

Rutgers
Agrivoltaics
Program

New Jersey Agricultural Experiment Station

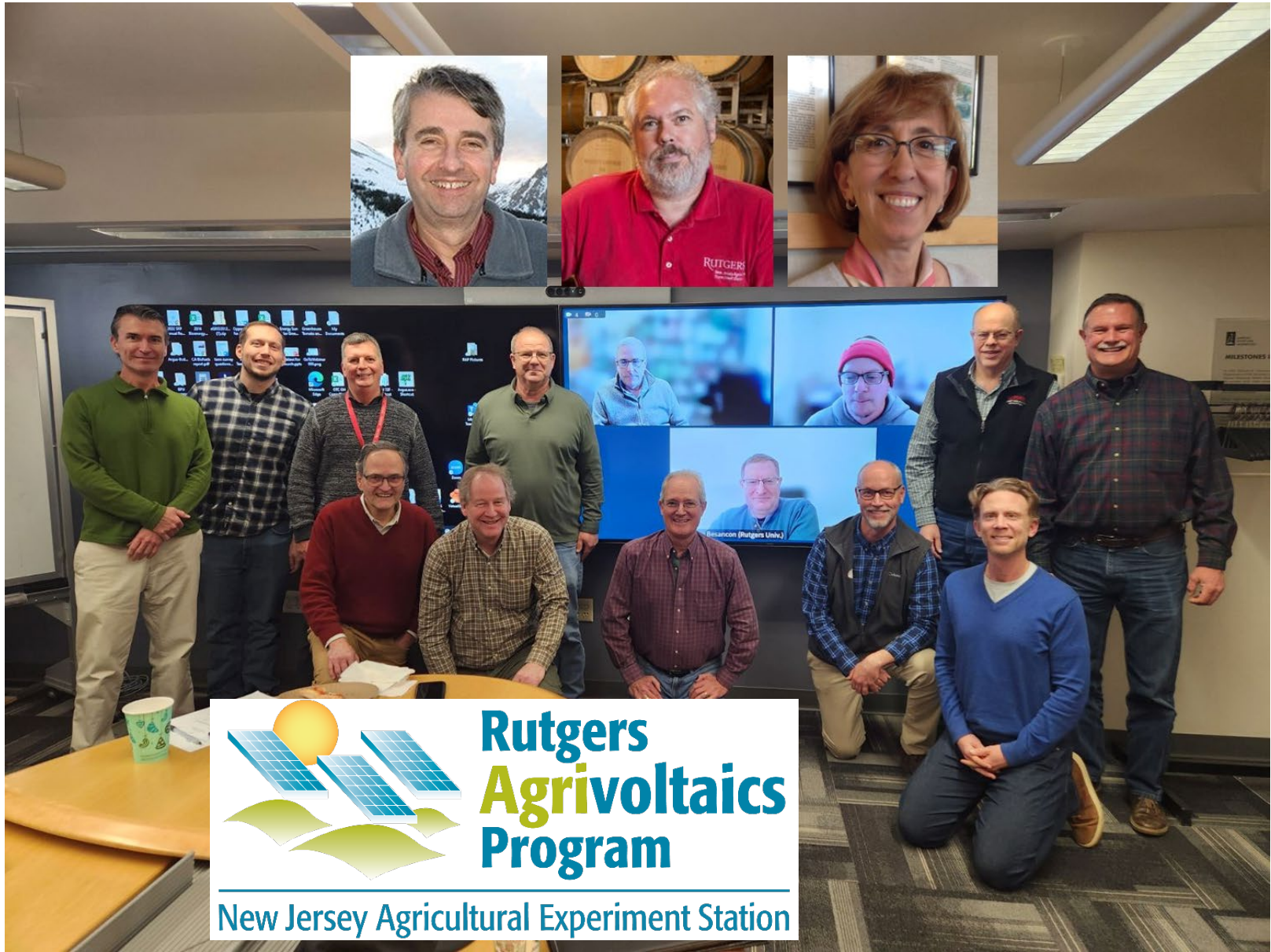


The Rutgers Agrivoltaics Program and the BPU Dual-Use Pilot Program

Dave Specca
RAP Lead

Rutgers Agrivoltaics Program Team(as of Dec 2023)

