

Notes from AFW TWG Call #2 (primarily AFW 1 through 7) and Call #3 (primarily AFW 8 through 11) are in blue below.

Notes from the MCCC-MWG 9-28-07 Meeting are in Red.

## Brief Description of Catalog Items

### Agriculture, Forestry, and Waste Management Technical Working Group

(Note that this listing is incomplete and will be fleshed out during the TWG process; working group members are encouraged to provide input to the TWG facilitators on existing policies and programs, where relevant. Recently enacted policies and programs in Maryland are listed where relevant in the policy options catalog notes. Additional details will be added to this document under each of the option descriptions, as they are provided)

#### AFW-1 PRODUCTION OF ENERGY - INITIAL PRIORITY (entire section)

##### 1.1 Expanded Use of Biomass Feedstocks for ~~Energy Electricity and Steam~~ Production

Increase the amount of biomass available for generating electricity and heating and displacing the use of fossil energy sources. Local electricity or steam production yields greatest net energy payoff.

Note: There are currently a few small biomass plants in operation in MD. There is interest and efforts to establish more facilities are apparent. Collectives may be useful.

Consider chicken litter in total biomass available for energy production.

*Recent Actions in MD: Renewable Portfolio Standard requires that 9.5% of all electricity be from renewable sources by 2022. Biomass, solar and wind are in Tier 1. Renewable Electricity Production credit (need more information). One private proposal (Fibersure) intends to use forest residue and chicken manure for power production.*

##### 1.1.2 In-state Liquid Biofuels Production

Increase production of ethanol and/or biodiesel fuel from agriculture and/or forestry feedstocks and/or municipal solid and other waste (raw materials) to displace the use of fossil diesel. Promote the development of cellulosic ethanol technologies and ethanol production systems that use renewable fuels to improve the embedded energy content of ethanol. Increased production and consumption in state give the highest benefits.

Note: Note that corn and other agriculture products have different costs than forestry or municipal solid wastes in ethanol production. Forestry feedstock show excellent potential for cellulosic ethanol, but group knows of only one possible plant in the Midwest.

The belief that using corn as feedstock will cause massive crop conversion in MD appears incorrect. MD only planted 10 -12% more corn in recent years. Assumption that this increase yields additional fertilizer runs off may be invalid as with proper application rates and best practices, there will be no additional run-off.

Cellulosic ethanol production from agriculture products will be challenging but perhaps feasible with leftover corn stock or winter grain cover crop. The technology is not perfected yet. Converting active cropland to switchgrass is problematic as most farmers economically require three crops through the year: corn, soybeans, winter grain cover crop. Changing to single crop, especially perennial, could be an economic hardship.

Ethanol and biofuels are planned in Norfolk VA and DE.

*Recent Actions in MD: Renewable Fuels Initiative Act provides incentives for biofuels produced by small grain, soybean and other agricultural products. There are caps in place: ethanol - 15mm gallons with 10mm being distilled from small grains; biodiesel – 5mm gals. with 2.0mm from soybeans. Farmers have option of investing in biodiesel plants. The Incentive program ends in 2017. There is a Renewable Fuels Taskforce at the state level. Maryland Green Producers are trying to build an ethanol plant in MD – on-going for 10 years. There is a biodiesel mixing station on the lower shore in MD.*

### 1.1.3 Manure Digesters/Other Waste Energy Utilization

Reduce the amount of methane emissions from livestock manure by installing manure digesters on livestock operations. Energy from the manure digesters is used to create heat or power, which offsets fossil fuel-based energy production and the associated Greenhouse Gas (GHG) emissions.

Note: There are no digesters in MD yet as they are too expensive to install in individual small to medium operations (less than 1000 head). Frederick County MD investigated possibility since digesters are installed in PA (Mason-Dixon). State law and grant programs may not yet allow cooperatives to form to spread costs and benefits. MD farmers would adopt this technology if economically feasible to install, either cooperatively or individually.

This is a good idea from energy standpoint, MCCAC Action Plan could remove roadblocks to collectives installing community digesters and help with costs.

*Recent Actions in MD: Clean Energy Incentive Act includes incentives for methane use in heat and electricity production.*

**AFW-2 AGRICULTURE – Livestock Val will seek more information on recent actions and inform TWG.**

#### 2.1.1. Manure Management: Manure Utilization

#### 2.1.2. Manure Management: Manure/Methane Capture

2.1.1. Implement manure management practices that reduce GHG emissions associated with manure handling and storage. Potential practices include but are not limited to manure composting (to reduce methane emissions) and improved methods for application to fields (for reduced nitrous oxide emissions). Application improvements include incorporation into soil, instead of surface spray/spreading.

