Governor's Task Force on Renewable Energy Development and Siting

Final Report

Prepared for:

Governor Larry Hogan

August 14, 2020

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EXECUTIVE SUMMARY

The Governor's Task Force on Renewable Energy Development and Siting was established by Governor Larry Hogan under Executive Order 01.01.2019.09 in August 2019 to examine renewable energy siting issues, and in particular, siting of utility-scale solar on farmland. Solar is of particular interest because of the large number of proposed utility-scale solar projects in Maryland, utility-scale solar's increasing cost-competitiveness and the need to meet the solar carve-out of the Maryland Renewable Portfolio Standard (RPS). Therefore, a focus of the Task Force was to explore other development opportunities besides utility-scale solar such as development on brownfields or parking canopies, as well as to consider streamlining of state permitting processes under certain conditions that could benefit all forms of generation sources.

The state seeks to increase the contribution of renewable energy to the electricity mix through Maryland's RPS, which requires 50% of overall electricity generation sales in Maryland to be met by renewable energy resources by 2030. As part of the RPS, Maryland has the largest solar carve-out in the country, at 14.5% by 2028, and a separate carve-out for 1,200 megawatts (MW) of new offshore wind, also by 2030, on top of the 368 MW of offshore wind authorized by the Maryland Public Service Commission (PSC) in 2017.

The availability of large tracts of open land in rural communities, which generally does not require extensive site work (e.g., clearing or grading), is ideal for utility-scale solar generation development, particularly if located within proximity to a power substation. Of the 30 solar generation facilities currently under construction or review by the state, a majority are located on agricultural lands. That, in turn, has raised concerns about whether the development of multiple large, utility-scale solar projects may consume prime farmland, which is important to the state's agricultural communities, culture and industry, and that existing state policy aims to preserve. Furthermore, farmers may benefit from leasing agricultural or rural land for utility-scale solar development, primarily as a source of predictable income, even though there are potential remediation issues to manage after a facility has outlived its useful life.

Using a variety of assumptions outlined in the main body of the report and in an Appendix, the Task Force estimates between 7,750 and 33,000 acres of farmland could be devoted to utility-scale solar, or between 0.4 and 1.7% of available farmland, and between 0.7 and 2.9% of available prime farmland, in Maryland. While small in aggregate, the encroachment of utility solar on prime agricultural and farmland remains a serious concern to rural communities, policymakers and stakeholders.

The Task Force submits the following 14 recommendations for consideration:

- Develop Additional Incentive Programs
- Consider Options for Updating and Streamlining the CPCN Process
- Expand Rooftop Solar and Other Preferred Applications by Increasing the Net Energy Metering Cap
- Accelerate Residential Rooftop Solar Permitting

- Evaluate New and Existing State and Local Government Facilities and Land for Solar Potential
- Establish an Offset Requirement for Farmland Development Similar to Maryland's Existing Forest Offset
- Degraded Lands with Photovoltaic (PV) Potential
- SmartDG+ Improvements
- Address Transmission and Distribution Constraints
- Assess Environmental Justice (EJ) Siting Impacts
- Develop Streamlined Standard to Review and Approve Energy Storage Projects
- Expand Efforts to Develop Microgrids in Maryland by Leveraging Solar in the Built Environment
- Expansion of Maryland Green Registry
- Promote Complementary Practices Like Agrovoltaics and Pollinator Habitat

Meeting Maryland's energy and environmental goals and requirements are challenging, but achievable. In developing its recommendations, the Task Force focused on strategies to preserve and protect farmland and property rights in Maryland while at the same time not suppressing the growth of clean and renewable energy. The 14 recommendations put forth in this final report are meant as a way to explore new and better approaches to siting, and to determine other enabling actions that can be taken in order to achieve Maryland's goals. The recommendations are informed and supported by models or examples from other states or countries and can be implemented through the Task Force's recommended actions and next steps.

The Task Force was supported through the collaborative efforts of key state agencies, representatives of the Maryland agricultural community and local governments, as well as those from the solar and wind industries. The Task Force met or had conference calls on nine different occasions and heard presentations on a number of topics.

LETTER FROM THE CHAIR

Dear Governor Hogan,

Thank you for the opportunity to chair the Task Force On Renewable Energy Development and Siting over the past year.

I am pleased to present our consensus-based recommendations that will help the State of Maryland move forward and meet our future energy and environmental goals and requirements.

The task force worked well together over the past year to make several recommendations for your consideration. I would like to thank your staff for their support on this project.

Sincerely,

Gregory I. Snook
President and CEO of CHIEF
1 South Potomac Street
Hagerstown, MD 21740

DRIVERS OF RENEWABLE ENERGY DEVELOPMENT

Maryland is on the path to a low carbon energy future that will benefit its residents, businesses, and the economy. In 2016, Governor Hogan signed a reauthorization of the Greenhouse Gas Emissions Reduction Act (GGRA), paving the way for reductions in greenhouse gases of 40% from 2006 levels by 2030. Through this process, the state is also required to reduce greenhouse gases in a manner cognizant of Maryland's economy, where actions taken should result in a net positive economic impact, protect employment in manufacturing, and create a significant number of new green jobs.

To meet these goals, the state can leverage different approaches, including demand response programs, which target reductions in peak demand, energy efficiency measures, the establishment of new generating stations to manage our energy sector, and more. Collectively, these and other innovative initiatives provide millions of dollars in relief and benefits to Marylanders, lower energy and maintenance costs, and create clean and green job opportunities.

Given Maryland's ambitious goals, it is necessary to increase in-state renewable generation. Electricity generation from solar and wind will account for a majority of the state's efforts to generate clean and renewable electricity and meet our GGRA objectives. The state's primary statutory obligation is derived from the RPS, described in the next section.

Maryland's Renewable Portfolio Standard

The RPS requires each retail electrical supplier to provide a specified percentage of its electricity sales from Maryland-certified Tier 1 and Tier 2 renewable resources. Every megawatt-hour (MWh) generated by qualified renewable energy resources is eligible to be registered as one Maryland-certified REC. Eligible RECs may come from a PSC-certified renewable energy facility located within PJM Interconnection, LLC (PJM), or for the electricity the facility delivers into PJM from an adjacent control area outside of the PJM. The RPS was modified by legislation 11 times from 2007 through 2019, mainly to increase the percentage requirement and change the eligibility of renewable energy resources. The current version of the Maryland RPS contains the following provisions:

- Tier 1 renewable resources include fuel cells that produce electricity from other Tier 1 renewable fuel resources, geothermal, hydroelectric facilities under 30 MW, methane, ocean, poultry litter-to-energy, qualifying biomass (including "black liquor" from paper mills), solar, wind, waste-to-energy, refuse-derived fuel, and offshore wind. The Tier 1 requirement began at 1% and increases annually. For 2020, the non-solar Tier 1 requirement is 22%, and including the solar and offshore wind carve-outs discussed separately below, will reach 50% by 2030.
- The solar energy carve-out requires that a specified percentage of energy supply must come from in-state solar facilities. The solar carve-out will reach its maximum of 14.5% in 2028. The 14.5% solar requirement is part of the Tier 1 overall 50% requirement.
- The Maryland Offshore Wind Energy Act created a separate carve-out for offshore wind facilities. The offshore wind energy carve-out requires that a specified percentage of energy

in the state must come from offshore wind facilities located between 10 and 80 miles off the coast of Maryland. Each year, the PSC will set the percentage of required offshore energy, to be no less than 400 MW of offshore wind by 2026, 800 MW by 2028, and 1,200 MW by 2030. This is in addition to the 368 MW of offshore wind approved by the PSC to receive Offshore Renewable Energy Credits (ORECs) in 2017.

- Existing hydroelectric facilities that are not pump-storage and are over 30 MW qualify to meet the Tier 2 standard if the facilities were operational as of January 2004. Tier 1 resources may also be used to meet the 2.5% Tier 2 standard. Tier 2 was originally set to expire in 2018, but that sunset was extended to 2020.

Of Maryland's renewable energy resources, solar development has been growing the most over the past few years, and it is in the state's interest to encourage and incentivize other non-farmland locations, where possible, due to the substantial cultural and economic value of the farmland.

ESTIMATING THE RENEWABLE ENERGY FOOTPRINT

In order to better understand the potential impact to agricultural lands in the state, the Maryland Energy Administration (MEA) developed a model to estimate the amount of new land required to meet the solar carve-out requirement of the current RPS (see model results in Table 1). Included in the table below is the range calculated along with other selected variables. The detailed calculations, with step-by-step explanation, can be found in Appendix A. The calculation is highly dependent on the assumptions used in the model, resulting in a wide range of possible land requirements. Using these assumptions, the Task Force believes estimates between 7,766 and 33,033 acres of farmland appear a reasonable range to provide going forward.

Table 1: Low and High Estimates of Agricultural Acreage Necessary for Solar Development

Description	Low Estimate	High Estimate
Energy (MWh) used in state in 2028	57,535,000	64,588,000
Percent ground mounted (assumed)	65%	80%
Energy to power (MWh-ac/MW-dc) conversion ratio	1,600	1,431
Acres per MW	5	8
Percent placement on agricultural land (assumed)	60%	100%
Acres of ground mounted panels on agricultural land	7,766	33,033
Percent of all agricultural land[1]	0.4%	1.7%
Percent of prime agricultural land[2]	0.7%	2.9%

[1] United States Department of Agriculture, "2017 Census of Agriculture, State Profile: Maryland,"using the figure for "Land in farms (acres)" of 1,990,122,, last modified March 8, 2019, nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Maryland/cp99024.pdf.
[2] United States Department of Agriculture, "Natural Resources Conservation Service Maryland," using the figure for "Prime Farmland" of 1,133,400 acres, n.d., nrcs.usda.gov/wps/portal/nrcs/detail/md/technical/dma/nri/?cid=nrcs144p2_025681.

POWER PLANT AND TRANSMISSION LINE LICENSING

Certificate of Public Convenience and Necessity

The PSC is the regulating entity whose jurisdiction includes siting approval of power generating facilities over 2 MW and overhead transmission lines greater than 69 kilovolts (kV) within the state. The PSC is an independent commission with commissioners appointed by the Governor for set terms and confirmed by the Senate. An applicant that is planning to construct or modify a generating facility or a transmission line must be granted a licensing permit, the Certificate of Public Convenience and Necessity (CPCN),[3] from the PSC before commencing construction. The applicant must provide notification of the CPCN application to each county or municipality in which the proposed facility or transmission line is located. The approved CPCN constitutes permission to construct the facility subject to conditions recommended by state and local permitting authorities, including air quality and water appropriation permits.

The CPCN licensing process was created in 1974. The state recognized that electricity is a vital public need, but that its construction, generation and transport can impact the state's natural, social, and cultural resources. The process provides an opportunity for the state to consider a proposed power facility or transmission line's potential impacts on these resources. The process also allows the state to obtain both the local jurisdiction's (the relevant county or municipality) recommendations and local communities' input.

A distinguishing feature of the CPCN process is the high degree of interagency coordination carried out to provide the PSC with the requisite information regarding a proposed project. By statute, certain state agencies are required to coordinate their review and provide recommendations about a proposed project to the PSC. These agencies include the Maryland Departments of Natural Resources, Environment, Agriculture, Commerce, Planning, and Transportation, and the Maryland Energy Administration.

Maryland Code requires the reviewing state agencies to forward to the PSC the results of their analysis and investigation of a CPCN application, "together with a recommendation that the certificate be granted, denied, or granted with any condition deemed necessary."[4] Consistent with its statutory responsibilities, the Maryland Department of Natural Resources' (DNR) Power Plant Research Program (PPRP) coordinates the project review and consolidates the reviewing state

[3] Not all projects are subject to CPCN review. Projects under 2 MW in capacity are exempt from the CPCN requirement and several types of projects can receive CPCN exemptions from the PSC. These include: (1) land-based wind projects, under 70 MW in capacity, whose energy is sold only on the wholesale market, pursuant to an agreement with the local electric company; (2) projects under 70 MW in capacity that export less than 20% of the energy generated on an annual basis; and (3) projects under 25 MW that use at least 10% of the energy generated annually onsite. In addition, FERC has licensing jurisdiction over non-federal hydroelectric projects located on navigable waters in the United States. Thus, Conowingo Dam's license is from FERC, while certain permits necessary for this license, such as the water quality certification, are issued by Maryland (see PUC § 7-207.1 Article).

[4] MD Nat Res Code § 3-306, 2019.

agencies' recommendation. For those projects that the reviewing state agencies recommend approving a CPCN, PPRP develops a consolidated set of scientifically supported recommended license conditions, designed to apply to each facility's unique circumstances, and submits these recommendations to the PSC on behalf of the reviewing state agencies. These measures are included to address unique circumstances of a specific project. Often these recommended conditions are the result of commitments agreed to by the applicant during the CPCN process.

When a proposed generation facility is within proximity to other already existing or approved facilities, or when a proposed transmission line spans multiple regions and resource areas, PPRP includes cumulative impacts within the reviewing state agencies' consolidated review process. In such cases, impacts to air, water, terrestrial, socioeconomic and other resources are evaluated and compared to the pertinent identified thresholds of acceptability. Additionally, the cumulative analysis identifies where license conditions are needed to address cumulative adverse impacts.

PJM Interconnection Queue

Another factor affecting the development of nearly all power plants is the PJM generation interconnection process. With the responsibility for assuring the transmission of safe and reliable electricity within its territory, PJM administers the interconnection of all new generators and transmission facilities to the PJM transmission system.[5] A developer of a proposed generation plant must secure permission from PJM to interconnect its generation asset to the bulk power grid in PJM, which is done through a series of studies discussed below. PJM's interconnection process is intended to protect the bulk power grid's safe and reliable operation while providing a transparent process for interconnecting new generation resources.[6] Even with no delays, it can take up to two years to go through the PJM interconnection process.[7] However, it can take longer should the interconnection studies identify necessary transmission system upgrades that must be completed before a generator can be interconnected.

