EXPLORING SOLAR LEASING

A Guide for Agricultural Landowners in the Pacific Northwest

AGRISOLAR CLEARINGHOUSE

American Farmland Trust
SAVING THE LAND THAT SUSTAINS US

FARM COMMONS

WESTERN EXTENSION RISK MANAGEMENT EDUCATION

USDA National Institute of Food and Agriculture
U.S. DEPARTMENT OF AGRICULTURE

EXPLORING SOLAR LEASING

A Guide for Agricultural Landowners in the Pacific Northwest

CONTENTS

Introduction

The Pacific Northwest (Washington, Oregon, Idaho) is seeing rapid growth in solar energy development as energy demand rises and interest in renewable sources increases. Communities across the region are debating the need for—and the location of—large-scale solar projects. Solar developers are particularly drawn to farmlands and rangelands due to their size, flat and tree-free terrain, accessibility, and proximity to existing power grid infrastructure.

Farmland and rangeland owners find themselves at the heart of the conversation: Is entering a solar lease for a large-scale solar facility the right choice for their land?

On the one hand, solar leases can offer agricultural landowners long-term, consistent income from 25 to even 50 years, depending on the length and terms of the arrangement. However, the transition of agricultural land to solar production raises various concerns. Local communities worry about the potential loss of livelihoods, reduced food production, the long-term impact on soil quality, changes to the aesthetics of the region's landscape, and whether the land can or will be farmed after the solar lease ends.

As an agricultural landowner, you may have already been approached by a solar developer to enter a solar lease, or you may expect to get an offer soon. Your decision about whether to enter a solar lease affects your land, your business, your family, and your community. You have an intimate understanding of your land's history, value, and importance to your livelihood and legacy. This knowledge puts you in a strong position to make an informed decision about the future of your land.

This guide highlights issues specific to landowners in the Pacific Northwest. Region-specific issues include the legal and regulatory landscape, farming conditions, and shifting climate patterns in Idaho, Oregon, and Washington. Farmers in other regions will still find this guide informative as many issues landowners face when deciding whether to lease their land for solar are shared throughout the country.

That said, the decision can feel overwhelming. You may be torn between preserving your farmland, leasing it to a solar developer, or exploring the options of agrivoltaics–the dual use of land for both solar power generation and agriculture. Differing opinions from family members or business partners can add complexity, and negotiating with a solar developer can feel intimidating.

The purpose of this guide is to help agricultural landowners understand the broader context of solar leasing—focusing on issues, risks, and potential benefits before deciding to enter into a lease agreement. Each section is designed support you through the complex decision-making process by:

- Highlighting key issues to consider
- Providing a roadmap for evaluating options
- Offering communication tips for discussing this decision with others

Each section concludes with a set of reflection questions that invite you to consider how the information provided relates to *your* situation. Taking time to write down answers can help you recognize and address your concerns and arrive at a more thorough and confident decision.

Ultimately, it is your decision. It takes integrity to gather information, evaluate options, and make a thoughtful decision. It requires courage to have difficult conversations with loved ones and partners about their concerns and the decision before you.

This guide is the first in a two-part series. If you've already decided to enter a solar lease—or decide to after reviewing this guide—be sure to check out **Negotiating a Solar Lease: A Guide for Agricultural Landowners**. The sequel will help you navigate the lease negotiation process by:

- Explaining when and why to involve an attorney
- Identifying key points to address in legal documents
- Offering tools for negotiating with solar developers

- What do you value most about your land? Consider tangible qualities of the landscape, wildlife that passes through, connections that it facilitates, memories you hold.
- Why are you considering a solar lease?

Understanding the Scale of Solar Projects

Rise of large-scale solar projects in the Pacific Northwest

Until recently, solar energy in the Pacific Northwest was primarily limited to small, residential rooftop installations. However, since 2016, large, utility-scale solar projects have been developed in all three states, with many more proposed or approved across the region. The growth of these projects is driven by the increased energy demands, a need to meet clean energy goals, and the decreasing cost of solar technology, which now competes with other energy sources like wind, hydro, and natural gas. Advances in technology have also made these projects more efficient and cost-effective. For these reasons, large-scale solar projects are expected to keep expanding in the Pacific Northwest.

What Does "Large-Scale Solar" Mean?

To understand large-scale solar projects, it's important to know some key terms: megawatt, behind-the-meter, and front-of-the-meter.

What Is a Megawatt?

A watt is a unit of power that measures the rate of energy transfer; a megawatt (MW) is one million watts. **1 MW = 1 million watts**

How many homes does a MW of solar serve in the Pacific Northwest? It varies depending on sunlight, temperature, wind, and average household electricity use. The Solar Energy Industries Association (SEIA), a leading trade organization in the solar industry, estimates that **one megawatt of solar energy powers between 100 and 150 homes annually in the Pacific Northwest**. The number continues to increase with improved technology and increased utility-scale solar production.

How much land is needed to generate one MW? It varies depending on the efficiency of the panels, the sunlight, topography, proximity to grid infrastructure, tracking versus fixed-tilt, latitude, ground-coverage ratio, and more. Generally, 5–10 acres are required to generate one MW. **A 5 MW project might need between 25 and 50 acres of land.**

Sunstone Solar is currently the largest planned solar facility in the Pacific Northwest to date. It is projected to generate **1,200 MW of power, covering 9,442 acres of agricultural land (zoned Exclusive Farm Use),** in Oregon, near the Columbia River in Morrow County. This facility will generate enough power to serve 800,000 homes annually. Construction is slated to begin in 2026.

ENERGY USAGE AND LAND REQUIREMENTS FOR SOLAR PROJECTS

AMOUNT OF MW GENERATED	HOMES POWERED (POTENTIAL)	AMOUNT OF LAND NEEDED
1 MW	100–150	3.5–16.5 acres (mean = 10)
100 MW	10,000–15,000	70–330 acres (mean = 200)
1,000 MW	100,000–150,000	7,000–33,000 acres (mean = 20,000)
Oregon example: Christmas Valley—400 MW	*40,000–60,000*	*3,840 acres (6 square miles)*

* Numbers based on data from "What's in a Megawatt", SEIA. seia.org/initiatives/whats-megawatt.

NOTE: These numbers are estimates and vary by state. In Idaho, 1 MW provides energy for close to 150 homes, while in Washington the number of homes powered by 1 MW is estimated to be closer to 100. Factors affecting the number of homes include average sunshine (also called insolation), average household electricity consumption, temperature, and wind.

These numbers only provide a glimpse of the land needed for a large-scale solar project. Solar energy is a rapidly emerging industry. Based on the trends of technological advancements, it seems that less land will be needed per MW of solar energy generated and costs will continue to decrease. This could shift tensions between risks and opportunities for all.

Regulatory decisions also influence the costs of solar and whether, where, and how solar projects are built. Currently, regulatory agencies at the national, state, and local levels are wrestling with strategies to regulate the markets for solar energy, provide incentives, or let things be. What's more, various policies and legal decisions are caught in litigation. The shifting political climate and inevitable legal battles provide further ambiguities for the future costs and advancements of solar development.

For more on regulation and legal battles, see Section 3: Regulatory Process

Behind-the-Meter vs. Front-of-the-Meter Solar

Solar energy can be categorized into two types:

- **Behind-the-Meter (BTM)**: This system powers the building or farm where it is installed. Surplus energy may be sent to the grid in exchange for utility credits, depending on net-metering policies. These systems are generally small-scale and include rooftop panels or on-site solar installations.
- **Front-of-the-Meter (FTM)**: This system generates solar power that is sent directly to the power grid. It is much larger in scale, typically over 5 MW. Examples include utility-scale and community solar projects, where the energy generated is shared among many users.

What Is Net Metering?

Net metering policies come into play when you have a solar energy system that generates more power than you use. You can deliver the excess solar energy directly to the power grid to be dispersed. In exchange, the utility gives you a credit on your utility bill. This is called "net metering." **If you're considering entering into a solar lease agreement, it's important to understand how the net metering policies in your state could impact the financial viability of solar projects on your land.**

NET-METERING POLICIES IN IDAHO, OREGON, AND WASHINGTON

STATE	NET-METERING POLICY	SYSTEM CAPACITY LIMIT
Idaho	Idaho does not have a statewide net-metering law. Instead, each of the state's three investor-owned utilities (Avista Utilities, Idaho Power, and Rocky Mountain Power) has its own net-metering rate approved by the Idaho Public Utilities Commission (IPUC). As of January 2024, Idaho Power transitioned to a net billing model for new solar customers, offering *lower* compensation for excess energy exported to the grid. The shift to net billing and potential reductions in export credit rates (ECRs) could affect the compensation solar developers receive, influencing the terms and financial benefits of solar leases.	Set by utility company
Oregon	Oregon's net metering program requires all utilities, including investor-owned, public utility districts, municipalities, and cooperatives, to offer net-metering programs to customers with solar and other renewable energy systems tied to the grid. ORS 757.300.	Up to 25 KW for residential installations, and 2 MW for commercial.
Washington	Washington's net-metering law requires all utility companies, including investor-owned, public utility districts, municipalities, and cooperatives, to provide net-metering on a first-come, first-served basis to eligible customer-generators with on-site renewable energy systems. RCW 80.60.	No more than 100 KW

Types of Large-Scale Solar Projects

Community Solar: This type of project allows multiple people in a community to benefit from solar energy. It involves a large solar array installed in a shared location, and participants can buy or lease a portion of the energy generated by the system. Community solar projects are typically smaller, usually between 1,000 kW and 5 MW in size, and the energy is used by local homes or businesses. Participants receive credits on their utility bills for the energy produced, often through a net-metering arrangement.

Utility-Scale Solar: Utility-scale solar projects are designed to generate power for distribution to the grid. These projects typically start at 5 MW and can be much larger. Power from these projects is distributed to a utility's ratepayers, who then pay for their electricity usage. Developers of utility-scale solar projects often lease large tracts of land and work with utility companies to sell the generated electricity via long-term power purchase agreements.

SCALE

TYPE		RECIPIENT OF SOLAR ENERGY
Personal Use/ Net-Metering		Farm operation
Community Solar*		Local Community
Large Commercial*		Single business or entity
Utility-Scale Solar*		Utilities (wholesale sales)

*Solar lease

Commercial Solar: These projects are similar to utility-scale projects, but they are built to serve a single commercial client. For example, large solar installations are sometimes constructed to power data centers for tech companies like Google, Meta, Microsoft, or Amazon. These projects are typically large-scale but focused on meeting the energy needs of one specific business, and are often rooftop, carport, or

ground-mount solar and are on-site at the commercial business. Some commercial solar, including those that power data centers, are considered to be utility-scale due to size and location.

How Large-Scale Solar Works

Most large-scale solar projects use one of two technologies:

- **Photovoltaic (PV)**: Converts sunlight directly into electricity using solar panels. PV systems require inverters to change the direct current (DC) into alternating current (AC) for the grid. **No water is needed for the PV process; however, water may be needed to clean the panels**.
- **Concentrating Solar Power (CSP)**: Uses mirrors to focus sunlight and create heat, which is then used to generate electricity. **CSP systems often require water for cooling.** This system is not common in the United States.