2.1.2. Implement digester and energy recovery projects at confined animal operations to both reduce methane emissions and utilize the energy to displace fossil fuels. To date, most of these projects have been implemented at dairies and swine operations.

*Recent Actions in MD: The Clean Energy Incentive Act includes incentives for methane use in heat and electricity production.*

## 2.2 Changes in Animal Feed

Livestock emit methane directly as a result of digestive processes (enteric fermentation). Research suggests that changes in the energy content of feed and other dietary changes can reduce methane emissions from enteric fermentation. By optimizing nitrogen (protein) utilization in the feed, nitrogen levels in the manure can be reduced, which in turn reduce the potential for nitrous oxide emissions.

*Recent Actions in MD:*

## 2.3 Rotational Grazing/Improve Grazing Crops and/or Management

Heavy grazing can cause significant soil disturbance and result in carbon losses from soils. Rotational grazing where animals are moved from field-to-field on a regular basis reduces soil disturbance and maintains soil carbon levels. Rotational grazing also can improve plant vigor and enhances soil carbon levels.

*Recent Actions in MD:*

## 2.4 Utilize Biofilters to Control CAFO Emissions

The utilization of collection and control equipment such as biofilters at confined animal feeding operations (CAFOs) can reduce methane emissions.

*Recent Actions in MD:*

## 2.5 Increase Pasturing and Lower Densities

Increasing the area over which manure is deposited has the potential to reduce emissions of methane, since the manure is more likely to be decomposed aerobically versus anaerobically.

*Note:* There are not a lot of suitable lands available for increased acreage for spreading and the amount of active agriculture lands are shrinking annually. Val will provide figures of active agriculture land past and present.

*Recent Actions in MD:* *The MD Nutrient Management Act dictates how manure is to be spread.*

## AFW-3 AGRICULTURE – CROP PRODUCTION

### 3.1 Soil Carbon Management - **SUGGESTED PRIORITY**

The MWG would like this to be considered a priority, potentially an early action item.

Consider how strip mining and removal of topsoil may impact carbon sequestration. Also examine strip mining in light of reforestation/reclamation requirements of surface impacts.

The amount of carbon stored in the soil can be increased by the adoption of practices such as conservation and no till cultivation. Reducing summer fallow and increasing winter cover crops are complimentary practices that reduce the need for conventional tillage. In addition, the application of biochar (i.e., charcoal) may also increase soil carbon content and stabilize soil carbon. By reducing mechanical soil disturbance, these practices reduce the oxidation of soil carbon compounds and allow more stable aggregates to form. Other benefits include reduced wind and water erosion, reduced fuel consumption, and improved wildlife habitat.

Note: Disking does occur, leaving stubble in situ but not deep tillage, except occasionally every 5 years. The Amish community operates under the same requirements of the Nutrient Management Act and tillage regulations. Incorporating manure is a best nutrient use.

It will be important to ascertain if this action is effective and determine if there are better ways to accomplish carbon sequestration in soils.

*Recent Actions in MD: MD is the national leader in no-till agriculture (95% no-till) and winter cover crop planting. Funding is available at the state level to assist.*

### 3.2 Advanced Nutrient Management - INITIAL PRIORITY

Improve the efficiency of fertilizer use and other nitrogen-based soil amendments through implementation of management practices. Excess nitrogen not metabolized by plants can leach into groundwater and/or be emitted to the atmosphere as N<sub>2</sub>O. Better nutrient utilization can lead to lower nitrous oxide emissions from run-off.

Nutrient trading could be incorporated in this option. Agriculture operations could get credits for additional pounds of nutrient reduction, beyond their basic Plan, to trade. Pounds per acre could be determined using look-up tables or on the ground measurements. There are notable ancillary benefits and synergies from such a system. Efficacy for dollar spent will need to be determined.

Note: Nutrient Management Plans require a minimum level of actions. There are many more that could be done in addition (such as Best Management Practices [BMP's] construction of wetlands, larger buffers along streams... George will provide more examples.)

MWG supports nutrient trading and would like to see it as a priority. Trading entities could include point source as well as more general non-point sources. Include more marketable goals such as water quality.

