

# Solar & Multiuse Farming

## Co-locating Utility-scale Solar with Livestock & Pollinators

Solar development and agricultural use can exist not only side-by-side, but increasingly are found together.

- A farmer can add solar to their property and get steady income from a land or rooftop array.
- Solar energy facilities can also collaborate with local farms and bee-keeping organizations to incorporate pollinator friendly plants and bee hives onto their sites.
- Responsible solar development could improve soil health, retain water, nurture native species, produce food, and provide even lower-cost energy to local communities.
- Sheep farmers have opportunities to contract for vegetation management of solar sites and thus increase farm viability



Photo Credit: American Solar Grazing Association

**According to a study conducted by Cornell University in 2018<sup>3</sup> and a study from the National Renewable Energy Laboratory in 2016,<sup>4</sup> co-location and solar grazing bring net positive benefits for farmers, in the form of hundreds of dollars per acre each year in additional income, and solar sites, through increased energy production and reduced maintenance expenses.**

### Benefits to Farmers

Farming is an extremely low-margin, competitive industry. If a farmer can add solar to their property and get steady income from a land or rooftop array, it can enable them to keep their farm.<sup>1</sup> Steady income from solar projects means that farmers are less vulnerable to fluctuations in market prices on their products. Especially for larger solar projects, local government and communities benefit from collected taxes and localized spending.

“Solar grazing” is a method of vegetation control for solar sites that utilizes livestock, primarily sheep.<sup>2</sup> While solar grazing is currently in pilot phases on various sites, it is increasing in popularity. Solar companies can contract with local farmers, resulting in a relationship that is financially beneficial for both farmers and solar developers. Properly installed systems are benign to nearby animals.

<sup>1</sup> <https://www.renewableenergyworld.com/articles/2016/04/solar-power-more-lucrative-than-crops-at-some-us-farms.html>

<sup>2</sup> Various livestock, and sheep in particular, may be sensitive to the preexisting mineral contents of the soil, and proper soil testing should always be done prior to grazing.

<sup>3</sup> Kochendoerfer, N. Hain, L., Thonney, M.L. (2018) The Atkinson Center for a Sustainable Future at Cornell University <https://www.solargrazing.org>

<sup>4</sup> <https://www.nrel.gov/news/features/2019/beneath-solar-panels-the-seeds-of-opportunity-sprout.html>

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Solar energy facilities can also collaborate with local farms and bee-keeping organizations to incorporate pollinator friendly plants and bee hives onto their sites. There are many benefits to combining solar facilities with pollinator habitats:<sup>5</sup>

- Using one large solar field or perimeter screening area is akin to planting thousands of backyard pollinator gardens, which ultimately increases the productivity of farmland for miles around the facility.
- Planting native pollinator habitats reduces waste water runoff, and pollinator-friendly vegetation management practices, including minimal use of pesticides, results in more stable bee populations, benefiting farmers in the surrounding area.



Photo Credit: Pine Gate Renewables, North Carolina

## Solar Projects Can Improve Biodiversity

Solar farms can support a greater diversity of plants as well as greater numbers of butterflies and bees, particularly under management which focuses on optimizing biodiversity when compared to equivalent agricultural land. This increase in plant and invertebrate availability may lead to more opportunities for foraging birds in terms of invertebrate prey and seed availability.<sup>6</sup> When joint solar and vegetation designs are developed together, the benefits achieved can be maximized.<sup>7</sup>

## Solar Installations Could Be Win-Win-Win for Food, Water, and Renewable Energy

Responsible solar development could improve soil health, retain water, nurture native species, produce food, and provide even lower-cost energy to local communities. The Department of Energy's (DOE) Innovative Site Preparation and Impact Reductions on the Environment (InSPIRE) project brings together researchers from DOE's National Renewable Energy Laboratory (NREL), Argonne National Laboratory, universities, local governments, environmental and clean energy groups, and industry partners to better understand how to maximize local benefits.<sup>8</sup>

At several InSPIRE sites, local beekeepers and university and national laboratory researchers are tracking their bees' visits to the pollinator-friendly vegetation under the solar panels. The goal is to determine how vegetation at solar sites can benefit insect populations and to understand the extent to which pollinator-friendly solar installations can boost crop yields at surrounding farms.



Photo: SouthHill Community Energy

<sup>5</sup> <https://www.greenbiz.com/article/solar-farms-could-make-fertile-habitats-bees-and-butterflies>

<sup>6</sup> Montag, H., Parker, G., Clarkson, T. (April 2016). The Effects of Solar Farms on Local Biodiversity: A Comparative Study.

<sup>7</sup> Macknick, J., NREL (June 2016) [Overview of opportunities for co-location of agriculture and solar PV](https://www.nrel.gov/news/features/2019/beneath-solar-panels-the-seeds-of-opportunity-sprout.html)

<sup>8</sup> <https://www.nrel.gov/news/features/2019/beneath-solar-panels-the-seeds-of-opportunity-sprout.html> and <https://openei.org/wiki/InSPIRE>