Solar Leases: Needed for Large-Scale Solar Projects

The development of a large-scale solar project often follows a "chicken-and-egg" process. Solar developers approach landowners to inquire about their interest in leasing their land for a planned solar project. So begins the process. The "solar developer" could be a representative from a private solar development company, a utility company that owns a solar project, a community solar project, or a commercial project. Here's a snapshot of how it typically plays out.

Private solar development companies. Generally, a **private solar developer's** goal is to sell the energy generated from the project to a utility provider. This arrangement typically requires a **power purchase agreement (PPA)**. However, before submitting a project to the utility, the developer must secure enough land—often by bundling multiple parcels together through landowner agreements to fulfill the vast acreage needs. Private solar developers may contact many landowners in a general area to see if sufficient interest and enough land area exist to develop a solar project. Some developers are advertising in farm magazines to further spread their reach.

Sometimes, private solar developers begin with a **Letter of Intent (LOI)**, expressing interest in leasing land and seeking cooperation to explore the arrangement. In other cases, they bypass the LOI and move directly to an **Option to Lease Agreement**. This agreement locks the landowner in once the developer determines that the land is suitable, and all financial, regulatory, and other contingencies are met.

Once enough land is secured, the project is presented to the utility provider. If the utility or regulators reject the proposal, the project collapses, and the initial agreements with landowners (e.g., LOI or Option to Lease Agreement) become void.

Utility-owned solar, community solar, or large commercial solar projects.
For **utility-owned solar projects**, the utility company often bypasses the need for a PPA but still faces the challenge of securing financing and regulatory approvals. The same applies to **community solar** and **large commercial** projects, where the end-users are already identified.

The initial process of a large scale solar project—from planning to construction—can take over a decade, especially with legal challenges. It's helpful for landowners to understand both the timeline and scale as they consider whether to enter into a solar lease. The next section dives into all the phases of a solar lease– from siting to decommissioning–in more detail.

Fundamentally, whether it's for a community solar, utility solar, or commercial solar project, a solar lease will impact the land for generations. These leases typically last 25 to 40 years with automatic extensions of 5-10 years. It is essential for landowners to carefully consider whether it's the right decision for them and to explore what matters most at the initial stage.

If a representative from each type of large-scale solar project approached you about a solar lease, what questions would you have for them? For example, you might want to know about their desired project scale, land requirements, and their track record in business ethics and land stewardship.

- Community Solar Representative (1000 kW to <3 MW for your community):
- Private Solar Developer or Utility Solar Representative (>5 MW for utility solar)
- Commercial Solar Representative (enough to power one specific facility):

Considering the Phases of the Solar Lease

It's helpful for landowners to understand the various phases and timelines of a large-scale solar project *before* they decide to enter into a solar lease. These phases go from initial contact with a solar developer to the eventual decommissioning of the project, with various uncertainties along the way. Understanding each phase will help you make informed decisions about your land and its future.

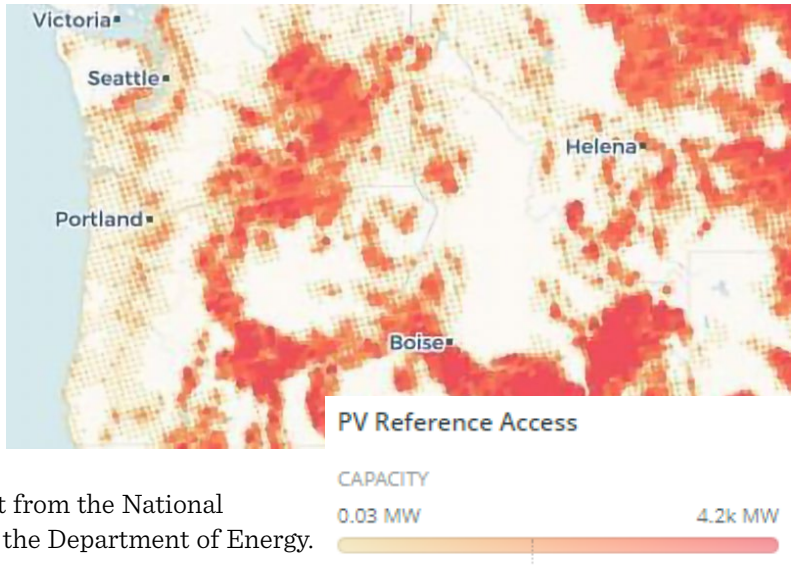
	PHASE	EVENTS
	Siting phase	**Identifying properties** **Contacting landowners** **Letter of Intent**
	Development or option phase	**Option agreement + Solar lease** **Due diligence** **Regulatory permitting** **Power purchase agreement (PPA)**
	Construction phase	**Solar lease begins**
	Operational phase	**Maintenance**
	Decommissioning phase	**Solar lease ends (25+yrs later)**

Siting Phase: The Solar Developer Identifies Suitable Properties

The process begins when the solar developer starts researching potential locations for the solar project. The developer's goal is to identify properties with the right conditions for solar energy production, including optimal sunlight and proximity to grid infrastructure. They also need to assess the legal and regulatory requirements for constructing and operating a solar facility.

Key factors that solar developers consider

Sufficient Sunlight: The developer will consider the amount of sunlight in the area, which is measured using the Global Horizontal Irradiance (GHI) metric. *To see what kind of solar energy potential exists near you, visit the National Renewable Energy Lab.*



The Pacific Northwest has varying solar potential, with areas in Central and Eastern Washington, Oregon, and Southern Idaho having the highest potential, as illustrated in the map at right from the National Renewable Energy Laboratory division of the Department of Energy.

Proximity to the Power Grid: Developers prefer locations near high-voltage power lines and electrical substations to reduce the costs of connecting the solar project to the grid.

Physical Property Characteristics: Flat, clear land with good drainage and minimal obstacles (like large rocks or trees) is ideal for solar arrays.

Minimal Legal Hurdles: Properties with fewer zoning or permitting issues and no conflicting easements (such as for utilities or wetlands preservation) are more attractive to developers.

After assessing these factors, the developer reaches out to landowners to gauge their interest in leasing their property for the solar project.

Development or Option Phase: Securing the Lease Agreement

Once a developer identifies potential properties, the next step is to enter into a **Letter of Intent (LOI) or Option Agreement** with landowners. These agreements provide the developer with exclusive rights to investigate the property further and secure necessary financing and permits.

See ***Negotiating a Solar Lease: A Guide for Agricultural Landowners*** for more details and legal tips on navigating the solar lease legal agreements, including the LOI and Option Agreement.

Be sure to get everything in writing during this initial phase. Spoken conversations can be misinterpreted or inaccurate. Always follow up with an email or written agreement to clarify details. These documents can then be shared with your attorney, business partners, or family as you move forward in the process.

A **Letter of Intent (LOI)** expresses the developer's interest in the project. While not legally binding in terms of committing to the project, the LOI often requires the landowner to agree to terms like exclusivity (not negotiating with other solar developers) and confidentiality (not sharing any information about the arrangement with others).

We highly recommend having an attorney review the LOI before signing. An attorney can help protect your interests and guide you through the process. As a general rule, seek legal advice whenever a solar company (or anyone) presents a written document, requests your signature, and offers money.

An Option Agreement is a more formal step. Once signed, the landowner is committed to the full terms of the solar lease agreement if the developer secures financing and regulatory approval. But, the agreement is void if finances or regulatory approvals fall through. In other words, the landowner does not have an out, but the solar developer does.

It's critical to have an attorney review the option agreement before signing, as it's a legally binding document with long-term implications. If you plan to farm during the option period, ensure the agreement allows it. The agreement should also require the developer to notify you before proceeding, giving you time to remove crops and livestock to prevent damages.

The development or option phase usually lasts between **2 to 5 years**, during which time the developer conducts **due diligence** on the property, including finalizing the project design, securing permits, and negotiating a power purchase agreement (PPA) with a utility company. The landowner may still use the land for farming, but must allow the developer access for surveys and inspections.

It's worth noting that developers often sell the project to a new owner at key milestones in the project, such as the start of construction. This means that the initial developer one works with may not be the ultimate owner of the project, emphasizing the need for proper due diligence during the contracting process.

Construction Phase: The Solar Lease Begins

If the project moves forward after the option phase, the solar lease officially begins. This marks the start of the **construction phase**, where the solar developer begins building the solar installation.

- Construction can take anywhere from **6 months to 3+ years**, depending on the project size.
- The **land may experience significant disruption**, including **grading**, **soil compaction**, and **noise** from construction equipment. Fencing is often installed around the solar array area.
- Landowners will typically begin receiving **rent payments**, although these may be lower during construction, as the project has not yet become operational.

Operational Phase: Ongoing Solar Production and Maintenance

Once construction is complete, the solar project enters the operational phase. This is the longest phase of the solar lease process, as the solar facility generates electricity for the grid, and the landowner receives rental payments based on the energy production.

- **Maintenance**: The developer is typically responsible for maintaining the solar facility. This includes **cleaning panels**, conducting **equipment repairs**, and managing vegetation growth. Some solar projects use innovative "dual-use solar" techniques like **solar grazing** (using livestock to maintain vegetation), integrated **crop production**, or establishing **pollinator-friendly habitats** beneath the panels. See the *Agrivoltaics* section for more details.
- **Lease Renewals**: The solar lease often includes automatic renewal provisions, meaning the lease could be extended after the initial term ends, depending on the condition of the infrastructure and any new technological advancements.

Section 4, Exploring Agrivoltaics, provides an overview of these innovative techniques.

Decommissioning Phase: The End of the Lease

The **decommissioning phase** marks the conclusion of the solar lease, typically **25+ years** after the project has started. This phase involves the removal of solar panels, infrastructure, and restoration of the land. The lease will specify a timeframe for the developer to remove all equipment and restore the land to its original condition, which usually takes **12 months**.

It's critical that the lease requires the developer to provide a financial bond or guarantee and sufficient insurance to cover the costs of decommissioning.

We discuss the decommissioning phase in more detail in *Section 6, Recognizing Impacts to Agriculture and the Land*.

TOTAL LEASE LENGTH

When we add up all these phases, we realize how long the land could be subject to the lease:

PHASE	TIME
Option phase	2–5 years
Construction phase	2–3 years
Operations phase	25–30 years
+ Renewals	5–10 years
Decommissioning phase	1–2 years
TOTAL LENGTH	**35–50 YEARS**

As you consider entering into a solar lease, reflect on the following:

- How do you feel about the long-term commitment required by the solar lease, from construction to decommissioning?
- What phase of the solar leasing process feels most uncertain or concerning to you? Why?
- Have you made a succession plan for your land? How will a project impact the next generation on the land?

Understanding the Regulatory Process for Large-Scale Solar Projects

Solar projects are subject to several federal, state, and local regulations that govern the construction, operation, and decommissioning of the project. By understanding these regulatory requirements, landowners can ensure that they are working with solar developers who are fully compliant with environmental and legal standards. This understanding can help minimize risks and delays throughout the process–including the risks and costs of getting pulled into litigation as the landowner.

Why It's Critical to Understand the Regulatory Process

A solar developer's failure to comply with federal, state, or local regulations can lead to significant consequences for the landowner:

- **Penalties, Fines, and Litigation**: Failure to obtain the necessary permits can result in fines and legal action, which can put landowners at risk.
- **Delays and Project Cancellations**: Inadequate permitting or environmental reviews can delay or even halt a solar project, which can impact anticipated lease payments.
- **Increased Costs**: Developers who fail to comply with regulations may face increased costs to remedy violations, further complicating the process and potentially reducing expected payments and income to the landowner.

