Buying, Selling, and Financing Agricultural Properties: Top Ten'ish Things You Need to Know

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Table of Contents

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Perishable Agricultural Commodities Act

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The Perishable Agricultural Commodities Act, or "PACA," was enacted in 1930 to regulate the marketing of perishable agricultural commodities in interstate and foreign commerce. The primary purposes of the PACA are to prevent unfair and fraudulent conduct in the marketing and selling of perishable agricultural commodities and to facilitate the orderly flow of perishable agricultural commodities in interstate and foreign commerce. It also provides important protections to sellers of "perishable agricultural commodities" that are relevant to many specialty crop producers.

PACA is administered and regulated by the Agricultural Marketing Service (AMS), an agency within the United States Department of Agriculture. AMS provides further information on PACA on its website, http://www.ams.usda.gov, as well as the National Agricultural Law Center at http://www.nationalaglawcenter.org/readingrooms/perishablecommodities/.

PACA is important for many specialty crop producers because it governs important aspects of transactions between sellers and buyers of fresh and frozen fruits and vegetables. In particular, the unfair conduct and the statutory trust provisions are particularly significant.

Key Definitions

PACA applies to "dealers", "commission merchants", and "brokers." In general, a "dealer" is "any person engaged in the business of buying or selling in wholesale or jobbing quantities . . . any perishable agricultural commodity" that has an invoice value in any calendar year in excess of $230,000.00. There are some exceptions to this definition that could become applicable under certain situations, but the general definition provided here is very instructive. A "commission merchant" is "any person engaged in the business of receiving . . . . any perishable agricultural commodity for sale, on commission, or for or on behalf of another." Finally, a "broker" is a person engaged in the business of negotiating sales and purchases of perishable agricultural commodities either for or on behalf of the seller or buyer. A person who is "an independent agent negotiating sales for or on behalf of the vendor" is not considered to be a broker, however, if "sales of such commodities negotiated by such person are sales of frozen fruits and vegetables having an invoice value not in excess of $230,000.00 in any calendar year."

Unfair Conduct

As noted, PACA prohibits certain types of conduct on the part of buyers and sellers, though issues arising in this arena commonly focus on the alleged conduct of commission merchants, dealers, and brokers. For example, it is unlawful for a commission merchant, dealer, or broker "to engage in or use any unfair, unreasonable, discriminatory, or deceptive practice in connection with the weighing, counting, or in any way determining the quantity of any perishable agricultural commodity received, bought, sold, shipped, or handled . . . ." It is also unlawful for a commission merchant, dealer, or broker to do any of the following:

- "to make, for a fraudulent purpose, any false or misleading statement in connection with any transaction involving any perishable agricultural commodity";
- "to fail, without reasonable cause, to perform any specification or duty, express or implied, arising out of any undertaking in connection with any such transaction"; and
- "to fail or refuse truly and correctly to account and make full payment promptly" with respect to any transaction.

PACA provides that a commission merchant, dealer, or broker that violates any of the unfair conduct provisions "shall be liable to the person or persons injured thereby for the full amount of damages . . . sustained in consequence of such violation." The injured person or persons may enforce such liability by bringing an action in federal district court or by filing a reparations proceeding against the commission merchant, dealer, or broker.

Licensing

The PACA requires that all commission merchants, dealers, and brokers obtain a valid and effective license from the USDA Secretary. PACA does not require growers who sell perishable agricultural commodities that they have grown to obtain a license, though sellers commonly choose to apply for a PACA license. From the grower's perspective, the license demonstrates that the buyer is a legitimate business person or business entity who can be trusted to honor contractual terms and PACA requirements.

The requirement of a PACA license by a commission merchant, dealer, or broker is akin to the requirement of a driver obtaining a driver's license. A commission merchant, dealer, or broker that fails to obtain a valid and effective license shall be subject to monetary penalties, though some leniency may be provided if the failure to obtain the license was not willful. Importantly, if a commission merchant, dealer, or broker has violated any of the unfair conduct provisions, that person's PACA license may be suspended or possibly revoked, which effectively negates their ability to engage in the fruit and vegetable industry. A person who knowingly operates without a PACA license may be fined up to $1,200 for each violation and up to $350 for each day the violation continues.

Statutory Trust

For specialty crop producers, the statutory trust is a very important aspect of PACA since it is specifically designed to protect sellers of perishable agricultural commodities in the event a

buyer becomes insolvent or otherwise refuses to pay for produce. The statutory trust provision under PACA specifically provides the following (emphasis added):

> [p]erishable agricultural commodities received by a commission merchant, dealer, or broker in all transactions, and all inventories of food or other products derived from perishable agricultural commodities, and any receivables or proceeds from the sale of such commodities or products, **shall be held** by such commission merchant, dealer, or broker **in trust for the benefit of all unpaid suppliers or sellers** of such commodities or agents involved in the transaction, **until full payment of the sums owing in connection with such transactions has been received** by such unpaid suppliers, sellers, or agents.

In other words, the buyer is required to maintain a statutory trust relative to fruits and vegetables received but not yet paid for. If a buyer becomes insolvent or declares bankruptcy, the statutory trust provides priority status to the unpaid seller against all other creditors in the world.

Consequently, the PACA statutory trust is often referred to as a "floating trust." Thus, a PACA trust beneficiary is not obligated to trace the assets to which the beneficiary's trust applies. When a controversy arises as to which assets are part of the PACA trust, the buyer has the burden of establishing which assets, if any, are not subject to the PACA trust. The PACA beneficiary only has the burden of proving the amount of its claim and that a floating pool of assets exists into which the produce-related assets have been commingled.

If a buyer files for bankruptcy, the trust assets do not become "property of the estate" because the buyer-debtor does not have an equitable interest in the trust assets. Rather, the buyer holds those assets for the benefit of the seller. Thus, a beneficiary of the PACA trust has priority over all other creditors with respect to the assets of the PACA trust.

However, the seller must take certain steps in order to protect his or her rights in the statutory trust. One method of preserving rights to the statutory trust is by simply including the following exact language on the face of the invoice:

> The perishable agricultural commodities listed on this invoice are sold subject to the statutory trust authorized by section 5(c) of the Perishable Agricultural Commodities Act, 1930 (7 U.S.C. § 499e(c)). The seller of these commodities retains a trust claim over these commodities, all inventories of food or other products derived from these commodities, and any receivables or proceeds from the sale of these commodities until full payment is received.

It should be noted that this method is available only to those sellers who are licensed under PACA. Hence, many sellers will elect to be licensed so that they can preserve their statutory trust rights in this manner. Unlicensed sellers (or licensed sellers who do not want to include the foregoing language on their invoices) may preserve their statutory trust rights through a different method. This method requires that the seller provide written notice that specifies it is a "notice of intent to preserve trust benefits". In addition, the written notice must include the name(s) and address(es) of the seller, commission merchant, or agent, and the debtor as well as the date of the transaction. The written notice must also identify the commodity at issue, the invoice price, payment terms, and the amount owed.

This written notice must be given within thirty calendar days

- after expiration of the time prescribed by which payment must be made, as set forth in the regulations issued by the Secretary;
- after expiration of such other time by which payment must be made, as the parties have expressly agreed to in writing before entering into the transaction; or
- after the time the supplier, seller, or agent has received notice that the payment instrument promptly presented for payment has been dishonored.

If the payment terms extend beyond thirty days, the seller will lose his or her rights to the statutory trust. PACA also provides that if the parties to the transaction "expressly agree to a payment time period different from that established by the Secretary, a copy of any such agreement shall be filed in the records of each party to the transaction and the terms of payment must be disclosed" on the documents relating to the transaction. But, as noted, if this agreement extends the time for payment for more than thirty days, however, the seller cannot qualify for coverage under the trust.

Prompt Payment

PACA also requires produce buyers to make full payment promptly, and the regulations implementing PACA expound on PACA. While there are additional rules embedded in the regulations, the most common payment requirement is that payment be made 10 days from date of acceptance of the goods for purchase.

For more information, please refer to the National Agricultural Law Center's Reading Room on PACA, available at: http://www.nationalaglawcenter.org/readingrooms/perishablecommodities/, or contact the National Agricultural Law Center.

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Heirs Property in Arkansas

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Background

"Heirs property" has disproportionately affected BIPOC communities, especially in the southern United States. Often, a heirs property situation occurs when a landowner passes away "intestate," without a will or other estate plan. If, for example, that landowner is unmarried and has three children, the laws of intestate succession will typically divide the property so that each of the children have an undivided 1/3 interest as "tenants in common." That means that each of the children have a right to the use and occupation of the entire property. As generations pass, the number of tenants in common for a single property can increase significantly.

This fractional ownership greatly increases the risk that an heir, in attempting to separate their interests, will force a partition sale of the property, or that the land will be lost to tax default. When property is partitioned by a court, it can either be partitioned in kind or partitioned by sale, but the more common outcome is for the property to be partitioned by sale. Property partitioned by sale, or sold to redeem tax debt, often results in the family members losing ownership of the property.

To combat that loss, 19 states, including Arkansas, have enacted the Uniform Partition of Heirs Property Act ("UPHPA"), which provides protections to other tenants including notice, appraisal and right of first refusal. If the other tenants choose not to exercise that right, the UPHPA includes requirements for conducting a sale for fair market value supervised by the court. However, because it is still essential to understand the foundation of intestate succession, and partition actions to see how the UPHPA modifies these laws, this fact sheet will outline each of these sections.

Intestate Succession:

Each state has passed a series of laws governing intestate succession. A person who passes away "intestate" has not made any other estate plan, such as a will or trust, to identify the people who they wish to leave their property. Without further direction from the decedent, intestate succession laws act as a default estate plan, of sorts. Generally, intestacy laws transfer portions of the estate to a surviving spouse and then through the decedent's bloodline to their heirs. Typically, descendants such as children and grandchildren will be first in line to inherit.