In order to connect to the PJM transmission system, a new generation project in PJM's service territory must submit an official interconnection request with PJM to initiate the process. The request is entered into PJM's Interconnection Queue (PJM Queue). Therefore, the PJM Queue serves as a running inventory of proposed generation or transmission projects that could be interconnected to PJM's grid in the future. However, only a small percentage (~20-25%) of the proposed energy capacity associated with them will eventually come online. PJM then systematically reviews each project in the PJM Queue and conducts a battery of interconnection

[5] PJM, "PJM Manual 14A: Generation and Transmission Interconnection Process," n.d., pjm.com/-/media/documents/manuals/archive/m14a/m14av19-generation-and-transmission-interconnection-process-11-01-2016.ashx.
[6] National Association of Regulatory Utility Commissioners, "An Introduction to Interconnection Policy in the United States," prepared for the U.S. Agency for International Development, n.d., pubs.naruc.org/pub.cfm?id=5375FAA8-2354-D714-51DB-01C5769A4007.
[7] PJM, "Generation Interconnection Process," Presentation before the SWANA Spring Conference, Atlantic City, NJ, April 18, 2016, swananj.org/wp-content/uploads/2018/02/K-Graff-PJM-Interconnection-Process-Presentation-1.pdf.

studies, including the Feasibility Study, the System Impact Study, and the Interconnection Facilities Study. To determine whether a project can safely interconnect to PJM's grid, the results of the three Interconnection Request Studies are evaluated against a baseline benchmark set of studies for PJM.[8]

After the final requisite study is complete and the results are given to the project developer, PJM tenders the Interconnection Service Agreement and the Interconnection Service Agreement (ISA), which allow the project to begin construction and interconnect with PJM's electricity grid.

Maryland Solar Projects in the Queue

As of July 2020, Maryland has 77 total solar projects in the PJM Queue with a total capacity of 2,242 MW. Two of these projects are combined solar and storage projects. Of the 77 projects, 14 individual projects with a cumulative capacity of 198 MW are considered "in-service" by PJM. The remaining 63 solar projects representing 2,044 MW of capacity are not yet operational. A significant portion (147.4 MW or nearly 75%) of Maryland's solar projects listed in the PJM Queue are in Maryland's Eastern Shore region. For the solar projects in Maryland that are not on-line, 58% of the total capacity, or 1,187 MW, are located on the Eastern Shore.

The solar projects in operation took an average of 3 years from entering the PJM Queue to coming on-line. Solar projects that entered the PJM Queue over time have taken longer, or are taking longer, to be processed. Specifically, using projected on-line dates that are in the queue studies, solar projects that have completed PJM's interconnection studies, but are not yet in operation are projected to take between 5 and 6 years to come on-line from the date they first entered the PJM Queue. Proposed solar projects on the Eastern Shore are projected to take even longer, at up to 8 years, suggesting that the transmission infrastructure on the Eastern Shore needs reinforcing if additional solar projects are to be accommodated.

[8] Ibid.

Maryland Farming and Solar Generation

For utility-scale solar developers, Maryland's prime agricultural land is a convenient option for siting generation plants and projects. More than 30 solar generation facilities are currently under construction or review by the state, and a vast majority will be located on agricultural lands. From a developer's perspective, the availability of large tracts of open land, which is more common in rural communities, is ideal as it generally does not require extensive site work (e.g., grading, or clearing), particularly if located within proximity to a power substation. As part of the coordinated CPCN review process, the reviewing state agencies must examine the benefits and the adverse impacts of siting a proposed utility-scale solar energy generating systems (SEGS) on agricultural land when applicable. Utility-scale refers to large generation projects that exceed two MW in capacity.

Maryland's Agricultural Sector

Agriculture plays an important role in Maryland. As of 2017, there are 12,429 farms in the state, the vast majority of which are family-owned, covering nearly 2 million acres of land.[9] The market value of all agricultural products sold in the state amounted to over $2.4 billion and directly supports over 16,000 jobs.[10] The overall impact to Maryland's economy resulting directly from agricultural production constitutes approximately $3.3 billion when counting the indirect and induced benefits from that activity, and pushes the job figure up to nearly 24,000. In addition to direct agricultural production, Maryland hosts a large processing industry (canning, frozen food manufacturing, and poultry) that relies on that production. This processing industry led to $9.5 billion in direct economic activity and around 23,000 jobs, while the inclusion of the indirect and induced benefits indicate roughly $12.5 billion in activity and roughly 41,000 jobs. This results in an impact of nearly $16 billion to the state economy and around 65,000 jobs.[11] Much of this broad impact results from agriculture's diversity in the state. It includes crops like oats, barley, sorghum, and soybeans, and livestock like cattle, pigs, and sheep, along with a host of other products, like poultry, honey, dairy, and even vineyards. Furthermore, each farm is essentially a business itself, looking for additional revenue streams.

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[9] United States Department of Agriculture, "2017 US Census of Agriculture, Maryland State and County Data, Volume 1, Geographic Area Series, Part 20, AC-17-A-20," issued April 2019. See also MD State Profile: nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Maryland/cp99024.pdf.
[10] Business Economic and Community Outreach Network at Salisbury University, "The Impact of Resource Based Industries on the Maryland Economy," 2018, marbidco.org/_pdf/2018/Full_Report_All_Maryland_Resource_Based_Industries_Beacon_2018.pdf.
[11] Ibid.

Loss of Prime Farmland from Solar Siting

A recurring issue with siting ground mounted SEGS on productive agricultural land is the loss of prime farmland. Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water). These soils are of the highest quality and can economically produce sustained high yields of crops when treated and managed according to acceptable farming methods.[12] Farmland is considered prime when 50% or more of the soils in a map unit composition is prime. Farmland is of statewide importance where less than 50% of the components in the map unit is prime, but a combination of lands of prime or statewide importance is 50% or more of the map unit composition. Excluding federal land, urban land and water areas, about 23% of Maryland's soils are prime.[13] Counties with the highest amount of prime farmland are found either in the upper part of the Eastern Shore, including Kent, Caroline, Queen Anne's and Talbot counties or along the Pennsylvania border such as Washington, Carroll and Cecil counties. Counties with the least amount of prime soils tend to be in southern or western Maryland and include Garrett, Allegany, Calvert and Charles counties.

The state's primary instrument for conserving prime farmland is the Maryland Agricultural Land Preservation Foundation (MALPF, or Foundation), a unit within the Maryland Department of Agriculture (MDA) that purchases perpetual agricultural preservation easements restricting development on prime farmland and woodland. Created in 1977, MALPF is one of the first of its kind and has become one of the nation's leaders in agricultural land preservation. Its mission is to protect the best quality farms and expand on existing preservation areas to increase the size of contiguous blocks of preserved farmland.

Through FY19, a cumulative total of 2,347 properties were included in the MALPF program, thereby, permanently preserving 318,216 acres.[14] Currently, MALPF regulations do not allow a solar facility to be located on a MALPF property and will not approve applications for such a use. Specifically, COMAR 15.15.14 specifies the Foundation may only accept applications to approve an authorized renewable energy source (ARES) on a farm subject to an agricultural land preservation easement before June 30, 2018. MALPF may not approve an ARES on a farm subject to an agricultural land preservation easement after June 30, 2019.[15] No other state regulation is designed to specifically restrict the placement of a solar energy project on prime farmland.

Farmland Critical Mass

The direct conversion of prime farmland acreage is just one aspect of the concerns regarding SEGS. There are also concerns that continuing to allow farmland to be converted into other land uses

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[12] USDA, "Soil Survey Manual", in *The U.S. Department of Agriculture Handbook 18* Soil Survey Division Staff, 1993.
[13] USDA, "Natural Resources."
[14] The Maryland Agricultural Land Preservation Foundation, "Annual Report Fiscal Year 2018," July 13, 2020, mda.maryland.gov/malpf/Documents/!MALPF%20Annual%20Report%202019%20FINAL.pdf .
[15] COMAR § 15.15.14.0.

would, at some point, reduce acreage below a critical mass of farmland needed to sustain a viable agricultural economy.[16] This issue is not specific to SEGS. Between 2007 and 2012, for example, 14,700 acres of agricultural land, 19,100 acres of forest land and 2,700 acres of other rural land in Maryland were converted to developed land.[17] Even greater rates of conversion prior to 2000 prompted public concern about the loss of farmland.

According to the 2016 report, "The Future of Sustainable Farming and Forestry in Maryland," (commissioned by the Harry R. Hughes Center for Agro-Ecology), there is a correlation with loss of farmland and the decrease in a county's agricultural economic rank. Specifically, the report sets forth the following: "Since the 1940s, counties that experienced greater reductions in farm acres primarily due to development tended to also experience greater decreases in agricultural economic rank, based on comparative total sales of agricultural products among counties. These counties also tended to have more rural land fragmented by large lot development; they also show the greatest shifts over that period away from livestock and toward nursery, greenhouse, horticulture, fruit and nuts, measured as percentages of agricultural sales from those respective products. These relationships between land in agriculture, fragmentation by large lot development, relative total agricultural sales, and shares of sales in large-scale livestock versus nursery, etc., appear likely to continue. The future of poultry and grain on the Eastern Shore remains promising. Nursery and horticulture should continue to thrive in service to developed and developing landscapes. The future appears reasonably stable for the equine industry. And the 'buy local' food movement holds the potential for growth in production, and direct and indirect local and regional marketing of fruits, nuts, vegetables, meats and value-added products. Projected land use changes, environmental regulations and food safety and health regulations will all play a role in defining what forms of agriculture will be sustainable in the future."[18]

Post-Solar Restoration of Farmland

In Maryland, CPCN license conditions generally require that once the operating life of a solar facility ends (at least 30 years), the facility must be decommissioned, and land returned to its original condition. Also, CPCN license conditions require a detailed decommissioning plan and surety agreement to be filed with the PSC. While decommissioning plans generally aim to remove all project components, plans include contingencies for structures, such as below ground piles and buried underground cables, to be cut and abandoned in place. Particularly for agricultural land, the abandonment of below ground structures is a concern, and Maryland requires the removal of all belowground structures and cabling to ensure safe agricultural operations after a site has been restored. Except in the event of a pending request for repowering filed with the PSC, the owner of a

[16] Farmland Information Center, "Critical Mass of Agricultural Land Report," prepared for the Maryland Center for Agro-Ecology Inc., Queenstown, Maryland, January 2003, farmlandinfo.org/statistics/Maryland.
[17] Ibid.
[18] Harry R. Hughes Center for Agro-Ecology, "The Future of Sustainable Farming and Forestry in Maryland," 2016, farmlandinfo.org/publications/the-future-of-sustainable-farming-and-forestry-in-maryland/.

solar generation facility is required to begin implementation of an approved decommissioning plan within 12 months after the project ceases to generate electricity for sale.

Maryland's Forest Conservation Act and Solar Generation

DNR has established land conservation strategies to preserve natural, cultural, agricultural, and forest lands to meet Maryland's environmental, recreational and economic goals. Forest resources are an important commercial resource, providing construction materials and renewable fuel supplies. They also provide critical ecological benefits such as water quality and carbon sequestration. In view of these significant factors, Maryland enacted the Forest Conservation Act (FCA) in 1991. All construction development that disturbs more than 40,000 square feet must comply with the FCA in accord with county implementation statutes (Forest Resource Ordinances). Heavily forested Allegany and Garrett counties are exempted from implementing County Forest Resource Ordinances under the FCA, while some counties have more stringent requirements.

The FCAs establish standards for land development that make the identification and protection of forests and other sensitive resources an integral part of the site planning process. The conversion of agricultural land for development triggers mitigation requirements, even if no trees are being removed (afforestation). Generation projects must be permitted through the CPCN licensing process and must minimize forest loss during site development. As such, PPRP recommends project-specific CPCN license conditions requiring project developers to meet the county's requirements for any afforestation, reforestation or mitigation that may apply to the project.

Under the FCA, evaluating existing forest condition and character is an integral component of power plant and transmission line facilities siting and development. The FCA requires the applicant to submit both a Forest Stand Delineation, defining the nature and character of the existing forest, and a Forest Conservation Plan for protecting the most ecologically valuable areas of forest. Under the FCA, tree conservation, replanting and other environmental actions must be considered before any development disturbs forest resources. The Maryland Forest Preservation Act amended the state's forest conservation policy to specify that the state's no-net-loss policy requires maintaining a statewide tree canopy cover of 40%. Taken together, the two laws provide for sustainable management of Maryland's forests when trees are being removed or non-forested land is being developed. Consistent with these acts, the PSC has certain responsibilities with respect to forest conservation during the CPCN review.

Compliance with FCA mitigation standards for tree removal or for development of agricultural land meets the requirements of the PSC review. FCA provides a set of minimum standards that developers must follow when designing a new project. County and municipal governments are responsible for making sure these standards are met. New CPCNs issued for the construction of electric generating facilities require compliance with these requirements.

RECOMMENDATIONS

These 14 recommendations presented in the following sections were identified by the Task Force as the most promising in terms of feasibility, significance and impact. For each recommendation, background information is presented to provide context, followed by achievable action items, creating a responsible path forward.

It should be noted that in two particular areas identified in the Interim Report, progress has either already been made, or clarification given:

Voluntary Cleanup Program:

Appendix 2 in the Interim Report identified use of the Voluntary Cleanup Program (VCP) as an avenue to provide relief to developers looking to locate solar arrays on degraded lands, such as brownfields. In the 2020 legislative session, the Hogan administration introduced Senate Bill 281,Renewable Energy Development and Siting (REDS) – Evaluations and Tax and Fee Exemptions. This successfully passed into law earlier this year.

Senate Bill 281 requires the Maryland Department of the Environment (MDE) to waive certain VCP application fees if the applicants plan to use an eligible property to generate clean and renewable energy. In addition, it requires MDE to adopt certain regulations for property identification in the Superfund Enterprise Management System. The VCP program ultimately benefits the state by reviewing eligible property for environmental hazards before being converted to another use, and currently the application fee is a $6,000 non-refundable fee or a $2,000 fee for a subsequent application if there is an active VCP application in progress. This further reduces the financial burden on developers that wish to locate generation on "preferred" sites.

Local Jurisdictions as Interested Parties:

In Appendix 3 of the Interim Report, it was noted that during the CPCN review process, local governments should automatically be listed as "interested persons" to the case and granted intervenor status upon request. This was a request focused on the PSC, and due notification of county and city governments that could be impacted by the development of renewable energy projects in their respective jurisdictions.

This issue was confronted in the abbreviated 2020 legislative session through Senate Bill 741, Certificate of Public Convenience and Necessity - Electric Facilities - Study and Procedures (crossfile House Bill 1390). A component of that bill reads: "On receipt of an application for a certificate of public convenience and necessity, the commission shall promptly list on the service list for the proceeding the office of planning and zoning for Senate Bill 741 each county or municipal corporation in which the generating station, qualified generator lead line, or overhead transmission line is proposed to be located." The PSC was proactive on this point, providing an informational letter to the legislature, providing an alternate solution to that component of the legislation. The PSC can automatically list affected local jurisdictions to the solar CPCN application service list, and has already started to do this. The two new solar-related CPCN dockets initiated this year, Jade Meadow Solar (Case Number 9643) and New Market Solar (Case Number 9635), have both listed

the pertinent authorities of those affected counties. This includes the President of the Board of County Commissioners and the Land Use and Planning Department in Cumberland, and the Mayor and Council of the Town of East New Market.

