Agriculture, Forestry, and Waste Management Technical Work Group

Summary List of Priority Policy Options for Analysis

Note that order, and therefore, number has been changed.

Draft Option #	Draft Policy Option Name	Straw Proposal Volunteers
AFW-1	**Forest Management for Enhanced Carbon Sequestration** (with Mitigation of Forest Loss Due to Insects, Disease, Pests and Invasive Species**)**	James Remuzzi, Eric Sprague, Gary Allen, Joel Dunn, Laura Miller, Elmer Weibley
AFW-2	**Managing Urban Trees and Forests for Greenhouse Gas Benefits** (with Mitigation of Forest Loss Due to Insects, Disease, Pests and Invasive Species)	Gary Allen, Cindy Parker, James Remuzzi, Laura Miller, Elmer Weibley
AFW-3	**Afforestation, Reforestation and Restoration of Forests and Wetlands**	Laura Miller, Gary Allen, James Remuzzi, Joel Dunn
AFW-4	**Protection & Conservation of Agricultural Land, Coastal Wetlands and Forested Land**	James Remuzzi, Eric Sprague, Joel Dunn
AFW-5	**"Buy Local" Programs for Sustainable Agriculture, Wood and Wood Products**	Cindy Parker, (Laura Miller)
AFW-6	**Expanded Use of Forest and Farm Feedstocks and By-Products for Energy Production**	Gary Allen, Chris Rice
AFW-7	**In-State Liquid Biofuels Production**	Eric Sprague, Chris Rice
AFW-8	**Nutrient Trading with Carbon Benefits**	George Kelly, Bob Ensor, Elmer Weibley
AFW-9	**Waste Management through Source Reduction & Advanced Recycling**	Cindy Parker, Ed Dexter

Straw Proposal

AFW-1 Forest Management for Enhanced Carbon Sequestration

Policy Description

Healthy, sustainable and productive forests provide a vast array of benefits. Sustainable forest management enhances environmental benefits and increases social and economical benefits, as well. This policy enhances productivity of healthy sustainable forests. Benefits from this option include increased rates of carbon dioxide (CO_2) sequestration in forest biomass through healthier forests, and increased amounts of carbon stored in harvested, durable wood products.

Practices may include: supplemental planting on poorly stocked lands, age extension of managed stands, thinning and density management, fertilization and wood waste recycling, expanded use of short rotation woody crops (for fiber and energy), expanded use of genetically preferred species, modified biomass removal practices, and/or fire management and risk reduction.

Policy Design

<Joel Dunn: Use Chesapeake Commission goals for purposes of quantification, such as by 2020 restore 25m acres. MWG agrees.

Tad: Positive direction on sequestration. Important to emphasize the value of forests as sinks.

Include outreach and education, both to underscore importance of forests and to teach best management practices for forests.>

Goals:

- Increase the level of sustainable forest management on private land
- Increase private lands in sustainable forest management programs
- Manage public lands using sustainable management practices
- Implement programs for no-net-loss of forests
- Use offset funds to enhance forest management on private lands and reduce conversion to other land uses
- Develop mechanism to aggregate smaller land holdings to compete in meaningful markets
- Include sustainable forest management in the RGGI Carbon Rule
- *As markets are developed, biomass removed through forest management be used first for long-term storage in durable wood products then for beneficial uses such as bio-fuels and energy.*
- **Timing:** short term for policy implementation and up to 20xx to begin to see on the ground changes in practices
- **Parties Involved: :** DNR, MDE, MDA, DNR, counties, SHA, Chesapeake Bay Program, NRCS, USFS, private land owners, public land owners, private sawmills, artisan community,

- **Other:**

Implementation Mechanisms

PLACE HOLDER:
Outreach and education
Revise FCA
Support Sustainable Forestry Act

Related Policies/Programs in Place

PLACE HOLDER:

FCA

Sustainable Forestry Act

Types(s) of GHG Reductions

CO_2: Enhancement of annual carbon sequestration from forest growth and reforestation through forestry management programs. Removal of fuels that contribute to wildfire emissions. Maintain carbon sequestration through the production of durable wood products. Reduce emissions by reducing use of fossil fuels replaced by energy from woody biomass.

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 TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MWG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MWG]

Straw Proposal

AFW-2 Managing Urban Trees and Forests for Greenhouse Gas Benefits

Policy Description

Healthy, sustainable urban forests are essential to our social, economical, and environmental welfare. This policy option maintains and improves the health and longevity of trees in urban and residential areas. Trees in urban areas avoid emissions from power production, maintenance of built structures and infrastructure, and store carbon. Urban trees contribute to lower summertime temperatures in urban areas reducing and the formation of ground-level ozone and the evaporation and volatilization of organic compounds from vehicles. Also, VOCs, NOx, fine PM, and other pollutants are reduced.

This option increases the utilization of wood recovered from urban trees for energy production or in value-added products for long-term carbon storage.

