentives that increase the generation of renewable energy from livestock manure and organic waste.

Promote the capture and destruction of methane and other greenhouse gases generated by livestock manure and organic waste.

Develop regulatory policy that allows for commingling of animal manure and organic waste to improve the economic viability of anaerobic digesters while allowing for sustainable treatment of organic waste.

Streamline existing interconnection policy to ease the process and control the cost.

Increase the ceiling created by existing net metering policy.

Promote policy that supports feed-in tariffs and distributed power systems

Promote or fund research to improve the efficiency of biogas production and utilization.

Promote efficient use of biogas through CHP, couple CHP users with biogas producers.

Related Policies/Programs in Place

The Michigan Biomass Energy Program created by the Department of Labor and Economic Growth's "Energy Office" is focused on encouraging increased production and use of energy derived from Michigan's biomass. They recently funded a study by the Michigan Department of Agriculture to develop analytical data on the quality of agricultural by-products treated by anaerobic digesters. This data will develop a better understanding of the benefits of co-feeding digester systems.

Michigan Department of Agriculture has provided outreach to expand awareness and availability of renewable energy generating treatment technologies. These have included tours for industry, conferences, and development of educational materials.

The Michigan Department of Agriculture, in conjunction with the Delta Institute has launched a pilot project titled, "Michigan Conservation and Climate Initiative." This program allows Michigan agricultural landowners to earn greenhouse gas emission reduction credits through installing methane digesters and earn revenue from the sale of their credits on the Chicago Climate Exchange. For more information on the MCCI Program go to <http://www.michiganclimate.org/>.

Michigan Department of Agriculture provides training certification for operators of Anaerobic Digester Systems. This is the first step in providing the system requirements necessary in order to claim available property tax exemptions.

Types(s) of GHG Reductions

Methane and carbon dioxide

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]

- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWG]

Additional Benefits and Costs

TBD – [as needed and approved by the TWG]

Feasibility Issues

TBD – [as needed and approved by the TWG]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until MCAC meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCAC]

AFW-4. Expanded Use of Bio-based Materials

Policy Description

Increase the amount of bio-based materials (e.g., wood, digester fiber, wheatboard, agricultural by-products, and biodegradable plastics) and green chemistry⁸ applications that reduce GHG emissions over conventional petroleum-based products. GHG reduction is further enhanced by promoting the use of Michigan-produced materials due to lower transport-associated emissions. Increase the recycling or reuse of bio-based products to reduce waste. This option does not refer to energy uses such as ethanol or electricity production which are covered in AFW-1 and AFW-2 (the use of bio-based products can increase carbon sequestration and produce fewer GHG emissions than processing high-energy or fossil-based input materials).

Comment [RSA8]: The MCAC would like green chemistry applications included.

Promote the manufacturing and use of composite products made from low grade wood timber, anaerobic digester fiber, and agricultural by-products. Michigan needs to develop the infrastructure to support sustainable bio-refineries that use biofuels to produce cellulose-based products such as particle board, medium-density fiberboard, plant pots, and other composite products.

Policy Design

Goals:

Utilize 100,000 tons of bio-based products by 2025.

Comment [RSA9]: MCAC asked what existing utilization levels are?

Reclaim 150,000 tons of solid wood residues from manufacturing processes, deconstruction sites, urban/suburban trees by 2025.

Comment [RSA10]: The MCAC asked if this is referring to annual usage?

Comment [RSA11]: MCAC asked what existing utilization levels are?

Comment [RSA12]: The MCAC asked if this is referring to annual usage?

Timing:

Parties Involved:

Other:

Implementation Mechanisms

TBD –

Related Policies/Programs in Place

Promotion through AgriEnergy conference.

Types(s) of GHG Reductions

TBD

⁸ According to US EPA, green chemistry, also known as sustainable chemistry, is the design of chemical products and processes that reduce or eliminate the use or generation of hazardous substances. Green chemistry applies across the life cycle, including the design, manufacture, and use of a chemical product; <http://www.epa.gov/greenchemistry/>.

