

PINELANDS CLIMATE COMMITTEE MEETING

This meeting was conducted in-person and available remotely.

The public could view/comment through Pinelands Commission YouTube link:

<https://www.youtube.com/c/PinelandsCommission>

Zoom Meeting ID: 812 4703 3977

July 19, 2023

MINUTES

MEMBERS IN ATTENDANCE: Chairman Mark Lohbauer, Jerome Irick, Theresa Lettman, Edward Lloyd

MEMBERS ABSENT: Commission Chair Laura E. Matos, Alan Avery

STAFF PRESENT: Susan R. Grogan, Stacey Roth, Jessica Lynch, John Bunnell, Ernest Deman, and Dawn Holgersen. Also present were Dorian Smith and Janice Venables with the Governor's Authorities Unit.

1. Call to Order

Chairman Lohbauer called the Pinelands Climate Committee meeting to order at 9:30 a.m.

2. Adoption of the April 19, 2023 Climate Committee meeting minutes

Commissioner Irick moved the adoption of the minutes of the April 19, 2023 Committee meeting. Commissioner Lettman seconded the motion. All voted in favor.

3. Dual-Use Solar Energy Pilot Program

Presentation by the New Jersey Board of Public Utilities (NJBPU)

Laura Scatena, from the NJBPU, introduced Scott Hunter, Veronique Oomen, and Dr. Diane Watson.

Mr. Hunter said that BPU's dual use solar energy pilot program has not begun stakeholder meetings, therefore, only current statutes and public domain information will be discussed.

He said that NJBPU has entered into a partnership with Rutgers University to facilitate the development and implementation of the pilot program. He said that Rutgers received funding to install three demonstration projects. He said those projects are not part of the pilot program, but the pilot program will benefit from the research of these projects.

Mr. Hunter said that the pilot program has not yet begun. He said during the process to establish the pilot program, staff will make recommendations on a framework, take comments from stakeholders, then make recommendations to the BPU who will make policy decisions for the

pilot program.

Mr. Hunter said that Dr. Watson is managing the Competitive Solar Incentive Program that is currently operating. He said that information will be provided during the presentation.

Ms. Scatena delivered a presentation on the Dual-Use Solar Energy Program (*attached to these minutes and available on the Commission's website through the following link: <https://www.nj.gov/pinelands/home/presentations/BPU%20Dual%20Use%20Solar%20Presentation%20July%202023.pdf>*).

She said that the State has a history of encouraging the use of solar energy. She said that the State has surpassed 4.5 gigawatts (GW) of installed capacity. She said that New Jersey is in the top ten states nationwide for solar installed capacity. She said there are approximately 180,000 total solar installations statewide and that 2022 was a record year for solar, with a total of 455 megawatts (MW) installed, including over 800 commercial installations.

She said the goals for solar generation come from the State's Energy Master Plan. She said the target for 2030 is 12.2 GW and the target for 2035 is 17.2 GW.

Ms. Scatena described goals that were outlined in the Solar Act of 2021. She said there is a goal of 7.5 GW of solar installation by 2026. She said the Act mandates a new program for grid supply solar and created siting rules for such.

She said the target of installing 750 MW of new solar capacity would be comprised of 300 MW of net metered solar, 300 MW of grid supply solar, and 150 MW of community solar. She said the Act also established the Successive Solar Initiative.

She said that legislation mandating a new Dual-Use Pilot Program was also enacted in 2021, under the Dual-Use Solar Act. She said both the Solar Act and the Dual-Use Act build on the Clean Energy Act of 2018.

She said as part of the Dual-Use Solar act, the NJBPU must consult with the Secretary of Agriculture and the New Jersey Department of Environmental Protection (NJDEP) for the establishment of Dual-Use solar rules. She also said that Dual-Use projects, also known as agrivoltaics, will be established on unreserved farmland selected through a competitive process.

Ms. Scatena described the definition of "Dual-Use solar energy project" as having two parts: the solar energy aspect of a facility and that the land must remain in active agricultural or horticultural production.

She said the Pilot Program will last at least three years with the possibility of fourth and fifth years. She said some of the goals established are an individual project limit of 10 MW in direct current (dc) with annual capacity targets to be determined. She said there will be a 200 MW(dc) total capacity cap for approved pilot projects up to three years with a potential 50 MW per additional twelve month period for years four and five. She also said there will be incentive requirements for consideration of project selection.

She said the some of the Pilot Program objectives are to select a diversity of crops and varying size projects, determine the economic feasibility of different types of agrivoltaics and establish a permanent program.

Ms. Scatena said that siting of Dual-Use solar facilities will be prohibited on lands in the Preservation Area and Forest Area of the Pinelands, freshwater or coastal wetlands, and the Highlands Preservation Area. She said there will also be a siting prohibition on prime agricultural soils or soils of statewide importance, unless it is a part of a research study conducted by a New Jersey public research institution of higher education, as approved by the NJBPU and the Secretary of Agriculture.

She said that NJBPU and the Secretary of Agriculture can approve a waiver based on unique factors that make the project consistent with the character of the specific parcel. She said that consultation with NJDEP and the New Jersey Department of Agriculture (NJDA) would be required, and a petition must be filed. She said that NJBPU plans to engage with the Commission for guidance on this process.