Also, this option expands the tree canopy in urban areas, encourages species diversity while extending survival and longevity rates;

Policy Design

< Be sure to add ozone & temperature regulation leading to reduced energy use as co-benefits. Model numbers based on American Forests recommendations and what Annapolis has found (Mike Galvin at DNR good contact for this info).

Assume a baseline if MD doesn't have one. >

Goals:

- Enhance green infrastructure planning including tying green areas together
- Develop incentives to better use urban wood recovery highest order wood product
- Develop urban tree canopy goals – *guidelines have been established by American Forests 40% overall in East Coast areas, 50% in residential and lower in commercial areas.*
- **Timing:** short timeframe *Need to develop policy specific dates short and long term. Where do we want to be by 2025 and how fast do we want to get there?*
- **Parties Involved:** DNR, MDE, MDA, DNR, counties, municipalities, SHA, Chesapeake Bay Program, NRCS, USFS, private land owners, public land owners, private sawmills, artisan community, landscaping industry, nursery industry, MD Cooperative Extension and Master Gardeners, arborist industry
- **Other:**

Implementation Mechanisms

PLACE HOLDER:

- Outreach and education
- Monitor and report plantings at local level
- Provide enhanced funding from conservation programs like Program Open Space to local jurisdictions to implement policies (like wood recovery and canopy goals) and/or plant trees

Related Policies/Programs in Place

PLACE HOLDER:

Strengthen, fund, and support the Urban Community Forestry Act

Add urban tree canopy goals to act

Types(s) of GHG Reductions

- **CO_2:** Avoidance of emission of carbon dioxide and associated GHGs through the reduction of heating and cooling needs in urban areas. Reduction of surface temperatures reducing volatilization of gasses from vehicles. Maintaining carbon sequestration by creating durable wood products. Reduce use of fossil fuels by using wood waste 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 TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MWG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MWG]

Straw Proposal

AFW-xx Mitigation of Forest Loss Due to Insects, Disease, Pests and Invasive Species

TWG recommends inserting in Forest Management and Urban Forestry Options – MWG accepts that recommendation

Policy Description

Programs that reduce populations of invasive and damaging insects, diseases, plants and other pests enhance forest health and long-term sustainability. This policy option reduces pressures from invasive species on forests increases benefits from forests and helps mitigate for GHG emissions and sequester more carbon. Threats from invasive species are increasing in number and severity, especially since forest lands are more vulnerable due to the accumulation of other stressors. Some native species undermine regeneration efforts, and therefore sustainability. For example, the over abundance of white-tailed deer places excessively browse pressure on regeneration and understory plants in all forests.

Policy Design

Goals:

- Develop prioritization of invasive species and identify species of high priority
- Shift decision making efforts to plan ahead for invasive species problems—move towards prevention or proactive management rather than control and reactive treatment
- **Timing:** very little time needed to implement
- **Parties Involved:** DNR, MDE, MDA, counties, SHA, Chesapeake Bay Program, NRCS, private land owners, landscaping industry, nursery industry, MD Cooperative Extension and Master Gardeners

Implementation Mechanisms

PLACE HOLDER:

- Legislation restricting sale of priority non-native invasive species
- Outreach and education about invasive species and control methods

Related Policies/Programs in Place

PLACE HOLDER:

Develop criteria for legislation (see above)

Types(s) of GHG Reductions

CO_2: Maintenance of annual carbon sequestration from forest growth and reforestation success and preventing the release of carbon from dead and dying trees. Reduce wildfire emissions by maintaining healthy forests.

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 TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MWG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MWG]

AFW-3 Afforestation, Reforestation and Restoration of Forests and Wetlands

Policy Description

Increasing forest and tree cover provides additional benefits for mitigation of GHG. This policy option promotes forest cover and associated carbon stocks by regenerating or establishing healthy, functional forests through afforestation (on lands that have not, in recent history, been forested including agricultural lands) and reforestation (on lands with little or no present forest cover) where current beneficial practices are not displaced. Successful establishment requires commitment for as much as 20 years. Forest patches should be sufficient in size to function as a community of trees.

In addition, this policy promotes the implementation of practices such as soil preparation, erosion control, and supplemental planting to ensure conditions that support forest growth. Identify areas, including all wetlands, that are in need of physical intervention to return forest habitats to full vigor. Additional areas of concern are linking islands of fragmented forests to restore function, recovering severely disturbed lands and reversing the effects of continued toxicity.

Policy Design

< Be careful not to double count with conservation/preservation and forest management.

Use caution with the wording. Afforestation is in RGGI but restoration isn't. Specific uses of revenues from sale of carbon credits is at the discretion of states. Compliance language in RGGI is very rigid. Direction is within the rule, be careful to align with model.

Need to check what's eligible under RGGI re restoration for short term, but can model offsets from this policy over the longer term because RGGI (and other offsets policies) can change.

Provide more specific definitions of reforestation and restoration.

Look closely at cost effectiveness and insure the implementation mechanisms and design compete well.

Don't be constrained on offsets by only looking at RGGI.

