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Cross-Cutting Issues Technical Work Group

Summary List of Pending Policy Options

	Policy Option	GHG Reductions ($MMtCO_2e$)			Net Present Value 2007–2020 (Million $)	Cost-Effectiveness ($/tCO_2e$)	Status of Option
		2010	2020	Total 2007-2020			
CC-1	GHG Inventories and Forecasting,	*Not Quantified*					Pending
CC-2	GHG Reporting and Registry	*Not Quantified*					Pending
CC-3	Statewide GHG Reduction Goals and Targets	*Not Quantified*					Pending
CC-4	State and Local Government GHG Emissions (Lead-by-Example)	*Not Quantified*					Pending
CC-5	Public Education and Outreach	*Not Quantified*					Pending
CC-6	Tax and Cap Policies	*Not Quantified*					Being addressed by ES TWG.
CC-7	Review Institutional Capacity to Address Climate Change Issues, including Seeking Funding for Implementation of Climate Action Panel Recommendations	*Not Quantified*					Pending
CC-8	Participate in Regional, Multi-State and National GHG Reduction Efforts	*Not Quantified*					Pending
CC-9	Promote Economic Development Opportunities Associated with Reducing GHG Emissions in MD	*Not Quantified*					Pending
CC-10	Create Capacity to Address Climate Change Issues in and "After Peak Oil" Context	*Not Quantified*					Pending
CC-11	Evaluate Climate Change Policy Options to determine Projected Public Health Risks/ Costs/Benefits						
CC-12							Combined w/ CC-7

CC-1. GHG Inventories and Forecasting

Policy Description

Greenhouse gas (GHG) emissions inventories and forecasts are essential for understanding the magnitude of all emission sources and sinks (both anthropogenic and natural), the relative contribution of various types of emission sources and sinks to total emissions, and the factors that affect trends over time. Inventories and forecasts help to inform state leaders and the public on statewide trends, opportunities for mitigating emissions or enhancing sinks, and verifying GHG reductions associated with implementation of action plan initiatives.

Policy Design

The CC TWG recommends that the state institute formal GHG inventory and forecast and GHG reporting functions.

Goals:

- Develop a periodic, consistent and complete inventory of emission sources and sinks on a frequent basis. To the degree that data and methods allow, the inventory should include all natural and man-made emissions generated within the boundaries of the state (e.g., a production-based inventory approach), as well as emissions associated with energy imported and consumed in the state (e.g., a consumption-based inventory approach). The inventory should, through performance metrics and differences in year-to-year emissions, provide a way of documenting and illuminating trends in state GHG emissions.
- Develop a protocol for use in preparing the statewide emission and sink inventory.
- Develop a periodic, consistent and complete forecast of future greenhouse gas emissions in at least 5 and 10 year increments extending at least 20 years into the future. The GHG forecast should be updated periodically. The GHG forecast should reflect projected growth as well as the implementation of scheduled mitigation projects. In the forecasting of future GHG emissions, the treatment of uncertainties should be transparent, as consistent as possible across sectors and time and, to the extent possible, reflect multiple scenarios. The estimation methods should be consistent with those used to develop the emission inventory and should reflect best practice.
- Develop a standardized protocol for the periodic forecasting of statewide GHG emissions.

Timing: This function should be implemented as soon as possible as allowed by current funding and supplemented in 2008 with pertinent appropriation requests. The institutional capability should be created as soon as possible by Executive Order and by policy and budget legislation. A supplemental budget should be introduced in the 2008 session of the General Assembly. An Executive Order should be issued in 2008. To the extent necessary, legislation should be enacted in 2009.

Parties Involved: All GHG emission sources and sinks (both anthropogenic and natural) should be included in the inventory and forecast.

Other: Not applicable.

Implementation Mechanisms

Seek funding through an FY 2008 supplemental bill and full funding in the FY 09 budget request. Current agency actions should be used as a basis for expansion of efforts. A standardized protocol should be developed. MDE does not currently track vehicle emissions, which should be included in the protocol. The Climate Registry is developing a protocol, but this process is happening slowly.

Related Policies/Programs in Place

MDE currently has 3 FTE working in the air quality planning and modeling program. Need to expand existing agency program staffing and financing to address GHG.. See Option 7.

Types(s) of GHG Reductions

Not applicable.

Estimated GHG Savings and Costs per $MTCO_2e$

Not applicable.

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

Pending.

Level of Group Support

TBD.

Barriers to Consensus

TBD.

CC-2. GHG Reporting and Registry

Policy Description

GHG reporting reflects the measurement and reporting of GHG emissions to support tracking and management of emissions. GHG reporting can help sources identify emission reduction opportunities and reduce risks associated with possible future GHG mandates by moving "up the learning curve." Tracking and reporting of GHG emissions can also help in the construction of periodic state GHG inventories. GHG reporting is a precursor for sources to participate in GHG reduction programs, opportunities for recognition, and a GHG emission reduction registry, as well as to secure "baseline protection" (i.e., credit for early reductions).

A GHG registry enables recording of GHG emissions reductions in a central repository with "transaction ledger" capacity to support tracking, management, and "ownership" of emission reductions; establish baseline protection; enable recognition opportunities; and/or provide a mechanism for regional, multi-state, and cross-border cooperation. Properly designed registry structures also provide a foundation for possible future trading programs.