Examine Farm Bill 2007 for possible tie-ins.

EARLY ACTION ITEM: Establish framework for a nutrient trading system.

*Recent Actions in MD: The Maryland Nutrient Management Act of 1998 contains a regulatory enforcement program. A Nutrient Management Plan is required. The Natural Resources Conservation Service (NRCS) and the MD Department of Agriculture are already looking at options for nutrient trading and expect to have a recommendation this fall.*

### 3.3 Technology Improvements to Increase Efficiency

New technologies and cultivation methods have the potential to reduce GHG emissions when fossil fuel or electricity consumption can be reduced. Auto-steer guidance systems are an example. Also, auto swath technology, using GPS to automatically turn the spray boom sections on or off when coming to an area of the field that has been sprayed or needs to be sprayed. This can be used for planting, fertilizing, etc. On odd shaped fields it can be a 3-5% savings: [http://www.agleader.com/products.php?Product=directcommand\\_1](http://www.agleader.com/products.php?Product=directcommand_1).

Variable rate fertilizing and liming is also becoming more popular among Maryland farmers. The farmer has a local Co-op grid sample the field and then variable rate applies the fertilizer or lime as need in the areas of the field that need it. The areas of the field that do not need the fertilizer

or lime have none applied on them. This can be as much as 50 to 60% reduction in the amount of lime or fertilizer needed.

[http://www.agleader.com/products.php?Product=directcommand\\_g](http://www.agleader.com/products.php?Product=directcommand_g).

Green Seeker NDVI technology. A farmer applies 50 to 70% of his nitrogen at planting and then in season uses the Green Seeker to apply what the corn or wheat plant needs when it is growing. A more efficient way of applying nitrogen and will result in less nitrogen being over applied. This is a new technology that is still in its early testing stages, but looks to be promising.

<http://www.ntechindustries.com/greenseeker-RT200.html>.

Note that this option has a similar counterpart in Option 5.1.

*Recent Actions in MD: Some farmers are using GPS technologies but no one is aware of the extent.*

### 3.4 Water Management

Improve the efficiency of water use through implementation of best management practices. Excess water can lead to run-off of nitrogen with subsequent emission to the atmosphere as N<sub>2</sub>O. By managing and improving water consumption and nutrients spread on crops, there will be a minimal loss of carbon from the soil. Reduced water consumption can result in lower energy use for water pumping.

*Note: How do existing programs and water management strategies fit into this policy options and quantification? Ancillary benefits should be shown in template.*

*Recent Actions in MD: Much work has gone into water management, tributary management strategies, etc. under a plethora of regulations and initiatives.*

### 3.5 Drainage Management

~~Improve drainage on agricultural lands to prevent ponding, which could lead to anaerobic soils and GHG emissions (methane).~~

*Note: This seems counter-productive to the protection of wetlands, especially since not every one is anaerobic. Unintended ponding is the likely target but this isn't common. [The AFW TWG recommends removing this option as not germane to MD.](#)*

*Subterranean may be a different dynamic, as it may be beneficial to attempt to impound subsurface water.*

*Recent Actions in MD: There are a whole series of drainage ditches in MD to keep farm land open and arable.*

## AFW-4 AGRICULTURE-LAND USE CHANGE

### 4.1 Land Use Management that Promotes Grassland Cover

Convert marginal agricultural land used for annual crops to permanent cover such as grassland/rangeland, orchard, or forest, where the soil carbon and/or carbon in biomass is higher under the new land use. Includes opportunities to keep CRP lands covered in perpetuity. Increased demand for corn-based ethanol and biodiesel feedstocks can act as an incentive for converting grassland to cropland. Adopt mechanisms to prevent these acres from either returning to conventionally tilled production or to suburban/urban development.

Note: Maryland does not participate in the Conservation Reserve Program (CRP) but rather in the Conservation Reserve Enhancement Program (CREP). This program does not take whole fields out of production but instead focuses on enhancing buffers, swales and edges.

Has there been any analysis on the benefits of plant conversion, especially in respect to the way soil carbon levels change?

*Recent Actions in MD: Discussions surrounding whether and how these perennial cover crops may be harvested for biomass feedstocks is taking place at the state level.*

#### **4.2 Preserve Open Space/Agricultural Land INITIAL PRIORITY WITH 7.1**

Add coastlines to list of protected areas.

Consider transfer tax for conversion of agriculture lands to other uses.

