

EXAMPLE ONLY

ES-1: Promotion of Renewable Energy Resources

Policy Description

This option focuses on financial incentives that promote the greater use of renewable energy. They are focused primarily for revising existing statutes/regulations regarding zoning, siting, incentives for centralized facilities, long-term contracting for renewable generation, and performance-based contracting. The effect of these changes is to encourage investment in renewables by easing restrictions and impediments to their more widespread diffusion within Maryland.

Policy Design

- **Goals:** This set of activities would be expected to lead to 5% of state gross generation to be comprised of centralized renewable sources by 2025
- **Timing:** This policy would be intended to come into effect in 2008 and 2009 and would continue indefinitely as an enabling mechanism for other climate-related policies.
- **Parties Involved:** Maryland government.
- **Other:** NA

Implementation Mechanisms

The proposed implementation mechanism for this option is the revision of zoning laws and contracting arrangements, developed by appropriate state agencies/entities.

Related Policies/Programs in Place

There are several state efforts in place that are related to this option, as follows...

Types(s) of GHG Reductions

Renewable generation can reduce fossil fuel use in power generation and correspondingly reducing CO₂ emissions.

Estimated GHG Reductions and Net Costs or Cost Savings

(to be completed at a future stage)

Key Uncertainties

(to be completed at a future stage)

Additional Benefits and Costs

(to be completed at a future stage)

Feasibility Issues

(to be completed at a future stage)

Status of Group Approval

(to be completed at a future stage)

Level of Group Support

(to be completed at a future stage)

Barriers to Consensus

(to be completed at a future stage)

EXAMPLE ONLY

ES-2: Technology-focused initiatives for electricity supply

Policy Description

Technology and innovation play a critical role in the development of economic processes, including energy production and use. Major progress in climate change policy requires improvements to technologies as well as increased rates of technology adoption and use. Trends toward smaller scale in energy production technology, combined with the impact of automation and remote system controls, present challenges to current business models and operational procedures. This policy is an umbrella covering several technology-related policy options that together can contribute to GHG emission reductions in Maryland.

Policy Design

- **Goals:** This set of policies would provide state government and other private and public parties with resources and incentives for analysis, targeted R&D, market development, and adoption of GHG-reducing technologies that are not covered by other policies. The overall goals would be: a) to position Maryland as a world leader in climate-related technology development and deployment; b) to achieve actual emission reductions from technology investments, and c) to develop state industries with high in-state and export capability.
- **Timing:** This policy would be intended to come into effect in 2008 and 2009 and would continue indefinitely as an enabling mechanism for other climate-related policies.
- **Parties Involved:** Maryland government. Private and public partners on a voluntary basis.
- **Other:** NA

Implementation Mechanisms

An R&D budget line item would be created to fund a small staff in the appropriate state agency, to be determined. This group would follow technology trends and identify critical technology pathways as well as opportunities for collaboration and funding from other sources.

In addition, a Clean Technologies Innovation Program would be funded at the state level to provide grants and incentives as they are identified by the state along with other sources of public input into the prioritization process. Two models would be the California Public Interest Energy Research (PIER) program and the New York Energy Research and Development Agency (NYSERDA). Utilities would be able to apply as partners for these funds.

Finally, the state's regulated utilities would be allowed to devote a percentage of their sales revenue to substantial R&D projects on a voluntary basis as part of their overall energy supply portfolios. The invested capital portion of these projects would be given advantageous cost recovery as an incentive to carry out such projects. This policy could be relaxed when effective climate change policy comes into effect, although there may still be merit in continuing some level of incentive for utility R&D effort even when climate policy is in place.

Related Policies/Programs in Place

There are several state efforts in place that are related to this option, as follows: a) innovation including biotechnology, agriculture, transportation etc, b) renewable development, c) tax credits and federal incentives, and d) technology-specific policies such as hybrid vehicle or solar pilot programs and incentives.

Types(s) of GHG Reductions

Various, from no direct reductions to direct offset of emitting fuels, processes, etc. to actual uptake and use of GHGs thus removing them from the atmosphere.