Policy Design

- Develop and manage a common greenhouse gas emissions reporting system with high integrity that is capable of supporting multiple greenhouse gas emissions reporting and emissions reduction policies for its member states/tribes and reporting entities; and

- Provide an accurate, complete, consistent, transparent, and verified set of greenhouse gas emissions data from reporting entities, supported by a robust accounting and verification infrastructure.
- Reporting should occur annually on a calendar-year basis for all six traditional GHGs and, to the extent possible, for black carbon.
- Reporting of direct emissions[1] should be required; reporting of emissions associated with purchased power and heat[2] should be phased in, and voluntary reporting of other indirect emissions[3] should be allowed.
- Every effort should be made to maximize consistency with federal, regional, and other states' GHG reporting programs.
- GHG emissions reports should be verified through current certification processes including federal CFR Part 75 Data quality assurance procedures where applicable. Data not subject to comprehensive protocols may need third party certification.

[1] Defined as "Scope 1" emissions in the *GHG Protocol*.
[2] Defined as "Scope 2" emissions in the *GHG Protocol*.
[3] Defined as "Scope 3" emissions in the *GHG Protocol*.

- The state should include provisions to exclude deminimus emission sources, where appropriate.
- Project-based emissions reporting should be allowed, when properly identified as such and quantified with equally rigorous consistency.
- The reporting program should provide for full transparency of reported emissions.
- The CC TWG notes that Maryland has joined the effort to develop a national GHG registry through The Climate Registry.
- Strive for maximum consistency with other state, regional, and/or national efforts; greatest flexibility as GHG mitigation approaches evolve; and providing guidance to assist participants.

Goals: Implementation of a GHG registry for Maryland sources as soon as possible.

Timing: As soon as possible

Parties Involved: Probably overseen by MDE; costs shared by participants benefiting from the registry.

Other: [Insert text as appropriate]

Implementation Mechanisms

- Build the GHG emission reduction requirements into Air permits.
- Address all GHG emissions, not just CO_2. Develop protocols foe reporting.
- Allow for calculation of GHG emissions, where the MDE determines that is appropriate.

Related Policies/Programs in Place

Currently have annual emission certification requirements for large sources for criteria pollutants and acid rain sources. Need to expand it to more sources and all GHG emissions.

Types(s) of GHG Reductions

[Insert text as appropriate]

Estimated GHG Savings and Costs per $MTCO_2e$

Not applicable.

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

Pending.

Level of Group Support

TBD.

Barriers to Consensus

TBD.

CC-3. Statewide GHG Reduction Goals and Targets

Policy Description

Governor O'Malley's April 2007 Executive Order not only created the Commission on Climate Change but also established the presumptive GHG reduction goals for the State. Maryland's greenhouse gas emissions are to be reduced to 1990 levels by 2020 and reduced to 80% of 2006 levels by 2050. An Interim Report to the Governor and General Assembly (December, 2007) resulting from the first phase of the MCCC process recommends revised goals that are more ambitious than the original order. (These proposals are described below.)

After reviewing recent reports issues by the International Panel on Climate Change and a summary of studies compiled by the Scientific and Technical Working Group, the Mitigation Working Group has concluded that it is absolutely necessary to adopt "stretch" goals for reducing Maryland's GHG emissions. Reductions occurring earlier in time have much more mitigation value than reductions later in time. Reductions in the 20% to 50% range by 2020 (2006 base) appear to be needed to avoid the IPCC's most catastrophic forecasts. Specific targets for GHG reductions by 2012/15, 2020 and 2050 are essential to provide a framework for Maryland's reduction efforts. These goals should be relative to Marylanders' consumption-based GHG emissions. Because new data, information and studies will become available in future years, the Mitigation Working Group recommends in-depth review of the targets every four years.

The goals presented below reflect the recommendations included in the Maryland Commission on Climate Change's (MCCC)'s Interim Report to the Governor.

Policy Design

- **Goals:** By Executive Order and legislation, the Governor and General Assembly should adopt the following specific goals for reduction of Maryland's greenhouse gas emissions:
  - 10% below 2006 GHG emission levels (using a consumption-based approach) by 2012
  - 15% below 2006 levels by 2015 [Both to be used as reduction goals for Maryland's Climate Action Plan.]
  - 25-50% below 2006 levels by 2020 [25% to be used as the "minimum" enforceable, regulatory driver for the Global Warming Solutions legislation. 50% to be used as a science-based, non-regulatory reduction goal for Maryland's Climate Action Plan. Programs to implement the legislation would reward market-based reductions above 25%.]
  - 90% below 2006 levels by 2050 [A science-based regulatory goal in the Global Warming Solutions legislation. It would provide a driver for research an d development of climate neutral technology/programs/innovations.]

  - Mid-course reviews- Conduct a science- based review of the goals at least every four years starting in 2012.
  - Track progress from 1990 levels as well
- **Timing:** The goals should be adopted in 2008.
- **Parties Involved:** All state and county governments and the citizens of Maryland.
- Other: The Executive Branch should issue a report to the public every second year, beginning in 2010, summarizing Maryland's programs and activities for greenhouse gas reductions and evaluating Maryland's progress in achieving State's mitigation targets.

Implementation Mechanisms

Propose a legislative initiative in the 2008 session with these goals included. Include a definition of GHG in the legislation.

Related Policies/Programs in Place

Governors Executive Order and the MCCC Interim Report

Types(s) of GHG Reductions

Not applicable.

Estimated GHG Savings and Costs per $MTCO_2e$

Not applicable.

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

Pending.

Level of Group Support

TBD.

Barriers to Consensus

TBD.

CC-4. State and Local Government GHG Emissions (Lead-by-Example)

NOTE: The Policy Option described below is the same as RCI-4.

