

Marian Mesrobian MacCurdy, Ph.D  
University of Massachusetts, Amherst  
maccurdy@ithaca.edu

Ms. Kaitlin Kelly  
Commonwealth of Massachusetts  
Executive Office of Energy and Environmental Affairs  
Department of Energy Resources  
Re: Comments on the SMART Regulations  
Date: June 1, 2020

#### Overview:

The large number of commercial solar arrays proposed recently in Massachusetts given the impetus of the Solar Massachusetts Renewable Target Program demonstrates that clear and comprehensive regulations of solar arrays in the Commonwealth at the state level are required. However, the primary issue that towns have had to confront—where to allow these arrays to be built—has not been adequately addressed by these proposed guidelines. Many environmental experts believe that cutting down forests to build commercial arrays is antithetical to the purpose of the program itself—to preserve our environment—but your guidelines ignore this key issue. Indeed, the priorities seem to be backward: instead of encouraging building on school rooftops, over parking lots, and other more appropriate sites, too many of these projects are just where they should not be—on forested hillsides, leading to some dramatic and costly failures such as we have seen in Williamsburg and Orange and widespread erosion as demonstrated by the array in Ware. While the guidelines prohibit arrays in protected areas, they do not address the manifold dangers presented by large commercial arrays built on steep forested slopes, especially on bedrock, which covers a large portion of our state, especially in the hill towns west of Quabbin. The presence of bedrock must be taken into account when developing site placement guidelines because bedrock on forested slopes presents intractable problems with erosion, stormwater runoff, and decommissioning. The lack of guidance in this issue is forcing towns to pass bylaws that protect their forested hillsides—and the people and property below them—but, of course, this can leave towns in the position of having to defend their decisions in court, an expensive and time-consuming effort. Your regulations should provide appropriate limits on the building of commercial arrays on forested hillsides, especially on bedrock, and they should allow towns more regulatory control without fear of lawsuits since the towns and their residents pay the price for any failures that affect the community. Assuming bedrock is not an issue on a given site, the current Belchertown solar regulations appear reasonable—slopes are limited to 8% with the possibility of up to 12% by special permission; forested land is limited to 10 acres. I urge DOER to adopt similar restrictions.

#### Purpose and Application:

It is startling that the only reference to “health and safety” in this section is the hope that increased use of solar will “improve public health and safety.” I saw no language devoted to ensuring that the installations supported by the SMART program must ensure the safety of residents, wildlife, and our natural resources as well. Many of the issues that appear thus far not to be addressed by the new regulations relate to just these issues, especially in forested areas.

#### Land Use Categories:

According to the Guideline, Category 1 land use is divided into two types: Agricultural and Non-Agricultural. Chapter 61A is listed by the state as agricultural only, that is, not land devoted to forestry, which is considered 61. Is forestry land therefore considered as non-agricultural or in specifying only land in 61A do the guidelines imply that no forested land may be used for arrays? I am assuming that forested land may be considered since Article 5 Ineligible Land Use does not mention forested land as ineligible to receive a Statement of Qualification under the SMART program, but this needs clarification, especially since forested hillsides present such difficulties and should be protected.

#### Performance Standards:

First, this section is confusing in its definition of the land that can be used for units with a capacity greater than 500 kW: “...when installed on Land in Agricultural Use, Important Farmland, or other pervious open space.” What does “pervious open space” mean in this context? Does it include forested land not protected by statute, for example? Forested land, especially that on slopes with bedrock should be off-limits, but if it is included, the language that follows presents serious problems. This section (6d) states the “ballasts, screw-type, or post-driven pilings and other acceptable minimal soil impact methods that do not require footings or other permanent penetration of soils for mounting are required, unless the need for such can be demonstrated.” This is language with a massive loophole included. What about the need NOT to use this technology? Solar arrays installed on a rocky hillside need either concrete ballasts or steel pilings since much of the land in central and western Massachusetts is situated on bedrock. Decommissioning a site erected on steep rock-laden hillsides that used steel pilings would be expensive, difficult, and result in some intractable problems such as the erosion of rusting metals into water supplies, creating a safety hazard. While siting solar in a forest may appear to be less expensive than installing it over parking lots and buildings, the cost to decommission and/or the cost of dealing with an expensive failure cannot be ignored in these calculations. In addition, the guidelines mandate that a certified professional engineer must approve the project. From our experience in Belchertown with solar array projects two engineers can look at the same project and come out with opposite views. Trusting only one, especially one employed by the applicant, is akin to allowing the defendant to be the judge and jury at his/her own trial.

#### Land Use and Siting:

The complex issues that building arrays on forested hillsides present do not appear to be addressed in your guidelines, which means large areas of western Massachusetts would not be protected against destructive development. Although fallow flat land is available in some valley locations, most of the undeveloped land north and west of Worcester is on forested hillsides.

