

# Renewable Energy Policy Initiative

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## Reconciling Renewable Energy and Farmland Preservation: An Inventory of State Land-Use Policies

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Decarbonizing the electricity sector will require a shift in the geography of where our electricity is produced. Currently, most electricity comes from large, centralized fossil fuel and nuclear power plants sited in or near urban areas where much of that power is used. Renewable energy power plants such as solar and wind energy systems require five to 10 times as much land area as fossil fuel power plants.<sup>1</sup> As a result, many of these renewable energy power plants are sited in rural communities where land is more plentiful. Agricultural lands, in particular, are often sought for utility-scale renewables development. This has raised questions, however, about whether renewable energy presents an opportunity or threat to state farmland preservation policies designed to preserve farmland by limiting non-agricultural development.

Here we inventory the farmland preservation policies in all 50 states to determine how each state treats the siting of solar- and wind-farms on preserved farmland. We also suggest how solar and wind development either align or conflict with common goals of state farmland preservation programs.

### Background: State Farmland Preservation Programs

With the advent of the interstate highway system and post-war housing boom, the U.S. began to experience rapid suburbanization in the middle of the last century. Much of this development occurred on agricultural lands, and between 1950 and 1997, roughly 20% of farmland in the U.S. was converted to non-agricultural uses. Concerned by this trend, most states began in the 1970s to develop farmland preservation programs to provide farmland owners with incentives to keep their land from being developed. These include offering reduced property tax rates on eligible farmland, authorizing conservation easements to allow for donation, purchase, or transfer of development rights, or creation of agricultural areas or districts that confer additional tax benefits or heightened Right-to-Farm protections. By the early 2000s, all 50 states had enacted at least one of these farmland preservation policies.

### Renewable Energy within Farmland Preservation Programs

In reviewing each of these state farmland preservation policies, we find that only 13 states explicitly mention how renewable energy infrastructure should be treated in the context of the program. In some states, the land on which the renewable energy system sits continues to be treated as an agricultural use and may remain in the program. In other states, renewable energy systems are not considered an agricultural use and the landowner must remove that

<sup>1</sup> A 1 gigawatt (GW) fossil fuel power plant requires roughly 100 acres of land. 1GW of solar requires 5,000-10,000 acres. 1GW of onshore wind energy requires 500 acres, but turbines must be spaced over 100,000 acres or more.

land from the program and/or pay a penalty. In many cases, there is different treatment based on whether the power generated is primarily for on-farm use or not, and a difference between solar and wind energy systems. And in other states, the policy is ambiguous about what scale of systems (e.g. on-farm or utility-scale) or technologies (e.g., solar or wind) apply. [See Table on page 3].

While no two of these policies are the same, some common themes do emerge:

- Both wind and solar energy systems sized for on-farm energy use (i.e., smaller systems) are generally permitted to stay enrolled in the farmland preservation program.
- Landowners who wish to host utility-scale solar energy systems are most commonly required to remove those lands from the farmland preservation program and/or pay a financial penalty for hosting the system on agricultural land.
- Fewer states provide policies for utility-scale wind energy systems, but those that do have policies tend to permit these wind systems or offer more preferable terms than they do for utility-scale solar.

## Reconciling Renewable Energy Treatment with Farmland Preservation Goals

What accounts for these different treatments of solar and wind energy systems? Perhaps it is their alignment with the different—and sometimes conflicting—goals of farmland preservation programs. These goals include:

- ***Farm livelihoods:*** ensuring farmers continue to contribute to state and local economies
- ***Food production:*** ensuring there is ample land to grow food and fiber
- ***Rural vistas:*** preserving agrarian landscapes with cultural and/or aesthetic values
- ***Ecosystem services:*** preserving land that serves as wildlife habitat or provides other services
- ***Urban boundary:*** reducing supply of land for low-density development (e.g., sprawl)

Indeed, solar and wind energy systems tend to have different impacts on each of these measures. Both solar and wind energy systems contribute positively to farm livelihoods by providing payments to landowners, and both can help to create an urban boundary to minimize low-density development. However, while both technologies may alter rural vistas and negatively impact ecosystems during construction, wind energy systems often have a greater impact than solar on both rural vistas and ecosystems (e.g., birds, bats). Conversely, solar energy, as commonly deployed,<sup>2</sup> tends to have a larger negative impact than wind energy on food production since solar arrays occupy more land.

This would suggest, then, that states which permit wind energy systems but not solar energy systems are giving more weight to the food production goal. This is not evident in the stated goals of the 13 states which have rules related to renewable energy on farmland. Indeed, most of these states list at least four of the five farmland preservation goals; there does not appear to be any systematic preference for the food production goal. However, this concern over loss of land for food production is evident in the discussions that led to the farmland preservation renewable energy policies in California, Maryland, and Rhode Island.

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<sup>2</sup> There is, however, a movement toward 'agrivoltaics,' grazing animals or growing hand-harvested crops or beneath solar energy systems, though neither of these is widely practiced in the US. There is also a large push for planting pollinator-friendly plants as groundcover under solar panels which may provide an ecosystem service to neighboring fields.

## Conclusion & Policy Recommendations

A move toward renewable energy will both shift the geography of where our electricity is produced—from urban to rural—and also increase the footprint of our energy infrastructure. Agricultural lands will be primary targets for renewable energy development, which may present either an opportunity or a threat to farmland preservation efforts. By the same token, limits on siting renewable energy systems on farmland—especially in states with a large percentage of land participating in farmland preservation programs—may limit the achievement of state climate policies.

To date, only 13 of the 50 states have explicit guidance on how renewable energy systems are treated within their state’s farmland preservation program. To prepare for future renewable energy development proposals, all states should consider:

- How much of the state’s land area is enrolled in the state’s farmland preservation program?
- Are there particular renewable energy technologies or particular sizes of systems that are more or less compatible with state farmland preservation goals?
- If there is a conflict between farmland preservation goals and climate goals, how might those differences be reconciled?

## Acknowledgements

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**Table 1**

States which have policies regarding renewable energy development on lands enrolled in farmland preservation program(s)

State	Solar			Wind			Renewable			Energy		
	On-farm	Ambiguous	Utility-scale	On-farm	Ambiguous	Utility-scale	On-farm	Ambiguous	Utility-scale	On-farm	Ambiguous	Utility-scale
California		6									1	
Hawaii	1		3	1		1	1					
Iowa		4			4							
Maine										1		
Maryland			3			3						
Massachusetts							2					
Michigan			3	1		1						
New Jersey	2			2								
New York	1		6		5							
Ohio		5			1,5		1					
Oregon			1									
Rhode Island									5			
Vermont	1		6									

**KEY**

- 1 Permitted
- 2 Permitted within limits without penalty
- 3 Permitted within limits, otherwise penalty
- 4 Remove from program later
- 5 Remove from program without penalty
- 6 Remove from program with penalty