If no descendants exist, the property will ascend through the bloodline to the decedent's parents, their parent's children (the decedent's siblings), and descendants of those children (the decedent's nieces and nephews). If there are no surviving relatives in those groups, the property will ascend to the decedent's grandparents, their children, and the descendants of those children.

Once the surviving heirs are identified, the property is divided between the group regardless of the number of members. It is common for land to be inherited by multiple people at the same time. For example, if the decedent had five children and no surviving spouse, then the court will give all five of the children property ownership. This ownership, as "tenants in common", provides each child with an undivided 20% ownership in the property as a whole. This can create both practical and legal issues.

Property Ownership: Tenancy in Common:

Tenancy in common is a type of ownership where multiple owners have a fractional interest that combines into a one hundred percent undivided interest in the property. Using the example above, intestacy laws would divide the property among all five children as tenants in common, with each having an undivided 20% interest.

Another generation of intestate succession, or if a cotenant transfers their interest to their heirs as tenants in common, just compounds the ownership concerns. For example, assume that one of the five siblings in the original problem has died unmarried and intestate, leaving behind two children. Those children will inherit their parent's undivided interest, which they will split between them. According to the county records the land itself still remains in the name of the original landowner. However, it is now owned by the four children of the original landowner, who each have a 20% undivided interest, as well as the two grandchildren of the original landowner, who each have a 10% undivided interest. As generations pass, the number of owners can increase exponentially. No matter how many owners there are or what percentage of ownership they have, they are referred to as cotenants.

All cotenants enjoy complete and equal rights to the real property including possession, benefits, and profits of the land, no matter how small their interest in the property. Along with the right to the property, each cotenant also has an equal responsibility to the costs, including costs to maintain the property as well as the cost of taxes on the property. This may be difficult to do on a property that is not income-earning, leading to disagreement among the cotenants, or even the failure to maintain the property or pay property tax. However, a

co-tenancy on an income-earning property such as farmland, for example, can still lead to disagreements, as each cotenant generally retains the right to farm the property, lease it out, choose the crops to plant or make any other production decision.

Further, each cotenant may also sell or transfer their interest regardless of what proportional percentage they own. Often, cotenants decide to request a partition action as the result of disagreements with other co-tenants or because they wish to convert their interest into money.

Partition Action:

A partition is a legal procedure that is used to resolve a land dispute brought by a tenant in common. There are two variations, a partition in kind and a partition by sale. While partition is an important focus of UPHPA laws, the following section is general overview of how it operates without UPHPA in place.

Partition in kind is a request for the land to be physically divided amongst cotenants. This is a more difficult route for a court to take, however, because each property is unique. It is usually difficult to physically divide property fairly as different parts of the same piece of property may have different values. For example, if the property contains both cropland and timber is it possible to physically divide the property so that all tenants receive a similar portion of each?

If the property cannot be divided equally through a partition in kind, then the court will turn to the process of partition by sale. Partition by sale is a request for a forced sale of the property. After the costs of the sale are subtracted, the proceeds are divided among the cotenants according to their ownership interest. So, in our earlier example, each of the five children would receive 20% of the proceeds from the sale of the property and if one of those children died intestate then their 20% would be equally divided among their children. In Arkansas, a partition by sale is generally conducted by public auction. Depending on the interest and turnout, the price received at auction might not be as high as if it were sold through the traditional real estate process, for example. Further, partition by sale can also compound familial land loss, because any members of the family who may have been living on the property will be forced to move once ownership changes hands.

Any one cotenant may ask for the property to be partitioned. Courts typically grant petitions for partition even if the majority of cotenants do not want the property partitioned, and regardless of a cotenants' percentage of ownership or their involvement with the property. The UPHPA modifies this standard approach for properties that qualify as heirs property.

Arkansas Uniform Partition of Heir Property Act (Ark. Code Ann. § 18-60-1002 et seq)

The goal of the UPHPA is to help balance the rights of cotenants in the event of a partition action, as well as give the cotenants tools to try and maintain ownership of the property. The UPHPA outlines options to buy out a petitioning cotenant, rules for

property valuation, a stronger emphasis on partition in kind instead of partition by sale, and provides flexibility in the sale process if partition by sale is the only equitable outcome. Arkansas adopted the UPHPA in 2015, and it applies to partition actions for heirs property filed on or after January 1, 2016.

When a partition has been requested, an Arkansas court will first determine whether the property in question is heirs property. If it is, UPHPA must be applied unless the cotenants have reached another agreement.

Definitions

In order to answer the question of whether something is heirs property and thus falls under the UPHPA, it is important to consider the definition of key phrases. In Arkansas, heirs property is real property that is owned by tenancy in common and that also meets each of the following three requirements:

1. There is no recorded agreement that explains how the property should be partitioned.
2. At least one of the cotenants has received their ownership of the property from a relative.
3. At least one of the following must be true:
    a. 20% or more of the interests are held by cotenants who are relatives
    b. 20% or more of the interests are held by one cotenant who acquired title from a relative
    c. 20% or more of the cotenants are relatives.

A relative is an "ascendant, descendant, or collateral or an individual otherwise related to another individual by marriage or law". As described earlier, an "ascendant" is someone who comes before a person in their bloodline and a "descendant" is someone who comes after a person in their bloodline. In Arkansas, ascendants include adoptive parents and their ascendants while descendants include adopted children and their descendants.

Notice:

All parties must be made aware that a legal action has started. The cotenant who has requested partition is responsible for giving this "notice" to all cotenants. While individual notification is always preferred, in some situation a notice "by publication" is allowed. If the court allows notice by publication, the partitioning party will be required to post a sign on the property stating that the action has been started and identifying the court that will hear it. Further, the court may require the partitioning cotenant to include their name and that of another other known cotenants.

Valuation and Cotenant Buyout Options:

After the action for partition has started, the property is determined to be heirs property, and proper notice has been given, the market value of the property must be assessed. The UPHPA outlines three ways that may be done. The first and easiest route is that the cotenants may agree to the value of the property itself, or agree to their own form of valuation. If this method is selected, no appraisal is conducted. Second, it is possible that "the evidentiary value of an appraisal is outweighed by the cost of the appraisal." In other words, the value of the property itself is low enough that a formal appraisal would be cost prohibitive. In those cases, the court may determine the fair market value after holding an evidentiary hearing. Third, the court may determine the fair market value of the property by ordering an appraisal by a disinterested real estate appraiser.

This fair market valuation will be done as if the property had a single owner. This eliminates the possibility that the property would be undervalued for being owned as a tenancy in common. Within ten days the court must send notice to each cotenant with a known address identifying the appraised fair market value, stating that the appraisal is available to each party, and explaining that all parties may file an objection to the appraisal within thirty days of the first notice being sent. At least thirty days after the notice is sent, the court typically will hold a hearing to consider the appraisal and any other evidence offered by parties to the case. After the hearing the judge will determine the fair market value of the property and notify all parties of the decision.

Under the Arkansas UPHPA, all cotenants who did not seek partition have the option of buyout. In other words, they may purchase the interest in the property owned by the partitioning cotenants. Any cotenant who did not seek partition has forty-five days from the day the buyout notice was sent to notify the court that they will pursue a buyout. The purchase price will be based on the cotenant's percentage of ownership and the value of the property. Depending on how many cotenants elect to use the buyout option, one of three things may occur:

1. If only one cotenant agreed to buy the petitioning cotenant's interests, all cotenants must be notified.
2. If more than one cotenant elects to buy the petitioning cotenant's interest, the court will determine how much interest each cotenant can buy based on their existing ownership interest in the property. The court will then send notice to all the cotenants with the price to be paid based on those ownership interests.
3. If no one elects to buy the interests of the cotenants that requested partition the court will notify all the cotenants that the buyout did not work and move on to the next option.

If either of the first two circumstances occur, the partition action is resolved once the non-partitioning cotenants complete the buyout. If none, or only some, of the interests of the petitioning cotenants are bought then the court will move on to a partition in kind.

Partition in Kind:

A partition in kind occurs when a court physically divides property among the cotenants. For example, if there are twenty acres owned by tenancy in common among four cotenants, then a court would typically award ownership of five-acre tracts to each of the cotenants. A partition in kind can be difficult to execute because all land is not the same. Going back to the example, some of the twenty acres may be more valuable than other parts of the property. This makes physically dividing the property difficult if there is no equitable means of doing so. The UPHPA offers more flexibility for courts to consider a partition in kind as a viable option. Under the UPHPA, a court may require that some cotenants pay others to even out the value of the property.

When a court executes a partition in kind, it will allocate a portion of the property to any cotenants that are unknown, not locatable, or the subject of a default judgment. If those interests were not bought out, a part of the property would represent the combined interests of these cotenants as determined by the court. This part of the property remains undivided among those cotenants.

A court will not partition the property in kind if it finds that the partition would result in great prejudice to the cotenants. To determine whether there is a great prejudice the court should weigh a variety of factors, including:

- If the property can be practicably divided;
- If the partition would divide the property in a way that the market value of all the parcels divided would be materially less than the value of the property if it were sold as a whole;
- Evidence of possession of the property by a cotenant;
- Cotenant's sentimental attachment to the property, including any attachment arising because the property has ancestral or some other special value;
- Lawful use being made of the property by a cotenant and the degree to which they would be harmed if they could not continue the same use of the property;
- Degree to which the cotenant has contributed their share of the property taxes, insurance, and other expenses associated with maintaining ownership of the property or have contributed to the physical improvement, maintenance, or upkeep of the property; and
- Any other relevant factor

Partition by Sale:

After the buyout option and consideration of partition in kind, the court may order a partition by sale as a final option. The sale of heirs property must be an open-market sale unless the court finds that sale by sealed bids or auctions would be more economically advantageous and in the best interest of the cotenants. Real estate brokers have a timeline to file a report with the court once they receive an offer from someone to purchase the property for at least the fair value that has been previously determined. Once the property has been sold for at least fair market value, the proceeds from the sale, minus any expenses, are distributed to the heirs based on their percentage of ownership in the property.