Related Work:

Outside of this Task Force, Maryland continues to engage in other areas directly related to the siting of solar energy, continually seeking out new ways to responsibly place such projects. One such related issue is the state's involvement in a new Joint Land Use Study, currently in its nascent stages. Maryland is the home of many key military installations, with missions as diverse as intelligence, medicine, biodefense, research and development, and many other functions. This study is an effort to protect property rights, prevent encroachment that would affect current and future military operational and training missions, the state and various military installations will participate in. The study implements a planning process to ensure and support compatibility between military installations and their surrounding communities. A component of this study will be to better understand potential renewable energy siting on military properties around the state. The process encourages a collaborative discussion between various stakeholders and covers a defined study area. When completed, the study, and the actions it recommends, should protect the viability of existing military installations well into the future. Study recommendations may include establishing channels of communication between the military installation and the surrounding jurisdictions, identifying new state policies, new legislation, or providing resources to assist local jurisdictions with compatibility planning to address identified concerns.

Recommendations:

1 Develop Additional Incentive Programs
2 Consider Options for Updating and Streamlining the CPCN Process
3 Expand Rooftop Solar and Other Preferred Applications by Increasing the Net Energy Metering Cap
4 Accelerate Residential Rooftop Solar Permitting
5 Evaluate New State and Local Government Facilities and Land for Solar Potential
6 Establish an Offset Requirement for Farmland Development Similar to Maryland's Existing Forest Offset
7 Degraded Lands with Potential for Solar Development
8 SmartDG+ Improvements
9 Examine Transmission and Distribution Constraints
10 Assess Environmental Justice Siting Impacts
11 Develop Streamlined Standard to Review and Approve Energy Storage Projects
12 Expand Efforts to Develop Microgrids in Maryland by Leveraging Solar in the Built Environment
13 Expansion of Maryland Green Registry
14 Promote Complementary Agricultural Practices Like Agrovoltaics and Pollinator Habitat

1. Develop Additional Incentives and Programs

Background:

Drawing best practices from other states' incentive programs is an essential component of determining new approaches to overcome our own challenges in Maryland. Many other jurisdictions have grappled with their own siting concerns and may have arrived at pragmatic solutions that can be applied in Maryland. Incentive programs should be designed to promote development in preferred areas and reduce the cost disparity associated with developing renewable energy on land we wish to protect, such as farmlands, forests and wetlands. Reviewing these other incentive programs and policies on renewable energy siting on preferred lands is a smart approach to accelerate Maryland's goals for solar development, at least cost to Maryland's residents and businesses. Additionally, several programs focus on the redevelopment of brownfields, toward the end of providing a site suitable for solar development. However, because of time constraints, conducting an in-depth analysis is a recommended project for a later date to properly reference and disseminate findings on this topic. Additional incentive programs also need to be aligned with budgetary realities and the scale needed to make a meaningful difference in where solar projects are developed. Below are a few examples of other state's incentive programs for consideration.

New York

ORES: In 2020, New York established the Office of Renewable Energy Siting (ORES) to help improve and speed up the siting process for large scale (25 MW and above) renewable energy projects. ORES is streamlining the review process to a single forum while helping to conclude the application process within a single year, except for former commercial and industrial sites, which will be reviewed within 6 months. Throughout this process there is opportunity for input by local communities. Among other things, the ORES will:

- Establish regulations and uniform standards that encompass the environmental impacts common to large projects and identify mitigation measures to address those impacts.
- Require that uniform and site-specific standards and conditions must achieve a net conservation benefit to any impacted endangered and threatened species.
- Authorize the Department of Environmental Conservation to use funds from projects permitted through the new siting office to implement an endangered and threatened species mitigation bank fund.[19]

NY-Sun: Special financing is directly provided to solar contractors and developers in order to offset the cost of solar for residents. Another example would be Not for Profit On-Bill Recovery loans

[19] NYSERDA, "New York State Announces Passage of Accelerated Renewable Energy Growth and Community Benefit Act as Part of 2020-2021 Enacted State Budget," April 3, 2020, nyserda.ny.gov/About/Newsroom/2020-Announcements/2020-04-03-NEW-YORK-STATE-ANNOUNCES-PASSAGE-OF-ACCELERATED-RENEWABLE-ENERGY-GROWTH-AND-COMMUNITY-BENEFIT-ACT-AS-PART-OF-2020-2021-ENACTED-STATE-BUDGET.

offered to businesses. These loans are recorded as a line item on a monthly utility bill, and are paid over time. Loans are available up to $50,000, with a repayment period of up to 10 years.

State Environmental Quality Review: These are regulations adopted as a rulemaking package to allow solar installers or contractors to bypass a formal assessment of environmental impacts for certain projects, such as adding solar to landfills or brownfields. In addition to eliminating the requirement for a formal assessment, New York offers a larger incentive to projects that are on landfills and brownfields.[20]

Brownfield Incentive Grant program: This program focuses on the environmental assessment, cleanup, and pre-development of brownfields. Property owners or developers are eligible for up to $5,000 in grant funds for Pre-Development Design activities and up to $10,000 for projects that address the needs of the immediate community.[21]

Rhode Island

Renewable Energy Fund: Similar to the MEA-implemented programs funded by the Strategic Energy Investment Fund (SEIF), this provides grants for renewable energy projects. Rhode Island has a $1 million dollar program that is designated toward incentivizing solar on brownfields. They allow $1.00/watt for a direct ownership model with a maximum grant of $250,000 per project, and a $0.80/watt for a third party owned system with maximum funding being $175,000 per project.[22]

Colorado

Investment Tax Credits: Another way to site on less desirable lands is the provision of investment tax credits for renewable energy investments on qualified brownfields, degraded lands, parking canopies, and right-of-ways. Colorado offers a 3% tax credit for renewable energy investments in distressed areas of the state up to a maximum of $750,000.[23] The Enterprise Zone tax credit incentivizes businesses to invest in distressed areas.[24]

Florida

Voluntary Cleanup Tax Credit: This program provides tax credits for the redevelopment of brownfield sites that are hindered by solid waste or contamination. For sites hindered by solid

[20] NYSDA, "New York State Announces."
[21] NYC, "Mayor Bloomberg Launches City's Brownfield Incentive Grant Program," n.d., home2.nyc.gov/html/oer/html/brownfield-incentive-grants/big.shtml.
[22] Rhode Island Commerce, "Renewable Energy Fund: REF Grants, Programs & Materials," , n.d., commerceri.com/financing/renewable-energy-fund/.
[23] DSIRE,"EZ Investment Tax Credit Refund for Renewable Energy Projects," programs.dsireusa.org/system/program/detail/5833.
[24] Colorado Office of Economic Develop & International Trade, "Enterprise Zone Tax Credits," n.d., choosecolorado.com/doing-business/incentives-financing/ez/.

waste, tax credits are 50% of investment up to a maximum of $500,000. For contaminated sites, tax credits are 25% of investment up to a maximum of $500,000.[25]

Job Bonuses: An incentive that can be applied to promote clean and renewable energy projects is the provision of job bonuses. Job bonuses can be given to companies who create jobs on brownfields. In Florida, developers can receive bonuses up to $2,500 for each job created on a brownfield site. To be eligible for the program, the applicant must create ten new full-time jobs.[26]

Loan Guarantees: Local governments can offer loan guarantees for the development of brownfields for clean energy purposes. Florida offers loan guarantees of up to 50% on all brownfield sites.

Pennsylvania

Low-interest loans: Pennsylvania provides low-interest loans for the remediation of sites that have been contaminated by past industrial or commercial activities. The Brownfield Redevelopment Loans prioritize sites that might affect underground water quality. The loans are up to a maximum of $11 million for projects in one municipality and up to $20 million when it involves two or more municipalities.[27]

This is just a sample of the possible areas for exploration. Many other states have tax credit programs for the installation of renewable energy on landfills and brownfields. Some of those states include are, but not limited to, Alabama, California and Colorado. Alabama provides a reduction in property taxes for qualifying renewable energy facilities in the state. Solar energy is one of the eligible renewable energy resources for this incentive. Municipalities, counties, and public industrial authorities may grant property taxes abatement from all taxes for ten years.[28] California Revenue and Taxation Code allows for the property tax exclusion for solar energy systems installed between 1999 and 2024.[29] The program and incentive possibilities are abundant.

***Subsidiary Recommendation A*: After thorough review, consider creating tax credits to incentivize solar development on brownfields, degraded lands, parking canopies, right-of-ways, poultry houses, and other existing infrastructure, including rooftops.**

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[25] Florida Department of Environmental Protection, "Brownfields Program," n.d., floridadep.gov/waste/waste-cleanup/content/brownfields-program.
[26] The Official Site of the Florida State Legislature, "The 2019 Florida Statutes, Title XIX, Chapter 288.107," n.d., leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=0200-0299/0288/Sections/0288.107.html.
[27] PennVest, "Brownfield Redevelopment Loans," Commonwealth of Pennsylvania, n.d., pennvest.pa.gov/SiteCollectionDocuments/Services/Brownfield%20Redevelopment%20Loans.pdf.
[28] Clean Energy Authority,"Alabama Local Option- Property Tax Exemption for Renewable Energy Facilities - Solar Rebates And Incentives," n.d., cleanenergyauthority.com/solar-rebates-and-incentives/alabama/.
[29] DSIRE, "Property Tax Exclusion for Solar Energy Systems," n.d., programs.dsireusa.org/system/program/detail/558.

Specific Actions:

- Develop small pilot programs to understand the effectiveness, weaknesses, and scalability of chosen alternatives.
- Deploy pragmatic incentives tailored for Maryland**.**

<u>Subsidiary Recommendation B</u>: Expand review of other state incentives for siting solar on preferred lands.

Specific Actions:

- Continue to review other state policies and incentives for solar energy and conduct a review based on the findings.
- Develop follow-up findings into a broader research product that can be disseminated for stakeholder review (including members of the Task Force) to determine which programs or incentives may be the most beneficial to pursue.
- Continue to identify opportunities where legislation could help further the goal of smart renewable energy development and siting within the state.
- Seek stakeholder input when developing credit or grant programs.
- Work with local counties to promote solar energy development (i.e., permitting, siting, and financing).
- Evaluate Maryland's Opportunity Zones for preferred locations for solar development or microgrids.
- Connect investors interested in funding solar, with an emphasis on brownfields and developed areas, with potential developers.
- Prepare an empirical analysis of incentives to determine cost-effectiveness and potential for optimizing land use in Maryland for policy alternatives.
- Target existing grant programs toward state-funded projects such as school buildings so they can be used to offset the additional cost of solar in a more efficient manner.

2. Consider Options for Updating and Streamlining the CPCN Process

Background:

Maryland will need to review and assess ways to make the CPCN process more efficient, particularly as it relates to renewable energy projects. Some areas that may require review include the pre-application steps, CPCN application requirements, and the reviewing state agencies' coordinated review process.

Pre-application. While not required, PPRP encourages prospective applicants to meet with them to identify potential issues with a proposed project, and to determine whether and how all relevant concerns will be addressed. This process provides an opportunity for the applicant to become familiar with the PSC regulations and procedures. In most cases, a significant amount of dialogue about the project and its potential impacts occurs which, in turn, informs the application filed with the PSC. Through a diligent and thorough pre-application process, a prospective developer can limit the risk of submitting a contentious or unsuccessful CPCN application by identifying potentially contentious areas and modifying the proposed project during the preliminary design to minimize adverse impacts.

Application. PSC regulations require the CPCN applicant to summarize the proposed project and its potential environmental, social, cultural and economic impacts. The application is often accompanied by an environmental review document that presents the applicant's supporting environmental and socioeconomic studies. Once the applicant has submitted a CPCN application to the PSC, PPRP coordinates with the other reviewing state agencies to evaluate the potential impacts of the proposed project on Maryland's resources, including water (surface and groundwater), air, land, ecology, and socioeconomics (such as visual and noise-related impacts). In the case of transmission line projects, the need for the project is evaluated and a review of alternative routes is conducted as part of the review process. In the case of electric generation, which is now a competitive market, there is no longer a regulatory requirement to prove "need" as part of the CPCN process.

PSC Process and PPRP Review. The Commission may handle a CPCN case or delegate the matter to the Public Utility Law Division. The docket is opened and, if delegated, a Public Utility Law Judge (PULJ) is assigned to the case who will oversee the CPCN proceeding and, ultimately, issue a Proposed Order for the Commission's consideration, either approving or denying the CPCN. A prehearing conference is held to establish an overall procedural schedule and to address other preliminary matters, such as hearing from any stakeholders that have asked to be a party to the CPCN case. Subsequently, the PULJ will issue a Scheduling Order, which will include deadlines for submitting written testimony and other filings, dates for public and evidentiary hearings, and any discovery rules agreed to in the prehearing conference. Discovery typically begins after the prehearing conference and may continue until the evidentiary hearing.

In support of its request, the applicant includes an impact analysis and other required information in its application and will file written testimony and additional updated information throughout the CPCN process. These filings will provide the evidentiary basis to support the applicant's request for a CPCN. Other parties to the case may also file written testimony and documents supporting their respective positions or recommendations about the proposed project. Once all written testimony is filed, and subsequent to the local public hearing, the PSC holds an evidentiary hearing. During the evidentiary hearing, written filings are put into the record, parties are given an opportunity to cross examine witnesses and the PULJ will ask questions of the parties' witnesses.

Given its statutory responsibilities, PPRP participates as a party in the CPCN process and provides evidence on behalf of the reviewing state agencies. PPRP files the reviewing state agencies' recommendation to approve or deny the CPCN application, recommended license conditions, and written testimony with supporting technical analyses (in the form of testimony and an independent project assessment report). Through this written evidence and oral testimony provided by witnesses during the evidentiary hearing, PPRP must show that the reviewing state agencies' recommended conditions are necessary. When a contentious issue is involved, witnesses may be subject to vigorous cross examination by other parties or significant questioning by the PULJ. The PULJ also presides over the local public hearings where the public has an opportunity to provide comments on the proposed project.

In considering its findings regarding the CPCN application, the PULJ weighs the evidence that is in the official record and takes into consideration the local jurisdiction's recommendations, any public comments and the legal arguments set forth in any briefs filed by the parties in the case. When finding in favor of approving a CPCN application, that finding may include required license conditions. Upon issuance of a Proposed Order by the PULJ, a party may appeal a contested issue in the order for the Commissioners' consideration. Absent appeal or further action by the Commission, the Proposed Order will become a Final Order after 30 days. After their deliberation, the Commissioners may affirm, modify or remand the Proposed Order. Unless remanded, the PSC will issue a Final Order, which may be timely appealed to the Circuit Court.