Plant Sciences, Animal Sciences, Engineering, Economics,
Social Science, Environmental Science, Meteorology



• Rutgers Agrivoltaics Program

➤ Formed in early 2021 before “Dual-Use” Pilot Program Legislation

➤ Funding received from:

- NJAES (\$100K start-up)
- State appropriation (\$2.9M)
- US DoE FARMS grant (\$1.6M)
- NJBPU (\$2.8M contract)

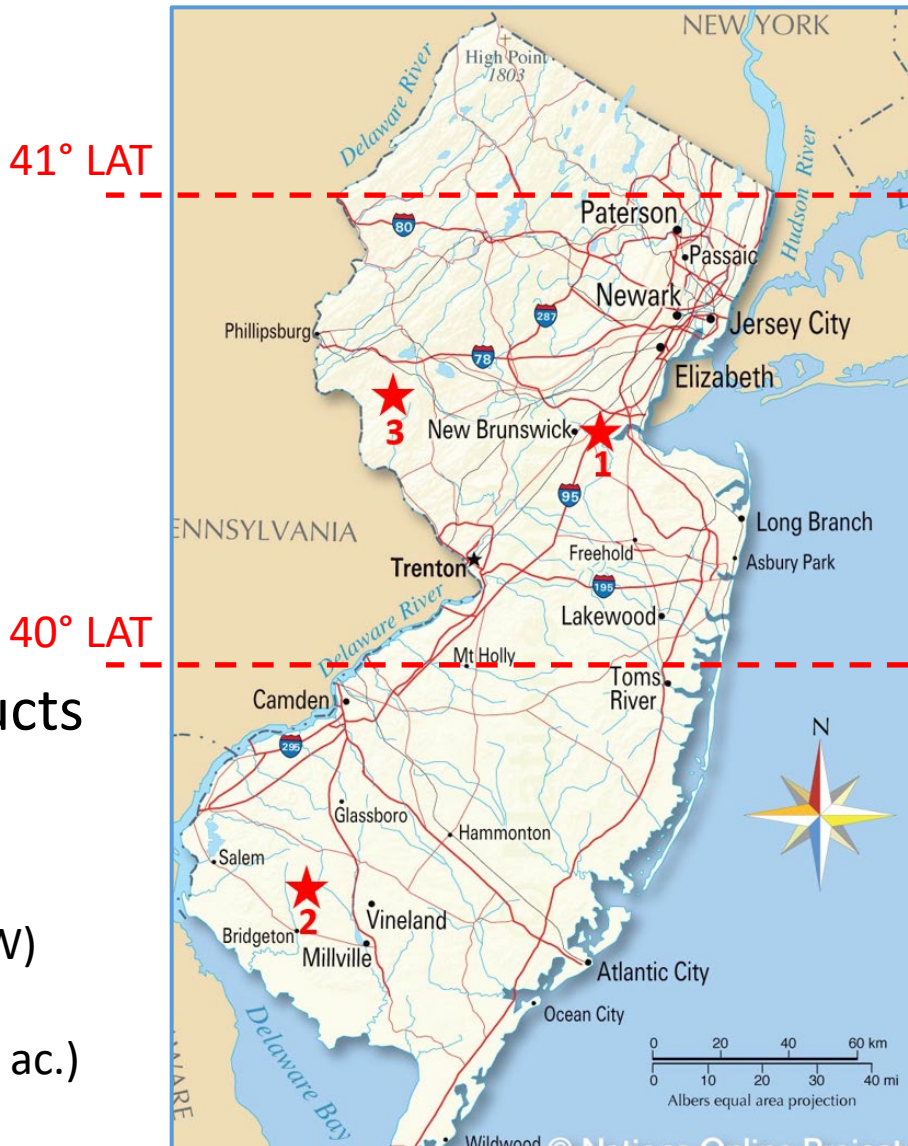
➤ Constructed three installations

1. Animal Farm (170 kW_{DC})
2. RAREC (255 kW_{DC})
3. Snyder Farm (94.5 kW_{DC})

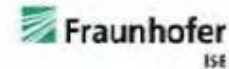
➤ Developer: Advanced Solar Products

New Jersey:

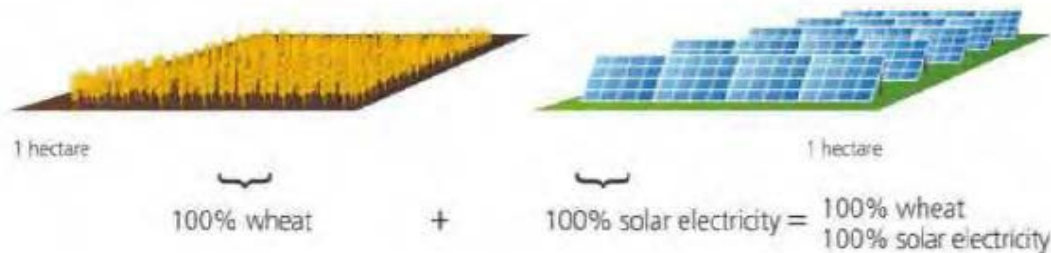
- Most densely populated state in the nation
- 8th state in terms of solar energy (4,411 MW)
- ~10,000 farms (\$1.5B in cash receipts)
- ~1/3 of the farmland is preserved (250,000 ac.)



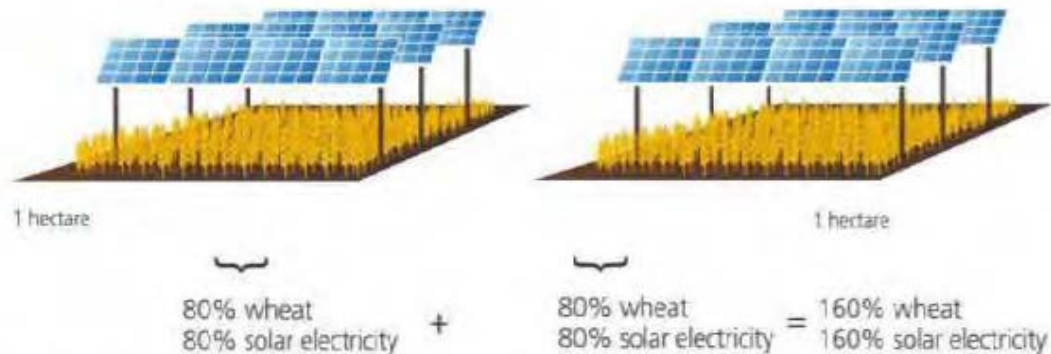
Agrivoltaics offers the potential for greater Land Use Efficiency



Separate Land Use on 2 Hectare Cropland



Combined Land Use on 2 Hectare Cropland: Efficiency increases over 60%



What is the Dual-Use Solar Energy Program?



NEW JERSEY
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- The Dual-Use Solar Energy Act requires BPU to develop rules and regulations for dual-use solar in New Jersey.
- BPU's process for developing new programs typically involves developing a Staff Straw Proposal, Draft Rules and Final Rules for public stakeholder input.
- BPU has contracted with the Rutgers Agrivoltaics Program (RAP) to assist with this process for dual-use solar.
- After stakeholders have provided their input, BPU will finalize the program, including eligibility criteria, operational requirements, and processes.