She said there are rules for the development of an application and process for incentives. She said the Dual-Use Act outlines specific criteria the NJBPU must consider. She gave examples such as proposals for monitoring the quality of agricultural or horticultural use of the land, minimizing negative impacts to farmland, technical feasibility and innovation, quality of the research, and various sizes and diverse types of agricultural and horticultural production.

Ms. Scatena said the next steps for the Pilot Program include stakeholder engagement, a straw proposal, a board order, program solicitation, rule adoption, and research results of pilot projects.

She said the Dual-Use Permanent Program will be adopted by rule following the end of the Pilot Program. She said it will be part of the permanent successor to the solar incentive program established in the Solar Act of 2021.

Commissioner Irick commented that many farmers in Atlantic County are interested in the Pilot Program. He suggested that siting prohibition should include wetland buffers.

He mentioned that for farmland assessments, certain income must be generated by the farm. He asked if the payment received from the solar facility can be included in the farm income. He also asked if the NJBPU had a list of areas where the grid is unable to accept excess energy generation.

Mr. Hunter said that most of those questions would be addressed during stakeholder meetings. He said that definitions of items such as active agricultural/horticultural use and areas prohibited would be addressed in the straw proposal.

In response to the question on grid capacity, Mr. Hunter said that the NJBPU recently passed an initiative for Atlantic City Electric to invest in increasing the capacity of the distribution circuits. He said there is a hosting capacity map available that shows what circuits are off-limits,

constrained, or unconstrained. He said that NJBPU is also working with information from stakeholder meetings to develop rule recommendations to streamline and facilitate grid interconnection of renewables. He said there is further work being conducted called the Grid Modernization Proceeding. He said more information can be found on the NJBPU Clean Energy website (www.njcleanenergy.com).

Commissioner Lloyd expressed his thanks to the NJBPU for their presentation and asked how the Commission can work with the board to promote the program.

Ms. Scatena replied that there will be stakeholder meetings. She said that NJBPU intends to have separate consultation with the Commission.

Ms. Grogan said that the Commission is scheduled to meet with staff from NJBPU in August for discussion.

Chairman Lohbauer commented that the process to develop the pilot program may take several years. He said that they would likely need to research several growing seasons. He asked if one of the goals of the Pilot Program is to determine which crops perform best with agrivoltaics.

Ms. Scatena replied that the intent of the Pilot Program would be to study the various crops and photovoltaic equipment for optimal performance. She said the NJBPU is working with the Rutgers to determine what the research will look like.

Chairman Lohbauer asked if other states had research available that could be used when developing the Pilot Program. Ms. Scatena replied that there is information available throughout the nation and globally.

Chairman Lohbauer commented that there may not be much information available regarding Pinelands native crops.

Lucy Bullock-Sieger, of Lightstar Renewables, replied that studies have been conducted with blueberry crops. She also said that blueberry crops have performed well under agrivoltaic arrays during those studies. She said the type of soil that works well for agrivoltaics is also the soil that are ideal for blueberries. She also said there is better water retention in the soil as a result of the photovoltaic panels, and that also reduces water consumption. She also said that the panels create an environment that protects the crop from frost, therefore extending the growing season.

Chairman Lohbauer echoed Commissioner Irick's concern for grid capacity. He suggested the use of energy storage equipment to preserve the excess power generated.

Veronique Oomen, from the NJBPU, said that storage is a key component of the energy master plan, and a storage incentive plan is currently in development. She said under the Competitive Solar Incentive program there are benefits for energy storage.

At 10:00 a.m. Janice Venables joined the meeting and at 10:08 a.m. Dorian Smith left the meeting.

Chairman Lohbauer asked how the Commission could help. He suggested the Commission could perform outreach to private farmers. Ms. Oomen replied that outreach is helpful. She said that it is likely that solar companies will perform some of the outreach.

Commissioner Irick shared his personal experience with solar panels. He said he observed a farm using tracker panels and utilizing the ground beneath the panels for animal grazing with much success.

Presentation by Lightstar Renewables, LLC

Ms. Grogan said that Lightstar Renewables has interest in developing Dual-Use solar in the Pinelands. She said the company has been involved in reviewing the NJBPU information, working with stakeholders, and providing input.

Ms. Bullock-Sieger introduced fellow Lightstar staff member Kelly Buchanan. She said they both work in New Jersey as chairs for the Coalition for Community Solar Access (CCSA).

She said that Lightstar currently has almost 300 MW of agrivoltaic projects in seven states. She said the company is currently in twelve markets. She said that observing the flooding in the northeast has increased the concern for climate change and economic resiliency.

In response to Commissioner Irick's concerns about wetlands, Ms. Bullock-Sieger said that their company does not install facilities in wetlands and wetlands buffers.

In response to Commissioner Irick's question regarding farm income, Ms. Bullock-Sieger said that inclusion of solar payments for income calculation is prohibited in the legislation. She said that she aided in crafting language for the legislation. She added that the definition of active agriculture is tied to the farmland tax assessment process. She said it was recommended by the New Jersey Farm Bureau (NJFB) as a compliance mechanism for annual audits.

Ms. Bullock-Sieger said that grid capacity is one of the two main items that is researched when looking to work with farms. She said that farmers' interest in the project is also evaluated.