Estimated GHG Reductions and Net Costs or Cost Savings

(to be completed at a future stage)

Key Uncertainties

(to be completed at a future stage)

Additional Benefits and Costs

(to be completed at a future stage)

Feasibility Issues

(to be completed at a future stage)

Status of Group Approval

(to be completed at a future stage)

Level of Group Support

(to be completed at a future stage)

Barriers to Consensus

(to be completed at a future stage)

EXAMPLE ONLY

ES-3 Cap-and-Trade

Policy Description

A cap and trade system is a market mechanism by which GHG emissions are limited or capped at a specified level, and those participating in the system are required to hold permits for each unit of emissions. Through trading, participants with lower costs of compliance can choose to over-comply and sell their additional reductions to participants for whom compliance costs are higher. In this fashion, overall costs of compliance are lower than they would otherwise be.

The initial allocation of the allowances is an important policy decision. They can be auctioned (with the proceeds used to benefit consumers who will pay higher costs) or allocated to existing sources, or some combination of the two. Participants can range from a small group within a single sector to the entire economy. As with carbon taxes, the compliance obligation can be imposed “upstream” (at the fuel extraction or import level) or “downstream” at points of fuel consumption.

Among the important considerations with respect to a cap and trade program are: the geographic coverage of the cap (which states), the sources and sectors to which it would apply; the baselines for these sources and sectors.; the level and timing of the cap; how allowances would be distributed (e.g., whether load-based or generation-based, how new market entrants are accommodated, how leakage is addressed, etc.); and what if any offsets would be allowed. Other issues to consider include which GHGs are covered; whether there is linkage to other trading programs; banking and borrowing; early reduction credit; what if any incentive opportunities may be included; use of any revenue accrued from permit auctions; and provisions for encouraging energy efficiency.

The principal example of a GHG cap-and-trade system in the US today is the Northeast States’ Regional Greenhouse Gas Initiative (see <http://www.rggi.org/>). A group of western states and Canadian provinces are also in the initial stages of developing a multi-sector cap-and-trade program through the Western Climate Initiative (see www.westernclimateinitiative.com)

Policy Design

- **Goals:** The cap-and-trade option should set an initial cap at 2007 emission levels, with gradual annual reductions to achieve GHG emission reductions of at least 15% below 2005 levels by 2015, 30% below 2005 levels by 2025, and 80% below 2005 levels by 2050. The cap may need to be adjusted from these levels to compensate for emissions from non-covered sectors if projections show those sectors are likely to fall short of or exceed the target reductions.
- **Timing:** The cap-and-trade should be implemented as soon as possible, to prevent significant increases above current emissions in the meantime and to maximize the time available to meet the 2015 target. In the event that good historical emissions data are available from some but not all covered sectors, a phased approach can be used. This is the approach followed by both EU ETS and RGGI. In both examples traditionally regulated stationary sources with

good emissions data are included in the first phase of the program, which also includes mandatory reporting from sources planned to be covered in future phases. This allows a relatively quick program start and a ramp-up of the administrative, governance and financial functions of the program. It also achieves greater emissions reductions progress over time by capping a limited number of large sources early.

- **Parties Involved:** The option should examine the feasibility of an economy-wide as opposed to an energy supply-only coverage. A cap and trade program that limited and reduced emissions from energy supply as well as other sectors would arguably be able to achieve substantial reductions. The cap-and-trade should therefore cover the electric sector, major industrial emitters, the transportation sector, and the buildings sector.
- **Other:** Most attention in other cap and trade programs has been focused on carbon dioxide, which represents 84 percent of all greenhouse gas emissions in the United States from human sources. Of this level, all but two percent are released as a direct result of the combustion of coal, petroleum and natural gas. Other gases, such as methane, tend to be sector-specific. Landfills and agricultural operations release significant quantities of methane, which ton-for-ton is 21 times as powerful a greenhouse gas as CO₂ over a 100-year time span. Much work has been done to standardize the greenhouse effect-forcing potential of the major gases so it is possible to regulate more than one gas under the same cap and trade program.