In states without a version of the UPHPA, the partition by sale process may result in the property being sold for substantially lower rates. This can prove particularly harmful for BIPOC owners of heirs property.

Conclusion

The Arkansas UPHPA governs partition of heirs property. It provides tenants in common of heirs property the opportunity to buy out other cotenants who want to force a partition of the property; it defines what considerations should be reviewed under partition in kind and allows courts greater flexibility to use this form of partition; and it protects all cotenants' ability to receive the full market value of the land if sold. Heirs property is a significant legal risk to BIPOC producers' generational ownership of farmland, and the Arkansas UPHPA helps creates more opportunities for families to keep their ancestral property.

Additional Resources

Intestate Succession and Agriculture Factsheet

Estate Planning and Taxation Reading Room

Arkansas Uniform Partition of Heirs Property Act

Uniform Partition of Heirs Property Act with Prefatory Note and Comments

Arkansas Code Intestate Succession

Children--Legitimacy--Inheritance by Illegitimate Children

Petition for Partition

Haunting the Title from the Beyond: When is a Probate Required in Arkansas? By J. Mark Robinette Jr. Law Offices of Mark Robinette

Thomas W. Mitchell, Reforming Property Law to Address Devastating Land Loss, 66 Ala. L. Rev. 1, 36 (2014)

Kamaile A.N. Turcan, U.S. Property Law: A Revised View, 45 Wm. & Mary Envtl. L. & Pol'y Rev. 319, 336 (2021)

UNDERSTANDING SOLAR ENERGY AGREEMENTS

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INTRODUCTION – THE "SOLAR ENERGY

For this guide, "solar energy agreement" will refer to the document or documents that work together to govern the relationship between the landowner and the party (or parties) constructing and operating the solar power project. These agreements are sometimes called "solar leases," "solar easements," or "solar power contracts."

Before beginning this discussion, it is important to note that a solar energy agreement is an important and complex legal agreement with a long duration that can have significant economic impacts. You should strongly consider contacting an attorney with experience in negotiating solar energy agreements to assist you before executing such a document.

HOW DO SOLAR ENERGY PROJECTS WORK?

To understand a solar energy agreement, it helps to understand how solar power generation works.

SOLAR POWER TECHNOLOGIES

Most solar projects are classified as either photovoltaic (PV) or concentrating solar power (CSP) based on how they use the power of the sun to generate electrical power.

PHOTOVOLTAIC TECHNOLOGY

A photovoltaic cell works by "sandwiching" two semiconductor materials (usually based on silicon, which is common in sand) together. The semiconductors are formulated so that when the photons that form light strike their atoms, electrons are released from one semiconductor atom to the next. By sandwiching a semiconductor that develops a negative charge to one that develops a positive charge, a flow of these electrons can be formed and electrical current is generated. When these negative and positive semiconductors are connected together and covered with an anti-reflective coating (this helps the cell absorb light rather than reflect it), they compose a "solar cell." When several of these cells are connected together, they form the kind of "solar panel" you have probably seen in use to pump water for livestock, used on rooftops to provide home power, or perhaps even in a utility-scale solar power project.

As you would expect, the more intense the sunlight is, the more power a PV cell can generate. The intensity of sunlight is sometimes measured in terms of how much power it is providing per unit of area (most often, in Watts or kilowatts per square meter, such as w/m^2 or kW/m^2). The light being absorbed by a PV cell is most intense when the line between the cell and the sun is directly perpendicular to the panel. You can think of

this as when the panel is directly facing the sun rather than being at some angle relative to the sun.

PV panels can be mounted on stationary structures such as the rooftops of existing buildings or on their own stationary frameworks. Mounting the PV panels to a stationary object reduces the cost of installing the panels, but the tradeoff is that the panels will not be able to collect as much energy during portions of the day when the sun is not directly perpendicular to the panels. On the other hand, some PV panels are mounted to moveable frames that track the sun so the panel is always directly facing the sun no matter where it is in the sky (such systems are sometimes called "heliostats"). These systems are more expensive to build, but they are also optimized to collect the maximum amount of power by always facing directly into the sun.

Some PV cells are designed to capture even more of the sun's energy by using a lens built into the cell to focus even more of the sun's light onto a high efficiency/high capacity solar cell. These cells are called Concentrated Photovoltaic (CPV) cells. CPV cells are almost always mounted to moving frames to track the sun as CPV cells work very well when pointed directly at the sun but are much less efficient when they do not directly face the sun.

CONCENTRATION SOLAR POWER (CSP)

While PV directly converts the power of sunlight into electrical power, Concentrating Solar Power (CSP) converts the power of the sun into heat, and then uses that heat to generate power. In a typical CSP system, large mirrors (called "reflectors") are used to direct sunlight toward a central receiver. In some systems, a field of reflectors focus light onto a central receiver mounted on a tower. In other systems, curved mirrors called a "parabolic trough" focus light onto a receiver tube that runs down the length of the trough. The focused light is used to heat a fluid in the receiver (which is often an oil, molten salt, molten metal, or sometimes water) and the heated fluid is then run through a heat exchanger to convert the heat energy into steam that then drives a turbine to produce electrical power.[1]

LAND NEEDS FOR SOLAR PROJECTS

A solar project developer has come to you because they need land either for the primary generation equipment (either an array of PV panels or for a CSP system) or for a system that will support the project, such as an electrical transmission line, substation, maintenance and operation (M&O building) or the like. We will discuss some of the specific land impacts of solar energy development later in this guide, but for now, we'll focus on what a solar project developer is likely looking for as a good site for solar power development. First, they are looking for an area with bright and abundant sunlight. A large function of that is simply where the project is located on Earth, since areas closer to the equator get more direct sunlight than areas to the north or south. For information on

[1] See K. Vignarooban et al., *Heat Transfer Fluids for Concentrating Solar Power Systems – A Review*, 146 APPLIED ENERGY 383-396 (15 May 2015).

the amount of solar radiation received by your area, you can consult the National Renewable Energy Laboratory's solar maps, available at https://www.nrel.gov/gis/solar.html. While geography and astronomy have much to do with how much solar energy an area may receive, the climate of the area has an impact as well. Areas often overcast with clouds will receive less light or have light that is frequently disrupted (which can also be a concern for developers). Land-based obstructions such as mountains, hills, trees, or buildings can also block light from reaching the project, and developers will often work to avoid those obstructions.

In addition to looking for areas with strong, consistent sunlight, the terrain upon which the project will be built can affect how easily it is constructed and maintained. Generally speaking, both PV and CSP projects are built on relatively flat areas, with less than 1 percent slopes. CPV projects may be able to use slightly rougher terrain.

Another location consideration for solar projects is how close the proposed site is to electrical transmission lines. The capacity of the project will dictate the capacity of the lines needed to transmit the power to users; some projects may require large-scale lines that are expensive to construct. Thus, developers may want to secure land that is closer to the transmission lines rather than building the project far away and constructing the lines to reach the project. Developers are constantly working to balance the potential revenues from a project (locating the project with optimal sunlight characteristics) versus the project's costs (such as costs of constructing on a rugged site or building miles of transmission lines to reach the project site).

HOW CAN I LEARN ABOUT THE DEVELOPER WHO WANTS TO USE MY LAND FOR THEIR PROJECT?

Whenever a solar energy developer approaches you, find out as much as you can about the company and their "track record." Ask the developer for information about their other projects, and ask them for contact information for other landowners with whom they have done business. Contact those landowners for their experiences, then ask *them* for additional landowners you can contact (obviously, the developer will suggest landowners they know will give a favorable reference, but the references you get from those landowners may have different experiences). Contact the office of the Secretary of State for your state to see if the developer is registered to do business in your state and is in good standing. Use the Internet to find additional information about the company (but also consider the sources of information – be a smart consumer of internet-based information).

The solar industry has an industry association – the Solar Energy Industry Association (SEIA) – that requires any members to abide by the SEIA Code, available at https://www.seia.org/initiatives/seia-solar-business-code. Ask the developer if they are a member of the SEIA, and review the Code as well.

In some cases, a land broker or a "landman" may be negotiating agreements rather than the developer itself. In some cases, they are doing this under a contract for a developer, and in other cases, they are trying to assemble "packages" of agreements for sale to a developer. Whenever a land broker or landman contacts you, ask him or her which arrangement applies. If they are negotiating for a developer, the developer has likely provided the agreement to be used, which in a way may be an advantage for you; the developer is more likely to have the required experience and knowledge to craft a mutually beneficial lease. In some cases, land brokers or landmen trying to package agreements may have drafted the agreements themselves (or engaged an attorney to do so) without the same level of experience. This does not mean a landowner should never negotiate with such parties but may mean the landowner must take extra care to understand the requirements for a successful agreement.

HOW ARE SOLAR ENERGY AGREEMENTS STRUCTURED?

When offered a solar energy agreement, remember attorneys working for the solar energy developer drafted the agreement. The attorneys' professional obligation was to prepare an agreement that was as favorable as possible for their client – the developer, not you. While it is in the best interest of the developer to craft an agreement that is fair to the landowner and will create a situation that is good for both developer and landowner, *you* as the landowner must look out for your own best interests. Never sign a solar energy agreement without discussing it with an attorney who has experience in solar energy agreement negotiations as well as with your tax professional and any other professional advisors who might be able to help you.