Policy Description

The State of Maryland and Municipal and County Governments can provide leadership in moving the state forward by adopting policies that improve the energy efficiency of new and renovated public buildings, facilities and operations. Recognizing that governments should "lead by example" the option presented here provides energy use targets to improve the efficiency of energy use in new and existing State and local government buildings, facilities and operations. The proposed policy provides energy efficiency targets that are much higher than code standards for new state-funded and other government buildings, facilities and operations. This option sets energy-efficiency goals for the existing government building stock, as well as for new construction and major renovations of government buildings, facilities and operations.

Potential elements of this policy include:

- Government buildings, facilities and related operations (please note this to include wastewater and water utilities) will be in operation for many years and should be designed in a manner that meets or exceeds private sector mandated building and trade energy efficiency. Because these buildings and facilities will be in operation for many years, savings can pay for themselves in life cycle cost reductions in energy costs and improvements in workforce efficiency. All new State buildings and facilities, and renovations and additions shall be Leadership in Energy and Environmental Design (LEED) certified at the "silver" or equivalent level, and meets or exceeds the energy efficiency and renewable energy goals below stated.

- Existing State and local government buildings shall be retrofitted for energy efficiency achieving 100% of cost-effective energy efficiency by the year 2015. To meet this goal, the State and local governments shall benchmark all buildings and facilities within the next 3 years.

- The State and local governments should consider comprehensive environmental and public health impacts as well as energy efficiencies. The goal of the State and local governments shall be to purchase goods from companies that practice energy use reduction and sequestration of carbon dioxide. Encourage citizens to place less emphasis on consumption and promote the use of materials that are compostable, recyclable, and reusable. Ensure that contracting procedures do not discriminate against reusable, recycled, or environmentally preferable products with sufficient and specific justification. Utilize environmentally preferable products to determine the extent to which they may be used by the State and local governments and their contractors. Review and revise contracting procedures to maximize the specification of designated environmentally preferable products where practicable. Adopt purchasing specifications that comply with U.S. Environmental Protection Agency Comprehensive Procurement Guidelines for preferred products. Recovered Materials Advisory Notices (RMAN) shall be used as a

reference for determining the recycled content specifications for these products. Make sure that these initiatives do not adversely impact public health. Programs shall include but will not be limited to:

- All printing and copy paper products shall consist of a minimum of 30% post-consumer recycled fiber. All janitorial paper products shall consist of a minimum of 50% post-consumer content. A ten percent price preference for processed chlorine-free paper shall be applied to (100 percent) of photocopy-grace and janitorial paper purchases. Returning used toner cartridges for remanufacture and purchase re-manufactured toner cartridges when practicable. To the extent practicable, no janitorial cleaning or disinfecting products shall contain ingredients that are identified by United States Environmental Protection Agency or the National Institute for Occupational Safety and Health as carcinogens, mutagens, or teratogens.
- Phase out the use of chlorofluorocarbons containing refrigerants, solvents and other products. All surfactants shall meet EPA standards as "readily biodegradable". Where practicable, no detergents shall contain phosphates.
- Shall not procure products that originate from rainforest hardwood or tropical wood.
- Where practicable, purchased or leased electronic equipment including photocopiers, computers, printers, lighting systems, HVAC, kitchen and laundering appliances, and energy management systems must meet U.S. Environmental Protection Agency (EPA), Energy Star-certified or the equivalent, or U.S. Department of Energy (DOE) energy efficiency standards. Where applicable, the energy efficiency function must remain enabled on all energy efficient equipment.
- All motor oil shall contain a minimum 25 percent re-refined base stock. All re-refined oil must be American Petroleum Institute certified. All motor vehicles operated by the government shall use recycled propylene glycol antifreeze.
- Paint purchased by the government or its contractors shall contain the minimum amount necessary of volatile organic compounds, and shall contain maximum recycled content where practicable.
- Shall implement an integrated pest management program for pest control. Any chemicals used to eliminate or deter insect pests and undesirable vegetation shall be the most readily and completely biodegradable product available for the given application, and shall be applied in a manner that is least likely to come into contact with humans and any other animals for which treatment is not intended. Shall give preference to products that are produced and are available locally. All governments shall ensure that they and their contractors/consultants use double-sided copying. Shall reduce or eliminate its use of products that contribute to the formation of dioxin and furan compounds.
- The following are environmentally preferred products: Compostable and vegetative products; Horticultural mulch made with recycled land clearing and other wood debris; Construction aggregates made with recycled cement concrete, glass or asphalt; Alternative fuels and vehicles and rolling stock that utilize same including, but not limited to, electric, hybrid, compressed natural gas, hydro-

diesel, hydrogen and ethanol; Cement and asphalt concrete containing glass cullet, recycled fiber or plastic, tire or rubber; Lubricating oil and hydraulic oil with re-refined oil content; Recycled plastic products; Remanufactured tires and products made from recycled tire rubber, including rubber mats and play field surfaces; Low wattage/high efficiency lighting fixtures, including but not limited to traffic signals, crosswalks, street lights and all interior and exterior building fixtures; Remanufactured laser printer toner cartridges; and other products as designated by the State and local governments.

- Audits of energy performance and operations of State and other government buildings (in tandem with an audit program). Audit results could be used to target and prioritize investments in improving government building energy efficiency.
- Improvement and review of efficiency goals over time, and development of flexibility in contracting arrangements to encourage integrated energy-efficient design and construction.
- Recommendations that the infrastructure for implementation (meters, accounting systems, staff, etc.) be established as soon as possible.
- Establishing "retained savings" policies whereby government agencies are able to retain funds saved by reducing energy bills for further energy efficiency/renewable energy investments or other uses.
- Require carbon neutral bonding for new construction and renovations and additions. A carbon neutral performance standard will require architects and engineers to design buildings to meet a climate-neutral requirement and built to meet or exceed the state's existing sustainable building guidelines and will save the taxpayers money as life-cycle costs will yield lower operational costs.
- Potential supporting measures for this option include training and certification of building sector professionals, and performance contracting/shared savings, but could also include surveys of government energy and water use, energy benchmarking, measurement, and tracking programs for municipal and state buildings.

