

**PLAN FOR REDUCING MARYLAND'S GREENHOUSE  
GAS EMISSIONS BY 25% BY 2020**

**Lead Agency: Maryland Department of Environment**

**April 2010**

# PLAN FOR REDUCING MARYLAND'S GREENHOUSE GAS EMISSIONS BY 25% BY 2020

## Executive Summary

Maryland is moving forward to implement one of the Nation's most aggressive state-based efforts to combat climate change. Central to this effort is the work of the *Maryland Commission on Climate Change* (the Commission) and the recent enactment of the O'Malley-Brown Administration (the Administration) sponsored Greenhouse Gas Emissions Reduction Act of 2009 (GGRA).

The Commission, established by Governor O'Malley in April 2007, released its *Climate Action Plan* in 2008. The *Climate Action Plan* addressed both the causes and consequences of climate change, and outlined a suite of 42 policy actions for reducing the State's greenhouse gas (GHG) and carbon emissions. In 2009, the Maryland State Legislature enacted the Greenhouse Gas Reduction Act (GGRA), solidifying many of the Commission's policy recommendations and establishing in law the goal of reducing Maryland's GHG and carbon emissions by 25 percent by 2020, from 2006 levels. The GGRA also established interim measurable targets of a 10 percent reduction by 2012 and a 15 percent reduction by 2015.

The GGRA requires that the State must adopt a final Greenhouse Gas Reduction Plan (GGRP) by 2012 that includes regulations and a timeline to implement necessary programs. The GGRP must also ensure no loss of manufacturing jobs, opportunities for new "green" jobs, and no adverse impact on the reliability and affordability of electricity. The Maryland Department of the Environment (MDE) is currently leading a multi-agency effort to develop the GGRP, which must be released to the public for comment by the end of 2011.

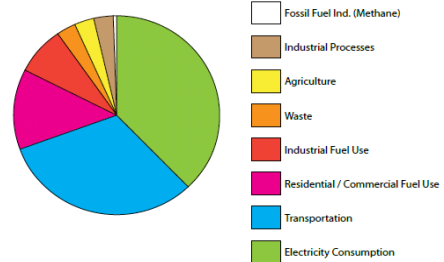
While many of the specific actions necessary to meet Maryland's 25% GHG reduction goal by 2020 won't be identified until the plan is completed, thanks to the work of the Commission, we have valuable information to begin some work now. The O'Malley-Brown Administration is committed to taking early action to ensure that the State is on target to meet the 25 percent reduction goal by 2020 at a net savings to Maryland citizens, businesses and the State's overall economy.

## Background

GHGs are not like other air pollutants. Ozone and other pollutants create hotspots over a city or region and typically dissipate in a period of hours, days or weeks. GHGs, on the other hand, accumulate in the atmosphere and stay there for a very long time. Industrial GHGs have even longer residence times. For example, sulfur hexafluoride (SF<sub>6</sub>), used as insulation in electronic switching equipment and other industrial applications, has a residence time of several *thousand* years.

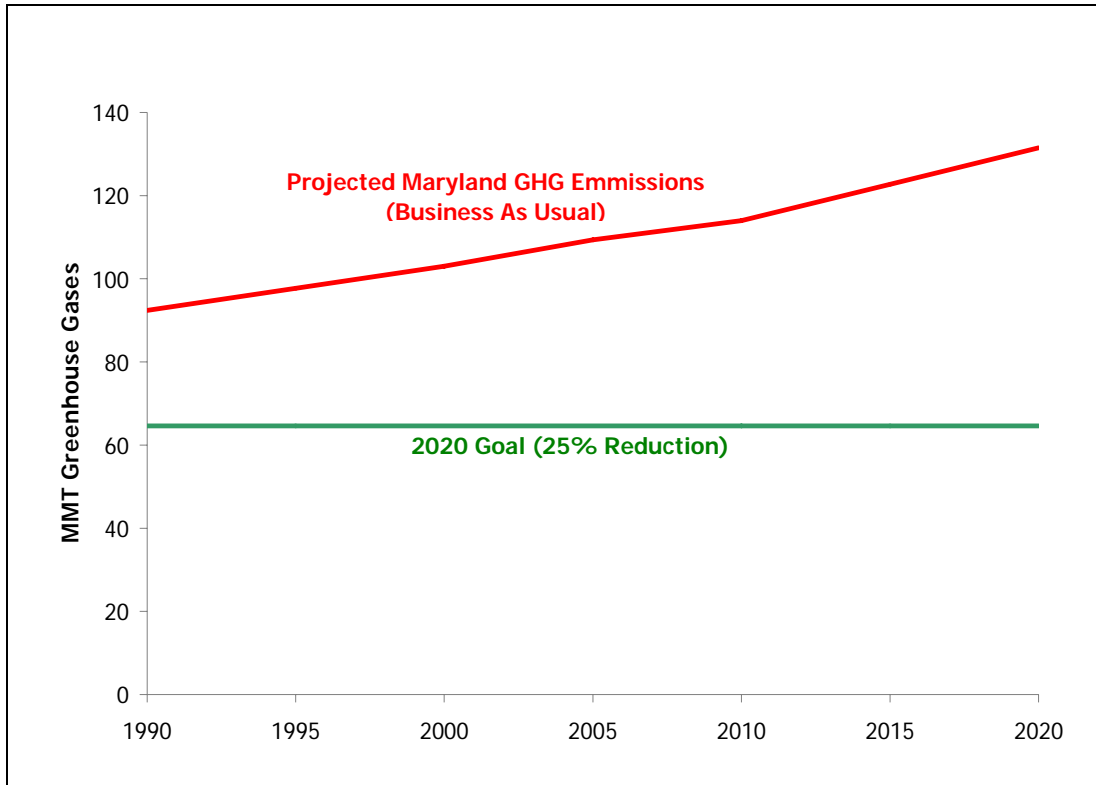
The accumulation of GHGs in the atmosphere traps heat from the sun and the planet. As synthesized by the Intergovernmental Panel on Climate Change (IPCC), when GHG concentrations in the atmosphere – (expressed in CO<sub>2</sub> equivalents or CO<sub>2</sub>e) reach 445-490 parts per million it will increase the annual mean temperature of the Earth's surface 2 - (3.6 - 4.3°F) above pre-industrial levels. The scientific evidence assembled by the IPCC indicates that temperature increases above this are very likely to result in dangerous consequences in terms of food production, biodiversity, and initiation of uncontrollable and unpredictable changes in the Earth's climate system, such as rapid melting of polar ice caps and changes in the ocean circulation that regulate the planet's climate. Thus, GHG concentrations need to be held around 450 ppm CO<sub>2</sub>e to avoid this level of global warming.

