



July 15, 2010

Ms. Lee Dillard Adams
Mass DEP
1 Winter Street, 6th Floor
Boston, MA 02108
email to: climate.strategies@state.ma.us

RE: Comments on Draft Implementation Plan for the Massachusetts Global Warming Solutions Act

Dear Ms. Dillard Adams:

On behalf of the Sierra Club, we submit the following comments on the draft implementation plan for the Global Warming Solutions Act (GWSA). We commend the administration for the tremendous strides already made with both legislative and regulatory initiatives to control greenhouse gas emissions. The Regional Greenhouse Gas Initiative (RGGI), the Green Communities Act, the Oceans Managements Act, the Wind Siting Bill, approval of the nation's first offshore wind farm, and the regulatory directive on biomass energy are but a few of the actions that will help keep Massachusetts at the forefront of innovative Greenhouse Gas (GHG) reduction strategies.

We further recognize that much of this progress has occurred under severe budget constraints, including significant cuts in staffing within the Executive Office of Energy and Environmental Affairs (EOEEA). Strategies developed to address GHG reductions in the commonwealth will require a rigorous and meaningful financial investment from the legislature as well public and private commitments, where they can be identified, to provide the necessary resources to achieve the goals of the GWSA. Despite these fiscal challenges, we feel that EOEEA has been performing very high quality work in several complex environmental-policy areas. EOEEA has been exemplary in basing its decisions on the latest and best available science, and acted quickly to call for new scientific investigation where current information was inadequate. This continued approach will be needed nowhere more urgently than in the implementation of the GWSA.

Most scientists now favor James Hansen's 2050 goal for carbon dioxide in the atmosphere of 350 ppm, not the previous goal of 450 ppm. Since we are currently at 390 ppm of CO₂, this would require an even more aggressive CO₂ reduction plan than 25% below 1990 baseline levels by 2020. Many actions are low cost actions (e.g. importing hydropower from Canada) with insufficient emphasis on other programs such as moving to Zero Waste policies. We note that nothing in the act prohibits the state from imposing more stringent limits.

Finally, we must recognize that a patchwork of individual legislative mandates/bureaucratic regulations (msw, wastewater, transportation, energy, etc.) will likely be insufficient and could even hinder the integrated action that will be required to reduce GHG emissions. The Northeast/Mid-Atlantic States Low Carbon Fuel Standard Program is one example of progress by the administration on this front, but much more will need to be done to identify and eliminate or bypass bureaucratic barriers in our efforts to address the global climate crisis.

Our detailed comments follow this cover page, and are divided into two sections. Section 1 contains responses to the specific questions on which EOEEA sought comments. Section 2 provides a more expanded set of recommendations on how best to develop a plan to implement the act. We look forward to working with you to help achieve these goals.

Sincerely,

Dan Proctor, Chair

James Bryan McCaffrey, Chapter Director

Section I. Specific questions on which EOOEA requested public comment:

Q1. *Where between 18 and 25 percent below 1990 levels should the emissions limit for 2020 be set and why?*

A. Obtain maximum feasible emissions reduction as quickly as possible, aiming well above a 25% reduction. Grounds for this position:

1. The most recent and authoritative science indicates that Massachusetts needs to reduce GHG emissions faster and more deeply than called for by the Global Warming Solutions Act.
2. The Act does not prohibit exceeding 25% reduction by 2020: SECTION 8. "...nor shall this act prevent the imposition of more stringent limits on emissions."
3. The most recent scientific findings suggest that in order to maintain a stable climate, with ice on both poles and mountain glaciers that continue to provide water to billions of people, atmospheric levels of CO₂ must stabilize below 350 parts per million (ppm).[i] The IPCC analysis and the Global Warming Solutions Act were both based on earlier belief that a concentration of 450 ppm was acceptable. This level already stands above 390 ppm and is increasing. Massachusetts, the United States, and the world must quickly stop putting carbon into the atmosphere, and start drawing it down.
4. EEOEA's consultants estimate that a 35% reduction is possible "at low or zero cost, or at a net savings." And that is using the consultants' conventional (i.e. too narrow in these circumstances) definition of "cost-effective." Furthermore, "[t]he projections in this report may understate the true potential for cost-effective emissions reductions in 2020."
5. Produce as much savings as possible as early as possible for later investment in measures not seen as conventionally "cost-effective."
6. The Act does not define "cost-effective." This phrase must be understood in terms of preventing the climate system from tipping into a condition controlled by runaway feedback loops--that is, a condition in which no conceivable human measures could prevent global catastrophe.

