Solar Energy Technologies Office (SETO) Overview

MISSION

We accelerate the **advancement** and **deployment of solar technology** in support of an **equitable** transition to a **decarbonized economy no later than 2050**, starting with a decarbonized power sector by 2035.

WHAT WE DO

Drive innovation in technology and soft cost reduction to make solar affordable and accessible for all Americans

Enable solar to support the reliability, resilience, and security of the grid

Support job growth, manufacturing, and the circular economy in a wide range of applications

What is Renewable Energy Siting?

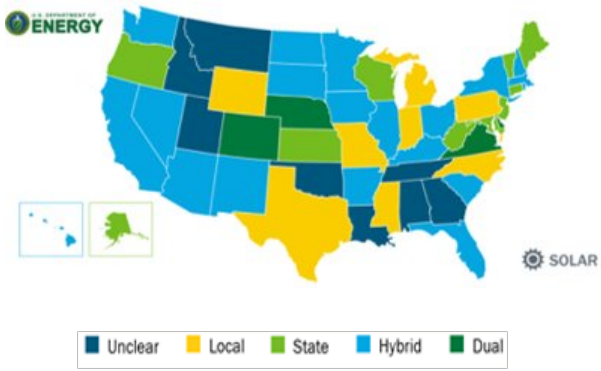
Renewable energy siting refers to a series of decision-making processes and actions that determine the location and design of new wind, solar, or other clean energy generating facilities

Siting **brings together a combination of stakeholders**

- Industry (i.e., developers) competes to identify suitable sites
- Local, State, Tribal, Federal governments review and provide permits
- Communities typically consulted after site is identified
- Researchers trying to catch up…

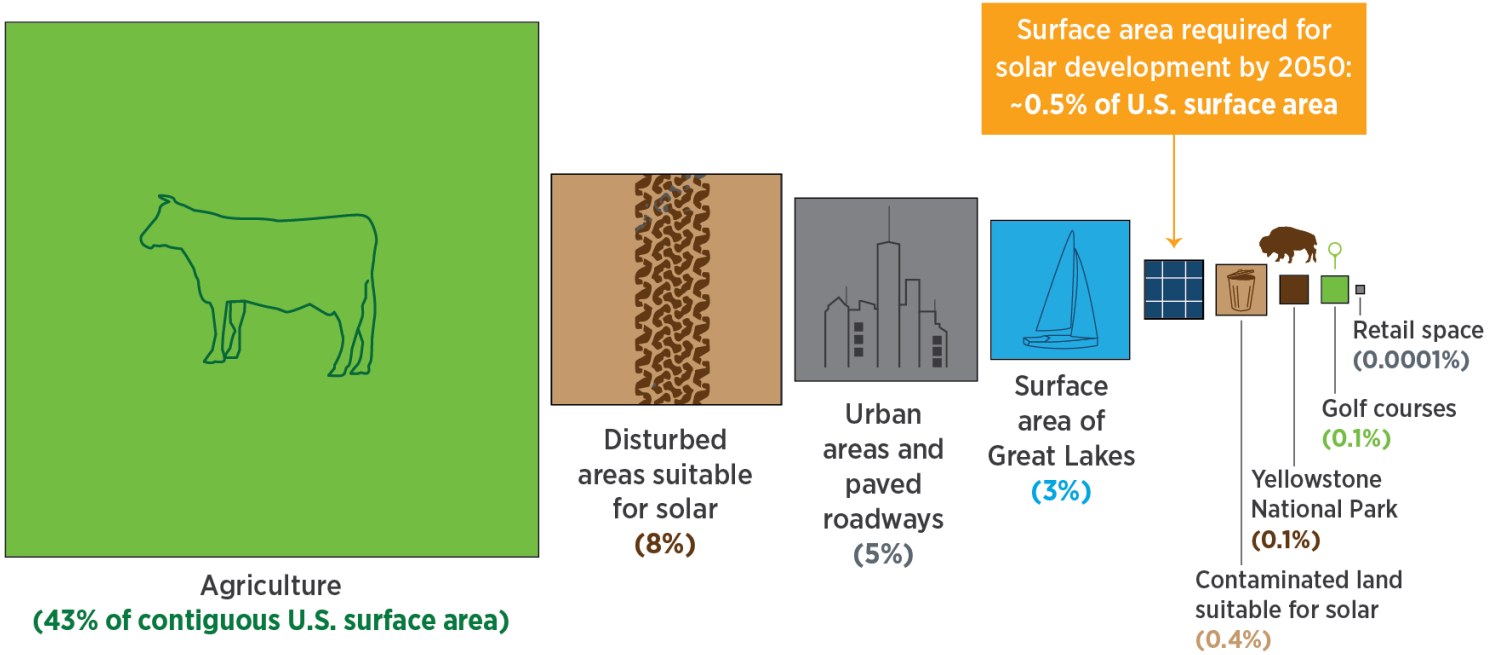
Siting is hyperlocal: the factors that dictate whether a site is suitable for a host community vary according to the priorities, values, and principles of that community

Siting Authority on Private Land

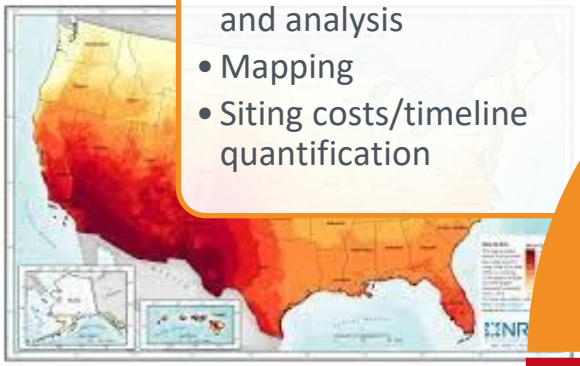


How much land will be required to achieve the scenarios?