Major GHG



warms  
(ppm),  
2.4°C  
level  
to

Although Maryland is a small state, it is responsible for nearly as many GHG emissions as Sweden and Norway combined. Our gross emissions have increased by about 18 percent since 1990, a faster rate of growth than the U.S. as a whole. Per capita GHG emissions by Maryland citizens also grew between 1990 and 2005, during period when per capita emissions for the U.S. as a whole decreased. Relative to its size, Maryland has a big and growing carbon footprint.

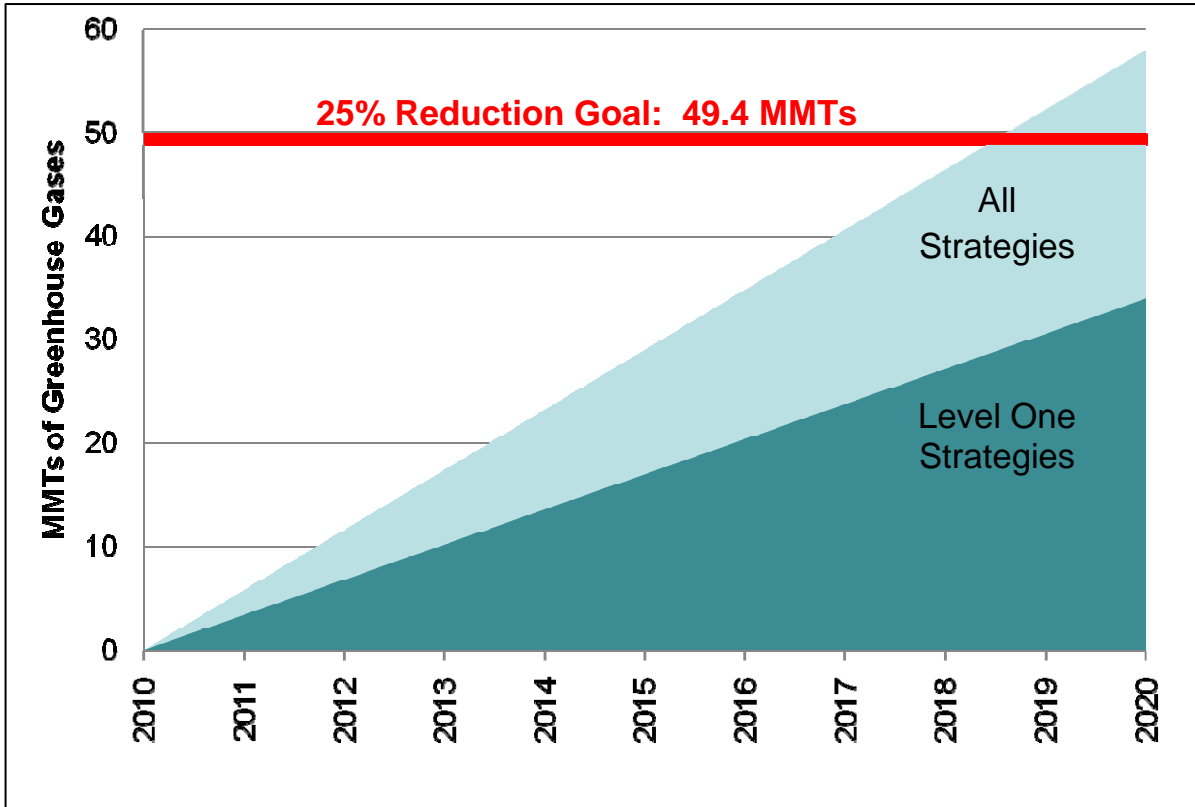


Maryland's *Climate Action Plan* calls for taking immediate actions to stem the projected growth in greenhouse emissions; and at the same time, implement specific strategies to reduce greenhouse gas emissions 25% below calendar year 2006 levels (Figure 1). Maryland's water-based livelihoods and much of its cultural heritage and unique quality of life are derived from the Chesapeake Bay and its many tributaries. Our exceptional vulnerability to sea level rise places a unique leadership responsibility on Marylanders to reduce our State and personal GHG footprints. We have a tremendous amount to lose. We also have a tremendous amount to gain.

### **A Strategic and Targeted Approach to Reducing Greenhouse Gas Emissions**

The O'Malley-Brown Administration has set an ambitious goal of reducing Maryland's GHG emissions by 25 percent below 2006 levels by 2020, with interim measurable targets of a 10 percent reduction by 2012 and a 15 percent reduction by 2015. The Maryland Climate Action Plan detailed 42 policies recommendations to reduce the State's GHG emissions in order to reach these goals. In accordance with the GGRA, MDE is aggressively working to develop the Greenhouse Gas Reduction Plan (GGRP) required for adoption by 2012. The full suite of 42 policy recommendations contained in the *Climate Action Plan* is being considered for inclusion in the GGRP.

Although the State is not required by law to adopt the final GGRP until 2012, Maryland's State Agencies are committed to and have already begun implementing a substantial number of the core elements of the *Climate Action Plan* that, if implemented aggressively, will put the State well on its way toward reducing emissions by 25 percent or more by 2020 at a net savings to Maryland citizens, businesses and the State's overall economy. This delivery plan outlines the implementation plans and performance goals for 29 select GHG reduction strategies.



The 29 GHG Reduction Strategies have been divided into three priority levels:

- **Level One Strategies:** The most substantive ongoing strategies to achieve the Administration’s GHG reduction goals.
- **Level Two Strategies:** Ongoing or near-term actions that will likely contribute to GHG reductions in the shorter term.
- **Level Three Strategies:** Prospective expansive strategies that are still under development, but are expected to contribute substantively to achieving the Administration’s GHG reduction goal if implemented prior to 2020.

The emission reduction benefits of some of the strategies can be tracked and measured with available information; however, the capacity to quantify the benefits of the full suite of reduction strategies outlined below will not exist until late 2010 or early 2011. Detailed information on how MDE will track and measure progress toward meeting the Administration’s 25% emission reduction goal by 2020 is included in the final section of this delivery plan.

The following represents the O’Malley – Brown Administration’s starting point in this critical effort based on the best information we have available to date. This strategy will be revised as more information becomes available, and certainly after the GHRP is completed in 2012.

