American Farmland Trust
SAVING THE LAND THAT SUSTAINS US

Smart Solar℠ on Farmland and Ranchland

Strengthening Farm Viability and Soil Health While Growing Renewable Energy

Over the next three decades, our nation's electric power sector will transition from a fossil-fuel dependent system to a more distributed and decarbonized energy network. Driving this change are markets, where solar and other forms of renewable energy are now cost-competitive, as well as ambitious local, state, and federal policy goals to address climate change by dramatically reducing greenhouse gas emissions. Achieving these essential goals will require substantial increases in renewable energy and primarily solar, which, according to a 2020 U.S. Department of Energy study, may rise from 4% of our nation's total energy production today to 45% by 2050. With dramatically increased funding for solar in the recently enacted Inflation Reduction Act, this pace should accelerate quickly.

American Farmland Trust's new report found that **83%** of new solar could be sited on farmland.

According to the same DOE study, increasing solar generation to 45% could require nearly 7.4 million acres of land by 2040 and 10.4 million acres by 2050, with approximately 90% expected to occur in rural communities.

Further studies reveal that most solar development will take place on farmland. Modeling done by American Farmland Trust (AFT), through the *Farms Under Threat: 2040* analysis, projects that **83% of new solar built by 2040 could be sited on agricultural lands, with almost half located on our most productive land for producing food and crops.** This is corroborated by a 2021 Cornell University study by Katkar et al. that found 82 to 85% of land suitable for solar to meet New York's ambitious climate goals is farmland. Displacing farming from productive land could put more marginal farmland in production, leading to decreased productivity, farm viability, and food security, as well as increased environmental impact.

DOE Solar Futures Decarb+E Scenario
Land area of utility-scale solar photovoltaics (projection in 2040)

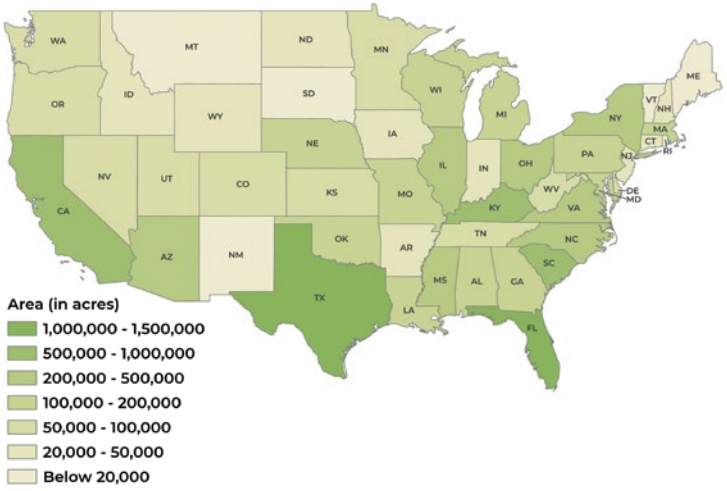

Figure 1. Projected acres of utility-scale solar photovoltaics energy generation facilities by state in 2040.

Solar developers often select high-quality farmland, since it is more likely to be flat, dry, clear, and close to existing infrastructure. And, according to research AFT conducted in 2021, developers are often willing to pay over 10 times the amount that landowners can make renting the land to farmers, with many offering the security of long-term leases lasting on

average 25–40 years. **The growth of solar development will reshape many rural landscapes and farm economies. It also has the potential to generate public backlash and permitting moratoria that could slow the achievement of decarbonization goals.**

Scientists agree that society needs to drastically reduce emissions to slow climate change and minimize future impacts from droughts, floods, and extreme heat—including on farmers and ranchers. In addition, solar energy leases can generate new streams of income for farmland owners, helping to keep the farm viable. But solar can displace farmer-renters, and large-scale solar may threaten the future viability of local economies dependent on agricultural production.

AFT's modeling reveals that, although solar development will be widely distributed across the country, projects will be concentrated in communities with favorable siting and transmission opportunities. For example, by 2040 Texas could have over 1 million acres of solar, and many Northeastern states could have solar on as much as 6% of their undeveloped land. In addition, large-scale solar projects will take hundreds of thousands of acres of a community's farmland out of production at once. This concentrated conversion will strain the viability of the farms that remain by decreasing land availability, increasing land prices, and reducing the viability of farm support services.

AGRISOLAR CLEARINGHOUSE

Agrivoltaics is the practice of installing solar panels on farmland so primary agricultural activities are maintained throughout the life of the project.

But America needs both—renewable energy and productive, resilient farms and ranches. Smart Solar can be the solution. In 2018 AFT began its efforts to help communities accelerate solar development in ways that strengthen farm viability.

Smart Solar Principles

Smart Solar projects meet three main goals: they accelerate renewable energy development, strengthen farm viability, and safeguard land for farming and ranching. AFT developed the following Smart Solar Principles to guide policymakers, developers, and decisionmakers:

1. Prioritize solar siting on the built environment and land not well suited for farming. Concentrate solar development on rooftops, irrigation ditches, brownfields, and marginal lands.
2. Safeguard the ability for land to be used for agriculture. Policies and practices should protect soil health and productivity, especially during construction and decommissioning.
3. Grow agrivoltaics for agricultural production and solar energy. Agrivoltaic projects allow for farming underneath and/or between rows of solar panels throughout the life of the project.
4. Promote equity and farm viability. Require inclusive stakeholder engagement, including farmers and underserved communities, to ensure widespread benefits from solar energy development.

Smart Solar means directing solar development to where it has the least negative impact on land well-suited for farming while protecting soil health, maintaining opportunities for farming, and ensuring equitable community benefits. Smart Solar elevates agricultural considerations and aims to accelerate renewable energy development by calming community fears over solar project impacts.

Recommendations

Many stakeholders—from landowners to solar companies to government officials—have important roles to play to achieve a Smart Solar buildout. Legislative bodies can ensure laws and regulations reflect Smart Solar principles. Solar companies can adopt the principles into their operations. State and federal governments can provide guidance, resources, and incentives. Actions various stakeholders can take:

- Incorporate Smart Solar Principles into land-use plans, permitting processes, and policies to guide approval of specific projects.
- Fund and participate in local/regional planning and community engagement with broad stakeholder involvement including farmers, developers, transmission groups, tribes, and environmental justice stakeholders.
- Define community preferred sites (e.g., the built environment, contaminated lands, land not well-suited to farming) and priority protection areas; prioritize siting on preferred sites with financial incentives and permit fast-tracking and disincentivize siting on protection areas with mitigation fees.
- Develop and require minimum standards to protect soil health and productivity based on the USDA NRCS soil health principles during construction, operation, and decommissioning.
- Fund research and create pilot programs to advance agrivoltaic projects and help determine which production systems should qualify for future agrivoltaic incentives.
- Invest in research to assess socioeconomic effects of solar on farm viability, land access, equity, and energy prices.

RESOURCES

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Check out **farmland.org/solar** or contact:
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