Solar Project Siting and Oversight: State and Local Regulations

State and local authorities are primarily responsible for approving the siting and construction of solar projects. Solar developers must navigate these local regulations, which can vary depending on which state and county the land is located.

State Energy and Environmental Agencies

In Oregon and Washington, state energy and environmental agencies regulate the siting and permitting of large-scale solar projects. These agencies may require developers to submit detailed plans, conduct public hearings, and assess potential impacts on local communities and the environment. The following table highlights key points of each state's siting process.

STATE	SITING PROCESS
Idaho	Idaho lacks a state-level agency for siting large energy facilities. Local governments, including county commissions and municipalities, handle most siting authority, including permitting and public participation. Solar developers must navigate local zoning requirements and any applicable state or federal regulations.
Oregon	The Oregon Energy Facility Siting Council (EFSC) oversees the siting of large energy facilities, including solar projects. Before construction can begin, the developer must apply for a site certificate from EFSC and meet the council's siting standards. This process consolidates state agency and local government regulations into a single review, covering issues such as land use, environmental impacts, noise concerns, and cultural considerations. The process includes a public comment period, a public information meeting, and a public hearing. Under **House Bill 3179 (effective Jan 2024)**, the thresholds for projects requiring EFSC review have increased, providing more flexibility for solar developers and allowing some larger projects to be permitted at the county level. The new thresholds are as follows: • **Projects over 240 acres** on high-value farmland as defined in ORS 195.300 • **Projects over 2,560 acres** (approximately 4 square miles) located on land that is predominantly cultivated or made up of soils in capability classes I to IV, as defined by the USDA's National Cooperative Soil Survey • **Projects over 3,840 acres** (approximately 6 square miles) located on other land Smaller projects may still be subject to local and state agency requirements, including zoning and permitting through the county or municipality where the solar project will be located. For projects below these new EFSC thresholds, local jurisdictions have increased authority to manage permitting, though developers must still comply with applicable state regulations.
Washington	The Washington Energy Facility Site Evaluation Council (EFSEC) oversees the siting of large energy projects. Developers must apply for a site certificate, consolidating local, state, and federal regulations. The review addresses land use, environmental impacts, noise, and cultural concerns, with public meetings and hearings. For solar projects of any size, EFSEC review is optional. If not pursued, developers must navigate local, state, and federal requirements separately, including zoning. Pursuing EFSEC approval enables developers to bypass local approval processes. Notably, EFSEC has the authority to overrule local zoning laws, which has been a point of contention in rural areas with strong local opposition to renewable energy projects.

Local zoning laws and permitting processes

Solar developers must comply with local land-use, safety, and environmental regulations, including zoning laws and permitting processes managed by counties and municipalities–or the state-agency that oversees the siting of large energy projects.

Zoning and Land-Use Classification. Zoning laws classify land by its intended use (e.g., agricultural, residential, commercial). Solar projects are often permitted only in specific zones (typically agricultural or industrial) and may require a zoning change or special permits, even for agricultural land. Some local governments may prefer solar projects on industrial or commercial properties, so if your land is not zoned accordingly, you may need to request a zoning change, which can be a lengthy process.

Permitting Process. State or Local governments review solar projects to ensure compliance with community standards. This includes evaluating the project's impact on infrastructure, the environment, and surrounding properties. Developers may need to submit detailed site plans and obtain approvals from local agencies to ensure compliance with zoning, building codes, and environmental laws.

Public Hearings and Variances. Local zoning boards or state agencies overseeing the siting process may conduct public hearings, allowing neighbors to raise concerns, which can delay or halt the project. If the proposed project doesn't align with zoning regulations, the developer may need a **variance** or **conditional use permit** to proceed. However, securing these permits can be complicated and is not guaranteed.

Implications for the Landowner. While it is the solar developer's responsibility to navigate these regulations and the permitting process, as the landowner, you may be responsible for securing necessary zoning changes or permits before construction can begin. This process can be time-consuming and may involve public opposition, so it's important to understand local zoning laws and work with legal experts to navigate the process smoothly.

Federal Regulations: Compliance with Key Federal Environmental Laws

Federal regulations may apply if the solar project impacts wetlands or water bodies (under the Clean Water Act), protected species or their habitats (under the Endangered Species Act), or if it could cause significant environmental impacts (under the National Environmental Policy Act). If construction or other aspects of the solar project are found to violate these federal or other state and local environmental laws, the landowner could risk getting pulled into timely and costly litigation.

The Clean Water Act regulates discharges of pollutants into U.S. waters and requires permits for projects that may impact water bodies, wetlands, or streams. For solar projects, permits may be needed to address potential **runoff** and **erosion** on adjacent lands during construction. In particular, if the project affects wetlands or other water bodies, the solar developer must obtain a **Section 404 permit** from the U.S. Army Corps of Engineers. If construction activities could lead to stormwater runoff, the developer must obtain a **National Pollutant Discharge Elimination System (NPDES) permit**.

Endangered Species Act (ESA). The ESA requires that projects do not harm protected species or their habitats. If the solar project is located in areas that may affect protected species, the developer will need to conduct environmental reviews and possibly consult with federal wildlife agencies to determine if restrictions or mitigation measures are necessary.

National Environmental Policy Act (NEPA). The NEPA requires an environmental review of projects that may have significant environmental impacts. While most solar projects do not trigger a full Environmental Impact Statement (EIS), larger projects or those near sensitive environmental areas may require an Environmental Assessment (EA) to evaluate potential impacts.

Who Regulates Solar Energy?

RETAIL: State Public Utility Commissions (PUCs) regulate the distribution and sale of solar energy to end-users (homes, businesses).

WHOLESALE: The Federal Energy Regulatory Commission (FERC) regulates interstate wholesale electricity transactions and sets reliability standards for the bulk power system. While FERC doesn't directly approve solar projects, its regulations impact project development. Under PURPA, FERC requires utilities to purchase electricity from renewable generators smaller than 80 MW, known as qualifying facilities (QFs).

Recent changes to FERC's PURPA regulations have introduced uncertainty, with ongoing litigation challenging these rules. While the revised rules are currently in effect, their long-term stability is uncertain, and future legal challenges could affect the regulatory framework and development of solar projects. It's essential for solar developers and landowners entering solar leases to keep these regulatory uncertainties in mind as they can impact the timeline and ultimate viability of utility-scale solar projects.

- How comfortable are you with the regulatory process and its potential impact on the project timeline?
- How comfortable are you with the potential opposition to the project, and your public exposure?
- Are there any environmental considerations on your property that might complicate the approval process (e.g., wetlands, streams, endangered species, etc.).

Exploring Agrivoltaics: Solar and Farming

What is Agrivoltaics?

Agrivoltaics is a form of dual-use solar with **solar power generation** and **agriculture**. By installing solar arrays over agricultural land, farmers can continue cultivating crops, raising livestock, or establishing pollinator habitats underneath the panels. Agrivoltaics is an emerging practice that offers a way to address the growing demands for renewable energy while preserving agricultural production. By integrating solar power into agricultural operations, landowners can generate an additional revenue stream and contribute to sustainable farming practices.

Types of Dual-Use Solar

There are several types of dual-use solar systems, each with its own set of benefits for landowners:

Grazing Agrivoltaics: Livestock grazing under solar panels is the most widespread form of agrivoltaics in the United States, employing sheep (or, in some cases, cattle or pigs) to manage vegetation under the panels. This reduces the need for—and is often cost-competitive with—chemical herbicides or mechanical mowing, and can improve soil quality, especially when paired with rotational grazing. Research from the American Solar Grazing Association and American Farmland Trust has demonstrated improved soil health outcomes on grazed solar sites, and research from Oregon State University has demonstrated improved stocking rates, reduced water consumption, and comparable weight gain for lambs raised on solar sites compared to lambs raised in an open pasture.

Crop Agrivoltaics: Agrivoltaic crop trials have demonstrated that certain crops can thrive in the partial shade of solar panels, particularly for shade-tolerant crops grown in arid or semi-arid regions. The shade from the panels helps conserve water by reducing evaporation and mitigating heat stress on crops. Similarly, the solar panels help moderate cold temperatures, potentially providing frost protection for crops. Crop agrivoltaics requires careful planning, and may require more significant modifications to the solar array (e.g., increasing panel height, increasing row spacing, burying cable) to allow access for farm machinery and sufficient light for crops. Farmers and landowners should carefully consider how the solar array may impact farm operations, ranging from equipment and seed selection to planting and harvest schedules.

Pollinator-Friendly Solar: Incorporating native vegetation or pollinator-friendly habitats under or along the perimeters of solar arrays is becoming a popular practice for utility-scale solar projects. These habitats can include wildflowers, grasses, and other plants that benefit pollinators like bees, butterflies, and birds. These habitats provide critical support for pollinators, which are essential for food production. Additionally, these habitats support biodiversity, help prevent soil erosion, reduce the need for mowing and application of herbicides, and improve overall ecosystem health. Other names for this practice include “ecovoltaics,” “conservation solar,” or “habitat-friendly solar.”

Innovations and Research in Agrivoltaics

With advancements in solar technology and a growing focus on sustainable farming, agrivoltaics has seen new applications and research emerging rapidly. These include:

Solar Trackers: Most large-scale solar arrays built in the United States use single-axis trackers, which enable the panels to follow the sun from east to west throughout the day. Certain trackers may allow farmers to manually control rows of panels to improve accessibility for equipment, or adjust the tracking mode to allow more light to pass to the crops below during critical growth stages.

Bifacial Panels: Bifacial panels can absorb sunlight from both sides and are often semi-transparent. This technology allows more light to pass through to the crops underneath while also capturing sunlight reflected from the ground or crops. Bifacial panels are also being deployed vertically, like a solar fence, which allows for easier access between rows.

Semi-Transparent Panels: Some agrivoltaic systems use semi-transparent panels that allow up to 40% of light to pass through. This enables farmers to grow crops that require moderate shading while still benefiting from solar power generation.

Automated Farm Machinery: As farm machinery is increasingly automated, new technology may allow for fleets of smaller, automated farm machines better-suited to navigating solar arrays. Automated machinery is expected to enable wider adoption of large-scale crop agrivoltaics systems.

Benefits of Agrivoltaics

Efficient Land Use: Agrivoltaic systems allow landowners to continue using the land for farming while also generating renewable energy. This approach addresses some concerns about solar projects displacing agricultural lands.

Water Conservation: Solar panels can create microclimates that help retain soil moisture and reduce water evaporation, a crucial benefit in regions experiencing drought or arid conditions. Research has shown that agrivoltaic systems can increase water efficiency, which is particularly relevant in the context of climate change and water scarcity.

Climate Resilience: The shade provided by solar panels can reduce heat stress on crops, particularly in areas prone to extreme weather. Agrivoltaics can also protect crops from hail, high winds, and extreme temperature fluctuations, both hot and cold. Research is constantly evolving, but agrivoltaic systems are expected to produce more consistent crop yields, and potentially much improved crop yields during drought years.

Carbon Sequestration: The soil under solar arrays may benefit from increased moisture retention, potentially improving soil health and sequestering more carbon. This aligns with global efforts to mitigate climate change through soil carbon management.

