RENEW WISCONSIN

Farming Sunshine: Solar and Agricultural Land Use

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Land use: Solar and Agriculture

- Changing agricultural landscape in Wisconsin
- Solar predominantly sited on agricultural land
- How much land would be needed by 2050 to reach a zero-carbon economy?

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How much land would be needed by 2050 to reach a zero-carbon economy?

- 50,000 acres
- 200,000 acres
- 500,000 acres
- 1 million acres

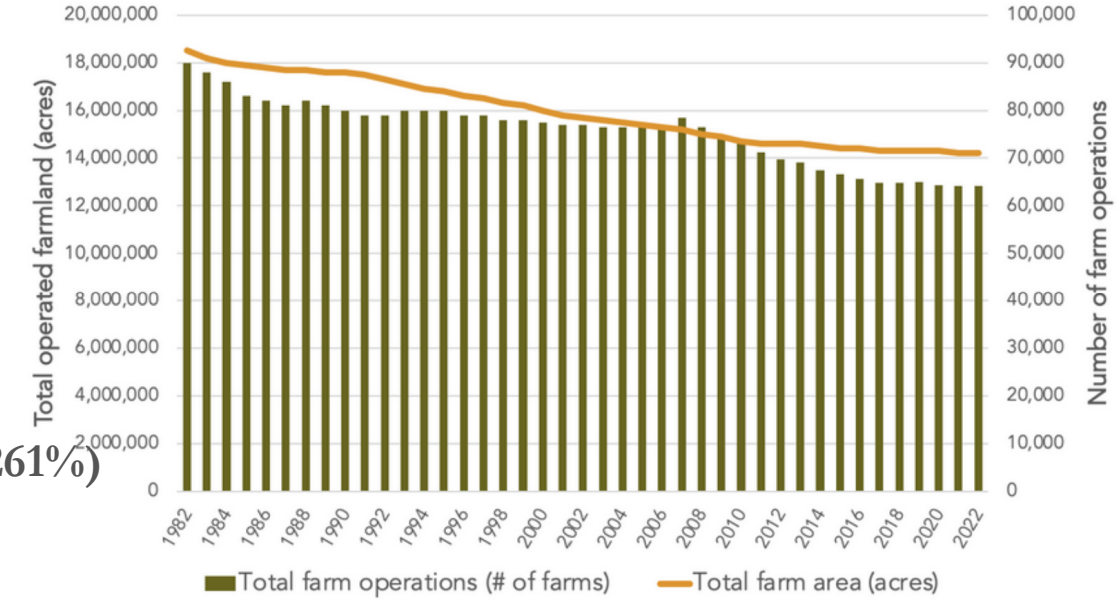
Changing agricultural landscape

Since 1982, decreases in:

- Total agricultural land (23%)
- Number of farms (29%)
- Total crop land (8%)
- Total field crop land (5%)

And increases in:

- Land growing corn (26%)
- Land growing soybeans (261%)
- Corn yields (69%)
- Soybean yields (75%)