## Strategy Overview: Level One Strategies

**Agency Leads:** Maryland Energy Administration (MEA), Maryland Department of Environment (MDE), and Maryland Department of Transportation (MDOT)

### Greenhouse Gas Reduction Strategies:

1. **Participate in GHG Cap-and-Trade (RGGI):** MDE will continue to coordinate Maryland's participation in the Regional Greenhouse Gas Initiative (RGGI). The Healthy Air Act, adopted as State law in 2006, included a provision for Maryland to join RGGI, a groundbreaking cap and trade program designed to reduce CO<sub>2</sub> emissions from power plants in participating states in the Northeast and Mid-Atlantic. RGGI requires electric power generators in participating states to reduce CO<sub>2</sub> emissions. The RGGI program, started in 2009, and includes coal-fired, oil-fired, and gas-fired electric generating units that are located in the RGGI region and have a capacity of at least 25 megawatts. In 2009, emissions in the RGGI region were capped at 188 million tons (37.5 million tons in Maryland).

#### Target Actions:

- The 188 million tons CO<sub>2</sub> cap will remain in place until 2015.
- From 2015 to 2019, emissions will be reduced a total of 10 percent, 2.5 percent per year, from the 2014 cap.
- A market-based system for purchasing emissions allowances occurs in quarterly auctions.
- Program allows for voluntary offset projects, which can generate credits for GHG source reductions outside the cap, can be applied against an electricity generator's CO<sub>2</sub> emissions.
- Continue to participate in Federal cap and trade discussions as well as other expansion opportunities.

#### Performance Goals:

By 2011:

- In Calendar years 2010 and 2011, participate in eight (8) RGGI allowance auctions.

By 2020:

- Reduce CO<sub>2</sub> emissions from the State's electricity generators by roughly 10 percent from current levels by 2019.

2. **Actively pursue Clean Cars Act Transportation Technologies:** MDE and MDOT will work cooperatively to actively implement and manage the Maryland Clean Cars Program. Adopted as State law in 2007, this law requires implementation of the California Clean Cars program (CA LEV). By requiring more rigorous emissions standards beginning in vehicle model year 2011, it will start reducing GHG emissions in Maryland as early as 2010, achieving reductions of about 6 million metric tons (mmt) when combined with the benefits of EPA's existing and proposed vehicle and fuel standards.

#### Target Actions:

- Implement MD Clean Cars Program via regulation.
- Ensure compliance with MD Clean Cars regulations.

#### Performance Goals:

By 2011:

- The MD Clean Cars program begins in 2011.

By 2020:

- Reduce projected 2020 GHG emissions by approximately 6 million tons through the National Vehicle Program, the Maryland Clean Car Program, and the use of renewable fuels.

**Implement EmPOWER Maryland:** MEA will continue to work to implement the EmPOWER Maryland Program, which includes a number of initiatives that will save electricity and reduce greenhouse gas emissions. Launched by Governor O'Malley in July 2007 and codified by the General Assembly in its 2008 Session, this program is designed to reduce per capita electricity consumption by 15 percent by 2015. Specific EmPOWER Maryland Initiatives include the State Agency Loan Program, the EmPOWER Financing Initiative, the Appliance Rebate Program, the Industrial/Commercial EmPOWER Initiatives, and the Residential Empower Initiatives. All are explained in more detail in Strategies #3 through #7 below.

- 3. Administer the State Agency Loan Program (SALP):** MEA will administer SALP, which is a revolving loan program that provides zero interest loans to state agencies for energy efficiency improvements. MEA will work with the Maryland Department of General Services (DGS)—the government entity responsible for managing state buildings' energy usage—and with state agencies directly to identify the best opportunities for SALP loans.

**Target Actions:**

- Work with DGS to identify projects that could benefit from energy performance contracts (EPCs) - contracts between a state agency and an energy service company (ESCO), whereby the ESCo guarantees that the cost of the energy improvements it installs will be covered by future energy savings.
- Solicit state agencies directly for projects.

**Performance Goals:**

By 2011:

- Fund energy efficiency improvements that will save over 15 million kWh cumulatively of electricity.

By 2020:

- Fund energy efficiency improvements that will save nearly 95 million kWh cumulatively of electricity.

- 4. Implement the EmPOWER Financing Initiative:** MEA will implement the EmPOWER Financing (EF) Initiative, whereby interested Marylanders could obtain a clean energy loan from their local government or a private bank and that loan would be secured through the locality (e.g., collected on water bills, property taxes, etc). The EF Initiative will help citizens overcome the high up-front cost of investments in energy efficiency and renewable energy systems. As part of the Initiative, MEA will partner with a state-wide non-profit such as the Maryland Clean Energy Center to create a “program in a box” that enables municipalities to offer energy efficiency and renewable energy financing to their citizens quickly and effectively. This “program in a box” will include: model local ordinances, standard contracts, development for software to assist with the application process, and marketing concepts.

**Target Actions:**

- Encourage and enable localities and citizens to participate in the EF Initiative.
- Work with the Maryland Clean Energy Center and other state-wide non-profits to create the EF “program in a box.”

**Performance Goals:**

By 2011:

- Enable citizens to save 1 million kWh cumulatively of electricity through clean energy improvements made by possible by the EF Initiative.

By 2020:

- Enable citizens to save 6 million kWh cumulatively of electricity through clean energy improvements made by possible by the EF Initiative.

- 5. Enhance Energy Efficient Appliance and Lighting Rebates:** MEA will work with Maryland's utilities to enhance their existing rebate programs. The enhanced rebates will steer customers towards the purchase of super-efficient appliances and lighting and the recycling of their old inefficient appliances and lighting.

**Target Actions:**

- Provide additional funding to utilities for rebates.
- Work with utilities to market the rebate program to customers to maximize participation.

**Performance Goals:**

By 2011:

- Enable citizens to save over 560 million kWh cumulatively through the purchase of energy efficient appliances and lighting.

By 2020:

- Enable citizens to save over 3.3 billion kWh cumulatively through the purchase of energy efficient appliances and lighting.

- 6. Implement Industrial/Commercial Empower Initiatives:** MEA will reach out to industrial and commercial sectors by providing financial assistance to help Maryland businesses and institutions implement energy efficiency upgrades. MEA will also partner with Maryland utilities companies in their efforts to assist the Industrial/Commercial sector.

**Target Actions:**

- Offer a low interest rate revolving loan program to help finance the cost of energy efficiency projects in commercial and industrial facilities.
- Partner with the Maryland Technology Extension Service (MTES) to provide energy assessment services at shared cost to commercial and industrial customers throughout the State. The energy assessment services will include a site visit by MTES to evaluate energy use at the facility, identify opportunities for energy efficiency improvements, and report the assessment findings and recommendations.
- Provide Maryland industries access to informational resources, workshops, technical support, trainings, and energy assessment opportunities.
- Assist Maryland utility companies as needed.