Challenges and Risks of Agrivoltaics

While agrivoltaics offers promising benefits, it is important to consider the uncertainties and potential risks associated with this approach:

Long-Term Impacts: Agrivoltaics is still a relatively new field, and the long-term effects of solar installations on soil health, crop production, and the local ecosystem are not fully understood. More research is needed to assess the impacts on agricultural practices.

Reduced Farmable Area: Installing steel structures to support the panels inherently reduces the land area available to farm. Even with agrivoltaic systems designed to accommodate farm machinery, there may still be areas within the array that are difficult to access and not worthwhile to sow and harvest.

Design Considerations: Agrivoltaic systems must be carefully designed to balance the needs of solar energy production with those of the crops or livestock being raised underneath the panels. For example, the height and spacing of panels, as well as the materials used, can significantly influence the success of the agricultural operations down below and around.

Potential for Future Adaptation: Once installed, solar infrastructure is typically fixed, which means landowners may face limitations in how they can adapt their agricultural operations in the future. For example, certain crops may no longer be feasible under the solar panels, or farming techniques might need to be adjusted.

Disease & Pest Pressure: Particularly in wetter climates or wetter years, the increased moisture retention beneath agrivoltaic systems may increase disease pressure on crops, particularly for fungal diseases. Additionally, the cool microclimate beneath the panels may attract unwanted pests.

Case Studies in Agrivoltaics

Ryan Indart is a third generation sheep rancher in Fresno County, California, and a leading solar grazier in California. Since 2018, Ryan has been growing the family sheep ranching operation by managing vegetation on utility-scale solar sites. Including grazing partners, **Indart Solar Sheep Grazing** has expanded to graze more than 10,000 head of sheep across over 20,000 acres of solar sites. To learn more, check out the Agrisolar Clearinghouse case study: Indart Solar Sheep Grazing.

AGRISOLAR CLEARINGHOUSE

Lettuce Shine, located at Our Table Cooperative near Sherwood, Oregon, is the first agrivoltaic microgrid project in the U.S. The project is designed to meet 100% of the farm's annual energy needs using a 75-kW dual-axis tracking solar array paired with battery energy storage to ensure critical refrigeration stays online during blackouts. The array provides shade for lettuce and other heat-sensitive crops, and the panels are mounted with minimum 14 foot clearance to ensure compatibility with commercial farming operations. To learn more, visit Our Table Cooperative: Lettuce Shine.

LETTUCE SHINE

Next Steps for Landowners Interested in Agrivoltaics

Agrivoltaics is still an emerging technology. Agricultural landowners who are interested are encouraged to keep up with the latest research and innovations. If you are considering agrivoltaics as part of your solar lease, be sure to:

- **Work with local agricultural extension agents, nonprofits,** and solar developers who are experienced with agrivoltaic systems.
- **Identify areas of your land** that may be well-suited for agrivoltaics, especially those that are less productive.
- Incorporate agrivoltaic elements into your lease discussions early to ensure that your solar developer is committed to designing a system that meets both your agricultural and energy needs.

Throughout this guide, we'll continue to identify issues to remember when contemplating whether and how to integrate an agrivoltaic system into your solar lease.

- Which parts of your land might be best suited for agrivoltaics?
- What crops, livestock, or pollinator habitats would you consider integrating into your solar project?
- How will this choice affect the next generation of farmers on the land?

Weighing Financial Opportunities, Losses, and Risks in Solar Leasing

This section provides a brief overview of the financial: (1) **opportunities**, (2) **losses**, and (3) **risks** associated with leasing farmland for solar development.

Given the long-term nature of a solar lease, each category carries complexities and uncertainties that need careful consideration and are greater than the scope of this guide. It's highly recommended to consult with a trusted financial professional (such as an accountant, tax professional, financial advisor, insurance agent, or attorney) to ensure you are making the best decision for your financial future.

Financial Opportunities

Leasing your land for solar development offers several financial benefits, including lease payments, tax incentives, income from agrivoltaics, and water rights transfers.

Solar Lease Payments

Solar lease payments vary by project phase, and it's critical to understand the payment structure for each.

Development Phase (Option Phase). This is when the solar developer conducts due diligence, including assessing the land's suitability for solar production, obtaining regulatory permits, and securing financing. During this phase the solar developer will likely need intermittent access to your land to test the soil, track the sun, or monitor the weather. The landowner will generally be permitted to use and access the entire property, including continuing crop production or grazing, so long as these activities do not interfere with the due diligence.

- **Payment structure:** Typically, landowners are compensated with a lump-sum payment or annual payments based on acreage. Payment amounts are lower during the development phase than the operational phase (often less than 10% of what would be received during energy production).
- **Negotiation tip:** Some developers offer compensation for attorney fees or other professional services involved in negotiating the lease agreement. Some offer a lump-sum "bonus payment" shortly after signing the lease. These additional payments can be included in negotiations.

If the payment is on a per-acres basis, ensure the acreage involved is clearly defined, so the landowner knows what acres are "in" and "out" of the rental payment equation. This clear definition of acreage should include an accurate legal description and a land map, which is ideally based on a new land survey. In particular, if you want to reserve certain areas of your property for production or other uses indefinitely (i.e., ultimately exclude them from the solar lease), it is best to express and negotiate this upfront and clearly include it in the land map. The importance of the legal description is discussed more in ***Negotiating the Solar Lease: A Guide for Agricultural Landowners.***

Construction Phase. Once the project is approved, the solar developer begins construction, including installing the solar panels, transmission lines, and necessary infrastructure. The landowner is typically restricted from using certain parts of the land (the "solar footprint" and "right-of-way" areas).

- **Payment Structure**: Typically, the landowner will receive **annual payments on a per acre basis.** The per-acre rental rate increases during this phase because the developer's use and access is more intensive. However, the total acreage covered by the project may decrease–depending on how much of the property is within the solar footprint and right-of-way areas
- **Negotiation tips**: You may negotiate additional compensation for lost income during this phase, particularly if crops are still in the ground when construction activities begin. You may also want to plan for costs of damage to land and other infrastructure from construction activities and consider negotiating how to handle any damage that occurs.

Operational Phase. The solar installation is operational and generating electricity.

- **Payment Structure**: The most common payment method during the operational phase is per-acre payments, but other methods can include:
  - **Nameplate Capacity**: Payments based on the estimated energy production capacity of the installed system (measured in megawatts).
  - **Royalty Payments:** Rare but negotiable, royalty payments are based on the actual energy produced by the solar array, providing a share of the revenue from the sale of the electricity.

If you choose royalty payments, you will need to decide the level of risk that feels comfortable to you. An attorney experienced in mineral leases will be able to advise you on structuring royalty payments. Your accountant or financial advisor may also be able to assist you with calculating best, average, and worst-case projections.

- **Negotiation Tips:**
  - **Competitive rate**: Be sure that the per-acre rate is competitive with local solar lease rates. You may start by consulting with agricultural service providers to assess prevailing lease rates. In addition, certain favorable land characteristics can be used to negotiate a higher rental rate. These include proximity to transmission lines and a power station, minimal complexity and cost of preparing the site, and weather stability. You may also consider negotiating a "**most favored nations**" clause, which requires the solar developer to match the highest lease rate offered to a landowner within a specified distance.
  - **Rental payment schedule:** Solar lease payments are typically made at the beginning of each year, though alternative schedules can be negotiated based on your cash flow needs.
  - **Rent escalation clause**: Solar leases usually include a rent escalation clause that increases rental payments at set intervals. Rent increases are often a fixed percentage, but you can also tie adjustments to an objective index, such as the Consumer Price Index or wholesale electricity prices. The interval for increases—whether annually or every few years—is negotiable.

The Decommissioning Phase involves removing the panels and restoring the land. The most significant financial issues to consider during this phase are the liability risks and costs if the solar developer doesn't fully clean up the site or if there is unrecoverable damage. We discuss this more a bit later in this section.

- **Payment Structure**: The lease should include rental payments during decommissioning, though these are typically lower than during the operational phase.
- **Negotiation Tips**: Decommissioning could involve significant costs. You should negotiate for a decommissioning bond or escrow account to ensure the solar developer has funds available to cover the cost of removing the equipment and restoring the land to its original condition.

Solar Tax Incentives

While tax incentives don't directly benefit landowners, being aware of what's available can help you understand the developer's cost structure and better assess your rental offer.

State Incentives: Each state in the Pacific Northwest offers unique programs and policies that can support utility-scale solar projects. It is essential for landowners to stay updated on these state-specific programs, as they can significantly affect the financial feasibility of solar projects.

Federal incentives: The Inflation Reduction Act (2022) extended federal tax credits for solar energy systems, providing substantial financial incentives for solar projects. However, the stability and future of these incentives are subject to change, as political landscapes and policies shift with new administrations. Potential changes to federal tax policies, including renewable energy tax credits, could impact the financial structure of solar projects in the future. Landowners should stay informed about these potential policy shifts to understand how they could affect the financial viability of solar leases.

Agrivoltaics Income

Landowner retains rights to pursue agrivoltaics (farming under or around the solar panels): Income will depend on factors like the type of system (e.g., rotational grazing, crop cultivation, or pollinator habitats), project scale, and overall success.

- **Negotiation Tips:** Make sure your lease allows for agrivoltaic income. Also, consider negotiating the right to sublease the land for agrivoltaic activities should you decide not to do it yourself.

For accurate financial projections, consider consulting with university extension or another research institute working on agrivoltaic projects.

Solar developer manages agrivoltaic systems: Often, the solar developer manages the agrivoltaics, for example, by entering into a sublease with a grazing operator to maintain the land and vegetation beneath the panels. In these cases, the grazing operator or other contractor retains any income from the agrivoltaic activity.

- **Negotiation Tips**: Studies have shown that solar grazing can save the solar developer money compared to traditional ground maintenance. You can use this data to negotiate a higher rental rate. However, if the design modifications to enable agrivoltaics (e.g., raising panel heights) increase construction costs, you may be offered a lower lease rate instead.

Water Rights Transfers

If your land is used for agriculture and you hold water rights, leasing land for solar development may affect those rights. Understanding how much water is needed for solar operations is crucial.

For more information on who to contact about water rights in Idaho, Oregon, and Washington, see Appendix.

- **Water for Solar**: Photovoltaic (PV) systems generally require minimal water, but water may be needed for cleaning panels or maintaining equipment. Often the solar company will bring their water supply for this purpose. On the other hand, Concentration Solar Power (CSP) projects require water for cooling or heat exchange to generate steam to produce electrical power. In this case, you will need to carefully negotiate the amount of water you allow the solar company to use and at what price. Be aware that water used for solar maintenance may not be an allowable use under existing water rights.
- **Water Rights Management**: If the solar developer does not need water, you may be able to transfer or lease excess water rights to a third party or a water bank. Be sure to negotiate the terms carefully to optimize the value and retention of any water rights.

Financial Losses and Opportunity Costs

While solar leases offer financial benefits, there are also potential losses and missed opportunities that landowners should consider.