Some examples of the feedback loops that are already under way:

- a. Increasing Forest Fires (including "megafires") due to:
 - decreasing rainfall in many areas
 - generally increasing temperatures
 - increasing winds along with drought, making fires harder to control
 - increasing vulnerability of trees to attack by lethal organisms
- b. Decreasing ocean CO₂-absorption capacity
- c. Melting permafrost, releasing huge quantities of methane and other GHG's
- d. Albedo effect: Increased melting of snow and ice means decreasing reflectivity of sunshine, causing more heat absorption, which means warmer water, which means faster melting
- e. Increasing use of air conditioners with increasing temperatures

Q2. *What role can Massachusetts state government play in catalyzing the clean energy economy? What policies could inspire entrepreneurship and create markets for clean energy products and services?*

A. Lead by example: Quickly minimize GHG emissions from government-owned buildings and equipment: Pass a comprehensive energy revenue bond bill to retrofit buildings, including schools and colleges. The bond could be retired with savings generated by the retrofits.

Encourage or require locally-generated clean energy. Importation of clean energy from outside state or national borders seems a questionable policy to promote a clean energy economy within the state, though it may be an excellent way to reduce GHG emissions if it does not entail “leakage” (as defined by the Act).

Q3. *Over what number of years should cost effectiveness of strategies be evaluated in pursuit of the goals of the Commonwealth for 2020 and 2050? How should future costs be compared to present costs?*

A. The Act does not define “cost-effectiveness,” though it employs the term. Deciding on an appropriate cost-effectiveness test, discount rate and time-frame in this circumstance is critical, and each must be decided with respect to the others. Furthermore, there is a wild card in this circumstance that is absent from conventional considerations of cost-effectiveness: the cost of failure. The Sierra Club’s position is that this cost, while unknowable with any accuracy, is so high as to make just about any cost an effective one. From this viewpoint, deciding on particular measures is a matter of ranking them from most to least cost-effective, beginning with the most and moving as rapidly as possible to the end of the list.

Q4. *How should the Commonwealth evaluate and prioritize strategies to achieve 2020 and 2050 goals?*

A. Use an adequate system dynamics model (preferably C-ROADS adapted to Massachusetts—see *Section II: Recommendation 1* below) with provision for key variables such as “public acceptance,” “net savings,” and “net tax burden” along with “GHG emissions rate” and “accumulated GHG.” This model should allow policy selection with the optimal combination of the key variables.

[ii] Target Atmospheric CO₂: Where Should Humanity Aim? Hansen et al.
http://www.columbia.edu/~jeh1/2008/TargetCO2_20080407.pdf

Section II. Further Recommendations

1. Use the best methodology for adequate analysis and policy selection: System Dynamics

*“Section 4. (d) The secretary shall evaluate the total potential costs and economic and non-economic benefits of various reduction measures to the economy, environment and public health, **using the best available economic models** [emphasis added], emissions estimation techniques and other scientific methods.”*

An adequate plan must be based on adequate analysis. Ecological and economic systems both contain many interacting feedback loops. Another way of referring to such loops is vicious or virtuous cycles. An adequate analysis must identify and take into consideration such loops.

Our ecological and economic systems are intricately intertwined. The Act calls for action in both these systems over a 40-year time-span. Spreadsheet-based modeling for a matter of this import and complexity is unacceptable except for very narrow calculations separate from the primary model. Econometric modeling suffers from being based on correlation rather than causation. We believe that the most adequate methodology for dealing with feedback systems of this complexity over time-spans of this length is system dynamics. Coincidentally, this methodology was developed here in Massachusetts (at MIT) beginning over 50 years ago. While not familiar to the general public, it is widely used for analysis and policy selection in corporations and, increasingly, in governments around the world. There are numerous consulting firms in the state that use system dynamics extensively in their work.

Furthermore, a system dynamics model (C-ROADS -- Climate Rapid Overview and Decision-support Simulator) was used at last November's climate summit in Copenhagen to rapidly assess each nation's proposed climate policies. This model is now being employed in U.S. Senate climate-bill negotiations and is also being adapted for use by other nations, notably China. An instructional version of the model may be reviewed on-line at <http://forio.com/simulation/climate-development>.

We recommend that EOEEA adapt the C-ROADS model for use in developing a plan for implementing the Act. If Massachusetts is the first state to adapt the model, it could presumably recoup associated costs by licensing its model to other states.

2. Learn from other states and nations

The Draft Plan takes no notice of emissions-reduction plans already in place in other states or countries, despite the Act's requirement that “The secretary shall consider all relevant information pertaining to greenhouse gas emissions reduction goals and programs in other states and nations.”

Each European Union member country must submit to EU headquarters an energy plan in its native language. The plan is then translated into English and posted at http://ec.europa.eu/energy/index_en.htm.

We commend this site to EOEEA's attention not only as a source of relevant information but also as an example for emulation with respect to EOEEA and the commonwealth's 351 municipalities (please see continued discussion below with respect to RPC's).

The Sierra Club has examined Denmark's most recent plan, which focuses on renewable energy. In this regard, EOEEA's draft plan seems narrowly focused (aside from importing renewable energy) on increasing the efficiency of fossil-fuel use. The latter approach may yield a considerable drop in emissions in the short run, but at the same time tends to lock us into continued fossil fuel use over the longer run. This is especially the case with replacing older heating oil furnaces with more efficient

models during the next 10 years: this presumes the continued burning of heating oil for the succeeding 20 years, i.e. the life of the new equipment. Section 3.(b) of the Act seems to be aware of this danger:

“... the 2030 interim emissions limits shall maximize the ability of the commonwealth to meet the 2050 emissions limit;... the 2040 interim emissions limit shall maximize the ability of the commonwealth to meet the 2050 emissions limit.”