**Performance Goals:**

By 2011:

- Enable industrial and commercial consumers to save 1 billion kWh cumulatively from energy efficiency upgrades.

By 2020:

- Enable industrial and commercial consumers to save over 8.6 billion kWh cumulatively from energy efficiency upgrades.

- 7. Implement Residential EmPOWER Initiatives:** MEA will reach out to the residential sector by providing financial assistance to help Maryland residents implement energy efficiency upgrades. MEA will also partner with Maryland utilities companies in their efforts to assist the residential sector.

**Target Actions:**

- In coordination with the Department of Housing and Community Development (DHCD) and housing nonprofit organizations, conduct energy efficiency retrofits in apartment units to reduce energy bills for low and moderate income families.
- Leverage funds with DHCD to pay a portion of incremental cost for energy efficiency measures for new or rehabilitated multifamily buildings already undergoing DHCD rehabilitation.
- Assist Maryland utility companies as needed.

**Performance Goals:**

By 2011:

- Enable residential consumers to save over 180 million kWh cumulatively from energy efficiency upgrades.

By 2020:

- Enable residential consumers to save over 1.4 billion kWh cumulatively from energy efficiency upgrades.

- 8. Achieve Maryland’s Renewable Portfolio Standard.** In 2004, Maryland was one of the first states to adopt a Renewable Portfolio Standard (RPS). An RPS is a requirement that Maryland's power providers buy or generate some of the electricity they supply or sell from renewable energy resources, guaranteeing a market for renewable energy. Maryland's RPS requires electricity suppliers to provide 20% of their total electricity from renewable resources (referred to as “Tier 1 resources”), such as solar, wind, biomass (including poultry litter), landfill gas, and small hydroelectric power, by 2022. The Maryland RPS also requires 2.5% to come from additional renewable (referred to as “Tier 2 resources”), such as municipal solid waste, until 2019, after which this additional renewable energy source will be no longer be included. Instead of generating renewable electricity themselves, the statute provides that suppliers may purchase Renewable Energy Certificates (RECs) from renewable projects located in the 14 state PJM regional grid.<sup>1</sup> To ensure that the RPS does not impose a significant cost on ratepayers, in the event that few RECs are available, electricity suppliers may choose an “alternative compliance payment” that acts as a ceiling on REC prices.

**Target Actions:**

- Leverage Maryland government’s electricity demand and purchasing power to give new renewable energy facilities the type of long-term power purchase agreements they need to obtain financing for construction.
- Expand residential renewable energy grants.
- Expand mid-size renewable projects (20kW- 100kW).
- Promote onshore and offshore wind.

**Performance Goals:**

By 2011:

- Enable electricity suppliers to obtain:
  - 0.04% of their electricity from solar
  - 4.96% of their electricity from other, non-solar Tier 1 resources
  - 2.5% of their electricity from Tier 2 resources

By 2020:

- Enable electricity suppliers to obtain:
  - 1.5% of their electricity from solar
  - 16.5% of their electricity from other, non-solar Tier 1 resources
  - 0% of their electricity from Tier 2 resources

**Level Two Strategies**

**Agency Leads:** Maryland Department of Transportation (MDOT), Maryland Department of Natural Resources (DNR), Maryland Department of Agriculture (MDA), Maryland Department of Business and Economic Development (DBED),

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<sup>1</sup> The PJM grid is a regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia. Acting as a neutral, independent party, PJM operates a competitive wholesale electricity market and manages the high-voltage electricity grid to ensure reliability for more than 51 million people.

Maryland Energy Administration (MEA), Maryland Department of Housing and Community Development (DHCD), Maryland Department of Environment (MDE) and Maryland Department of Planning (MDP).

## Greenhouse Gas Reduction Strategies

**9. Conduct a GHG Inventory and Forecast.** MDE will prepare a statewide inventory and forecast of GHG sources and sinks. MDE will implement this strategy with assistance from DNR, MEA, PSC, MDOT, and MDA. GHG emissions inventories and forecasts are essential for understanding the magnitude of all GHG emission sources and sinks (both anthropogenic and natural), the relative contribution of various types of GHG emission sources and sinks to total emissions, and the factors that affect trends over time.

### Target Actions:

- MDE will examine specific Maryland GHG data inputs.
- MDE will develop a consistent and complete inventory of GHG emission sources and sinks.

### Performance Goals:

By 2011:

- Publish inventory for state GHG emissions for calendar year 2006.
- Projected “business as usual” inventory for calendar year 2020.

By 2020:

- Maryland will continue to measure and track GHG emissions and reductions achieved through the GHG Reduction Plan.

**10. Develop a GHG Report and Registry.** MDE will establish and oversee a GHG reporting system for GHG emitting sources. MDE will be responsible for reporting GHG emissions into a GHG registry by two means. In 2008, MDE joined The Climate Registry (TCR), an existing national GHG registry system, and reports department GHG emissions routinely. In addition, MDE has required that registered sources annually report GHG emissions and this data will be entered into MDE's TEMPO system.

### Target Actions:

- The 2008 TCR data certified by the independent ISO/ANSI-certified verification body will be verified and made available to the public in 2010.
- Maryland registered sources are required to report GHG emissions in their annual compliance certifications.

### Performance Goals:

By 2011:

- Continue to participate in the Climate Registry.
- Ensure federal reporting under new federal emissions reporting requirements.

By 2020:

- Continue to participate in the Climate Registry.
- Ensure federal reporting under new federal emissions reporting requirements.

**11. Participate in Low Carbon Fuel Standard (LCFS) Efforts.** MDE will participate in and encourage regional programs regarding LCFS in an effort to push for federal low carbon fuel standards. MDE will implement this policy through its own leadership example of implementing aggressive GHG reduction programs, by participating in and encouraging regional programs like RGGI and, through its elected leadership, by working with Congress and the Federal government to significantly reduce GHG emissions nationally and internationally.

**Target Actions:**

- MDE, through its elected leadership, will continue working with Congress and the Federal government to significantly reduce GHG emissions nationally and internationally.
- MDE will continue to be an active member in RGGI and numerous other regional and national groups focused on climate change and multi-pollutant planning.

**Performance Goals:**

By 2011:

- Regional framework complete and carbon intensity goal established.

