Rutgers Agrivoltaics Program Information Sheet 2026-03

July 2026

Combining Animal Husbandry with Agrivoltaics

Agrivoltaics (a.k.a. dual-use solar) can combine raising livestock with solar energy generation, while keeping the land in active agricultural production, and producing a steady income from renewable electricity generation. Early applications included grazing sheep on solar farms. While sheep can do an excellent job keeping the grass short, the high panel density used in solar farms typically prevents other types of agriculture. Modifying solar farms by increasing the panel row spacing and elevating the panels above the ground, more opportunities can be created for a variety of agricultural practices, including animal husbandry with animals other than sheep.

Why Agrivoltaics?

1. Provides supplemental income
    a. With the generated electricity, farmers can reduce their own electricity bills
    b. Depending on arrangements with the local utility, excess electricity can be sold to that utility
    c. Solar systems generate income that can be more predictable than income from farming
    d. Agrivoltaics may generate rental income when solar developers operate the solar system
2. Allows the land to remain in active agricultural production
    a. Farmers are able to keep their land instead of selling it for development
    b. Supports local agriculture, thus reducing food transportation from other states
    c. Keeping agricultural land in active production reduces suburban sprawl into agricultural landscapes
3. Generates renewable energy
    a. Helps meet clean energy goals set forth by local, state, and national governments
    b. Contributes to the net-zero emission goals set for 2050 by the United Nations
    c. Contributes toward a greener future

Common Types of Agrivoltaic Systems

1. Fixed-Tilt Installations
   This configuration consists of South-facing panels (for locations in the northern hemisphere) installed with a fixed tilt angle (relative to horizontal) and are often installed low to the ground. The tilt angle is typically site-specific and can depend on local latitude and array design (designers often aim to minimize the impact of shade patterns from one row of panels onto an adjacent row) (Marcy, 2018)
2. Single-Axis Trackers
   Panels are mounted on elevated torque bars that are typically mounted in a North-South orientation and only have one axis of rotation, allowing the panels to face East in the morning, to lay flat (horizontal) at solar noon, and face West in the afternoon. In most cases, single-axis trackers generate the most electricity of the three systems discussed here, but may need more maintenance for the moving parts.
3. Vertical Bifacial Installations
   Bifacial panels are able to generate electricity when the sun hits either the front or back of the panels. While both sides may not generate the same amount of electricity under the same light conditions, their stationary and vertical mounting system requires a small footprint and therefore creates minimal obstruction to farming operations.
4. Panel Mounting Configurations
   Solar panels can be mounted in the portrait (P, with the longest side of the panel in the vertical orientation) or the landscape orientation (L, with the longest side of the panel in the horizontal orientation). In addition, panels can be mounted in single rows (e.g., 1P, 1L), or in multiple rows (e.g., 2P, 6L)

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Considerations for Specific Animal Species

1. Cattle
   Electric fencing may be required to keep the animals from touching the panels and/or electric wiring. In the case of vertical bifacial panels, additional shading may be needed to prevent animal stress during the middle of the day during the summer months. Cattle require access to an adequate water supply and animal rotation may be needed to avoid overgrazing.
2. Small Ruminants
   Sheep are particularly effective for grass management underneath panels that are installed relatively low to the ground. Goats are not recommended for low-to-the-ground systems due to their tendency to chew on electric wiring and their curious nature that prompts them to climb onto the panels.
3. Poultry
   One of the main considerations for raising poultry is preventing predation. Fixed-tilt installations aid in protecting the birds, just like protective housing. Rotating birds may be necessary to facilitate regrowth of grazed areas.

Examples of Installations

Evaluating agrivoltaic installations is important before considering installing such system on any farm. Here are a couple of producers, domestically and abroad, who have successfully implemented agrivoltaic installations.

1. Hathaway Farms & Maple Ridge Meats — Benson, VT
   Once a dairy operation, Hathaway Farms turned to beef production and constructed a processing facility on-site. The processing facility, Maple Ridge Meats, constructed a 5-acre 500-kW ground-mounted, net metered solar array in collaboration with the solar developer Green Lantern Solar. The land under the panels is used for cows during calving season, and yearling grazing thereafter. The farm charges land rental fees to Green Lantern Solar. This installation was the first of its kind in Vermont and a picture is shown in Figure 1.

Figure 1. A 500 kW fixed-tilt (2P) solar array (2,300 modules) covering almost 5 acres of a Benson, VT farm allows cattle to graze in areas shaded by solar panels. Tilt angle: 30°, minimum clearance: 8 ft, posts extend up to 12 ft underground. Completed in June, 2016.
Photo credit: Green Lantern Solar.

2. Kohirā Solar Farm — Far North District, New Zealand
   Kohirā Solar Farm is the first of its kind in New Zealand and its utility-scale 33 MW_{DC} capacity provides energy to the national grid. The system uses bifacial panels mounted on single-axis trackers with a pivot point of approximately 6.6 feet above the ground, allowing for easy maneuvering of machinery and ample access for the sheep. A picture of the installation is shown in Figure 2.

Figure 2. A utility-scale 33 MW_{DC} single-axis tracker (2P) solar array (60,000 modules at 540 W each) covering 200 acres of farmland in Kaitaia, Northland, New Zealand. Pivot point: 6.6 ft above the ground, posts extend up to 14 ft underground. Completed in November, 2023.
Photo credit: Lodestone Energy.

Making Livestock Production Compatible with Agrivoltaics

Agrivoltaic systems require a level of compatibility between the animals raised and the solar infrastructure in order to achieve optimal production of both components. This requires a range of considerations including animal species and the type of array and solar panels installed.

Examples of Animal-Array Type Compatibility

1. Cattle and Chicken Under Single-Axis Trackers
   Producers with both cattle and poultry who rotate these two animal species on land with solar panels can benefit from restorative grazing practices that maintain soil health. Single-axis trackers with pivot points of at least 7 feet above the ground can accommodate the height of the cattle as well as create room for chicken coops. Rotational grazing helps to keep the farmland productive, all the while generating electricity.
2. Sheep and Vertical Bifacial Arrays
   Some European producers have already implemented the use of vertical bifacial panels on their sheep operations and have observed positive results. The use of sheep allows for easy maintenance of agricultural soils. Utilizing smaller sheep breeds, like Katahdins and Dorpers (https://www.youtube.com/watch?v=Ip2DAAsTeOs), has made it easier to maneuver the animals around the arrays that are mounted at least 2-3 feet above the ground. Producers noted that these docile breeds are able to navigate the pasture with ease and they do not disrupt the electricity production by the panels.

3. Chicken under Fixed-Tilt Arrays
   Fixed-tilt panels are ideal for egg-laying operations looking to improve sustainability. Fixed-tilt panels cover a large amount of land, helping birds seek shelter from heat and predation. However, a rotation schedule is needed as well as bird housing. Pens can be installed underneath the panels to ensure proper pasture regrowth.

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Additional agrivoltaics information can be found at: https://agrivoltaics.rutgers.edu