Policy Design

Goals:

- Reduce per-unit-floor-area consumption of carbon based electricity by 15% by 2010, 50% by 2020 and 100%, carbon neutral, by 2030. These goals can be made by a combination of on-site carbon neutral generation and grid based green power purchases. Green power purchases shall exceed the amount of green power purchases already provided by the utility.

- **Timing:** See above.
- **Parties Involved:**

1.1 State and local governments;

1.2 Maryland Municipal League and Maryland Association of Counties,

1.3 Public Service Commission;

1.4 Maryland State Contractors association and related private contractor and materials and supply providers; and

1.5 Environmental Advocacy Organizations.

- **Other:** Keep Public Health issues in mind.

Implementation Mechanisms

- **Collect Data on State and Local Government Building and Facilities Energy Use.** A key implementation mechanism for this option will be to first provide a thorough assessment of the status and energy consumption of all existing State and local government buildings, including establishing a database of buildings and building attributes including floor area, insulation level, energy-using equipment, and history of energy consumption. This baseline, or "carbon footprint," will be used to assess program success.
- **Benchmark State Buildings:** Benchmarking is a process of using the data on building size, use, and energy use to quickly compare a building against others of similar size and use to get an idea of how efficiently the building is operating. It is an important step in identifying opportunities for savings and prioritizing work to be done.
- **Commission State Buildings:** Building commissioning is a process of reviewing and tuning up the operation of building systems and controls much like the tune-up of a vehicle. Potential targets for commissioning might include commissioning of state buildings upon completion of construction or renovation and whenever the energy use in a building shows an unexpected and unexplained increase in energy use.
- **Purchase Green Power:** Enter into agreements to purchase green power for a portion of the states electricity needs. Increase purchases over time until 100% of power needs are met through direct use of renewable energy or green power purchased by 2030.
- **Energy Use Targets:** Set targets for energy use in the operation of state buildings, potentially including capping state and local building and facilities energy use per square foot. Motion sensors are a specific technology for reducing lighting energy use in government buildings that may have broad application in Maryland.
- **Renovate State and Local Buildings and Facilities through a Buildings and Facilities Energy Program:** Renovate all state and local buildings and facilities with more than 5,000 square feet and smaller buildings identified through energy benchmark process as having a high potential for energy savings within 5 years. The State and locals buildings and facilities energy program will provide funds for energy audits, engineering analyses, and renovation costs.
- **Increase the Efficiency of Operations Through Purchasing and End-of-Life Disposal or Recycling:** Establish policies for purchasing only energy efficient products and services by specifying Energy Star–certified and other efficient equipment and appliances, stocking only energy efficient and environmentally preferable products in Central Stores, and planning for end of- life disposal of equipment and other goods when initial purchase is made. Purchase items that can be recycled rather than thrown away.

- **Develop and Use Renewable Energy Resources:** Evaluate the potential for direct use of solar, wind, biomass, geothermal, and hydro power to meet the needs of state government operations. Take advantage of these renewable resources whenever it is cost-effective to do so, and as a means to lead by example in investing in these systems when it is practical to do so.
- **Carbon-Neutral Bonding:** Climate-neutral bonding will require that any building projects financed with the issuance of state, county, or local/municipal bonds result in no net increase in GHG emissions. If a new construction project is projected to result in an emissions increase, there must be GHG emissions offsets within the state or particular jurisdiction. Offsets could include onsite renewable energy development, renewable energy purchases, energy efficiency (in existing state buildings), carbon sequestration (tree planting), and switching to cleaner or renewable fuels. Any GHGs emitted after the bond-financed project becomes operational will have to be offset. The new buildings could also offset their emissions by purchasing renewable electricity from their local utility. Paying a premium for what's known as "green pricing" electricity will usually be a more expensive offset option than energy efficiency. A community or state could install their own renewable energy project as a way to offset heir GHG emissions.
- Monitor building emissions over time.

Related Policies/Programs in Place

- Maryland State Buildings Council Program to set energy efficiency programs for State buildings.
- State buildings required to reduce energy use by 15% by 2015.
- Montgomery County Government and Board of Education, Bill 17-06 and Green School Focus.

Types(s) of GHG Reductions

[CCS to list GHG reductions with input / approval from TWG]

Estimated GHG Savings and Costs per $MTCO_2e$

. [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

TBD

Level of Group Support

TBD.

Barriers to Consensus

TBD.

CC-5. Public Education and Outreach

Policy Description

Public education and outreach is vital to fostering broad awareness of climate change issues and effects (including co-benefits, such as clean air and public health) among the State's citizens. Such awareness is necessary to engage citizens, businesses, and institutions in actions to reduce GHG emission. Public education and outreach efforts should be designed to reinforce State climate change policies and build upon existing outreach on climate change and related issues.

Due to the positive-feedback nature of climate change, massive, early actions are imperative. For example, a ton of carbon dioxide emission reduction this year is more effective in slowing warming than the same reduction the next year, and is *much* more effective than the same amount five years later. For this reason, the proposed efforts focus on energy conservation and efficiency—which can be implemented now and have immediate effects—and purposely leave out renewable energies and new climate-friendly technologies. These technologies may require substantial investments and may not be economically viable at present. The TWG recommends that they be considered when the policies are updated in the future. Furthermore, because early actions are important, the TWG recommends that the State not wait for perfecting its plans before implementation. Quick implementation requires that the State plan a little, do a little, and let actions, results, and mistakes help stimulate more widespread actions.