Field Code Changed

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWG]

Additional Benefits and Costs

TBD – [as needed and approved by the TWG]

Feasibility Issues

TBD – [as needed and approved by the TWG]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until MCAC meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCAC]

AFW-5. Land Use Management that Promotes Permanent Cover

Policy Description

Strengthen current programs and develop new programs to maintain existing, and promote new, permanent cover on agricultural lands, forests, wetlands, prairies, buffer strips, and transportation medians. Existing permanent cover contains carbon which becomes a GHG when converted, while new permanent cover captures and sequesters carbon from the atmosphere.

Note the linkage of this option with AFW-6 covering Forestry and Agricultural Land Protection. The focus of this option is on bringing additional areas under land cover with higher levels of sequestration potential. There is also a linkage with AFW-8 on Forest Management for Carbon Sequestration and Biodiversity. That option aims to protect carbon stores and enhance sequestration potential on existing forest lands and also to increase forested acreage via reforestation projects. This option seeks to bring new areas into land cover with higher sequestration potential and is incremental to the AFW-8 goal for reforestation.

Policy Design

Goals: Reduce rates of carbon loss 90% by 2025 due to ~~conversion of~~ farmland and grassland ~~coming out of CRP protection and/or~~ other conservation programs, ~~90% by 2025 and~~ Reduce rates of carbon loss due to conversion of wetlands by 90% by 2025. Increase the acreage of lands with permanent cover 10% by 2025.

Timing: See goal above.

Parties Involved:

Other: New, economically viable biomass opportunities are key to expanding permanent cover on Michigan land. Economic and technical support must drive these systems as demand for biomass develops. The definition of permanent cover can be broadened to include things beside agricultural lands such as medians, lands along highways, etc.

Implementation Mechanisms

An inventory of agricultural lands, forests, wetlands, prairies, buffer strips, and transportation median lands both in permanent cover and with the potential for permanenet cover is needed and should be conducted jointly by the relevant agencies.

Request that MSU Crop and Soil Science Extension Educators develop a survey directed at large farm operations to determine if bio based production other than corn is in their future. The survey is to include a gross per acre return needed to compete with existing crops. Request that MSU Soil Scientists develop a paper stating the trade offs of complete harvest of crops as opposed to some of the crop returned as organic matter.

State and Federal Programs need to be strengthened, and incentives increased to prevent farmland, grasslands, and wetlands in the Conservation Reserve Program and similar conservation programs from being plowed up and/or drained.

Comment [smr13]: TWG should consider the need to change the title in regards to the use of the term "permanent cover". That usually implies a change from annual cropland to some perennial crop or other permanent cover.

Comment [RSA14]: MCAC wants to specify that permanent cover should have higher carbon content than current cover.

Comment [smr15]: MCAC would like language added referencing the threats to existing areas with permanent cover.

Comment [RSA16]: MCAC wanted language to be clearer.

Comment [RSA17]: MCAC asked how many acres are threatened to come out of CRP protection?

Promote the market potential for biomass crops locally through Conservation Districts.

Provide technical information on production techniques and equipment for no-till planting and for organic farming.

Provide technical information on production techniques and equipment for improving pasture land.

Increase enrollment in the MCCI by promotion of financial incentives associated with the program.

Expand successful programs like CREP to additional Ag watersheds.

Develop a certified and sustainable program comparable to MAEAP, which would use grass buffers, conservation tillage, and nutrient management to promote biofuel sources which are truly green.

Related Policies/Programs in Place

The Michigan Conservation and Climate Initiative allows Michigan agricultural landowners to earn greenhouse gas emission reduction credits through grass planting and earn revenue from the sale of their credits on the Chicago Climate Exchange. (see2.1)

The Michigan Forest Carbon Offset and Trading Program allows Michigan forest landowners to earn and sell greenhouse gas emission reduction credits through increasing the amount of stored carbon on conservation lands. (See 7.1)

The Federal Farm Bill offers a variety of cost share programs for landowners implementing NRCS practices.