Such sites pose manifold problems for safe installation and use of solar arrays. The arrays in Ware, Orange, and Williamsburg demonstrate the massive erosion and stormwater damage possible from building arrays on deforested hillsides. The levels of stormwater can disrupt ecosystems for years. Significant erosion has occurred at the Ware site. In Orange after removal of all trees and other vegetative matter, a historical cemetery was flooded, and in Williamsburg a coldwater fishery, protected wetlands, and a river were swamped with stormwater, resulting in a lawsuit brought by the state against the developer. Even more problematic, these western Massachusetts hillsides are often on bedrock, which presents serious obstacles, as discussed previously. The SMART regulations posted do not appear to address the dangers inherent in building arrays on forested hillsides, especially those on bedrock, a serious oversight.

The proposed categories for land in Chapter 61 (assuming 61 is included as well as 61A) are inadequate to protect our forests, which in themselves are a powerful weapon against climate change. While Massachusetts is the 8<sup>th</sup> most forested state in the country, it is also the third-most densely populated area. Equally important, 75% of those forests are owned by private individuals, not the Commonwealth, and over 40 acres of our state's land go into development every day. According to Mass Audubon almost 25,000 of land in Massachusetts—about 13 acres a day—was developed between 2012 and 2017. When the “hidden” effects of development are included, including roads and building lots, the human impact is about 78 acres per day. The state imports 98% of its wood needs. Seventy-one percent of wildlife habitat statewide lacks permanent protection and is in danger of development and subsequent loss of habitat. [“Losing Ground: At What Cost,” [www.massaudubon.org/losingground](http://www.massaudubon.org/losingground)]. Yet these guidelines make no mention of the Prime Forest designation from BioMap2 information, nor do the guidelines provide any restrictions on deforestation.

Much of this development in western Massachusetts is located near environmentally sensitive areas. One such commercial solar array site proposed for Belchertown is located between two areas designated as within the BioMap 2 Critical Natural Landscape area on a steep, forested hillside on bedrock near a protected coldwater fishery and the town's water supply, and close to a residence on an adjacent property below, presenting a clear danger to health and safety. A section of the property is on protected land, yet most of the land is, inexplicably, not included in BioMap 2 protected areas in spite of the similarity of its features. I strongly suggest that the regulations need to be strengthened by eliminating the 50% of parcel caveat that opens up protected land to solar development. This project is a classic case that can prove the rule: this parcel plays a crucial role in protecting the community and its water sources. Given the danger erosion and stormwater pose to the fishery, to residents and property down below the proposed detention pond and to the town's water supply, the Planning Board denied the application, and now the case is before the courts, causing more time and expense for a community that can ill afford it. SMART regulations covering building arrays on forested hills, especially those with bedrock, should be much more restrictive than they appear to be in this draft given the problems such projects can cause. This particular Belchertown project, one that poses multiple risks to our local environment, including our homes and our water, took the Planning Board, the Conservation Committee, the town planner, and countless numbers of concerned citizens over two years and many thousands of dollars to fight, and we are still at it. We were presented with 13 different versions of engineering designs, none of which could protect our wetlands and private property because the site itself posed dangers that could not be remediated: a close to

400-foot long detention basin, 16 feet high, on a 30-50 degree slope, with one section below as steep as 60 degrees, perilously close to a private residence 500 feet below. Such projects should be screened out by your guidelines. It is only because among our engaged residents is an experienced US government hydrologist, an administrator with many years' experience with large construction projects, a plant biologist who has served on town boards, and many other talented and dedicated residents that we had the appropriate expertise to discover the massive holes in each of those 13 plans. These kinds of dangerous sites should be weeded out by state regulations, so the responsibility to ferret out the serious problems they present does not fall primarily on those most affected by them, often leading to high expense and much anxiety to those downhill and downstream of such projects, not to mention the time sink for local officials. Please note, this is not a NIMBY issue. These issues are health and safety related. The first job of a public official is do no harm. This is what your regulations must ensure.

#### Compliance:

The concern that solar arrays built on steep forested sites could produce dangerous erosion has already been demonstrated by the arrays in Ware, Orange, and most recently Williamsburg. Stiffer regulations with consequences could prevent failures, by weeding out inappropriate sites. We are in uncharted waters with most of these arrays: for example, how can vegetative cover be maintained on a steep hillside? If a company is found in non-compliance what will restore a forested hillside to its original state once the mature trees have been cut down? And if a coldwater fishery is damaged how many years would it take to restore it? Non-compliance on a relatively safe site would be less catastrophic than what we have seen in Williamsburg, for example.

#### Local Control

Page 5 of the Mass Audubon report, *Losing Ground*," shows the twenty municipalities with the greatest area of forestland converted to development. Five of those areas are in the south central/western part of the state, south and west of Quabbin Reservoir, including my community, Belchertown. The rush to commercial solar development has inundated communities in western mass with applications. Local towns need to have more control. Town officials, planning boards, and the public know what they need and what risks they are willing to take. They should be free to decide without having to spend massive quantities of money and time on legal challenges.

