



Luuk Scholten in his solar park ♦ Photo Resource

# HOW MUCH SHADE CAN A SOLAR FARM TAKE?

Solar panels trap light, which means less light gets through to the ground below the panels. Plants don't grow so well, or not at all, which has a negative effect on biodiversity and the quality of the soil. But the size of that effect depends a lot on how the panels are arranged. That is the subject of Soil Biology PhD candidate Luuk Scholten's research. Text Roelof Kleis

To perform his research, Scholten has his own solar farm less than a kilometre from the campus. Behind De Born Farm, nearly 1000 solar panels in various 'pitched roof' setups are generating electricity. The solar farm was created in October 2023 specifically for his study, which is part of the Eco Certified Solar Parks project. The project's name says it all. 'The aim is to draw up guidelines and requirements for solar farms to make sure they blend in with the landscape and offer a boost to biodiversity,' explains Scholten. He is focusing on soil quality while two fellow PhD candidates are looking at biodiversity above ground.

'The problem with solar farms is that it's dark under the panels and the transition from dark to light is very abrupt,' he says, explaining his research. 'I'm looking for the minimum value for the incident light you need to maintain proper vegetation

and retain soil quality.' To investigate this, he has arranged 'solar roofs' of varying sizes running from east to west, that let through different amounts of light.

## Biomass

The vegetation growing beneath and between the rows of panels ranges from grass to mixtures of plants that vary in how well they grow in the shade. At first sight, there seems to be an abundance of plants growing and flowering in the park. 'Everything grows well under a row of single panels,' says Scholten, 'but there is a clear deterioration in the rows with two or four panels. The shade-loving species appear to be doing well.'

To quantify the growth, Scholten measures the biomass: he simply cut, dries and weighs the plants. He also measures differences in the exchange of CO<sub>2</sub> between the soil and the atmosphere, both

under and next to the panels, and monitors things such as the soil temperature and moisture content. In addition to the trial in this park, research is also being carried out on existing solar farms elsewhere in the country.

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Scholten's solar farm has a pitched-roof setup, but numerous other setups are possible. Even so, he believes the results from this specific setup will be more broadly applicable. 'The idea behind this project is to look at how much sunlight is needed. If you know that, you can design other setups that deliver the same amount of light under the panels.'