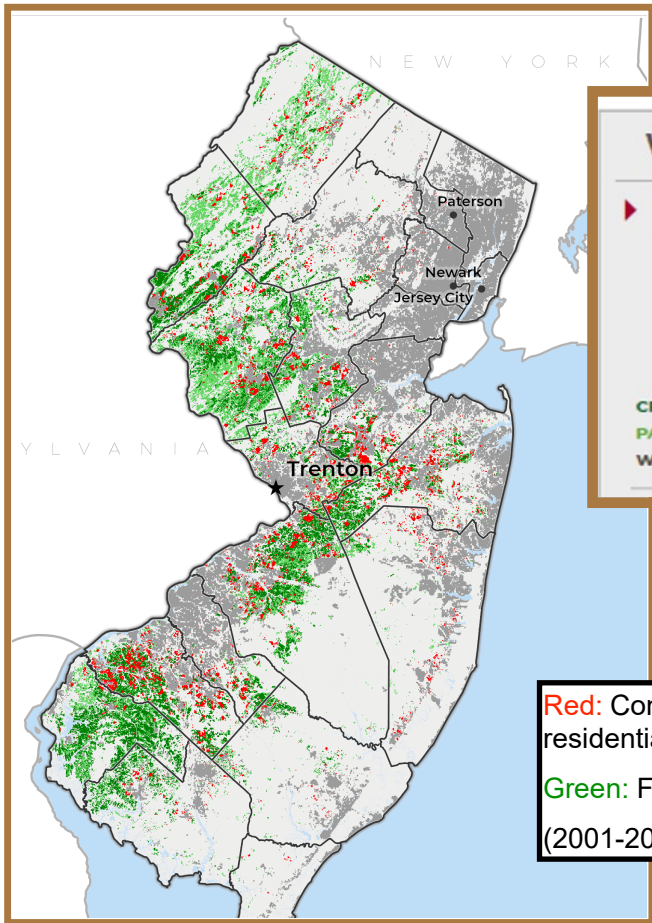
Solar energy is important to New Jersey's energy future



Rutgers Snyder Farm

- To meet the goals of the 2019 Energy Master Plan, the Solar Act of 2021 established a framework for a successor solar incentive program.
- To implement the Solar Act, BPU established two separate solar incentive programs:
 - Competitive Solar Incentive Program (CSI): for grid supply & net metered projects greater than 5 MW
 - Administratively Determined Incentive Program (ADI): for net metered projects less than 5 MW
- The CSI and ADI programs specify how certificates for solar energy production—Solar Renewable Energy Certificate-IIs (SREC-IIs)—are provided and how their value is determined.

Protecting farmland in New Jersey is very important!



Red: Converted to residential/urban uses
Green: Farmland (2001-2016)

Solar farm: No more room for agriculture



Naval Weapons Station Earle in Tinton Falls, NJ

Source: American Farmland Trust

The Dual-Use Solar Energy Act is the first New Jersey legislation to focus on how solar projects can be built without taking farmland out of production



Rutgers RAREC Farm

History of state legislation on solar and agriculture:

- 2009 legislation required the State Agriculture Development Committee (SADC) to establish rules for how farm-based solar would affect Farmland Assessment Taxation, Right-to-Farm, and farmland preservation.
- Energy Master Plan of 2010 recommended that solar incentives should not be provided to solar projects on farmland.
- Solar Act of 2012 gave BPU discretion to approve some solar projects on farmland. As a result, 200 MW of solar was installed (of 600 MW proposed), and the farmland for these projects was taken out of production.
- The Dual-Use Solar Energy Act aims to facilitate solar projects on working farmland, while keeping the farmland in continued agricultural production.

Dual-Use Solar Pilot Program: A program to advance and study agrivoltaics in New Jersey



Rutgers RAREC Farm

The Pilot Program:

- Seeks up to 200 MW generating capacity from dual-use solar in the first 3 years, with additional capacity if program is extended
- Will establish a process for BPU to solicit, evaluate and approve proposals to build and operate dual-use solar arrays on farmland in New Jersey
- Will last for at least 3 years, with a possible extension of 2 more years (5 years total)
- Has a 10-MW capacity limit for each dual-use project proposed
- Is intended to serve as the basis for a permanent dual-use program in New Jersey

Research through the Pilot Program will lay the groundwork for a permanent program

Dual-Use Solar Pilot Program: A program to advance and study agrivoltaics in New Jersey



Rutgers Animal Farm

In order to participate in the program, applicants:

- Must apply and be selected through a competitive process.
- Must commit to keeping farmland with dual-use solar in active agricultural/horticultural use
- May propose a monetary incentive in the form of an “adder” to the SREC-II (certificate for producing solar).