For many landowners, any prior experience with resource development agreements may be in the form of oil and gas leases, and as a result, they try to apply those experiences to examining the solar energy lease. To some extent, this makes sense. A company wants to enter a landowner's property, construct facilities, extract an energy resource, and send that resource to market. However, when you compare a typical "Producers 88" form oil and gas lease side-by-side with a solar energy agreement, the differences between them can be quite apparent. Landowners who have negotiated wind power agreements might have more relevant experience, but again those agreements can also differ significantly from solar energy agreements.

When you sit down to review a solar energy agreement the first thing you will likely notice is the length. Many solar energy agreements are 20 pages or longer, with some over 40 pages long, while an oil and gas lease may often be a two-page, "fill-in-the-blank" document. The difference? First, the oil and gas lease comes with a century of case law, statutes, regulations, and industry custom "built" into it, while the solar energy agreement is often an entirely new creation of the solar energy developer. Second, while the primary duty for a mineral interest owner is often "just stay out of the way," the relationship between solar power developer and landowner is much more complex and must be (or at least, should be) spelled out, in detail, within the agreement. Finally, the typical financing arrangements for an oil and gas well differ starkly from those for a solar power project, and a great deal of the language and terms contained in the solar energy agreement may be dictated by lenders or investors rather than the developer itself, complicating the negotiation process.

As you look at your solar energy agreement, you must understand that you may be looking at something that may function as an option, easement, and lease simultaneously. As each of these tools can have very different impacts on your property interests, you must make careful note of the potential interactions among them all.

Many solar energy agreements commence with an option contract between the developer and the landowner in which the landowner grants an exclusive right to the developer to investigate the suitability of the project for development, and if the developer should so choose, to enter into a full development contract and commence project construction and operation. During this option period, the developer will likely survey the property and may deploy sensors to verify their estimates of the solar capacity for the location. They may also conduct environmental and wildlife impact studies, and analyze construction suitability for the site. Option periods often vary widely, in some cases as short as one or two years, and extending to ten years in other cases. Almost every solar energy agreement that contains an option will make the option "exclusive" which means the landowner cannot enter into any other agreement for solar development on the land (and perhaps any other form of energy development) during the option period.

Another feature often included in solar energy agreements is a confidentiality agreement covering the site data obtained during the option period and, in many cases, most of the terms of the overall agreement. Many landowners are unfamiliar with confidentiality agreements. Understand that by signing an agreement with a confidentiality clause (or a separate confidentiality agreement), you will be bound by its terms and may not be able to discuss your solar energy agreement with others whose advice you may need. Confidentiality agreements can also restrict landowners' ability to negotiate together. Consider whether you should strike the confidentiality provision (or separate agreement), or if the developer is unwilling to consider that, make sure you reserve the right to consult with your attorney, accountant, and any other professional that would be bound by a professional obligation of confidentiality.

Some developers take an approach of negotiating the agreement in its entirety before execution of the option, while other developers provide only the option agreement with a term sheet for the subsequent, full agreement with the details to be negotiated if and when the option is triggered. Another alternative is an option agreement along with a "letter of intent" that spells out the items to be negotiated before executing a full contract. The trend appears to be towards negotiating the agreement in its entirety before the option period starts. Understand that if you choose to leave terms open after the agreement begins, factors can change, perhaps to your advantage, but perhaps to the advantage of the developer.

If the developer's investigations indicate that the project will indeed work, the developer will then trigger the option and enact the full agreement. In many solar energy agreements, the assurances needed by the developer to enable project construction and operation may take the form of a collection of easements and/or a general lease of the affected property. A brief summary of some of the typical terms (be they presented as easements, covenants, or contractual lease terms) follows:

Table 1 – Common Landowner Terms

Term	Description
Access	Developer has right to access the property and construct roads, for evaluation of site, and construction, operation, and maintenance of equipment.
Construction	Developer may use portion of surface for access to construction equipment and "lay-down" areas.
Transmission	Allows for construction of underground and above-ground transmission lines, construction and operation of substations.
Non-obstruction	Landowner will not construct any improvements that could interfere with light patterns on property, nor permit obstructions to occur.
Glare / aesthetics / nuisance	Landowner acknowledges that certain reflected light levels, noise, or other issues may be caused by the project and agrees not to file suit for any such effects.

Most of the solar energy agreement will likely revolve around securing these terms, establishing the compensation package for the landowner, and defining the other parameters of the parties' legal relationship. While hundreds of pages could be written about the issues to be considered in evaluating a solar energy agreement, this guide will focus on what are arguably the five most important questions for you to analyze as you evaluate the proposed agreement. These questions are:

1. How will current uses of the property be affected by the project?
2. How long will the agreement last?
3. What are the landowner's obligations under the agreement?
4. How will the landowner be compensated?
5. What happens when the project ends?

HOW WILL THE SOLAR ENERGY AGREEMENT AFFECT THE USE OF MY LAND?

Assuming that the developer builds and operates the project, you will be "sharing" the surface of your property with the project to some extent. Unlike with wind energy projects, which often allow for crop, livestock, and even hunting operations to occur around the turbines, a solar project typically restricts or prohibits use of property immediately around the solar equipment (although the area or "footprint" of the project may be relatively small). Thus, while wind energy projects often provide a *supplemental* revenue stream in addition to the agricultural or recreational uses of the property, a solar project may represent a *replacement* of the agricultural or recreational revenues from the land it occupies, since those uses may no longer be possible.

To maximize efficiency, a developer will likely seek to install as many solar panels in an area as possible so long as they do not cast shadows on each other and thus reduce their efficiencies. While solar energy projects may have a smaller overall "footprint" than a wind energy project, they occupy a greater percentage of that footprint than a wind energy project. For example, one wind energy land use study showed the maximum number of wind turbines on a quarter-section (160 acres) of land was four turbines; combined with the access roads for the turbines, this added up to 3.85 acres of the 160 acres being used or a land use percentage of 246 percent.[2] By comparison, evaluation of one solar project found the fenced area of the project was 15.51 acres, with 6.81 acres of that area taken up by panels, transformers, and roads for a land use percentage of 43.92 percent. A 2013 study by the National Renewable Energy Laboratory found that on average, large PV projects (defined as projects with a capacity of 20 megawatts or more) used approximately 8 acres of land per megawatt of capacity, while CSP projects used approximately 10 acres of land per megawatt of capacity.[3] Compared to the 0.46 acres per megawatt of capacity found in the wind energy land use study mentioned above,[4] this illustrates the point that while solar projects are relatively small, they do occupy a greater proportion of that area.

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[2] *See* Shannon L. Ferrell and Joshua Conaway, "Wind Energy Industry Impacts in Oklahoma," Oklahoma State Chamber Research Foundation report (November, 2015).

[3] Sean Ong, et al., "Land-Use Requirements for Solar Power Plants in the United States," National Renewable Energy Laboratory Technical Report NREL/TP-6A20-56290 (June, 2013).

[4] *See* Ferrell and Conaway, *supra* at 2.

While there are a handful of examples where landowners have been allowed to graze small livestock such as sheep or goats around solar panels or other equipment in a solar energy project, the majority of solar energy agreements appear to prohibit any agricultural use of property within the area of the solar equipment. Landowners should work closely with the project developer in the design of the project to minimize the amount of land occupied by the solar equipment in order to maximize the amount of land still available for agricultural use. This can include requirements for the developer to fence off the areas where livestock or crop operations are not allowed, and to construct such fences to maximize the amount of land available for such operations.

Similarly, landowners and developers need to work together to minimize inconveniences caused by changed fencing configurations, the fragmentation of crop areas, blockages to irrigation systems, and changes to drainage patterns. These concerns should be raised during the initial contract negotiations to determine if reasonable accommodations can be reached either to minimize these disruptions or for additional compensation for them, in the form of "liquidated damages" language. Liquidated damages language that provides agreed-to compensation for each event (for example, a specified dollar amount for each fence breach, each linear foot of terrace repair needed, etc.).

Another frequent use of land that may be impacted by solar power development is recreational leasing, frequently in the form of hunting agreements. In many solar energy agreements, hunting may be completely prohibited on the affected property during the construction phase to minimize risk to construction crews. However, solar energy agreements may also contain broad indemnification language that makes the landowner responsible for injuries of project personnel or damage to project equipment caused by hunting lessees or other assignees of the landowner (for a discussion of these indemnity issues, see the section "What are the landowner's obligations under the agreement" below). Landowners should discuss compensation for loss of lease revenues to the extent such losses are caused by the project. They should also consider adding an indemnity agreement to any hunting leases specifying if the hunter causes any damage to the solar equipment they will pay any damages rather than the landowner. It may be wise to work with the developer to craft the language of such indemnity agreements and to make the agreement part of the solar energy agreement with a provision stating if the landowner requires any hunters to sign the agreement the developer will agree not to hold the landowner liable for any damages caused by the hunter.

Aesthetic uses of the property (sometimes called "beauty" or "scenic" uses), as well as of surrounding property, may also be a concern. Noise is not a concern for solar projects because they usually have few or no moving parts; in the case of fixed mount PV projects, they may have no moving parts. Visual impacts are far more difficult to address. In the case of *Rankin v. FPL Energy, LLC*, Texas' Eleventh Court of Appeals refused to stop the operation of a wind power project on the basis that aesthetics were not a sufficient basis to award damages based on negligence.[5] Several other cases have also

[5] *See Rankin v. FPL Energy, LLC*, -- S.W.3d --, 2008 WL 3864829 (Tex. App. 2008).

cited the subjectivity of aesthetics claims in suits involving wind power projects – in other words, "beauty is in the eye of the beholder."[6] It is likely courts would follow similar principles in evaluating the aesthetic issues surrounding solar projects.