Achieving a meaningful reduction in GHG emission requires substantial efforts in conservation and energy efficiency. This means behavioral and life style changes in a broad spectrum of the public. State-sponsored public education and outreach alone will not result in behavioral and life style changes in the public. Repeated community actions, combined with economic incentives and disincentives provided by other Sate climate change policies, is the foundation for behavioral and life style change. This public education and outreach policy is designed to provoke such actions.

Policy Design

Segments of the public engaging in different activities have different concerns about climate change; the TWG recommends that public education and outreach efforts deliver messages to them in different ways.

The TWG recommends that the State build upon current educational efforts and action campaigns of State agencies, utilities, and non-profit organizations. These organizations understand their offerings; enhanced resources from the State will reinforce their efforts to encourage Maryland residents and businesses to take action. The combination of efforts by the State, nonprofits, education institutions, and utilities should insure that public education and outreach efforts reach all segments of the public.

The TWG recommends the State to tap into the science and technology expertise from institutions in the state (e.g., The Johns Hopkins University School of Public Health, Goddard Space Flight Center, National Oceanic and Atmospheric Administration, and The University of

Maryland) to develop information needed for public education and outreach. Many scientists from these institutions are deeply concerned about climate change and are disappointed at the lack of visible leadership on this issue from all levels of government thus far. They will be enthusiastic to volunteer their services when they are called upon.

Environmental non-profits and environmental organizations within the faith communities are also poised to support action-initiatives from the State when it shows visible leadership and the urgency that climate change calls for. The TWG recommends the State to tap into their support to organize massive community actions in conservation and energy efficiency.

1. STATE, COUNTY, AND LOCAL GOVERNMENT INITIATIVE

Educate and coordinate legislatures and agencies on climate change, conservation, and energy efficiency for government facilities, operations, and transportation. For example, achieve measurable GHG reduction through

- Lighting, indoor temperature, insulations, hot water temperature, and water consumption
- Reducing paper consumption (e.g., by printing multiple slides on a page and using both sides)
- Reducing consumption of single-use containers (e.g., drinks in plastic bottles and cans)
- Using fuel efficient vehicles
- Growing trees in place of lawns

Goal Legislatures and government agencies reinforce and further the State goals and serve as role models for citizens in conservation and energy efficiency; measurable GHG emission reduction

Timing Complete a plan in 1 month and start implementation in 3 months

Parties involved State, county, and local government agencies and legislatures

Implementation mechanisms

- Develop informational material (brief, specific, and actionable guidelines) appropriate for this target audience
- Deliver information and guidelines on climate friendly measures to department secretaries, managers, and building/ground managers to stimulate actions in conservation and energy efficiency
- Periodical inspections to reinforce guidelines

Cost

2. STATE K-12 EDUCATION INITIATIVE

Develop Maryland-specific lessons on climate change, energy conservation, and energy efficiency aligned with the Voluntary State Curriculum and Core Learning Goals. The modules will reflect age-appropriate, inquiry and problem-based learning concepts and activities that result in actions in conservation and energy efficiency. Modules/lessons may include

- Climate change science
- Climate change and its implications on natural and human systems (e.g., social, political, and public health impact

- Renewable energies and climate friendly technologies
- Individual and group actions that positively and negatively affect natural systems

Encourage schools in other states to adopt these teaching modules.

Goal High awareness in climate change and climate friendly behavior in students and their families

Timing Complete the plan in 2 months, issue grants to develop teaching modules in 4 months, and start delivering teaching in the 2009 school year

Parties involved Maryland State Department of Education, MDE, county school boards

Implementation mechanisms Delegate the Maryland State Department of Education to coordinate this initiative. Issue grants to experts to develop Maryland-specific teaching modules. Identify existing teaching materials that address general climate change concepts and make these available through the MSDE Environmental Education website. Set up a website (e.g., as part of the Maryland State Department of Education website) to host modules for teachers to download to eliminate distribution cost.
Delegate community colleges and state public colleges and universities to train teachers.

Cost

3. Governor's Regional Environmental Education Network (GREEN)
The Maryland Dept. of Education has been planning for the formation of this group (the plan has not yet been presented to the Governor). This group, with county and local chapters, can coordinate environmental groups into concerted efforts and draw higher visibility to climate actions from the public. This group will attract volunteers from

- Environmental non-profits
- Faith communities, social and civic groups
- K-12 school students in fulfilling community services
- College voluntary interns
- Adult volunteers

This group will call on and coordinate environmental non-profits (e.g., Sierra Club, Chesapeake Bay Foundation) and environmental organizations in the faith communities (e.g., The Eco-Justice Program, Greater Washington Interfaith Power and Light) to educate and organize the larger populations for widespread conservation and energy efficiency actions.

Goal High awareness on climate change and climate friendly behavior in citizens and widespread community actions on conservation and energy conservation; measurable GHG emission reduction

Timing Complete the plan in 1 month and start implementation in 3 months

Parties involved State and county departments of environment, environmental groups

Implementation mechanisms Start the implementation with a conference of interested parties (e.g., environmental organizations) to form the Governor's Regional Environmental Education Network (GREEN) and establish its charter. With some financial support from the Sate Government for coordination, the group will be mostly sustained by volunteers and private donations. Involve the group in other public education and outreach efforts. Seek support from utilities to training members to conduct energy audits, demonstrate conservation and energy efficiency, and analyze and present cost savings. Aim to nurture the group to a level of maturity that it no longer needs State government support in 3 years.

