

Understanding and Addressing the Impact of Solar Development on Pennsylvania Farmland

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Many solar energy developers are seeking to build large (utility-scale) solar facilities in Pennsylvania. Nineteen such facilities are operating or partially operating in the Commonwealth, and as of late 2023, at least nine additional projects were under construction (Pennsylvania Department of Environmental Protection (DEP), 2024). Many additional lands have been leased or purchased for the purposes of utility-scale solar development, pending local government approval and permission to interconnect with transmission lines.

The purpose of this study is to identify and analyze the demonstrated and potential economic, social, and physical land-based impacts of utility-scale solar development on farmland, farming practices, and farming communities in Pennsylvania. Based on these findings, the study explores a menu of policy options to mitigate negative impacts and harness the positive outcomes of this development.

Methods

Study authors conducted a literature review of the impacts and solar policies in Pennsylvania and other states; explored and analyzed case studies in four locations; and interviewed 40 individuals.

Key Findings

Physical Land-Based Impacts

Impacts on farmland:

- A substantial percentage of utility-scale solar development is on farmland across the United States and in Pennsylvania, including some prime agricultural soils.
- Farming operations are temporarily displaced for the life of utility-scale solar projects unless agrivoltaics are included.
- Agrivoltaics are uncommon in Pennsylvania but are growing.
- Utility-scale solar farms, unlike warehouses and housing developments, have a relatively impermanent impact on farmland. Installed solar facilities have a useful life of 30 to 35 years. Note, however, that solar leases often total 50 years (20 to 25 years for the initial lease term, with an approximate 20- or 25-year extension option). For a solar farm to last more than approximately 30 years, “repowering” (placing new panels on the existing racks) is required (Sorenson et al., 2022, p. 3).
- Solar sites may remain as energy facilities at the end of their useful lives because they have obtained valuable regulatory approval for electric grid interconnection at the sites. They may be repowered (replaced with new solar panels) or converted to another type of electric facility.
- The equipment at solar sites may not be fully removed, and sites may not be returned to farmland conditions or conditions amenable to transforming the sites

back to farmland. This is particularly a risk where local governments have not taken measures at the beginning of solar projects to ensure that solar developers post some sort of financial security—funds that are available in the event the facility is not properly “decommissioned” (removal of equipment and restoration of land).

Economic Impacts

Impacts on farmland:

- Crop and livestock production declines unless agrivoltaics are included in solar projects. Impacts on state and national agricultural production are minimal, but local impacts can be more substantial.
- Solar development displaces land that could otherwise be available for farmers who rent land; many development pressures (including housing in addition to solar) are likely to contribute to higher leasing costs.

Impacts on farming practices:

- Solar development generates lease revenue for farmers. Current lease rates paid in some regions of PA for utility-scale solar range from approximately \$800 to \$2,200/acre annually, with a typical 2% annual inflation escalator built into the 20- to 30-year lease. This escalator value has been increasing annually.

Impacts on communities and the state:

- Host townships/boroughs and counties receive increased revenue from the payment of roll-back taxes under the Clean and Green preferential tax assessment program.
- Host townships/boroughs, counties, and school districts may receive increased revenue from the higher property taxes paid by commercial solar projects compared to the property taxes paid by agricultural uses.

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- In states with more developed utility-scale solar, there is no direct evidence of farming supply chain impacts from solar development, such as the closure of feed or equipment stores.

- Local governments in areas with concentrated solar activity may experience the temporary growth of local industry, such as minor construction, land excavation, hospitality, and some routine maintenance jobs.

- There is currently no solar manufacturing in Pennsylvania; other states, such as North Carolina, have experienced positive solar supply chain impacts associated with expansive utility-scale solar development. Pennsylvania is unlikely to host solar manufacturing or battery manufacturing; other countries dominate this area, and the smaller amount of US manufacturing is concentrated in a limited number of states.

Social Impacts

Impacts on farming practices:

- Farmers may use the income from solar leasing to retire, in which case farming is unlikely to recommence following the end of the solar facility’s useful life. In other cases, farmers use the income to support farming on the non-solar portions of their land, including expanding operations through renting or purchasing additional land.

- Due to the older median age of Pennsylvania farmers, some farmers losing land to solar leasing are choosing to downsize instead of finding replacement acres for those lost to solar development.

Impacts on communities and the state:

- Sense of place: The predominant concern of residents near proposed utility-scale solar development on farmland is aesthetic impact. Many residents believe that solar energy development will affect the rural character of the area in which they live.

- Some landowner-farmers believe that residents concerned about preserving viewsheds should pay for that preservation. These farmers focus on property rights and the burden of forgone solar leasing (and income).

- Controversy surrounding proposed solar developments causes social rifts within communities and makes residents, farmers, and business owners fearful to engage in public discussion regarding proposed

solar facilities, at least in the short term.

Policy Considerations

Physical Land-Based Impacts

- Consider providing state incentives for the siting of solar in locations without prime agricultural soils (USDA Class I and II).

- Provide additional incentives—beyond those currently being pursued by the DEP—for the development of solar on disturbed lands such as former mine lands.

- Implement incentives and other policies to harness the benefits of agrivoltaics to be identified by the Joint State Government Commission—a commission tasked by House Resolution 224 (2023) to study the benefits and opportunities of agrivoltaics.

Economic and Social Impacts

- Provide additional funding for data collection and studies that address the social and economic impacts of utility-scale solar facilities in Pennsylvania as developers construct and continue to operate more facilities, including, for example, local government tax revenues and job creation.

- Track and record the acreage and type of land (farmland, former industrial) and specific type of soil on

which each utility-scale solar facility is located.

- Consider implementing a Payment in Lieu of Taxes (PILOT) local government option for solar energy and revising the Clean and Green preferential tax assessment program to align with wind energy and oil and gas development.

- Continue considering uniform, statewide regulation of bonding and decommissioning of utility-scale solar energy.

- Continue and expand the Pennsylvania Department of Environmental Protection’s work providing information for local governments to help them effectively regulate utility-scale solar development.

- Convene a statewide session of local government officials and DEP experts at annual meetings of county and township associations to share effective strategies for utility-scale solar regulation. Publish a white paper summarizing the workshop conclusions.

- Continue considering the allowance of mid-scale “community solar” projects in Pennsylvania that avoid interconnection delays and can be more strategically sited to address concerns about aesthetics and solar on prime soils.

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