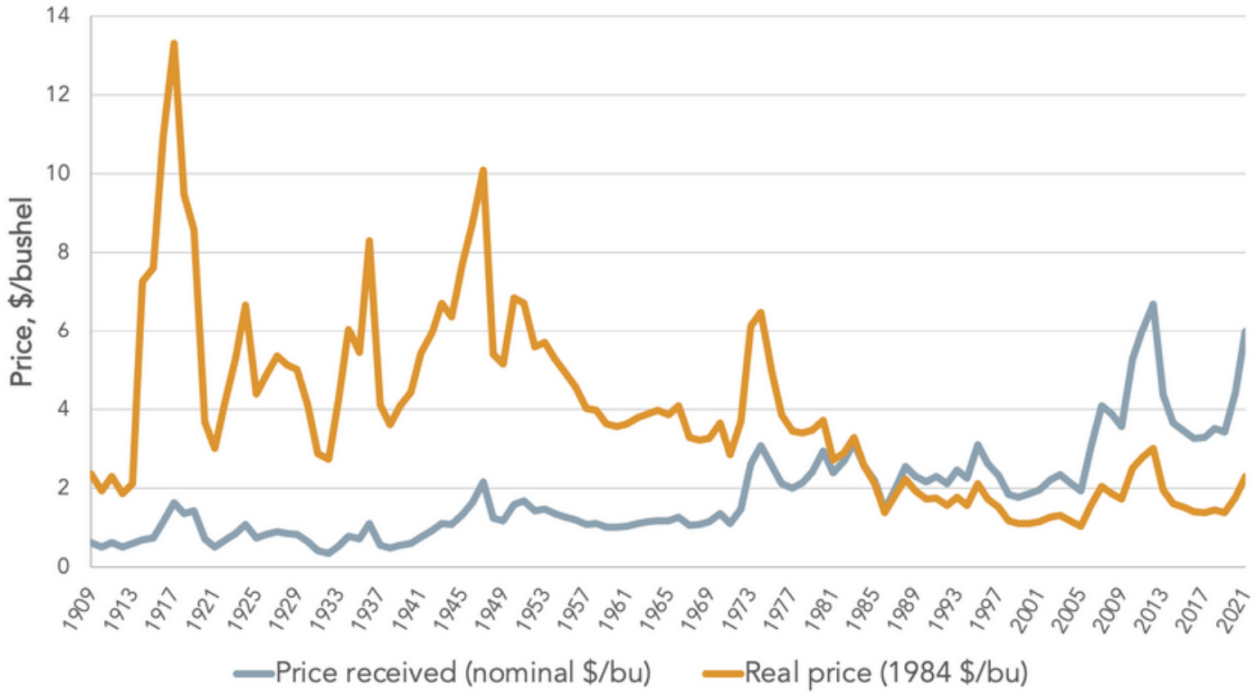
Pressure from prices

Adjusting for inflation shows the gradual decrease in real corn prices over time

Price received by farmers (the nominal price) vs real price (CPI-adjusted 1984 dollars)

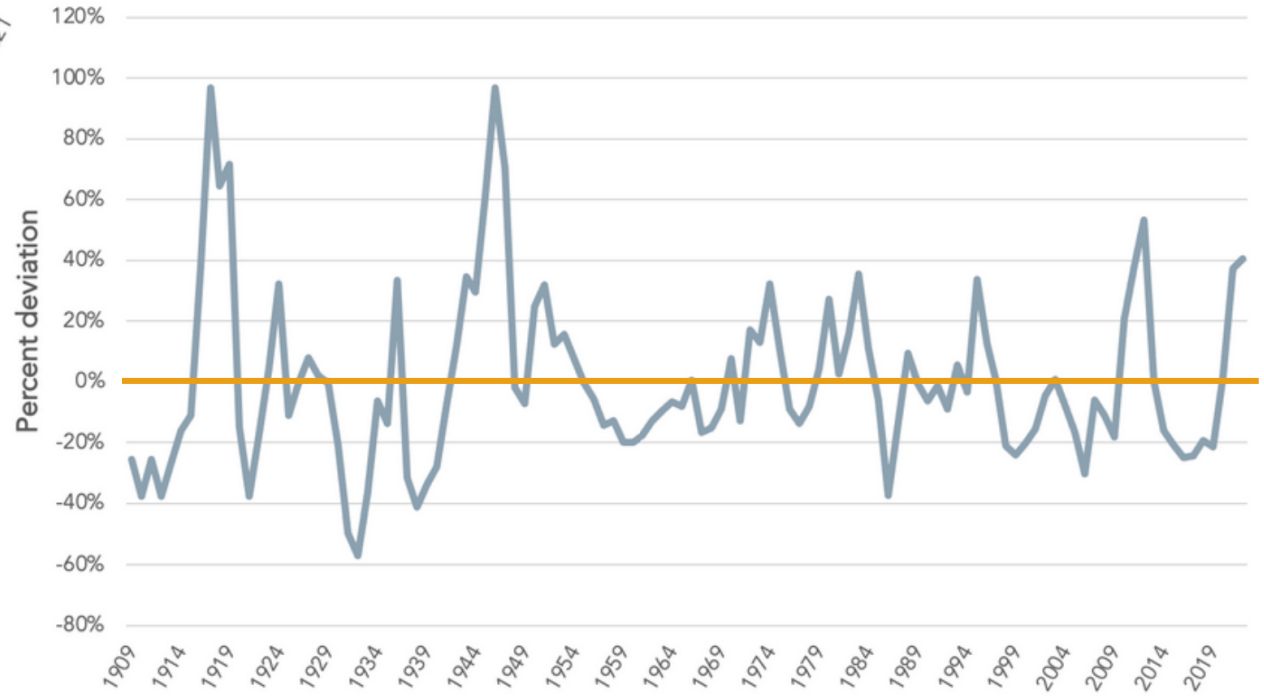
Corn prices are naturally volatile due to the inelasticity of their supply and demand

Magnitude of price volatility: percent deviation of each year's corn price from the period mean



Nominal corn price (price received) vs real price (inflation-adjusted)