Implementation Mechanisms

There are three key implementation mechanisms. The first concerns the regulatory oversight agency. This is the entity responsible for acquiring and surrendering allowances for emissions. In some sectors, such as major industrial emissions, this is simply the entity operating the facility from which the emissions are released. But for other sectors it is either impractical or undesirable to use this approach. The electrical power sector is a good example. Emissions are released from fossil fuel generating units located within the state but of all the GHG emissions resulting from electricity *used* in-state, a major percentage was as a result of imported power generated out-of-state. A cap and trade program that covered only in-state generation would not only miss substantial GHG sources, it could place in-state generators at a competitive disadvantage, assuming the exporting state was not a participant in the cap and trade. By setting the power sector point of regulation at the ‘first seller’ of electricity *into* the in-state market, both in-state and imported emissions are captured. In the power sector, the point of regulation should be “first sellers,” to ensure emissions associated with imported power are covered.

The transportation sector offers a similar challenge, in that a program requiring the surrender of allowances from the end users of motor fuels would be unworkable. Transportation sector emissions should therefore be regulated upstream, focusing on the entity that imports the petroleum into the state. Emissions associated with the buildings sector would primarily reflect natural gas consumption. Natural gas should also be regulated upstream, again focusing on the entity that imports the natural gas into the state. Major industrial emissions should be regulated at the point of emissions, except to the extent emissions are associated with natural gas and petroleum that has already been regulated upstream. Emissions of certain high global-warming potential gases may also be regulated upstream of their usage, at the distribution level, if more practical.

The second key implementation mechanism concerns the distribution of allowances. There are two basic models: 1) free distribution to covered sources on some basis such as historical

emissions (grandfathering); or 2) auction at the market price, requiring covered sources to purchase the allowances. It should be pointed out that these options are not mutually exclusive, and a blend of both auction and free distribution is possible. The Cap and Trade TWG is modeling considers using both methods. If allowances are auctioned, with proceeds collected by the state, these funds could be used to: a) finance energy efficiency programs, b) promote development of sustainable low-carbon energy sources, c) assist low-income energy consumers, and d) help any workers harmed by the transition away from high carbon-emitting technologies.

The second key implementation mechanism concerns offsets. Offsets are out-of-sector emissions reductions or carbon sequestration projects that are recognized by the program as qualifying for allowance credit. By definition offsets must be measures that are not required by the program and in most cases they cannot be required by any emissions reduction program. They provide an incentive for low-cost investments in emissions reductions as an alternative to higher-cost in-sector reductions or allowance purchases. Offsets should be subject to stringent standards to ensure their environmental integrity, and limited to ensure that the overwhelming majority of emission reductions come from covered sectors.

Related Policies/Programs in Place

There are several existing or planned programs that are relevant to the implementation of the cap-and trade program as follows....

Types(s) of GHG Reductions

All 6 statutory GHGs (CO₂, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride)

Estimated GHG Reductions and Net Costs or Cost Savings

(to be completed at a future stage)

Key Uncertainties

(to be completed at a future stage)

Additional Benefits and Costs

(to be completed at a future stage)

Feasibility Issues

(to be completed at a future stage)

Status of Group Approval

(to be completed at a future stage)

Level of Group Support

(to be completed at a future stage)

Barriers to Consensus

(to be completed at a future stage)

EXAMPLE ONLY

ES-4: Combined Capture, Storage, and Reuse (CCSR) incentives, requirements and/or enabling policies

Policy Description

Integrated gasification combined cycle (IGCC) is an emerging technology for coal power, offering the potential for higher efficiency and reduced cost of pollutant emissions control. IGCC involves partially combusting coal under high pressure to produce a synthetic gas, which is then turned into electricity via combined cycle combustion. IGCC can be combined with carbon capture and sequestration or reuse (CCSR) in Maryland to lead to significant CO₂ emission reductions relative to those of conventional coal technology.

Policy Design

- **Goals:** Retrofit one existing coal station by 2015 with IGCC technology including carbon capture and storage; Replace the next planned pulverized coal power station in Maryland with IGCC/CCS technology.
- **Timing:** As noted above.
- **Parties Involved:** All power producers operating qualifying facilities in Maryland, independent power producers, and state regulators.
- **Other:** Not applicable.