Sequestration, ancillary benefits and avoided emissions are very important. Emphasize this aspect.

Use Chesapeake Bay Commission goals where possible. >

Goals:

- Establish sufficient acreage in forests to off set loss of 900 acres each month to development.
- Include another goal to address increasing
- Connect goals to Chesapeake Bay Forest Conservation directive soon to be released

- **Timing:** Timing of implementation depends on funds and policy changes; once trees are planted 6 to 18 years before significant potential for carbon sequestration is predictable
- **Parties Involved:** DNR, counties, SHA, MDA, MDE, Chesapeake Bay Program, NRCS, private land owners

Implementation Mechanisms

PLACE HOLDER:

- Outreach and education
- Green infrastructure plans
- FCMA – tax law program
- Economic incentive to private landowners including promotion of non-traditional products such as hunting leases and passive recreation
- Review fee-in-lieu dollars (amount and use) within the Forest Conservation Act. Fees should be available for easements and set at fair market values. Fee-in-lieu should be used as a last resort and in amounts that make it.
- Allowances from RGGI auctions should be available to for reforestation and restoration.
- Also property and inheritance tax incentives

Related Policies/Programs in Place

PLACE HOLDER: FCA;
Recommend that the Commission for Climate Change and RGGI increase acknowledgment and importance of forests as significant in climate change mitigation

See example from Washington County in implementation of the Forest Conservation Act.

Types(s) of GHG Reductions

CO_2: Increasing annual carbon sequestration from increased forest growth and cover, and restoring wetlands.

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 TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MWG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MWG]

Straw Proposal

AFW-4 Protection and Conservation of Agricultural Land, Coastal Wetlands and Forested Land

Policy Description

Land conservation offers an important mechanism to mitigate and adapt to climate change. Deforestation and other land-use changes account for as much as 25 percent of global greenhouse gas emissions. In addition, the increasing rate of sea level rise and associated erosion threaten Maryland's 7,000 miles of shoreline.

The State of Maryland and its partners should map, designate, prioritize and purchase areas/property interests that provide potential retreat for wetlands and wildlife, address shoreline erosion issues and provide ancillary carbon sequestration benefits.

Policy Design

< Mostly looking at existing programs and use them/fund them better. Joel has identified goals and sent them to GF – THESE ARE INCLUDED BELOW.

Cite watershed-based planning as important tool and add Maryland Department of Planning an involved party.

Look into DNR's Greenprint program regarding green infrastructure planning which takes into account GHG emissions.

Possibly rank POS (point of sale?) money by GHG benefit? State explicitly that there should be no diversion of land conservation funds.

Increase transfer tax on ag/forestry land transfers to non-ag/forestry uses. MD Land Preservation Taskforce suggests doubling that tax on conversion of ag lands to development.

Reduce or eliminate transfer taxes for continued ag/forestry uses. (From Brad H).

Instead of saying "offset allowances", say "proceeds from future Maryland carbon markets" politically sensitive issue (Liz Martin) >

Goals: Leverage funds to protect vulnerable coastal areas, species habitat and sequester carbon dioxide.

Agriculture lands: Increase the protection of productive agricultural lands 300% by 2022 to 1.2 million acres (MALPF Task Force – MDA)

Forest lands: Retain existing levels of forest cover in Maryland, estimated at 2.6 million acres, past 2020 and protect an additional 250,000 acres of forest by 2020 through legal mechanisms, with more than half in areas of high value to water quality (MD Forest Service)

Wetlands: Protect, restore, create or enhance 60,000 acres of wetlands by 2035 (Wetlands Restoration Steering Committee – MDE)

Coastal lands: Increase the number of shoreline miles stabilized through nonstructural shore erosion control (i.e., living shoreline) [Goal?]

Timing: Next legislative session.

- **Parties Involved:** State and quasi-state government agencies, non-profit organizations, foundations and individuals.

Other: Before colonization by Europeans, Maryland was 95% forested, the other 5% being marsh around Chesapeake Bay (Besley, 1916 and Powell and Kingsley, 1980). By 2000, forest had decreased to 42.8% of land cover. Similarly, Maryland has lost 50% of its pre-settlement wetlands (Tiner and Burke, 1995). Developed land use reached 509,200 ha in 2000. The Maryland Department of Planning has projected that by 2020 urban land use will increase by more than 25% from 1997 levels, and that forest cover will decrease a further 9% by 2020 from 1997 levels. Agriculture has also been projected to decrease by 9% during the same period. Maryland loses 260 acres of tidal shoreline to erosion each year [need to determine number of miles of shoreline with nonstructural shoreline erosion control (see shore erosion task force?)].