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWG]

Additional Benefits and Costs

TBD – [as needed and approved by the TWG]

Feasibility Issues

TBD – [as needed and approved by the TWG]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until MCAC meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCAC]

AFW-6. Forestry and Agricultural Land Protection

Policy Description

Reduce the rate at which agricultural and forest lands and wetlands are converted to developed uses, while protecting private property rights and responsibilities. This retains the above- and below-ground carbon on these lands, as well as the carbon sequestration potential of these lands. Promote the implementation of goals and mechanisms that:

- Reduce agricultural and forest land conversion to non-agriculture or forest through conservation land grants and conservation easements between landowners and governmental and non-profit land conservation agencies.
- Encourage expanded use of existing available infrastructure and public utilities and encouraging brown field redevelopment to redirect development away from green field forest and farm lands.
- Promote state and federal tax benefits that create incentives for retaining forest and agricultural land uses.
- Promote local, regional and state markets so landowners have outlets for a variety of products (traditional and/or ecosystem service based) to provide income streams and incentive to keep working agricultural and forest lands, promote carbon sequestration and reduce GHG emission.
- Quantify and retain wetland carbon sequestration capacity.

Note the linkage to AFW-5; also note that this option has linkage and overlap with TLU-6, which includes a provision for “greenfield open land” protection.

Comment [RSA18]: Added language on linkages to other options.

Policy Design

Goals: Reduce the rate of conversion from agriculture to non-agriculture use by 50% by 2025 and maintain or increase forestlands.

Protect and restore northern peatlands and other wetlands to prevent releases of GHGs which will allow existing peatlands to continue to sequester carbon. (non-quantified)

Timing:

Parties Involved: Private landowners; Michigan Forestry Association; Michigan Departments of Agriculture, Natural Resources and Environmental Quality; Conservation Districts; Farm Bureau; environmental/sustainability interests; Forest Industries; People and Land (a Kellogg Foundation funded organization which tracks progress on the 2003 Michigan Land Use Leadership Conference Report recommendations); American Farmland Trust, Michigan United Conservation Club; The Nature Conservancy, Heart of the Lakes, USFS State and Private Forests; and USFS Forest Legacy; Land Policy Institute (MSU supported); Michigan State University Extension.

Comment [RSA19]: MCAC would like the TWG to consider a more aggressive goal: e.g. no net loss.

Other: Smart urban development will have a secondary benefit of reducing GHG emissions.

Increase the acreage of agriculture, forestry and wetland conservation land grants and conservation easements to 1.5 million acres by 2025, with priority for those areas under significant development pressure.

Implementation Mechanisms

Agricultural and forest land conversion (including unique areas of fruit and vegetable production) may be prevented through conservation land grants and conservation easements facilitated through non-profit land preservation organizations, policies to discourage greenspace development, expanded availability of public utilities, and encouraging urban redevelopment.

- The Farmland and Open Space Preservation Program, commonly known as PA 116, is an effective voluntary method of protecting farmland, while giving farmers needed property tax relief. This program is already effective at improving our carbon footprint by keeping land in open space. However, additional use of PA 116 is needed by creating additional incentives to maintain and increase participation.
- The Agricultural Preservation Fund (PA 262 of 2000) provides grants to eligible local units of government for the purchase of agricultural conservation easements through Purchase of Development Rights programs (PDR) to preserve farmland. This program already has a proven track record of reducing carbon emissions by permanently preserving land as open space. However, the Agricultural Preservation Fund is currently not receiving adequate funding. Annual funding sources should not be less than \$35,000,000. For long-term funding, a statewide agricultural land conversion fee should be implemented. The fee, based on 5-7 percent of market value, should be paid at the time of conversion by the developer who converts the land. Sales where land remains in agriculture would be exempt from the conversion fee as an incentive to keeping land as open space to reduce our carbon footprint.
- Legislation is needed to establish voluntary Agricultural Security Areas (ASA) to place a temporary, long-term agricultural conservation easement on farmland. ASAs must be designed to preserve large blocks of farmland by a voluntary, incentive-based contract between the landowner, local unit of government and state government.