One of the most frequent concerns expressed about solar projects is whether the PV panels or CSP reflectors will cause light reflection onto neighboring properties. In the case of PV panels, this is usually not a problem as the panels are coated with an absorbent coating to make sure the panels absorb light rather than reflect it. With CSP projects, the goal of project design is to maximize the amount of light directed to the central collector; this usually means minimizing the amount of light directed anywhere else. That said, though, reflectors can sometimes cause reflection of light to areas outside the project itself. In many cases, developers will construct maps showing the potential area of light reflection, and landowners should ask to have access to those maps. While aesthetic considerations should not be a problem for a well-designed solar project, both developers and landowners should consider possible opposition to projects by neighbors.

The landowner's participation in governmental programs can also have an impact on the use of the property for solar energy development. Several USDA programs such as the Conservation Reserve Program ("CRP"), Environmental Quality Incentives Program ("EQIP"), the Grassland Reserve Program ("GRP") and other common programs for landowners require participants to have multi-year contracts and plans for the use and maintenance of the land under contract. Constructing solar power equipment on such lands in violation of those contracts or plans could cause landowners to forfeit future payments, return of past payments, or even pay penalties.[7] If the project lands are any under USDA program contracts, the appropriate agencies should be contacted to discuss integration of the project under the contract plans or an amendment of the government program agreement before execution of the solar energy agreement.[8] Landowners should consider negotiating agreement language providing that the developer should compensate any loss of revenues from such programs caused by the solar power project.

Finally, landowners should explicitly reserve the right to use the property for agricultural, recreational, and other uses to the maximum extent possible. From the landowner's perspective, such a reservation should be as broad as possible while still

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[6] For a compilation of such cases, *see generally* Stephen Baron, New Meets Old: Wind Turbines and the Common Law of Nuisance, University of Texas Wind Energy Institute (February 19-20, 2008, Austin, Texas), *available at* http://www.utcle.org/eLibrary/preview.php?asset_file_id=15069.

[7] *See, e.g.*, 7 C.F.R. § 1410.32(h), providing that termination of a CRP contract will trigger repayment of all amounts received by the landowner under the contract, plus interest.

[8] For an excellent discussion of these programs, *see generally* Farmers Legal Action Group, Inc., *Farmers' Guide to Wind Energy: Legal Issues in Farming the Wind* and its discussion of "Impact[s] on Farm Program Eligibility" at pp. 4-8 *et seq.*, *available at* http://www.flaginc.org/topics/pubs/index.php#FGWE.

allowing the developer the rights necessary to construct, operate, and maintain the project. Similarly, landowners should also be careful not to grant away access to other resources on the property without fair compensation. Some solar agreements may attempt to give developers free access to water, rock, and other materials without any additional payment to the landowner.[9]

HOW LONG WILL THE SOLAR ENERGY AGREEMENT LAST?

With some of the early solar energy leases, the lease terms were 99 years; others called for terms of 50 years. This fact alone frequently shocked landowners to the point of rejecting any further consideration of the lease. Long lease terms reflect the classic struggle, seen for many years in the oil and gas industry as well: a resource developer wants to secure access to the resource at a fixed price for as long as possible, while the landowner would like to continually offer access to the resource back to the market if a better price may be secured. While some leases with these 99-year terms may still be offered, they are becoming rarer. The general trend seems to be toward shorter periods, often ranging between 20 and 50 years. From the developer's perspective, a lease period must be of sufficient length to recapture the project's costs and return an acceptable profit to project investors. Additionally, the contract the developer has to sell power to a utility (sometimes called a "power purchase agreement" or "PPA") may last for 20 years or more. A developer will likely insist on a lease term as long as the PPA so the developer can be guaranteed access to the project site for as long as they are obligated to provide power to the purchaser under the PPA.

Some leases have an "initial" or "primary" term that may last for a significant period (such as 20 years) followed by options to renew the lease at the developer's option. These renewals may be for a second period equal to the primary term, or for a shorter period (such as five or ten years). The effect of these circumstances may lead to long-term leases with renewals that are solely at the discretion of the project developer. However, while it may be difficult to get initial terms in smaller increments, there may be opportunity for negotiating the terms of lease renewals. Thus, the first step for the landowner is to analyze the duration of the agreement carefully. Be sure to account for not only the primary term but also for any renewal periods as well (and assume for the

[9] Agreements that seek water rights from the landowner are of particular concern. PV energy facilities do not require water for their operation, and thus landowners confronted with such a provision must undertake special care to determine the proposed use of, and compensation for, their water by a project developer. CSP projects may require water for cooling or for heat exchange fluid purposes, but again the landowner should carefully consider the amount of water use to be allowed as well as the water rights the landowner has and his or her ability to transfer those rights to a developer.

sake of discussion that the developer will execute any and all renewals to which they may be entitled).

If the project developer is unwilling to negotiate the overall length of the agreement, it may be possible to negotiate a "reopener" term that allows for negotiation of some commercial terms at renewal periods. It is important to tie such reopeners to the compensation terms of the agreement to minimize downside risk with a price floor for the landowner if electrical markets should trend downward at the time of lease renewal. The landowner may also wish to reopen the entire agreement if the project is to be "repowered" (that is, if existing project equipment is removed and replaced with new, larger, or more efficient systems).

Finally, many landowners may overlook the fact that entering into a solar energy agreement may impact their estate plans. The length of these agreements makes it quite possible that successors to the land in question will take the property subject to the agreement. Thus, landowners may need to involve those successors in discussions about the agreement as part of their succession planning efforts.

WHAT ARE YOUR OBLIGATIONS AS A LAND OWNER?

As mentioned above, solar energy agreements differ from oil and gas agreements in that there may be many more on-going duties faced by the landowner under a solar energy agreement. First among these obligations is likely the non-obstruction term of the agreement that requires the landowner to avoid (and in some agreements, actively defend against) the creation of any condition that could interfere with the light reaching the solar equipment. While this may not seem like a significant constraint, landowners may be unaccustomed to thinking about the shadows cast by a windmill, granary, barn, home, or other structure. Depending on the size of the parcel in question, this principle, or an express set-back provision in the agreement, may effectively block the construction of any new improvements on the land unless an agreement is in place that allows for discussion of potential improvements with project engineers. If you have any plans for improvements, such plans should be raised to the attention of the developer as the agreement is considered. You may also need to examine the agreement to see if requires you to affirmatively eliminate other obstructions, such as trees and if it prohibits the leasing of the land for any other uses such as cellular towers.

Another significant issue may be the indemnification provisions of the solar energy agreement. The concept of indemnification itself may be new to many landowners. Adding to this is the fact that the indemnification provisions of many solar energy agreements are the provisions developers are least willing to negotiate.[10] Indemnification, in an agreement to reimburse another party for damages they sustained as the result of another party's actions. Indeed, some agreements will effectively hold the landowner liable for any damages or injuries that are not the result of negligence or willful misconduct by the developer. Landowners may also be required to take on increased insurance limits to satisfy these indemnification obligations.

Landowners should seek a balanced and fair indemnity relationship. For example, if the project site is under a hunting lease, the landowner and developer may consider a standard indemnification agreement to be executed by the hunting lessee that provides the lessee will be responsible for any damages or injuries caused by its presence on the property. Landowners should also consider negotiating indemnity language that explicitly exonerates the landowner from liability for the actions of trespassers and any other parties that are not under the direct control of the landowner. Finally, increases in insurance requirements for the landowner should be a consideration in compensation negotiations. Further, indemnity should work both ways; landowners should also insist on indemnification language protecting them from any damages caused by the solar energy project or the actions of the developers and any one on the property at the invitation of the developers. Further, landowners should insist that the developer secure and maintain commercial liability insurance with the landowner made a "named insured" on the policy. Landowners should also have the right to request a certificate of insurance (verifying that the insurance is in place and names the landowner as an insured) from the developer.

Another potential hazard for landowners may come from the legal interests created in the property by the solar energy agreement. If the land is subject to an agreement with a secured creditor, such as a mortgage, entering into a solar energy agreement could mean creating an "interest" in another party that violates the terms of the mortgage. In the case of some mortgages, this default may make the entire amount owed due and payable immediately. As a result, creditors' consent may be needed prior to execution of a solar energy agreement. If the land sought for a solar energy project is subject to a mortgage, consult with the lender to ensure the mortgage will not violate the solar energy agreement or to see if the mortgage can be modified to allow the agreement. Conversely, many solar energy agreements often require the landowner to secure "subordination" agreements from creditors, sometimes called "subordination, non-disturbance, and attornment agreements" or "SNDAs." These agreements usually state that if the creditor forecloses on the mortgaged property, they will not evict the developer from the solar project and will not interfere with the

[10] For an analogy in wind energy agreements, *see* Neil Hamilton, "Roping the Wind: Legal Issues in Wind Energy Development in Iowa," American Agricultural Law Association Symposium, (October 25, 2008, Minneapolis, Minnesota).

operation of the project. The solar energy agreement may restrict or prohibit the creation of any new encumbrances (such as mortgages or liens) on the property.

Landowners' equity in real property may be a significant source of capital, especially in agriculture, and such provisions could pose challenges for accessing that equity. At a minimum, landowners should involve their lenders in the solar energy agreement discussion and work out an arrangement that will allow the landowner to meet their lending and liquidity needs, prior to executing the solar energy agreement. Further, requesting an SNDA from a lender can be a difficult or awkward conversation with a lender; landowners may want to consider negotiation for language that says the landowner will not interfere with the developer seeking an SNDA from a lender but is not obligated to get the SNDA themselves.

Finally, a natural concern for developer and landowner alike is the potential conflict between development of the surface for solar energy projects and the development of the property's oil and gas resources. In many states, the mineral estate is dominant over the surface estate.[11] However, in some states it would also appear that a shift towards a greater accommodation of surface interests has been underway. Early cases in predominantly "oil and gas" states held that an oil and gas lease necessarily implied that a lessor or claimants under him would not improve land *at all*, thereby interfering with lessee's rights to the surface.[12] However, those rights have been increasingly limited by the concept of reasonableness, "surface damage" statutes, or the "accommodation doctrine."