By 2020:

- Program implementation to meet carbon intensity goal established in 2011 framework document.

- 12. Pursue Integrated Planning for Land Use and Location Efficiency.** MDP will work with MDE and MDOT to develop and implement Smart, Green and Growing policies that enable safe, reliable and sustainable development and travel options for Maryland's citizens and businesses thereby reducing vehicle miles traveled and GHG emissions from the transportation sector. Implementation will be achieved through a mix of integrated land use planning measures, transportation and development strategies that encourage location efficiency, siting and design standards, and growth management techniques that accommodate the state's expected growth and enable people to drive fewer miles while ensuring a competitive economy, affordable housing opportunities, livable communities, and quality public facilities and services. Implementation may be accomplished through legislation, integrated planning process reforms, investment incentives, regulations, pricing and other strategies to promote compact, transit-oriented development, community-based public schools and public services, and other growth management objectives.

**Target Actions:**

- Coordinate first round of PlanMD public participation process, including hosting of regional meetings.
- Publish draft goals, assessment, challenges and general strategy.
- Request local recommendations for Priority Development Centers, Priority Preservation Areas and Areas of Critical State Concern.
- Publish draft recommendations and recommended strategies.
- Coordinate second round of PlanMD public participation process.
- Publish final PlanMD.
- Implement the Sustainable Communities Act of 2010 to support building reuse and redevelopment in high-priority areas.
- Provide funding for development in Priority Funding Areas and land conservation in Rural Legacy Areas.
- Work with local governments to implement the measures in the 2008 Smart, Green, and Growing legislation, including incorporation of the twelve new planning visions in local comprehensive plans, development of local land use goals, and submittal of local annual reports.
- Implement additional strategies recommended by PlanMD.

**Performance Targets:**

By 2011:

- Complete a final draft of PlanMaryland, a state development plan that will contain policies to achieve more compact, mixed-use development and to prevent sprawl. This in turn will reduce land conversion outside of Priority Funding Areas (PFAs), including the loss of forest and farmland, as well as VMTs, energy use, and CO<sub>2</sub> emissions.

By 2020:

- Reduce the rate of sprawl by 30 percent measured as an average over five years from the baseline of 1992-1997. Sprawl will be measured as acres of improved residential parcels outside of PFAs. To achieve a 30 percent reduction in sprawl in Maryland, there would need to be no more than an average of 8,667 acres per year of improved residential parcels outside of PFAs over a 5-year period.

**13. Improve transit opportunities to reduce GHG's.** MDOT will implement policies and practices that contain costs, manage its demands and resources to improve transit systems and services around the State.

**Target Actions:**

- Ensure quality service
  - Implement a single electronic payment card, CharmCard, that allows riders to load cash or pass products and ride. This initiative will reduce the time it takes for riders to pay a fare and is more convenient (October 2010).
- Improve safety and security
  - Expand coverage of the closed Circuit Television (CCTV) network by installing additional cameras and connecting them to MTA's central Police Monitoring Facility.
- Enhance existing services
  - Guaranteed Ride Home – MDOT will expand the existing program that will provide transportation home in the event a transit rider has an emergency. Many choice riders are not confident that they would be able have access to transportation, especially if their schedules change, and are therefore reluctant to give up their cars.
- Implement additional services
  - Construct major New Starts. MTA will continue to advance the following system expansion projects:
    - The Red Line – a 14-mile east-west corridor from Woodlawn to Bayview in the Baltimore region;
    - The Purple Line – a 16-mile corridor from New Carrollton to Bethesda in the Washington region; and
    - The Corridor Cities Transitway (CCT) – a 14-mile corridor from Rockville to Clarksburg in Montgomery County.
- Increase Locally Operated Transit System Ridership
  - Provide technical assistance to LOTS to improve efficiencies and make travel more convenient for the customers.
- Promote Transit Oriented Development (TOD)
  - Promote and achieve TOD by providing technical assistance, outreach and education to local governments, opportunities to coordinate with other state agencies and programs, promoting public-private partnerships and project development and implementation around state-owned land.

**Performance Goals:**

By 2011:

- One percent increase in annual transit ridership in Maryland from 2010.

By 2020:

- Double transit ridership in Maryland

**14. Incentives, Pricing, and Resource Measures.** MDOT will balance services, facilities and demand to contain costs, improve performance and reduce transport-related GHG emissions. This would amplify efforts to reduce GHG emissions through Smart Growth incentives and transit investments.

**Target Actions:**

- MDOT will continue to conduct periodic meetings with TLU working groups, and coordinating committee and consultants to discuss policy options and implementation.
- MDOT will evaluate specific strategies and the feasibility implementing incentives and resource recommendations detailed in Maryland's Climate Action Plan.

**Performance Goals:**

By 2011:

- MDOT will evaluate specific strategies and the feasibility incentives and resource recommendations detailed in Maryland's Climate Action Plan.
- Initiate a Guaranteed Ride Home (GRH) program for the Baltimore region and include Cecil County.

- Expand the Washington Region Guaranteed Ride Home (GRH) program for St. Mary's County.  
By 2020:

- MDOT will implement a Guaranteed Ride Home (GRH) program to include the entire State.

**15. Bike and Pedestrian Infrastructure.** MDOT will work with local jurisdictions and other State and regional agencies, to improve infrastructure design and construction standards and policies, funding, regulatory and land use strategies supporting bike and pedestrian amenities, and education and marketing measures. Increasing the number of trips made on foot or bicycle will reduce the number of vehicle trips, resulting in a reduction in GHG emissions.

**Target Actions:**

- Promote use and regular review/updates to existing manuals and standards.
- Complete streets policies.
- Work with stakeholders to ensure bike facility placement is at strategic locations.
- Further enhance education and encouragement of non-motorized modes.

**Performance Targets:**

By 2011:

- Introduce and roll out Maryland's Trails Plan and refine.

By 2020:

- Increase the bicycle and pedestrian mode share to 15 percent of all trips in urbanized areas.

**16. Manage Urban Trees & Forests for GHG Benefits.** DNR will work to maintain and improve the health and longevity of urban trees and increase urban tree canopy throughout the state. DNR will work with the General Assembly and various State agencies (MDE, MDA, and SHA), as well as local governments, conservation organizations, private landowners, sawmills, arboreal industries and others to implement this strategy.

**Target Actions:**

- Work with local communities to secure funding for conducting urban tree canopy assessments.
- Encourage the adoption and implementation of urban tree canopy goals by local communities.
- Provide outreach and education on the significance of trees and their role in the built environment and control methods for invasive species.
- Develop incentives for diverting wood from waste-stream to value-stream.