The Danish plan requires switching, where feasible, to renewable energy sources when heating-oil equipment is replaced. In Massachusetts, heating oil systems should be replaced where feasible by a) renewables, including geothermal or b) high-efficiency natural gas systems. This should produce at least a 40% reduction in CO₂ emissions and probably an increasing financial savings over time if heating oil prices continue to increase, as they are likely to do.

3. “Recycle” some savings into further investment

The Draft Plan appears to allow all savings from contemplated measures to accrue to the consumer, with none being captured by government for either investment in further emissions reduction or pursuit of equity among segments of the populace or economy. Such capture and “recycling” should be given extensive consideration.

4. “Mine” energy efficiency and zero waste policies as new revenue streams for state and local government.

Demonstrate to municipalities how optimal energy and waste policies can produce significant new revenue. This should include zero waste policies, which conserve resources while reducing emissions and disposal expenses.

5. Zero Waste - Include waste reduction as a major strategy for reducing GHGs

Waste reduction is largely neglected in the plan. The one-sentence mention refers only to diversion with no attention to reduction. Since solid-waste incinerators produce more CO₂ than coal-fired plants, we recommend that much more attention be given to this matter. See epa.gov/cleanenergy/energy-and-you/affect/air-emissions.html.

Organic waste

EPA GHG emission inventories estimate landfill methane emissions at about 2% of total anthropogenic (i.e. manmade) GHG emissions in the U.S in 2005. It appears that, depending upon which assumptions are adopted (i.e. high vs. low gas collection efficiency, long vs. short term time periods for measuring impacts (GWP), and wet cell vs. dry tomb management), landfills may be responsible for a much greater impact -- up to approximately 12% of total GHG emissions. Using the latest IPCC 20-year GWP of 72 to weight methane instead of the earlier IPCC 100-year value of 21 used by EPA will, by itself, increase the estimated percentage of GHG emissions by more than three times.

In addition, any assumed CO₂ benefit from utilizing methane captured at landfill gas-to-energy (LFGTE) facilities is greatly outweighed by an increase in fugitive (uncontrolled) methane emissions resulting from the altered landfill management methods apparently practiced at most LFGTE projects.

To reduce emissions from landfills, organic materials should be banned from disposal and diverted to composting or anaerobic digestion.

Products and packaging

On September 18, 2009, EPA released a report detailing why the production, transportation, and disposal of goods and materials can be seen as the largest opportunity to reduce GHG emissions. Production emissions contribute the greatest share, indicating that “upstream” reductions in waste generation are an appropriate focus. The lead author, Joshua Stolaroff, in a white paper released the same day, explains why enhanced producer responsibility (EPR) measures are among the most important steps that state and local governments can take to reduce GHG emissions. Also, Lisa Skumatz has done extensive work comparing energy-efficiency measures to waste-reduction measures and finds that waste reduction is cheaper and produces much faster results. She recommends that waste reduction, especially PAYT be on the “first tier” of GHG reduction measures.

6. Maximize the important role that can be played by regional planning commissions (RPC’s) in both implementing a plan and educating municipal officials and the public.

The reasons we emphasize the role of the RPC’s are:

- a) Much of the legislation passed by state and federal governments regarding emissions-reduction relies on municipalities, individual households and individual businesses for actual implementation.
- b) It is highly inefficient to expect or require 351 separate municipalities to separately invent 351 wheels. That is, to round up an energy committee, learn how to develop an energy plan, prepare the plan, get the plan accepted by city council or town meeting, then try to persuade businesses and residents to carry out the plan. But to the extent that this will be the modus operandi, RPC’s can play an important catalyst, educational, and burden-assuming role in the process.
- c) State government already provides a template document for long-range municipal planning. In practice, this planning is mostly done by professional staff (and sometimes subcontractors) at the local and regional planning levels. Energy planning will soon expand into broader sustainability plans (this is already happening in some communities), and then merge with existing long-range planning processes. State government and the RPC’s already have established templates and other procedures regarding long-range planning. These should be expanded to include energy/sustainability planning.
- d) EOEEA should maintain a website to support municipal energy/sustainability planning. It would be readily accessible to municipal officials, businesses and citizens; and would contain among other information current plans submitted by municipalities.
- e) If the C-ROADS model is adapted to Massachusetts, it could be further adapted for municipal use. This modeling methodology can be readily applied to broader sustainability planning. Here, too, the RPC’s can play a key role in educating municipal leadership on the value and use of this kind of modeling.

Thank you for the opportunity to comment, and for your attention to this issue of great importance.

Please contact us if you have any questions regarding the Sierra Club’s views on these matters.

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