Implementation Mechanisms

There are four key aspects to the implementation of this option in Maryland, as follows:

- Require development of the legal and regulatory frameworks needed for geologic storage of CO₂ – new regulations should address issues of CO₂ ownership in storage and liability for same. State environmental agencies should develop permitting processes for underground storage, including guidance on pipelines, drilling, storage, measurement, monitoring and verification.
- Support comprehensive assessments of geologic reservoirs at state and federal levels to determine storage potential and feasibility.
- Evaluate the feasibility of CO₂ transport via pipeline and “advanced sequestration” (i.e., mineralization, carbon nano-fibers) if Maryland determines it has no in-state storage opportunities.
- Provide tax incentives for CCS, including when transported via pipeline for use in enhanced oil recovery operations.

Related Policies/Programs in Place

None.

Types(s) of GHG Reductions

Carbon dioxide from displaced coal.

Estimated GHG Reductions and Net Costs or Cost Savings

(to be completed at a future stage)

Key Uncertainties

(to be completed at a future stage)

Additional Benefits and Costs

(to be completed at a future stage)

Feasibility Issues

(to be completed at a future stage)

Status of Group Approval

(to be completed at a future stage)

Level of Group Support

(to be completed at a future stage)

Barriers to Consensus

(to be completed at a future stage)

EXAMPLE ONLY

ES-5: Clean Distributed Generation (renewables and combined heat and power)

Policy Description

This policy option reflects a suite of financial incentives to encourage investment in distributed renewables and combined heat and power. Financial incentives for distributed renewables could include: (1) direct subsidies for purchasing/selling distributed renewable technologies given to the buyer/seller; (2) tax credits or exemptions for purchasing/selling distributed renewable technologies given to the buyer/seller; (3) tax credits or exemptions for operating distributed renewable energy facilities; (4) feed-in tariffs, which provide direct payments to distributed renewable generators for each kWh of electricity generated from a qualifying renewable facility; (5) tax credits for each kWh generated from a qualifying renewable facility; (6) R&D funding to support development of distributed renewable technologies; (7) net metering; (8) financial incentives or assurance of cost recovery for regulated utilities that make reasonable and prudent investments in utility-owned or customer-owned distributed renewable energy resources and (9) a clean energy grants program. Maryland should strive toward capital buy downs and production incentives such that there is full payback over 25-30 years to those who install distributed renewable options.

Combined heat and power (CHP) can reduce GHG emissions by increasing the overall efficiency of fuel use and reducing transmission line loss with the co-location of heat and power facilities. CHP also lends itself to the use of biofuels, an important Maryland emphasis. However, there are numerous barriers to CHP, including inadequate information, institutional barriers, high transaction costs because of small projects, high financing costs because of lender unfamiliarity and perceived risk, "split incentives" between building owners and tenants, and utility-related policies like interconnection requirement, high standby rates, exit fees, etc. The lack of standard offer or long-term contracts, payment at avoided cost levels, and lack of recognition for emissions reduction value provided also creates obstacles. Policies to remove these barriers can include: improved interconnection policies, improved rates and fees policies, streamlined permitting, recognition of the emission reduction value provided by CHP and clean distributed generation, financing packages and bonding programs, power procurement policies, education and outreach, etc.

Financial incentives for CHP could include: direct subsidies for purchasing/selling CHP systems given to the buyer/seller; tax credits or exemptions for purchasing/selling CHP systems given to the buyer/seller; tax credits or exemptions for operating CHP systems; feed-in tariff, which is a direct payment to CHP owners for each kWh of electricity or BTU of heat generated from a qualifying CHP system; and tax credits for each kWh or BTU generated from a qualifying CHP system.

Policy Design

- **Goals:** Undertake a concerted effort to revise its regulatory policies and remove institutional barriers in order to allow distributed renewable and CHP to compete on a level playing field

with other sources of electric and thermal energy. Set a goal for distributed renewable generation equal to 1% of all electricity sales in the state by 2025, with a start-up year of 2015. Set a goal for combined heat and power equal to 50% of in-state CHP technical potential at commercial and industrial facilities by 2025, with a start-up year of 2015.