Thus, one must wonder what would happen in the event that a solar project and an oil well needed to occupy exactly the same location. Optimal solar equipment placement is critical to project profitability. It is also conceivable that geologic conditions could dictate that a mineral interest owner place a well at the same location in order to access the oil and gas resource. Holding to a strict "dominance" concept would mean that the solar equipment loses in this scenario, but one must ask whether asking a surface estate owner (or in this case, his or her lessee) to move or at least deactivate a multi-million dollar project would constitute an "unreasonable" interference with surface use.

Some solar energy agreements purport to override any previously-granted rights to develop the mineral estate underlying the surface property, but these provisions should be struck as a nullity under many states' law. On the other hand, some newer solar energy agreements ask that the developer be forwarded notice of any indication that the mineral interest owner intends to undertake development of mineral estate so that the parties can arrive at a mutually-agreed upon plan to develop all of the parcel's resources. It seems that in all but the most extreme cases, this strategy can allow for the development of the property to the satisfaction of all parties.

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[11] For example, in Oklahoma, *see, e.g. Enron Oil & Gas Co. v. Worth*, 947 P.2d 610 (Okla. Civ. App. 1997).

[12] *See Conway v. Skelly Oil Co*., 54 F.2d 11 (lOth Cir. 1932).

In evaluating the potential problems between solar development on the surface and development of the mineral estate on property, the landowner needs to consider what roles he or she *can* and *should* play. If the landowner owns both the surface and minerals, they have the ability to control mineral development, and should make sure that any mineral leases entered after the solar energy agreement make sure mineral development will not interfere with the solar project (and the solar energy agreement will likely require as much). If the landowner owns only the surface, they do not have the power to impose any obligations on the mineral estate, and should carefully avoid agreeing to any language in the solar energy agreement that holds them responsible for anything relating to the mineral estate.

HOW ARE PAYMENTS SET UNDER THE SOLAR ENERGY AGREEMENT?

At the core of every solar energy agreement is the issue of compensation, and there are almost as many different ways to calculate landowner payments as there are landowners. One of the most common questions asked is "what is the 'going rate' for solar leases?'" Since the solar industry is still growing and there are relatively few leases available for review relative to oil and gas leases or wind energy agreements, there has yet to form a body of data to determine market trends in solar energy agreements. Nevertheless, there are a number of considerations landowners should consider in the payment terms of their agreements.

When evaluating the payment terms of a lease, one should consider whether the payments vary by the "phase" of the project. Often, solar power projects are divided into an "option" or "pre-construction" phase (during which the project's viability is evaluated), a "construction phase" (occurring after the option has been exercised but before commercial production of energy has commenced), an "operation phase" (during which the project is generating and selling power), and possibly a "decommissioning" phase (when the project has wound up and is dismantled). Other agreements may combine the option and construction phases with a separate operation phase, and may omit the decommission phase entirely. The landowner should be aware of how the project's phases will affect payments, and what milestones trigger each phase. Those milestones need to be clearly defined, and a landowner should be able to determine if those milestones have occurred (with the developer required to provide notice of those milestones and with the landowner given access to the records needed to determine when those milestones).

One common factor used as a compensation basis is the acreage involved. For some solar energy leases, acreage is the foundation of landowner compensation, rather

than the amount of generating capacity installed on the acreage. In these cases, the landowner should make sure the acreage in question is clearly defined so the landowner knows what acres are "in" and what acres are "out." This should include not only a precise legal description of the land considered for payments but also a map of the land. Given that solar energy development on land is much more intensive and potentially carries higher revenues and greater liabilities than agricultural uses, any per-acre lease rate should be higher than prevailing agricultural lease rates. Conduct a diligent search of any other solar projects in the area to determine what prevailing lease rates may be. Also, consider a "most favored nations" clause requiring the developer to match the highest lease rate and/or lease terms given to a landowner within a specified distance of the proposed project.

Other solar energy agreements may base payments on the "nameplate" capacity of the solar equipment on the property rather than on the acreage leased. "Nameplate" capacity is the estimated generation capacity of the equipment if it is operating under optimal conditions. Agreements based on nameplate capacity may offer a flat amount of payment per unit of capacity (often denominated in megawatts). As with acreage payments, landowners should investigate the local "market" for rates and consider the most favored nations clause.

Lastly, some solar energy agreements may provide for a "royalty" payment to the landowner based on the production of the solar equipment on his or her property. At this stage of development in the solar energy industry, this payment method appears to be less prevalent than the acreage or nameplate methods. This is a significant difference between solar energy agreements and wind energy agreements, with wind energy agreements widely using the royalty payment methods. This element of the landowner payment is often the most complex to understand, calculate, and verify. While the concept of a payment based on the electrical production of the project seems fairly simple, there are some variables that may be in play. First, the landowner must understand the basis of the payment, which may be the megawatt- or kilowatt-hours of power produced, "gross proceeds" from sales of electricity, "net revenues" from the power sold, *etc*. It is critical that the definition of these terms within the agreement be analyzed thoroughly. If basing a royalty on "gross proceeds," do those proceeds include revenues from the sale of transferable tax credits or renewable energy credits ("RECs")? If the payment is based on "net revenues," what costs are deductible by the developer – and if the project sells its power on the spot market rather than under a long-term power purchase agreement ("PPA"), will the landowner be at the mercy of market fluctuations? Market-based measures may give landowners the opportunity to participate in favorable price swings but should be tempered with minimum-payment provisions to secure against downside risk. In solar energy agreements with a royalty provision, there is often a "base" or "minimum" payment that sets a floor for landowner payments, with any additional royalty owed above the minimum amount paid at the end of the project year. Royalty-based payments may provide upside potential for landowners, but also present "downside" if the project does not perform up to expectations (as in the case of a cloudy year), so minimum payments are especially crucial in a royalty-based agreement.

Regardless of the payment mechanism, some agreements may include an inflation adjustment that increases the amount of payments for acreage or capacity based on a measure of inflation (often the Consumer Price Index). Agreements with a royalty provision may include a royalty "escalator" clause that increases the royalty percentage at specified intervals. The escalator clause can prove to be a mutually-beneficial provision for both developer and landowner, allowing for more rapid cost-recovery by the developer while allowing the landowner to increase his or her participation in project profits during later years. Escalators need to include either an explicit function for increases (specifying the intervals at which royalties will increase and in what proportion) or be indexed to an objectively-determinable, publicly available number (*ex*. the U.S. Bureau of Labor Statistics Consumer Price Index, U.S. Energy Information Agency wholesale electrical price, *etc.*).

Acreage payments may be fairly easy to verify, but capacity payments and especially royalty payments are accompanied by the need for landowners to audit payments. Make sure you have the right to access any developer records needed to verify the accuracy of your payments, and that such records are made available to you at a convenient location. In the Information Age, most if not all records can be made available electronically rather than requiring you to go to an office in New York or Houston to examine them physically. Landowners should also consider negotiating for a provision that adds interest to late or low payments discovered in such an audit.

As mentioned above, negotiating a "most favored nation" clause may be possible in some projects. As the name implies, such a clause enables the landowner to capture the most favorable easement or lease terms granted to any other landowner within the same project. A "most favored nation" clause can help the landowner overcome potential oversights in the negotiating process or a lack of information regarding comparable terms. The problem with such a clause, of course, lies in its verifiability, which is complicated by the confidentially agreements typically tied to the project. "Most favored nation" clauses can be used *against* landowners: "I can't give you what you are asking for, because if I did, I would have to give it to everyone else in the project." An alternative for landowners is collective negotiation of a lease with their neighbors. Collective negotiation can increase the landowners' bargaining power and allows them to spread legal costs amongst themselves. Some developers even favor these arrangements, as they allow the developer to secure large areas of land through the negotiation of one agreement, rather than "piecing" a project together through individual negotiations and risking a checkerboard pattern in the land under lease.

WHAT HAPPENS WHEN THE AGREEMENT IS OVER?

With the length of agreements mentioned above, a landowner may not be thinking much about what happens when the lease is over. However, landowners *should* consider what happens with the agreement is concluded. First, what are the conditions that provide either party the ability to terminate the agreement? Often, agreements will provide a host of potential causes that can enable the developer to terminate the agreement. In such case, landowners should require, at a minimum, the immediate payment of all sums then due to the landowner. Some practitioners have also suggested requiring a "termination fee" that is a function of a historic course-of-payments for the landowner (*ex.* a termination fee equal to the past three years of payments to the landowner).[13]

In virtually every case, the ability of the landowner to terminate the agreement will be extremely limited, and will likely be based on the non-payment of amounts due the landowner within a certain timeframe. Further, the landowner will likely be required to provide written notice of a potential termination event to the developer and provide a specified cure period. Thus, landowners should be advised to keep sound records of payments and project milestones, and to provide prompt notice of any potential defaults so as to preserve their rights if termination is warranted.

Assuming the project operates until the date specified in the agreement, the parties must then ask what happens then. A common fear of landowners is that the developer will default or dissolve, and leaving the landowner with what may be obsolete or inoperable equipment on his or her property. To that end, many landowners have requested that solar energy agreements contain some form of "decommissioning" language that, at the end of the project, requires the developer to remove all equipment, restore the land to its original grade, vegetation, and soil condition, and to remove sub-surface materials to a specified depth. Further, landowners are also seeking a "performance bond" from the developer, the funds from which are to be used to ensure the performance of the decommissioning obligations.

Decommissioning language is not found in all agreements, and frequently must be requested by the landowner. Further, the posting of a bond or other security in an amount sufficient to cover the complete costs of a decommissioning project could become cost-prohibitive for some developers. A compromise offered by some companies is a "salvage value" decommissioning clause whereby the salvage value of the equipment in a project

[13] For an example from wind energy leases, *see* University of Texas Wind Energy Institute CLE, The Ultimate Guide to Wind Leases, June 2, 2006 (available from Texas Bar Association).

is evaluated at a specified period (for example, every five years) relative to the estimated cost of decommissioning activities. If the salvage value of the equipment falls below the estimated decommissioning costs, bonds are posted in an amount sufficient to cover the difference.