Cost

4. HIGHER EDUCTION INITIATIVE

Recommend guidelines to higher education institutions to

- Include climate science and climate-friendly technologies (such as renewable energy development) in their curricula
- Partner with industries to transfer climate-friendly technologies from research to industries
- Apply climate friendly measures (conservation and energy efficiency) on campuses

Goal High awareness of climate change and climate friendly behavior in students; widespread institutional and student actions on conservation and energy efficiency; measurable GHG emission reduction

Timing Complete the plan in 1 month and complete the development of guidelines within another 4 months; deliver the guidelines to higher education institutions within 6 months of start

Parties involved Statewide higher education institutions

Implementation mechanisms Joining the American College & University Presidents Climate Commitment (ACUPCC) will satisfy the above goals. College and university presidents signing the Commitment are pledging to eliminate their campuses' greenhouse gas emissions over time. This involves:

- Completing an emissions inventory
- Within two years, setting a target date and interim milestones for becoming climate neutral
- Taking immediate steps to reduce greenhouse gas emissions by choosing from a list of short-term actions
- Integrating sustainability into the curriculum and making it part of the educational experience
- Making the action plan, inventory and progress reports publicly available

All the institutions within the University System of Maryland have agreed to join the ACUPCC. However, most private institutions and almost all community colleges are not members of ACUPCC yet. Establish a state goal for all higher education institutions in the state to join the ACUPCC within 6 months. Delegate early ACUPCC adopters like Frostburg State University and UMBC to coordinate a statewide effort to encourage all higher education institutions to join ACUPCC.

Cost

5. PUBLIC MEDIA INITIATIVE
Organize an annual 1-day conference for regional (MD and neighboring states) public media representatives on the

- The state of climate change mitigation in Maryland and the level of attainment of State GHG goals
- Latest climate science and observations
- Climate change impacts on public health, regional environment, the Chesapeake, and the economy
- Applications of climate friendly technologies

Develop a website to host voluntary experts to answer climate related questions from journalists.

Goal Media information consistent with accepted climate science and latest technologies; high awareness in climate change and climate friendly behavior in citizens

Timing Complete the plan in 1 month and organize the first annual conference within 6 months

Parties involved MDE and University of Maryland College of Education at College Park

Implementation mechanisms Delegate the College of Journalism at College Park to plan and organize this annual conference. Invite authoritative panelists in climate science, climate impacts on public health, environment, industries, and economy; renewable energy and climate friendly technologies. These experts can be tapped from institutions such as The Johns Hopkins University School of Public Health, Goddard Space Flight Center, National Oceanic and Atmospheric Administration, renewable energy industry, insurance companies, and The University of Maryland.

Cost

6. COMMERCIAL AND HOMEOWNERS INITIATIVE
Collaborate with county departments of environment and utilities to educate and stimulate commercial organizations (Chamber of Commerce, business owners, building industry, building owners/tenants)**, a**partment tenants, and homeowners to adopt climate friendly measures and promote climate friendly products. Deliver information (e.g., short seminars) on the climate crisis and call for citizen actions in conservation and energy efficiency. Perform energy and environment audits of homes and buildings and provide specific recommendations for improvements such as

- Lighting, indoor temperature, insulations, and hot water temperature with measurable GHG emission reduction
- Reducing paper consumption (e.g., by printing multiple slides a page and using both sides)
- Reducing consumption of single use containers (e.g., drinks in plastic bottles and cans)
- Growing trees in place of lawns

Goal High awareness of climate change and climate friendly behavior in these organizations; measurable GHG emission reduction

Timing Complete the plan in 1 month and start implementation in 3 months

Parties involved State and county departments of environment, utilities

Implementation mechanisms Collaborate with utilities to develop informational material and guidelines that target different audience (e.g., commercial office buildings, homes, apartments). Organize members of Governor's Regional Environmental Education Network (GREEN) to conduct energy audits, demonstrations, and cost-saving analysis for business organizations, commercial buildings, and homes.

Cost

7. TRANSPORATION INITIATIVE

Educate and encourage transportation operators (buses, taxis, limousines, trucks, boats) to adopt climate friendly measures such as

- Plan routes and avoid traffic congestion using GPS devices
- Turn off engine while waiting
- Use renewable fuels

Goal High awareness of climate change and climate friendly behavior in transportation operators; measurable GHG emission reduction

Timing Complete the plan in 1 month and start implementation in 3 months

Parties involved State and county departments of transportation

Implementation mechanism Collaborate with transportation trade associations to develop informational material and guidelines that target different audience (trucking, buses). Organize members of Governor's Regional Environmental Education Network (GREEN) to conduct demonstrations and cost-saving analysis.

Cost

8. AGRICULTURE AND FORESTRY INITIATIVE

Develop/distribute guidelines to encourage farmers and forestry operators to practice climate-friendly measures. Develop a website to host voluntary experts to answer climate related questions from this target audience.

Goal High awareness in climate change and climate friendly behavior in agriculture and forestry, measurable GHG emission reduction, carbon capture

Timing Complete the plan in 1 month and start implementation in 3 months

Parties involved: State and county Departments of Agriculture, State Cooperative Extension

Other: [Insert text as appropriate]

Implementation Mechanisms

Collaborate with the Agricultural Cooperative Extension Office (at University of Maryland, Collage Park) to develop/distribute climate-friendly guidelines.

Related Policies/Programs in Place

See above.

Types(s) of GHG Reductions

Not applicable.

Estimated GHG Savings and Costs per $MTCO_2e$

Not applicable.

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

Pending.

Level of Group Support

TBD.

Barriers to Consensus

TBD.

CC-6. Tax and Cap Policies

Policy Description

Sample text in italics.