Ms. Buchanan delivered a presentation on agrivoltaics for New Jersey Pinelands Farmers (*attached to these minutes and available on the Commission's website through the following link:*

<https://www.nj.gov/pinelands/home/presentations/Lightstar%20Dual%20Use%20Solar%20Presentation%20July%202023.pdf>).

Ms. Buchanan said that Lightstar is committed to working with farmers and farm managers to understand dual-use solar and how to leverage it for farm viability, food system stabilization, and ecological benefits. She said the company prioritizes sustainable siting and development practices while being an engaged member of the conservation and research community. She said that Lightstar provides resources, support, and opportunities for farming families. She said the company is also committed to ensuring valuable farmland remains in production.

Ms. Buchanan provided a brief outline of the dual-use legislation included in the NJBPU presentation.

She said the Dual-Use Solar Act provides the definition of agrivoltaics as energy generation facilities, structures, and equipment for the production of electric power from solar photovoltaic panels located on unpreserved farmland in agricultural or horticultural production that ensures the continued, simultaneous use of the land below and adjacent to the panels for agricultural or horticultural production.

She said that the land is required to remain in agricultural production through the life of the project, which may be over 20 years, retaining farmland tax assessment and subject to NJBPU compliance. She said that acceptable agricultural and horticultural activity is already defined by existing statute and farmland tax assessment acceptable use.

She said the lease payments and a portion of any available incentives for the solar project are paid to the farmer for the life of the project to support farm viability.

Ms. Buchanan said that research studies in Arizona indicated that tomatoes fruited more, and peppers fruited three times more than in an open field. She said the crops grown with dual-use solar were less water stressed than in open fields under equal water conditions. She said there was no reduction in production when water was decreased by 50% in the dual-use crops.

She said in Illinois it was determined that solar panels could protect plants in times of heavier precipitation. She said in Colorado, the first commercial dual-use solar project had a large successful harvest which saved on water use and provided a profit.

She said in Massachusetts that peppers, broccoli, kale, and Swiss chard all saw the same or greater yield despite a record dry and hot summer in 2017.

Ms. Buchanan said that Jack's Solar Garden in Longmont Colorado harvested 8,600 pounds under a slightly modified single-axis tracking array. She said the successful harvest included over 25 varieties. She said that it is a 1.2 MW project which has the capacity to power 300 homes.

She said that the University of Minnesota conducted a study that found that cattle thrived when dual-use solar was placed on grazing land. She said the research found that there was reduced heat stress in the cattle, and that increased the wellbeing of the livestock.

Ms. Buchanan said that a Lightstar project planned on the Thompson Family Farm in Wappinger, New York will produce 2.1 MW on 15 acres. She said the land historically was a hay field and the family plans to expand production to two acres of blueberries, two acres of strawberries, and six acres of squash. She said the construction is set to begin in September 2023.

She said that the company has plans with the DiMartino family in Montgomery, New York. The land historically was a hay field. She said the family intends to grow an additional year of hay

before transitioning to vegetable crops and growing pumpkins between seasons. She said the construction of the 2.1 MW project over fifteen acres is due to begin in the Winter of 2023.

Ms. Buchanan said that Lightstar has a project planned with the Phillips Family and a tenant farmer in Freeland, Maryland to construct a 3 MW project on 15 acres. She said the land had the same landowner and tenant farming family since 1900. She said the farm was historically used for soy production. She said the soy production will continue and the project is designed to provide clearance for a combine. She said that permits are planned for the summer.

Ms. Buchanan said that the CCSA, NJFB, American Farmland Trust, Rutgers, Duke Farms, New Jersey Conservation Foundation, and NJBPU have been working together since 2021 to collaborate on principles of an agrivoltaic program.

She said that the company consulted with legal professionals to draft suggestions for Pinelands Comprehensive Management Plan (CMP) amendments. She suggested the legal definition of dual-use solar be added to the CMP. She said another recommendation is to allow dual-use facilities as a permitted use on prime soils and active agricultural operations, as farmers need productive soil to produce crops.

She said that a stipulation should be made that dual-use facilities shall not remove more than two acres of trees for access roads and utility distribution infrastructure. She also said the CMP should provide clarity on the waiver process.

Commissioner Irick commented that a waiver process will be implemented through the NJDA. He suggested that the Commission be included in that process. He also commented that the permitting process in New Jersey is tough. He said that in New Jersey land use law, solar panels are described as an inherently beneficial use, making the permits easy to obtain. Commissioner Irick expressed concern on the decommissioning process for the solar projects.

Ms. Bullock-Sieger agreed with Commissioner Irick's comment on the ease of permitting. She said that Lightstar provides the funding, which is an industry standard, for the decommissioning of the solar panels. She said farmers expressed interest in having the agricultural fencing that is installed for the project remain after the decommissioning of the project. She said farmers also expressed interest in repurposing some of the metal posts to create hoop houses. She said that the state of New York has detailed requirements for the construction and decommissioning of agrivoltaics.

Commissioner Irick requested information regarding the costs for decommissioning an agrivoltaic project.