Corn price deviation from periodic means

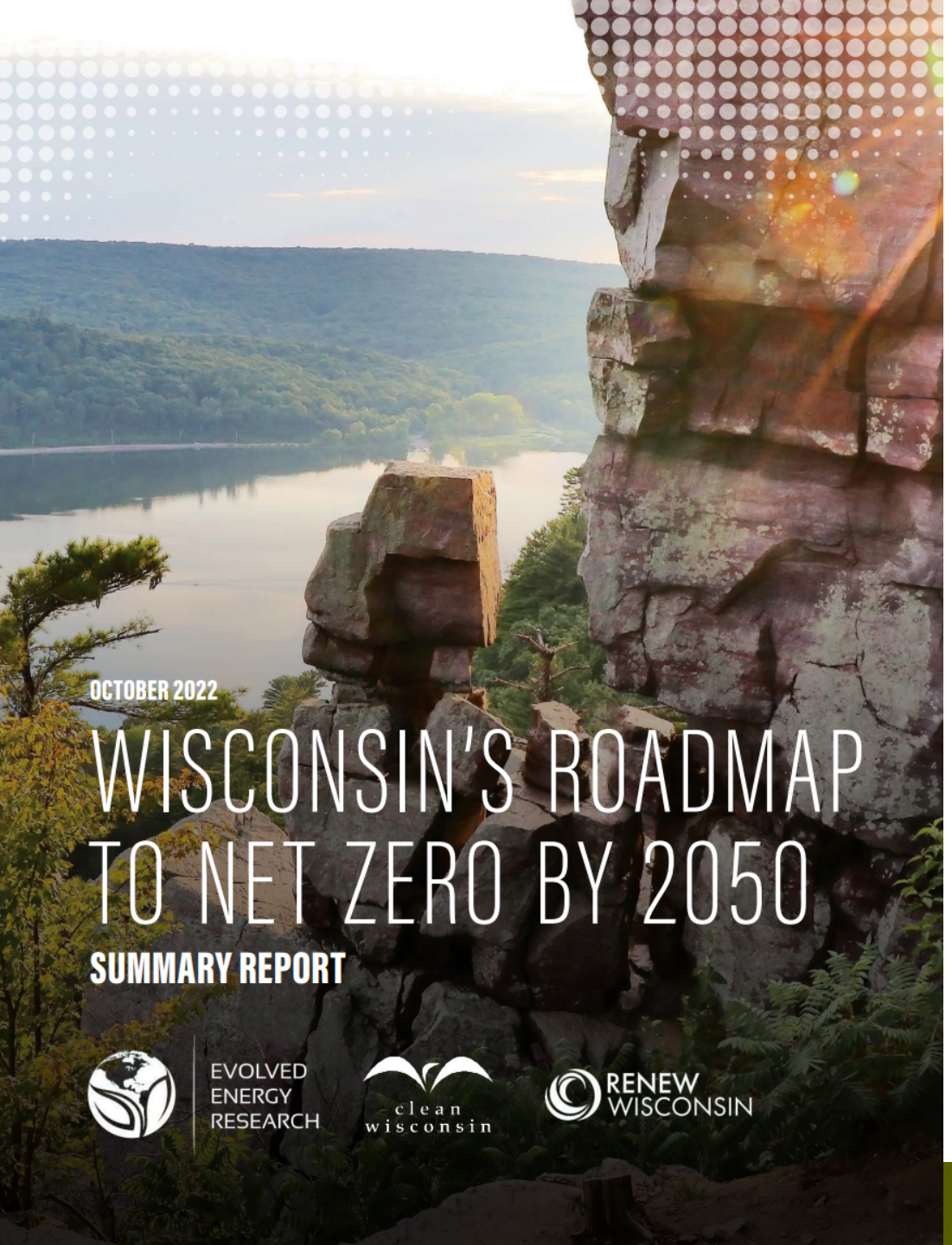


Solar land footprint

- How much land to site 1 MW of solar?
- 7 to 10 acres to site 1 MW of utility-scale solar PV
- Our analysis assumed 7 acres per MW