Increased Property Taxes

Idaho, Oregon, and Washington each have a property tax assessment program for commercial agricultural land. These programs allow agricultural land to be assessed at a lower tax rate to support farm businesses. **Leasing all or even part of your agricultural land for solar may remove that land from the agricultural property tax assessment, which could result in a sizable financial hit.**

Taxes for agricultural land in one of these programs are typically thousands of dollars less than the regular tax rate. Depending on state rules, you must pay back taxes for 5–10 years when your land is disqualified from the program. You might also be responsible for interest or penalties. See the chart below for more specific information on your state's disqualification policies and eligibility requirements.

- **Financial losses:** When you remove land from agricultural production for a solar lease you may face higher property taxes, as the land will be assessed at a commercial rate rather than as agricultural land.
- **Negotiation Tips**: Ensure the solar lease agreement includes provisions requiring the solar developer to cover back taxes or any increased property tax burden that results from the lease.

By pursuing agrivoltaics, you may be able to retain the lower agricultural land tax rate.

AGRICULTURAL LAND TAX INCENTIVE PROGRAMS

STATE	QUALIFICATION	COST OF REMOVAL	SOURCE
Idaho	5+ acres and actively devoted to agriculture- crops, nursery stock, livestock. If less than 5 acres, the annual gross income from the farm must be at least 15% of the owner's annual gross income or gross revenue must exceed $1,000.	No penalty for a change of use.	Idaho Code § 63-604
Oregon	To qualify for special assessment, you must use the land for the primary purpose of obtaining a monetary profit through crops or livestock. If the land is not zoned exclusively for farming, an income requirement will apply, depending on your acreage.	Removal from the program triggers owing back taxes for either 5 or 10 years, depending on the characteristics of the land.	ORS § 308A
Washington	Land must be primarily used to produce livestock or agricultural commodities. Federal conservation programs may qualify large farms for this tax status. The farm must be at least 5 acres; if less than 20, there is an income requirement of $200/acre.	Additional taxes will be calculated for the past four years. Interest will be charged on this amount. In most cases, a penalty of 20% of the total tax due and applicable interest is also assessed.	RCW 84.34, WAC 458-30-300(4); WAC 458-30-305(3).

Loss of Eligibility for Agricultural Conservation Programs

Converting agricultural land to solar energy production can affect your eligibility for certain government agricultural conservation programs, such as the USDA's **Conservation Reserve Program (CRP)** or **Environmental Quality Incentives Program (EQIP)**.

- **Financial losses**: You may lose eligibility for these programs, forfeiting any future payments, returning past payments, or paying a penalty for early termination.
- **Negotiation Tips**: If you're enrolled in any conservation programs, be sure to discuss this with the relevant agency early in the process. You may be able to negotiate higher rental rates or compensation for any losses incurred.

By pursuing agrivoltaics, you may be able to retain your eligibility for some of these agricultural conservation programs.

Loss of Income from Farming

Converting agricultural land to solar development will naturally result in missed income from farming.

- **Opportunity Costs**: While the solar lease provides steady income, you need to weigh this against the income that could be generated from farming the land. Determine which parts of your land you are willing to dedicate to solar use and which you want to reserve for agricultural production.
- **Negotiation Tips**: Consider negotiating terms that allow for the continued agricultural use of parts of your land, especially areas that are ideal for farming and not optimal for solar installation.

Loss of Income from Existing or Future Agreements

Existing leases, such as agricultural, hunting, or mineral agreements, may require early termination or buy-out costs. Additionally, certain interests in the land, including easement rights, may prohibit you from entering the solar lease altogether.

- **Opportunity Costs**: The loss of income and potential risks from existing agreements should be carefully considered: Do you have existing or anticipated future leases (e.g., hunting, agricultural)? Are there oil, gas, or mineral agreements in place that would be impacted? Are there any easements tied to the property (e.g., utility, conservation, or farmland preservation) or do you anticipate placing easements on the property in the future?
- **Negotiation Tips**: Review any current agreements and easements early in the process. Discuss potential buy-outs, and consider negotiating a higher lease rate to compensate for any losses.

Loss of Income from Limitations on Mortgages

If you have a mortgage on the property, entering into a solar lease could trigger provisions that require lender approval. Mortgages typically restrict granting long-term legal interests, and violating these terms could result in default and the lender demanding full payment of the mortgage balance. Additionally, solar developers often require a **subordination agreement** from your lender to ensure the solar project remains in place if you default on the mortgage.

- **Opportunity Costs**: If future financing is needed, you may face challenges in obtaining additional mortgages, as solar leases often preclude further land encumbrances.
- **Negotiation Tips**: Discuss the mortgage terms with your lender before entering a solar lease to ensure you understand how the lease could affect future financing.

Financial Risks

Liability Risks

Leasing land to a solar developer presents numerous liability risks. Someone could get hurt by construction vehicles. The solar array equipment or farm structures could be damaged. A neighbor could file a lawsuit against you because of runoff and erosion from construction activities or glare and noise from the solar array. Overall, securing the right insurance, negotiating fair indemnification clauses, and being meticulous during the lease negotiations are essential to minimize your financial risks.

Insurance. You will want assurances that the solar developer has adequate comprehensive liability insurance to cover damages to your land and the developer's equipment.

- **Risk mitigation tips:**
  - You should be named as an insured party on the developer's policy, and always retain a copy of the certificate of coverage.
  - Discuss responsibilities for damage caused by natural events like storms or wildfires, especially regarding equipment like solar panels. Typically, landowners are responsible for natural event clean-ups, but this can be negotiated to shift responsibility to the solar company for damage to their infrastructure.
  - You should also consult your current insurance provider to check if you need additional coverage or higher limits due to the risks associated with a solar lease. Consider negotiating for the increased cost of insurance to be factored into the lease payment.

Indemnification means a promise to compensate someone for damages they incur due to another party's actions. In your lease, the solar developer should indemnify you for damages caused by their activities or by people they invite onto the land, such as construction accidents or damage to crops. On the other hand, you may be asked to indemnify the solar company for any damage you or visitors to your land cause, like accidentally damaging solar panels with equipment.

- **Risk mitigation tips**:
  - To protect yourself, ensure the indemnification clause holds the solar company responsible for any damage caused by their operations, while you should only be responsible for damages caused by your own or invited parties' actions. The lease should also address damages caused by third parties, such as neighbors' activities or trespassers, and release you from liability for these.
  - Be mindful of potential lawsuits from neighbors due to runoff, glare, or noise. You'll want the developer to indemnify you for any costs if a neighbor sues you. Right to Farm statutes typically do not cover solar arrays, so a lawsuit could wipe out your lease income if the terms are not carefully negotiated.
  - If you're considering agrivoltaics, additional liability concerns arise, such as injuries to workers or damages to crops and equipment. Make sure your insurance and indemnification provisions address these specific risks and are adequate for the combined solar and farming activities.

Decommissioning Risks

Decommissioning solar projects can be costly, and you need to ensure that the developer is financially prepared to remove the panels and restore the land.

- **Risk mitigation tips**:
  - **Bonding protection is highly recommended and should be a top priority during negotiations.** The lease agreement should require that sufficient funds for decommissioning are set aside.
  - Your state might have specific laws requiring the solar company to purchase a **decommissioning bond**. Take some time to confirm that securing adequate costs for decommissioning is either legally required by your state or that the solar company has made plans to ensure sufficient funds for the end.

Solar Company Bankruptcy

Many solar companies are startups or relatively small companies that could face financial challenges, including bankruptcy.

- **Risk mitigation tips**: Conduct thorough due diligence on the solar company's financial stability before signing a lease agreement. Ensure that bonding or financial guarantees are in place to cover decommissioning costs and other liabilities.

Impact on Property Sale

If you decide to sell your land during the lease period, the solar lease will "run with the land" and bind the new owner to the lease terms. In other words, the new owner will receive the lease payments and take on the liability risks. This carries both an upside and a downside for future owners. It is highly speculative to know whether the solar lease will increase or decrease the value of your land in the future, given market fluctuations for agricultural land coupled with the uncertainty of the future of energy production.

- **Risk mitigation tips**: Understand how the solar lease will affect the property's value and the potential sale price. Consult with an estate planner or financial advisor to ensure you are prepared for any future sale of your property.

Assessing Financial Opportunities

- What is your primary financial goal for your land—do you prefer a steady income stream from a solar lease or continued agricultural production?
- Do you have water rights that may be impacted by a solar lease? How might these rights provide an additional source of income or affect your farm's current or future operations?

Evaluating Financial Losses and Opportunity Costs

- Have you calculated the potential loss of income from transitioning part of your land from agriculture to solar energy production (including loss of agricultural tax exemptions, conservation payments, etc.)? How does this compare to the lease payments you would receive?

Weighing the Financial Risks

- Which liabilities most concern you in entering into a solar lease (e.g., property damage, injury, disputes with neighbors)? Have you considered insurance or indemnification clauses that protect you?
- How confident are you that the solar developer is financially reliable and will fulfill their decommissioning obligations at the end of the project? Would a decommissioning bond or escrow account provide peace of mind for you?

Planning for the Future

- If you plan to sell your property during the lease period, how might the solar lease affect the value of your land? Have you discussed the lease with an estate planner or financial advisor to understand potential impacts?

Recognizing Impacts to Agriculture and the Land from Solar Leasing

When considering leasing your land for a large-scale solar project, it's important to consider the long-term impacts on the land and surrounding environment. The motivations for leasing land to solar developers can vary, whether it's for financial gain, transitioning away from farming, or supporting renewable energy development. The consequences of these decisions can extend beyond your property.

Zooming Out: National and Global Impacts

While these broader concerns may not directly affect your land, they are important to consider in the context of the larger energy landscape.

In this section, we'll highlight some actual and potential impacts on agriculture and the land that landowners may want to evaluate before entering a solar lease. We'll begin with a broad perspective at the national and global level and narrow it to impacts that you and your local community may face.

Solar Power as a Clean Energy Source

Solar energy is recognized for its environmental benefits. Unlike fossil fuels, solar power produces minimal emissions during operation and uses limited water resources. However, the production of solar panels can still have environmental costs, including the extraction and processing of raw materials like silicon, copper, and rare earth metals. The production processes and transportation (depending on where the panels are made) generate some greenhouse gas emissions, though some studies show that solar panels "pay back" their carbon footprint within 1–3 years of operation. Importantly, solar power is far less carbon-intensive than coal or natural gas, making it a "cleaner" alternative over the long term. As solar technology evolves, there are efforts to reduce emissions in the production process, such as the promising use of perovskite solar cells, which are more environmentally friendly than traditional silicone panels.

Larger-Scale Solar Projects Lead to Larger-Scale Impacts

As the demand for renewable energy grows, utility-scale solar projects have increased in size, leading to broader land use changes. While farm and ranch lands are ideal for solar development due to their size, sun exposure, and cleared land, large-scale conversion of these lands to solar installations raises concerns about the future viability of agriculture in some areas.

Loss of Agricultural Land

If significant portions of agricultural land are converted to solar use, it could increase economic pressures on farmers. Leasing farmland for solar could make agricultural land more expensive, further reducing access to land for crop production.