Funding is often the limiting factor in protecting farmland from development. The creative development of farmland protection funding mechanisms at the local and state scale is needed in addition to substantiated concepts (e.g. conversion fees, millage proposals, tax credits, recapture penalties).

Enhance investments in mechanisms with clear points of entry for non-industrial private forest landowners to obtain assistance to facilitate increased participation in forest management.

Promote local, regional and state markets so private and public landowners have outlets for a variety of products (traditional and/or ecosystem service based) to provide income streams and

incentive to manage forestlands, promote carbon sequestration and reduce GHG emissions (For example, promote enrollment in agriculture and forest carbon trading markets).

Provide information for local and regional land use planners.

Review tax policies and incentives to ensure support of goals.

Develop policies to encourage expanded use of existing available infrastructure and public utilities and encouraging brown field redevelopment.

Review and promote existing and proposed state and federal tax benefits that create incentives for retaining forest and agricultural land in those uses.

Promote efficient forestry and agriculture production techniques, conservation tillage and other land conservation practices (e.g. buffer strips and forestry soil and water quality best management practices).

Promote development of technology and information to enhance the profitability of forestry and agriculture to reduce the likelihood of development

Related Policies/Programs in Place

MI maintains temporary conservation easement on 41,000 farm parcels protecting more than 3.3 million acres of farm ground. New applications for the program in 2007 totaled 360 newly enrolling 28,800 acres. MI provides grants to local qualified permanent conservation easement programs to protect farmland. To qualify local programs must adopt an ordinance and update their long range plan showing farmland protection areas. Grants have been awarded to 11 local programs for \$2.8 million to protect approximately 1,875 acres. MI also holds 87 permanent conservation easements protecting 19,000 acres.

The Governor sponsored a Blue Ribbon Commission on land use changes in MI.

MI has an underfunded purchase of development rights program where farmers can purchase the development rights to their land and thus put it into agricultural production for perpetuity.

The Michigan Department of Natural Resources holds conservation easements on 138,500 acres of forest land for an array of rights including public recreation, hunting and fishing, and maintenance of forest cover. Additional forest tracts totaling more than 200,000 acres have been identified for their forest and biodiversity values.

The Michigan Department of Natural Resources, in conjunction with the Delta Institute has launched a pilot project titled, 'Michigan Forest Carbon Offset and Trading Program.' This program allows Michigan forest landowners to document their creation of greenhouse gas emission reduction credits from increasing stored carbon on non-industrial working forests and earn revenue from their sale on the Chicago Climate Exchange.

The Michigan Department of Natural Resources administers the Commercial Forest Program and supports local tax offices in the implementation of the Qualified Forest Program. Both of these

programs offer tax incentives to landowners to maintain managed forests. The Department of Natural Resources also administers a Forest Stewardship program that distributes federal grants to support private forest landowners to develop stewardship plans that promote sustainable forest management.

Heart of the Lakes Center for Land Conservation member organizations own or hold easements on 411,517 acres of forest, wetlands, and open lands.

The Michigan Department of Agriculture works in collaboration with the Conservation Districts to provide private forest landowners support related to the implementation of sustainable forest management (Presently not funded in the State budget).

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWG]

Additional Benefits and Costs

TBD – [as needed and approved by the TWG]

Feasibility Issues

TBD – [as needed and approved by the TWG]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until MCAC meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCAC]

AFW-7. Promotion of Farming Practices That Achieve GHG Benefits

Policy Description

Promote farming and food system practices that achieve GHG benefits by:

- Promoting technologies and farming practices with the highest proven record of carbon capture and sequestration, including but not limited to: organic farming practices, no-till approaches, and various forms of cover crop management, crop rotation, and conservation tillage;
- Developing programs to significantly reduce GHG emissions from conventional agriculture, especially in terms of reducing application rates of nitrogen-based fertilizers and soil amendments;
- Increasing the energy efficiency and sustainability of farms;
- Reducing the carbon footprint of Michigan’s various food systems by promoting a range of local, regional, and state programs that encourage “buying local,” re-establishing local food infrastructures, reducing food-miles, recycling and/or composting more food wastes, and generally encouraging more sustainable and energy-efficient local and regional food economies.