- **Timing:** As noted above.
- **Parties Involved:** Financial incentives would be administered by a state agency and provided to individuals, commercial enterprises, and industrial enterprises.
- **Other:** A source of funds to cover these financial incentives would need to be determined. It may be possible to link incentives to (or condition them upon) the manufacture within Maryland of associated equipment.

Implementation Mechanisms

There are five key aspects to the implementation of this option in Maryland, as follows:

- Information and education.
- Technical assistance.
- Financial incentives.
- Regulatory policies.
- Codes and standards.

Related Policies/Programs in Place

None.

Types(s) of GHG Reductions

Reductions in emissions of carbon dioxide from combustion sources.

Estimated GHG Reductions and Net Costs or Cost Savings

(to be completed at a future stage)

Key Uncertainties

(to be completed at a future stage)

Additional Benefits and Costs

(to be completed at a future stage)

Feasibility Issues

(to be completed at a future stage)

Status of Group Approval

(to be completed at a future stage)

Level of Group Support

(to be completed at a future stage)

Barriers to Consensus

(to be completed at a future stage)

EXAMPLE ONLY

ES-6: Integrated Resource Planning

Policy Description

Several regulatory and rate reforms in Maryland would encourage electric utilities to invest in clean, non-carbon-producing energy resources such as renewables and energy efficiency. Under the current rate structure, utilities have an incentive to invest in new large capital projects, which also may inhibit investments in energy efficiency. Maryland could align the regulated electric utilities' profit motive with increased energy efficiency by implementing integrated resource planning (IRP) in the state.

The aim of IRP is to remove perverse disincentives to energy efficiency. It is a planning process for electric utilities that evaluates many different options for meeting future electricity demands and selects the optimal mix of resources that minimizes the cost of electricity supply while meeting reliability needs and other objectives. An IRP framework strives to achieve the following: a) evaluate all options, from both the supply and demand sides, in a fair and consistent manner; b) minimize costs to all stakeholders (and not just costs to the utility); and c) create a flexible plan that allows for uncertainty and permits adjustment in response to changed circumstances.

The use of IRP would help to better align environmental and profit incentives and could be accomplished by action on the part of the Utilities Commission to reform the rate structure through a) decoupling profits from sales volume, b) making lost revenue adjustments, and developing inverted block rates. Moreover, the Utilities Commission could require electric utilities to consider the costs associated with future regulation of carbon dioxide emissions when evaluating both supply-side (*e.g.*, new power plants) and demand-side (*e.g.*, energy efficiency) resource options. Aligning environmental and profit incentives in Maryland would involve the following:

- *Decoupling Profits from Sales.* In a decoupled rate structure, utility profits are based on their cost of service and number of customers, rather than electricity sales. Utilities are entitled to earn enough revenue to cover fixed costs plus some profit based on their projected sales. If sales exceed projections, excess revenue is returned to ratepayers through rate adjustments the following year. If sales are lower than projection, rates are increased the following year to make up the difference.
- *Lost Revenue Adjustment.* Lost revenue adjustments reward utilities for energy generation lower than anticipated levels and remove additional profits when utility generation is higher than anticipated levels. This is accomplished by allowing utilities to recover net revenues lost due to energy efficiency programs (including decreased sales plus the administrative costs of the program) via periodic rate adjustments. Thus, the incentive for ever-increasing electricity sales is removed *and* efficiency is rewarded.
- *Inverted Block Rates for Residential Customers.* Inverted block rates, in which rates increase with consumption, can encourage efficiency for residential customers by sending

customers price signals that more accurately reflect the costs of producing electricity. Because each successive “block,” or increment of energy used per billing period becomes progressively more expensive, inverted block rates encourage efficiency and discourage wasteful consumption. Inverted block rates can also better serve families with low incomes.

- *Require Utilities to Use a “Carbon Adder” in Resource Selection:* “Carbon adders” are a means of accounting for possible future costs of compliance with future GHG regulations. A carbon adder is an expected future price for CO₂ that is assumed when comparing resource options. It typically involves that utilities include in the resource selection and screening process a CO₂ cost adder.