Dual-use projects:

- Cannot be sited on “prime agricultural soils and soils of statewide importance,” unless undertaken as part of a research study with a New Jersey agricultural institution
- Cannot be sited on wetlands or in Highlands/Pinelands preservation areas, unless a waiver is granted by BPU
- Cannot be sited on farms in the New Jersey Farmland Preservation Program

Application rounds will start with pre-qualification or Expression of Interest



Rutgers Snyder Farm

Pre-qualification

- At least three “rounds” for applications to the program are currently being considered—in 2025, 2026, and 2027. Additional rounds may occur in 2028 and 2029.
- Each round, interested parties would first be invited to submit an Expression of Interest (EOI) for their project, that provides:
 - A description of the land parcel
 - Preliminary array design
 - Proposed agricultural/horticultural use
- BPU (with RAP assistance) would provide feedback on pre-proposals, encouraging some and discouraging others

NJ Farm Characteristics by product classification for the Dual-Use Pilot Program

Product Classification	Farms (#)	Cropland (acres)	Total sales	Percentage of cropland
Crop production				
Oilseed and grain	810	161,641	\$77,955,000	39.3%
Other crop farming	2,143	78,489	\$43,913,000	19.1%
Vegetable and melon	895	65,221	\$226,747,000	15.8%
Fruit & tree nut, nursery & floriculture	1,886	60,085	\$514,812,000	14.6%
Strawberry and berry farming	212	13,751	\$97,852,000	3.3%
Animal production				
Cattle, beef, and dairy farming	792	24,272	\$35,816,000	5.9%
Other animal production	1,728	4,467	39,441,000	1.1%
Horse and other equine	1,312	3,726	28,781,000	0.9%
Total	9,778	411,652	\$1,065,317,000	100.0%

Source: 2017 Census of Agriculture, USDA, National Agricultural Statistics Service

After feedback on pre-proposals, applicants may submit a Full Application with a Construction, Operations, Monitoring and Project Research Plan (COMPR)

COMPRs will include many elements, including:

- Specifications for the planned solar array:
 - Array type: fixed-tilt, single-axis tracking, vertical bifacial, etc.
 - Design specifications: row height, orientation, spacing, etc.
 - Fencing plans
- Plans for continued agricultural/horticultural use:
 - At a minimum, project land must maintain farmland tax eligibility
 - Applicants must report on pre-construction soil quality, to assess erosion potential during and post-construction
 - Applicants must propose a means of monitoring and verifying continued agricultural/horticultural use throughout the project
 - Applicants should also propose research on crop performance in conjunction with dual-use solar (conducting research is mandatory for projects in ADAs)

Very important!!



Rutgers RAREC Farm

Dual-use solar projects will be eligible for increased incentives, relative to conventional, non-agricultural solar



Rutgers Animal Farm

- Eligible projects would qualify for a baseline incentive in an existing ADI or CSI market segment and propose in the dual-use solicitation an additional incentive (“adder”), due to:
 - Construction costs for dual-use solar that are higher than for conventional solar
 - Costs associated with research and data collection that are not covered by a collaborator (like a university)
 - Reduced electricity production due to array design for dual use
 - Declines in crop yield or revenue due to the presence of the array

Dual-use solar can provide benefits to farmers... and New Jersey

- Farmers derive new revenue, or reduced costs, from generating electricity.
- In addition to existing solar incentives, farmers may receive an added economic incentive from being part of the Dual-Use Pilot Program.
- Crop yield and performance can continue to be strong with dual-use solar.
- *All while producing 100% clean energy for New Jersey*



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Rutgers Snyder Farm



Thank You!

David Specca
Rutgers Agrivoltaics Program Lead
Rutgers EcoComplex
1200 Florence-Columbus Rd.
Bordentown, NJ 08505
609-360-0107
specca@njaes.rutgers.edu
agrivoltaics.rutgers.edu