**Performance Goals:**

By 2011:

- Establish urban tree canopy goals for 12 of the 74 communities developed before stormwater management regulations.
- Work with private citizens to plant 50,000 by 2010.

By 2020:

- Achieve a 10% cumulative increase in urban tree canopy throughout Maryland.
- Establish urban canopy goals for 50% (74 communities) of the area developed primarily before stormwater management regulations (pre-1984).

**17. Afforestation, Reforestation and Restoration of Forests and Wetlands.** DNR and MDE will promote forest and wetland CO<sub>2</sub> sequestration - both ecosystems being natural carbon "sinks" - using a suite of strategies including green infrastructure planning, reforestation offsets under RGGI, tax incentives, fee-in-lieu payments, and acquisition of landward properties to allow migration of coastal wetlands at risk of inundation from sea level rise. DNR plans to implement this strategy through a mix of efforts, including: public outreach and education; green infrastructure

planning; use of reforestation offsets under RGGI and allocation of RGGI allowances to forest management; and pursuing various tax incentives.

**Target Actions:**

- DNR to continue development of BayBank and associated LandServer utilizing USFS grant awarded to Pinchot Institute.
- DNR to hold meetings with local governments to refine local policies towards establishment, expansion, and protection of riparian zones and wetlands.
- DNR to draft regulations pursuant to passage of No-Net-Loss legislation.
- DNR to draft regulation pursuant to passage of Sustainable Forestry Act of 2009.
- DNR to report afforestation and buffer planting on public land accomplishments for 2009.
- MDE to work with federal and state partners, local government and non-profits to create, restore, and enhance wetlands.

**Performance Goals**

By 2011:

- Achieve afforestation and/or reforestation of 2,183 acres.
- Expand streamside forest buffers by 433 acres on public lands.
- Restore 525 acres of wetlands on public lands.

By 2020:

- Establish or restore 16,678 of wetlands
- Protect 250,000 acres of forest by 2020.
- Achieve afforestation and/or reforestation of 10,000 acres.

**18. Enhanced Carbon Sequestration Potential through Sustainable Forest Management.** DNR will promote sustainable forestry management practices in existing Maryland forests on public and private lands. DNR will work with the General Assembly and various State agencies (MDE, MDA, and SHA), as well as local governments, conservation organizations, private landowners, sawmills, arboreal industries and others to implement this strategy.

**Target Actions:**

- MDA and DNR will work together on Emerald Ash Borer (EAB) and Gypsy Moth control efforts
- DNR will work with NRCS State Technical Committee, Forestry Sub-committee.
- DNR will continue to explore potential of establishing a carbon credit market aggregation service with private entities.
- DNR will continue to support the Forestry for the Bay program, which reaches forest owners with management message.
- Partner with the Pinchot Institute with support from Center for AgroEcology to develop best management protocols for forest harvests associated with expected biomass markets.
- Draft legislation to amend NRA 5-304 Woodland Incentive Fund (WIF) to allow use with federal cost-share programs.
- Schedule meetings with all potential partners to discuss additional options for legislative actions.
- Prepare and adopt the Statewide Forest Assessment and Response plan, a 5-year strategic planning document enabling access to federal funds as mandated by 2008 Farm Bill.
- Submit draft Forest Products Operators (FPO) legislation to AELR.

**Performance Goals:**

By 2011:

- Use NRCS funds to leverage cost-share assistance for improving 500 acres of private forest.

- Achieve Woodland Incentive Fund underwrites improvements to 3,000 acres of private forest.
- Document results of amending legislation relevant to Woodland Incentive Fund, Forest Products Operators, and Sediment & Erosion Control.

By 2020:

- Improve sustainable forest management on 25,000 acres of private land by 2020.
- Improve sustainable forest management on 100 percent of State-owned resource lands by 2020.
- Certify 50% of State-owned forest lands as sustainably managed.

**19. Protection & Conservation of Agricultural Land, Coastal Wetlands & Forested Lands.** MDA and its climate change partners will map, designate, prioritize, and conserve existing forests, agricultural lands, and wetlands – all major carbon sinks – to sequester additional carbon and to avoid GHG emissions associated with development, degradation, and clearing. Deforestation and development now contribute up to a 25 per cent increase in GHG emissions. MDA will work with the General Assembly, DNR, MDE, and MDP in partnership with local governments, nonprofit organizations, foundations, and property owners to implement this strategy.

**Target Actions:**

- Decrease the conversion of agricultural land to developed land through the protection of productive farmland.
- Continue to pursue policies and programs that complement those of DNR and MDP by preserving existing forested, grassed, and wetland areas on agricultural lands.
- Continue to pursue policies and programs promoting the installation of forest and grass buffers and wetlands on agricultural lands.

**Performance Targets:**

By 2011

- Protect an additional 21,600 acres of productive farmland from development.
- Meet two-year CREP milestone for 12,800 acres of forest and grass buffers, wetland creation, and protection of highly erodible land.

By 2020

- Protect 962,000 acres of productive farmland from development.

**20. Expand "Buy Local" Programs for Sustainable Agriculture.** MDA will promote the sustainable production and consumption of local agricultural products. This strategy promotes the sustainable production and consumption of local agricultural goods by displacing the production and consumption of goods transported from other states and countries. In addition to the energy savings and GHG reductions resulting from decreased transportation emissions, greater demand for local products preserves the agricultural landscape, supports agro-biodiversity, and encourages beneficial environmental practices. MDA will work with farmers, local governments, restaurants, food distributors and retailers, value-added producers, public and private institutions, and trade associations to maintain and expand this popular program.

**Target Actions:**

- Sustain the extraordinary growth already evidenced in the "Buy Local Program."
- Increase public awareness of the program.

**Performance Targets:**

By 2011:

- Raise the number of farmers' markets by 2 percent.
- Increase direct sales (buyer/grower) by 2 percent.

By 2020:

- Raise the number of local farmers' markets by 20 percent.
- Increase direct sales (buyer/grower) by 20 percent.

**21. Promote Economic Development Opportunities Associated with Reducing GHG Emissions in Maryland.** DBED will work with public and private entities to expand green jobs and industry in Maryland. This strategy focuses on promoting the economic and business opportunities associated with climate protection and growing Maryland businesses while achieving state-wide GHG reduction goals. The Maryland Clean Energy Center and Technology Incubator Program, created by the General Assembly in its 2008 Session (HB 1337), supports this strategy by promoting the development of clean energy industries and jobs in Maryland. In March 2010, Governor O'Malley convened the Green Jobs and Industry Task Force to provide recommendations on creating and retaining green jobs and fostering green economic development.