Implementation Mechanisms

- **Land Preservation Tax Credit – Modify Existing Income Tax Credit for Preservation and Conservation Easements (Md. Code Ann §10-723)**
    - Individuals *and corporations* would be allowed to take a *larger* conservation credit for conveying land located in Maryland for such purposes as historical or conservation preservation, agricultural use, forest use, open space, and natural resource conservation. The credit pool would be capped at $100million per year and prioritized to first accept tax credits in coastal hazard areas.
        - A conservation credit is an income tax credit available to landowners who voluntarily preserve their land through the donation of a conservation easement and or fee title.
        - Landowners with little or no taxable income derive fewer benefits from tax credits than do wealthier landowners with high incomes. To address this issue the credit should be made transferable (not the case under existing law) to other taxpayers for use on Maryland State income tax returns.
    - The maximum credit would be raised to $100,000 per year with an unlimited amount eligible for transfer and use by third parties and could be carried forward for 15 years (as is the case under current law).
    - The transfer of the credit must be completed before the end of the tax year in order to use the credit for that year and must be registered with the Department of Assessment and Taxation to be valid.
    - A cap of $100 million will be placed on the first year of implementation, and will be increased each year by the percentage that the consumer price index (CPI-U) exceeds the previous years CPI-U.
    - A fee of 3% of the appraised value of the donated interest will be charged on the sale of land preservation credits.

  - Funds derived from this program will cover the cost of program management up to 2% with residual monies used for shoreline restoration/conservation fund.

- **CO2 Budget Trading Program**
  - Prioritize the sequestration of carbon through land conservation or restoration by making a fixed percent of CO2 emissions offset allowances exclusively available to land conservation projects.
  - Approve Subtitle 26.09 Maryland CO2 Budget Trading Program, with above modification.
- **Blanket Authorization for Local Bond Initiatives**
  - Authorize all County governments (some are presently restricted) to approve local bond initiatives specifically for land conservation and climate change adaptation.
- **Program Open Space (POS) Targeting**
  - A fixed percentage of POS funds should be directed towards conservation projects that address climate change (CO2 sequestration, shoreline management, and wildlife migration).
- **Extend the Next Generation Farmland Acquisition Program to Maryland Forest Landowners**
  - Through the Maryland Agriculture and Resource Based Industry Development Corp. (MARBIDCO), provide eligible forest landowners up to 70 percent of the easement value of a property, giving the forester equity for a loan to purchase the property.
  - The forester then has the option of finding a land preservation program to buy the development rights at a higher price within three years, paying back MARBIDCO and pocketing the difference. Otherwise, the state pays back MARBIDCO's investment (POS funds) and takes over the easement (Maryland Environmental Trust).
- **Others**
  - Statutory and regulatory changes to cited laws.
  - Modify income tax policy regarding land conservation credits, cap credit pool to $100mm. Maximum credit suggested is $100m/year. *(Concept: update Tax Credit program to be more similar to VA to incentivize land conservation.)*
  - Generate pool of money from industry off-set allowances; earmark a certain amount specifically for land conservation.
  - Encourage local bond initiatives – allow through state authorization.
  - Encourage and support right of local governments to hold taxes specifically for conservation.

Related Policies/Programs in Place

Program Open Space (POS)
Rural Legacy Program (RLP)
Maryland Agricultural Land

Preservation Foundation (MALPF)
Maryland Environmental Trust (MET)
Maryland Historical Trust (MHT)

Types(s) of GHG Reductions

CO_2: Preventing release of carbon from conversion of forests, wetlands, and agricultural lands to development. Maintain annual carbon sequestration from forest growth, thriving wetlands and productive agricultural lands. Reduce urban sprawl thus avoiding additional emissions from vehicle miles traveled.

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 TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Straw Proposal

AFW-5 "Buy Local" Programs for Sustainable Agriculture, Wood and Wood Products

Policy Description

Promote the sustainable 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, reduced production-related emissions *(how might this be accomplished?)* and enhanced forest health.

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.

The use of wood products displaces GHG emissions associated with processing high-energy input materials such as steel, plastic and concrete.

Increased demand for local wood products increases opportunities for forest management treatments that improve forest health and sustainability, thereby improving sequestration and nutrient absorption.

Policy Design

< The RPS (Renewable Portfolio Standard) does include biomass and methane in Tier 1 and Tier 2. Make sure we don't double count.

Sustainable biomass- look at definition of biomass in RPS

Put leverage on local governments to be part of the solution by ensuring that zoning does not preclude intelligent, sustainable uses that support this objective, such as constraining local value-add mills or limit location/participation in local markets.>

Goals: Several projects are being proposed in Maryland that would result in the increase of local farmer's markets in Maryland by 25% by 2015 and 50% by 2020. Of the food Marylanders consume, 80% would be grown or produced locally by 2050. The amount of locally grown and processed lumber would displace imported wood by 20% by 2015 and 50% by 2050.

- **Timing:** Startup in 2009 and ramp up to higher levels in 2015 and 2020, consistent with goals.
- **Parties Involved:** Agricultural and wood product primary producers such as Maryland farmers, lumber mills, farmer's market associations and promoters; value-added producers such as Maryland caterers, producers of packaged food for retail, furniture makers, construction businesses, wholesalers and retailers of construction and do-it-youself products,

architects and designers; applicable trade associations, Dept. of Agriculture, Dept. of Natural Resources, LEED certification entities.