Chairman Lohbauer asked for clarification on lease payments to be made to the farmers. Ms. Bullock-Sieger said that Lightstar works with an agricultural consultant to ensure the payments are competitive to the market and include the value of their time. She said there is a payment structure in place that will pay the landowner for hosting the facility and a stipend payment to tenant farmers for maintenance.

She said that Lightstar is working with Senator Cory Booker, who is sponsoring legislation to ensure farmers receive farmland and conservation benefits while participating in dual-use solar.

Chairman Lohbauer remarked on the ability of Jack's Solar Garden to produce enough energy for approximately 300 homes. Ms. Bullock-Sieger replied that it is a conservative estimate. She also clarified that the large yield of crop on that farm was produced on a single acre of land over the course of half a season. She also said that the farm is being extensively researched for many aspects of agrivoltaic use.

In response to Chairman Lohbauer's question on the possibility of replacing panels and the end of their useful life, Ms. Bullock-Sieger said that it is possible. She also said that many photovoltaic panels have a lifespan of around 40 years. She said that recent legislation has made recycling programs easily accessible. She said that currently up to 80% of a solar panel is recyclable.

Ms. Bullock-Sieger said that the design of Lightstar's project includes the use of single axis tracking arrays, which are an industry standard. She said that costs are a concern, and she commends NJBPU for ensuring that the costs are competitive with the least impact on ratepayers. She said the biggest difference between a standard solar array and one for agrivoltaic use is the increased clearance area that is established when placing agrivoltaics. She said that there is standard agrivoltaic equipment, which is less costly, and that costs should decrease as more equipment becomes standard.

Discussion of current CMP requirements and potential amendments

Ms. Grogan delivered a presentation on solar energy facility requirements in the Pinelands Area (*attached to these minutes*).

She said that while there are advancements in legislation for solar energy, there are some limitations in the CMP.

She said in the Preservation Area District (PAD), Special Agricultural Production Area (SAPA), and the Forest Area (FA), solar facilities as a principal use are limited to closed landfills, hazardous waste sites, and resource extraction sites. She said a large solar array would not be permissible on other lands within those areas.

Commissioner Irick asked that if a farm maintains agriculture as the principal use, could the solar arrays be considered an ancillary use. Ms. Grogan said that solar arrays are allowed as an accessory use in all areas of the Pinelands, but the definition of accessory use indicates the solar facility must be used primarily for the needs of the farmer. She said that definition would not permit dual-use solar.

Ms. Grogan said that in the Agricultural Production Area (APA), where dual-use solar is likely to be proposed, solar facilities as a principal use are limited to 20% of a parcel, with a 10-acre maximum under current CMP rules. She said most of the projects in the previous presentation were around 15 acres, which would not be permissible under the current rules. She said facilities

also must be sited to avoid prime farmland and lands with high ecological value, which would be a direct conflict of the objective of the Dual-Use Solar Pilot Program.

She said that in the Rural Development Area (RDA), which would be the next likely area for dual use solar, solar facilities as a principal use may be developed on any previously disturbed portions of a parcel. She said that additional clearing would be permitted, not to exceed 30% of a parcel. She said facilities also must be sited to avoid lands with high ecological value. She said the rules for this area would provide some opportunity for dual-use solar, but there is less agricultural use in this area.

Ms. Grogan said that the Committee has previously discussed possible CMP amendments for solar facilities. She said that one recommendation is to exempt principal solar facilities on rooftops and parking lots. Another recommendation is to establish specific limitations on clearing and tree removal for principal solar facilities by requiring installation on existing impervious surfaces such as rooftops and parking lots before allowing clearing for ground mounted facilities and requiring tree replacement on- or off-site.

She said the most relevant CMP amendment recommendation would be to expand siting opportunities for principal solar facilities in the RDA and APA and/or at old mines in the PAD and FA. She said that since amendments are far from being enacted, the Commission must work within the context of current rules when collaborating with the NJBPU on the dual-use rules and pilot program. She said that much of the legislation mirrors many of the restrictions of the CMP but mentions the ability to petition for a waiver. She said that current CMP rules do not allow for a waiver of these rules. She said waivers are only permitted under extraordinary hardship and for compelling public need. She suggested the Committee might want to consider a special agreement with the BPU to facilitate implementation of the Pilot Program in the Pinelands Area.

Commissioner Irick suggested creating a pilot program, as it may be easier than rule amendments. Ms. Grogan said that creating a pilot program requires the same rulemaking procedure as any other CMP amendments. She said a Memorandum of Agreement (MOA) with NJBPU could be explored to allow some properties in the Pinelands to participate in the Dual-Use Pilot Program. She said those concerns would be discussed during the upcoming meeting with NJBPU.

Ms. Roth said that a deviation MOA could be used to permit participation in the Pilot Program, but it would require offsets.

Ms. Grogan said the intent of today's presentations was to help establish an understanding of the framework, review examples of how the pilot program can be implemented and consider rule changes that could be introduced. She said that staff will report back to the Committee after the upcoming meeting with NJBPU.

Ms. Roth said that staff will be tracking the process for the Pilot Program as well as the Grid Modernization Proceeding. She said that staff also participated in stakeholder meetings for an incentive program that had waiver requirements and could provide guidance for handling the Pilot Program process.