<u>Subsidiary Recommendation A</u>*: *Petition the PSC for a rulemaking to consider whether the CPCN process could be improved, specifically by updating PSC regulations to be more applicable to proposed renewable energy generation projects. Simplify CPCN requirements/process to provide more efficient and timely review and greater responsiveness and transparency. Increase awareness of PSC requirements and likely PPRP recommendations. Develop user-friendly project evaluation criteria of projects to help all stakeholders, including developers of renewable energy and the local jurisdictions (county and municipal government and community residents who they serve).

Specific Actions:

- Request the PSC to open a docket to review and update the PSC's regulations related to its CPCN process. Through the rulemaking process, interested stakeholders may provide their recommendations for possible areas where the CPCN process may be improved.
- Increase coordination among reviewing state agencies to discover additional ways to further streamline the development of their review, recommendation and recommended conditions.
- As part of the rulemaking process, consider requiring an applicant to demonstrate compliance with all requirements by submitting a checklist (see recommendation below) as part of its CPCN application, including referencing where the required information may be found in its application. Such a checklist could expedite the process by facilitating a completeness review of the application and helping to assure that applications, when filed, are complete. Examine other state siting processes to identify potential "best practices" that could be incorporated in Maryland's CPCN process.

Subsidiary Recommendation B*: *Consider the viability of developing a fast-track process for CPCN applications that meet certain criteria, including the submission of a complete application; a showing, through reliable documentation, that the proposed project complies with local land use requirements and other required special exception to county requirements; and the proposed project falls below a specified size/capacity threshold and is close to finalizing required PJM approval.

Specific Actions:

- Specify a maximum time from application to evidentiary hearing for a CPCN application that meets certain detailed criteria. Availability of such an expedited time frame would encourage applicants to address potential issues, including local land use concerns, before submitting an application.
- Make an expedited review contingent upon the applicant's provision of a letter from the local jurisdiction's planning office indicating that all required application materials are complete and have been submitted, prior to filing a CPCN application. Also, require the applicant to provide contact information for all elected officials and the planning director of each local jurisdiction to facilitate the process.
- Identify that the project is consistent with a county's comprehensive plan and, ideally, has already received county approval.
- Develop a process to quickly confirm that the proposed project, as described in the application, will likely comply with and/or will have no significant environmental or socioeconomic impacts.
- Require applicants to demonstrate that the proposed project will have no adverse impact on agricultural, critical, or forest preservation areas.

- Fast-track the review of proposed projects that are located on brownfields, parking lots, or other types of already developed or disturbed lands. In the beginning, limit maximum project capacity to 20 MW and consider increasing the maximum project capacity if the fast track process proves successful and a higher capacity limit is justifiable.

<u>Subsidiary Recommendation C</u>*: *Create an initial checklist for the coordinated review of a CPCN application to facilitate the overall process.

Specific Actions:

- Increase transparency and communication between developers/potential applicants and PPRP (on behalf of reviewing state agencies) through publication of an application checklist. Compliance with the checklist at the time of application would allow for greater efficiency throughout the process.
- Coordinate with each reviewing state agency to identify a specific list of items that should be addressed before, during and after a CPCN application is filed.
- PPRP to consider identifying the relevant standard conditions included in the reviewing state agencies' recommended conditions associated with an item included on the checklist.

3. Expand Rooftop Solar and Other Preferred Solar Applications by Increasing the Net Energy Metering Cap

Background:

Net energy metering (NEM) has been a part of Maryland energy policy since 1997. The overall capacity limitation on NEM was increased to its current level of 1,500 MW a decade later. NEM is a tool that Maryland uses to encourage the adoption of distributed generation assets that align with state goals. NEM policies create a streamlined regulatory scheme for property owners to invest in behind-the-meter distributed generation assets.

The practice has been expanded in Maryland through community solar programs that allow renters, as well as homeowners, to participate in, and receive the financial benefits of, NEM by subscribing to a solar array constructed within the customer's utility service territory. Maryland has also instituted Aggregate Net Energy Metering for agricultural, nonprofit, and municipal ratepayers. This allows a single entity served by multiple electric utility meters to offset its aggregate energy usage with a singular distributed generation asset.

Distributed generation offers potential grid operations and planning benefits, including peak-shaving and increasing power quality.[30] Additionally, distributed generation can be used to increase resiliency from catastrophic weather events, unanticipated grid events, or terrorist attacks. This translates into greater resiliency for nearby critical infrastructure, such as those associated with emergency response or medical services.[31] By displacing more highly polluting generation, NEM reduces greenhouse gas and carbon emissions. Finally, NEM eliminates energy losses associated with transmission and distribution, which helps to reduce grid strain and congestion while promoting private in-state investment in clean and renewable energy generation.

An added strength of NEM is that the majority of private investment it spurs is investment in rooftop solar, accelerating the siting of clean and renewable energy projects in a target area under the Task Force's goals. This helps to minimize the need for development on land that is agriculturally valuable or ecologically sensitive. In addition, this can be further narrowed to allow larger site caps for solar located on brownfields and landfills, which can potentially make these projects financially feasible.[32]

However, there is a socialization of costs resulting from NEM. This is not unique to NEM; it is a result of the very nature of ratemaking. If any expense is accounted for in the rate base, there will be a certain level of socialization. The electricity industry's traditional rate design is based on the

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[30] U.S. Depart. Of Energy, "*The Potential Benefits of Distributed Generation and Rate-Related Issues That May Impede Their Expansion*," 2007, federalregister.gov/documents/2007/03/01/E7-3565/study-of-he-potential-benefits-of-distributed-generation-and-rate-related-issuesthat-may-impede, iii.

[31] *Ibid*.

[32] Utility Scale Solar Energy Coalition, "Solar Development Potential on Contaminated Lands in Maryland," Draft Report, October 5, 2018, mdcounties.org/DocumentCenter/View/2924/USSEC-Analysis-of-Solar-Potential-on-MD-Contaminated-Lands---FINAL-10918.

premise that all ratepayers share the costs of the system. Rate design does not predicate that the costs be shared either equally or proportionately. This may be exacerbated by policies that compensate participating NEM ratepayers for generation at a rate in excess of the market cost of energy. In Maryland, these installations are currently credited for generation at the full retail rate, encompassing both the wholesale cost of energy and the cost of delivering that energy, which in 2019 amounted to $2,921,334 statewide, across both residential and commercial customer classes.[33] By this arrangement, the expense associated with the portion of credits representing the delivery of energy is socialized across the rate base. It is worth mentioning that the environmental benefits of NEM are also shared by society at large, both ratepayers and non-ratepayers.

Maryland lawmakers and regulators have concluded that the environmental and grid benefits provided by distributed generation, especially the adoption of clean and renewable assets, outweigh the limited impact to ratepayers. NEM continues to be an excellent tool for advancing the development of distributed generation assets and spurring private investment, while providing grid and environmental benefits to Marylanders. As of June 2019, Maryland had achieved 754 MW of NEM generation of the permissible 1,500 MW, or approximately 50% of the capacity limitation.[34] At 2019 adoption rates, that capacity limit is estimated to be met by 2025 or 2026. MEA further encourages distributed generation asset adoption through its bevy of programs, including grants for design and planning as well as capital for generation assets themselves.

Even if the entire 1,500 MW capacity limit is met with rooftop solar, Maryland will have deployed only a small fraction of potential rooftop solar arrays. The National Renewable Energy Laboratory (NREL) estimates that total technical potential for rooftop solar in Maryland is 10,900 MW on small buildings (less than 5,000 square feet) and an additional 8,500 MW on larger buildings.[35] While technical potential does not mean all this potential is feasible for solar deployment, it is indicative of the potential growth available.

Given the benefits and effectiveness of NEM for deploying solar in preferable applications, and the expectation that the NEM cap will be met within several years, Maryland could consider expanding the cap. Continued growth in rooftop and community solar beyond 2025 is essential, as the RPS' solar carve-out is scheduled to continue to grow through 2028. Since utility-scale solar projects take an average of over 3 years to be completed after entering the PJM queue, 2025 will be a key year for siting the remaining capacity necessary to meet the overall solar carve-out.

This leads to four conclusions:

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[33] Public Service Commission of Maryland, "Report on the Status of Net Energy Metering in the State of Maryland," September 1, 2018, psc.state.md.us/wp-content/uploads/2019-MD-PSC-Report-on-the-Status-of-Net-Energy-Metering.pdf, 4-5.
[34] *Report on the Status of Net Energy Metering In the State of Maryland*, Maryland Public Service Commission (2019), 1.
[35] Gagnon, Margolis, Melius, Philips, and Elmore, *Rooftop Solar Photovoltaic Technical Potential in the United States: A Detailed Assessment*, National Renewable Energy Laboratory, 2016 pp. 26-27 and 32. nrel.gov/docs/fy16osti/65298.pdf

1. NEM continues to be an effective mechanism for encouraging the adoption of clean and renewable distributed generation assets and the associated private investment therein.
2. The effectiveness of NEM relies on available generation capacity under PUA §7–306(d), which may be exhausted in as few as five years.
3. An expansion of the NEM capacity limit may be necessary to ensure rooftop solar, community solar, and other beneficial applications play an appropriate role in achieving the statewide solar goals in the RPS.
4. The socialized costs associated with NEM should be considered.

<u>Subsidiary Recommendation</u>*: *Discuss the necessary next steps regarding net energy metering in the state.

Specific Actions:

- Determine the feasibility of increasing the cap on total MW nameplate capacity eligible for NEM.
- Conduct internal review on ratepayer impact of increasing the NEM cap. This can guide the appropriateness of any potential increases and how they should be structured.
- Explore the feasibility of creating a tariff structure that credits NEM generation installed in excess of the current 1,500 MW limit at a new specified rate that is less than the full retail rate.
- Reviews of the tariff structure should include a consideration of mechanisms that will encourage or require a certain percentage of NEM capacity to be dedicated to the benefit of low-to-moderate income residents. This would allow the continued use of NEM as a promotional mechanism, but limit the potentially negative impact of socialized costs.
- Determine feasibility of targeting NEM to brownfields and landfills.
- Continue to monitor petitions such as the NERA NEM petition at FERC and intervene when and if appropriate.
- Evaluate options for expanding aggregate net metering to include state agencies and instrumentalities or other options to make projects more cost-effective compared to the state's other energy purchasing options.
- Explore adding state facilities as an eligible customer qualifying for aggregation. This would allow state agencies to credit kWh from a single customer-generator electric account to another electric account, providing additional incentive for solar adoption.
- Explore options beyond NEM or NEM 2.0. Examples in other states of different ways to design net metering.

4. Accelerate Residential Rooftop Solar Permitting

Background:

Solar permitting can be split into different, distinct groups of projects, each with their own complexity in permitting. However, the bulk of solar permitting applications are for routine residential rooftop systems, with standard design and review, and less than 20 kW. The large number of residential rooftop systems undergoing permitting can be burdensome for county and local permitting officials. From an Authority Having Jurisdiction (AHJ) point-of-view, potentially automating this process could allow these permitting officials to concentrate on the more difficult cases and to become more involved in CPCN cases of concern. From a solar developer point-of-view, an automated process would be quicker, more transparent, and hopefully less costly.

While AHJ's are responsible for permitting and inspections within their jurisdictions, developers would be more efficient and effective in their permitting applications if there was a more uniform option available. Understanding that local control of permitting is often a tightly held local function, the adoption of this standard should remain voluntary.

One possible solution is to leverage work done by the federal labs to streamline permitting, or systems developed by other states or localities that have successfully adopted such approaches. Over the last few years, NREL has developed a computer program (SolarAPP) that is able to review routine residential solar rooftop applications and determine if they meet applicable building and electrical codes.[36] The program can be customized for each AHJ, but retains the basic functional review capability. The program is being tested on a number of communities in California, and is expected to be ready for widespread use in September 2020.

The availability of such an automated permitting system could increase permitting efficiency, lower costs, and free up trained AHJ permitting officials to concentrate on more difficult projects.

Specific Actions:

- MEA, in partnership with Maryland Departments of Housing and Community Development and Labor and Planning should convene stakeholder meetings with AHJ's, major solar developers and others to review possible permitting streamlining opportunities.
- MEA, in partnership with the National Association of Counties' SolSmart Program or similar efforts, should identify state and local governments that have successfully adopted permit automation and streamlining, and host educational sessions to share best practices with key state agencies and AHJ's.
- MEA should continue to coordinate with NREL on their program, which is currently in beta-testing.

[36] National Renewable Energy Laboratory, "Safe and affordable home solar through permitting automation," n.d., solarapp.nrel.gov/.

- MEA, in conjunction with relevant authorities, should coordinate an NREL-facilitated briefing for Maryland agencies and AHJs on the capabilities of the SolarAPP system and provide support for counties interested in testing the system.
- Maryland AHJs are encouraged to evaluate this NREL-developed program to determine if it can meet their needs for reviewing and approving permits for routine residential rooftop systems.
- Follow up with feasibility of widespread availability in late 2020.

5. Evaluate New and Existing State and Local Government Facilities and Land for Solar Potential

Background:

Public buildings and infrastructure, including state, local government, universities, schools, and other facilities guided by state or local policy, provide an ideal opportunity for accelerating solar development in the built environment. These facilities are often located in already developed areas, typically have consistent ownership over long periods of time, and may leverage existing contractual vehicles. Public facilities often lead by example by exploring the cost effectiveness of concepts, removing financial risks from commercial entities and lead the way toward broader implementation of new technologies. In addition, projects such as solar canopies allow for more seamless integration of electric vehicle charging infrastructure, when paired with charging equipment, and provide shaded parking areas that reduce "heat island" impacts by absorbing or reflecting sunlight.

Evaluate New State and Local Government Buildings and Infrastructure for Solar Potential:

It is recommended that all new construction or upgrades of state-managed or -owned buildings over 7,500 square feet include the design for solar canopies and rooftop solar. Solar should be evaluated for possible inclusion in the design process for all new and upgraded state-owned facilities over 7,500 square feet.[37] Relatively minor adjustments early in the design process can make facilities solar-ready. Such measures include orientation of the building to maximize solar gain, providing space for equipment, clearly defining wire routing, roofing capable of supporting solar equipment, and installing more flexible electrical gear that can easily incorporate solar and other distributed energy resources if added later. County and municipal governments may also mirror the state's lead by enacting similar goals for their publicly-owned facilities. Discussions should begin on whether solar should be included in local government facilities funded in part or whole by the state.

MEA has been working with local governments and school districts to facilitate solar development on public facilities. The Maryland Net Zero Energy (NZE) Schools Program has enabled the development and construction of three new NZE schools within the Baltimore Gas and Electric (BGE) service area, using settlement funding from a PSC proceeding. The schools were designed and constructed to be as energy-efficient as possible, thereby minimizing the amount of renewable energy technologies required to achieve the net-zero energy goal. MEA provided awards to help with the incremental costs of NZE design and construction. As a result, Howard County's Wilde Lake Middle School has been fully constructed and, after more than a year of operation, was verified to have achieved NZE status. Two new NZE schools in Baltimore City, Graceland Park O'Donnell Heights Elementary and Middle School, and Holabird Elementary and Middle School, are in the final stages of construction, with an anticipated opening date of fall 2020.

[37] Additional future consideration includes ownership vs operating or leasing, and exemptions, including sheds, salt domes, and airports.

Specifically, the state should develop a policy for considering the inclusion of solar technologies in the public facility design and development process. The building design should not only accommodate, but possibly maximize the use of solar collection at that site. Integrating solar-ready rooftops into the design process will minimize costs and may generate offsetting savings. Similarly, guidelines should be developed to identify cost-effective thresholds for when solar should be included, or facilities made solar-ready, for state projects and those heavily- funded by the state. The Maryland Green Building Council (MGBC), Interagency Commission on School Construction (IAC), MEA, Maryland Department of Labor (Labor), Maryland Department of Housing and Community Development (DHCD), Maryland Department of General Services (DGS), Maryland Department of Planning (MDP) and other stakeholders should coordinate on these policies and processes.

The state should also engage in efforts to evaluate whether solar should be included as an elective in codes and standards that guide new construction or major upgrades. Codes will influence the adoption of solar on future public and private buildings and are often one of the most cost-effective mechanisms for transforming the market and reducing costs. The state already has several provisions that encourage construction of green and high-performance buildings, which often incorporate energy efficiency, use materials with a low carbon footprint, and incorporate renewables and other features that reduce the environmental impact of the building through its lifecycle. Currently, the Maryland Green Building Council's High Performance Green Building Program includes guidelines for state facilities over 7,500 gross sq. ft., and these guidelines are also applicable to public school construction projects or replacement schools in which 80% of the final square footage is newly constructed. Projects are required to comply with either the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) Program or the current version of the 2018 International Green Construction Code (IGCC) adopted by Maryland. While neither includes a requirement for solar, it is an elective or a consideration in the design process. Jurisdictions such as Montgomery County have adopted IGCC. Similarly, local governments, including Charles County, Frostburg, Howard County, Rockville, Salisbury and others have adopted the 2018 International Energy Conservation Code (IECC), with others in the process of local adoption. The next code adoption cycle for the FY21 code is underway. It presents an ideal opportunity for Maryland to discuss further how solar and other sustainable features can be applied to new construction. The state could continue to participate and expand its presence in the code process to impact future versions of the IGCC and IECC. The International Code Council (ICC) allows multiple state agencies to participate and vote, so expanding the number of applicable state agencies engaged would increase Maryland's voice in these proceedings.

Identify Potential Solar Locations on Government-owned Facilities and Land

Maryland operates more than 2,000 facilities across 50 plus agencies. Many of these facilities and sites may be suitable for solar; however, they must be evaluated to assess issues such as viewshed, historic status, shading, facility condition, long term disposition, potential alternative future uses and more. Local governments and other institutions may control a significantly larger amount of available space. It is recommended that the state work to identify potential sites on existing state

facilities with an emphasis on the built environment, existing impervious surfaces, brownfields, landfills and underutilized land. Many of these facilities may have significant solar potential.

Maryland already has much of the infrastructure in place to identify and mobilize potential solar projects where appropriate for the surrounding community, that are compatible with existing uses, and that are technically feasible and cost-efficient. In an August 2019 announcement, Governor Hogan highlighted opportunities to assess public facilities for solar potential and to provide funding to offset some of the additional costs of installing solar on buildings, parking lots and already developed spaces as opposed to greenfields.[38]

MEA, in partnership with other state agencies, has initiated a first-of-its-kind assessment process for state and local facilities in Maryland. MEA is reaching out to state agencies to identify potential candidate facilities and is providing support to help agencies select the most viable projects. MEA has contracted with the Maryland Environmental Service (MES) to provide detailed feasibility assessments, including economic benefits, of facilities or portfolios of facilities in coordination with the agencies. MEA is in the process of deploying this resource with state agencies and anticipates the work will occur throughout FY21. MEA also plans to use this resource to support outreach to local governments and commercial organizations in concert with its existing portfolio of solar programs.

In addition, as part of Governor Hogan's FY21 budget, $2 million was made available to incentivize solar on large public institutions. MEA is currently working with stakeholders to define the criteria of this program and its applicability. Some of the criteria being incorporated into the program include: the ability to maximize generation potential; to use publicly-sited solar projects as demonstration and educational tools; and to leverage existing developed areas. MEA also plans to emphasize projects that are highly visible, where appropriate, and consistent with solar best practices to showcase how solar can be incorporated into the built environment. The program is expected to launch in September 2020. In addition to this new program, many of MEA's existing programs already support solar in the built environment, including:

- Parking Lot Solar PV Canopy with EV Charger Grant Program
- Community Solar Grant Program
- Resiliency Hub Grant Program

The Maryland Department of Transportation (MDOT) has developed a standard solar contract to enable state and local government agencies access to vendors for projects. MDOT has five solar projects currently underway totaling approximately 1.8 MW to date; these projects involve the Maryland Transportation Authority, Maryland Transit Administration, Maryland Port Administration, and the Maryland Aviation Administration at Baltimore-Washington International Airport. MDOT's new contract allows Maryland state agencies, counties, municipalities, other

[38] The Office of GOVERNOR LARRY HOGAN, "Governor Hogan Launches New Push for Clean and Renewable Energy." Governor of Maryland, August 14, 2019, governor.maryland.gov/2019/08/14/governor-hogan-launches-new-push-for-clean-and-renewable-energy/.

instrumentalities of state or local government, and non-profits to leverage its Master Services Agreement.[39] Currently the agreement has six qualified solar developers. The format is flexible, and many installations are done via a Power Purchase Agreement (PPA) where the offtaker, such as a state agency, agrees to pay for electricity from the system while a third party owns, operates and maintains it. This provides a no-cash, upfront option that is budget friendly: instead of paying for traditional energy supply, the offtaker is paying for the electricity generated by the system. The system developer and owner can leverage tax incentives that are unavailable to government entities, as well as the sale of renewable energy credits (RECs), to improve system cash flow and reduce costs.

Model Initiatives in Other Counties or Jurisdictions:

- The District of Columbia is scaling up the installation of renewable energy on public schools with an objective of installing 10 megawatts of solar on 40 schools.[40]

- Montgomery County, Maryland builds all facilities to LEED-Silver or IGCC standards and has established a portfolio target for solar on public facilities and sites.

- The Washington Metropolitan Area Transit Authority has signed a contract for $12.8 million in solar projects in the National Capital Area around four major stations.[41]

Subsidiary Recommendation A*: *Determine best approaches for deploying solar on state-owned buildings.

Specific Actions

- MEA, DGS, and IAC should collaborate to develop a policy and process for evaluating solar potential for new public facilities or infrastructure over 7,500 square feet for new construction or major upgrades as part of the design process, as well as guidelines for when a solar project should be considered.

- DHCD, MEA, Labor, MGBC, DGS and the International Council of Shopping Centers should evaluate options for solar related to the Maryland Green Building Performance Standard and future code cycles.

- Consider expanding the number of state agencies that hold ICC memberships, thereby expanding the state's voting rights related to the ongoing code IGCC and IECC code cycle.

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[39] Maryland Department of Transportation (MDOT), "Solar Program at MDOT", n.d, mdot.maryland.gov/newMDOT/Planning/Environmental/Solar.
[40] District of Columbia Department of General Services, "DGS at DC Public Schools: Building a Sustainable Future", n.d, dgs.dc.gov/page/dgs-dc-public-schools-building-sustainable-future.
[41] Washington Metropolitan Area Transit Authority, "Metro agrees to $50 million deal with SunPower and Goldman Sachs Renewable Power LLC that will drive revenue and create the largest community solar project in the region", July, 8, 2020, wmata.com/about/news/Metro-solar-contract-announcement.cfm.

- MEA and MDOT should educate state agencies and local governments on options for solar as part of PPAss or energy-as-a-service financing approaches. Leverage the MDOT indefinite quantity master PPAwhere appropriate.
- Explore interagency partnerships to identify impervious surfaces under state agency control, as possible candidates for solar.

***Subsidiary Recommendation B*: Identify Potential Solar Locations on State, Local and Public Facilities or Institutions with an Emphasis on Developed Spaces and Brownfields.**

Specific Actions:

- MEA, in consultation with PPRP, develops workgroups of interested state agencies and possibly stakeholders to identify potential solar sites for detailed assessment by MES.
- PPRP and MDE identify brownfield sites, from the state's portfolio of state and local facilities that may be suitable for larger-scale solar development.
- MDOT continues to provide its Master Solar Contract to state and local agencies interested in developing solar.
- MDP, Commerce and other relevant agencies should consider conducting targeted outreach to local government economic development organizations and others to identify potential underutilized sites and the community's vision for these properties. Consider a study after receiving stakeholder feedback.
- MEA deploys a program in FY21 to encourage solar development on public or large institution facilities. Continue the program in FY22, subject to funding availability and appropriation.
- MEA to continue the Resilient Maryland Program in FY21 to help leverage solar and energy storage in support of microgrids, including vital public safety and essential state and local facilities.

6. Establish an Offset Requirement for Farmland Development Similar to Maryland's Existing Forest Offset

Background:

MALPF purchases agricultural preservation easements that permanently restrict development on prime farmland and woodland, but does not replace agricultural land that is developed into residential housing or solar facilities. On the other hand, Maryland has a robust program for protecting forests, including no-net loss provisions. Maryland should explore the feasibility of expanding MALPF using elements of the Forest Conservation Act to accelerate and target farmland easement acquisitions.

Under the FCA, tree conservation, replanting, and other environmental actions must be considered before any development disturbs forest resources. Developers are required to consult with their respective counties and comply with the county's requirements for any afforestation, reforestation or mitigation that may apply to the project. Additionally, the conversion of agricultural land for development triggers FCA mitigation requirements even if no trees are being removed (afforestation). The afforestation costs are paid by the developer into the local county's forest conservation fund, or forest mitigation bank, for the equivalent number of forested acres removed for site development. The local authority must then utilize the funds in its entirety within 2 years or three growing seasons or the funds are returned to the developer who then must document tree planting in the same county or watershed. Many specifics would need to be determined, including whether an offset purchase would be necessary if farming activities continue on developed land.

Subsidiary Recommendation*: *Require renewable energy developers to purchase land offset credits when siting a new project on an agricultural preservation easement.

Specific Actions:

- For solar projects that are sited on prime farmland, determine the minimum acreage that triggers purchase of the farmland offset credits.
- Follow similar regulations utilized for the FCA, including:
    - Direct the funding from project developers towards Maryland's existing MALPF and Rural Legacy programs for the creation of farmland easements.
    - The easements should be no less than three-quarters of the total acreage used by the project developer.
- Determine boundaries of the farmland easements.
    - When a solar project is proposed for development on farmland in a county, then its corresponding easement should also be placed in the same county.

- If no suitable land is available to be rezoned, the easement must be placed in an adjacent county.

7. Degraded Lands with Potential for Solar Development

Background:

Continuing to explore new avenues to locate solar fields on lands that are disused or contaminated provides an excellent way to achieve Task Force objectives. These are typically former landfills and contaminated sites not in current use, but in many cases, still owned by local governments. Open land in government control, without any other use should be used and promoted for viable energy production. In addition, if the landfill is of an age where it is still producing methane, the landfill could also have a power generation system installed, providing additional baseload power on-site.

A study from 2018 indicates roughly 214 to 427 MW could be open for solar development on degraded lands throughout the state, and there are significant opportunities for value stacking in many of these projects.[42] For instance, the City of Annapolis opened the largest PV plant on a closed landfill, in the country. Not only is this project structured as a PPA, locking in renewable energy costs over the long-term while providing power to the local grid, but the city is also in receipt of roughly $150,000 a year in lease payments.

In other areas of Maryland, like Fort Detrick Municipal Landfill in Frederick County and Hoods Hill Municipal Landfill in Carroll County, solar projects have already been approved, and several other sites, like Berlin Municipal Landfill in Worcester County and Hernwood Municipal Landfill in Baltimore County are open and available for potential solar development.

For these sorts of projects, information availability can be problematic. To that end, MDE has a Land Restoration Program and provides a Brownfield Master Inventory, which is required by §7-223(1) of the Environment Article, meant to notify and report where there is reason to believe, or notification has been received, that controlled hazardous substances may be present.[43] The section also maintains the Land Restoration Program Project Site Mapping (LRP-MAP) site, which attempts to make information on these sites more accessible.[44]

<u>Subsidiary Recommendation</u>: Upgrade information in MDE databases and make it more accessible.

Specific Actions:

- Explore opportunities to enhance the Brownfield Master Inventory (BMI) database and the LRP-MAP program.

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[42] Utility Scale Solar Energy Coalition of Maryland, "Solar Development Potential on Contaminated Lands in Maryland: A detailed analysis of hundreds of contaminated sites across Maryland to determine their development potential for solar photovoltaic electricity generation facilities", October 5, 2008,mdcounties.org/DocumentCenter/View/2924/USSEC-Analysis-of-Solar-Potential-on-MD-Contaminated-Lands---FINAL-10918.

[43] Maryland Department of the Environment, "Brownfield Master Inventory", n.d, mde.maryland.gov/programs/Land/MarylandBrownfieldVCP/Pages/BrownfieldMasterInventory.aspx.

[44] Maryland Department of the Environment, "Land Restoration Program Project SiteMapping", n.d, mde.maryland.gov/programs/LAND/MarylandBrownfieldVCP/Pages/mapping.aspx.

- Provide direct LRP-MDE contact information to potential developers.
- MDE and MEA coordinate to provide information and fact sheets to renewable energy developers for when sites enter VCP or controlled hazard substance (CHS) status. Similar to existing information on the environmental aspects of developing solar on closed landfills, the information would be directly applicable to solar developers, focusing on site characteristics. They would be able to determine whether the site could be viable for renewable energy development, along with information about regulatory requirements for renewable energy projects, and links to any financial resources and contacts.
- Continue to explore options to increase accessibility to these degraded sites, including through increases in available information, such as via MDP's Brownfield Redevelopment Assistance Program.

8. SmartDG+ Improvements

Background:

Successful project development requires the understanding of many factors that affect the siting of a renewable energy project. To assist developers, counties, and other stakeholders, PPRP and MEA developed SmartDG+, a free, online, map-based screening tool that is intended to help users identify promising areas for the location of large-scale (i.e. greater than 2 MW) renewable energy projects.[45] Specifically, the goals of SmartDG+ are to provide a neutral platform for energy developers and other stakeholders to access information necessary to site renewable energy projects; facilitate the development of renewable energy on new and underutilized sites; and support future dialogue and proactive planning amongst communities and developers. SmartDG+ was jointly sponsored by PPRP and MEA, and was launched in 2016, building off an existing GIS mapping tool, Smart Siting, which was established in the late 1990s and early 2000s.

SmartDG+ includes several individual layers as well as multiple static screening scenarios involving infrastructure proximity, resource availability, and land suitability have been applied. SmartDG+ also includes a statewide layer of 1-to-4-mile-wide corridors surrounding electrical distribution and transmission lines that appear strong enough to absorb large-scale projects. In addition to these corridors, the tool's screening layers include variable wind speeds, county protected areas, flood zones, land cover/land use, Naval Air Station Patuxent River Protected Areas, MALPF easements, forested lands, airports, Department of Defense no-go zones, county-level zoning, and proposed and operational wind and solar projects that are greater than 1 MW in Maryland.[46] SmartDG+ also includes several layers that highlight areas such as brownfield sites, U.S. Environmental Protection Agency (EPA) RE-Powering sites, coal combustion byproduct storage sites, and wastewater treatment plants. In addition to the standard layers provided in SmartDG+, the tool also allows users to add their own data layers.[47] PPRP updates the layers in SmartDG+ biannually and is in regular contact with county officials to confirm that all zoning information in the tool is accurate and up-to-date annually.[48] PPRP is collaborating with MDP and with counties to ensure that SmartDG+ is useful and up-to-date.

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[45] The tool focuses on screening factors of relevance to wind and solar projects that are greater than 2 MW in size because that is the capacity threshold which triggers the CPCN process in Maryland.
[46] The SmartDG+ User Guide provides instructions for navigating and using the tool, including viewing the standard screening scenarios and incorporating additional data into the tool dnr.maryland.gov/pprp/Documents/UserGuide_20190514.pdf .
[47] SmartDG+ provides a full description of data layers available in the tool dnr.maryland.gov/pprp/documents/LayerDescriptions_SmartDG_20190514.pdf.
[48] The SmartDG+ tool provides a summary of all information pertaining to county zoning, comprehensive plans, and policies relevant to the siting of renewable energy projects dnr.maryland.gov/pprp/Documents/CountyZoningGuide.pdf.

<u>Subsidiary Recommendation A</u>*: *Incorporate info on degraded properties, Priority Funding Areas (PFAs), PJM interconnection and utilities data on congestion, etc. into SmartDG+. Additional information on renewable energy assets, projects in the pipeline, and congestion and transmission may help developers make better siting decisions.

Specific Actions:

- The Interim Report includes several recommendations for adding content to SmartDG+ to include the following:
    - Forthcoming MDE data on degraded lands that may be suitable for solar projects;
    - MDP data on Priority Funding Areas;
    - County-specific GIS data related to project zoning/permitting; and
    - PJM and utility data on renewable energy assets, projects in the pipeline, congestion, and transmission.
- Adding PJM and utility data on renewable energy assets, projects in the pipeline, congestion and transmission is challenging. PPRP communicated with PJM, the Maryland-DC-Delaware-Virginia Solar Energy Industries Association (MDV-SEIA) and the Potomac Electric Power Company (Pepco) about possible additions to SmartDG+. Ultimately, PPRP decided to link to but not fully incorporate various data sources in SmartDG+, either because of technical constraints or because the data did not appear to have major relevance with regards to siting solar and wind energy projects.

<u>Subsidiary Recommendation B</u>*: *PPRP, MEA and other agencies, such as MDP, should provide educational and technical assistance to county and local governments as they review renewable energy projects (e.g., educational sessions/videos about SmartDG+, how county zoning can assist the PSC in the CPCN process).

Specific Actions:

- The Interim Report made several other recommendations concerning SmartDG+, including providing education for renewable energy developers and education to county governments. PPRP has and will continue to demonstrate the use of SmartDG+ to interested parties.
- MDP recently completed an online solar facility siting guide for local planning and zoning offices to explain Maryland's CPCN process; provide access to relevant judicial, PSC and state agency decisions (via PPRP) impacting local solar siting; and share case studies of local solar siting approaches and of successful solar on brownfield projects in Maryland. The webpage can be found at planning.maryland.gov/Pages/OurWork/envr-planning/solar-siting/solar-siting-home.aspx

<u>Subsidiary Recommendation C</u>: PPRP and MEA should demonstrate the use of SmartDG+ to developers and interested parties.

Specific Actions:

- The Interim Report made several other recommendations concerning SmartDG+, including providing education for renewable energy developers and education to county governments. These are discussed further below:
    - PPRP has and will continue to demonstrate the use of SmartDG+ to interested parties.
    - PPRP is collaborating with MDP and with counties to ensure that SmartDG+ is useful and up-to-date.

<u>Subsidiary Recommendation D</u>: Each county should provide MDP with GIS layers regarding local renewable zoning for SmartDG+.

Specific Actions:

- County-specific GIS zoning layers are incorporated into SmartDG+.
- PPRP is also collaborating with MDP to connect with county contacts on an annual basis to update county zoning layers.
- PPRP also compiles the SmartDG+ County Zoning Guide, which summarizes key wind and solar zoning requirements by county.

9. Examine Transmission and Distribution Constraints

Background:

Distribution Constraints: Many factors go into the siting of a solar project, often including land values, work needed to get the site ready for solar, and distance from a high voltage power line. Each of these factors address economic issues, but they do not address other issues that must be considered (often when developing the interconnection agreement). These factors may include wire loading issues, safety trip points, grid reliability and stability. This data and analysis capability is in the hands of the utilities, and their contractors.

Maryland could consider making a broad study of the distribution system in order to better inform the solar siting process. This would most likely need to be in the form of a Locational Value Study in order to provide the most benefit to the grid as a whole. Generally, the utility determines where and how much solar energy could safely be injected into the grid without requiring major system upgrades, and makes this information available to the solar development community. In this way, developers can propose projects where the interconnection charges are lowest, and the energy is most needed.

Requirements for future increases of renewable energy on to the grid would allow the utility to identify projected energy and power needs, and then identify the utility system upgrades that would be required to accommodate the additional power and energy. Under this approach, the utility ratepayers would be assured that large scale solar projects were being developed where they were needed, that the costs of interconnection were kept low, and that system upgrades were being designed to address the design of the entire system, thus allowing for easier and less costly integration of upgrades to the smart grid.

Such a study could require major involvement of the utilities, as well as county planners; and consultation with PSC staff, MEA, and PPRP. The initial plan may need insight from the PSC, with subsequent plans developed as part of a periodic grid planning process conducted by the utilities (such as an Integrated Distribution Planning process, or equivalent).

Developers would still have the option to ignore the reports by the utilities and develop projects where desired, but the availability of a well thought out report from the utilities would allow the state to incentivize renewable energy projects where the energy and power were needed, in a manner that would strengthen the grid and help prepare for the smart grid.

It should also be noted, a Locational Value of Solar study is different from a hosting study. A hosting study looks at the capability of the current grid, and identifies the amount of additional power that can be carried by each circuit. It does not consider, nor does it make recommendations as to where the injection of solar energy would be of value to the grid. In other words, a hosting study tells the developer where a new solar system can be attached without overloading the existing grid, but does not identify if it is a beneficial location to connect to the grid. Hosting studies do not help the state determine where large scale solar should be incentivized.

Transmission: In addition to studies on the distribution system, Maryland has transmission constraints that could benefit from further study as well. Nearly 2.2 GW of solar is currently in the PJM interconnection queue, some of which is seeing delays due to the need for increased transmission capacity. Many of these proposed projects are running into difficulties because grid reinforcements are needed to reliably interconnect to the grid. Without grid reinforcements, the transmission lines become congested and cannot accept additional electric power without exceeding the thermal, voltage, and stability limits designed to ensure reliability. Maryland has several areas of congestion, which not only may result in project delays, but also see higher prices as a result.

PJM's annual Regional Transmission Expansion Plan assesses a number of factors such as integrating new generation, improving overall market efficiency, and replacing aging infrastructure, in addition to maintaining grid reliability. PJM has the expertise to do a generation deliverability study in order to determine the necessary upgrades to fully integrate proposed and existing generation while allowing capacity for additional generation projects. Such a request could be made in collaboration with the states of Delaware and Virginia, which will help determine what transmission investments are necessary, along with the potential costs.

Subsidiary Recommendation A: ***Require utilities to produce a study allowing for locational value assessments.***

Specific Actions:

- Determine what sort of action would be required via the PSC in order to enable the production of a locational value study.
- Determine the feasibility of a pilot program to demonstrate value.
- Create a working group or task force to determine the impediments to the commissioning of such a study.

Subsidiary Recommendation B: ***Request PJM to conduct a generation deliverability study in collaboration with Delaware and Virginia.***

Specific Actions:

- Form a task force with the PSC, PPRP, MEA, utilities, generators and other interested stakeholders to:
    - Consider asking PJM to conduct a generation deliverability study.
    - Monitor and provide input into PJM's study.
    - Prepare a report with recommendations on whether to adopt any recommendations made by PJM.

10. Assess Environmental Justice Siting Impacts

Background:

Environmental Justice is the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income when it comes to the development, implementation and enforcement of environmental law and policies,[49] and ensuring that no group of people experience a disproportionate burden of environmental consequences from commercial, industrial, or governmental operations or policies.

Minorities are disproportionately affected by the impacts of power plants located in or near their neighborhoods. About 68% of African Americans reside within 30 miles of a coal-fired power plant, and as a result, the health conditions associated with exposure to pollutants coming from these plants disproportionately affect them. A Black child is three times as likely to be admitted to the hospital and twice as likely to die from an asthma attack than a white child. Minorities also are less represented in the solar workforce and are less likely to have a distributed solar facility. In Maryland, African Americans make up only 12.9% of the solar workforce, despite making up about 31% of the state population.[50] A national study found that, even after accounting for income, majority Black or Hispanic communities have fewer distributed solar facilities (i.e., rooftop solar) than predominantly white communities.[51] A recent report conducted by PPRP found that this was true in Maryland, noting that in addition to distributed solar, more of the state's utility-scale projects, and, in particular, solar projects, were located in non-EJ communities than in EJ communities.[52]

In December 2019, PPRP released a report on the Maryland RPS, which explored whether the benefits, including jobs, land use, and reduced air emissions, from in-state RPS projects were equitably distributed across overburdened and underserved EJ communities.[53] The report determined that 40% of the utility-scale renewable energy capacity installed in Maryland were

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[49]United States Environmental Protection Agency (EPA), "Environmental Justice", n.d,epa.gov/environmentaljustice.

[50] United States Census Bureau, "U.S. Census Quick Facts—Maryland, July 1, 2019," census.gov/quickfacts/MD and Solar Foundation; The Solar Foundation, "Solar Jobs Census 2019, Maryland Fact Sheet," February 2020, solarstates.org/#state/maryland/counties/solar-jobs/2019.

[51] Deborah Sunter, Sergio Castellanos and Daniel Kammen, "Disparities in Rooftop Photovoltaics Deployment in the United States by Race and Ethnicity," Nature Sustainability, Vol. 2, January 2019, rael.berkeley.edu/wpcontent/uploads/2019/01/Sunter-Castellanos-Kammen-NatureSustainablityDisparities PVDeploymentRaceEthnicity.pdf.

[52] Maryland Department of Natural Resources, "*Final Report Concerning the Maryland Renewable Portfolio Standard as Required by Chapter 393 of the Acts of the Maryland General Assembly, of 2017*," PPRP, December 2019, dnr.maryland.gov/pprp/Documents/FinalRPSReportDecember2019.pdf, 2-87. In the RPS Study, environmental justice communities were identified as a census tract with 50 percent or more of the population identifying as a minority or a census tract with 50 percent or more of the population with a median household income equal to or below 65 percent of the state's median income ($51,314).

[53] Maryland Department of Natural Resources, "*Final Report Concerning the Maryland Renewable Portfolio Standard as Required by Chapter 393 of the Acts of the Maryland General Assembly, of 2017*," PPRP, December 2019, dnr.maryland.gov/pprp/Documents/FinalRPSReportDecember2019.pdf, 2-87.

located in EJ communities.[54] The report determined that in addition to the majority of the projects being located in non-EJ communities at a 3:1 ratio, the overall benefits were disproportionately allocated to non-EJ communities at the same ratio. In total, EJ communities only recognized 25% of the benefits that are associated with the state's utility-scale renewable energy projects. The disparity in utility-scale solar may be in part due to topography and development density. For example, several large areas that meet the EJ criteria are in western Maryland, but its hilly terrain is not conducive to utility-scale solar projects. Meanwhile, very little of the Eastern Shore meets the EJ criteria, but its large, flat terrain has attracted many of the state's largest utility-scale solar projects.

In addition to utility-scale solar projects, the PPRP report identified that there is significantly lower adoption rate of distributed solar among minorities and low-income populations.[55] In Maryland, only 31% of distributed generation solar projects were located in EJ communities, which is disproportionate to the share of Maryland's population that comprise EJ communities (approximately 43%). One of the factors that may explain the lower penetration rate of distributed solar in EJ communities is the strong correlation between low-income households and rental units, which typically have a low adoption rate of distribution solar due to the upfront costs of solar investment and the misalignment of those who receive the benefits (renters through lower energy costs) versus those who bear the costs (the landlord).

It should be noted that the renewable energy industry is working toward ensuring that minorities realize the economic and environmental benefits of renewable energy. MDV-SEIA collaborated with the Solar Foundation to produce a guide on how to recruit, support and retain a more diverse workforce.[56] MDV-SEIA is also partnering with Historically Black Colleges and Universities Community Development Action Coalition to recruit more students into the solar industry.[57] In Maryland, the Power52 Foundation provides training and skills to historically underserved populations and prepares them for careers in Maryland's clean energy sector through its Energy Institute.[58] Graduates from the Power52 Energy Institute receive a Power52 Certificate of

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[54] The 40 percent percent capacity is when the Conowingo Dam's capacity was excluded. When including the Conowingo Dam, the level of utility-scale renewable energy capacity in EJ communities decreased to 25 percent.

[55] Deborah Sunter, Sergio Castellanos and Daniel Kammen, "Disparities in Rooftop Photovoltaics Deployment in the United States by Race and Ethnicity," Nature Sustainability, Vol. 2, January 2019, rael.berkeley.edu/wpcontent/uploads/2019/01/Sunter-Castellanos-Kammen-NatureSustainablityDisparities PVDeploymentRaceEthnicity.pdf. 140 The study used data from Google's Project Sunroof and merged it with the 2009-2013 American Community Survey. Also, Deborah Sunter, Sergio Castellanos and Daniel Kammen, "Disparities in Rooftop Photovoltaics Deployment in the United States by Race and Ethnicity," Nature Sustainability, Vol. 2, January 2019, rael.berkeley.edu/wpcontent/uploads/2019/01/Sunter-Castellanos-Kammen-NatureSustainablityDisparities PVDeploymentRaceEthnicity.pdf.

[56] The Solar Foundation and Solar Energy Industries Association, "U.S. Solar Industry Diversity Study 2019," May 2019, thesolarfoundation.org/diversity/.

[57] Emma Foehringer Merchant, " 'We Too Must Improve': Clean Energy Industry Looks Into Mirror on Racial Inequity," Greentech Media, June 4, 2020, greentechmedia.com/articles/read/clean-energy-industry-speaks-out-on-racial-injustice-nationwide-protests .

[58] Power52, "Mission/Vision/Values," power52.org/mission-statement.

Completion, and North American Board of Certified Energy Practitioners, National Center for Construction Education and Research and OSHA-10 credentials, allowing them to enter the Maryland clean energy workforce.[59]

There are several ways that Maryland is working to reduce the disparity in renewable energy benefits between communities. First, community solar is one way to allow for low-income and minority populations to participate in solar by eliminating the upfront costs. Community solar is a business model that allows for solar power installations to be funded by subscribers, such as ratepayers, individuals, and/or businesses, who buy or lease a portion of a solar project. The PSC, under Rulemaking 56, revised the Code of Maryland Regulations (COMAR) to require the state's distribution utilities to implement community solar pilots. The pilots have a statewide cap of 412 MW, of which 123.5 MW must be set aside for low- and moderate-income ratepayers.[60]

MEA has a number of programs in place to help incentivize community solar developers, participants and subscriber organizations. The Community Solar Low-and-Moderate-Income Power Purchase Agreement Grant Program (commonly called the Community Solar LMI-PPA Grant Program) provides grants to developers to reduce customer acquisition costs while providing significant, long term savings to subscribers. As of July 1, 2020, MEA has provided over a dozen awards totalling $4 million from this program, encouraging nearly 11 MW of new capacity once constructed. Organizations that finance community solar arrays may perceive added financial risk from projects with a large number of low and moderate income subscribers. Therefore, MEA is working on a solution to help overcome this barrier. MEA's grant to the Climate Access Fund, a nonprofit greenbank, allows them to provide guarantee payments to offset potential Community Solar subscriber non-payments, effectively removing this barrier. The Climate Access Fund will reduce the guarantee amounts to developers over time as the actual default rate is determined, allowing those funds to be recycled to future projects. The data will help Community Solar stakeholders better understand and accurately quantify the risk of low-to-moderate income defaults, should they occur, as opposed to increasing costs to cover worst case scenarios.

In addition to community solar, the RPS allows the use of the SEIF for grants to small, minority, and women-owned businesses related to clean and renewable energy, and in FY19, MEA also initiated a Resiliency Hubs Grant Program. The program provided an incentive to developers to install solar plus energy storage systems at facilities that could provide critical services to low and moderate income neighborhoods during a grid outage. These resiliency hubs are required to provide lighting, recharge small battery operated electronics, provide refrigeration for temperature-sensitive medication, and provide sufficient heating/cooling to prevent people from needing medical services.

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[59] Ray Lewis and Cherie Brooks, "Solar Workforce Development Can Transform Disadvantaged Communities," Maryland Matters, February 12, 2019, marylandmatters.org/2019/02/12/solar-workforce-development-can-transform-md-s-disadvantaged-communities/.

[60] This is based on 2015 peak load. Under the new cap of 3.2% over the 7 year period, the new cap would be 411.73 MW. LMI is 30% of the total, which equates to about 123.5 MW. The new annual caps can be found in COMAR 20.62.02.02 (A)(2).

The FY20 Resilient Maryland program is supporting a study of providing a number of resiliency hubs in Baltimore City neighborhoods.

Finally, through Rulemaking 69, the PSC is developing requirements for applicants proposing a fossil-fueled power plant to notify PPRP of their intent to file for a CPCN at least 90 days in advance; to appoint a community liaison officer; to hold at least one public hearing at least 60 days in advance of filing its CPCN application in the county hosting the proposed power plant; to conduct an environmental screening analysis using EPA's EJSCREEN tool; and to send a letter by U.S. mail to all residential and business addresses within a one-mile radius of the proposed facility, for an urban area, or within a three-mile radius for a rural area.

***Subsidiary Recommendation A*: MEA, Commerce, and Labor should coordinate to focus existing workforce training funds to benefit minority and economically-disadvantaged communities.**

***Subsidiary Recommendation B*: Maryland should consider setting a target of ensuring communities identified as burdened by air, land, or water pollution receive the benefits of energy- and climate-related state spending on programs, grants and investments.**

Specific Actions:

- In 2019, New York enacted the Climate Leadership and Community Protection Act , requiring the state to reach net-zero emissions by 2050.[61] The act also requires the state to ensure that at least 35% of the benefits of state energy- and climate-related spending on programs, investments and grants be realized by communities identified as burdened by air and water pollution. Examples of benefits include housing, workforce development, pollution reduction, low-income energy assistance, energy, transportation and economic development. Maryland should work with stakeholders to develop a program, using the New York program as an initial guide.

***Subsidiary Recommendation D*: Maryland should consider how to encourage more low-income and moderate-income customers to sign up for community solar.**

Specific Actions:

- MEA, PPRP, the PSC, and the utilities should partner on a customer outreach and marketing program with an emphasis on low- and moderate-income customers. At a minimum, a directory of available community solar projects and subscription organizations should be available to consumers, similar to the PSC's Electric Choice website.[62]
- Consider public-private partnerships with organizations serving low- and moderate-income communities to provide education and outreach on community solar.

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[61] New York State Senate, "Senate Bill S6599, 2019-2020 Legislative Session," 2019, nysenate.gov/legislation/bills/2019/s6599.

[62] Maryland Public Service Commission, mdelectricchoice.com/. See also New York's program as an example: nyserda.ny.gov/All-Programs/Programs/NY-Sun/Solar-for-Your-Home/Community-Solar/Community-Solar-Map.

11. Develop Streamlined Standard to Review and Approve Energy Storage Projects

Background:

Energy storage is important for integrating renewable energy resources into the energy grid. Storage can be used to smooth out intermittency or absorb excess production from wind and solar resources. It can help transform a renewable facility into a "firm," meaning more predictable, source of generation by supplying stored power whenever the renewable energy resource experiences an interruption; for instance, when the wind stops blowing or clouds block the sun. And, it can minimize the curtailment of renewable energy generation, especially during negative price periods, which can occur when supply exceeds demand.[63]

Decreases in the prices of storage devices, particularly lithium ion battery storage which has benefited from research and development related to plug-in EVs, have been significant in recent years and prices are generally expected to continue to decline over time. Maryland has been a leader in facilitating greater adoption of energy storage, being the first state to adopt tax credits for energy storage. Additionally, Maryland enacted legislation that required PPRP to study regulatory reforms and market incentives that may be needed or may benefit energy storage in Maryland. The final report, released January 22, 2019, provides a review of the energy storage technologies, their applications, efforts by other states to promote storage, the current state of storage in Maryland and the barriers that discourage widespread implementation.[64] Legislation enacted in 2019 directing the PSC to establish an energy storage pilot program for the state's four investor-owned utilities of up to 10 MW state-wide to be put in-service by February 2022. In April 2020, the Exelon utilities (BGE, Delmarva Power & Light, and Pepco) and Potomac Edison collectively submitted eight energy storage projects to the PSC for review and consideration. Additionally, in March 2020, the PSC adopted new standards resulting from a stakeholder driven process initiated by the Commission, which resulted in energy storage facilities being conditionally required to: (1) have limits on inadvertent export and (2) project evaluation utilizing net system capacity and proposed-use concepts.

The Task Force Interim Report stated that "the state needs to develop a streamlined standard to review and approve [energy storage] projects." The eight projects filed as part of the energy storage pilot required by state legislation are among the first commercial-scale energy storage projects proposed in Maryland to date, and as such, there is a limited experience and history to draw upon in terms of experience with licensing energy storage projects through the CPCN process. In addition, all but one of the eight projects are below the 2 MW threshold for having to obtain a CPCN, meaning the majority of these projects will not need to seek a CPCN. Finally, some of the energy storage projects may be targeted for utility distribution systems, which would not be subject to CPCN siting requirements.

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[63] Maryland Department of Natural Resources, " Energy Storage in Maryland: Policy and regulatory options for promoting energy storage and its benefits," 2018, Maryland Department of Natural Resources. dnr.maryland.gov/pprp/Documents/Energy-Storage-In-Maryland.pdf.
[64] Id.

While it may be too early to consider a streamlined standard to review energy storage projects, there is a great deal to be gained by closely monitoring the pilot program currently underway. This may generate new best practices or inform changes to current processes. It is anticipated these energy storage pilot projects will contribute to discussions about the regulatory reforms needed to facilitate wider deployment in Maryland.

Specific Actions:

- Monitor the storage pilot program in order to develop Maryland-specific best practices for reviewing new storage projects.

12. Expand Efforts to Develop Microgrids in Maryland by Leveraging Solar in the Built Environment

Background:

A "microgrid" is a series of interconnected facilities, generation assets, and advanced control equipment installed across a defined geographic area that is capable of operating in parallel to and disconnecting from the overall utility grid and operating independently.[65] Microgrids enhance the value of solar and other distributed energy resources, like Combined heat and Power (CHP), by leveraging these resources to support resilience of connected facilities and in some cases the electricity grid, reduce the need for additional traditional utility grid investment and in many cases promote holistic energy management efforts through other grid interactive technologies.

In most cases, microgrids will combine advanced breakers, energy storage, variable renewable energy sources (e.g., solar), and dispatchable energy sources (e.g., natural gas generators and CHP) to allow facilities to be supported independently from the grid in response to an outage and seamlessly operate in tandem with the grid during normal conditions. Under normal conditions, microgrids leverage distributed energy resources, demand management, and other technologies to: provide energy to connected facilities and potentially export excess generated electricity to the overall grid to generate revenue or bolster the grid during periods of high demand. In some cases the microgrid will provide full electrical capacity to all loads, but in other cases, the microgrid will only power certain electrical circuits powering portions of a facility microgrid. Microgrids typically include multiple facilities, however they can be applied on a single building and are often referred to as a resilient facility power system. The energy generation must be within the boundaries of a microgrid, hence renewable energy siting is in the same geographic area. In addition, the facilities connected to the microgrid and the utility need to carefully coordinate energy generation and apportioning of costs.

Microgrids can benefit government operations, businesses and residents by providing continuity of electrical supply and improving power quality. Microgrids provide greater power continuity and quality to businesses that are highly vulnerable to process or financial losses due to power outages, including data centers, biotech facilities, food processors, manufacturers and business districts. When applied to housing, microgrids can help protect vulnerable populations, particularly low-to-moderate income Marylanders, who may not be able to relocate to hotels or other centralized emergency shelters. During an emergency situation, microgrids can support continuity of operations for critical facilities and infrastructure or serve as a resource for rapid recovery. Public purpose microgrids support a variety of key public services (e.g., government administration, shelters, cooling centers), as well as supply distribution points or amenities (e.g., gas stations, financial services, lodging, pharmacies) and can provide community-scale benefits to many residents and other ratepayers.

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[65] Maryland Resiliency Through Microgrids Task Force, "Maryland Resiliency Through Microgrids Task Force Report," n.d, energy.maryland.gov/Documents/MarylandResiliencyThroughMicrogridsTaskForceReport_000.pdf.

As an example, Montgomery County has installed two microgrids at two critical facilities: the Public Safety Headquarters building in Gaithersburg, and the Montgomery County Correctional Facility in Boyds. At the Public Safety Headquarters, a 2 MW-ac solar canopy was combined with a 865 kW CHP system to allow the building to operate while disconnected from the electric grid. The CHP system produces hot water, which is used to heat the building and provide domestic hot water, but is also used by an absorption chiller that helps support the current building chillers. In addition, the solar system helps provide energy to the level 3 EV charger and three level 2 EV chargers located onsite.

Microgrids require significant investments for feasibility analysis, design, breakers, generators, energy storage, grid controls and other equipment. These costs may accrue on the customer side of the meter or to the utility, depending on the type of microgrid. However, offsetting savings are possible due to eliminated or deferred utility investment in electricity grid transmission and distribution infrastructure, efficient management of energy resources, and reduced costs for customer sited back-up generation systems. These initial cost hurdles have historically been the decision point on whether or not a microgrid project is feasible.

MEA developed the Resilient Maryland program in FY20 to address this roadblock. Resilient Maryland accelerates prospective microgrid candidates by funding feasibility analysis, planning and design to address stakeholder concerns and foster shovel-ready projects. Participants in the program will generate information that can support decision making by regulators, facility managers, chief financial officers, private debt and equity investors, and other stakeholders.

In its first year, Resilient Maryland received 25 proposals resulting in 14 awards totaling over $1 million. Selected projects include a government center microgrid, public safety facilities, a university, low-to-moderate income communities, regional food producers and agricultural entities that depend upon continuously available power to meet food supply chain demands. The result in data from these projects will provide key information to Maryland and contribute to replicable models for the development of microgrids and other advanced energy projects.

While Resilient Maryland provides funds for the planning and design hurdle, MEA also understands that system components and installation also represent a significant cost hurdle. MEA offers other programs that can help defray the capital costs of microgrid components.

- Combined Heat and Power Grant Program
- Commercial Clean Energy Rebate Program
- Parking Lot Solar PV Canopy with EV Charger Grant Program
- Community Solar Grant Programs
- Resiliency Hub Grant Program
- Energy Storage Tax Credit
- Commercial, Industrial & Agricultural Grant Program

To date, three public purpose microgrid proposals have been considered by the PSC, but none have been approved.[66]

Model Initiatives in Other States or Countries:

- Commonwealth Edison received approval from regulators to develop one of the first utility-scale microgrid clusters in the nation. [67] The microgrid, currently under construction, will connect the City of Chicago's Public Safety Headquarters and other public safety buildings, the Illinois Institute of Technology among others. When complete the project will serve approximately 1,060 residential, commercial and small industrial customers.[68]
- Blue Lake Rancheria, located in a rural area prone to earthquakes in the near California's Humboldt Bay, successfully implemented a microgrid that can operate in tandem with the grid and island during an emergency. Including solar and battery storage the project is expected to save residents $150,000 annually in energy costs.[69]
- The town of Onslow in Western Australia has implemented a microgrid that incorporates 1 MW of solar PV and battery storage in order to increase sustainability of its energy sources and improve reliability.[70]

<u>Subsidiary Recommendation</u>: Expand Use of Microgrids in the Built Environment.

Specific Actions:

- PSC and MEA could host a working meeting with investor owned utilities, city and county representatives to discuss lessons learned from previous microgrid proposals and potential solutions.

- MEA, PPRP, PSC and other applicable agencies could analyze the feasibility study results from the Resilient Maryland program to identify replicable models for microgrid development.

- MEA should continue the Resilient Maryland program in FY21, budget dependent. MEA should also leverage existing programs to promote and provide capital to support the development of microgrids that include solar and other renewable energy systems.

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[66] Maryland Public Commission, "Maryland Public Service Commission Order No. 88836, In the Matter of the Merger of Exelon Corporation and Pepco Holdings, Inc, Case No 9361," 2018, psc.state.md.us/wp-content/uploads/Order-No.-88836-Case-No.-9361-Pepco-Microgrid-Order.pdf ; Maryland Public Commission, "Maryland Public Service Commission Order NO. 87669 In the Matter of Baltimore Gas and Electric Company's Request for Approval of its Public Purpose Microgrid," Case No 9416, 2016.
[67] ComEd, "ComEd Approved to Build One of First Microgrid Clusters in the Nation," 2018, comed.com/News/Pages/NewsReleases/2018_02_28.aspx.
[68] ComEd, "Bronzeville Community of the Future," n.d, bronzevillecommunityofthefuture.com/project-microgrid/
[69] Schatz Energy Research Center, "Blue Lake Rancheria microgrid," 2019, schatzcenter.org/blrmicrogrid/.
[70] Microgrid Knowledge, "Community Microgrids: Four Examples of Local Energy that Improves Lives," 2019 microgridknowledge.com/community-microgrids-examples/.

- MEA should develop an inventory of currently available incentives for microgrids in other states, communities, or countries.
- Support, where appropriate, federal efforts to fund microgrids, including changes to investment tax credits to allow developers to accrue tax benefits from the balance of a microgrid system.

13. Expansion of Maryland Green Registry

Background:

A preliminary recommendation within the REDS interim report was that MEA "should begin a program that will certify projects as Maryland Green Energy Certified if they are contributing to renewable energy production in 'best use' areas such as rooftops, parking lots, and degraded lands in Maryland."

In the interests of efficiency and interagency cooperation, the Task Force now finds that it is beneficial to build on the existing successes of the state; in particular, the Maryland Green Registry administered by MDE.

The Maryland Green Registry is a free, voluntary program offering tips and resources to help businesses and other organizations set and meet their own goals on the path to sustainability. Collectively, Maryland Green Registry members have reported saving over $76 million annually through the proven, practical measures they have shared in their online member profiles.[71]

Rather than creating a similar program within MEA that would require dedication of resources in a time when scarcity has increased, the Task Force recommends that MEA partner with both MDE and the DGS to expand the scope of awards distributed at the annual Maryland Green Registry recognition event.

Specific Actions:

- MDE, DGS, and MEA to work collaboratively to create a project-based award to recognize projects that contribute to renewable energy production in "best use" areas such as rooftops, parking lots, and degraded lands in Maryland.
- MDE, DGS, and MEA to work collaboratively to create project or agency-wide awards for recognition of state agencies.
- Additionally, MDE, DGS, and MEA are to examine a methodology of recognizing institutions of higher education within the state.
- The agencies are encouraged to work cooperatively in the development of an expanded recognition program while harnessing the advantages provided by the existing structures of the Maryland Green Registry.

[71] The Maryland Department of the Environment, "Working Toward a Sustainable Maryland" 2019 Retrieved July 20, 2020, mde.maryland.gov/MarylandGreen/Pages/Home.aspx.

14. Promote Complementary Practices Like Agrovoltaics and Pollinator Habitat

Background:

Agrivoltaics is the co-development of the same area of land for solar power and agriculture, keeping agricultural land in farm production while also benefiting from the use of solar panels. This concept can include the use of livestock to graze the area beneath and around the solar panels, as well as planting crops beneath the panels. Several kinds of farm animals have been used for grazing in solar arrays, including chickens, sheep, and cows underneath elevated panels. Sheep are the most successful grazers, but must be managed in a way that also benefits the sheep, including the rotation of the herd once the source crop has been depleted. Benefits of grazing on solar lands include the use of manure to enrich the soil and reduced vegetation management costs. "Solar-grazing" has been used in numerous states, including North Carolina and Florida. Massachusetts has developed financial incentives under its Solar Massachusetts Renewable Target program for farmers who put land into dual-use with solar arrays.

The planting of food crops under solar arrays has been widely used in Europe and Asia, and is being studied in the United States. Both the University of Arizona and Oregon State University have published papers showing that the shade from solar panels can increase crop yields and decrease water usage for some species such as peppers and tomatoes grown under the panels. Additionally, these food crops can serve as essential habitat for pollinator species.

Pollinator species such as bees and butterflies are facing drastic reductions in population numbers worldwide. The Pollinator-Friendly Designation Program bill was signed by Governor Hogan in May 2017. This bill established a pollinator-friendly designation for ground-mounted solar facilities in Maryland. A Pollinator Certification Regulation was finalized in March 2020 (COMAR 08.13.02.01-04). This is a voluntary certification that recognizes that a solar developer has planted and maintained their solar array in a manner that benefits pollinator species. This certification is good for two years and can be renewed upon request. DNR awarded the first certification of a "Maryland Pollinator-Friendly Solar Generation Facility" to the Perdue Farms Solar Field in June 2020.

In addition to benefiting pollinator species, planting pollinator-friendly vegetation on solar arrays provides multiple benefits to landowners. The use of native plants in place of turf grass can provide benefits such as the reduction of soil erosion and the improvement of soil carbon sequestration; thereby improving soil quality for future agricultural use. Native plants also require less mowing, reducing vegetation management costs for developers.

<u>Subsidiary Recommendation A</u>: Further research into the use of agrivoltaics in other states/regions in order to better understand the feasibility of dual-use farming in Maryland.

Specific Actions:

- Study the benefits of grazing in states such as North Carolina and Florida.
- Perform a literature review regarding the research on crop production on solar facilities.
- Obtain further information regarding the tax incentive offered by Massachusetts for dual-use farming.
- Based on information from previous studies, develop an agrivoltaics pilot program in Maryland.

<u>Subsidiary Recommendation B</u>: Promote the DNR Pollinator-Friendly Solar Designation to increase "buy-in" from solar developers to plant pollinator friendly species as a standard best practice.

Specific Actions:

- Enhance communications regarding DNR's Maryland Pollinator-Friendly Solar Generation Facility designation.
- Convene a webinar to promote the designation, inviting interested parties, including members of the Maryland Pollinator Workgroup; solar developers; county and local representatives; and representatives of other state agencies in order to explain the designation process and answer related questions.
- Provide information and outreach to existing solar generation facilities about the designation.
- Coordinate with solar developers to initiate minimum pollinator-friendly habitat areas at solar facilities.

APPENDIX A: DETAILED ACREAGE CALCULATIONS

Detailed Solar Calculations: This more detailed analysis provides a "best estimate" based on several long-term assumptions. For the purposes of this report, the provided range in the main body of the document should be most directly pertinent to the Task Force dialogue. However, here the best reasonable assumptions are made in order to demonstrate the reasoning and source of each component of the solar calculations.

Table 2: Best Estimate with Detailed Calculations, Explanation, and Sourcing

Note	Description	Best Value
1	Energy (MWh) requiring 14.5% solar carve-out (major utilities)	51,939,000
2	Energy (MWh) requiring 2.5% solar carve-out (co-ops)	5,596,000
3	Solar energy RECS (MWh) required	7,671,055
4	Solar capacity (MW) existing in MD as of 12/31/2019	1,159
5	Ratio of energy to power (MWh/MW) for existing solar through 2018	1,121
6	Energy (MWh) from existing solar	1,299,239
7	Energy (MWh) required from new solar	6,371,816
8	Ground mounted percentage (assumed)	80.00%
9	Energy (MWh) from ground mounted solar	5,097,453
10	Energy to power (MWh-ac/MW-dc) conversion ratio for new solar	1,600
11	Capacity (MW) required from new ground mounted solar	3,186
12	Acres per MW	8
13	Acres of land required for new land based solar	25,487
14	Agricultural land percentage (assumed)	60%
15	Acres on agricultural land	15,292

Notes:

1. Data from Appendix 2a, Table 2(a)(i) of "2019-2028 Ten Year Plan" (dated DEC 2019) found at: psc.state.md.us/wp-content/uploads/2019-2028-Ten-Year-Plan-FINAL.pdf. The state's energy use is projected by the various distribution utility companies and compiled by the Maryland Public Service Commission in Appendix 2 of the Ten-Year Plans of Electric Companies in Maryland. A value of 64,588,000 MWH was used for the upper estimate. Energy use could be lower than the estimate if energy efficiency and demand side management measures are effective. A lower number, 57,535,000 MWh was used for the lower estimate.
2. Ibid.
3. (Line 1 * 14.5%) + (Line 2 * 2.5%).
4. Data from public report: "Renewable Generators Registered in GATS" found at: pjm-eis.com/reports-and-events/public-reports.aspx for data through 12/31/2019. The value of 1,159 MW of existing solar energy in Maryland was calculated using the listing of solar projects in the PJM GATS database. The value of output energy to solar capacity (1,120 MWh/MW) for existing solar projects was similarly sourced from data derived from the PJM GATS database.
5. Data derived from the "Annual Certified Generation" report. The end date for this calculation was 12/31/2018 to ensure arrays had a full year to produce and report energy.
6. (Line 4 * Line 5).
7. (Line 3 - Line 6).
8. Historically, rooftop solar development has been highly dependent on Solar Energy Renewable Certificate (SREC) values. When SREC values were high (above $100/SREC), the solar industry installed about 150 MW/year. When SREC values were low, the installation rate dropped to about 50 MW/year. Under current legislation, the Alternative Compliance Payment (which effectively caps the maximum SREC value) will fall into the range of $20 to $30/SREC by 2028, which would indicate that, without other major incentives, the rooftop solar installation rate will probably not exceed 100 MW/year. However, to meet the RPS solar carve-out, Maryland will need to install 500 MW/year. As such, the ground-mounted percentage is estimated at 400 MW/year, or 80% of the newly installed solar. This is an estimate of how the market will evolve, with larger and smaller percentages possible.
9. (Line 7 * Line 8).
10. It is assumed that the arrays are single axis tracking arrays with backtracking software, installed at zero degree tilt. This would normally yield an energy to power factor of 1,571 MWh-ac/MW-dc (per PVWatts). Under the assumption that solar panels will improve during the next 10 years, this factor was increased by 1.5%, yielding a new factor of 1,600 MWh-ac/MW-dc.
11. (Line 9 / Line 10).
12. The solar community widely recognizes that it takes at least 5 acres of land to install one MW of solar. However, a review of recent large projects approved by the Maryland Public Service Commission leads to a larger estimate of 8 acres per MW. While the installation of solar may disturb land up to 8 acres per MW, much of this disturbed land is restored following construction leaving about 5 acres/MW as the final footprint on the land.
13. (Line 11 / Line 12).
14. Data from Appendix 2a, table 2(a).

15. Solar arrays may be placed on vacant, underutilized, or agricultural land. The model assumes 60% of the solar will go on agricultural land, but this is a guess of future siting.
16. (Line 13 / Line 14).

APPENDIX B: TASK FORCE MEMBERS AND STAFF

MEMBERS

Members	**Names**
Maryland Department of Agriculture	Joe Bartenfelder
Maryland Department of Commerce	Ewing McDowell
Maryland Department of the Environment	Ben Grumbles
Maryland Department of Natural Resources	Jeannie Haddaway-Riccio
Maryland Department of Planning	Sandy Schrader
Maryland Department of Transportation	Earl Lewis
Maryland Energy Administration	Mary Beth Tung
Maryland Environmental Service	Charles Glass
Public Service Commission	Joey Chen
Maryland Farm Bureau Representative	Billy Bishoff
Maryland Farm Bureau Representative	Janet Christensen-Lewis
MACo Representative	Alex Butler
MML Representative	Terry McGean
Solar Energy Industry	John Finnerty
Wind Energy Industry	Andrew Gohn

STAFF

Governor's Office	Andrew Cassilly
Governor's Office	Hannah Schaeffer
Governor's Office	Stephen Schatz
Maryland Energy Administration	Ryan Opsal
Power Plant Research Program, Maryland Department of Natural Resources	Helen Stewart

APPENDIX C: ACRONYMS

AHJ	Authority Having Jurisdiction
ARES	Authorized renewable energy source
BGE	Baltimore Gas and Electric Company
CARES	Clean and Renewable Energy Standard
CEJA	Clean Energy Jobs Act
CHP	Combined Heat and Power
COMAR	Code of Maryland Regulations
CPCN	Certificate of Public Convenience and Necessity
DGS	Maryland Department of General Services
DHCD	Maryland Department of Housing and Community Development
DNR	Maryland Department of Natural Resources
EJ	Environmental Justice
EV	Electric Vehicle
FCA	Forest Conservation Act
FERC	Federal Regulatory Energy Commission
GGRA	Greenhouse Gas Emissions Reduction Act
GHG	Greenhouse Gas
IAC	Interagency Commission on School Construction
ICC	International Code Council
IECC	International Energy Code
IGCC	International Green Construction Code
ISA	Interconnection Service Agreement
kV	kilovolts
Labor	Maryland Department of Labor
LEED	Leadership in Energy and Environmental Design
LRP-MAP	Land Restoration Program Project Site Mapping
MALPF	Maryland Agricultural Land Preservation Foundation
MDA	Maryland Department of Agriculture
MDE	Maryland Department of the Environment
MDOT	Maryland Department of Transportation
MDP	Maryland Department of Planning
MDV-SEIA	Maryland-DC-Delaware-Virginia Solar Energy Industries Association

MEA	Maryland Energy Administration
MES	Maryland Environmental Service
MGBC	Maryland Green Building Council
MOU	Memorandum of Understanding
MW	Megawatts
MWh	Megawatt-hour
NEM	Net energy metering
NERA	New England Ratepayer Association
NREL	National Renewable Energy Laboratory
NZE	Maryland Net Zero Energy
NZE	Net Zero Energy
ORECs	Offshore Renewable Energy Credits
ORES	New York Office of Renewable Energy Siting
Pepco	Potomac Electric Power Company
PJM	PJM Interconnection, LLC
PJM Queue	PJM's Interconnection Queue
PPRP	Power Plant Research Program
PSC	Maryland Public Service Commission
PULJ	Public utility law judge
PV	Photovoltaics
REC	Maryland-certified Renewable Energy Credit
REDS	Renewable Energy Development and Siting
RGGI	Regional Greenhouse Gas Initiative
RPS	Renewable Portfolio Standard
SEGS	Solar energy generating systems
SEIF	Strategic Energy Investment Fund
USGBC	U.S. Green Building Council
VCP	Voluntary Cleanup Program
WMATA	Washington Metropolitan Transit Administration
ZEV	Zero Emission Vehicle