- **Other:** As needed, identify incentives that encourage the sustainable growing and harvesting of local agricultural and wood products.

Implementation Mechanisms

Specific incentives recommended:
Care must be taken to ensure that the wood and agricultural products are sustainably harvested and produced to create a net carbon sequestration and reduction in emissions.

The following will be included in further discussions:
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.

Related Policies/Programs in Place

The Maryland Dept. of Agriculture has recently been revitalized and is actively promoting a Buy Local program by (list specific actions and incentives here).

Types(s) of GHG Reductions

CO_2: Extending carbon sequestration in durable wood products and wood construction. Maintaining carbon sequestration in healthy forests. Avoidance of emissions through reduced transportation miles. Avoidance of emissions through reduced use of high-energy input construction materials.

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 TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MWG meeting #5]

Straw Proposal

AFW-6 Expanded Use of Forest and Farm Feedstocks and Bi-Products for Energy Production

Policy Description

Sustainable forest and farm practices produce bi-products and feed stocks. These are renewable sources of energy. This policy option should increase the utilization of biomass from urban and rural feed stocks including processing byproducts for generation of electricity, thermal energy, and transportation fuels. Additionally, this option should reduce the amount of methane emissions from livestock manure by installing manure digesters and energy recovery projects.

All sources will be considered and implementation strategies will ensure the sustainability of supply. Energy from forest and farm feed stocks and bi-products are used to create heat or power, which offsets fossil fuel-based energy production and associated greenhouse gas (GHG) emissions.

[Note: Need to add reductions from municipal sources of methane.]

Policy Design

< Need to cite/include "sustainably harvested". Look at possible impacts of local zoning (that should be modified as part of the recommendation).

Look to whole life cycle of biomass.

Suggest using a % improvement in describing goals.>

Goals: *Need to establish general goals by dates to 2025 so benefits and costs can be quantified. What is the desired goal(s) in terms of carbon emission reductions over time in MD?* .

- Install manure digesters and energy recovery projects –*such as hog and dairy*
- Crop residue potentially available – *what % targeted for collection and utilization?*
- Establish certain acreage target for energy crops
- Ensure wood-based energy is given weight equal to wind and solar-based energy in renewable energy credits

- Many questions about biomass supply remain making projections that drive technology and policy difficult to estimate. Given the current information, it may be too early in the development process to predict goals. Therefore preliminary goals should include
    - Develop benchmarks to implement mechanisms for improvements
    - Developing processes and identifying resources to capture data
    - Develop metrics and methodology of data collection and analysis
- **Timing: TBD** (no measurable goals therefore no timeline to come into compliance)
- **Parties Involved:** Maryland Energy Administration, DNR, MDE, municipalities, power producers (Mirant and Constellation), local electric utilities (distributors), Board of Education, rural community entities (hospitals, community colleges, and universities), Department of Agriculture, Soil Conservation Districts
- **Other:**

Implementation Mechanisms

PLACE HOLDER:

- Outreach and education
- Change present laws to add incentives (such as Maryland Clean Energy Act)
- Increase incentives through programs such as Fuels for Schools, tax-forgiveness
- Department of General Service could provide equal credit to efficient design, energy efficiently loan programs, etc.

Related Policies/Programs in Place

PLACE HOLDER:
Modify the Renewable Portfolio Standards requiring local sources of renewable energy

Types(s) of GHG Reductions

- **CO_2, N_2O, CH_4:** Displaces emissions from fossil fuel combustion.

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 TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MWG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MWG/MCCC]

Straw Proposal

AFW-7 In-State Liquid Biofuels Production

Policy Description

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 fuels. Favor the use of cellulosic and non-food source starches in ethanol production and monitor to ensure the sustainability of feedstocks and soil health.

Policy Design

<Think about lifecycle of biofuels too (e.g., switchgrass, not more corn) TLU and LCFS is also dealing with this issue.. Suggest using a % improvement in describing goals. (Liz)>

Encourage biofuels but be cautious on encouraging food stuffs like corn.

Coordinate with TLU as they will be looking at a similar proposal.

Look to whole life cycle of biomass.>

Comments from Bob Ensor (AFW TWG): Need comprehensive evaluation of the availability of materials for use in the production of ethanol through cellulosic digestion. I expect there really is not an adequate supply of farm feedstock wastes (corn stalks, etc) to do much with this. The corn stalks and soybean residue are critical components of maintaining soil organic matter and overall soil health throughout the US. When Agricultural Best Management Practices (BMP's) are discussed there is a technical guideline inferred that crop residues will be utilized on the land to reduce erosion to tolerable levels, reduce nutrient loss to an absolute minimum and maintain organic matter levels in the soil. So farm feedstocks may need to be eliminated from the list or at

least considered in a reduced amount. The planting and harvesting of Switchgrass or other permanent grass crop for the purpose of energy production is a different, and more favorable, story and should work OK.