The MD MWG approved as a priority policy option for analysis by Energy Supply- (ES-x: GHG Cap-and-Trade) and ES-x: Carbon (GHG) Tax). The ES TWG will quantify the emission reductions and costs or cost savings associated with these options. The CC TWG will review the results of the ES TWG quantification process towards achievement of proposed goals.

Policy Design

[Insert text as appropriate]

Goals: [Insert text as appropriate]

Timing: [Insert text as appropriate]

Parties Involved: [Insert text as appropriate]

Other: [Insert text as appropriate]

Implementation Mechanisms

[Insert text as appropriate]

Related Policies/Programs in Place

[Insert text as appropriate]

Types(s) of GHG Reductions

Not applicable.

Estimated GHG Savings and Costs per $MTCO_2e$

Not applicable.

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

Pending.

Level of Group Support

TBD.

Barriers to Consensus

TBD.

CC-7 Review Institutional Capacity to Address Climate Change Issues Including Seeking Funding for Implementation of Climate Action Panel Recommendations

Sample text in italics.

Policy Description

Addressing the myriad of challenges posed by climate change and implementing the numerous recommendations emanating from this process will be a long-term endeavor for the state of Maryland. In order to do in a strategic and cost-effective way it is important to review the state's capacity in some or all of the following areas: finances, governance, authority, expertise, technology, etc.

Enactment of legislation and adoption of policies to mitigate GHG emissions is the essential first step for Maryland. Additionally, it is necessary that the State create the governance and organizational capacity to execute GHG mitigation policies, implement programs, monitor and analyze results, and modify and update policies and programs as necessary over time.

Additional agency resources will likely be required to implement some aspects of the MD climate protection strategies. The state needs to identify appropriate governance mechanisms, agency capabilities, staffing and funding for effective implementation and enforcement of GHG mitigation programs. Also, financial mechanisms will be needed to stimulate investment in developing cost-effective climate solutions.

Policy Design

Goals: The governance structure requires involvement at the highest levels of the Executive Department. Agency organizational and staffing capacity must be adequate to oversee and carryout comprehensive GHG mitigation programs and activities. To this end, the elements of successful State institutional capacity might include:

- A member of the Governor's staff assigned as liaison for GHG policies
- A department secretary assigned as the lead official for coordinating GHG mitigation activities
- A sub-cabinet committee for coordination of GHG programs and activities across departments and agencies
- A departmental agency that is tasked with: implementing key GHG mitigation programs and activities: serving as a coordinating point with respect to programs and activities housed in other agencies: analyzing and evaluating the overall effectiveness of GHG mitigation efforts; recommending changes and improvements to the efforts; and, generally exercising primary responsibility for promoting successful GHG mitigation.
- Assignment of responsibility to all departments to consider and take into account GHG consequences when making decisions about departmental policies, programs and activities.
- Full funding for the lead agency and all departments to carryout GHG responsibilities.

- An innovative state funding mechanism to stimulate investment in cost-effective climate change solutions.

Timing: 2008 and 2009

Parties Involved: Governor's Office, General Assembly, Department of the Environment, and other Executive Departments

Other: Within the office of every department secretary or agency head a staff member must be assigned responsibility to assure that GHG mitigation objectives are integrated within the decision making process of that department or agency.

The Department of Economic Development should be assigned the responsibility to develop for legislative enactment a funding mechanism to stimulate investment in cost-effective climate change solutions.

Implementation Mechanisms

- The institutional capability should be created as soon as possible by Executive Order and by policy and budget legislation during 2008-9.
- A supplemental budget should be introduced in the 2008 session of the General Assembly with a full funding request submitted for the FY 2009 budget cycle.
- Legislation should be enacted in 2008 and/or 2009.
- Examine creative funding solutions such as: using RGGI funds, aligning investors, financing up-front costs w/ out-year savings.

Related Policies/Programs in Place

Existing statutes and budgets.

Types(s) of GHG Reductions

Not applicable.

Estimated GHG Savings and Costs per $MTCO_2e$

Not applicable.

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

Pending.

Level of Group Support

TBD.

Barriers to Consensus

TBD.

CC-8 Participate in Regional, Multi-State and National GHG Reduction Efforts

Sample text in italics.

Policy Description

Regional approaches undertaken in collaboration with partner states or other organizations can offer broader and more economically efficient opportunities to reduce GHG emissions across Maryland's economy. Maryland is already a member of Northeast States Regional Greenhouse Gas Initiative (RGGI). There are several options for broadening Maryland's regional, market-based GHG reduction strategies which should be considered, such as the Clean Cars Initiative, etc.

The Governor and the Maryland General Assembly should aggressively push for Federal action to reduce GHGs. Global warming is a problem that requires national and international action. An aggressive approach to GHG reductions within the United States would have a significant effect on the international reductions needed to begin reversing global warming trends. Ultimately, many of the climate protection issues need to be addressed at the national level and Maryland needs to help shape those national initiatives.

Policy Design

Working through the RGGI process address CO2 emissions from power plants first and then address GHG emissions from other sources?

Goals: Develop a regional cap and trade program for GHG in the northeast.

Timing: June 2008 auctions and January 2009 RGGI start-up.

Parties Involved: Nine states in RGGI.

Other: [Insert text as appropriate]

Implementation Mechanisms

MD is planning to participate in June 2008 RGGI auctions and is developing the regulations needed to do so.

Related Policies/Programs in Place

NA.

Types(s) of GHG Reductions

Not applicable.

Estimated GHG Savings and Costs per $MTCO_2e$

Not applicable.

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

Pending.

Level of Group Support

TBD.

Barriers to Consensus

TBD.