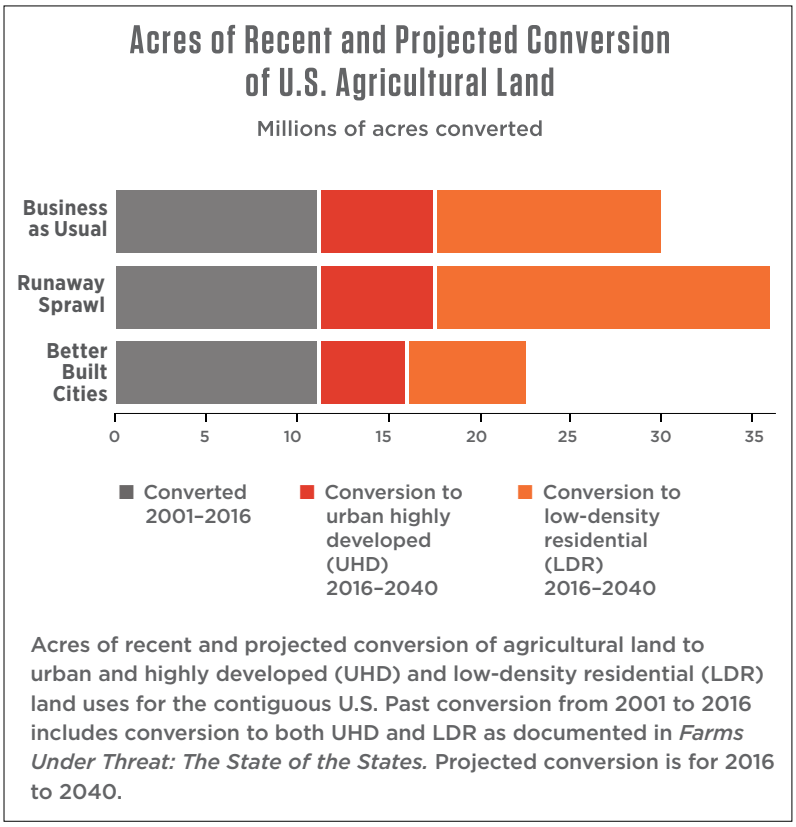
Communities require a critical mass of farms and farmers to sustain a local food economy, including agricultural suppliers, markets, processors, storage facilities, and other industry infrastructure. As more land transitions out of agriculture, the demand for these supportive services erodes.

In addition, once agricultural land has been converted to solar, it may not be easy to return it to crop production. Decommissioning has yet to happen on a large scale. It is difficult to know the full extent of the long-term physical impacts on the farmland and whether and how quickly the land can be converted back to agriculture.

Decommissioning and Waste

The decommissioning phase, when the solar panels are removed after the end of their operational life (typically 25-50 years), raises concerns about waste disposal. Current recycling programs for solar panels are underdeveloped, and the rapid expansion of solar technology could lead to a significant increase in waste. Although future technologies may improve recycling efforts, the decommissioning process presents an unresolved environmental issue.

In 2022, American Farmland Trust (AFT) released its *Farms Under Threat: Choosing an Abundant Future* report, highlighting three projected farmland loss scenarios.



Acres of recent and projected conversion of agricultural land to urban and highly developed (UHD) and low-density residential (LDR) land uses for the contiguous U.S. Past conversion from 2001 to 2016 includes conversion to both UHD and LDR as documented in *Farms Under Threat: The State of the States.* Projected conversion is for 2016 to 2040.

Do the broader concerns of solar energy production affect your decision to pursue a utility-scale solar project on your property?

Zooming In: Impacts to Your Land and Your Community

These impacts are felt more directly at the local level, and they may have a greater influence on your decision to lease land for a solar project.

Impacts on Soil Health

Soil Disturbance During Construction: The construction phase of a solar project often requires significant soil disruption, which can affect soil health, especially for farms that practice no-till or low-till agriculture. Disturbing the soil could also interfere with subsurface drainage systems, making future farming difficult. To learn more about construction practices that minimize soil health disturbance, see American Farmland Trust's Solar Soil Health Guide.

Erosion and Topsoil Loss: Soil compaction and erosion are common during construction. The weight of heavy machinery can compress the soil, reducing its ability to retain water and nutrients. It's essential to negotiate terms that require the solar developer to use practices like double ditching, which separates topsoil from subsoil to ensure the layers are properly replaced after construction.

Long-Term Soil Depletion: Even with efforts to mitigate soil damage, the land might not return to its original condition after the solar panels are removed. Studies show that solar farm sites can have lower carbon and nitrogen levels than similarly vegetated grasslands. This loss of nutrients and uneven soil moisture retention can affect future farming potential.

These potential impacts to soil health are particularly concerning if you plan to pursue agrivoltaics, so ensure that soil protective language is included in your lease.

Ideally, the lease would include a thorough (1) development or construction plan and (2) decommissioning and reclamation plan that must be approved by the landowner so that clear expectations are set during these phases. These plans would set protocols for addressing any issues or concerns, including soil damage, noise, traffic, remediation, revegetation, etc.

Chemical Use and Vegetation Control

Spraying and Mowing: During the operational phase, solar companies may need to control vegetation around the solar panels. This could include mowing or using herbicides, which can negatively impact soil health and biodiversity.

If you prefer an environmentally-friendly approach, you can negotiate the use of agrivoltaic systems, like grazing or pollinator habitats, as alternatives to chemical use. Such systems provide benefits to both the land and the developer, reducing costs for the solar company while improving land stewardship.

Impacts on Wildlife

Disrupting Wildlife Movement: Large solar arrays can create barriers that interrupt wildlife migration, especially in areas with established corridors. Fencing, roads, and infrastructure can fragment natural habitats, posing risks to biodiversity.

Collisions and Habitat Loss: Some birds are attracted to solar arrays, mistaking them for large water bodies, and may collide with the panels. The siting of solar projects should account for potential threats to local wildlife and their habitats.

You can influence the solar development process by raising concerns about wildlife impacts upfront. Ensuring the project complies with the Endangered Species Act and other relevant wildlife protection laws is essential for minimizing habitat disruption.

Decommissioning and Site Reclamation

The decommissioning phase involves removing the solar panels, infrastructure, and restoring the land to its original condition. The lease should require the solar company to remove the infrastructure and restore the topsoil, providing as many details as possible to ensure this is done adequately. In addition to infrastructure that is added to the surface (e.g., panels, battery banks, transmission lines, roads), materials will be buried underground (e.g., cables, footings, foundations, etc.). Sometimes underground materials are only removed to a certain depth. Make sure the solar company is transparent in telling you what is left behind.

The lease should also require the solar company to revegetate the land after the panels are removed. If you are unsure what type of revegetation would be ideal for returning the land to agricultural production, consider engaging your local Conservation District, Extension agent, or other crop advisors. The more detailed the lease is in describing standards or protocols for these obligations, the better the solar company will be able to restore the land appropriately, at their expense.

Make sure the lease specifies how the land will be revegetated, whether with native plants or agricultural crops, depending on your goals. This is critical for restoring soil health and ensuring that the land can be returned to agricultural use if desired.

Other Annoyances and Disturbances: View, Glare, Noise, Dust & Traffic

The presence of a large solar array can dramatically change the landscape, which might not be desirable for you or your neighbors. Solar panels can create glare, especially in certain angles of sunlight. This can be a nuisance for neighboring properties. Construction and decommissioning phases can generate noise, dust, and increased traffic.

Discussing the visual impact and exploring mitigation options (such as landscaping or panel orientation) can help minimize disruptions to views. Work with the solar developer to ensure that the panels are oriented and installed to reduce glare and any potential impact on surrounding areas. You may want to negotiate specific hours of operation or mitigation strategies to limit disturbances from noise, dust, and traffic.

- **Soil Health:** How do you feel about the potential impacts of soil disturbance on your land's future agricultural productivity? What measures would you want to ensure are in place to protect soil health during construction and decommissioning?
- **Wildlife and Habitat:** Do you have any wildlife or habitats on your land that could be impacted by the solar project? How might you work with the solar company to protect wildlife corridors and ensure minimal disruption to local ecosystems?
- **Decommissioning and Land Restoration:** What would you expect in terms of land reclamation after the solar project ends? Do you have preferences for revegetation or restoring the land to agricultural use?
- **Aesthetic and Community Impacts:** How do you feel about the potential aesthetic changes to your land and surrounding views? What steps can you take to mitigate the visual impact of the solar project?

Making a Decision

Having gained an understanding of the financial, environmental, and agricultural implications of leasing land for a solar project, the next crucial step is to make a well-informed decision. Deciding whether to enter negotiations for a solar lease involves more than just evaluating the technical and financial aspects; it also requires introspection, communication with those who have a stake in the land, and a clear vision of what you want for the future.

Reflecting on Your Vision for the Land

Before diving into the complexities of negotiations, it is essential to reflect on what you envision for your land. This vision will serve as the foundation of your decision-making process.

- **What do you want your land to represent in the future?** Are you looking to preserve it for future generations to farm? Do you see an opportunity to diversify and generate income through renewable energy?
- **Do you have emotional ties to the land that should factor into your decision?** Perhaps the land holds sentimental value, has been passed down through generations, or is central to your identity. If that's the case, your decision may involve not just financial considerations but emotional ones as well.

Taking the time to clarify your long-term vision will help guide your decision as you move forward. It will also inform the kinds of questions you should ask when engaging with others involved in the decision-making process.

Take some time to reflect on the following questions about your vision for your land. Write down your responses in a word document or on paper or use a voice recorder to speak aloud freely.

- What are the priority qualities and functions of the farm property right now?
- What do you want to happen to the farm property in the future?
- What qualities and functions of the property need to be preserved to make this happen?
- Who is involved in overseeing the land in the future?
- How will entering a solar lease shape the future of the farm property?
- What extent of protection and access to the farm property is necessary for the present and future owners or caretakers, including family members and business partners?

Respecting Relationships: Having Powerful Conversations with Stakeholders

Leasing your land for solar development is a decision that likely affects more than just you. Your co-owners, family, business partners, neighbors, and even future generations may all have a stake in the land's future. Now is the time to involve them in the conversation and consider their perspectives.

Co-owners and Business Partners. If your land is owned jointly, it is crucial that all parties involved agree on the decision to enter into a solar lease. Whether the business is structured as a partnership, LLC, or trust, your lease agreement should reflect the collective decision of the ownership group. Understanding each co-owner's goals, both financial and personal, will help ensure that the agreement is made with consensus and mutual support.

Family Members and Successors. Solar leases often extend for decades, which could impact the future of your land, especially if there is a generational transfer of property. Succession planning is a key consideration:

- **Will your heirs be able to farm the land after the lease term ends?** It's essential to discuss the long-term implications with family members and successors, especially if they plan to continue farming.
- **Does the lease align with their values and goals?** If your family or heirs are committed to farming, a solar lease could limit their options. Engaging in conversations with them will help gauge their views and ensure everyone's expectations are aligned for the future.

Neighbors and the Local Community. Community sentiment towards solar projects can be mixed, and you may face opposition from neighbors or other local stakeholders. While some may view the transition to solar energy as a positive step, others may have concerns about the aesthetics, environmental impacts, or economic ramifications. Being prepared for these differing opinions will help you navigate potential conflicts.

- **How do your neighbors feel about solar development?** The community's reaction can affect your relationships and the smooth implementation of the solar project. Be open to hearing both positive and negative feedback.
- **Could collective negotiations with neighbors be beneficial?** If your neighbors are also considering solar leases, negotiating together could help streamline the approval process and improve negotiating power. However, ensure that the terms align with everyone's expectations to avoid conflicts down the road.