**Target Actions:**

- Work with public and private entities to develop green industries and jobs in the areas of energy efficiency, energy production, environmental quality, green building/construction, and waste and recycling.
- Implement Green Jobs and Industry Task Force recommendations and action items, focused on incentives, programs and initiatives to green existing Maryland business and industries, attract green businesses and industries to Maryland, and support ecosystem markets and regional economies.

**Performance Goals:**

By 2011:

- Interact with 75 sector companies and assist 15.
- Visit with 40 Maryland-based green companies by 2011.
- Participate in 10 business education forums, workgroups, conventions, and seminars, and create an outreach program for in-state green companies.

By 2020:

- Interact with 500 sector companies and assist 100.
- Visit with 250 Maryland-based green companies by 2020.
- Participate in 100 business education forums, workgroups, conventions, and seminars.

## Level Three Strategies

**Agency Leads:** Maryland Department of Transportation (MDOT), Maryland Department of Natural Resources (DNR), Maryland Department of Agriculture (MDA), Maryland Department of Business and Economic Development (DBED), Maryland Energy Administration (MEA), Maryland Department of Housing and Community Development (DHCD), and Maryland Department of Environment (MDE)

## Greenhouse Gas Reduction Strategies

**22. Improve Waste Management through Source Reduction & Advanced Recycling.** MDE will work to reduce Maryland's waste stream through programs that reduce waste, expand recycling, and enhance the re-use of products<sup>2</sup>.

**Target Actions:**

- MDE will continue to monitor and initiate source reduction programs.
- MDE will continue to seek expansion of existing recycling programs.

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<sup>2</sup> Due to a projected increase in Maryland's population each year through 2020 over 2006 (i.e., 4.99 percent in 2011 and 11.61 percent in 2020), the amount of waste generated in Maryland is expected to rise over the 2006 - 2020 time period. Without additional enabling legislation, MDE will not have the authority to require additional recycling or waste reduction activities.

**Performance Goals:**

By 2011:

- Maintain a maximum 1.36 tons per person per year waste generation (waste generation is equal to the amount of waste disposed plus the amount of waste recycled) by reducing the amount of the waste stream generated per person by 3.91 percent (pounds/person with SR ÷ pounds/person without SR) resulting in a total tons of waste generation increase, from 2006 to 2011, of 6.4 percent.
- Reduce the amount of waste disposed by 2.64 percent.

By 2020:

- Maintain a maximum 1.36 tons per person per year waste generation by reducing the amount of the waste stream generated per person by 4.56 percent (pounds/person with SR ÷ pounds/person without SR), resulting in a total tons of waste generation increase, from 2006 to 2020, of less than 14 percent.
- Reduce the amount of waste disposed by 13.81 percent.

**23. Improved Design, Construction, Appliances & Lighting in New and Existing State and Local Government Buildings, Facilities and Operations.** MDE will work to adopt practices to obtain high performance and energy efficient buildings in state and local government-owned and leased buildings.

**Target Actions:**

- MDE will continue to work with other state agencies on implementation plans and regulatory changes, if appropriate, by participating in quarterly Meetings of the Green Building Council (GBC) and contributing to the annual Green Building Council report (due in November of each year).

**Performance Goals:**

By 2011:

- DNR will publish environmental footprints for all state government agencies.

By 2020:

- By 201, increase the efficient use of resources and reduce carbon footprint of government by 25%.

**24. State and Local Government Lead by Example.** MDE will promote energy efficiencies and GHG reductions through procurement and purchasing practices for State and local governments. This strategy will work together with the "Government Lead-by-Example" policy of building and operating energy efficient government buildings to reduce government's GHG footprint and encourage the private sector to follow suit.

**Target Actions:**

- MDE will promote energy efficiencies and GHG reductions through procurement and purchasing practices for State and local governments.

**Performance Goals:**

By 2011:

- DNR will publish environmental footprints for all state government agencies.

By 2020:

- By 2014, increase the efficient use of resources and reduce the carbon footprint of government by 25%.

**25. Energy Improvements and Repowering Existing Plants- Biomass.** MEA will work with MDE and Maryland utilities to identify emissions reductions from existing generating units through improving their operating efficiency.

**Target Actions:**

- MEA will work with MDE to conduct a study evaluating the relative efficiency of existing power plants, reviewing options and identifying priorities.

- MEA will support federal climate legislation that will create a price on carbon which will in turn incentivize existing plants to operate more efficiently.
- MEA will work with MDE to consider issuing climate regulations setting higher efficiency standards for existing plants.
- MEA will meet with utilities to discuss opportunities for improving their efficiencies.
- MEA will review optional methods to recover the costs of efficiency improvements.

**Performance Goals:**

By 2011

- Conduct study evaluating the relative efficiency of existing power plants, reviewing options and identifying priorities.

By 2020:

- Achieve 2 million tons of carbon reductions from efficiency improvements at existing plants.

**26. Evaluate GHG Emissions Impacts of Major Projects.** State agencies and sponsors of other large projects, including transportation, water & sewer, building construction, and public school construction projects will be able to evaluate and address the GHG emission impacts for new projects.

**Target Actions:**

- Influence national policy for GHG evaluations as part of national Climate Change and Transportation legislation now pending before U.S. Congress.
- Develop and test procedures to evaluate GHG as part of the federal NEPA process.
- Reduce the amount of waste disposed by 3.75 percent.
- Consider how to best address GHG mitigation of mobile and non-mobile projects that generate GHG emissions.

**Performance Goals:**

By 2011:

- State agencies and sponsors of other large projects will form a technical advisory group to explore and evaluate a process for analyzing GHG impacts of major mobile and non-mobile projects.

By 2020:

- Evaluate major projects for GHG implications as part of the project development process.

**27. Intercity Travel: Aviation, Rail, Bus and Freight:** MDOT will enhance connectivity of non-auto transportation modes between cities through infrastructure and technology investments. This will include improvement in passenger rail and bus services as well as freight movement capacity and bottleneck relief.

**Target Actions:**

- MDOT will form an “Intermodal Advisory Group” and a “Freight Stakeholder Advisory Group” to discuss and coordinate freight issues as outlined in the Maryland Freight Plan. Discussion will include how GHG emission benefits can be achieved and measured.
- Seek federal High Speed Intercity Rail funding for improvements to freight and passenger movements.

