Solar

Utility-scale Solar on Farmland by the Numbers

Why do developers consider farmland for project sites?

- **Farmers looking for ways to strengthen financial stability of their land** may seek renewable energy development on portions of their land because of the long-term stability of lease payments to supplement income from farming.
- **Farmland is flat and cleared**—two characteristics desirable for solar energy sites as they reduce the need for extensive land grading and/or tree removal. The leased parcels are often areas that have been impacted by intensive agricultural practices.
- **Siting projects on and adjacent to working lands helps reduce the potential for conflicts with other resources** of concern to stakeholders, such as wildlife and their habitat and historic/cultural resources.
- **Brownfields, rooftops, parking lots, and other previously disturbed areas are possible sites for solar**. Tradeoffs include increased cost to consumers, legal liability (brownfields), additional permits required, and project size limitations that undermine benefits of scale (ACP).
  - Even if these sites are used for solar, there are not enough to meet the full demand for solar energy generation.

Photo credit: AES

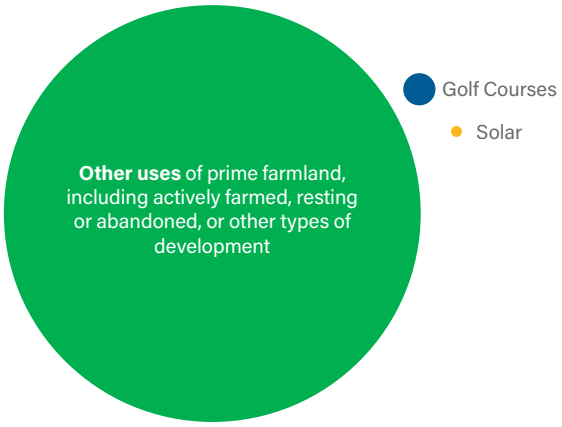
How much farmland does solar occupy?

- In **36** states with solar, utility-scale solar takes up less than **0.1%** of prime farmland. In **12** states with solar, utility-scale solar takes up less than **0.01%** of prime farmland.
- On average, utility-scale solar takes up **0.07%** of prime farmland in a state.
- There are only **two** states where solar takes up greater than **0.25%** of prime farmland in the state (California – 0.33%, Rhode Island – 0.31%).
- In **20** states with golf courses, golf courses take up more than **5x** as much prime farmland as solar.
- On average, golf courses take up **22x** more prime farmland than solar in a state; There are only four states where solar takes up more prime farmland than golf courses (Florida, Indiana, Nevada, Texas).

Furthermore, in **95%** of counties with solar, solar takes up less than **0.25%** of farmland (DOE, USDA).

While these numbers could grow as solar development increases, it is unlikely that the change will be significant, especially with improvements to technology making solar projects more efficient, meaning projects can produce more electricity from the same amount of land.

Uses of Prime Farmland – National Average



Even in the highest land use scenarios for expanding solar by 2050 that DOE evaluated in the Solar Futures Study, about 10.3 million acres would be necessary for solar development (DOE). If this new solar were to be built on farmland, which is highly unlikely, this new development would affect less than 1.2% of current farmland.

The farmland solar occupies is too small to significantly affect food supply in the U.S.

Energy production on farmland is not new

Many farmers are already contributing to domestic energy generation in the form of ethanol fuel for vehicles, totaling approximately 40 million acres of corn grown (~4.5 % of farmland) per year for ethanol production (ACP).

Combined energy production from corn for ethanol and solar on farmland would still be less than 6% of the total farmland acreage in the contiguous U.S. (ACP).

Solar can produce 30-100x more energy per acre with less resources than corn grown for ethanol (Cornell, Clean Wisconsin).

