LIGHTSTAR

To: ILLINOIS POWER AGENCY
From: LIGHTSTAR RENEWABLES, LLC
RE: RESPONSE TO ILLINOIS POWER AGENCY REQUEST FOR COMMENTS ON BEHALF OF LIGHTSTAR RENEWABLES, LLC
Date: FEBRUARY 28, 2022

Background

Lightstar Renewables (Lightstar/LSR) is a community solar developer based in Boston, MA focused on solar for both the land and the community. Lightstar has a portfolio of agrivoltaics projects being developed across the nation. Our team is pioneering the farm-centered and cost-effective deployment of community solar sized agrivoltaic systems in markets with decarbonization goals and land-use concerns similar to Illinois. Lightstar believes that Illinois farmers, municipalities, and ratepayers could benefit from this innovative project type. There are existing agrivoltaic systems in the United States and worldwide totaling 3GW. However, *there are currently no commercially operating agrivoltaic farms in Illinois*. Federally funded research is underway at the University of Illinois to highlight opportunities for optimizing agrivolatics in the state and nationwide.[1]

Conservation and agricultural groups are turning to agrivoltaic systems not only for a sustainable solar siting solution, but as a rural economic development tool and providing an opportunity to lower the financial barriers to entry for farmers of color and new farmers. With the largest intergenerational land transfer already underway as the Boomer generation starts to retire, agrivoltaics allows generational farmers to not only provide themselves with secure passive retirement income through solar land leases, but an opportunity to keep their prime farmland in production for another generation and earn income from an agrivoltaic system. This can minimize costs associated with farming that often prevent new farmers from joining the profession.

Research has been conducted over the last decade by institutions and the federal government on the promise of agrivoltaics on crop outcomes, soil health, and solar panel

[1] https://sustainability.illinois.edu/usda-funds-agrivoltaics-project/

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efficiency. Enabling biodiverse vegetative and crop ground cover under the solar panels is known to improve soil health, especially when regenerative farming techniques are

employed. The panels promote further root spread, water retention and a cooler microclimate. The addition of pollinator plants can improve local agricultural yield and support the surrounding ecology.

Studies show that soil water retention is dramatically improved by solar panel coverage, especially during high heat and low rainfall. Solar panels also reduce runoff that lead to crop loss in times of increased precipitation. By reducing water loss and run-off, there is less demand on both public and private water supplies. An agrivoltaic system on Oregon State University's campus saw a 90% increase in soil biomass and 328% increase in water efficiency in the areas under the solar panels.[2] Another system in France saw a savings of up to nearly 30 percent of water evapotranspiration.[3]

Shading from the solar panels provides multiple additive and synergistic benefits, including reduced plant drought stress, greater food production and reduced PV panel heat stress. In 2021, The University of Arizona research saw tomatoes benefitted from panel shade and peppers fruited 3x more than in an open field.[4] A system in Germany saw combined land use of solar and wheat crops on two hectares of land increase land productivity by 60% compared to only planting wheat on one parcel and siting solar on the other. [5] At the University of Massachusetts Amherst, which has a similar hardiness zone range as Illinois (5a-7b), research conducted, although it remains unpublished, since 2011 has shown that peppers, kale, and broccoli were recorded to either have the same or better outcomes than crops in an open field. [6]

Jack's Solar Garden Developments, LLC (JSGD), in Longmont, CO, is the largest commercially operating agrivoltaics project in the United States. JSGD recently had a successful harvest of 8,300 lbs of food crops harvested from July-October 2021.[7] The design of the array was modestly modified with trackers and a portion of the array with 8 and 6 foot racking, to keep construction costs down. There was minimal soil preparation,

[2] journals.plos.org/plosone/article?id=10.1371/journal.pone.0203256
[3] www.nature.com/articles/s41893-019-0377-0
[4] https://www.governing.com/next/transforming-farms-food-production-with-solar-panels.html
[5] pv-tech.org/wp-content/uploads/2021/02/Fraunhofer_ISE_AGROAPV_Grafik_20112017_final_en_diagram-scaled.jpg
[6] www.farmlandinfo.org/wp-content/uploads/sites/2/2020/08/NE-SSS-Dual-Use-Examples.pdf
[7] https://sproutcityfarms.org/jacks-solar-farm

with a cover crop seeded the prior season and compost used as a farm would on a non-agrivoltaic parcel. The result was surprising crop success, significantly less water used, and the farm managers will carry forward lessons learned into the next season. JSGD will

be participating in the University of Illinois – National Renewable Energy Lab research grant recently awarded. Crop variety and water conservation outcomes will be among the focuses on this research.[8]

Agrivoltaics Definitions

Lightstar recommends that the IPA adopt a clear and Illinois-specific definition of agrivoltaics, the definition below is being considered in New York and New Jersey and is adopted from the Fraunhoefer Institute for Solar Energy Systems.[9]

"Agrivoltaic System" – A configuration where solar photovoltaic energy generation and agricultural production (crops, livestock, and livestock products as defined by (505 ILCS 5/3.02) (from Ch. 5, par. 1003.02)) are directly integrated and simultaneously producing within the same parcel.

"Dual-Use System" –" A configuration where solar photovoltaic energy generation is performed in conjunction with an alternative land use within the same land area."

