

# Agrivoltaics 101

## A Primer on Integrating Agriculture and Solar Energy Generation



Southern Alliance for  
**Clean Energy**

**Greg Plotkin**

Sr. Manager, Smart Solar Outreach & Engagement  
American Farmland Trust

← Photo: Tomatoes, Eggplant, and Peppers being grown under solar panels at a Rutgers Agrivoltaics Project site in New Jersey



Keeping  
Farmers on  
the Land



Clean Water &  
Healthy Soil



Food Security for  
the Nation



Wildlife Habitat &  
Working Landscapes



Climate Resilience



Healthy & Equitable  
Food Systems



Rural Prosperity



Protecting  
Farmland

American Farmland Trust

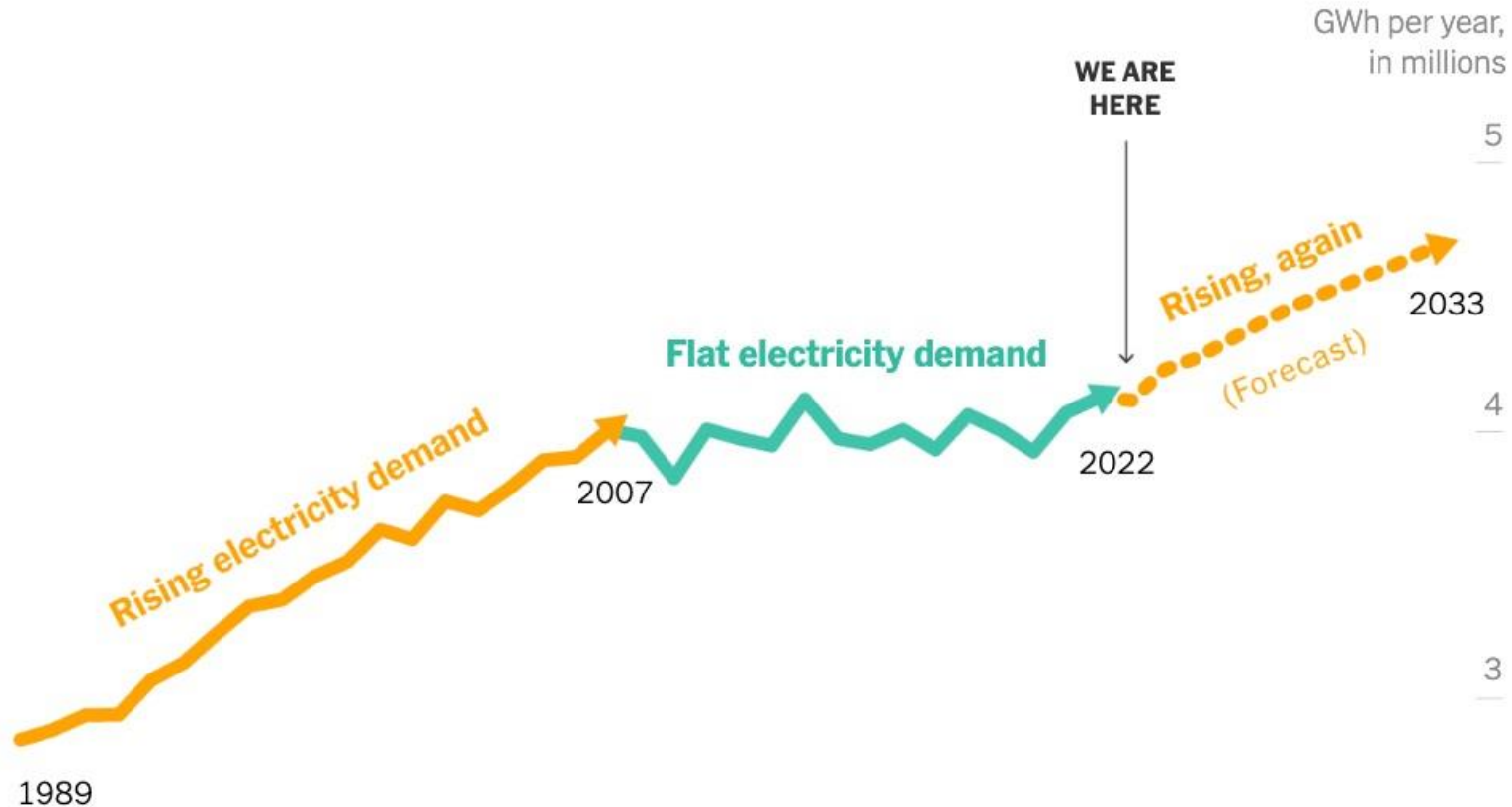
Saving the  
Land that  
Sustains Us

Promoting  
Sound  
Farming  
Practices



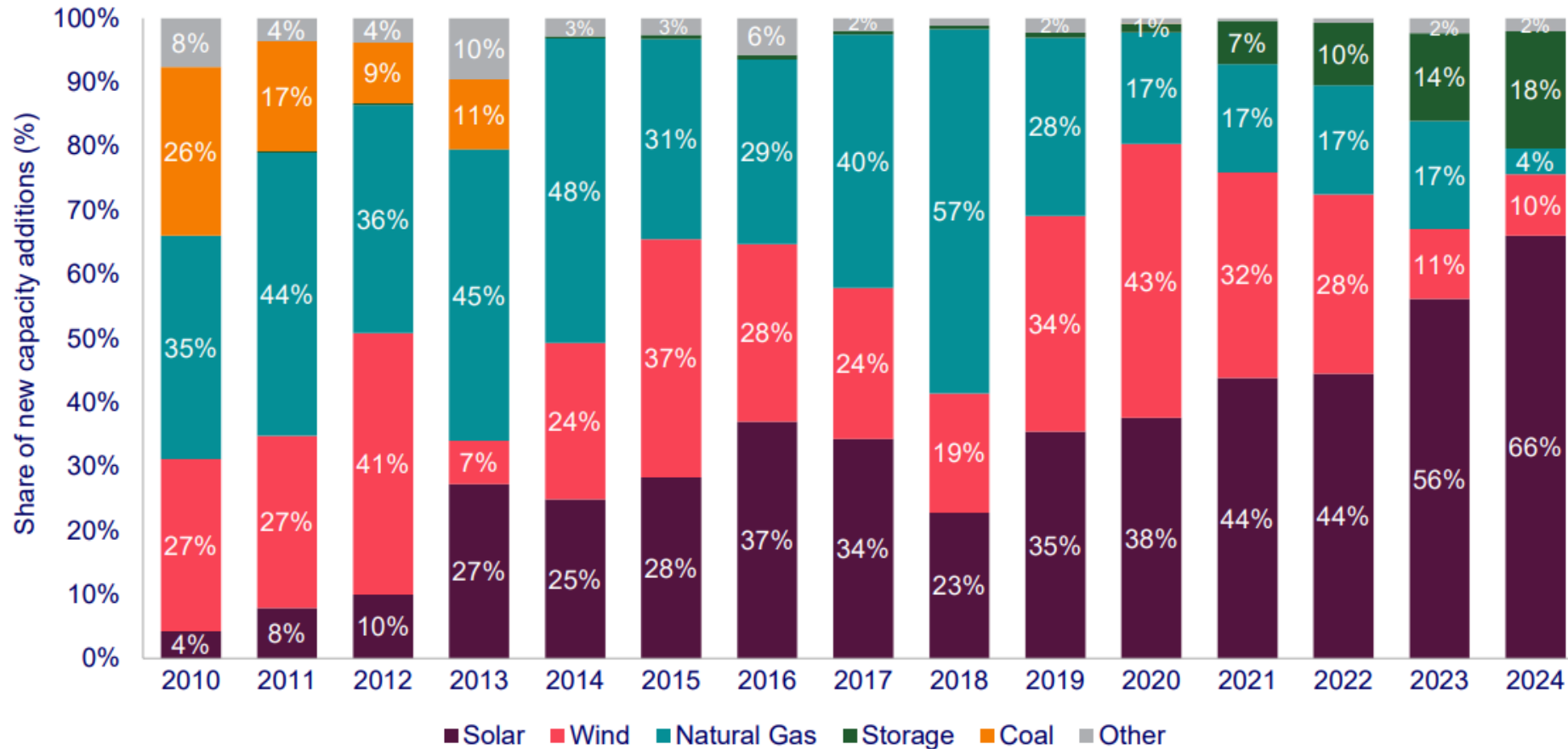
# Setting the Stage: Energy Demand is Rising