HOW CAN LANDOWNERS MANAGE THE EXPENSE OF LEGAL ASSISTANCE?

At the risk of stating the obvious, reviewing a highly technical lease presenting a host of novel issues will take more of a lawyer's time than reviewing a two-page oil and gas lease with familiar provisions. Landowners who realize this may be reluctant to engage an attorney for fear of the cost; attorneys may be hesitant to take clients due to the time-intensive nature of the enterprise. Collective action may serve both groups well. If the footprint of a project suggest multiple landowners will be involved, those landowners may enhance their bargaining power by forming a negotiation group that enables them to share in the expense of legal services while providing the developer the ability to negotiate one agreement binding the entire group, rather than numerous individual agreements. Also, landowners should ask developers if they will provide for reimbursement of legal fees incurred in reviewing the agreement; many developers will provide such fees up to a capped amount.

HOW TO FIND AN ATTORNEY TO HELP YOU ANALYZE YOUR AGREEMENT

Finding the right attorney to help you evaluate your solar energy agreement is crucial. As you have probably learned from reading these materials, the solar energy industry, and solar energy agreements are unlike almost any other industry landowners will encounter. Specialized legal experience in the solar energy industry is crucial to providing the best service possible to landowners. As a result, when you are looking for an attorney to help you analyze your solar energy agreement, one of the first questions to ask is "what experience do you have in negotiating solar energy agreements?" Demand specific details; do not settle for generalities like "I do this sort of thing all the time" or "I've negotiated hundreds of oil and gas leases – they're just the same" (they're not, as you have seen here).

The good news for landowners is that the growth of the solar energy industry has brought about an increasing number of attorneys that do have experience in this area. When looking for such attorneys, good place to start is in those areas that already have a significant number of solar energy projects.

Once you have found some candidates, ask them for reference clients that you can contact to discuss the clients' experiences with the attorney, and the quality of their representation. You may also want to ask those references for secondary (or "indirect") references you may contact.

Lastly, when hiring a new attorney, be sure to check with your state bar association to make sure that the attorney is currently licensed, in good standing, and has a clean disciplinary record.

Solar energy agreements are complex, important documents – be sure that you get the help you need in negotiating and executing them!

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Land Use Conflicts Between Wind and Solar Renewable Energy and Agricultural Uses

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Land Use Conflicts Between Wind and Solar Renewable Energy and Agricultural Uses

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I. Introduction

The terms "solar farm" and "wind farm"[1] could not more perfectly demonstrate the inevitable pairing of renewable energy and agriculture as uses of land. At the same time, harvesting the sun and wind and converting both to energy forms usable to mankind are far from traditional agricultural practices.

Many states have renewable energy policies, goals, or even mandates that encourage the development of large utility-scale renewable energy facilities.[2] Utility-scale facilities are those that produce energy to sell directly to the electrical power grid—these may have size requirements based on acreage or power production capacity.[3] These renewable energy efforts raise the question of where to put the renewable facilities, particularly facilities that take up considerably more land or surface area than traditional sources of energy, at least initially.[4]

[1] Energy Farms, U.S. Department of Agriculture, https://www.nal.usda.gov/afsic/energy-1.
[2] State Renewable Portfolio Standards and Goals, National Conference of State Legislatures, https://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx.
[3] *See e.g.*, Governor's Task Force on Renewable Energy Development and Siting, State of Maryland, at 11 (2020), https://governor.maryland.gov/wp-content/uploads/2020/09/REDS-Final-Report.pdf; Model Solar Ordinance for Indiana Local Governments, Indiana University Environmental Resilience Institute and Great Plains Institute, at 6 (Dec. 2020), https://eri.iu.edu/documents/in-solar-ordinance-2020-december.pdf; Planning and Zoning for Solar Energy, American Planning Association, at 770 (2014) https://planning-org-uploaded-media.s3.amazonaws.com/document/product_EIP_E_IP30.pdf.
[4] See *infra* Section II.a.

Although siting renewable facilities on farmland can supplement the landowner's income and allow agricultural production to occur where such production otherwise would not be feasible,[5] more often the loss of farmland and increased land competition set renewable energy policies at odds with farmland protection policies. That is, policies that aim to reduce the conversion of agricultural land to non-agricultural uses directly compete with policies that encourage increased production of renewable energy.[6] The friction forces a policy decision on whether to prohibit or limit wind and solar development on farmland in the face of mandates and incentives for renewable energy.

By way of example, one particularly complex clash occurs in California between the Williamson Act, originally adopted to combat suburban development,[7] and siting renewables. Under the Act, counties may enter into contracts with landowners to dedicate land to agricultural use in exchange for tax benefits, with the counties also holding the authority to determine whether green energy development is compatible with a Williamson Act contract.[8] Most local governments have found that green development is not compatible.[9] However, three counties have allowed solar development on non-prime farmland soils.[10] In the majority of cases, the Williamson Act contracts have had to be cancelled.[11]

Land use is typically under local purview. Thus, tensions escalating between renewables and agriculture are being exacerbated by the age-old tension between state and local control.[12] Notably, local regulation runs the full gamut

[5] In the Matter of Twigg, 2019 WL 1375206, 3 (Ct. Spec. App. Md. 2019) (The Court of Special Appeals of Maryland recognized this concept, opining that allowing solar arrays on 10 acres of a 40-acre parcel would allow the remaining to return to agricultural production).
[6] American Farmland Trust, To Combat Climate Change: Encourage Solar Energy That Doesn't Sacrifice Agricultural Land, https://farmland.org/encourage-solar-energy-that-doesnt-sacrifice-agricultural-land/.
[7] Comment, Growing Energy: Amending the Williamson Act to Protect Prime Farmland and Support California's Solar Future, 21 San Joaquin Agric. L. Rev. 321, 322 (2011-2012).
[8] *Id.* at 322.
[9] *Id.* at 323.
[10] *Id*.
[11] *Id*.
[12] Two-thirds of Illinois Counties Oppose SB 1602, National Wind Watch (May 21, 2021), https://www.wind-watch.org/news/2021/05/21/two-thirds-of-illinois-counties-oppose-sb1602-limiting-local-zoning-laws/; Illinois Bill Proposes Statewide Standards for Solar, Wind Farm Energy Facilities (May 3, 2021), https://www.natlawreview.com/article/illinois-bill-proposes-statewide-standards-solar-wind-farm-energy-facilities.

from total exclusion[13] to equating solar and wind facilities to traditional agricultural practices.[14]

The U.S. Census of Agriculture began tracking on-farm energy produced by wind turbines, solar panels, and methane digesters in 2009.[15] In the 2012 Census of Agriculture, the survey identified "renewable energy systems" that also included geothermal/geoexchange systems, small hydro systems, biodiesel, and ethanol in addition to solar panels, wind turbines, and methane digesters.[16] Most data show only the number of systems and not whether systems provide energy only to the farm itself or to the grid.[17]

The number of farms with renewable energy producing systems has grown exponentially, particularly solar panels. In 2009, a total of 9,509 farms in the U.S. had renewable energy producing systems.[18] That number rose to 57,299 in 2012 and more than doubled in five years to 133,176 in 2017.[19] Similarly, the number of farms with solar panel systems grew from 7,968 in 2009 to 36,331 in 2012, and to 90,142 in 2017. A total of 1,420 farms reported wind turbines in 2009, of which only 14 are considered "large wind" (greater than 100 kW).[20] By 2017, a total of 14,136 farms had wind turbines.[21]

This paper first, in Section II, reviews the issues arising between renewable energy and agriculture when siting the two uses, in terms of land consumption,

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[13] *Id.*
[14] *Id.*
[15] U. S. Dept. of Agriculture, National Agricultural Statistics Service, 2007 Census of Agriculture: On-farm Energy Production Survey (2009), https://www.nass.usda.gov/Publications/AgCensus/2007/Online_Highlights/On-Farm_Energy_Production/index.php, (hereinafter 2009 Survey). Note that the 2007 data were collected differently than subsequent years, contain more detail, and were collected in a 2009 survey.
[16] U. S. Dept. of Agriculture, National Agricultural Statistics Service, 2012 Census of Agriculture History (2017) at 197, https://www.nass.usda.gov/Publications/AgCensus/2012/Online_Resources/History/2012%20History%20Final%203.14.17.pdf. Although the other renewable energy systems are significant in number and generally increasing, the land consumption issue focuses on wind and solar, so this paper also focuses on those two types of systems.
[17] 2009 Survey, *supra* note 16. Note that the 2009 data show more detail than the other years.
[18] *Id.*
[19] Table 49, Renewable Energy: 2017 and 2012, in U.S. Dept. of Agriculture, National Agricultural Statistics Service, 2012 Census of Agriculture (2017), https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_US/usv1.pdf (hereinafter 2012 Census Table 49).
[20] Table 1, Farms Reporting Wind Turbines, Capacity, Installation Cost, Percent Funded by Outside Sources, and Year of Installation: 2009, in 2009 Survey, *supra* note16.
[21] 2012 Census Table 49, s*upra* note 19.

local opposition, and co-location. Section III then highlights results of our research on the status of state laws in place that weigh the interests of renewables and use of agricultural lands and summarizes the range of local regulation. At present, few states have detailed regulation as to how to navigate siting renewable energy facilities on agricultural lands.[22] In Section IV, the paper compiles recommendations from existing laws, recent state bills, as well as leading resources on siting renewables on agricultural lands, including model code language. The paper concludes with several issues for future research in Section V and a full list of recommended resources on siting renewables and agricultural uses in Section VI.