Policy Design

Goals:

Increase no-till farming to 4 million acres by 2025 and organic farming practices that increase carbon sequestration to 500,000 (? ~~There are currently ~45,000 organic acres in MI~~) acres by 2025.

Adopt soil management and nutrient management practices on 5 million acres by 2025.

Reduce the net on-farm fossil fuel energy consumption 50% by 2025.

Increase the local/regional purchasing of locally-grown agricultural produce and products 50% by 2025.

Timing: See goals above.

Parties Involved:

Other:

A strong R & D component will be needed to support the above goals.

Growth in the use of biomass fuels needs to be linked to the health of Michigan’s agricultural, food processing, and forest products industries, and to sustainable agricultural and forest management practices.

Comment [smr20]: MCAC had no strong reaction to this level of implementation.

Comment [RSA21]: MCAC wants reduction of N-based fertilizers included. Note overlap of soil carbon benefits between the first two goals. TWG should consider combining these.

Comment [RSA22]: MCAC wants definition of locally-grown.

Comment [RSA23]: MCAC wants more aggressive goal, noting that recent growth has been high.

Assessment models need to be developed so that growers can make decision on how they can reduce their carbon footprint. This can be enhanced with support of emerging approaches to increase long-term soil carbon content, such as no-till roller crimpers which combine winter cover crops with no-till, while reducing or eliminating the need for chemical fertilizers. Also, explore new approaches, like biochar, which may enhance soil carbon stability.

Implementation Mechanisms

Promote conservation tillage for GHG benefits. High fuel costs are making large-scale operations take another look at reduced tillage. USDA source suggests 2 million acres are currently under no till.

Expand organic farming by providing technical assistance and financial support for small and medium size farmers in gaining organic certification.

Promote greater use of MCCI as an additional incentive for no-till and organic farming. The value of carbon credits on the CCX has increased dramatically over the past year.

Work locally through Conservation Districts to get back to basics on equipment and techniques to make no-till successful.

Promote better management of the application of crop nutrients by using grid soil testing, variable rate fertilizer application, and making more use of cover crops and new, slow release fertilizer products. Use of auto steer for application and other field work also maximizes the efficacy of crop nutrients.

Promote greater use of manure as a crop nutrient. Develop nutrient management plans that avoid run-off and over-application, provide better crop nutrient analysis of manure use, and encourage professional handling and application.

Promote “MAEAP” for livestock and cash crop producers. Soil testing and manure analysis are critical components to emphasize.

Encourage use of the technical assistance that is available through Certified Crop Advisors and local county conservation districts.

Develop outreach programs to improve on farm energy efficiency that includes the identification of areas where the greatest savings could be achieved. Examples include the use of more fuel efficient equipment, more energy efficient lighting systems, and less energy intensive irrigation practices.

Encourage the development and adoption of life-cycle cost-benefit and carbon impact analyses that would be applied to new and current regulations that involve food production and processing.

Develop an agricultural energy conservation board consisting of farmers with 1,000 acres or more of production. Their goal would be to recommend energy saving plans targeted especially

at large farm operations. Increasing the energy efficiency and sustainability of small and mid-size farms by promoting more on-farm and local energy sources (wind and solar), displacement of fossil fuels, and more efficient whole farm and watershed planning, something facilitated by programs like MAEAP.

Technology transfer from Universities to the farm will augment carbon footprint reductions. Develop the network locally to get the transfer in place.

Develop programs, policies, and legislation to encourage and facilitate the purchase of local agricultural produce and products by local, regional, and state institutions and wholesale and retail firms.

Develop and support economic development programs to help rebuild their local and regional food infrastructures.