The process of anaerobic digestion of livestock waste reduces the nutrient value of the waste, so one side effect is that farmers will have to purchase and apply additional commercial fertilizer to maintain crop production. I don't know what the carbon balance is between what is being proposed with methane capture and the carbon production associated with fertilizer production. I expect it may be a net of zero but I have not done a literature search on this one.

Goals: Develop specific policies based on cellulosic feedstock and value-added by-product study due in December 2007 with production volumes, percent supply use.

- **Timing:** Startup in 20xx and ramp up to higher levels in 20xx and 20xx, consistent with goals.
- **Parties Involved:** Suppliers of feedstocks, ethanol producers, distributors, communities adjacent to potential facilities, environmental groups, etc. Associated agencies would include: Maryland Department of Natural Resources, MD Energy Administration, Department of Agriculture, Department of Business and Economic Development, etc.

Other:

Currently there are no commercial cellulosic ethanol plants in the United States. One large plant is under construction in Georgia, one has just broken ground in Montana and a few others are being planned across the country. There are no plants proposed in MD, except for corn-based plants.

There are two biodiesel plants in the state totaling 5 million gallons per year.

Implementation Mechanisms

- Develop a state strategy for increasing production of biofuels
    - Based on the MEA/Salisbury University study results of statewide feedstock supply (December 2007), determine opportunities for appropriately-scaled, cellulose-based biofuels facilities
    - Policy options could include:
        - Ensure wood-based energy is given weight equal to wind and solar-based energy in renewable energy credits
            - Change current Renewable Fuels Incentive to include cellulosic ethanol production specifically and give a larger incentive to it
        - Establish tax credit and grant program for E85 filling stations
        - Change existing gasoline specifications in Maryland so that ethanol can be blended into conventional fuel
- Integrate state strategy with regional activities to serve as a market for Maryland supply
- Promote the development of technologies to fractionate black liquor (from paper mills) which can be refined into valuable products using a thermo-chemical or other processes

- Provide financial incentive to research the production of bio-oils from algae grown in wastewater effluents
- Provide "bonus" renewable energy credits for fuels generated in-state or from fuels derived from in-state sources
- Provide access to long-term, low-interest financing for new cellulosic ethanol facilities and supporting infrastructure
- Tax credits and grant programs designed to reduce capital costs of new cellulosic ethanol facilities and supporting infrastructure
- Foster partnerships between users, suppliers, corporations, and adjacent communities
- Provide incentives to communities that provide supply (e.g. woody debris) to biofuels industries
- Provide reliable and predictable supply of cellulose from state lands while ensuring sustainable management
- Incentivize local production of biofuels

Related Policies/Programs in Place

- Renewable Fuels Incentive Act
- Cellulosic feedstock and value-added by-product study (MEA)
    - Feasibility studies
- Renewable Fuels Task Force (created by statute)
- Grants for E85 refueling stations (MEA- but very limited funds- $50,000 total)
- Increase E85 use in State Government
- US DOE construction grants (for bio-fuels plants?)
- Federal loan guarantees (for bio-fuels plants?)
- Potential 2007 Farm Bill programs (need some specifics on this)

Types(s) of GHG Reductions

CO_2: Lifecycle emissions are reduced to the extent that biofuels are produced with lower embedded fossil-based carbon than conventional (fossil) fuel. Feedstocks used for producing biofuels can be made from crops or other biomass, which contain carbon sequestered during photosynthesis (e.g., biogenic or short-term carbon).

Estimated GHG Reductions and Net Costs or Cost Savings

According to studies conducted by the U.S. Department of Energy's Argonne National Laboratory, one of the benefits of cellulosic ethanol is that it reduces greenhouse gas emissions (GHG) by 85% over reformulated gasoline. By contrast, starch ethanol (e.g., from corn), which most frequently uses natural gas to provide energy for the process, reduces GHG emissions by 18% to 29% over gasoline.

- **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

Cost competitiveness of biofuels will depend on cost of oil

Does Maryland have enough supply to sustain a cellulosic ethanol plant?

Construction of pilot scale lignocellulosic ethanol plants requires considerable financial support through grants and subsidies.

Will cellulosic ethanol plants be commercially viable?

> Current costs for pilot programs translate into $7/annual gallon in capital investment costs. This seems to be high because these are pilot plants; in the near future, these costs may drop to 2.5 - 4 times the capital costs of a corn ethanol plant. For comparison, corn to ethanol plants cost roughly $1 - $3/annual gallon capacity.
>
> In June 2006, a U.S. Senate hearing was told that the current cost of producing cellulosic ethanol is US $2.25 per US gallon (US $0.59/litre). This is primarily due to the current poor conversion efficiency. At that price it would cost about $120 to substitute a barrel of oil (42 gallons), taking into account the lower energy content of ethanol. However, the Department of Energy is optimistic and has requested a doubling of research funding. The same Senate hearing was told that the research target was to reduce the cost of production to US $1.07 per US gallon (US $0.28/litre) by 2012.