Third Parties and Legal Considerations. There are also third parties with legal interests in your land that should not be overlooked. These may include:

- **Agricultural service agencies**: Could the solar lease impact your eligibility for conservation programs like the USDA's Conservation Reserve Program? You may also want to discuss the solar project's potential effects on wildlife and habitat with local, state, and federal agencies interested in habitat and endangered species protection.
- **Tenants or other land users**: Does the lease affect current agreements with tenants or third parties using the land for hunting, grazing, or other activities?

- **Lenders**: Does your mortgage agreement allow for the leasing of land for solar development? Some mortgages require prior approval before such agreements are made.
- **Insurance and Financial Professionals**: Consulting with insurance agents and financial advisors will ensure that you are covered against potential risks and have a clear understanding of the financial implications of signing a solar lease.

Make a list of people who have a connection to the property, legal or otherwise, now and in the future.

Next to each person, note:

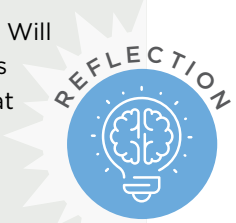
- Any specific questions you have for them. This may include asking about their goals and objectives for the property.
- Whether or not you think they would put a hard stop to the project.
- For those you think would be against the project, identify why you believe this.

To inspire productive discussion, identify one question you could ask them for each reason based on your sense of their level of openness. This question could be general, *"What are your thoughts about solar energy?"* or *"What do you know about agrivoltaics?"* or, more specifically, *"What are your thoughts on my land being used for solar energy or agrivoltaics?"*

Then it's up to you to carve out time and space for this conversation. Remember, hard conversations are often the pathway to deeper understanding and connection. When engaging someone in a conversation about a solar lease, realize that you may disagree with their stance. One tip is to listen with an intention to understand their perspective rather than try to persuade them toward your vision or conclusion. A helpful question to remember while listening to what they have to say is: *What can I learn from their perspective?*

Anticipating the Impact of Solar Development

The decision to lease your land to a solar developer is not just about the immediate financial benefits; it also requires understanding the long-term impacts on the land, the community, and your own personal values. Consider the following questions as you assess whether to move forward with negotiations.



- **How will solar development affect the future use of your land?** Will it make the land unsuitable for farming after the lease ends? If so, is this something you are comfortable with, or would you prefer a solution that integrates agriculture (agrivoltaics)?
- **What are your priorities for your land's legacy?** Do you want to preserve the land for future generations of farmers? Are you open to diversifying the land's use to include renewable energy generation?
- **How will solar development affect local ecosystems and wildlife?** Have you considered how wildlife corridors, habitat, and natural landscapes will be impacted? Are there ways to minimize disruptions to the local environment, such as incorporating agrivoltaic systems or leaving portions of the land untouched?
- **What impact will this decision have on your relationships?** How will this affect your relationships with family, co-owners, and neighbors? Are you prepared to navigate any conflicts or challenges that arise?

Moving Forward

Once you've reflected on these aspects and consulted with relevant stakeholders, you will be in a better position to decide whether to enter into negotiations. Keep in mind that this is a long-term commitment, and you need to feel confident that the decision aligns with your values, your family's needs, and your financial goals.

Consult Professionals: Before committing, make sure you have the necessary legal, financial, and environmental experts involved. They will help you navigate the complexities of the lease agreement, ensuring that your rights are protected.

Take Your Time: Don't feel rushed to make a decision. This is a significant commitment, and it's important to have all the facts and a clear understanding of the potential outcomes.

Prepare for Negotiation: If you decide to proceed, prepare for negotiations by understanding the key issues that matter to you, your family, and any other stakeholders involved. Be sure to review ***Negotiating the Solar Lease: A Guide for Agricultural Landowners***. This sequel guide will help you navigate the lease negotiation process by:

- Explaining when and why to involve an attorney
- Identifying key points to address in legal documents
- Offering tools for negotiating with solar developers

Additional Resources

Regional Resources

Idaho

Idaho Conservation League, Speak up for Community Owned Solar: idahoconservation.org/blog/solar-for-all-speak-up-for-community-owned-solar.

Idaho Energy Permitting & Siting: oemr.idaho.gov/energy-infrastructure/permitting.

Oregon

Oregon Community Solar Program: oregoncsp.org.

Oregon Energy Facility Siting Council (EFSC): oregon.gov/energy/facilities-safety/facilities/Pages/Council-Jurisdiction.aspx.

Washington

Washington Community Solar: utc.wa.gov/regulated-industries/utilities/energy/community-solar.

Washington Energy Facility Site Evaluation Council (EFSEC): efsec.wa.gov/about-efsec/certification-process.

Guides on solar leases in other regions

(ALL OF WHICH WERE INFORMATIVE TO THIS GUIDE)

New York: NY Farm Bureau, "Leasing Your Farmland for Wind & Solar Energy Development," December 2016.

Ohio: Kirk Hall, Peggy; Bachelor, Evin, Romich, Eric. "Farmland Owner's Guide to Solar Leasing." National Agricultural Law Center, August 2019.

Oklahoma: Ferrell, Shannon L. "Understanding Solar Energy Agreements." National Agricultural Law Center Production," 2019.

Minnesota: Kuehn, Lindsay, "Farmers' Guide to Solar and Wind Energy in Minnesota." April 2019

Pennsylvania: Brocket, Daniel; Johnstonbaugh, Edward. "Landowner Leasing for Utility Scale Solar Farms." Penn. State Univ. Extension, September 2019.

Agrivoltaics

American Farmland Trust's Farmland Information Center: farmlandinfo.org.

American Solar Grazing Association: solargrazing.org.

OSU's North Willamette Research and Extension Center: agsci.oregonstate.edu/nwrec.

OSU's Extension Small Farms Program: smallfarms.oregonstate.edu/smallfarms/projects/dry-farming.

USDA and the University of Illinois "Sustainably Co-locating Agricultural and Photovoltaic Electricity Systems (SCAPES)" project FAQs: scapes.illinois.edu/about- the-project/project-q-a.

Pollinator Friendly Solar Scorecard: fresh-energy.org/beeslovesolar/pollinator-friendly-solar-scorecards.

Jacks Solar Garden: jackssolargarden.com.

Eagle Point Solar Farm: Case study: Eagle Point solar farm sets precedent for solar apiaries in the United States.

Pennsylvania State University Extension Webinar, Agrivoltaics and Solar Utility Considerations, August 2022.

References

Adeh, Elnaz Hassanpour, John S. Selker, and Chad W. Higgins. "Remarkable Agrivoltaic Influence on Soil Moisture, Micrometeorology and Water-Use Efficiency." PLOS ONE, November 1, 2018.

Atasu, Atalay, Serasu Duran, and Luk N. Van Wasenhove, "The Dark Side of Solar Power." Harvard Business Review, June 18, 2021.

Barron-Gafford, Greg A., Mitchell A. Pavao-Zuckerman, Rebecca L. Minor, Leland F. Sutter, Isaiah Barnett-Moreno, Daniel T. Blackett, Moses Thompson, et al. "Agrivoltaics Provide Mutual Benefits across the Food–Energy–Water Nexus in Drylands." Nature. www.nature.com, September 2, 2019.

Benage, Megan. "Field Notes: Solar Sites Double as pollinator habitat." MN Department of Natural Resources, May June 2017.

Brown, Parks F. "Solar Lease Negotiations from the Landowner's Perspective," 49 Tex. J. Bus. L. 1 (2020).

Choi, Chong Seok, et al. "Effects of Revegetation on Soil Physical and Chemical Properties in Solar Photovoltaic Infrastructure." International Renewable Energy Agency, Frontiers, January 2001.

de Wild-Scholten, M.J. "Energy Payback Time and Carbon Footprint of Commercial Photovoltaic Systems." Solar Energy Materials and Solar Cells, vol. 119, 2013.

Donofrio, Joel. "Central Washington family that owns Wautoma solar project site explains benefits of proposal." Yakima Herald-Republic, August 22, 2022.

Ferrell, Shannon L. "Understanding Solar Energy Agreements." National Agricultural Law Center, 2019.

Hall, Peggy; Bachelor, Evin; Romich, Eric. "Farmland Owner's Guide to Solar Leasing." National Agricultural Law Center, August 2019.

Helmer, Jodi. "Solar Farms Shine a Ray of Hope on Bees and Butterflies." Scientific American, www.scientificamerican.com, January 14, 2019.

Kochendoerfer, N., A. Hain, and M. Thonney. "Grazing Sheep on Solar Sites in New York State: Opportunities and Challenges." Dept. of Animal Science, Cornell Univ., 2021.

NC Clean Energy Technology Center, "Health and Safety Affects of Solar Photovoltaics." May 2017.

Oregon State University, "Sustainable Farm Agrivoltaic."

Pehl, Michaja, et al. "Understanding Future Emissions from Low-Carbon Power Systems by Integration of Life-Cycle Assessment and Integrated Energy Modelling." Nature Energy, vol. 2, 2017.

Proctor, Kyle W., Ganti S. Murthy, and Chad W. Higgins. "Sustainability and Agrivoltaics Align with Green New Deal Goals While Supporting Investment in the US." Rural Economy." MDPI, December 25, 2020.

Solar@Scale. "A Local Government Guidebook for Improving Large-Scale Solar Development Outcomes." International City/County Management Association, September 2021.

Solar Energy Industries Association, "What's in a Megawatt."

US Department of Energy, "Solar Impacts on Wildlife and Ecosystems, Request for Information Response Summary." November 2021.

Watson, Leroy, Mishra, Shruti Khadka, Hartmann, Heidi M., Hlohowskyj, Ihor, McCall, James, and Macknick, Jordan. "Examining the Potential for Agricultural Benefits from Pollinator Habitat at Solar Facilities in the United States." Environ. Sci. Technol., May 28, 2018.

Appendix: Water Rights

Idaho: A General Guide to Water Rights

Landowners with water rights: Where to begin?

The following information comes from the Idaho Department of Water Resources (IDWR). In Idaho, a water right is the right to divert public waters and put them to a beneficial use in accordance with one's priority date.

- How to find out if you have a water right: Irrigation Rights Finder
- How do water rights work? Read the IDWR's Water Rights Overview
- General water right FAQs

Within the IDWR are Water Districts, government entities that are tasked with distributing Idaho's water in a manner consistent with the water rights on record. Find your water district.

Groundwater Irrigation Districts are organized by landowners with groundwater irrigation rights, and serve to represent their members and provide basic functions, such as measuring and reporting (Idaho Code § 42-5224).

The Idaho Water Resource Board is an elected eight-member board that oversees project financing and operates programs that support sustainable management of Idaho's water resources. One such resource is the Water Supply Bank, a water exchange program operated in association with water districts and IWRB-appointed local rental committees.

The Water Supply Bank facilitates the acquisition and exchange of water rights for new and supplemental uses, as outlined in Idaho Code (Sections 42-1761 through 42-1766 Idaho Code) and IDAPA rules (Water Supply Bank Rules). The program includes two initiatives: the Board's water supply bank, which leases and rents water rights statewide, and rental pools, which manage leases and rentals for specific watersheds or water sources, overseen by local committees appointed by the IWRB

The Shoshone-Bannock Tribes operate a Tribal Water Supply Bank, for Snake River water stored in federal reservoirs, under authorities of Water Supply Bank statutes and Tribal Water Supply Bank rules.