1. Increasing productivity of solar panels over time
2. Solar panel design, installation layout improvements

- Solar fields become more productive per square foot
- Generate more electricity with fewer total inputs, including land
- Occupy less land to generate the same amount of electricity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WISCONSIN'S ROADMAP TO NET ZERO BY 2050
SUMMARY REPORT
EVOLVED ENERGY RESEARCH
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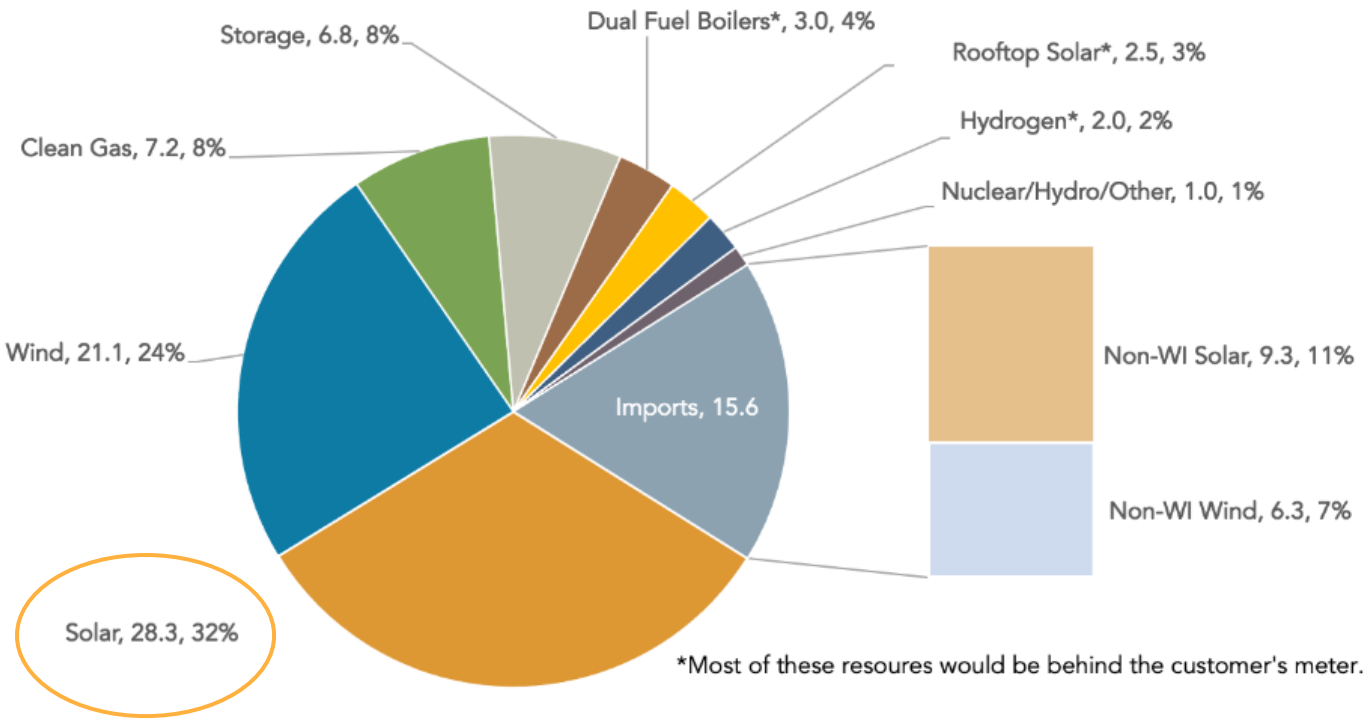

Storage, 6.8, 8%
Dual Fuel Boilers*, 3.0, 4%
Rooftop Solar*, 2.5, 3%
Hydrogen*, 2.0, 2%
Nuclear/Hydro/Other, 1.0, 1%
Clean Gas, 7.2, 8%
Wind, 21.1, 24%
Imports, 15.6
Non-WI Solar, 9.3, 11%
Non-WI Wind, 6.3, 7%
Solar, 28.3, 32%
*Most of these resoures would be behind the customer's meter.

Solar land use in Wisconsin by 2050

The NZEW scenario projects **28.3 GW of utility-scale solar** will be needed by 2050

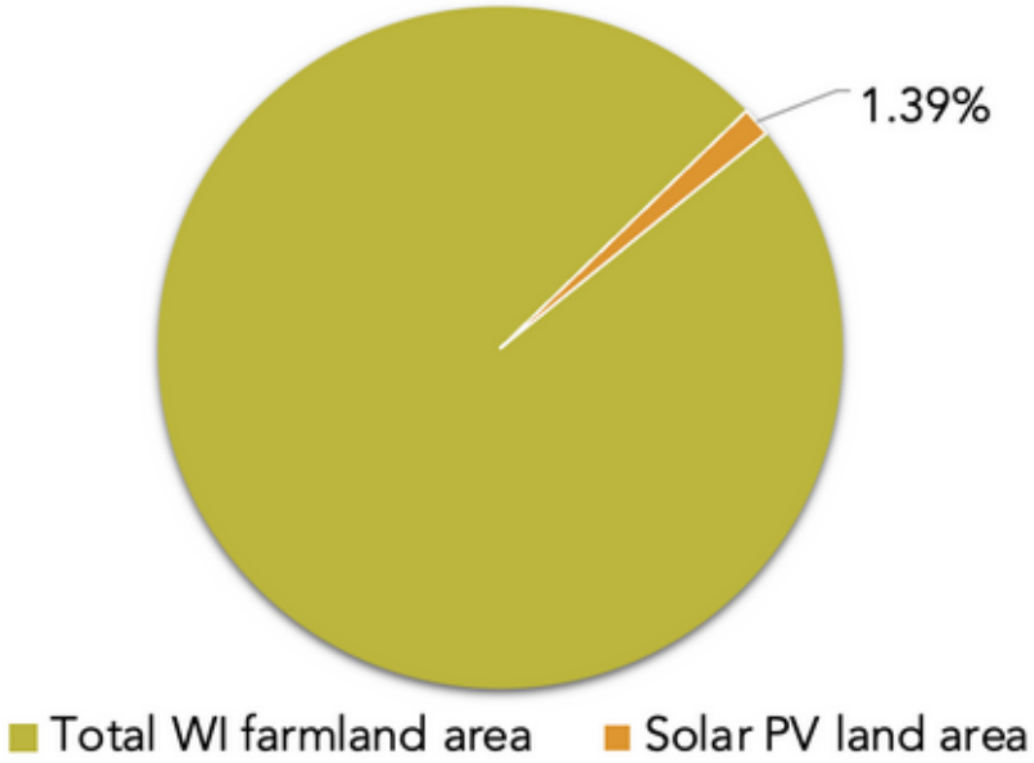
Our analysis assumed the land footprint for utility-scale solar PV is **7 acres per MW**