Ms. Grogan said implementing the Commission's own pilot program is a possibility but may be difficult with limited staff resources. She said the Pilot Program from the NJBPU is likely to gather all of the information that the Commission would need and that the Commission should work on identifying a way to permit the Pilot Program to proceed in the Pinelands so that rule changes could be introduced in the future.

Commissioner Lloyd commented that he learned a lot from today's presentations and expressed appreciation for having Lightstar Renewables and the NJBPU provide such presentations. He said the Commission should think about what approach to take regarding dual-use solar and where it fits in the Committee's priorities for climate change rulemaking. He said that it is a significant but important undertaking.

Ms. Grogan said these topics are the reason the Commission needs to be given the funding necessary to hire additional staff, including a Climate Coordinator.

Chairman Lohbauer commented on the importance of dual-use solar as a possible benefit to native berry agriculture. He expressed optimism that dual-use solar could encourage farmers to continue their agricultural work.

4. Update on state initiatives

Ms. Grogan delivered a presentation of state and office initiatives (*attached to these minutes*).

She said that staff continue to work on the Commission's contribution to the Extreme Heat Resilience Action Plan (RAP) for the Interagency Council on Climate Resilience (IAC).

She said that hundreds of action items have been identified by state agencies. She said that rough draft descriptions written by the agencies were to be provided to the IAC in May/June 2023. She said that a meeting was held on July 11, 2023, where agencies were notified of a delayed schedule for completion of the RAP. She said a new schedule was not announced.

She said the Commission's RAP action item was to identify Pinelands native plant species that are more heat tolerant; encourage or require their use in landscaping plans associated with new development and work with municipalities to incorporate tree and other plant lists in their land use ordinances.

She said this action item may lead to future rule proposals or additional guidance documents and that the Committee should keep this in mind when creating the next work plan.

5. Update on office initiatives

Ms. Grogan said that a grant application was submitted to NJBPU on May 12th for two electric vehicle (EV) fast charging stations. She said staff participated in an EV charging webinar on July

13th, held by the New Jersey Zero Emission Incentive Program, sponsored by the New Jersey Economic Development Authority.

She said that two new NJBPU grant opportunities have been identified, the Clean Fleet EV Incentive Program, and the EV Tourism Program, with applications due November 30th.

She said the Commission purchased a new electric riding lawnmower that is in use and has received positive feedback.

Commissioner Irick inquired as to whether the Commission has funds to use for a consultant for climate matters. Ms. Grogan said that while new staff may not be hired, funding could be redirected from other priorities to pay for a consultant.

6. Public comment

Heidi Yeh, from the Pinelands Preservation Alliance (PPA), said the PPA is excited to hear about agrivoltaics and its unique use. She said the state is about a quarter of the way toward meeting the goal of 17 GW of installed solar generation facilities. She expressed concern on how much land would need to be used for solar energy facilities and expressed optimism on the increasing potential for agrivoltaics. She encouraged the Commission to make the changes necessary to allow testing of the technology so that berry farmers don't get left behind.

There being no further discussion, Commissioner Irick moved to adjourn the meeting. Commissioner Lettman seconded the motion. The meeting concluded at 11:23 a.m.

Certified as true and correct:



Dawn Holgersen
Office Assistant
September 11, 2023



Solar in New Jersey

Dual-Use Solar Energy Program: 2023 Update

N.J. Pinelands Commission
Climate Committee Meeting
July 19, 2023



- In July 2023, NJ surpassed 4.5 GW of installed capacity
 - 4.5 GW can generate ~5,193 GWh of electricity per year, or 7.11% of total retail sales
 - In the top 10 states nationwide for solar installed capacity
 - ~180,000 total solar installations statewide
 - 2022 record year for solar! (total 455 MW added, 800+ new commercial installations)
- Energy Master Plan targets:
 - 12.2 GW by 2030
 - 17.2 GW by 2035



Solar Act of 2021, P.L.2021, c.169

- 7.5 GW of solar installation by 2026
- Mandates new program for grid supply solar
- Siting rules for grid supply solar
 - Caps on farmland
 - Waiver requirement for forests, wetlands, Highlands & Pinelands
- Annual goal of installing 750 MW of new solar capacity:
 - 300 MW of net metered solar
 - 300 MW of grid supply solar
 - 150 MW of community solar

} Successor Solar Incentive (SuSI) Program

➤ Legislation mandating a new Dual-Use Pilot Program was enacted in 2021, under the Dual-Use Act, P.L.2021, c.170

Dual-Use Solar Act, P.L.2021, c.170

- July 7, 2021, P.L.2021, c.170
- BPU must establish rules: Dual-Use Pilot Program to inform a Permanent Program
- Consultative role for Secretary of Agriculture and NJDEP
- Dual-Use projects (also known as agrivoltaics) on unreserved farmland selected via a competitive process



Dual-Use Solar Act

Dual-Use Pilot Program

Definition of “Dual-Use solar energy project”



Image courtesy of the U.S. Department of Agriculture:
<https://www.climatehubs.usda.gov/hubs/northeast/topic/agrivoltaics-coming-soon-farm-near-you>