1. We must install an average of 30 GW of solar capacity per year between now and 2025 and 60 GW per year from 2025-2030.
2. Ground-mounted solar is projected to require **~5.7 million acres** by 2035 (0.3%), and as much as **10 million acres** in 2050 (0.5%)



SETO Siting Research Framework



- Land use modeling and analysis
- Mapping
- Siting costs/timeline quantification

Foundational Data and Analysis

Social Benefits and Costs

- Economic impacts (jobs, revenue)
- Stakeholder perceptions/ knowledge flows
- Community-driven siting

Innovative Siting Solutions

- Floating solar
- Agrivoltaics (pollinators, grazing, and crops)
- Solar on contaminated lands and mine lands

Environmental Benefits and Costs

- Wildlife
- Native vegetation
- Water and soil quality
- PV End of life
- Carbon emissions

Solar Dual Use

Agrivoltaics

Agriculture (crop and livestock production, as well as pollinator habitat) underneath the solar panels, and/or in adjacent zones around the panels.

Pollinator Habitat

- Wildlife benefits – habitat creation
- PV facility as an ecosystem – native vegetation
- PV performance benefits

Ecosystem Services

- Crop pollination
- Food supply (e.g., honey)
- Stormwater management
- Soil carbon sequestration

SETO's Wildlife Portfolio

Mitigating Impacts and Maximizing Benefits
- Avian fatalities (CSP)
- Vegetation management
- Habitat creation
- Technology development

University of Illinois, Chicago
Assessing impact of pollinator-friendly solar ground cover at large (10MW+) projects

University of Central Florida
Characterizing performance of floating PV and associated environmental effects

Sandia National Laboratories
Developing bird surveillance technology and studying measures to reduce bird fatalities at CSP facilities

UMass, Amherst
Assessing bird reproductive success and pollinator biodiversity at solar facilities in the Northeast

Cornell University
Characterizing pollinator biodiversity at U.S. solar facilities using a new monitoring technology: Environmental DNA (eDNA)

Understanding Solar-Wildlife Interactions
- Avian activity, collision
- Presence/absence beyond birds
- Population-level impacts
- Landscape-level interactions
- Habitat fragmentation

Electric Power Research Institute
Developing drone and LIDAR technology which can be used to track and monitor avian activity at solar sites automatically

Argonne National Laboratory
Developing an AI-based edge computing camera system which identifies, tracks, and classifies avian activities at solar sites

University of CA – Los Angeles
Developing genetic analysis techniques to understand species and population impacts based on remains found at solar sites

University of Arkansas
Modeling bird, mammal, reptile, amphibian, and insect species occupancy at solar facilities with various forms of vegetation management and comparison to nearby reference sites

Wildlands Network
Monitoring pronghorn and other mammal activity, migration patterns, and distribution before and after construction of large-scale solar energy systems in the four corners region

Facilitating Access to Data
- Data sharing infrastructure
- Regional analyses
- Beyond the Southwest

Renewable Energy Wildlife Institute
Creating database composed of wildlife data from facilities across the U.S. Owners/operators contribute data and researchers query it to perform analyses that improve siting and permitting decisions.

SETO Agrivoltaics Projects

Agrivoltaics with Traditional PV Designs

The Ohio State University
Grazing and hay/forage production on traditional solar site; characterizing animal health and hay production.

University of Arizona
Grazing, crop production, and dryland-adapted crops, working with tribal and underserved farmers in desert Southwest.

University of Illinois – Chicago
Scaling pollinator-friendly solar ground cover to large (10MW+) projects.

Agrivoltaics with Modified PV Designs

Iowa State University
Horticulture and beekeeping at on-campus testbed, developing enterprise budgets to help farmers understand costs and revenues.

Rutgers University
Research at state-funded testbeds to understand soil, yield, impacts on crops and grazing, building a Northeast regional network of extension staff.

Silicon Ranch
Solar combined with rotational cattle grazing in Georgia, with a focus on impacts to animal health and soil carbon.

University of Alaska
Research on unique challenges and opportunities in high-latitude agrivoltaics, studying O&M costs and benefits for food security.

University of Massachusetts – Amherst
Agrivoltaic farm performance and economics in MA using various crop types.

National Resources

NREL (InSPIRE project)
Field research, data collection and analysis, and thought leadership on agrivoltaics.

National Center for Appropriate Technologies
AgriSolar Clearinghouse to connect practitioners with technical assistance and each other.

Solar and Storage Industries Institute (SI2)
Partnership with the solar, agriculture, and cooperative utility industry associations to understand and address practical barriers to agrivoltaics.

Interagency Coordination on Solar Siting

SETO collaborates with other state and federal agencies on solar siting topics to promote information sharing, stakeholder engagement, and collaborations.

- U.S. Department of Agriculture (USDA)
- Environmental Protection Agency (EPA)
- Bureau of Land Management (BLM)
- U.S. Fish & Wildlife Service (USFWS)
- U.S. Geological Survey (USGS)
- Association of Fish and Wildlife Agencies (AFWA)