Examine tax policy for obstacles and deterrents to protection of lands. (Cross-Cutting TWG may want to examine also.)

Combine with forestry lands AFW 7.1 for a comprehensive protection/conservation/stewardship option.

Reduce the rate at which agricultural lands 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. Transportation emissions will be reduced indirectly through more efficient development and lower vehicle use. Agricultural land conversion may be prevented through conservation land grants and conservation easements facilitated through non-profit land preservation organizations.

Note: Maryland's active program implemented and planned may not require enhancing but there is a need to prioritize investments of available funds. Initiatives like the Chesapeake Bay Program will result in protection of roughly 250,000 acre of open space. The interim target is 100,000.

An ancillary benefit is that conservation programs allow for better planning and smart growth vs. sprawl by channeling development, interspersed with open space.

The Regional Greenhouse Gas Initiative (RGGI) has a related offset under consideration: sequestration of carbon due to salt marsh restoration and conservation. Maryland could create a similar model and garner offset credits.

**EARLY ACTION ITEM:** There is a need to develop data on GHG values lost due to development of forests and farmlands so efficacy of open space retention in relationship to emissions can be determined.

*Recent Actions in MD: MD has a many diverse open space initiatives (three major and six smaller programs) which have received a lot of public attention and support. Over \$200 million a year is spent in land/open space conservation. MD state government also has established a Cabinet level position to track the state implementation and progress on Chesapeake Bay plans.*

## AFW-5 AGRICULTURE-FARMING PRACTICES

### 5.1 Reductions in On-Farm Energy Use

Renewable energy can be produced and used on-site at agriculture operations. For example, installation of solar or wind power, use of hydro-powered generators for irrigation, and converting diesel farm equipment to LNG/CNG or hybrid technology will reduce carbon dioxide emissions by displacing the use of fossil based fuels.

*Note:* Farmers are currently using some alternative fuels but amount is unknown. No objections are expected but cost is always a factor in implementation. If there were monetary support, most would go for it. The Cooperative Extension Service could help in education and administering incentive programs. Opportunities abound but farmers can't build in additional costs to their operations because the cost of food is not flexible.

*Recent Actions in MD:* The Clean Energy Incentive Act may provide incentives for installing renewable energy systems. One of many of Maryland Transportation Initiatives encourages diesel retrofits. (More research is necessary to find specific language that would directly relate to this policy option.) Maryland Farm Energy Audit Program can assist in assessing energy use and efficiency on farms.

### 5.2 Promotion of Farming Practices that Achieve GHG Benefits

Provide incentives to farmers for using production processes that achieve net GHG benefits. For example, some organic farming practices could achieve reduced GHG emissions compared to conventional farming, depending on the specific practices implemented (e.g., use of no-till cultivation and fewer chemical inputs).

*Recent Actions in MD:*

### 5.3 Programs to Support Local Farming/Buy Local

Promote the production and consumption of locally produced agricultural goods, which displace the consumption of those transported from other states or countries. GHG reductions occur from reduced transportation-related emissions.

*Recent Actions in MD:* MD Dept of Ag revitalized and is actively promoting a Buy Local program.

## AFW-6 FORESTRY – PRODUCTION OF FUELS AND ELECTRICITY–ENERGY IN FORESTRY AND URBAN TREE MANAGEMENT

### 6.1 Expanded Use of Biomass Feedstocks for Electricity, Heat and Steam Production

Increase the amount of biomass available from forests for generating energy and displacing the use of fossil energy sources.

*Note:* Include urban tree management in feedstock stream.

**Focus on biomass source protection in all sectors. Support tying all sectors together.**

*Recent Actions in MD:*

## 6.2 In-State Liquid Biofuels Production

Increase production of ethanol and/or biodiesel fuel from agriculture and/or forestry feedstocks (raw materials) to displace the use of fossil diesel. Promote the development of cellulosic ethanol technologies and ethanol production systems that use renewable fuels to improve the embedded energy content of ethanol. Increased production and consumption in state give the highest benefits.

*Recent Actions in MD: The Renewable Fuels Incentive Act prescribes incentives for the use of biomass to produce ethanol and biodiesel. Currently forestry biomass has a 5 cents per ton incentive while small grains has a 20 cents per ton pay back.*

## 6.3 Improved Energy Capture from Wood Waste Combustion

Reduce emissions and increase heat efficiency from heat sources such as wood burning stoves and furnaces.