Develop programs, policies, and legislation to encourage and facilitate the reduction of food miles, the recycling and/or composting of food wastes, and to generally encourage more sustainable and energy-efficient local and regional food economies.

Related Policies/Programs in Place

The Michigan Agriculture Environmental Assurance Program (MAEAP) teaches farmers how to identify and prevent environmental risks and comply with state and federal environmental regulations. Farmers who successfully complete the three phases of a MAEAP system are rewarded by becoming verified in that system. It involves a systems approach to environmental stewardship for numerous crops in Michigan, including nutrient and pest management, water use and soil conservation.

The Federal Farm Bill offers a variety of cost share programs for landowners implementing NRCS practices.

The Michigan Conservation and Climate Initiative allows Michigan agricultural landowners to earn greenhouse gas emission reduction credits through conservation practices including no-till and strip-till farming and earn revenue from the sale of their credits on the Chicago Climate Exchange.

USDA-Natural Resources Conservation Service offers a variety of cost-share programs for producers who improve system management by implementation of NRCS-approved practice standards.

The Federal Farm Bill offers a variety of cost share programs for landowners implementing NRCS practices.

The Student Organic Farm at Michigan State University exposes students and faculty to organic farming concepts and techniques.

The Federal Farm Bill offers a variety of cost share programs for landowners implementing NRCS practices.

The Farm Energy Audit Program at Michigan State University currently targets Michigan dairy farms measuring on farm energy efficiencies.

The Michigan Food Policy Council - www.michigan.gov/mfpc - issued a report with recommendations including preserving farmland, enhancing the viability of small- to mid-scale family farms, increasing markets for organic and sustainably produced food, and increasing access to fresh and healthy Michigan-grown food., Greater use of Michigan-grown foods reduces food miles (and their GHG), recycles dollars, and build healthier and more self-reliant communities.

MIFFS and various organizations encourage local and sustainable food growth and farm markets.

MDEQ and MSU recently developed an on-farm energy audit program. Develop the ranks of this program and build in carbon impact analysis. We will need to get the tools in the hands of practitioners who can help with on farm adjustments.

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:**
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWG]

Additional Benefits and Costs

TBD – [as needed and approved by the TWG]

Feasibility Issues

TBD – [as needed and approved by the TWG]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until MCAC meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCAC]

AFW-8. Forest Management for Carbon Sequestration and Biodiversity

Policy Description

Our State's forests whether they be public or private; urban, managed or wild, provide many carbon sequestration and other natural resource benefits such as biodiversity, water quality, wildlife habitat and recreational opportunity. Implement goals and mechanisms that:

- Promote forest management activities that maintain and enhance forest health, productivity and carbon sequestration in forest biomass and soils and in harvested wood products while sustaining biodiversity and other natural resource benefits.
- Promote local, regional and state markets so landowners have outlets for a variety of products (traditional and/or ecosystem service based) to provide income streams and incentive to manage forestlands, promote carbon sequestration and reduce GHG emission.
- Protect and enhance the carbon stored in tree biomass by maintaining and improving forest health and canopy cover in urban and residential areas. Emissions reductions from reduced heating and cooling resulting from increased canopy cover will be a co-benefit.
- Maintain the carbon sequestration potential of forests through reduction of the potential and severity of wildfires and associated GHG emissions.

Policy Design

Goals:

- Increase permanent forestland cover (including improved stocking of under-stocked stands) across the state on 1 million acres through afforestation and reforestation by 2025.
- Achieve 40% canopy cover in urban communities by 2025.
- Implement wildfire reduction Community Wide Protection Plans for 10-12 identified communities at risk by 2025.

Timing: See above

Parties Involved: Private landowners; Michigan Forestry Association; Michigan Departments of Agriculture, Conservation Districts; environmental/sustainability interests; Forest Industries; People and Land (a Kellogg Foundation funded organization which tracks progress on the 2003 Michigan Land Use Leadership Conference Report recommendations); The Global Observatory for Ecosystem Services; Michigan United Conservation Club; The Nature Conservancy, USFS State and Private Forests; Michigan State University Extension; Farm Bureau; Forest Industry; [Carbon Traders](#).