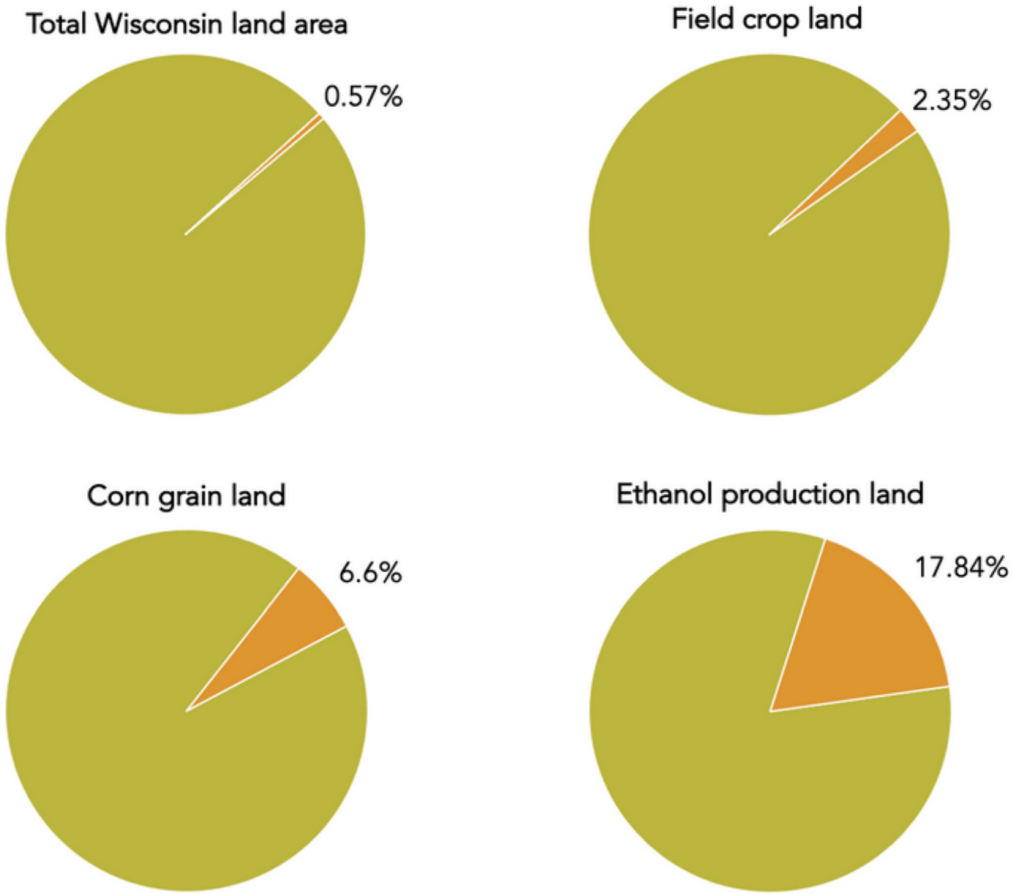
If 1 MW of utility-scale solar uses 7 acres, the 28.3 GW of solar required by 2050 would use about **198,000 acres of land**

198,000 acres of utility-scale solar

LAND USE	LAND AREA (million acres)	SHARE OF LAND NEEDED FOR SOLAR BY 2050 (%)
Total WI land area	34.7	0.57%
Actively cultivated farmland	14.2	1.39%
Field crop land	8.4	2.35%
Total corn grain land	3.0	6.60%
Total ethanol land	1.1	17.84%

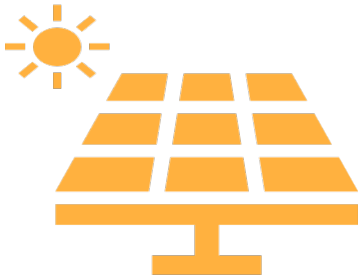
198,000 acres of utility-scale solar





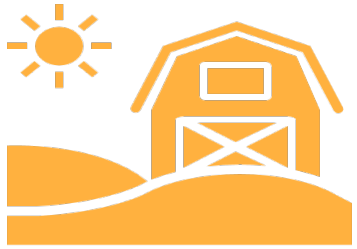
Solar farming in Wisconsin

Solar energy can supply almost **one-third of Wisconsin's electricity consumption** in 2050 using a **small portion of our agricultural land (198,000 acres, 1.4%)**



Solar farms do more than just generate **cheap, reliable electricity**:

- **Stable revenue source** for farmers and landowners
- Provide beneficial **ecosystem services** (soil health, pollinator environment)
- Financial support to local government (**shared revenue formula**)



Large-scale solar development can help **sustain the agricultural heritage** of the state, **keep Wisconsin farmers in business**, and provide environmental and economic **benefits to the greater public**

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Thank you! Questions?