*Recent Actions in MD:*

## 6.4 Improved Commercialization of Biomass Gasification and Combined Cycle

Improve the rate of technology development and market deployment of biomass gasification and combined cycle (BGCC) technologies. These technologies expand the application of renewable fuels derived from biomass.

*Recent Actions in MD:*

## AFW-7 FORESTRY – BIOMASS PROTECTION AND MANAGEMENT

### 7.1 Forest Protection – Reduced Clearing and Conversion to Nonforest Cover - **INITIAL PRIORITY with 4.2**

Reduce the rate at which existing forest are cleared and converted to developed uses. Much of the carbon stored in forest biomass and soils can be lost as a result of such a land use conversion.

Note: Open space discussion above applies here as well, these could be combined into [Land Protection and Conservation](#). Add [coastlines](#).

*Recent Actions in MD:*

### 7.2 Urban Forestry

Maintain and improve the health and longevity of trees in urban and residential areas to protect and enhance the carbon stored in tree biomass. Indirect emissions reductions may also occur by reducing heating and cooling needs as a result of planting shade trees.

Be sure to emphasize ancillary benefits of urban forests and green space, especially ameliorating urban heat island effect.

Add vegetative plantings in median strips along highways.

Note: The TWG requests significantly more detail in Urban Forestry. Include the benefits of shade on reducing heating, cooling and urban heat island, including reduced evaporation of volatile organic compounds from autos. VOC's are a component of ozone stipulations in the State Implementation Plan for Air Quality Improvement, under Clean Air Act (SIP).

Biomass could be utilized – see AFW6 above. Can use wood waste stream generated from arbor care industry.

RGGI Urban tree canopy carbon offsets under consideration.

Certain tree species are encouraged for planting but size and longevity seem to be more important factors than emissions levels from different species.

*Recent Actions in MD: MD is required to complete a State Improvement Plan (See above) with ozone stipulations due next year. In 2007, use of urban forestry for ozone mitigation was a new voluntary measure – a first for a state. Baltimore and Washington Metro have an Air Quality Plan that covers 2,000 square miles.*

### 7.3 Afforestation/Reforestation

Establish forests on land that has not historically been forested (e.g., agricultural land) (“afforestation”). Promote forest cover and associated carbon stocks by regenerating or establishing forests in areas with little or no present forest cover (“reforestation”). In addition, implement practices such as soil preparation, erosion control, and stand stocking to ensure conditions that support forest growth.

Rules about how, what, and where to plant will govern costs.

Consider adding a time frame, such as immediate sequestration of carbon for next 60 years.

Note: Beyond requiring a certain amount of planting, many aspects of the programs mentioned below are voluntary. Reporting and monitoring can be done more efficiently and consistently. The State needs stronger enforcement and monitoring, with stronger incentives.

Expand programs to any tree planting effort where increasing forested acres, including urban areas.

*Recent Actions in MD: MD utilizes the Forest Conservation Act, which requires replacing lost forest land due to new development Mitigation strategies are required. There are additionally about three dozen laws or programs that support reforestation.*

*RGGI has an Afforestation offset model rule. State has taken this RGGI model rule and is shaping a MD specific rule (see [www.rggi.org](http://www.rggi.org) under Offset Rules).*

### 7.4 Forest Management for Carbon Sequestration INITIAL PRIORITY

Forests are significant yet Maryland is losing forest cover at a rate of nearly 100 acres a day. There is a need to ensure long-term health and productivity of forests. Along with many ancillary benefits, forests are a proactive way to sequester carbon.

Forest management activities promote forest productivity and increase the rate of carbon dioxide sequestration in forest biomass and soils and in harvested wood products. Practices may include: increased stocking of poorly stocked lands, age extension of managed stands, 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, and/or pest and disease management.

Facilitate foresters applying their skills and reaching out to land owners to help them through adequate funding and policies that support appropriate forest management.

Encourage developers to focus mitigation on large tracts of forests such as an acre-for-acre exchange for forests lost rather than simply protection of small randomly distributed patches of forests. This would only require changing the order of priorities in the existing regulations. Counties can do the same at the local level.

Note: MD needs funding strategies for identification of best practices and highest priority locations for action. The Bay Bank – a management group that oversees forest practices - is up for funding to procure baseline data on policy drivers for mitigation management in MD law. Gary Allen has more information he will share with the group.