Policy Design

- **Goals:** This mitigation option will not be quantified in the analysis phase, as it is too early in the process to assign goal levels. Instead, the emphasis during the analysis phase will be to define the details of a prospective rate reform program. After this process, it may be possible to assign goal levels in some future initiative.
- **Timing:** The initial details of a prospective rate reform program should be developed as soon as possible.
- **Parties Involved:** Utilities Commission, regulated electric utilities, environmental and public health groups.
- **Other:** NA

Implementation Mechanisms

This is a command/control option that requires changes to Utilities Commission rules and/or new legislation.

Related Policies/Programs in Place

Numerous other states have similar rate reform programs in place.

Types(s) of GHG Reductions

Greater reliance on renewables and energy efficiency would reduce dependence on electricity produced by burning coal and other fossil fuels, thereby reducing emissions of carbon dioxide and other greenhouse gases.

Estimated GHG Reductions and Net Costs or Cost Savings

(to be completed at a future stage)

Key Uncertainties

(to be completed at a future stage)

Additional Benefits and Costs

(to be completed at a future stage)

Feasibility Issues

(to be completed at a future stage)

Status of Group Approval

(to be completed at a future stage)

Level of Group Support

(to be completed at a future stage)

Barriers to Consensus

(to be completed at a future stage)

EXAMPLE ONLY

ES-7: Renewable Portfolio Standard

Policy Description

A renewable portfolio standard (RPS) is a policy requiring investor-owned electric utilities to supply a certain percentage of retail electricity from renewable energy sources by a stipulated date. An RPS that includes measurable, verifiable and lasting efficiency options is an Environmental Portfolio Standard (EPS). Utilities can satisfy the EPS requirement by generating renewable energy themselves or by purchasing renewable energy credits (REC) from a renewable energy generator. A REC is equal to 1 kWh of eligible and verified renewable electricity produced. Eligible renewable sources and energy efficiency applications are as briefly outlined below:

- **Renewables:** Solar PV; wind power; micro-hydropower (< 20MW); ocean current, tidal and wave energy; fuel cells using renewable fuels; and biomass including hog waste using an innovative waste management system that does not employ a lagoon, non-woody energy crops, wood wastes, anaerobically digested waste biomass and other animal waste biomass.
- **Efficiency:** applications that provide measurable, verifiable, long-term savings to the retail customer as compared to current technology in use, including but not limited to appliances, HVAC, efficient motors, etc.

The option focuses on a strengthening the existing portfolio requirements up through the 2025 time frame, and incorporates an assessment of the adequacy of transmission capacity. It proposes an increase in R & D funding for renewable/environmental (low CO2 emitting) energy that reduces CO2/ GHG emissions.

Policy Design

- **Goals:** Strengthen the existing RPS to achieve a 25% EPS by 2025, starting in 2010 and ramping up linearly over the 2011-2025 period.
- **Timing:** As noted above.
- **Parties Involved:** All power producers operating qualifying renewable facilities in Maryland would participate.
- **Other:** Not applicable.

Implementation Mechanisms

This is a command/control policy requiring a legislative act by the MD legislature, and/or mandated by the Maryland Utilities Commission, within their jurisdiction.

Related Policies/Programs in Place

The option is a strengthened version of the existing RPS.

Types(s) of GHG Reductions

Carbon dioxide from displaced coal, NG combined cycle and combustion turbine facilities; Methane through the use of animal waste-to-energy and landfill gas-to-energy (LFGE) resources; and aerosols from displaced coal.

Estimated GHG Reductions and Net Costs or Cost Savings

(to be completed at a future stage)

Key Uncertainties

(to be completed at a future stage)

Additional Benefits and Costs

(to be completed at a future stage)

Feasibility Issues

(to be completed at a future stage)

Status of Group Approval

(to be completed at a future stage)

Level of Group Support

(to be completed at a future stage)

Barriers to Consensus

(to be completed at a future stage)

EXAMPLE ONLY

ES-8 Efficiency Improvements and Repowering Existing Plants

Policy Description

This policy would promote the identification and pursuit of cost-effective emissions reductions from existing generating units through improving their operating efficiency, adding biomass or other fuel changes, or adding carbon capture technology. This policy would complement a Generation Performance Standard (which applies to new plants and new units) by applying to existing units. Given that CO₂ emissions have not previously been the focus of state regulation, and given that existing units have not been the focus of resource planning, it is expected that there are as-yet unidentified opportunities to reduce emissions from existing facilities that will be cost-effective, particularly once CO₂ limits are in place. This policy would, in time, result in the identification of a portfolio of technological options for reducing greenhouse gas emissions and allow state utilities to share the opportunities they have identified.

Key aspect of the options include a) requiring utilities to evaluate their existing generating units for opportunities to improve their emissions profile through efficiency improvements, the addition of biomass or other fuel changes, or the addition of carbon capture technology. This evaluation would be part of an overall plan identifying cost-effective options for reducing system CO₂ emissions on a short-term and long-term basis; b) requiring utilities to pursue cost-effective options for reducing their emissions profile through measures identified above; and c) creating financial incentives that reward such emissions reductions. The terms “cost effective” would be defined by some objective measure, such as cost per ton of carbon equivalent.

Policy Design

- **Goals:** The repowering option should seek to achieve biomass co-firing at its upper practical limit (i.e., not requiring major capital investments) 2015. This option should set a goal of repowering all eligible coal stations with natural gas by 2020.
- **Timing:** As noted above.
- **Parties Involved:** The option applies to Maryland electric load serving entities.
- **Other:** Not applicable.

Implementation Mechanisms

The planning and emission reduction requirements would be implemented through planning processes already implemented by the Public Utilities Commission.

Related Policies/Programs in Place

The option is an important counterpart to the Generation Performance Standard (GPS), which only covers new financial commitments. It complements a cap and trade policy by ensuring that utilities pursue cost-effective potential emission reductions rather than the more obvious option

of purchasing emission allowances (with the projected price of allowances being a key part of the definition of “cost effective” reductions).

Types(s) of GHG Reductions

All 3 major GHG emissions (i.e., CO₂, methane, nitrous oxide).

Estimated GHG Reductions and Net Costs or Cost Savings

(to be completed at a future stage)

Key Uncertainties

(to be completed at a future stage)

Additional Benefits and Costs

(to be completed at a future stage)

Feasibility Issues

(to be completed at a future stage)

Status of Group Approval

(to be completed at a future stage)

Level of Group Support

(to be completed at a future stage)

Barriers to Consensus

(to be completed at a future stage)

EXAMPLE ONLY

ES-9: Carbon (GHG) tax

Policy Description

A GHG tax would be a tax on each ton of CO₂ equivalent emitted from certain sources. The tax could be imposed upstream, based for example on the carbon content of fuels (e.g. fossil fuel suppliers) or at the point of combustion and emission. Although taxed entities would pass some or all of the cost on to consumers, there would be competitive pressure to find cost-effective ways to lower (or offset) emissions. Consumers who see the implicit cost of GHG emissions in products and services could adjust their behavior to lower emissions and reduce cost. Revenues collected could be fully applied to incentivize low emission alternatives. The program can also be designed to be “revenue neutral” (not a net tax increase) for example by offsetting with an income tax reduction. Revenue could also be directed for relief to parties that are disproportionately impacted by the tax. In general a carbon tax can influence behavior through tax avoidance opportunities, exemptions, targeted rebates and funding mechanisms for installation of favored technologies.

The commodity that would be taxed is CO₂ or equivalent emitted from combustion, expressed in metric tonnes. Specific assessment factors (such as BTU) could be determined for ease of collection and to account for variability of carbon content of fuel. Rebates could be created for CO₂ controls that prevent atmospheric emissions. The tax would be imposed as far upstream as practicable to ensure ease of administration. It is assumed that the cost of the tax would be passed down to the ultimate consumer, such as residential and commercial utility ratepayers for electricity and heating and purchasers of fuels for commercial and personal transportation. In order to achieve the stated goal, the amount of the tax must be high enough to trigger financial and behavioral decisions to actually shift to lower emitting fuels.

Policy Design

- **Goals:** Make the cost of inefficient or higher CO₂ emitting activities more expensive than alternatives, creating a financial incentive to change behavior away from activities that result in atmospheric CO₂ emissions. Design a tax that includes safety valves to reduce low-income impact and minimize detrimental economic consequences. Optionally, the tax could be “revenue neutral”, meaning an equal amount of other state taxes would be reduced so that the “net” to the state is essentially zero; or, the revenue from the tax could be used to develop or promote alternatives that reduce CO₂ emissions. However, reducing other taxes must not have the effect of eliminating the incentive to change behavior (reduce CO₂ emissions). Establish a tax collection system that is simple and cost-effective. The emission reduction targets should be pegged to the reduction targets specified in the cap-and-trade option (see ES-3).
- **Timing:** Pegged to the timing of the cap-and-trade option (see ES-3).

- **Parties Involved:** Major payers would be utilities that generate or distribute electricity in Maryland; refiners or distributors of transportation and heating fuels in Maryland; and commercial and industrial sources creating energy for production or other commercial use.
- **Other:** NA

Implementation Mechanisms

This option requires legislation and detailed tax collection system.

Related Policies/Programs in Place

None.

Types(s) of GHG Reductions

Reductions in emissions of carbon dioxide from combustion sources.

Estimated GHG Reductions and Net Costs or Cost Savings

(to be completed at a future stage)

Key Uncertainties

(to be completed at a future stage)

Additional Benefits and Costs

(to be completed at a future stage)

Feasibility Issues

(to be completed at a future stage)

Status of Group Approval

(to be completed at a future stage)

Level of Group Support

(to be completed at a future stage)

Barriers to Consensus

(to be completed at a future stage)

EXAMPLE ONLY

ES-10 Generation Performance Standard

Policy Description

A generation performance standard (GPS) is a mandate that requires those entities that deliver electricity (load-serving entities or LSEs) to acquire electricity, or power plant developers to build and operate new base load generation, with a per-unit emission rate below a specified mandatory standard.

Policy Design

- **Goals:** The general goal of the policy is to prevent utilities from making long-term investments in high-carbon generation technology. In particular, the generation performance standard would prevent utilities from making a long-term financial commitment to base load generation plants with CO₂ emissions in excess of 1,100 pounds of CO₂ per megawatt-hour. The GPS would be designed to harmonize with policies that seek to reduce greenhouse gas emissions by promoting greater use of biomass and combined heat and power (CHP). For purposes of compliance with the GPS, the CO₂ emissions attributed to biomass energy would be net emissions based on a full fuel-cycle analysis. For base load projects that are part of a CHP project, the GPS would be raised to 1300 pounds of CO₂/MWh.
- **Timing:** Two alternative onset dates for the GPS should be considered – an immediate onset date that would apply to all base load projects not already in operation, and a delayed onset date that would exclude base load facilities currently under consideration in proceedings before the Public Utilities Commission. The ongoing need for a GPS would be reviewed after the implementation of a cap and trade system.
- **Parties Involved:** The program would apply to any state LSE making long-term financial commitments to base load power.
- **Other:** Not applicable.

Implementation Mechanisms

Implementation would be through the Public Utilities Commission, which would review all long-term financial commitments to base load generation made by Maryland utilities to ensure compliance with the generation performance standard.

Related Policies/Programs in Place

None.

Types(s) of GHG Reductions

Reduces carbon dioxide emissions from fossil-fuel electric generators, and promotes low carbon alternatives to fossil fuel generators.

Estimated GHG Reductions and Net Costs or Cost Savings

(to be completed at a future stage)

Key Uncertainties

(to be completed at a future stage)

Additional Benefits and Costs

(to be completed at a future stage)

Feasibility Issues

(to be completed at a future stage)

Status of Group Approval

(to be completed at a future stage)

Level of Group Support

(to be completed at a future stage)

Barriers to Consensus

(to be completed at a future stage)