



ENVIRONMENT

Can Solar Farms Help Save Bees?

Pairing solar farms with pollinator-friendly plants could be a win for both green energy and biodiversity.

By Brianna Barbu | Jun 26, 2021 12:00 PM



(Courtesy of Rob Davis, Center for Pollinators in Energy at Fresh Energy)





almost exponentially in that time, and they're going to have to keep growing even faster to meet climate goals.

But all of that growth is going to take up a lot of space. Princeton University's Net Zero America study estimated that the area taken up by ground-mounted solar panels in the United States will have to increase by nine million acres by 2050 to reach carbon neutrality. And that means that what's going in with the land underneath the panels, which solar companies typically haven't given much thought to, is starting to get more attention.

Over the past few years, solar farm developers have increasingly been encouraged to transform the space underneath their solar panels into a safe haven for bees, butterflies and other endangered pollinators.

When done right, pollinator-friendly solar farms can do much more for the environment than just generating clean energy. They can create biodiverse habitats that improve the soil, sequester carbon and potentially benefit nearby agriculture. "These solar farms can have a valuable impact on everything that's going on in the landscape," says Matthew O'Neal, an entomologist at Iowa State University and co-author of a recent [paper](#) discussing how solar farms can contribute to pollinator conservation.





HERE COMES THE SUN

By and large, people like solar energy as a concept, says Joshua Pearce, an engineering professor at Michigan Technological University who studies solar technology. A 2017 Pew research study found that 65 percent of Americans support expanding renewable energy. But while few complain about neighbors putting solar panels on their roof, large solar installations tend to be met with NIMBYish resistance.

“Everybody's pro solar, but they might not be pro giant solar near them,” he says.

Solar developers want to put up panels as quickly and cheaply as possible, says Pearce, so they traditionally haven't given much thought to what they put under them. Often, they'll end up filling the area with gravel or turf and spraying the ground with chemicals to control weeds. The upshot is that many communities, especially in farming regions, see solar farms as eyesores that wreck the soil.

“Solar projects need to be good neighbors,” says Jordan Macknick, the lead Energy-Water-Land Analyst at the National Renewable Energy Laboratory. “They need to be good stewards of the land and contribute to the agricultural economy.” Macknick heads up the Innovative Site Preparation and Impact Reductions on the Environment (**InSPIRE**) project. InSPIRE is investigating practical approaches to “low-impact” solar development, which focuses on establishing and operating solar farms in a way that is kinder to the land. One of the easiest low-impact solar strategies is incorporating pollinator habitat.

Bee a Good Neighbor

Habitat loss, pesticide use, and climate change have caused drastic declines in bee, butterfly and other pollinator populations over the past couple of decades. Considering that bees contribute **\$20 billion** to the U.S. agricultural economy every year, **being nice to pollinators** is something people can rally behind.

There's a pretty good consensus around **how to protect pollinators**—protect their habitat, make sure they have food and shelter and aren't exposed to pesticides. Over 28 states have passed **legislation** related to pollinator conservation research, education, habitat protection and pesticide use. The EPA has also **issued policies** meant to protect pollinators from harmful



California. The standards are typically aimed at solar projects that are larger than one acre and tied to the electrical grid. Projects that earn enough points on their state's scorecard can market themselves as pollinator-friendly.

More and more cities, universities and even companies like Clif Bar and Bank of America want to buy their solar energy from verified pollinator-friendly sources, says Rob Davis, the Director of the Center for Pollinators in Energy at Fresh Energy, a Minnesota-based clean energy think tank. "it's increasingly helpful for developers to be able to describe their projects as pollinator friendly, and then base those claims on standards."

The key to creating good pollinator habitat — anywhere, not just on a solar farm — is to use a mixture of native perennial flowering plants, O'Neil says. "If you do that, then you're halfway there." Non-native flowering plants like clover work in a pinch, but the more native species you can use, the better. That principle is front and center on many states' pollinator-friendly solar scorecards.

Native plants aren't just good for bees, either. "There's a lot of critters that use prairies," says O'Neal. Beetles, birds, mammals, reptiles — the whole ecosystem benefits. And native plants are excellent at carbon sequestration.

Of course, he says, it matters what the land was being used for to start off with. Healthy habitats should be left alone; plopping down a bunch of solar panels in a fully-functioning ecosystem would be a major disruption. But if you can turn a patch of sandy or erodible former farmland that's no longer useful for agriculture into a solar farm and also restore some native plants and pollinators there, that's a big win.

A **study** published earlier this year by researchers from Oregon State found that over 65 different insect species visited flower plots planted at a solar site. Whether pollinator-friendly solar farms improve overall pollinator populations is still an open research question. O'Neal's colleague Adam Dolezal at the University of Illinois is part of a new **project investigating that** and other unexplored aspects of maintaining pollinator habitat and a solar farm in the same place.

Flower Power



front and take a little more planning to choose different mixes of plants to go under the panels and around the border. But not much more. Davis says the cost difference between planting turf grass and meadow flowers is less than a tenth of a percent of a typical project budget.

And, after the first couple of years it takes to establish the flowers and make sure weeds don't outcompete them, O'Neil says they actually require less maintenance than filling the area with grass or gravel. There's also **some evidence** that having plants under solar panels can create a cooling effect that boosts the panels' efficiency.

"It looks pretty. It cuts down on your operational costs, it's just a smart idea," says Pearce. He'd like to see more policy incentives like tax breaks to give developers even more reason to put a little thought into what they put under the panels.

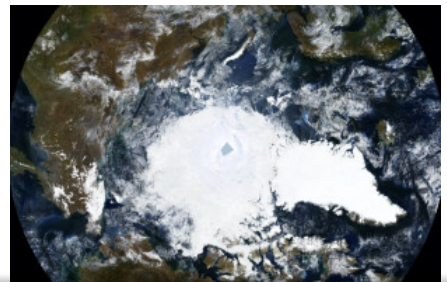
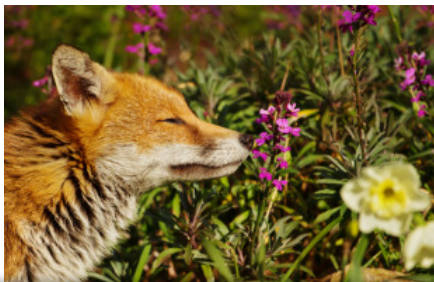
Macknick and Davis even created a **LEGO set** to promote and educate people about low-impact solar.

Several of InSPIRE's research sites are working on systematically testing seed mixes, planting strategies and panel configurations to figure out the most efficient, cost effective ways to establish pollinator habitat on a solar farm. Macknick's hope is that it will become "almost a no-brainer for people" to do.

The research, he says, is pretty clear that the benefits of low-impact, pollinator-friendly solar outweigh the initial extra investment. "It ends up being a win-win-win situation."

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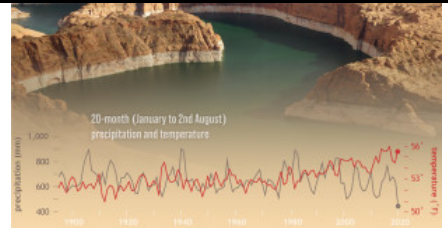
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