## Water Quality

Proposed policy:
*Update Maryland's solar-specific laws and permitting guidelines to incorporate best practices for estimating and managing stormwater runoff.*

Background:
Research presented at a recent conference convened by the Chesapeake Bay Program called attention to the need for new solar-specific standards for mitigating stormwater impacts. That research suggests that models for ground-mounted arrays should be updated to account for the effects of soil compaction, soil depth, and vegetative ground cover. Maryland's runoff models also need to reflect changing levels of rainfall and the geographic diversity of sites with solar arrays.

To be effective, Maryland's permitting regime needs to give developers sufficient time and expert guidance to implement effective measures. Following best practices should minimize harm to water quality and increase reliance on green infrastructure. Research suggests that updated guidelines would address pre-construction, construction, and post-construction practices and the modelling of site-specific features that affect runoff from ground-mounted solar panels.

## Forested land

Proposed policy:
*Ensure that the ecological value of forests is incorporated into Maryland's solar incentive framework.*

Background:
Some solar incentives could have the unintended consequence of encouraging the use of forested land instead of other surfaces. Increased pressure on forests puts Maryland at risk of losing assets that provide ecosystem services valued at thousands of dollars per acre per year, according to estimates by DNR. Their analyses suggest that water-related benefits—such as protecting ground and surface water supplies and mitigating stormwater impacts—account over 60 percent of the economic value of ecosystem services statewide.

There are various ways Maryland could incorporate protections for forests and other ecological assets into its solar incentive framework. Massachusetts uses a pricing strategy akin to impact fees, paying above-average prices for solar generated on rooftops and other impaired surfaces but lower than average prices for greenfield projects. New Jersey has taken a different approach; it uses a combination of restrictions and project eligibility criteria to avoid the loss of forested land.

Note:
For more details on the research supporting these and other environmental proposals, see Advocates for Herring Bay's submission to the Task Force dated October 6, 2023.

To: Task Force on Solar Incentives
From: Kathy Gramp, on behalf of the Advocates for Herring Bay[1]
Date: October 6, 2023
Re: Comments on September 22 draft of a "Maryland Solar Program Transition Blueprint"

The Advocates for Herring Bay (AHB) have an active interest in solar policy matters because of our dual focus on clean energy and promoting the health and biodiversity of Maryland's ecological resources. We want to thank the Task Force for making your deliberations open to the public and welcoming citizen input. In support of your efforts, we respectfully offer the following recommendations on the draft Maryland Solar Program Transition Blueprint that was circulated on September 22, 2023. Our comments focus on four topics:

- The benefits of variable pricing mechanisms
- Effectiveness and equity considerations regarding pricing incentives
- Water quality permitting issues related to greenfield projects, and
- Potential unintended impacts of agrivoltaics policy on forested land.

**Benefits of variable pricing mechanisms.** AHB strongly supports the Blueprint's goals of creating "an equitable market between industry segments without inflating project returns for lower cost, higher performing systems." Targeting financial incentives to the need for subsidies will maximize the solar capacity that can be leveraged with ratepayers' finite resources and minimize profit differentials that distort investment decisions. In practice, moving away from today's one-size-fits-all approach should increase investments in ecologically beneficial projects, such as those on impervious or impaired surfaces. Importantly, the plan recognizes the need to monitor and update incentives in response to changing market conditions, and recommends funding for the state agencies to do that work.

**Effectiveness and equity considerations regarding pricing incentives**. As the state boosts incentives to meet its solar goals, it is important to consider the impacts of their design and funding sources. Adding subsidy costs to electricity prices, for example, could deter progress in decarbonizing other sectors by increasing the cost to consumers of switching to electric appliances and vehicles. Those impacts could be especially burdensome for low-income families, as noted by economists researching the effects of net energy metering (NEM) and other rate-funded programs in California:

> Because electricity bills account for a larger share of income among lower-income households, we find this invisible electricity tax is more regressive than the state sales tax and far more regressive than the state income tax. We show that this tax will significantly impede electrification of vehicles and buildings by raising the cost of operating electric alternatives.[2]

While Maryland's electricity markets differ from those in California, some solar incentives increase consumer prices. For example, Maryland's approach to NEM for community solar

[1] The Advocates for Herring Bay is a community-based environmental group in Anne Arundel County.
[2] See Severin Borenstein, Merideth Fowlie, and James Salee, Paying for Electricity in California: How Residential Rate Design Impacts Equity and Electrification, September, 2022, and Designing Electricity Rates for an Equitable Energy Transition, February 2021.

projects affects the allocation of certain infrastructure costs between those who buy power from those projects (known as subscribers) and those who do not. According to a 2022 analysis by the staff of the Public Service Commission, costs shifted from subscribers to non-subscribers in the BGE and Pepco areas will raise rates for non-subscribing households by about $25 to $30 a year for the first 600 megawatts built under the program.[3] Those costs will continue over the life of the projects (20 years or more) and grow in size if the community solar program exceeds 600 megawatts.

*Recommendation regarding effectiveness and equity concerns: Knowing about the financial implications for consumers early in the decision-making process would give policymakers an opportunity to reduce the risk of making clean power less competitive with fossil fuels and mitigate the impacts on vulnerable households. AHB urges the Task Force to propose a procedural reform that would make action on any new or revised energy incentives like Alternative Compliance Payments and NEM contingent on an analysis by the appropriate state agencies of the impact on the cost of electricity for residential households in the state.*

**Water quality issues related to greenfield projects:** Participants in Task Force meetings have proposed reforms aimed at accelerating the timelines for installing greenfield projects. A topic missing from discussions about permitting is recent research on Maryland's need for new solar-specific standards for mitigating stormwater impacts.

Solar's impact on stormwater was addressed at a conference convened by the Chesapeake Bay Program in April 2023.[4] According to researchers at the National Renewable Energy Lab and Great Plains Institute, solar's impacts on water quality largely depend on soil compaction and depth, vegetative ground cover, and the distance between the arrays for infiltration. [5] Their *PV-SMaRT* models identify best practices that would minimize harm to water quality and may lower the cost of solar generation by using green infrastructure to manage runoff.

Implementing those best practices involves advance planning to adapt strategies to the features of each site. To be effective, Maryland's permitting regime needs to give developers sufficient time and scientific guidance to devise those plans. As industry expert Virginia Brown explained at the April conference:

> Unlike a lot of other industries I've worked in where you can do remediation afterward, [with solar] we really need to put all of that at the beginning….The timeline of construction is very tight, but…we always have to think about vegetation.[6]

[3] See Maryland Public Service Commission, RM56 Log number 267, Comments of the Staff of the Public Service Commission (PSC), August 22, 2022, pages 22-24.
[4] See the proceedings of the April 2023 the Scientific and Technical Advisory Committee's conference on Best Management Practices to Minimize Impacts of Solar Farms on Landscape Hydrology and Water Quality.
[5] See, Great Plains Institute, Best Practices: Photovoltaic Stormwater Management Research and Testing (PV-SMaRT), January 2023.
[6] See *Bay Journal*, Chesapeake experts focus on solar power's stormwater footprint by Whitney Pipkin, July 24, 2023. See also Protecting the water while harvesting the sunshine by Whitney Pipkin, August 22, 2022.

*Recommendation regarding water quality: Incorporating the latest science on best practices for solar site development would minimize costs to the public from stormwater runoff and may reduce the long-term cost of solar generation. If the Task Force makes recommendations on procedural reforms, AHB urges the Task Force to recommend that Maryland's performance standards for ground-mounted projects be updated to reflect best practices for water quality, including pre-construction, construction, and post-construction standards regarding soil compaction, soil depth, deep-rooted vegetated ground-cover, and disconnection distances.*

**Potential unintended impacts of agrivoltaics policy on forested land:** The draft Blueprint recommends mandating "integrated ag use" for all projects built on farm land. While the definitions in the Blueprint for "agrivoltaics" and "integrated ag use" are ambiguous, international researchers have stated that "a core tenet…is that the land used for agrivoltaics must continue to be used for agricultural purposes" over the 20-year life of the project. Projects that meet their definition are expected to have numerous co-benefits. However, the cost of producing electricity at agrivoltaics facilities is generally higher than for conventional projects, largely because of higher planning and construction costs to accommodate agricultural activities.[7]

Requiring higher-cost agrivoltaics systems could have the unintended consequence of encouraging solar developers to use less expensive forested land instead. Increased pressure on forests puts the state at risk of losing assets that provide ecosystem services valued at thousands of dollars per acre per year, according to estimates by the Maryland Department of Natural Resources (DNR).[8] DNR's analyses suggest that water-related benefits—such as protecting ground and surface water supplies and mitigating stormwater impacts—account over 60 percent of the economic value of ecosystem services statewide, and an even higher percentage in some of the more developed areas in the state.

*Recommendation regarding forested land: AHB urges the Task Force to ensure that the values of forests and other ecological assets are factored into Maryland's solar incentive framework. One option would involve charging an annual fee akin to the "subtractor" levied on the price of electricity generated by greenfield projects in Massachusetts. Alternatively, Maryland could take the approach outlined in New Jersey's Solar Act of 2021, which expressly precludes siting projects larger than 5 megawatts on designated forested lands without a waiver. In addition, New Jersey's community solar program limits siting to rooftops, carports and canopies, contaminated sites and landfills, and certain water bodies.*

Thank you for considering our views. Please do not hesitate to contact us if you have any questions about our recommendations.

[7] See Fraunhofer Institute Agrivoltaics: Opportunities for Agriculture and the Energy Transition, April 2022, pages 12 and 35-39.

[8] Elliott Campbell, Rachel Marks, and Christine Conn, Spatial Modelling of the Biophysical and Economic Values of Ecosystem Services in Maryland, USA in Ecosystem Services, Vol.43, June 2020.