Long-term changes in water use may require a transfer. Five years of nonuse may result in a forfeiture of water rights unless the nonuse meets the criteria outlined in Idaho Code 42-223, which includes but is not limited to:

- Water placed in the water supply bank.
- Cropland contracted through a federal set-aside program.
- Compliance with the provisions of a ground water management plan approved by the director of the department of water resources

- No portion of any water right shall be lost or forfeited for nonuse if, after the five (5) year period of nonuse, use of the water is resumed prior to a claim of right by a third party.

State contacts: Idaho Department of Water Resources

Regional contacts: Idaho Water District

Oregon: Water Rights and Solar

If you are considering a solar lease, the best place to locate a solar array is on marginal farmlands without irrigation. If this is not an option, the landowner should weigh the alternatives of what to do with a water right that may be located on the same footprint as the solar array. If the project is in an area with surface or groundwater irrigation rights, the landowner has multiple temporary and permanent options available to them that can either preserve the water right on the farm for future use or can provide additional income by permanently moving the water to a new location or use. The question of what to do with the water rights should be addressed prior to signing paperwork for the solar project.

Landowners with water rights: Where to begin?

- Do you have water rights? Surface water diversion or groundwater appropriation (pumped)?
- Is your water in an irrigation district or not related to an irrigation district?
- Do you know the status and requirements for use of your water rights? (may vary by state)
- Have you used your water in the past five years?
- Was it used fully (within its mapped area) or partially?
- Is there something you need to do to make sure all your water is eligible for lease or transfer programs before installing solar arrays?
- Is your diversion location the location of record? If not, this would need to be resolved.
- Do you intend to use part or all of your water in conjunction with the solar array?
- If you will not use your water while in a solar contract, do you want your water to be available to you again in the future?
- If your water is associated with an irrigation district or water user group—what level of approval do you need from them to make a change (either temporary or permanent) to your water right?

Beneficial use of a water right to prevent forfeiture

- In the state of Oregon, both surface water and groundwater use rights must be beneficially used for the purpose stated on the certificate/permit/groundwater registration (pre-1995) once every five years to prevent forfeiture of the water right.
- The specific legal requirements for avoiding forfeiture of a water right are outlined in ORS 540.610.
- The water right must be certificated (not just a permit or a groundwater registration) to take advantage of other options such as temporary transfer, lease, or permanent transfer (see next section as options may be different for groundwater than for surface water).

Options: Depending on future goals for water

Retain and use all of the water right under the solar array.

- Retaining use of the water right under the solar project may still require the transfer or lease of water from some small areas where semi-permanent or permanent structures will be placed in the irrigated area, or where access roads may be located on the mapped water right to avoid forfeiture for non-use.

Lease, temporary transfer, or permanent transfer of a water right.

- **instream water lease**—available in most western states (surface water - SW). In Oregon, a water right holder can lease a water right instream for up to five years but can renew the lease indefinitely—with each year of the instream lease counting as a year of "beneficial use" of the water, allowing it to revert to its original use at some future time. The ability of the irrigation diversion structure and delivery system to take water must be maintained. If the water right is in an irrigation district, they must also approve of this long-term lease of water.
- **time-limited transfer** (instream)—available in most western states (SW). In Oregon, a water right can be placed instream for a period longer than five years with one application, a time-limited transfer. The ability of the irrigation diversion structure and delivery system to take water must be maintained. There may be term limits in your basin or limitations if the water user is a patron of an irrigation district.
- **temporary transfer to another property** (SW or groundwater—GW)—In Oregon, a surface water or groundwater right can be temporarily transferred to another location for continued use for its intended purpose (use listed on certificate, e.g., irrigation). A temporary transfer is limited to 25 years in the Deschutes Basin (ORS 540.585) and might also be limited by irrigation districts, aquifer sources, or by proximity to a new location.
- **permanent transfer instream** (SW)—depending on priority date and stream, there are funding sources willing to pay for water to permanently transfer instream. Prices paid for these transfers can vary dramatically based on priority date and stream. If in an irrigation district, the district must also approve of this type of transfer.
- **permanent transfer to another user or another part of your property** (SW or GW)—if in an irrigation district, the district must also approve of this type of transfer. If the water right is for groundwater use, then the transfer may be restricted based on the groundwater source—will the new location draw from the same aquifer?

Legal or administrative references or links to information on leasing and transfer programs/options.

- If part of an irrigation district, check on district policies regarding leasing and transferring of water.
- Check with the Water Resources Department (state) watermaster for the region in advance of lease or transfer to identify potential issues (SW or GW).

Instream Leasing and Transfers (time-limited and permanent) Authority	• ORS 537.348 • OAR 690-077 & 690-380 • Instream lease Oregon • Instream transfer in Oregon
Temporary Transfers Authority	• ORS 540.523 • OAR 690-380 • Temporary transfer Oregon
Irrigation District Transfers Authority (temporary and permanent)	• ORS 540.570 to 540.580 • ORS 540.505 to 540.585 • OAR 690-385 • District transfers Oregon
Beneficial use and forfeiture	• ORS 540.610 forfeiture of water rights

State forms

Any transfers of water associated with an irrigation district must have district approvals.

- Application for instream lease forms—Oregon
- Application for water right instream transfer forms—Oregon
- Application for district transfer forms—Oregon
- State fees for transfer or lease of water—Oregon

Contacts for assistance

- Irrigation District: If an irrigation district is the water provider, it must provide approval for changes to the water right.
- Local water conservancy:
  - Deschutes River Conservancy: Working in the Deschutes Basin, including its tributaries.
  - Klamath Basin Rangeland Trust: Working in Oregon's upper Klamath Basin.
- Regional-national water conservancy:
  - Trout Unlimited: TU Oregon, working in SW and NE Oregon (and other PNW states), for contacts: national staff in Oregon.
  - The Nature Conservancy (active in water transactions for some states).
- Oregon Water Resources Department region offices and watermasters
- State contacts for transfers and leases: Oregon Water Resources Department.
  For irrigation district-related transfers, contact your irrigation district.

Washington: Water Rights and Solar

Landowners with water rights—where to begin?

- Find out if you have a water right: *The Landowner's Guide to Washington Water Rights* provides key tools for understanding water rights.
- The following information is adapted from the Washington State Department of Ecology. For full text and additional details, visit: ecology.wa.gov.

Washington's water law, like many western states, holds that water is owned by the public but allowed to be used by water right, and includes the principle that a water right is confirmed and maintained through beneficial use—you may have heard "use it or lose it." Put simply, a water right may be wholly or partially lost through extended periods of voluntary non-use. If water is no longer used by the rights holder, the rights or portion thereof may be relinquished to the state so that the water can return to maximum beneficial use.

Sufficient cause

Five or more successive years of non-use trigger relinquishment of a water right unless there is sufficient cause to explain the non-use, with the burden of proof on the rights holder.

The following categories may serve as "sufficient causes" to explain non-usage of water: (RCW 90.14.140)

Water unavailability	• Drought or other water unavailability.
Military duty	• Active service in the U.S. Armed Forces during military crisis. • Non-voluntary service in the U.S. Armed Forces.
Legal proceedings	• Operation of legal proceedings that directly prevent the water right holder from using the water.
Special federal or state programs	• Federal or state agency leases or purchase options for lands or water rights that reduce or prevent the use of the right by the owner. • Federal laws or voluntary enrollment in a federal program imposing land or water use restrictions, acreage limits, or production quotas.
Irrigation specific	• Temporarily reduced irrigation due to varying weather conditions, as long as water diversion and delivery facilities remain able to support the full beneficial use of the water right. • Use of water conservation measures as part of the Yakima River Basin Water Enhancement Project, so long as the conserved water is reallocated in accordance with the provisions of P.L. 103-434. • Use of measured or reliably estimated return flows in place of water from the primary source of supply. • Reduced use of irrigation water due to crop rotation when sound farming practice advises the temporary change of crop type, and the remaining portion of the water right is put to beneficial use. • Reduced irrigation water use from an aquifer within the Odessa ground water subarea (as defined in chapter 173-128A WAC), due to drought or low flow period

Additional resources

Water rights purchases, leases, and donations provide a flexible opportunity for water users to protect their water in trust and take advantage of financial incentives for allocating some of their water use to conservation purposes.

- Lease—Landowner payments for temporary trust water left in stream
- Sale—Fair market value for permanent trust water
- Donation—Protects water rights, stops potential relinquishment

The Washington Department of Ecology's Trust Water Rights Program (TWRP) allows landowners to manage their water rights and temporarily place them in trust, providing environmental benefits while they are not in use. Other uses of the TWRP are to permanently dedicate water rights to improve streamflow, as well as to provide for the sustainable allocation of new water uses. For more information on water banking in Washington, visit: Water banks—Washington State Department of Ecology.

Information on the TWRP from ecology.wa.gov:

Temporary water donations

- Water right holders can temporarily donate all or part of their water right to the TWRP without impacting seniority (priority date) and all other attributes of the water right.
- Donors receive their water right back at the end of the temporary donation period without penalty.
- Water rights held in trust are not subject to relinquishment.
- To temporarily donate a water right or a portion of a water right, a water right holder submits the temporary donation form to the Washington State Department of Ecology. Once the regional office receives the complete form, they will notify the water right holder if they have accepted their water right into the TWRP.
- How to temporarily donate a water right to the Trust Water Rights Program

If you would like to permanently donate your water rights, you can do so by contacting regional TWRP staff—click here and scroll to the bottom of the page for contact info.

Related laws and policies

- Chapter 90.38 RCW: Trust water statutes applied to the Yakima Basin
- Chapter 90.42 RCW: Trust water statutes applied statewide
- Policy 1010: Administration of the Trust Water Rights Program

State contacts

Washington Department of Ecology—Water Resources Program: The Water Resources program supports sustainable water resources management to meet the present and future water needs of people and the natural environment, in partnership with Washington communities. See link for regional contacts.

Irrigation Districts: To find out if you are within a water district or company click here.

Washington Conservation Commission: The Washington State Conservation Commission (SCC) is the coordinating state agency for all 45 conservation districts (CDs) in Washington state. Together, the SCC and CDs provide voluntary, incentive-based programs that empower people to practice conservation and ensure healthy natural resources and agriculture for all.

Washington Water Trust: The Washington Water Trust (WWT) collaborates with agricultural producers, conservation districts, irrigation districts, land trusts, landowners, legal experts, state agencies, tribes, and others on innovative strategies to protect water instream. WWT conducts water rights assessments, provides confidential water right consultations with landowners, and develops water rights transactions with water users utilizing the Trust Water Rights Program.

Washington Conservancy Boards: Conservancy boards process water right change and transfer applications only, and forward decisions to Ecology for final approval.

Conservancy boards do not review requests for new water rights and lack authority to process applications involving tribal lands. Ultimately, Ecology makes the final decision to either affirm, reverse, or modify the board's decision.

Regional contacts

Dungeness Water Exchange (in Sequim, WA): The Dungeness Water Exchange (DWE) is a mitigation program advised by a diverse group of local stakeholders. DWE allows new water users in the Dungeness Water Rule Area to purchase a certificate that meets state requirements for protecting the Dungeness River.

For more information, please contact
American Farmland Trust
info@farmland.org
PO Box 5263 Bellingham, WA 98227