The New York Times



# Solar Dominates New Capacity Additions

New US electricity-generating capacity additions, 2010 – 2024



Source: Wood Mackenzie / SEIA

# The Solar Scale Continuum



**Behind the Meter**



**Community Scale**



**Utility Scale**

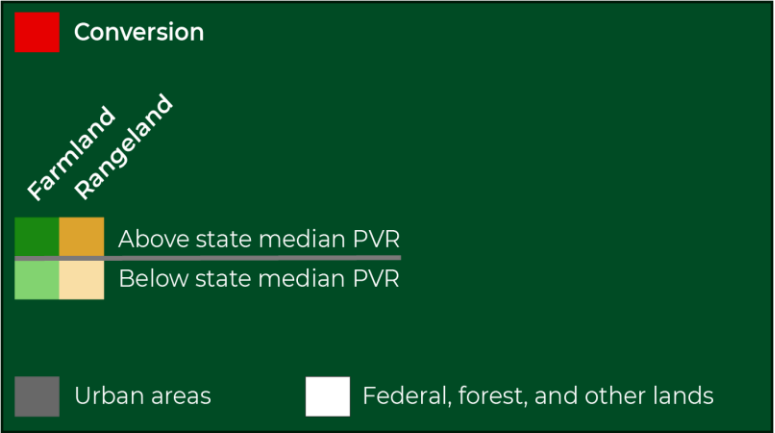
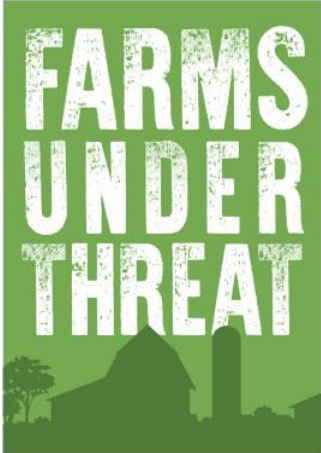
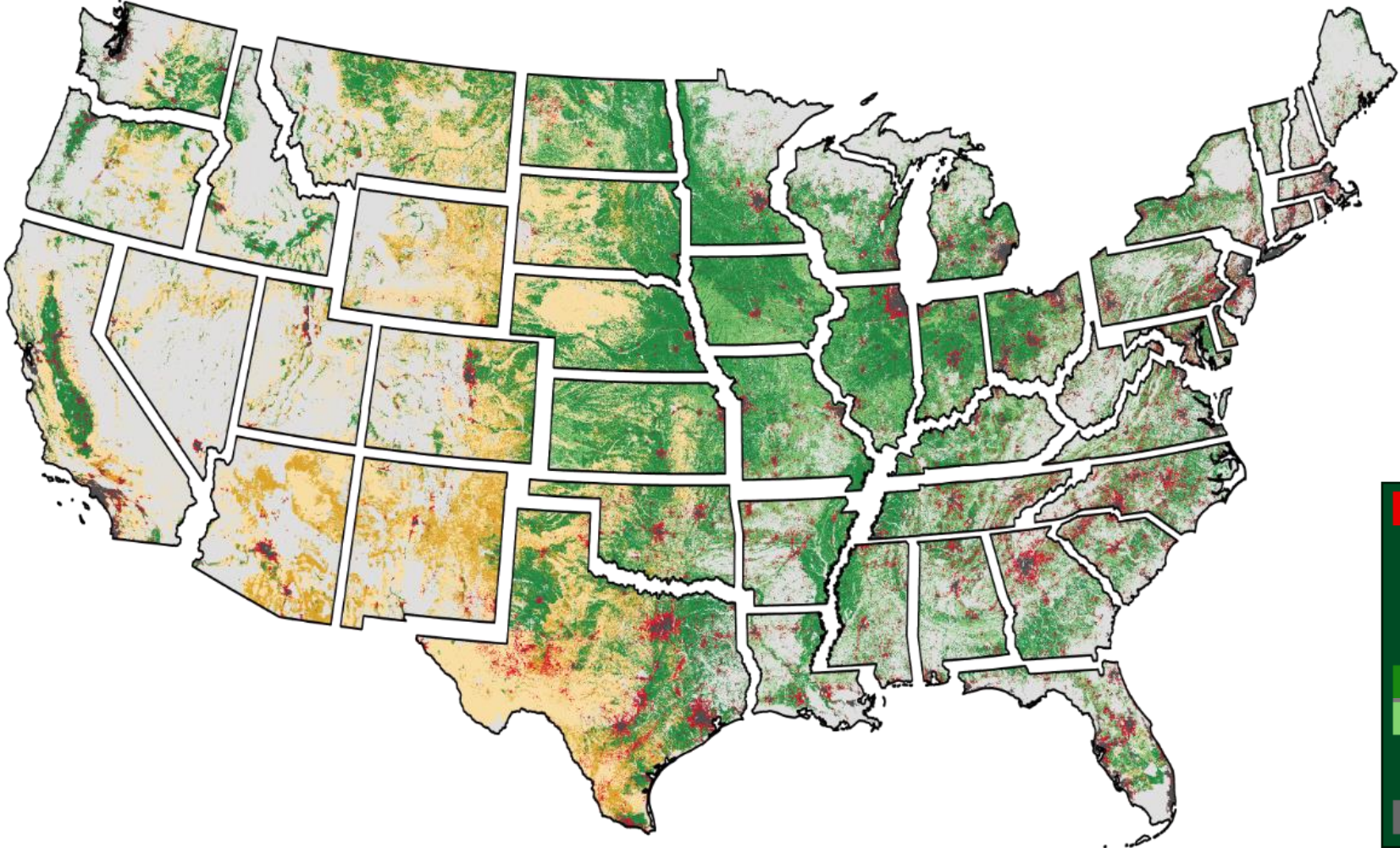