1. Solar energy aspect of a facility
2. Land must remain in active agricultural or horticultural production

- Under development (at least 3 years, with possible 4th and/or 5th year)
- Pilot goals as established by the Act:
 - Individual project limit of 10 megawatts in direct current (MW(dc))
 - Annual capacity targets (TBD)
 - 200 MW(dc) total capacity cap for approved pilot projects (3 years)
 - Potential 50 MW per an additional 12-month period (4th, 5th years)
 - Incentive requirements for consideration of project selection
- Pilot objectives:
 - Select a diversity of crops and varying size projects
 - Determine economic feasibility of different types of agrivoltaics
 - Inform permanent program
- May 2023: Grant agreement executed with Rutgers University Agrivoltaics Program (RAP) to help facilitate development and implement Pilot

Dual-Use Pilot Program

Dual-Use Pilot Program

Siting Prohibitions on Land

- Preservation area of the Pinelands
- Forest area in the Pinelands Comprehensive Management Plan
- Wetlands: freshwater or coastal
- Highlands preservation area

Waiver Process:

- Board approval required, following filing of petition
- Based on unique factors that make the project consistent with the character of the specific parcel
- Consultation with NJDEP and NJ Dept. of Ag required
- Strategy under consideration
 - Plans to engage with Pinelands Commission

Dual-Use Pilot Program

Waiver Process continued...

- Waiver considerations, examples such as:
 - Land use determinations/status from regulatory bodies, including Pinelands Commission
 - Maps, soils, erosion, negative impacts to farmland
 - Etc., TBD

Dual-Use Pilot Program

- Development of incentive structure, solicitation process
- Development of application & process (C.48:3-87.13)
 - Section 1c(1): Criteria (a) through (k)+
 - Examples:
 - Proposals for monitoring the quality of agricultural or horticultural use of the land
 - Minimizing negative impacts to farmland
 - Technical feasibility and innovation
 - Quality of the research
 - Various sizes and diverse types of agricultural and horticultural production

Dual-Use Pilot Program

General Overview of Next Steps

- Stakeholder engagement
- Straw proposal
- Board Order
- Program solicitation
- Rule adoption
- Pilot projects – research results



Dual-Use Permanent Program

- Adopt Dual-Use rules following end of Pilot
- Part of the permanent successor to the solar incentive program established (Solar Act of 2021)
- Key elements:
 - Capacity limits for individual projects and total program
 - Requirements to protect NJ's prime agricultural soils and soils of Statewide importance and the State's agricultural and horticultural diversity
 - Standards to minimize negative impacts to farmland
 - Provisions for continued active agricultural or horticultural use
 - Siting criteria and application process
 - Data Collection, Research, and Evaluation!

THANK YOU!



NJBPU: <https://nj.gov/bpu/>

NJ's Clean Energy Program, Solar Program:

<https://njcleanenergy.com/renewable-energy/home/home>

LIGHTSTAR

Agrivoltaics for New Jersey Pinelands Farmers

July 19, 2023



LIGHTSTAR

Meet the Team



Lucy Bullock-Sieger
VP of Strategy



Kelly Buchanan
Policy Manager

LIGHTSTAR



LIGHTSTAR

Lightstar's Agrivoltaic Commitments

- Working with farmers and farm managers to understand dual-use and how to leverage it for farm viability, food system stabilization, ecological benefits.
- Prioritizing sustainable siting and development practices and being an engaged member of the conservation and research community.
- Providing resources, support, and opportunities for farming families.
- Ensuring valuable farmland stays in production.

LIGHTSTAR

New Jersey Dual-Use Legislation



1. Enables up to 200MW of agrivoltaic (AgPV) solar in New Jersey during a pilot program lasting 36 months, a 12 month extension and an additional 50MW may be made available. After which, the legislation stipulates that a permanent AgPV program will be implemented. Rules were to be est'd December 2021, now 2023.



2. Allows up to 10MW of solar on prime, non-preserved farmland with the ability to retain the farmland tax assessment if it remains in production. Prime and SWI soil projects must be enrolled in a research study.



3. Prohibits siting in the area of the Pinelands unless a waiver is granted by Secretary of Ag, Department of Environmental Protection, and the project is consistent with the character of the parcel.

LIGHTSTAR



Intro to Agrivoltaics

“Energy generation facilities, structures, and equipment for the production of electric power from solar photovoltaic panels located on unpreserved farmland in agricultural or horticultural production that ensures the continued simultaneous use of the land below and adjacent to the panels for agricultural or horticultural production.” – NJ Dual Use Solar Act C.48:3-87.13, section h.

- The land is **restricted to remain in agricultural production** through the life of the project, often 20 years or more. Retaining farmland tax assessment and subject to BPU compliance.
- Acceptable agricultural or horticultural activity is **defined by existing statute** and farmland tax assessment acceptable use.
- **Lease payments and a portion of any available incentives (stipend) are paid to the farmer** for the life of the project (20+ years) to ensure agricultural activity and support farm viability.

Latest Solar Crop Research

Arizona – Hardiness zone 8a

Tomatoes fruited more, and peppers fruited **3x more** than in an open field. Additionally, dual-use grown crops were **less water stressed** than in open fields under equal water conditions, when water was decreased by 50% in the dual-use crops – there was no reduction in food production.

Illinois – Hardiness zone 5a-7b

In studying system designs – potential that in times of heavier precipitation dual-use systems could **protect plants**.