#### The Larger Picture

The larger goal—to counteract climate change— needs to be the priority, and that means the rush to solar must not eclipse the benefits trees provide. Worldwide, 40% of human carbon dioxide emissions are taken up by forests, but unfortunately most of that is returned into the atmosphere by cutting down forests. The profits these companies can make must not drive these decisions; what is best for our communities should. The SMART regulations need to address forest destruction more directly. A recently published study (Jean-Francois Bastin et al. " *The global tree restoration potential*, *Science* (Science, 2019: 365 (6448): 76 DOI: 10.1126/science.aax0848) demonstrated that planting trees throughout the world in an area roughly the size of the United States would result in the absorption of nearly 830 billion tons of

carbon dioxide, approximately what humans have discarded into our environment in the past 25 years. As study co-author Thomas Crowther, a climate change ecologist at the Swiss Federal Institute of Technology, said, “This is by far—by thousands of times—the cheapest climate change solution” and, according to the article, the “most effective.”

In addition to the other more well-known benefits of trees (they produce oxygen, remove pollutants, and cool the environment by 6-10 degrees) they also, of course, provide necessary habitat for wildlife, which can have significant effects on disease transmission. Recent research demonstrates that forest fragmentation may contribute to the startling rise in tick-borne illnesses. Deforestation has produced fragmented forests, those broken into little pieces by roads, farms, and housing developments. Areas of patchy woods cannot support predators such as foxes, hawks, and owls that prey on mice and other small mammals that spread Lyme; such predators need big forests to survive, as opposed to coyotes that can live virtually anywhere but do not have much effect on rodent populations because they tend to spread out, so fewer coyotes live in areas that used to harbor larger numbers of foxes. Forest patches smaller than three acres have an average of three times the number of ticks than larger fragments, and seven times more infected ticks. According to a study supported by the National Science Foundation, as many as 80% of the ticks in the smallest patches were infested with Lyme, the highest rate scientists have seen. Increasing the size of forests and avoiding fragments smaller than five acres could help reduce the incidence of Lyme. Where there were fewer foxes, there were more instances of Lyme disease. [Taal Levi, et al. Proceedings of the National Academy of Sciences] Fragmented forests not only inhibit wildlife movement, but they also cause declines in water quality, harbor more invasive plants, and store less carbon. Temperate forests are also more efficient at storing carbon compared to tropical rainforest according to a study conducted at Australian National University.

The area west of Quabbin has, as pointed out, unique characteristics that make it more vulnerable to exploitation—its forested slopes on bedrock which make it prone to costly flooding events which would be only more prevalent with denuded hillsides. The argument that solar arrays benefit us all rings hollow here because the local communities pay the price for these arrays by the loss of habitat and the risks to water, wildlife, and property, but they get no break on electricity prices. So once again it appears that western Massachusetts is being asked to sacrifice its resources for the eastern part of the state. The history of the loss of area towns to Quabbin Reservoir to supply water for the eastern part of the state is still known and felt in western Massachusetts. Water rights are important here. The water from one of the largest reservoirs in Belchertown, Knight’s Pond, is off limits to town residents since it has been designated a water source for Springfield. Belchertown water, therefore, must come from its streams and other aquifers, which means any development that threatens local water will be heavily scrutinized as it must be. Local residents need state regulators to ensure their towns’ health and safety as regulations are developed for implementation of commercial solar power. These proposed regulations are insufficient because they do not take into account the unique characteristics and needs of this area.

These needs are especially critical now as we face a climate change crisis, which will increase the amount of rainfall in the Northeast. The Northeast Climate Center at Cornell University states on its website that 1 in a 100-year rainfall events are now likely to occur twice as often in the Northeast. Therefore, it is important for rainfall estimates to include rainfall projections, not

simply historical data, because the latter are now inaccurate. Increased rain makes our trees more crucial than ever. Trees hold water. Building commercial solar arrays on deforested steep hillsides would produce increased storm water, flooding, and dangerous erosion, even more destructive in the event of rain over frozen ground events, which have become more common with global warming. Indeed, Gulf Road in Belchertown was flooded in January 2019 after a rain over frozen ground event occurred that took out culverts and caused much damage to the road. Had the hillside been denuded of trees, the result could have been catastrophic for property. Dr. Ray Bradley, lead researcher and professor at the UMass Northeast Climate Science Center said in a meeting in January 2019 that “this has been the wettest year for Amherst since 1838. Sixty-four inches of water have fallen in one year.” He explained that “Our storms have more energy and frequency, and this will only increase. Much of the precipitation will be in winter and early spring. Groundwater is at the surface,” which means the ground is saturated and additional water from storms will be more likely to flood downstream, given the high water table. Dr. Bradley urged residents to raise these issues with our political leaders to ensure that appropriate policies are adopted to deal with the increase in rainfall and consequent flooding. The erosion from deforestation, especially on hillsides with bedrock, would only serve to exacerbate these problems. We must ensure that solar will not be bought at a price we cannot afford to pay.