CC-9. Promote Economic Development opportunities associated with Reducing GHG Emissions in MD

Sample text in italics

Policy Description

There are many economic and business opportunities involved in designing and implementing a comprehensive GHG Reduction Strategy for Maryland. The state should work with public and private entities to design mechanisms that promote these economic opportunities for Maryland businesses.

Policy Design

- Include a Green Collar Jobs component
- Look at economic development opportunities of promoting energy efficiency
- Promote job training into this field
- Look for seed monies –e.g. REGGI
-

Goals: [Insert text as appropriate]

Timing: [Insert text as appropriate]

Parties Involved: [Insert text as appropriate]

Other: [Insert text as appropriate]

Implementation Mechanisms

[Insert text as appropriate]

Related Policies/Programs in Place

[Insert text as appropriate]

Types(s) of GHG Reductions

Not applicable.

Estimated GHG Savings and Costs per $MTCO_2e$

Not applicable.

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

Pending.

Level of Group Support

TBD.

Barriers to Consensus

TBD.

CC-10. Create Capacity to Address Climate Change in an "After Peak Oil" Context

Policy Description

Oil is a finite resource and many respected scientists and industry analysts project that we will reach the top of the bell curve of oil production—the "peak" of oil production—soon, if we have not already done so. Once we have passed the peak, termed After Peak Oil, oil will become ever more costly. This cost will be manifest in both higher prices for a barrel of crude as well as the higher environmental and health costs of extracting oil from nontraditional sources, such as tar sands, which require far more energy to extract and will result in even greater greenhouse gas emissions.

Because our society has been fully constructed to depend on an endless supply of inexpensive oil, the eventual lack of inexpensive oil will have profound impacts on all aspects of our society. In particular, greenhouse gas emissions could greatly increase as a result of society relying on the least expensive alternative to oil, which would be coal. Moreover, projections of greenhouse gas emissions over time have generally not factored in the increased emissions from the use of more coal or the increased emissions from the use of nontraditional fossil fuels as the demand for energy outstrips the supply of oil.

Any hope of successfully achieving the state's greenhouse gas emission reduction goals will depend on effectively avoiding the "easy" energy shortage solutions of relying on more coal or encouraging the use of nontraditional fossil fuels.

Maryland should take a strategically proactive stance to deal with After Peak Oil by establishing a State 'After Peak Oil' Advisory Council of experts and stakeholders to review and evaluate all proposed climate change and energy-related policies and legislation for their appropriateness and sensibility in the context of shrinking supplies of affordable oil.

By 2010, Maryland will have a State After Peak Oil Advisory Council reviewing and evaluating all proposed climate change and energy-related policies and legislation. The recommendations of the Council should be considered and concerns addressed before the proposed policy or legislation moves forward.

Policy Design

Goals: By 2010, Maryland will have a State After Peak Oil Advisory Council reviewing and evaluating all proposed climate change and energy-related policies and legislation. The recommendations of the Council should be considered and concerns addressed before the proposed policy or legislation moves forward.

Timing: By 2009, the Governor will appoint a core group of Council members representing major stakeholders and content experts. Additional Council members will be recruited by a non-political process. By 2010, the Council will have finalized their mechanism of operation.

Parties Involved: All state agencies, energy producers, consumers, environmentalists, health professionals.

Other: Examine both short-term and long-term aspects of this challenge.

Implementation Mechanisms

Create the Advisory Committee and make it operational.

Related Policies/Programs in Place

None.

Types(s) of GHG Reductions

Not applicable.

Estimated GHG Savings and Costs per $MTCO_2e$

Not applicable.

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

Pending.

Level of Group Support

TBD.

Barriers to Consensus

TBD.

CC-11. Evaluate Climate Change Policy Options to Determine Projected Public Health Risks/ Costs/ Benefits

Policy Description

Climate change will have profound and largely negative effects of the health of Maryland's citizens. Dealing with these negative effects will be costly in terms of actual money spent by state government, private businesses, and individuals for health care; increased burden of disease on individuals; time off work and out of school; and lost productive years of life, Moreover, many strategies for reducing greenhouse gas emissions also have beneficial effects on health, such as improved air quality.

Because the potential risks to health of unmitigated climate change are so extreme, and the potential benefits to health of certain policies to reduce greenhouse gas emissions are significant, these risks, costs, and benefits should be considered for all climate change and energy policies. It is also conceivable that policies to reduce greenhouse gases could have unintended negative side effects on health.

To ensure that these risks, costs, and benefits are evaluated in a systematic manner, Maryland should establish a State Climate Change Environmental Health and Protection Advisory Council of content experts and stakeholders to review all climate change and energy-related policies and legislation for health benefits and risks to all Maryland's citizens. Careful attention should be given to vulnerable populations such as children and the elderly.

Policy Design

Goals: By 2010, Maryland will have a State Climate Change Environmental Health and Protection Advisory Council reviewing and evaluating all proposed climate change and energy-related policies and legislation. The recommendations of the Council should be considered and concerns addressed before the proposed policy or legislation moves forward.

Timing: By 2009, the Governor will appoint a core group of Council members representing major stakeholders and content experts. Additional Council members will be recruited by a non-political process. By 2010, the Council will have finalized their mechanism of operation.

Parties Involved: All state agencies, energy producers, consumers, environmentalists, health professionals.

Other: [Insert text as appropriate]

Implementation Mechanisms

Create the Advisory Council and make it operational.

Related Policies/Programs in Place

None.

Types(s) of GHG Reductions

Not applicable.

Estimated GHG Savings and Costs per $MTCO_2e$

Not applicable.

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

Pending.

Level of Group Support

TBD.

Barriers to Consensus

TBD.