II. The Issues: Renewables and Agriculture

Agricultural lands can play an important role in meeting energy demands in the United States. One prediction is that 11% of the country's cropland could satisfy U.S. electricity production needs if converted to producing renewable energy.[23] Most Americans support expanding wind and solar energy over continued investments in other energy sources such as coal, nuclear, and oil and gas.[24] Even so, locating utility-scale wind and solar facilities in agricultural areas raises recurring issues centered on land consumption and its implications, opposition to individual wind and solar projects at the local level, and co-locating multiple land uses.

a. *Land Consumption*

Concerns commonly surface about the amount of acreage consumed by a utility-scale solar or wind project.[25] Much of the attention focuses on farmland

[22] The research for this paper included a state-by-state review of current local ordinances to identify provisions addressing the siting of renewable energy facilities on agricultural lands. *See infra* Section III.
[23] Rebecca R. Hernandez et al, Environmental Impacts of Utility-scale Solar Energy, 29 Renewable and Sustainable Energy Reviews 766, at 775 (2014).
[24] Cary Funk and Brian Kennedy, The Politics of Climate, Pew Research Center, at 16 (Oct. 4, 2016), https://www.pewresearch.org/internet/wp-content/uploads/sites/9/2016/10/PS_2016.10.04_Politics-of-Climate_FINAL.pdf.
[25] *See, e.g.*, Christopher Joyce, Renewable Energy Needs Land, Lots of Land, National Public Radio (Aug. 28, 2009), https://www.npr.org/templates/story/story.php?storyId=112323643; Dave Merrill, The U.S. Will Need a lot of Land for a Zero-Carbon Economy, Bloomberg Green (Apr. 29, 2021), https://www.bloomberg.com/graphics/2021-energy-land-use-economy/; Tux Turkel, Unprecedented Wave of Solar Development Spurs Land Rush in Maine, Press Herald (Jan. 4, 2021).

loss.[26] The land consumption issue in turn raises implications for land competition, prime soils, and farmland protection policies. Possible alternative sites for renewable energy facility development include state lands, landfills, brownfields and industrial lands, and rooftops.[27] However, like most development, renewable energy facilities can generally be developed less expensively on agricultural land and forestland than previously developed land or land that may be contaminated.[28] At the same time, solar and wind development may not encroach on farmlands to the same detrimental degree as housing or commercial development.[29]

The initial physical footprint of wind or solar energy undoubtedly differs from those of extractive sources such as coal and gas, with wind and solar having a greater direct footprint at the onset of a project.[30] The lower "power density" of wind and solar energy contributes to this difference, as more land is arguably necessary to produce a set amount of energy from wind and solar than from extractive energy sources.[31] The result is that wind and solar energy can require at least ten times the amount of land per unit of power as coal and gas energy.[32]

A counter to apprehensions over land consumption is the "time to land use equivalency" theory, which argues that land consumption comparisons between energy sources should be made over time.[33] Wind and solar facilities use the same land year after year for decades, while fossil-based energy continuously requires new land, that may or may not be capable of being

[26] *See, e.g.*, Donnelle Eller, Solar Energy Projects Surge in Iowa, Farmland Loss a Concern, Des Moines Register, (Apr. 22, 2021); Ally Lanasa, A Third Solar Farm Eyes County, Marysville Journal-Tribune (Aug. 4, 2021) https://www.marysvillejt.com/news/a-third-solar-farm-eyes-county; Matthew Weaver, NW Solar, Wind Developments Could Impact Vast Swaths of Ag Land, Capital Press (May 5, 2021).
[27] Energy Sprawl in Connecticut: Why Farmland and Forests are Being Developed for Electricity Production; Recommendations for Better Siting, A Special Report of the Council on Environmental Quality, at 7-9 (Feb. 3, 2017).
[28] *Id.* at 4.
[29] Grow Solar: Local Government Solar Toolkit for Planning, Zoning, and Permitting, Brian Ross and Abby Finis, Great Plains Institute, at 11 (Jun. 2017), https://ilcounty.org/file/195/IllinoisSolarToolkit_June2017.pdf (Agricultural Protection If the community has ordinances that protect agricultural soils, this provision applies those same standards to solar development. Counties should understand, however, that solar farms do not pose the same level or type of risk to agricultural practices as does housing or commercial development.).
[30] Anne M. Trainor et al, Energy Sprawl is the Largest Driver of Land Use Change in United States, PLoS ONE 11(9), at 9 (Sept. 8, 2016), https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0162269.
[31] Samantha Gross, Renewables, Land Use and Local Opposition in the United States, Brookings Institute, at 4 (Jan. 2020) https://www.brookings.edu/wp-content/uploads/2020/01/FP_20200113_renewables_land_use_local_opposition_gross.pdf.
[32] *Id.* at 11.
[33] Trainor, *supra* note 30, at 2, 6.

reverted to an alternate use. Applying "time to land use equivalency" theory, land consumption for extraction-based energy eventually catches up to the larger initial needs of renewable energy, and the land use impacts of each is about the same over the lifetime of an energy project.[34]

Land conversion data helps explain the concerns about initial losses of agricultural land to utility-scale wind and solar energy development. One study concluded that by 2015, almost 30% of utility-scale solar projects in the U.S. were sited on croplands and pastures.[35] Over 27,000 acres of solar projects at that time were in California's Central Valley, a highly productive agricultural area.[36] More recently, approved or pending utility-scale wind and solar projects in Ohio today total more than 73,000 acres of land, primarily agricultural, with an average size of 1,027 acres per solar facility.[37] Meanwhile, wind farms can occupy thousands of acres in agricultural areas, such as the 70,000-acre Roscoe Wind Farm in Texas, the 41,632-acre Grand Meadow Wind Farm in Minnesota, and the 40,000-acre Whispering Willow Wind Farm in Iowa.[38] As another example, Connecticut adopted laws to encourage renewable energy development as early as 2005. By 2016, solar photovoltaic facilities constituted the primary type of development consuming agricultural and forest land in the state.[39]

The loss of farmland to wind and solar facilities also raises the issue of increased competition for land. Additional demands for renewable energy intensify land competition between energy and agricultural production.[40] Heightened competition for farmland can alter the nature of economic activities in rural

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[34] *Id.*
[35] Rebecca R. Hernandez et al, Solar Energy Development Impacts on Land Cover Change and Protected Areas, Proceedings of the National Academy of Sciences of the United States of America, Vol. 112, No. 44, 13579, at 13582 (Nov. 3, 2015), https://doi.org/10.1073/pnas.1517656112.
[36] *Id.*
[37] Ohio Power Siting Board, Wind Farm Map and Statistics and Solar Farm Map and Statistics, https://opsb.ohio.gov/wps/portal/gov/opsb/.
[38] Paul Denholm et al, Land-use Requirements of Modern Wind Power Plants in the United States, National Renewable Energy Laboratory, Technical Report NREL/TP-6A2-45834, Appendix (Aug. 2009), https://www.nrel.gov/docs/fy09osti/45834.pdf.
[39] *Id.* at 2.
[40] Anuj Krishnamurthy and Oscar Serpell, Harvesting the Sun, On-Farm Opportunities and Challenges for Solar Development, Kleinman Center for Energy Policy, U. of Pennsylvania, at 1 (July 2021), https://kleinmanenergy.upenn.edu/research/publications/harvesting-the-sun-on-farm-opportunities-and-challenges-for-solar-development/.

areas.[41] More specifically, for the 39% of U.S. farmland being rented,[42] tenant operators at risk of losing land to wind and solar development can be forced to compete for other land and see increases in per-acre rental costs.[43] In Maryland, for example, farmers lease crop or pastureland for between $25.50 per acre and $175 per acre, while lease rates offered by solar companies can range from $800 to $1,200 per acre.[44]

At the core of the land competition conflict is the reduction of "prime farmland," land that is highly suited for food and fiber production due to its physical and chemical characteristics.[45] However, the same flat, unshaded, well-drained lands that contain productive soils are also optimal for wind and solar development, particularly if located near transmission access and infrastructure. [46] Consuming prime farmland for renewable energy facilities rather than agricultural production naturally leads to conflict in the farm communities where facilities locate.[47]

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[41] Craig Schultz et al, Renewable Energy Trends, Options, and Potentials for Agriculture, Forestry, and Rural America, U.S. Dept. of Agriculture Office of the Chief Economist, at 43 (March 2021), https://www.usda.gov/sites/default/files/documents/renewable-energy-trends-2020.pdf.
[42] Daniel Bigelo, Allison Borchers and Todd Hubbs, U.S. Farmland Ownership, Tenure and Transfer, EOB-161, U.S. Dept. of Agriculture, Economic Research Service (Aug. 2016), https://www.ers.usda.gov/webdocs/publications/74672/eib-161.pdf?v=5301.6.
[43] Travis Grout and Jennifer Ifft, Approaches to Balancing Solar Expansion and Farmland Preservation: A Comparison Across Selected States, Cornell University Charles H. Dyson School of Applied Economics and Management EB 2018-04, at 3 (May 2018).
[44] Dru Schmidt-Perkins, An Opportunity to Get Solar Siting Right, Abell Foundation, at 5 (Sept. 2019), https://abell.org/sites/default/files/files/Solar%20Siting%20Report%209_10_19.pdf. In addition, consider the following: "Land is more valuable if building a solar farm is less expensive to construct. Ideally, land would be: flat (less than 5 degrees of slope; more is acceptable if it slopes to the south), clear of trees, structures, or other obstacles, free of ponds, streams, creeks, etc., and bordered by a road that will provide easy access to construction crews. These conditions are typically found on prime agricultural farmland. Simple rule of thumb is that 1MW solar power should require about 7.9 acres. Depending on the specific technology, a utility-scale solar power plant may require between 5 and 10 acres per megawatt (MW) of generating capacity." