

CHAPTER 10 CONCLUSION

Emissions

Without policy intervention, existing greenhouse gas emissions trends in Delaware are forecast to continue rising between 1996 and 2010. The principal source of these increasing emissions is the combustion of fossil fuels for energy use. Under a business-as-usual scenario, the State's emissions will reach approximately 20 mmtCO₂ by 2010. The emission target for the DCCC is a reduction to 7% below Delaware's 1990 level during 2010-2012, which will require a 23% reduction from the forecast BAU total by 2010.

Sector analyses conducted for this Action Plan reveal that greenhouse gas contribution by 2010 will likely have the following distribution: Industry (22%), Residential (11%), Commercial (10%), Transportation (26%), and Utility (31%). Reducing statewide emissions requires a strategy that achieves energy savings in each sector. This Action Plan also investigates contributions from wastes and the decrease in Delaware's carbon sinks (principally, its forests).

The recommended steps in this Action Plan would enable Delaware to contribute to a national strategy to cost-effectively lower CO₂ emissions. In addition to satisfying the emission reduction goals set by the Delaware Climate Change Consortium, there are a range of other environmental and social benefits that result from reducing energy use and emissions from transport, industry and other sources, and protecting carbon sinks in our ecosystems. These include cleaner air, reduced congestion, improved water quality, a more competitive state economy, healthier ecosystems and greater biodiversity in the State.

Action Plan

The Delaware Climate Change Action Plan represents a consensus-building effort to identify, with the aid of analysis, a wide range of measures applicable to each sector. Appropriateness of specific measures was determined qualitatively by assessment of their applicability to the State's economic and geographic circumstances, and quantitatively through an assessment of their cost-effectiveness, impact on energy efficiency, and environmental benefit.

A wide variety of sources were used for the assessment. Nearly all the policy options involve either proven or existing technology and established and documented practices. The Action Plan is designed to provide guidelines for the selection of emission reduction measures and policies for each sector that meet the cost-effectiveness and efficiency criteria adopted by the Consortium. Policy options were identified through reviews of other state action plans and the policy research literature, and at the suggestion of members of the Consortium. Final selection of policy options reflected those that represented the least cost and highest energy savings for Delaware, which in combination could achieve the Consortium's emission reduction target by the year 2010.

Three policy scenarios are developed for each sector: Full Implementation (100%) of all measures; a Major Commitment scenario in which approximately two-thirds of the identified cost-effective energy savings are realized; and the Modest Commitment scenario in which State actions are able to encourage Delawareans to realize approximately on-third of the cost-effective energy savings identified in the Action Plan. This method was adopted for a national assessment conducted by the Interlaboratory Working Group entitled *Scenarios of U.S. Carbon Reductions: Potential Impacts of Energy-Efficient and Low-carbon Technologies by 2010 and Beyond (1997)*. The Consortium found this approach a reasonable one given the political and economic uncertainties in current discussions in the U.S. and Delaware concerning the need to act on the climate change problem.

Full implementation would result in emission savings that exceed the DCCC reduction target of 23% for 2010, realizing a 32% decrease in CO₂ emissions. Under the Major Commitment scenario, Delaware would realize a 22% reduction in CO₂ emissions, while a Modest Commitment scenario would yield a 12% decline from the 2010 forecasts.

It should be observed that, while the Action Plan can identify strategies to meet its target for Delaware under certain scenarios, any reasonable plan must ultimately rely on national and regional, as well as state and local action. Actions by other states may impinge on Delaware and its Climate Change Action Plan, adding emphasis to the need for effective regional coordination. Thus, the Delaware Action Plan, in any of its scenario formats, may be found to make significant contributions to a national effort which, ultimately, must coordinate initiatives throughout the society to fully realize reductions in CO₂ emissions.

Sector Results

Industrial Sector: After screening nearly 2,000 energy-saving measures, it was possible to select 170 individual measures for application to Delaware. Measures included upgrades to boiler and steam systems, heat recovery and containment, space conditioning, air compressors, motors, and lighting. A feature of the identified measures is their high cost-effectiveness: an average payback period of less than one year. This scenario would lead to an 18% decline from this sector's forecast emissions for 2010.

Residential Sector: Through a combination of replacing existing household equipment with more energy efficient appliances and by changing the energy source of selected household devices, it was possible to devise a set of policy options that achieve a cost-effectiveness of less than 5.0¢/kWh of energy saved. This is below the price paid by most Delaware households for electricity service. The focus in this sector was on refrigeration, water heating, cooking, space conditioning, freezers, clothes dryers,

lighting and building shell measures. This scenario would lead to an 18% decline from this sector's forecast emissions for 2010.

Commercial Sector: Equipment replacement and fuel-switching produced the target energy savings at a reasonable cost for this sector. Higher-efficiency lighting, refrigeration, space conditioning and other equipment, together with some fuel switching and the use of building-integrated photovoltaics led to energy savings with overall costs of less than 4.0¢/kWh. Again, this is below the price paid by commercial customers for electricity service. This scenario would yield an 18% decrease from this sector's forecast prepared for DCCAP.

Transportation Sector: A combination of measures affecting fuel efficiency of cars and light trucks, the diffusion of alternative fuel vehicles into Delaware corporate and government fleets and the adoption of a comprehensive array of transportation control measures to reduce vehicle miles traveled in the State are found to produce sizable energy savings in the forecast period. Measures recommended in this study are cost-effective with payback periods of less than 5 years for most measures. A 24% reduction in the CO₂ releases from forecast levels for 2010 is expected under this scenario. In addition, the Action Plan recommends a long-term land use planning strategy that can reduce transportation needs and encourage greater use of public transit, bicycling, and walking.

Utility Sector: Emissions reductions are possible in the forecast period by fuel switching from coal to natural gas at appropriate generating facilities and by instituting a renewable portfolio standard. The cost of these actions taken together would be modest. If the Major Commitment scenario, with a 1% renewable portfolio standard and fuel switching, is adopted, this would mean a 24% reduction in CO₂ emissions for the sector (compared to forecast emissions). In addition to these actions, investigation of a regional environmental dispatch policy and a state emission standard for electricity generation is encouraged as a means of securing long-term benefits from the Action Plan.

Wastes and Forest Sinks Sectors: Waste reduction through recycling can produce significant emission reductions by preventing biodegradable materials reaching landfills, and by lowering resource consumption and processing. Three recycling strategies – pay-as-you-throw, curbside recycling and improvements in the Delaware bottle refund program – are recommended for implementation over the forecast period. Carbon sink enhancement can be used to offset greenhouse gas emissions. Several measures are proposed, including urban tree planing and reducing the extent of forest clearance for urban land use.

Education and Outreach: Increasing awareness of climate change and its environmental, social, economic, and political impacts among Delawareans will aid the implementation of DCCAP’s emission reduction measures. DCCAP proposes reaching out to targeted audiences (government, industry, students, interest groups, and the media) as well as the general public by holding workshops, distributing educational materials, and developing a website.

Summary of Policy Options Linked to the Action Plan

- Industrial Sector – Through market incentives and greater participation in voluntary federal programs, more energy efficient equipment and better operations and maintenance will increase energy efficiency, produce lower costs, and reduce CO₂ emissions from this sector.
- Residential and Commercial Sectors – Through improved building standards, market incentives, and participation in voluntary partnerships, the Action Plan would increase energy efficiency and lead to use of lower carbon fuels in these sectors.
- Transportation Sector – Through standards, market incentives, and land use policy, vehicle fuel efficiency and the penetration of alternatively fueled vehicles can be increased, while vehicle miles traveled are reduced, under the Action Plan.
- Utility Sector – Through the adoption of a renewable portfolio standard, fuel switching, pursuit of a regional environmental dispatch policy, and state emission

standards for electricity generation, overall greenhouse gas emissions can be lowered, under the Action Plan.

- Wastes Sector – Through volume-based fees, recycling/container deposit programs, and greater participation in voluntary federal programs, the volume of waste can be reduced along with total demand for materials. Greenhouse gas emissions from landfills and industrial processing are thereby reduced, under the Action Plan.
- Forest Sinks Sector – Through urban growth management, afforestation, and rural land and forest conservation, Delaware’s carbon sinks can be protected and enhanced, thereby offsetting a portion of the State’s greenhouse gas emissions.

The Next Stage

Reaching the required emission reduction targets necessitates policy responses in each sector throughout the forecast period. These can be achieved at relatively low cost and comprise proven and practical measures.

Having broadly identified the necessary policy options to satisfy the greenhouse gas emission goals of the Delaware Action Plan, there remains the considerable task of policy formulation and implementation, which involves a wide range of activity. The Consortium considers public education and outreach a key tool for overall success of the Action Plan. An initiative is needed which engages Delawareans of all ages and walks of life, as well as government, industry and citizen groups in addressing the legal, regulatory and economic barriers and impediments to the implementation of emissions reduction policy as identified by the Consortium. The time to act is now if Delaware is to be effective, environmentally and economically, in its response to the international call for steps to reduce greenhouse gas emissions.