**Performance Goals:**

By 2011:

- Complete a statewide “Rail Plan.”

By 2020:

- Make passenger and freight rail more accessible, efficient, and available to help meet the 2020 GHG reduction goals.

**28. Nutrient Trading with Carbon Benefits.** MDA will add carbon credits and enhanced nitrogen credits to the Maryland incipient nutrient trading program. Carbon and enhanced nitrogen credits would be “stacked” onto existing nutrient credits as tradable commodities, adding more value to the total credit package and creating a comprehensive environmental trading market. Encouraging trades between non-point sources (e.g. agricultural operations) and point sources (e.g. wastewater treatment plants, industrial dischargers, highway contractors and developers) would create even more opportunities for GHG reductions while also improving water quality, reducing fertilizer use and soil erosion, restoring wildlife habitat and wetlands, expanding economic opportunities for farmers and foresters, and promoting Smart Growth goals by preserving agricultural and forested lands.

**Target Actions:**

- Continue to train state soil conservation staff and other interested third parties in the use of MDA’s computerized nutrient assessment tool.
- Hold public meetings to provide an overview of the nutrient trading program and future carbon stacking opportunities.
- Determine the baseline eligibility and nutrient credit generating potential of each prospective participant’s existing and proposed agronomic, land use, and/or structural practices and certify and register the resulting tradable credits.
- Work with DNR, MDE, and other public and private stakeholders to develop menus, policies, and guidelines for use in a complementary program of carbon reduction.

**Performance Targets:**

By 2011

- Establish an active nutrient trading market in Maryland.
- In cooperation with DNR and MDE, adopt a menu of carbon sequestration practices and relevant policies and guidelines.

By 2020

- Participation by 10 percent of farmers and landowners in providing nutrient and carbon credits to an active environmental trading market.
- Establish an interstate environmental marketplace throughout the Chesapeake Bay watershed states.

**29. Improve Building Codes & Trade Codes.** DHCD will reduce energy consumption in new or renovated buildings through improvement and enforcement of building and trade codes. On a three-year cycle, the International Code Council (ICC) develops and updates the International Building Codes, which include the International Building Code (IBC) and the International Residential Code (IRC). Following adoption of the MBPS by DHCD, local code jurisdictions are required to adopt the new MBPS within six months. The latest version of the MBPS incorporates the latest energy codes from the International Code Council (ICC), which is the 2009 version of the ICC’s International Energy Conservation Code (IECC 2009).

**Targeted Actions:**

- Improve, assess, and adopt the latest building codes following the International Code Council (ICC) three-year cycle of development of the I-Codes, including the energy code.
- Participate in the ICC process to improve and develop building codes on a national level, including participation in annual conferences and code development hearings.
- Identify opportunities to improve and expand much-needed training on building codes, especially those that will continue to be developed relating to energy efficiency and other green building standards.
- Identify funding for DHCD training programs to ensure that suitable training remains available statewide to local code authorities and other stakeholders.
- Provide training on the Maryland Building Performance Standards (MBPS) to local jurisdictions, architects, engineers, green building professionals, and other stakeholders.

**Performance Goals:**

By 2011:

- 60 local jurisdictions to adopt the latest, nationally-accepted, building and trade codes into the Maryland Builder Performance Standard (MBPS). DHCD will track local jurisdictions as they complete their required adoptions of the latest MBPS.
- Hold 3 public stakeholder event(s) to solicit input on the need for enhanced building codes, particularly for coastal communities.
- Pilot program established and a usable database accessible for tracking state and local processes for building code adoption, implementation, training, compliance, and development.
- Train 1,100 people (i.e., local jurisdiction representatives and other stakeholders) trained by DHCD/Maryland Codes Administration each year on the MBPS.

By 2020:

- State and local adoption of the latest, nationally-accepted, building and trade codes into the Maryland Builder Performance Standard (MBPS). This version of the MBPS will incorporate the latest energy codes from the International Code Council (ICC), which will be the 2018 version of the ICC's International Energy Conservation Code (IECC 2009).

**Tracking and Measuring Progress**

Responsibility for the implementation of this delivery plan has been divided among the appropriate State agencies. The Maryland Department of the Environment (MDE) is the lead on certain policies as well as continuing to oversee the process. Other key agencies include: the Department of Natural Resources (DNR), Maryland Department of Transportation (MDOT), Maryland Energy Administration (MEA), the Department of Housing and Community Development (DHCD), Maryland Insurance Administration (MIA), Maryland Department of Agriculture (MDA), the Department of Business and Economic Development (DBED), and the Maryland Department of Planning (MDP).

All Agencies listed above have taken steps independently to ensure that the GHG reduction strategies for which they are responsible are being thoroughly developed. For example, MDE, MIA, MDA, and DNR have held stakeholder processes to gather public input and answer questions on the implications of the Commission-recommended emission reduction policies. MDOT established seven broad Working Groups for policy options related to transportation and land-use, and a Coordinating Committee to oversee the process. The Coordinating Committee membership was designed to ensure full representation of all MDOT modal agencies and other relevant State agencies. The Working Groups provided technical guidance and membership in each Working Group was determined based on (1) assuring agency relevance to each specific topic area, (2) ensuring broad cross-sectional representation among State, regional and local agencies, and (3) maintaining a manageable size and focus for each Working Group. In Phase I of MDOT's efforts, working groups defined and evaluated 72 strategies, 44 of which were determined capable of implementation by 2020. The contribution the transportation sector can make to meet the 2020 target established in the GGRA was quantified under Phase II of the work program. And finally, DNR has moved closer to its implementation goals during the 2009 Legislative Session, when the State passed the Sustainable Forestry Act and the No Net-Loss- Forest Conservation Act. Both of these bills are closely related to many of the Commission's agriculture and forestry-related policies.

MDE is currently working to evaluate each of the 42 policy measures for inclusion in the Greenhouse Gas Reduction Plan to be completed by the end of 2011. For these measures, the key activities and dates linked to adoption will be tracked. As measures move from the adoption phase to the implementation phase, the tracking metrics will be adjusted. A smaller subset of the strategies described in Levels 1, 2 and 3 above will be tracked either directly or indirectly for the GHG emission reductions being achieved by that measure.

For those strategies that can not currently be tracked for GHG reductions, MDE will track progress toward achieving the 2011 Performance Goals as outlined in the document above. Strategies that will be tracked in detail for early reductions

between 2010 and 2012 are noted in Table 1. As the metrics become available to track individual measures for direct GHG reductions, this delivery plan and the tracking tables will be updated.