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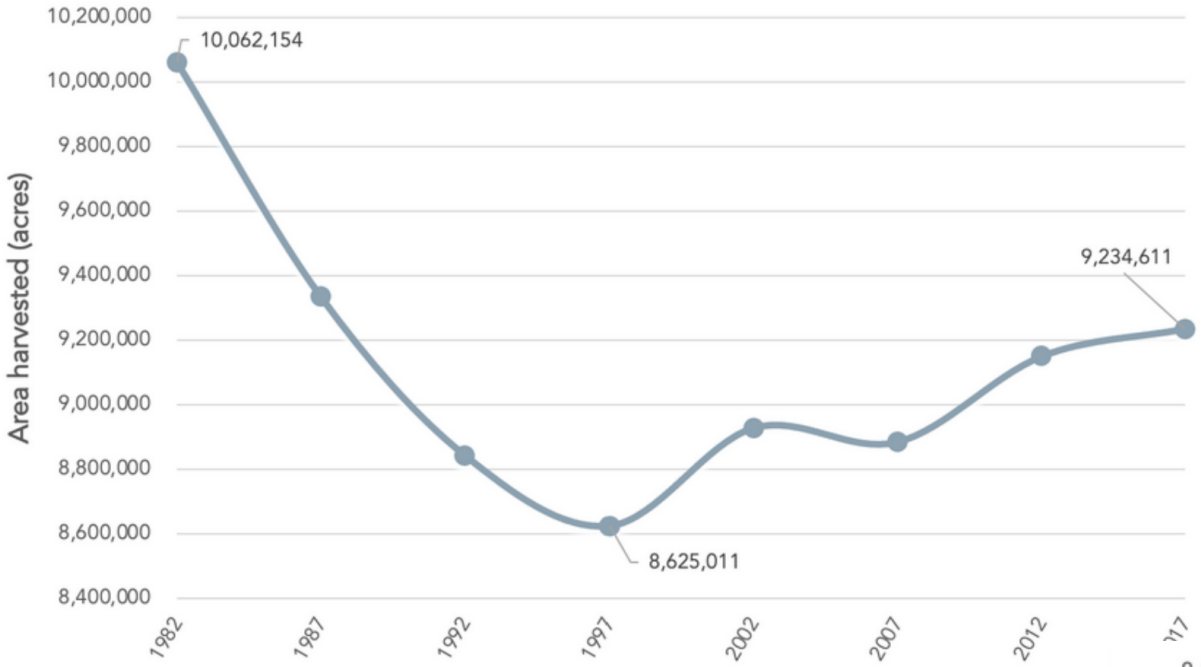