Other:

Comment [RSA24]: MCAC requested that this be added.

Implementation Mechanisms

Develop the scientific foundation related to carbon sequestration practices in forestlands, associated life cycle analyses that consider the end use of various forest products and the long-term impacts of climate change on Michigan's forests.

Enhance investments in mechanisms with clear points of entry for non-industrial private forest landowners to obtain assistance to facilitate increased participation in forest management.

Develop information related to improving carbon sequestration in a manner that improves forest health and productivity, while sustaining biodiversity and other natural resource benefits.

Look for opportunities and provide necessary resources to improve forest health and productivity on State-owned forests as described in the State Forest Management Plan and supporting projects identified by the Michigan Forest Finance Authority.

Document long-term impacts of climate change on Michigan Forests.

Promote local, regional and state markets so private and public landowners have outlets for a variety of products (traditional and/or ecosystem service based) to provide income streams and incentive to manage forestlands, promote carbon sequestration and reduce GHG emissions (For example, promote enrollment in agriculture and forest carbon trading markets).

In terms of forestry, current programs need to be changed to offer new initiatives that provide landowners with incentives to improve forest resources, encourage proper management, promote sustainability of forestlands, and benefit the forest products industry.

Practices may include: increased stocking of poorly stocked lands, thinning and density management, fertilization and waste recycling, expand short rotation woody crops (for fiber and energy), expanded use of genetically preferred species, modified biomass removal practices, fire management and risk reduction, pest and disease management, and promoting biodiversity of forests to improve ecosystem services and sustainability.

Related Policies/Programs in Place

The Michigan Forest Carbon Offset and Trading Program allows Michigan forest landowners earn and sell greenhouse gas emission reduction credits through reforestation of degraded forest land. (See 7.1.) The Department of Natural Resources also administers a Forest Stewardship program that distributes federal grants to support private forest landowners to develop stewardship plans that promote sustainable forest management.

The Michigan Department of Agriculture works in collaboration with the Conservation Districts to provide private forest landowners support related to the implementation of sustainable forest management (Presently not funded in the State budget).

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWG]

Additional Benefits and Costs

TBD – [as needed and approved by the TWG]

Feasibility Issues

TBD – [as needed and approved by the TWG]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until MCAC meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCAC]

AFW-9. Source Reduction, Advanced Recycling, and Organics Management

Policy Description

Increase recycling and reduce waste generation in order to limit GHG emissions associated with landfill methane generation and with the production of raw materials. Increase the breadth and depth of recycling programs, provide incentives for the recycling of construction materials, develop markets for recycled materials, and increase average participation/recovery rates for all existing recycling programs. Increase reuse and composting. Reduce the volume of waste from residential, commercial, and government sectors through programs that reduce the generation of wastes. Reduction of generation at the source reduces both landfill emissions as well as upstream production emissions.

Note the linkage to AFW-10 covering LFG methane collection and control. To the extent that this option achieves lower levels of biodegradable waste emplacement in the future, lower levels of landfill methane will be generated.

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Policy Design

Goals:

- Achieve a 75% MSW recycling rate by 2025.
- Achieve a 50% industrial/commercial recycling rate by 2025.
- Achieve a 75% organics composting rate by 2025.
- Achieve a 50% recycle rate for new construction waste by 2025.

Timing:

Interim goal

- Comply with the state solid waste plan goal of achieving a 50% MSW recycling rate by 2015.
- Ensure that all Michigan citizens have convenient access to residential recycling programs by 2012.