Colorado – Hardiness zone 3a-7a

First commercial dual-use project had a successful harvest – 8,600 lbs in half a season, **saving on water use**, and profiting from CSA. Research outcomes forthcoming.

Massachusetts – Hardiness zone 5a-7a

Conducting research since 2011 – the first dual-use project in the nation. Peppers, broccoli, kale, and swiss chard all **saw the same or greater yield** despite a record dry and hot summer in 2017.

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National Agrivoltaic Project Examples



Hayfield to Vegetables in One Season

- Planted July 2021, harvested 8,600 under a slightly modified single-axis tracking array.
- Successful harvest with over 25+ varieties
- Owned/operated by Jack’s Solar Garden Developments
- 1.2 MW of solar powering over 300 homes, 5 acres.

Jack’s Solar Garden – Longmont Colorado with Sprout City Farm Workers



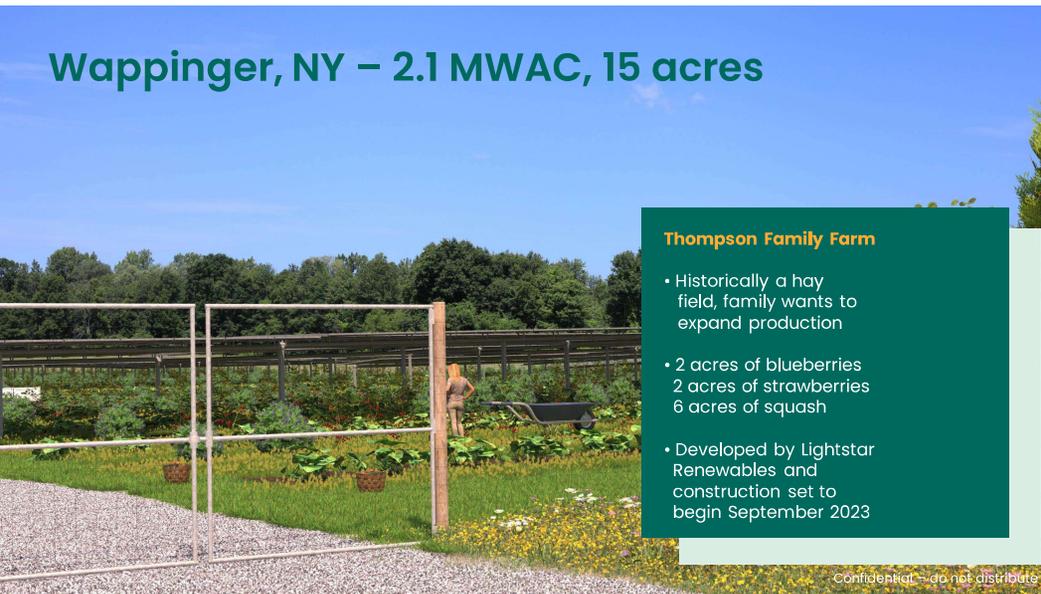
**Cattle + Solar –
University of Minnesota**

- Reduced heat stress in cattle
- Increased well-being of livestock
- Developed by the University of Minnesota



Lightstar Agrivoltaic Project Examples

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Wappinger, NY – 2.1 MWAC, 15 acres

- Thompson Family Farm**
- Historically a hay field, family wants to expand production
 - 2 acres of blueberries
2 acres of strawberries
6 acres of squash
 - Developed by Lightstar Renewables and construction set to begin September 2023

Confidential – do not distribute



Freeland, MD – 3 MWAC, 15 acres

- Phillips Family & Tennant Farmer**
- Same landowner and tenant farming family since 1900. Historically used for soy, and soy production will continue with the array wide enough for a combine.
 - Developed by Lightstar Renewables, permits Summer 2023

Confidential – do not distribute

Montgomery, NY – 2.5 MWAC, 15 acres



DiMartino Family

- Historically a hay field
- 1 year of hay, transitioning to vegetables
- Pumpkin production in between seasons
- Developed by Lightstar Renewables and construction set for Winter 2023

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Next Steps for the Pinelands



NJ AgPV Stakeholders

Working together since Fall of 2021, stakeholders have been collaborating on principles of an AgPV program and DOE implementation funding:

- Coalition for Community Solar Access (CCSA)
- New Jersey Farm Bureau (NJFB)
- American Farmland Trust (AFT)
- Rutgers University Agrivoltaic Research and Extension Program (Rutgers)
- Duke Farms
- New Jersey Conservation Foundation
- NJ Board of Public Utilities

Additional Information: What is needed for responsible AgPV?