State	% of prime farmland that is solar	% of total land that is solar	% of prime farmland that is golf courses	% of total land that is golf courses	prime farmland — ratio of golf course to solar	total land — ratio of golf course to solar
Alabama	0.028	0.011	0.167	0.12	5.97	11.01
Alaska	0	0	NA	NA	NA	NA
Arizona	0.186	0.043	0.505	0.08	2.71	1.86
Arkansas	0.038	0.018	0.07	0.07	1.84	4.02
California	0.326	0.122	0.44	0.141	1.35	1.16
Colorado	0.03	0.019	0.084	0.058	2.82	2.97
Connecticut	0.14	0.044	1.531	0.634	10.96	14.42
Delaware	0.053	0.033	0.657	0.499	12.33	15.02
District of Columbia	0.121	0.113	12.838	1.392	106.38	12.32
Florida	0.212	0.133	0.116	0.485	0.55	3.65
Georgia	0.121	0.059	0.158	0.184	1.3	3.12
Hawaii	0.229	0.048	NA	NA	NA	NA
Idaho	0.016	0.007	0.113	0.032	7.26	4.56
Illinois	0.023	0.019	0.238	0.25	10.12	13.5
Indiana	0.043	0.04	0	0	0.01	0.01
Iowa	0.008	0.005	0.088	0.102	10.91	19.87
Kansas	0.001	<0.001	0.039	0.049	53.36	102.83
Kentucky	0.005	0.003	0.155	0.111	29.99	40.59
Louisiana	0.014	0.007	0.1	0.073	7.11	10.56
Maine	0.037	0.009	0.174	0.06	4.72	6.68
Maryland	0.055	0.033	0.582	0.474	10.54	14.15
Massachusetts	0.165	0.113	1.584	0.757	9.58	6.68
Michigan	0.041	0.015	0.362	0.278	8.72	18.71
Minnesota	0.016	0.013	0.081	0.109	4.96	8.68
Mississippi	0.016	0.011	0.068	0.054	4.17	4.83
Missouri	0.001	0.001	0.088	0.096	86.9	102.41
Montana	0.001	0.001	0.03	0.011	41.15	19.88
Nebraska	0.003	0.001	0.056	0.079	17.9	71.44
Nevada	0.052	0.04	0.036	0.024	0.68	0.59
New Hampshire	0.003	<0.001	1.185	0.257	383.3	972.09
New Jersey	0.154	0.087	1.311	0.9	8.54	10.35
New Mexico	0.002	0.014	0.016	0.017	7.35	1.27
New York	0.066	0.027	0.737	0.343	11.2	12.74
North Carolina	0.184	0.095	0.25	0.26	1.36	2.72

State	% of prime farmland that is solar	% of total land that is solar	% of prime farmland that is golf courses	% of total land that is golf courses	prime farmland — ratio of golf course to solar	total land — ratio of golf course to solar
North Dakota	0	0	0.027	0.026	NA	NA
Ohio	0.058	0.043	0.304	0.306	5.26	7.19
Oklahoma	0.004	0.002	0.062	0.062	15.27	35.34
Oregon	0.058	0.011	0.208	0.044	3.56	3.93
Pennsylvania	0.025	0.008	0.655	0.323	26.26	37.97
Rhode Island	0.308	0.208	2.307	0.766	7.48	3.68
South Carolina	0.063	0.045	0.293	0.305	4.67	6.84
South Dakota	0.001	0.002	0.042	0.023	33.5	10.27
Tennessee	0.033	0.012	0.242	0.157	7.4	13.22
Texas	0.101	0.064	0.07	0.075	0.7	1.17
Utah	0.15	0.027	0.244	0.03	1.63	1.09
Vermont	0.039	0.013	0.417	0.141	10.6	10.77
Virginia	0.179	0.071	0.185	0.135	1.03	1.9
Washington	0.005	0.003	0.259	0.08	47.37	23.75
West Virginia	0.023	0.002	0.4	0.087	17.14	37.4
Wisconsin	0.045	0.025	0.255	0.184	5.71	7.22
Wyoming	0.017	0.002	0.03	0.014	1.78	6.65
AVERAGES	**0.069**	**0.034**	**0.609**	**0.219**	**21.99**	**35.9**

Endnotes

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