Parties Involved:

Other:

Implementation Mechanisms

TBD – [CCS drafts based on TWG inputs; this can be developed as they go along, and can start early or late as they prefer; the level of detail can vary on TWG approval]

Related Policies/Programs in Place

Recycling is promoted by Michigan Department of Environmental Quality (MDEQ) including mandated recycling of office paper by the Michigan State Government. For details on the

various recycling efforts in the Michigan, go to http://www.michigan.gov/deq/0,1607,7-135-3585_4130---,00.html

Types(s) of GHG Reductions

TBD

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWG]

Additional Benefits and Costs

TBD – [as needed and approved by the TWG]

Feasibility Issues

TBD – [as needed and approved by the TWG]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until MCAC meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCAC]

AFW-10. Landfill Methane Energy Programs

Policy Description

Use the renewable energy (methane) created at landfills during anaerobic degradation of wastes unable to be utilized in recycling and compost programs to displace fossil fuel use through the creation of useful energy.

Note the linkage to AFW-9 covering source reduction, recycling and composting. There is also potential linkage to the biomass utilization options under AFW-1 and AFW-2, such that some biomass fiber in the MSW stream could be diverted to energy use under those options. To the extent that those options achieve lower levels of biodegradable waste emplacement in the future, lower levels of landfill methane will be generated for collection and control. The analysis of the costs and benefits for this option captures the effects of AFW-9. The potential effects of MSW biomass for energy utilization are also addressed.

Policy Design

Goals:

Implement controls or waste management options at municipal solid waste landfills such that 50% of the methane emissions that would be generated under business as usual conditions are avoided by 2025. This can be done through improving collection efficiency of existing landfill gas collection systems, development of additional landfill gas to energy (LFGTE) projects, reducing the amount of biodegradable waste being landfilled (see AFW-9), or possibly other methods.

Timing: By 2012, develop improved collection efficiency regulations for existing landfills that have active gas collection systems. By 2025, achieve full implementation of improved collection efficiency at all solid waste landfills to reduce methane emissions by at least 50%.

Parties Involved: TBD

Other: Policies should be designed to incorporate: comprehensive environmental protection including the greatest: total efficiency of energy use (i.e., useful energy divided by wasted energy); maximum displacement of fossil fuels; net greenhouse gas reductions; and reductions of all harmful emissions. All financial incentives should be market transformation policies.

To the extent practical, landfill gas should be captured and utilized at all existing landfills.

Policy may need to be different for large versus small landfills. If economics are not favorable of interconnecting with electric grid and/or shipment off-site of pipeline gas, then the addition of some on-site facilities to use the energy might be needed.

Studies should be conducted to determine the most appropriate policies for future waste collection and conversion to biomass fuels.

Implementation Mechanisms

Optimizing production at landfills through operational efficiency.

Audit/database of existing emissions and collection efficiencies.

Legislative Actions

Administrative Rule Development - Design Standards, Monitoring Standards, Reporting Requirements, and Action Limits

Join U.S. EPA Landfill Methane Outreach Program as a State Partner

Related Policies/Programs in Place

- Federal New Source Performance Standards/Emission Guidelines for municipal solid waste landfills (require landfill collection and control for landfills of specific sizes and pollutant emission levels).
- The Michigan Public Service Commission has commenced a formal rulemaking proceeding in Case No. U-15239 to revise the state's Electric Interconnection Standards Rules. The intention is to make the interconnection procedures more predictable and smoother. A revised set of rules is being filed as a starting point for the formal rulemaking process.⁹ Also, utility rates, terms, and conditions of service for interconnected generators are being reviewed by the MPSC Staff and concerns, issues, or barriers that might affect such facilities will be addressed in the rate case process.

Types(s) of GHG Reductions

- Methane reductions through increased collection and control efficiency
- Methane emissions reduction through conversion (preferentially via energy utilization or through flaring).
- Reduction of fossil fuels and associated GHGs through the use of landfill methane for energy.

Estimated GHG Reductions and Net Costs or Cost Savings

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWG]

⁹ Similar processes are underway at the Federal Energy Regulatory Commission (FERC) for improving the interconnection process for larger generators seeking interconnection with the electric transmission grid.

Additional Benefits and Costs

TBD – [as needed and approved by the TWG]

Feasibility Issues

TBD – [as needed and approved by the TWG]

Status of Group Approval

Pending –

Level of Group Support

TBD – [blank until MCAC meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCAC]