STATE OF NEW JERSEY

BOARD OF PUBLIC UTILITES

In the Matter of a Solar Successor Incentive Program Pursuant to P.L. 2018, C.17, Docket Nos. QO19010068 and QO20020184 –

Comments of Lightstar Renewables, LLC Regarding the New Jersey Board of Public Utilities Siting of Solar Facilities on Agricultural Property in the Successor Program (September 8, 2020)

Lightstar Renewables LLC (Lightstar) respectfully submits these Comments to the New Jersey Board of Public Utilities (Board) regarding the Board's development of the Successor Program.

Lightstar is an experienced solar developer that is developing solar projects in the Northeastern United States. In New Jersey, Lightstar is interested in the development of grid-supply projects to be installed on marginalized/under-performing agricultural property. Lightstar recommends that the Successor Program confer incentives upon grid supply projects constructed on marginalized farmland and for "dual-use" solar projects.

Scope of Comments

]While the Board's Request for Comments identifies several specific questions, it also encourages stakeholders to address Successor Program policy recommendations beyond the focus of the specific questions in the Request. Lightstar's comments submitted herein focus on the policy issue of ensuring that the Successor Program include incentives for grid-supply projects to be constructed on marginalized agricultural property and/or under a farmland/solar dual-use scenario.

Draft Capstone Report and Dual-Use Solar

The "New Jersey Solar Transition Draft Capstone Report: Successor Program Review" (the Report) sets forth an ambitious overview of the possible structure of the Successor Program.

The Report, in several instances, discusses "dual-use solar agriculture" as an emerging technology[1], noting interest and discussion in previous stakeholder meetings and workshops for "solar installed on agricultural land and integrated with active crops to some extent."[2] In its introduction, the Report states that this, and other emerging technologies, should be investigated to "ensure that the Successor Program is sufficiently flexible to adapt to such potential opportunities for solar expansion"[3], and notes "solar co-located with agriculture production (dual-use) could provide various benefits and opportunities for growth, but may pose unique cost profiles and design variations."[4] The Report requests additional information on dual-use solar (and other technologies), and recommends close work between BPU and developers to investigate this category of project.[5]

[1] p.80, p. 36, p. 2

[2] p. 11

[3] p.2 "Investigate emerging technologies and new solar business models (e.g., energy storage, dual-use solar agriculture, floating solar, building-integrated photovoltaics, and project repowering), and ensure that the Successor Program is sufficiently flexible to adapt to such potential opportunities for solar expansion."

[4] p.32

[5] p. 80. "Emerging or future new (sub)segments: Technological advancements, development innovations, and regulatory and rulemaking adjustments may create opportunities for new project segments or subsegments. Stakeholders pointed to innovations and solutions such as dual-use solar-agriculture, floating solar, and building-integrated PV. Cadmus recommends gathering unique cost and design aspects as well as benefits and impacts of these projects to determine the optimal way (if any) to integrate them into the Successor Program."

p.86 "Maintain robust estimates of project economics. The BPU should work closely with developers to gather other data sources for compiling project costs that align with actual project economics and market trends. This could include a mix of recent project costs, price discovery in auctions for larger projects, stakeholder-submitted estimates, and/or stakeholder cost surveys. In particular, the BPU should seek market input on the following: Reasonable, incremental costs for different structures and technologies (such as Community Solar, carport systems, landfill/brownfield, dual-use solar on agricultural land, floating solar, and building-integrated PV)."

The Report, though, is ultimately silent on whether dual-use solar projects, including farmland "Subsection r" projects, should be included in the Successor Program.

Lightstar takes this opportunity to strongly recommend the inclusion of, and incentives for, dual-use solar projects under the Successor Program, and to provide additional recommendations and information regarding dual-use solar generally, project qualification, classification of projects and associated costs, and examples from other jurisdictions.

Solar and Marginal Farmland – An Overview

Lightstar recommends that under the Successor Program, the Board enable grid supply projects dual-use based to be eligible for the Successor Program incentives. A "dual-use" project would require the subject property to be used for both agricultural and renewable energy production. Consistent with recommendations in the 2019 New Jersey Energy Master Plan (EMP), "dual-use" projects should be encouraged to be sited on a property where the non-preserved farmland area is considered marginal, and in which a substantial portion of the property's arable area remains available for agriculture use.

An ideal site for a dual-use project is a farm property that has been marginalized (due to property location, property characteristics, etc.). Marginal farmland should be considered as existing farmland that is not likely to remain in agricultural use because of the area where it is located or because the property's characteristics cause the agricultural use of the property to be underperforming and uneconomic. These farmland properties are likely to be lost to commercial or residential development in the coming decades.

In order to determine whether a farmland property is "marginal" and thus, a well-suited dual-use candidate for participation in the Successor Program, the following should be evaluated:

- the location of the property and the type of the properties in the area;

- the likelihood that the property is a target for development;
- the physical characteristics of the property and how they affect farming the property;
- the current agricultural use of the property, and
- the soil conditions of the property.

Indeed, the EMP supports development of solar resources on marginalized farmland. Specifically, EMP "Goal 2.1.8, Coordinate permitting and siting processes for renewable energy development" encourages the siting of solar facilities on marginalized sites, defining 'marginalized' as areas of "constrained social and economic value," and further identifying marginalized farmland by "poor soil conditions" or underutilization. The goal goes on to state "there are areas of non-preserved farmland that may have poor soil conditions, or non-pristine open spaces that are underutilized, both of which could potentially serve as host sites for solar projects while not compromising the state's commitment to preserve open space"[6]

Thus, the EMP itself confronts the somewhat false dichotomy of the farm vs. solar debate. While there are tradeoffs, and while solar sites should not displace prime farmland and pristine open space, solar can be developed on marginalized farmland while conforming to, and

[6] Goal 2.1.8: Coordinate permitting and siting processes for renewable energy development:

> In order to enhance smart siting of solar, the state should better define areas that are considered marginalized, such that they have constrained economic or social value. **For example, there are areas of non-preserved farmland that may have poor soil conditions, or non-pristine open spaces that are underutilized, both of which could potentially serve as host sites for solar projects while not compromising the state's commitment to preserve open space**. Dual-use opportunities may exist for siting solar on areas of open space or non-preserved farmland, but they must be examined carefully for environmental impacts. NJDEP and NJBPU will coordinate landuse policy for solar siting with the New Jersey Department of Agriculture to identify sites that could be used to expand New Jersey's commitment to renewable energy while still protecting the state's farmland and open spaces.
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> These policy initiatives, as well as other locational analysis, should be evaluated for potential inclusion as part of an upgraded transparent and predictable interconnection process. Proper incentives consistent with EMP goals will maximize ratepayer value and ensure appropriate compensation

2019 NEW JERSEY ENERGY MASTER PLAN, *Pathway to 2050,* pages 112-113 (Emphasis supplied)

potentially supporting, New Jersey's long-term goal of open space preservation. A BPU decision supporting preferential siting of dual-use solar as part of the Successor Program supports the implementation of the goals of the EMP.

(Appended is a list of publicly available resources that discuss some of the characteristics used in the determination of the quality of agricultural land, and whether it should be considered "prime" or "important," or marginal.)

Dual Use Solar – A Unique Opportunity

The rationale behind policy which supports dual-use solar is simple: (1.) a landowner will switch from a dis-economic land use to an economic land use given the opportunity, (2.) over the next decade many marginal farmland owners in New Jersey will be approached to develop structures on their property, and (3.) these landowners wish to preserve their non-preserved farmland, but absent increased economics or additional revenue, they will be forced to sell or change properties to a higher economic value use. The economic benefit from the dual-use property (namely the rent paid to landowners) will act as an economic bulwark, and enable the preservation of non-preserved farmland that would otherwise be lost to development. The revenue that a property owner can derive from the generation of solar electricity can make the difference between needing to sell an underperforming non-preserved farmland property for development and maintaining a portion of the property for farming or as open space.

In view of this, under the Successor Program the Board should establish (1.) regulations (or a policy set forth in a Board Order) to allow Successor Program incentive qualification of dual-use solar projects, and (2.) incentives to encourage dual-use projects.

Qualification for Successor Program

In developing the Successor Program, it is not necessary for the Board to be constrained by the limitations in the Legacy SREC program regarding the issuance of SRECs to projects that have been found to be connected to the "distribution network." For example, the provisions of Subsection r of the Solar Act (N.J.S.A. 48:3-87r) are applicable to the award of SRECs, not the incentives that are to be developed under the Successor Program. Therefore, it is not necessary for the Board to subject dual-use Successor Program projects to be subject to the requirements of Subsection r which is intended to address eligibility for incentives under the Legacy SREC program.

However, if the Board determines that being "connected to the distribution system" is prerequisite for Successor Program eligibility, the Board can continue to apply the Subsection r type process, provided the Board's policies/regulations are modified, as required, to eliminate any restrictions against the use of farmland property for projects that meet dual-use requirements projects and are revised to reflect the closure of the Legacy SREC program.

In an effort to achieve the State's dual goals of preserving farmland space and promoting the development of renewable energy sources, Lightstar encourages the Board to include in the Successor Program farmland properties that satisfy the definition of "dual-use" projects. In order to qualify as a dual-use project, it will be necessary for the project applicant to demonstrate that the farmland property is a "marginal", underperforming agricultural property that would likely be lost to development if a solar project was not available to support the continued use of the property for agricultural purposes.

Further, in addition to demonstrating that a property is "marginal" in order to qualify as a dual-use project it would be necessary to show that (i) for a Farmland Sharing (as discussed

below) that a material portion of the property's arable area remains available for agriculture use, (ii) for a Pollination Habitat (as discussed below) project that the habitat is robust and has a maintenance and performance monitoring plan, or (iii) for a fully integrated project (as discussed below) that the property under the elevated panels will be continually used for agricultural purposes.

Incentive Design and Project Classification and Costs

In designing the dual-use incentive, the Board should recognize there is a spectrum of types of dual-use projects, and establish a range of different incentive values for such different dual-use projects. The incentive would ideally be administratively, as opposed to competitively set, to allow more certainty in project development, economic forecasting and EPC costing.

The incentive value should recognize that (1.) the costs for dual use projects are greater than traditional ground-mount grid supply projects, and (2.) that the extent of the increased costs for such project is related to the extent of the facility's physical integration of agricultural and solar operations. For example, a "dual-use" project that involves the continued agricultural use of a portion of the farmland while dedicating a separate portion of the farmland to the installation of ground mount solar panels is a less expensive form of dual-use than a project that would involve the installation of elevated panels that would permit continued agricultural use underneath the panels.

We recommend that three (3) classifications of permitted dual-use projects be included in the Successor Program:

1. Farmland Sharing: Projects that require a portion of the property's farmland to continue to be available for agricultural purposes while a portion of the property is dedicated to a grid supply ground-mount solar project.
2. Pollination Habitat: Projects that require the creation of a *robust* pollination habitat integrated into the property. An ongoing habitat maintenance and performance monitoring program would be required for each project.
3. Fully Integrated (*Agrivoltaics*): Projects that require the simultaneous use of the same property for an integrated agricultural and solar use. Panels would be required to be elevated so that the land below the panels can be used for agricultural purposes.

These project types should be awarded different levels of incentive under the Successor Program in recognition that costs vary based on project type. The least costly is likely to be Farmland Sharing, while the costliest dual-use project is the Fully Integrated Agrivoltaics model.

For a Farmland Sharing project additional costs are de-minimis, and would largely be comprised of limited cost increases to engineering and design, and additional costs related to soil and other types of studies.

For a project involving the creation of a pollinator habitat, the increased costs are attributable to (i) developing a robust pollination habitat, (ii) maintaining the habitat, and (iii) ongoing performance monitoring. We estimate that these activities will increase a solar project's installation costs by about $0.01/W-dc to $0.025/W-dc (~$10,000 - $25,000 per MW-dc, depending on layout and site conditions), and that, for a sample 3 MW project, increases to operating expenses would be low , an approximately 1-2% increase above normal O&M, or roughly $500 per MW-dc per annum.

For a Fully Integrated project that involves crop growth or grazing under solar panels, it will generally be necessary for the panels to be elevated several feet above the ground. The increased costs associated with the purchase and installation of elevated structures, as well as their operation and maintenance, is significant. The cost to obtain project funding (*i.e*. cost of capital) is likely to be higher for a Fully Integrated dual-use project due to the limited experience that equity investors have with dual-use projects. Also, additional project costs are likely to include increased irrigation equipment costs, equipment needed to facilitate tilling and harvesting under the panels, and additional labor for crop maintenance and harvesting. The actual additional costs for any particular project will vary based upon the circumstances of the project.

Lightstar estimates that the increased cost (capital expenses and increased operational expenses related to maintenance and monitoring and) for a Fully Integrated dual-use project can be as much as 50% more than a traditional ground-mount project; costs can vary considerably across projects due to site conditions and design of installation.[7] As a result, the incentive for Fully Integrated dual-use projects should be higher than the incentive value for Farmland Sharing Projects.

Finally, while we do not recommend that the Board establish a maximum size for dual-use projects, we recommend that project incentives should be tailored to recognize that economies of scale that can be realized in larger projects. For example, for projects above 5 MWs, the incentive should decline based upon the size of the project, *e.g.* projects between 5 MWs and 10 MWs would receive an incentive at a designated percentage below the incentive for projects between 0-5 MWs.

[7] As a rough example, the equivalent EPC cost of a "non-agrivoltaic" project in the 3MW-dc size can range from $1.10-$1.25/W-dc – An Agrivoltaic project can have the equivalent cost, taking into account increases in OPEX and financing costs, of $1.50 - $1.90/W-dc, depending on numerous factors.

Fully Integrated Projects under SMART[8]

The Fully Integrated project approach could contain conditions similar to the Massachusetts SMART program, with the exception of the 2 MW maximum size requirements. In Massachusetts, the Department of Energy Resources (DOER) has established a solar incentive program that enables solar facilities to qualify as an "Agricultural Solar Tariff Generation Unit" ("ASTGU") under the Solar Massachusetts Renewable Target (SMART) Program. In order to be an eligible ASTGU, the solar facility must, among other things:

- not interfere with the continued use of the land beneath the canopy for agricultural purposes;
- be designed to optimize a balance between the generation of electricity and the agricultural productive capacity of the soils beneath;
- be a raised structure with a minimum height of 8 feet above ground allowing for continuous growth of crops underneath the solar photovoltaic modules;
- demonstrate that the maximum sunlight reduction from the panel shading on land directly beneath, shall not be more than 50% of baseline field conditions, and
- AC rated capacity not greater than 2 MWs.

Projects eligible for participation in the SMART Program receive a fixed "Base Compensation" amount per kWh subject to "rate adders" or "subtractors" based upon the characteristics of the project. The Base Compensation is set either based upon a competitive bidding process or by the SMART Program. Solar projects are eligible to qualify as an ASTGU, which is defined under 225 *CMR* 20.02 as "a Solar Tariff Generation Unit located on Land in Agricultural Use or Prime Agricultural Farmland that allows the continued use of the land for agriculture." Projects qualifying as an ASTGU receive a compensation adder of $0.06 per kWh.

[8] See also, Cadmus report, p. 17 "Conversely, SMART offers adders that incentivize the development of projects on landfills, as parking lot canopies and in dual-use agriculture."

(See Massachusetts Department of Energy Resources' "Agricultural Solar Tariff Generation Unit" ("ASTGU") program under SMART Program, 225 *CMR* 20.00).[9]

As mentioned above, projects qualifying as an ASTGU receive a compensation adder of $0.06 per kWh. This equates to almost $1.5mm of performance-based incentives per MW-dc or $700,000-$900,000 on a present value basis, or $0.70 - $0.90/W-dc, versus an assumed EPC cost of $1.2-$1.4/W-dc in Massachusetts. While this is a fulsome incentive, it should be noted:

1. Anecdotal evidence, as well as the lack of (publicly reported) development of privately owned ASTGUs under the MA SMART program, suggests this incentive amount has not been sufficient to spur growth of Agrivoltaics in Massachusetts under SMART, and
2. Direct comparison of specialized incentives across jurisdictions with differing base compensations incentives, incentive payment timings, program structures and regulations, and markets and costs for labor can be difficult.

Conclusion of Comments

In order to advance the State's goals of preserving farmland and promoting renewable generation development, Lightstar urges the Board to incorporate dual-use projects into the Successor Program.

In order for a dual-use project to be approved, the applicant should be required to demonstrate that (1.) agricultural or pollinator activity will be preserved on the site, (2.) the farmland is marginalized, and but for the dual-use project the property would likely be lost to development. In designing incentives for dual-use solar projects, the increased and differing

[9] *Note on Pollinator Habitat adder*: Under the SMART program, solar projects which are not ASTGU, but which act as pollinators, receive between $0.0025-$0.0015 per kWh as an adder – this lower adder, compared to ASTGUs, is reflective of the much lower construction and maintenance costs, discussed earlier. Under SMART, Pollinators are certified by the state university system, UMASS. 225 CMR 20.00

costs of the various types of dual-use facilities should be taken into account in setting incentive levels.

Including dual-use projects in the Successor Program is a unique opportunity to advance the State's renewable energy policy goals without compromising, and actually supporting, the goal of preserving farmland properties.

Sources related to the categorization of farmland quality:

7 CFR § 657.5 - Identification of Important Farmlands. *Legal Information Institute*, Legal Information Institute, www.law.cornell.edu/cfr/text/7/657.5.

NRCS Prime and Other Important Farmlands, www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcseprd1338623.html.

Identification of Important Farmland. August 4, 2020. https://prod.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_010970.pdf

Natural Resources Conservation Service. *New Jersey Important Farmlands Inventory | NRCS New Jersey*, www.nrcs.usda.gov/wps/portal/nrcs/detail/nj/soils/?cid=nrcs141p2_018875.

Natural Resources Conservation Service. *Prime Farmland*, www.nrcs.usda.gov/wps/portal/nrcs/detail/null/?cid=nrcs143_014052.

Guideline Regarding the Definition of Agricultural Solar Tariff Generation Units. April 26, 2018. https://www.mass.gov/doc/agricultural-solar-tariff-generation-units-guideline-final/download

Land Types for Solar Development. August 4, 2020. https://www.mass.gov/files/documents/2016/10/sm/solar-land-use-guidance-and-information.pdf