Potential for biodiversity impacts

Additional Benefits and Costs

Unlike corn ethanol, does not compete with the production of food

Far less impacts than corn ethanol on water quality and could actually reduce nutrient loads in some circumstances

Permanent new source of income for farmers and foresters

Just current waste streams could replace 30% of current US fuel consumption. Incorporating other sources provides an almost unlimited capacity to replace our on gasoline and our dependence on foreign oil.

Environment

Recycling money in local economies

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MWG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MWG]

Straw Proposal

AFW-8 Nutrient Trading with Carbon Benefits

Policy Description

Nutrient trading, particularly trading between point sources (such as waste water treatment plants) and non-point sources (such as agricultural operations), provides the opportunity to create significant carbon sequestration benefits in Maryland.

Nutrient trading is a flexible and cost-effective means to achieve water quality improvements while also providing significant carbon benefits. Nutrient trading is the transfer of credits created through nutrient reduction from one source, specifically nitrogen and phosphorus. For example, buyers who need to apply or release more nutrients than currently permitted under state-law could obtain credits from sellers who have produced excess nutrient credits. Opportunities exist to apply this policy to also promote and register any carbon reductions associated with nutrient reduction practices. These polices would apply to agriculture, wastewater treatment plants, industrial dischargers, highway contractors and developers.

Besides creating economic benefits, nutrient trading encourages improved efficiency of fertilizer use and other nitrogen-based soil amendments through best management practices and advanced technologies. Advanced technologies such as GPS and GreenSeeker can assist in precision application of nitrogen on crops.

Many of the best management practices that would be incentivized under the nutrient trading program would also result in significant greenhouse gas reductions, such as no-till, conservation tillage, improved irrigation management, conservation buffers, grassland plantings, green infrastructure, afforestation, reforestation and restoration of wetlands.

Note: Excess nitrogen not metabolized by plants can leach into groundwater and/or be emitted to the atmosphere as N_2O which has 310 times the effect as one unit of CO_2. Better nutrient utilization can lead to lower nitrous oxide emissions from run-off.

Policy Design

< Need to look into ability to include these strategies in the TCR (what's TRC?).

Need also to look into if/how to have a cap against which to trade. This is important so as not to overpromise and under-deliver. Also keep costs under control and stay focused on the real goal of reducing GHG rather than just trading for economic gain. (Brad H)

Include acreage benefits and ancillary benefits.

Quantify as best as possible what the saving might be in nutrient reductions. Have a 2010 target – perhaps that should be the cap?

Check with CC TWG if there is overlap in the registry process.

Consider placing nutrient trading options in permits.>

Goals: Build on existing point source nutrient trading policy document being developed by the Maryland Department of the Environment and develop a complimentary agricultural non-point source policy to include carbon and nutrients. This can be accomplished through regulation and guidance.

Need the desired goal(s) to 2025 in terms of carbon emission reductions over time in MD. It could be amount of acreage in program or number of participants or expressed in terms of carbon.

Need one goal to address nutrients and another to address carbon. For example: Through this program nitrogen will be reduced x% by 2025. Carbon will be reduced by xx % by 2025 through sequestration.

The Chesapeake Bay Program has specific reduction goals. Those could be incorporated.

Perhaps this is qualitative rather than quantitative because it takes in such a wide range of implementation mechanisms which are to some extent voluntary.

Work with MDA to put together some state-wide scenarios and come up with some goals.

- **Work Group:** Agricultural Nutrient Trading Advisory Committee formed and convened November 20, 2007. A draft policy on the non-point source policy is slated for public review by February, 2008.
- **Timing:** Adopt policy by first quarter 2008, stakeholder meetings in spring, and finalize by June, 2008.
- **Parties Involved:** Agricultural and urban non-point sources; municipal wastewater treatment plants; industrial and commercial dischargers; Soil Conservation Districts, Maryland Department of the Environment and Maryland Department of Agricultural.
- **Other:** Septic system owners; other non-point sources; Chesapeake Bay Foundation; University of Maryland; World Resources Institute; Maryland Association of Municipal Wastewater Agencies; Soil Conservation Service.

Implementation Mechanisms

A nutrient/carbon trading policy could be implemented through watershed-based MDE general permit that authorizes trading to occur. A point and non-point source trading policy would be developed and finalized by the MDE and MDA. Any credits produced would be certified and the carbon sequestered could be placed on the state registry and eligible for sale in the event such credits meet applicable standards under emerging state and federal laws/polices on greenhouse gasses.

Related Policies/Programs in Place

- Chesapeake Bay Program, Nutrient Trading, Fundamental Principles and Guidance, March, 2001.
- MDE point source trading document, to be issued by end of 2007.
- EPA Water Quality Trading Policy, 2003.

- EPA, Water Quality Trading Took Kit for Permit Writers, 2007.
- Maryland Nutrient Management Act of 1998.
- Virginia Chesapeake Bay Watershed Nutrient Credit Exchange Program, 2005
- Pennsylvania Policy and Guidelines on Trading of Nutrient and Sediment Reduction Credits, 2006.