*Recent Actions in MD:*

### **7.5 Mitigation of Forest Carbon Sequestration Loss and Emissions Due to Wildfire**

Programs that reduce the potential for and severity of wildfires also reduce GHG emissions by lowering the forest carbon lost during the fire in addition to the subsequent losses of carbon sequestration potential in the area impacted by wildfire.

Note: There has only been one major wildfire in the last year and a half. Accordingly and due to resource prioritization, the USFS is reducing the area in which they will respond to forest fires. This option is of less concern than 7.6.

*Recent Actions in MD:*

### **7.6 Mitigation of Forest Loss Due to Insects/Disease**

Programs that reduce insect damage to forests also reduce GHG emissions by maintaining the carbon sequestration achieved in healthy forests.

*Recent Actions in MD:* The biggest problem has been invasives and pest management. MD is losing many trees through insects and disease like the emerald ash borers. Other insects, like the gypsy moth is under more control. Non-natives invasive plant species driving natives out of their habitat is a strong concern.

## **AFW-8 FORESTRY – WOOD PRODUCTS AND WASTE**

### **8.1 Improved Mill Waste Recovery – Utilization of Sawmill Residues & Emissions**

Improve treatment and cleaning of waste materials from paper mills, which can then be re-used to manufacture additional wood products. Ensure that sawmill byproducts are recycled or beneficially used for energy. Promote opportunities for using mill CO<sub>2</sub> emissions to create chemical products, such as carbonates. These actions would reduce CO<sub>2</sub> emissions by replacing fossil fuels.

Sawmills – unaware of too many opportunities to better utilize residues – robust market for residues (sawdust into poultry litter or animal bedding; shavings go to bedding; mulch from bark; high quality wood chips sought after by the paper industry in and out of state). These waste uses would compete with energy market but conversely energy markets could prop up residue market.

Combined heat and power create better economies of scale than straight heat.  
Net metering law could be made more favorable for electricity generated by wood.

*Recent Actions in MD: There is only one paper mill in the state. They do capture a lot of waste and are looking at even more focused on energy production. One practice that shows promise is fractionation of black liquor which can be refined into valuable products using a thermo-chemical process.*

*A MD State prison (8<sup>th</sup> largest in its class) uses 100% wood power for steam, heat, energy.*

*Quite a few sawmills are converting waste to energy.*

*Currently there is no official Fuels for Schools sort of program.*

## **8.2 Improved Wood Waste and Logging Residue Recovery**

Use more efficient logging methods to fully utilize harvested trees, which will minimize carbon losses from wood damaged during harvesting and maximize the potential for carbon sequestration in harvested wood products. Process the logging remains efficiently. Include other wood residues from pallet recovery, yard wastes, arbor care wastes from urban and rural areas and other wood wastes brought to recycling centers. Support development of energy markets for low-grade wood wastes.

*Recent Actions in MD: Not including logging residue, just wood that shows up at recycling centers is estimated at about 300m to 900m tons annually. A significant amount of energy savings could be had by processing these wastes for energy.*

## **8.3 Expanded Use of Wood Products for Building Materials**

Increase the amount of renewable wood products used for residential and commercial building. The use of wood products in place of other building materials can increase carbon sequestration in wood products and displace GHG emissions associated with processing high-energy input materials such as steel, plastic and concrete. Reduction potential is enhanced by promoting the use of locally grown wood due to lower transport-associated emissions.

Maryland has been a LEED (rating system for green building) leader, but hasn't been given credit for wood products, especially local woods as contributing to energy efficiency and carbon emission reductions. This is an issue in several states. TWG needs to put removing that obstacle into Policy Implementation design. **MWG is aware of this problem and supports resolution.**

Encourage the creation of value-added products from local woods in lieu of shipping raw materials.

*Recent Actions in MD:*

## **8.4 Reduction in Logging Industry Energy Use**

Renewable energy can be produced and/or used on-site at logging and milling operations. For example, distillation of residue for ethanol production, use of wood residue for electricity generation, and using biodiesel in logging equipment will reduce carbon dioxide emissions by displacing the use of fossil based fuels. Conservation is an important component of this option.

*Recent Actions in MD:*

## 8.4 Support Buying Local Wood Products

Using local wood for construction, furniture or other value-added wood products will enhance local economies while reducing carbon emissions by lowering transportation distances and sequestering carbon in those products.

Ensure that wood is harvested sustainably and the products are produced sustainably.