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**Number of Acres**

1,000+

# Farmland Loss in America



# Smart Solar: Farmer-First Development

## Three Equally Important Goals

- Strengthen farm viability
- Safeguard land well-suited for farming and ranching
- Accelerate solar energy development



# Principles to Guide Solar Development

## Smart Solar<sup>SM</sup> Principles

### PRINCIPLE 1

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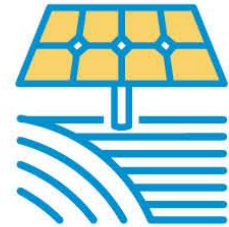
Prioritize solar siting on buildings and land not well suited for farming (unless agrivoltaics).



### PRINCIPLE 3

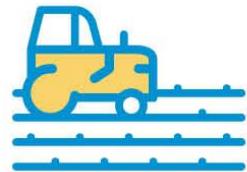
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Grow agrivoltaics for agricultural production and solar energy.



### PRINCIPLE 2

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Safeguard soils and the ability for land to be used for agriculture.

### PRINCIPLE 4

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Promote equity and farm viability.

# What is Agrivoltaics?

Agriculture + Photovoltaics

## **Federal Bills:**

“a system under which solar energy production and agricultural production, including crop or animal production, occurs in an integrated manner on the same piece of land through the duration of a project.”