Types(s) of GHG Reductions

- **N_2O:** reductions occur when nitrogen run-off and leaching are reduced, which leads to the formation and emission of N_2O.
- **CO_2:** Carbon is sequestered through riparian buffers; soil sequestration; and constructed wetlands.
- **CH_4:** Methane is reduced through agricultural best management practices or captured for renewable energy.

Estimated GHG Reductions and Net Costs or Cost Savings

- **Data Sources:** See reference documents regarding carbon sequestration rates from reforestation**.** For example, see the USDA Forestry Inventory and Analysis "look up tables", USDOE's 1605 (b) look up table; Winrock carbon uptake model; Chapman – Richards growth model. See reference documents regarding carbon sequestration rates from no-till practices, such as Va. Tech Rainfall Simulate Research. Also, see research analysis from USDA/ARS in Fort Collins, Colorado, which included analysis on deep core soil samples for baseline data under NLEAP and CEQUESTER models.
- **Quantification Methods:**
- **Key Assumptions:**

Key Uncertainties

Due to weather and drought conditions there may be a discrepancy between estimated and actual nutrient and GHG reductions. This poses some uncertainties in certifying credits in advance of project construction.

Additional Benefits and Costs

Ancillary conservation benefits; wildlife corridors; enhanced biodiversity, and leveraged private capital in ecosystem restoration projects.

Feasibility Issues

Pending –

Status of Group Approval

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Level of Group Support

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Barriers to Consensus

- Baseline issues: what are the minimum standards below which credits will be generated
- When should trading occur – now or in the future after implementation of certain regulatory standards?
- Duration of trade: 10 years or life of BMP?

Straw Proposal

AFW-9 Waste Management through Source Reduction & Advanced Recycling

Policy Description

Reduce the volume of waste from residential, commercial, and government sectors through programs that reduce the generation of wastes and enhance reuse of product components and manufacturer's lifetime product responsibility. Reduction of generation at the source reduces both landfill emissions as well as upstream production emissions. Increase recycling and reduce waste generation in order to limit greenhouse gas emissions associated with the production of raw materials.

Reduce methane emissions associated with landfilling by reducing and recycling the biodegradable fraction of waste emplaced.

For products that can not be reused, 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 to enhance and encourage upcycling (where the remanufactured product is equal to or higher in quality than the original product).

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

Policy Design

< Baseline, specifiy from 2006 levels.

Be more explicit in what this is trying to accomplish.

Statewide goals in recycling may be harder to accomplish in rural counties with lower volumes of overall waste. Perhaps set or recommend county by county goals. Goal is 50% in urban areas but they seem to be stuck at about 30%. (Ed)

Add discussion of consumer's role in reducing overall consumption. Perhaps look at incentives or disincentives to reduce consumption. (Frank)

Categories may be more useful in accurately addressing % of waste stream diverted to recycling. For example, break out paper, metal, glass, etc. May make analysis and monitoring progress easier. >

- **Goals**: Waste stream will be reduced by 15% in 2012, 25% by 2015, 35% by 2020, and 80% by 2050. Recycling stream will increase by 10% by 2012, 20% by 2015, 30% by 2020, then gradually decrease to 10% by 2050 as more products and their components are reused and new source use also decreases.
- **Timing**: Startup in 2010 and ramp up to higher levels in 2012 and 2015, consistent with goals
- **Parties Involved:** Manufacturers, relevant trade associations, consumer's associations, all state and local agencies,
- **Other:** As needed, identify incentives that encourage the reuse of materials and products, recycling of materials and products, and discourages the single-use waste of products. In addition, identify incentives to reduce the amount of raw materials used. Increase quality as a means to enhance product longevity with innovative programs to reward manufacturers for quality. Identify and phase out any subsidies that discourage waste reduction, reuse of components, or improved quality and longevity of products. Work with cross-cutting TWG to include education regarding the wisdom of these policies to all segments of the population including the public.

Implementation Mechanisms

All government agencies would be required/encouraged to preferentially purchase goods made from reused and recycled materials and goods from manufacturers who take "cradle to cradle" responsibility for their products,

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. These tend to be problematic and can have negative impacts not only in smell but in groundwater pollution.

The European Union has WEEE (Waste Electronic and Electrical Equipment) Directive. Manufacturers of all electronic and electrical equipment sold in Europe are required to take back all products when no longer useful or desired by the purchaser. This encourages interchangeable, reusable parts; elimination of toxins and heavy metals; and maximum recycling, significantly reducing waste.

Related Policies/Programs in Place

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

Types(s) of GHG Reductions

- **CH_4:** Methane reductions because of reduced volumes in landfills. Diverting biodegradable wastes from landfills will result in a decrease in methane gas releases from landfills.
- **CO_2:** Upstream Energy Use Reductions – The energy and GHG intensity of manufacturing a product is generally less using recycled feedstocks than from using virgin feedstocks.

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]

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

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MWG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MWG meeting #5]

Barriers to Consensus

TBD – [blank until final vote until final MWG meeting]