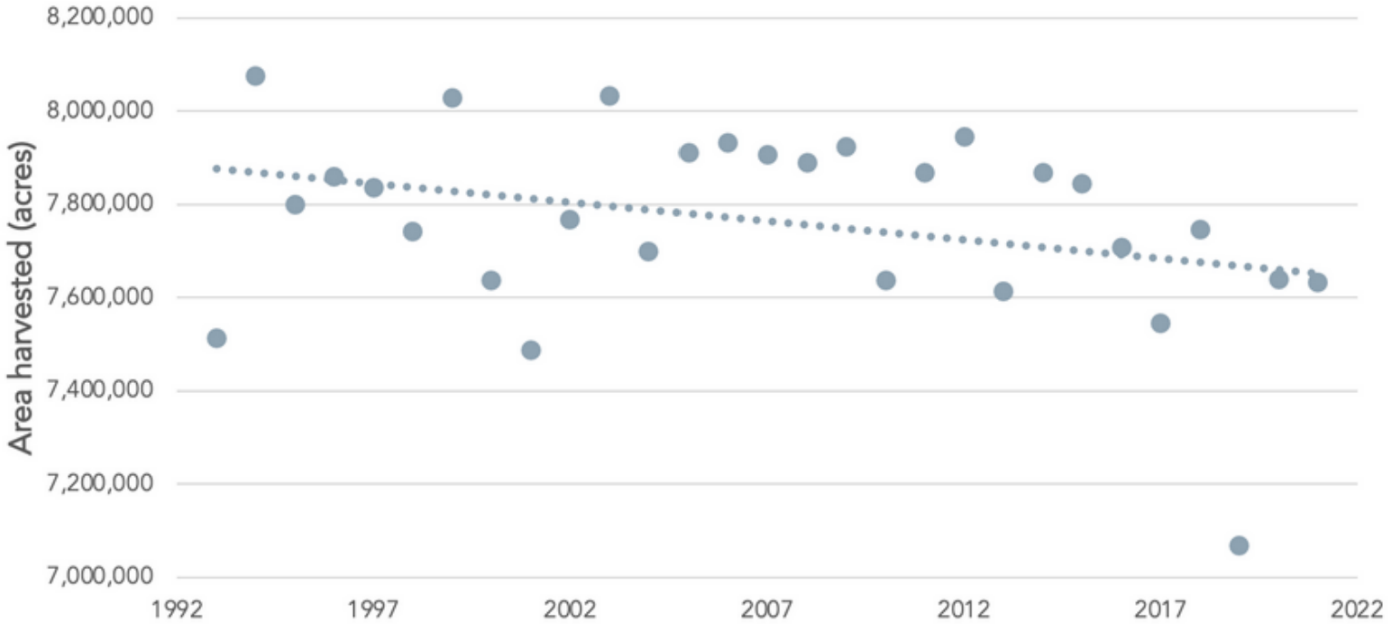
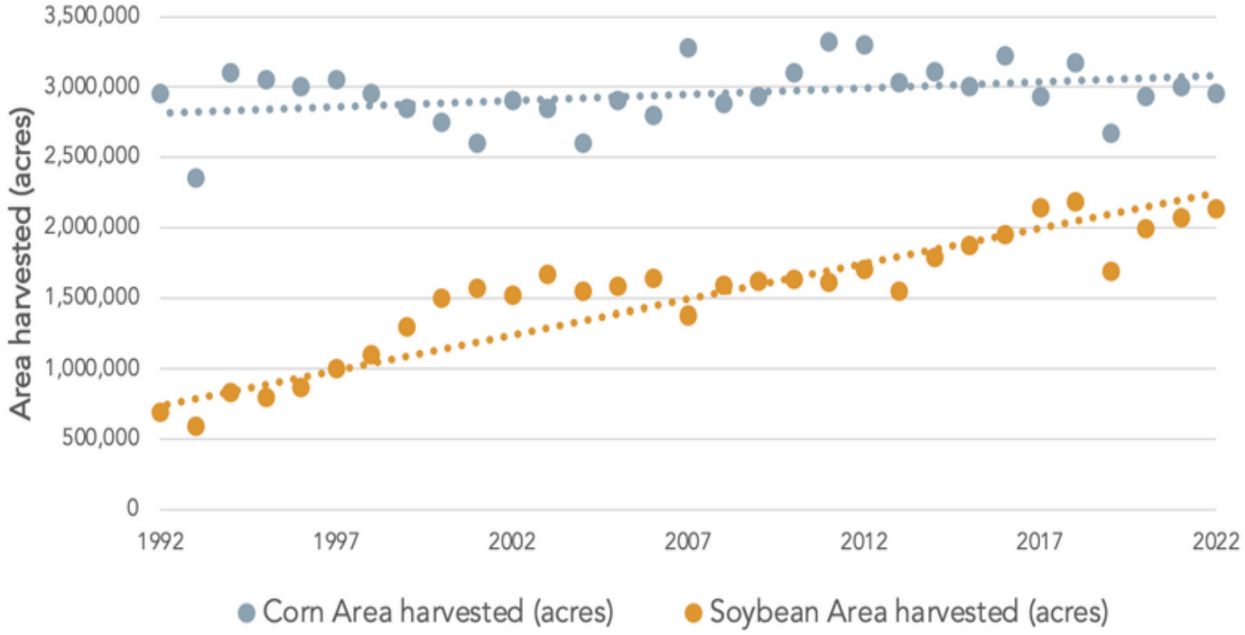