*Recent Actions in MD:*

## AFW-9 WASTE MANAGEMENT – WASTE MANAGEMENT STRATEGIES

The TWG may want to set waste standards for carbon emissions and utilization of solids, gas and liquid waste for energy regardless of disposal/treatment method.

### 9.1 Advanced Recycling

Increase recycling and reduce waste generation in order to limit greenhouse gas emissions associated with landfill methane generation and with the production of raw materials. Increase recycling programs, create new 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.

Electronics recycling and recovery of industrial gases from foam products could be included.

*Recent Actions in MD: No cradle-to-cradle programs in place but MDE does have an aggressive e-cycling program.*

### 9.2 Promotion of Bioreactor Technology

A bioreactor landfills is essentially in-landfill composting activity at a Subtitle D sanitary landfill in which liquid, temperature, and air (for aerobic processes), are managed in a controlled manner to achieve rapid stabilization of the food, greenwaste, and paper-waste constituents. To optimize the rapid waste stabilization of these wastes, moisture, gas composition, gas flow, and temperature must be carefully maintained and monitored. Bioreactor technology is used to accelerate waste stabilization, enhance gas production and collection, control leaching, reduce volume, and minimize long-term liability of waste.

*Recent Actions in MD: The Clean Energy Incentive Act includes incentives for methane use in heat and electricity production.*

### 9.3 Source Reduction Strategies

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.

Quantification of carbon emissions of associated transportation of solid waste may be a useful figure.

*Recent Actions in MD:*

#### 9.4 Resource Management Contracting

Unlike traditional solid waste service contracts, resource management (RM) compensates waste contractors based on performance in achieving an organization's waste reduction goals rather than the volume of waste disposed. As a result, RM aligns waste contractor incentives with the goals to explore innovative approaches that foster cost-effective resource efficiency through prevention, recycling, and recovery.

*Recent Actions in MD:*

#### 9.5 Waste Coal Recapture

Promote research and implementation of recovering waste coal. Waste coal is a usable material that is a byproduct of previous coal processing operations. Emissions are reduced relative to the mining of new coal.

*No one on the TWG is familiar with the waste recovery situation with coal (\*\* check with coal industry) MD is low quality/high sulfur.*

*Recent Actions in MD:*

#### 9.6 Enhanced Management of Organic Waste

Reduces methane emissions associated with landfilling by reducing the biodegradable fraction of waste emplaced. Recently, an area of focus in the solid waste industry has been in increase recycling of organic wastes (lawn & garden waste, food waste, wood, paper, etc.) using different conversion technologies, including composting, anaerobic digestion, or hybrids of these technologies.

*Recent Actions in MD:*

#### 9.7 Promotion of New & Existing Technologies for Waste Energy Conversion

New processes include biomass gasification and pyrolysis. A range of renewable products can be developed from these processes, including gaseous and liquid fuels, biochar, and chemical products. Existing processes include waste combustion and energy recovery (as electricity, steam or both).

*Recent Actions in MD: The Clean Energy Incentive Act includes incentives for methane use in heat and electricity production.*

### AFW-10 WASTE MANAGEMENT – LANDFILL GAS STRATEGIES

#### 10.1 Flare Landfill Methane at non-NSPS (smaller) sites

Encourage smaller landfills that do not fall under environmental protection regulations to capture and flare methane gas. Flares are used to safely combust toxic and volatile gases from landfills and they convert methane gas, which has a relatively high global warming potential, to carbon dioxide.

*Recent Actions in MD: Only 11 out of 59 sites are controlled so application of programs would be focused only on these sites.*

#### 10.2 Methane and Biogas Energy Programs

Encourage and promote the use of anaerobic digesters and energy recapture for waste materials other than municipal solid waste at landfills (e.g. food processing waste). These projects will

help prevent the emission of methane while producing clean energy. Anaerobic digesters 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).

*Recent Actions in MD: The Clean Energy Incentive Act includes incentives for methane use in heat and electricity production that may apply here, but there is concern from small potential producers that digester costs are not adequately off set by current incentives.*

### 10.3 Landfill Methane Energy Programs

Use the renewable energy created at landfills by anaerobic digesters (methane) to make electric power, space heat, or liquefied natural gas.

*Recent Actions in MD: The Clean Energy Incentive Act includes incentives for methane use in heat and electricity production that may apply here.*

## AFW-11 WASTE MANAGEMENT – WASTEWATER MANAGEMENT ACTIVITIES

### 11.1 Energy Efficiency Improvements

**General Comments on Wastewater:**

Municipal bonds are one of the few ways to finance and financing can create barriers to innovative technologies. Consider not only financing but performance contracting, public-private partnerships, procurement rules that impede progress.

The Clean Water Act may provide some opportunities in how programs are financed. States have some level of discretion in how it allocates resources.

Government ownership can limit flexibility and creativity.

Investigate the use of solar power for waste water treatment operations.

Provide incentives for efficiency improvements. Encourage the set up of energy policies, energy audits, and energy cost tracking. Identify and implement energy improvements such as using energy efficient equipment and generating on-site power (e.g. solar power).

The term “efficiency improvements” is defined, within the scope of wastewater management activities, as:

- Conversion of secondary aeration processes to fine bubble diffusion and optimization of oxygen transfer efficiencies.
- Research and development of diffuser cleaning protocols.
- Research and development to increase removal of chemical oxygen demand (COD) in primary treatment tanks and clarifiers.
- Evaluate steam usage in plant processes and biofilters. Optimize use and find alternatives.
- Research and development of options to optimize denitrification in secondary treatment.

Financial and performance analyses that may be conducted to assist the implementation of this option include:

- Creation of a leveraged state revolving loan fund program to capitalize energy efficiency in municipal WWTPs.
- Establish a “fair cost of service” pricing tariff for transmission and distribution of remotely sited wind power.
- Facilitate optimization of energy management by requiring all utility meter data to be available without extra charge on a monthly basis.
- Provide incentives to install interval meters to get whole load profile and make data available online and in real-time.
- Conduct benchmarking of energy use per million gallons treated in Maryland to showcase good and deficient energy performance in this specific climate.

*Recent Actions in MD: Maryland is a member of the Regional Greenhouse Gas Initiative (RGGI – called Reggie), a consortium of 10 northeastern and mid-Atlantic states committed to reducing greenhouse gases through a cap and trade program for electricity producers. Reducing demand has specific emphasis in Maryland, thus energy efficiency and conservation play a strong role.*

### **11.2 Lower Waste Processing Needs**

Develop and implement best practices for lowering water consumption and lowering waste production in the industrial, commercial, and residential sectors. Encourage and create incentives for research and development on methods/technologies to reduce water consumption and waste production. Provide education to reduce water consumption and waste production. Lower water consumption and waste production lead to lower GHG emissions.

*Recent Actions in MD:*

### **11.3 Install Digesters and Turbines or Engines**

Provide incentives to install anaerobic digesters to treat municipal waste and create methane. Install turbines or reciprocating engines to generate electricity from the methane. Reductions occur via methane control and offsetting fossil energy use.

*Recent Actions in MD: The Clean Energy Incentive Act includes incentives for methane use in heat and electricity production.*

### **11.4 Restoration of Soil Organic Carbon from Application of WWTP Biosolids**

Evaluate the restoration and sequestration of carbon in soil through land application of biosolids. Research and develop a mechanism to remove algae from WWTP ponds and apply solids to restore/sequester soil carbon.

*Recent Actions in MD:*

### **11.5 Heat Recovery**

Provide incentives to recover heat from wastewater influent or effluent through the use of heat pumps.

*Recent Actions in MD:*

### **11.6 Algae and Bio-Oils**

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

Old Dominion University in VA is currently studying bio-oils in algae.

*Recent Actions in MD:*

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**Forward to Cross-cutting Issues TWG:**

1. State has set ambitious goals in recycling and recovery. Targets haven't been met. Participation dropping. Efforts are not widely or as consistently promoted. Need renewed effort to popularize.
2. Education: use education to force advances in waste technologies, in farming and producing foods with an eye towards addressing the inefficiencies in meat production.
3. Set performance standards for the state in all sectors with consequences. Encourage the use of public-private partnerships in meeting goals.
4. Improve the design/build/operate components of all public facilities including waste treatment plants and facilities.
5. Examine tax policies that may inhibit innovations in carbon emission reductions across all sectors.

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**Criteria for Fast Track Priority Items are:**

1. Win-win-win actions where multiple stakeholders receive benefits.
2. Actions that are already in the pipeline, covered by previous plans or initiatives.
3. Actions that can be implemented by either Executive Orders or legislative action.
4. Will cause a minimum of controversy.

Note: These criteria are for the promotion of immediate action items that can be pushed forward, not for any subsequent priority policy options.

See MD AFW TWG Fast Track Options, a separate document.