- **Definition of AgPV** The technical definition of Agrivoltaics should follow the [Fraunhofer ISE's guidance](#). Municipalities can use the state definition for acceptable agricultural use in each state. Although apiaries and pollinators can be considered dual-use, LSR does not consider it agrivoltaics or "solar farming."
- **Ensuring a project remains in production** Developers should pay a meaningful stipend to the farmer for keeping the land in production. Utilize the tax assessment or similar for compliance. Cure periods, similar to other agricultural programs, should be allowed for projects that have fallen out of compliance due to extreme weather, crop failure, drought, and other typical agricultural challenges. Site plan approval can be revoked if project is not farmed.
- **Farm Logistics Plan** should be completed in direct consultation with the farmer or farm manager, and an agricultural extension agent and/or equipped third parties (NRCS conservation planner). Should be required for site plan approval.
- **Clear Construction Guidelines** these may include soils being tested for Ph levels, nutrients, etc. before and after construction. Engineering, procurement and contracting firms (EPCs) must have proper soil compaction practices outlined in the specs of each project. (NY State has excellent ones)
- **Decommissioning of Projects** includes soil testing, top soil treatment, and removal of all solar system materials, unless determined that some materials would be beneficial to the farming operation.
- **Agricultural Fencing** should be an acceptable option for all zoning purposes and is in line with federal electric code, as it preserves the rural character of the farm and lends an added benefit to farmers by keeping wildlife away from crops.
- **Setbacks for Operation** towns should consider the total farming operation and adjusting setbacks to allow for maneuvering of necessary farm equipment, while maintaining necessary screening.

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Allowing for AgPV

Initial considerations for amendments needed to the Comprehensive Management Plan, Section 7:50–5.36:

1. Dual-use projects shall be a permitted solar energy facility. "iv. On a parcel that operates in a dual-use capacity through the simultaneous use of the parcel for an agricultural or horticultural purpose and the installation and operation of a solar energy facility that produces solar energy. "
2. Dual-use facilities would be allowed on prime soils and on active agricultural operations. Farmers need productive soils to produce crops.
3. Stipulating that dual-use facilities shall not remove more than 2 acres of trees for access roads and utility distribution infrastructure.



AgPV Resources

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Additional Information: Resources for AgPV

Arenas-Corraliza et al, 2019. [Wheat and barley can increase grain yield in shade through acclimation of physiological and morphological traits in Mediterranean conditions](#)

Tazawa, 1999. [Effects of Various Radiant Sources on Plant Growth](#)

UMass Extension, 2019. [Expectations for Cranberry Growth and Productivity under Photovoltaic Panels](#)

Fraunhofer Institute for Solar Energy Systems, 2018. [Agrivoltaics: High Harvesting Yield in Hot Summer of 2018](#)

Adeh, Selker, & Higgins, 2018. [Remarkable agrivoltaic influence on soil moisture, micrometeorology, and water-use efficiency.](#)

[Barron-Gafford et al., Nature 2019 Agrivoltaics provide mutual benefits across the food–energy–water nexus in drylands. Outline of 2020–2021 Research Findings By Professor Greg Barron–Gafford, Arizona State University.](#)

[Laub et al. Agronomy for Sustainable Development 2022. Contrasting yield responses at varying levels of shade suggest different suitability of crops for dual land-use systems: a meta-analysis](#)

[Potenza et al. Agrivoltaic System and Modelling Simulation: A Case Study of Soybean \(Glycine max L.\) in Italy](#)

[Growing Crops Under Solar Panels? Now There's a Bright Idea.](#)

[American Farmland Trust Dual-Use Resources.](#)

[Agrivoltaic Research and Resource Clearinghouse](#)

[NREL 5 C's of Agrivoltaic Development](#)

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Solar Energy Facility Requirements in the Pinelands Area



July 2023

CMP Requirements PAD, SAPA and Forest Area

- Solar facilities as a **principal use** are limited to:
 - Closed landfills
 - Hazardous waste sites
 - Resource extraction sites

CMP Requirements Agricultural Production Area

- Solar facilities as a **principal use** are limited to 20% of a parcel (10 acre maximum)
- Facilities must be sited to **avoid** prime farmland and lands with high ecological values

CMP Requirements Rural Development Area

- Solar facilities as a **principal use** may be developed on any previously disturbed portions of a parcel
- Additional clearing is permitted, not to exceed 30% of a parcel
- Facilities must be sited to avoid lands with high ecological values

Possible CMP Amendments

- Exempt principal solar facilities on rooftops and parking lots
- Establish specific limitations on clearing and tree removal for principal solar facilities
 - Require installation on existing impervious surfaces (rooftops and parking lots) before allowing clearing for ground-mounted facilities
 - Require tree replacement on- or off-site

Possible CMP Amendments

- Expand siting opportunities for principal solar facilities in the RDA and APA and/or at old mines in PAD and FA
- Require that certain types of new development incorporate solar energy facilities
 - Major residential, commercial, industrial, public, redevelopment



Interagency Council on Climate Resilience

- **Extreme Heat Resilience Action Plan (RAP)**
 - Hundreds of action items identified by state agencies
 - Rough draft descriptions written by agencies and provided to the IAC in May/June 2023
 - Council meeting held July 11, 2023; agencies notified of delayed schedule for completion of RAP

Interagency Council on Climate Resilience

Extreme Heat RAP Action Item

- Identify Pinelands native plant species that are more heat-tolerant; encourage or require their use in landscaping plans associated with new development and work with municipalities to incorporate tree and other plant lists in their ordinances

Office Initiatives: EV Charging Station

Grant application submitted to BPU on May 12 for two DCFC (fast charging) stations

Staff participated in EV Charging 101 webinar on July 13, held by NJZIP (NJ Zero Emission Incentive Program), sponsored by the NJ Economic Development Authority

New BPU grant opportunities identified, with applications due November 30

- Clean Fleet EV Incentive Program
- EV Tourism Program