Section 7 – Adjustable Block Program Comments
(Section 7.4.3 – CS Project Selection)

In the Joint Solar Parties' comments, the JSP urges the IPA not to use a points-based system to choose between projects submitted at the "same time." This is because a points-based system would lead much of the CS program back into a lottery. Lightstar agrees with this assertion. However, should the IPA choose to continue with the points-based selection criteria, Lightstar would be supportive but requests a modification as follows:

[8] https://sustainability.illinois.edu/usda-funds-agrivoltaics-project/
[9] https://www.ise.fraunhofer.de/en/key-topics/integrated-photovoltaics/agrivoltaics.html

1. **Given the outsized benefits that agrivoltaics contributes agriculturally, ecologically and economically, Lightstar requests that an additional point be added to the agriculturally-sensitive provisions criteria** (from 2 points to 4 points).

    - Agrivoltaics can simultaneously address food access issues for EJ communities, while helping consumers save on their electric bill. Agrivoltaics can also introduce sustainable, climate-resilient practices into Illinois farm communities. In particular, environmental justice communities could see additional spillover benefits from dual-use farms utilizing regenerative practices.

    - While the proliferation of community solar has been renowned by the solar industry, advocates and the U.S Department of Energy[10], concerns have arisen that it could cut into food production. And some counties nationwide have now prohibited large-scale photovoltaic arrays from replacing agricultural land. Lightstar's innovative agrivoltaics model addresses these concerns. This will ensure that robust agrivoltaics projects are competitive and properly differentiated from pollinator-friendly only projects.

    - Lightstar proposed that agrivoltaic projects would be eligible for a total of 4 total points (an extra 2 points)

2. Alternatively, if the IPA will not be adding additional points for categories, Lightstar requests that agrivoltaics be eligible for the IPA's selection criteria which includes: "projects that are committed to agriculturally -sensitive provisions, such as providing a pollinator friendly habitat (2 points)."

- Lightstar requests that agrivoltaics be included and considered as a part of the agriculturally- sensitive provisions criteria due to its benefit to farmers, regional food systems, soil health, pollinators and agricultural land preservation.
- Lightstar respectfully recommends this because of the IPA's stated preference for keeping prime farmland in production. Lightstar's recommendation ensures that converting productive farmland to solar farms is not a zero-sum

[10] https://www.energy.gov/eere/solar/national-community-solar-partnership

game. I.e., to the extent that cropland can coexist with solar farms in Illinois, the state can and should encourage this model.

Should the IPA choose to forgo the points selection criteria and instead create pilot adders for "built environment" which would include rooftops, brownfields, carports, floating PV, etc. Lightstar requests that "agrivoltaics dual-use" be added to the list of qualifying adders.

3. Lightstar Urges a Diverse Project Selection Criteria and Process.

- Lightstar supports the IPA's proposed 20% developer cap. Lightstar does not take a position on whether the 20% developer cap should be modified, however a developer cap should remain to advantage a larger group of developers and prevent a small group of larger developers from being awarded capacity, despite early submissions of projects.

- In the Joint Solar Parties, the JSP recognizes that "ties that exceed program capacity within the same day of application are likely to be smaller than the original lottery but will still be possible." As a result, the Joint Solar Parties suggest that project maturity, as measured by the last date of the site control documentation, the effective date of the interconnection agreement, and the land-use permit (if required), as a secondary screen. The JSP asserts that this will allow projects that have been waiting longer, to go forward more quickly. Lightstar believes that this assertion will disadvantage new, innovative project development and application in the State of Illinois. The Public Utilities Act (220 ILCS 5) has addressed the reality of long-term projects, from the 2016 ABP program languishing on a waitlist, by creating a 250MW waitlist program which opened December 14, 2021 (See 220 ILCS 5/16-342 (c)(5)(iv)(B)). It is important to ensure that all projects, whether new or old are placed on equal footing. Accordingly, Lightstar requests that project maturity should not be the only criteria utilized after first-come first-served submission and in the absence of the points selection system. Lightstar requests that the IPA keep this in mind when finalizing its project selection decisions.

Lightstar respects that the IPA is not proposing any specific geographic price adders for distributed generation projects. Lightstar respectfully disagrees with the Agency's assertion that "the split of blocks between utility service territories adequately addresses

program-wide/statewide geographic diversity." While the Agency expects that the creation of the new category of Community-Driven Community Solar will address community solar's lack of geographic diversity in the state, this is not guaranteed. To fully ensure geographic diversity, Lightstar recommends the inclusion of geographic REC price adders for qualifying projects on "the built environment." Lightstar concurs with the JSP on this matter.

Lightstar recommends that the Built Environment adder could encompass a wide variety of land uses, including projects in Equity Eligible Communities, **dual-use/agrivoltaics**, rooftops, parking lots, carports, canopies, abandoned lands, brownfields, water bodies (floating solar) and possibly other sites. A single, small adder would be easy to implement, and would be a more direct means of fostering projects that are located in urban areas that represent broader geographic diversity and avoid prime farmland. This adder could be called the "Preferred Siting" adder.

Lighstar would like to thank the IPA for carefully considering these requests. Should the Agency have any questions or need clarification on any of these items, Lightstar can be reached at Theodora.Okiro@Lightstar.com.

Sincerely,

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Lightstar Renewables, LLC

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