Harvested total crop land

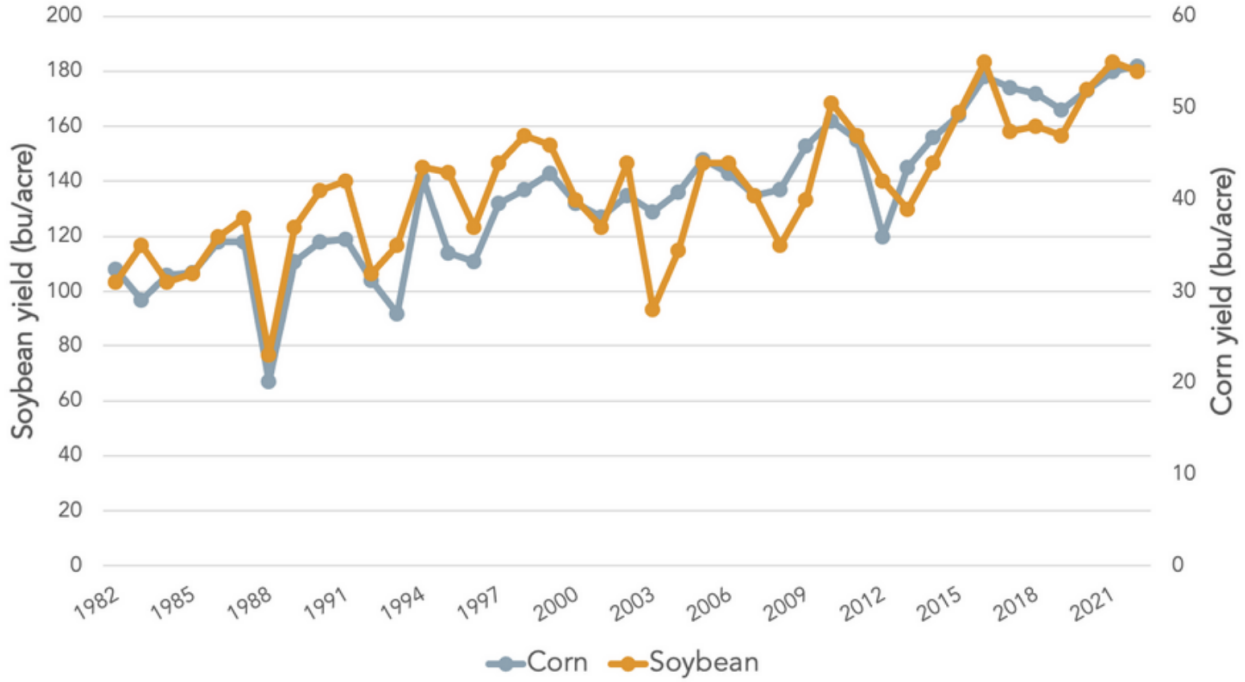
Harvested field crop land

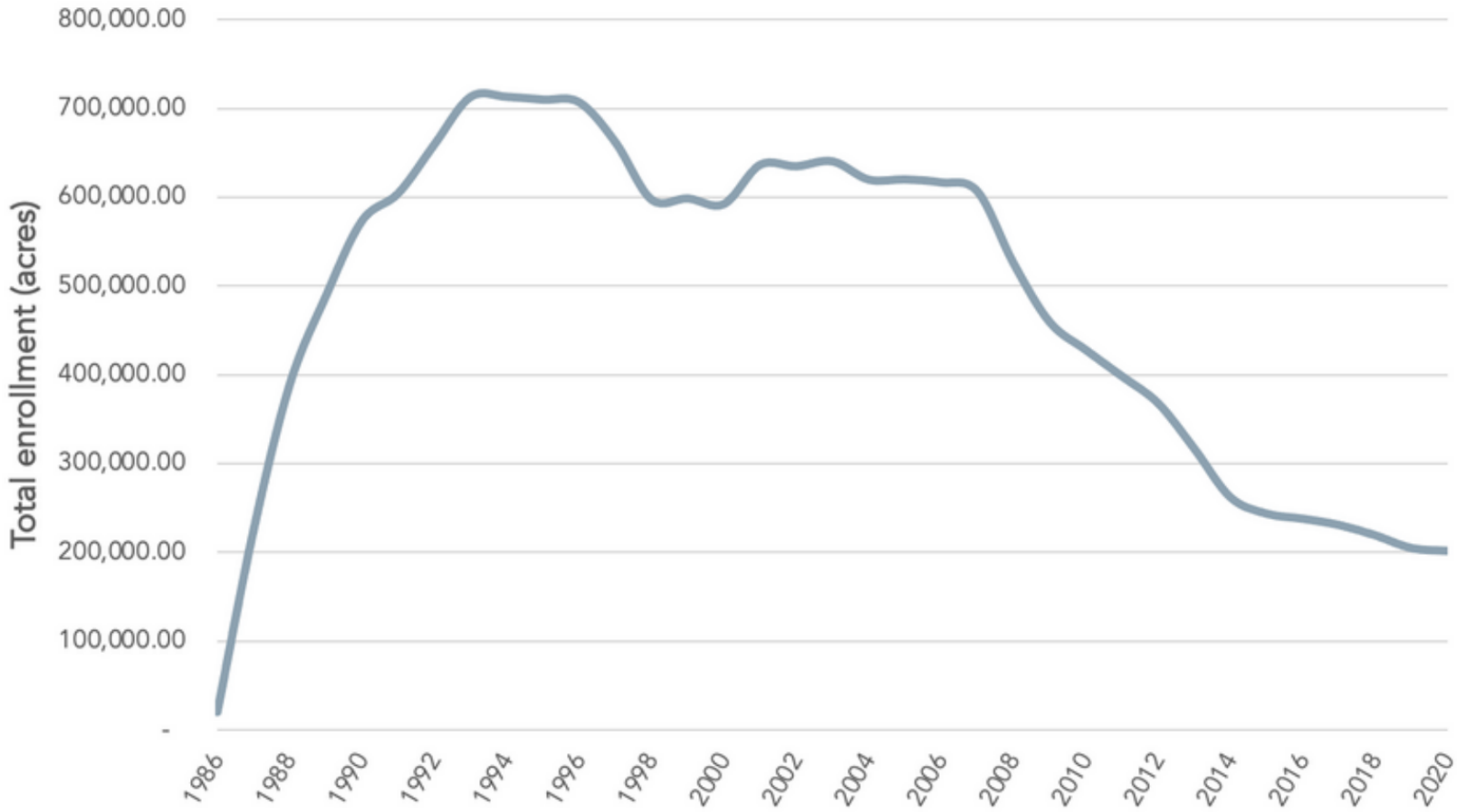




Harvested corn and soybean land area

Corn and soybean yields





Conservation Reserve Program Total Enrollment