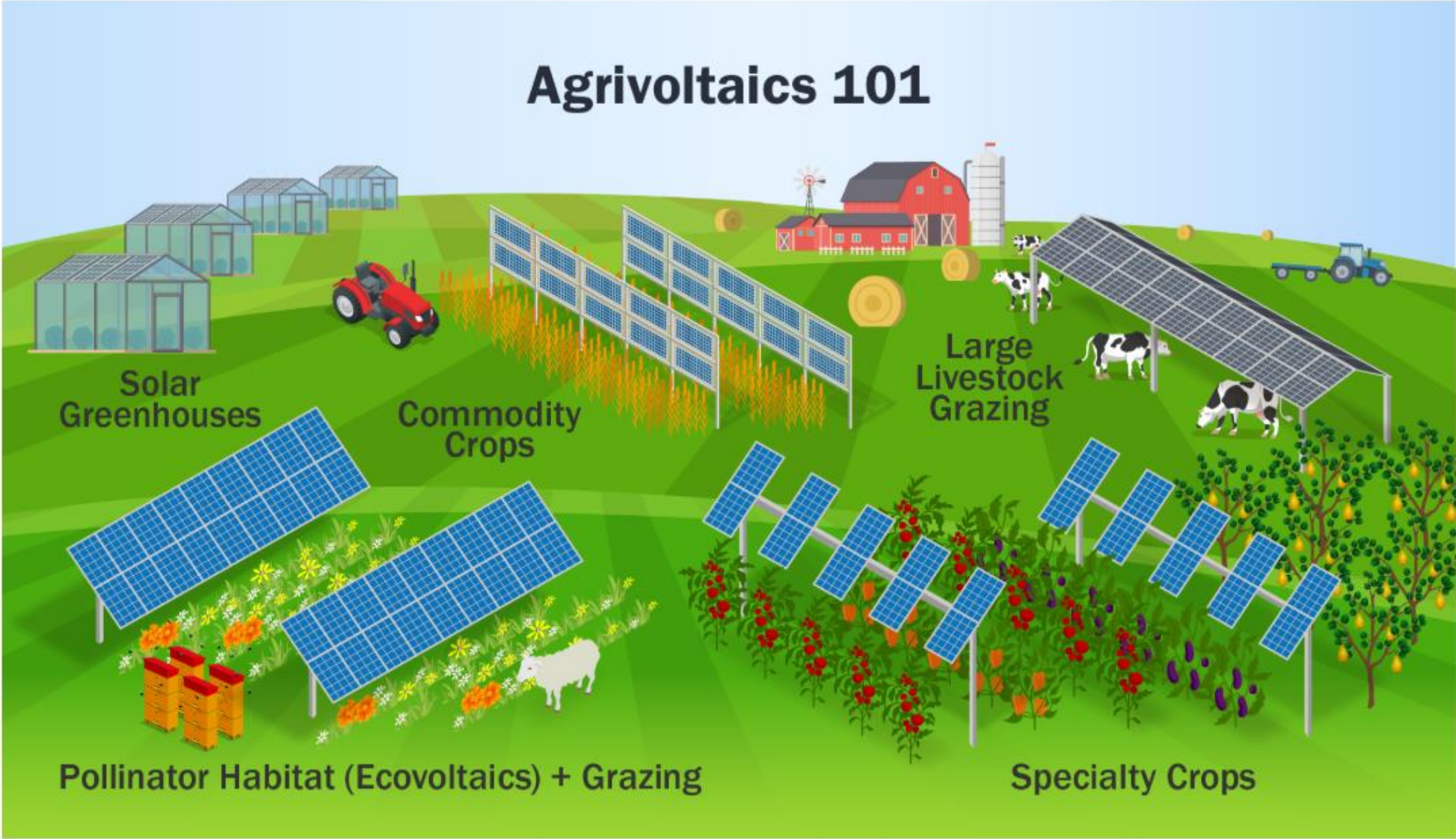


# Types of Agrivoltaics

- Grazing
- Crop Production
- Greenhouses



# Agrivoltaics 101



*Illustration by Tom Hickey and Al Hicks, NLR*

# Benefits of Agrivoltaics

## Food

- Protect crops, livestock from heat stress and drought
- Fenced arrays protect livestock and crops from pests/predators
- Produce more consistent crop yields

## Water

- Reduce water use for irrigation by up to 50%
- Increase water use efficiency of crops

## Energy

- Improve solar cell efficiency via reduced operating temperatures
- Reduce vegetation management costs

## Producers

- Reduce energy and water consumption
- Reduce risk of heat-related illness
- Diversify income



# Challenges of Agrivoltaics

## Food

- Uncertain impacts on crop yield, nutrition, and flavor
  - We know a lot, but not everything
- Potential increase in pest pressure
  - Especially fungus

## Water

- Variation in moisture distribution

## Energy

- Increased capital costs
  - \$0.07 to \$0.80 per  $W_{DC}$
- Increased complexity
- Transmission capacity in rural areas

## Producers

- Negative impacts from construction
- Limited flexibility in farming practices



# Current Tenure Models of Agrivoltaics

## Solar Leasing (3<sup>rd</sup> Party Owned)

- Landowner engages with Solar Company to lease land to solar project
- Typically ~25-40 year lease
- Option to negotiate an agrivoltaics option under panels

## On-Farm/Behind-the-Meter

- Covers On-Farm energy costs
- Expenses primarily covered by the landowner

## Tenant Farming

- Potential opportunities for tenant farming or grazing under a solar array



# Agrivoltaics Examples – UC Davis (CA)



# Agrivoltaics Examples – Czajkowski Farm (MA)



# Agrivoltaics Examples – Jack’s Solar Garden (CO)



# Agrivoltaics Examples – White Oak Pastures (GA)



# Upcoming In-Person Learning Opportunities

## ➤ Georgia Solar Farm Summit

- From the producers of the Solar Farm Summit (Dan French and Katie Meyer)
- July 15
- University of Georgia

## ➤ RE+ Southeast

- Navigating Siting and Permitting Challenges in the Southeast
- Wednesday, April 1, 1-5pm ET
- Ethan Winter, AFT National Smart Solar Director participating on panel



# Resources to Learn More



National Lab of the Rockies  
InSPIRE Agrivoltaics Program



American Solar Grazing  
Association



AGRI-SOLAR CLEARINGHOUSE

# Smart Solar<sup>SM</sup>



American Farmland Trust

## Thank you!



**Greg Plotkin, Sr. Manager for Smart Solar  
Outreach & Engagement**  
[gplotkin@farmland.org](mailto:gplotkin@farmland.org)



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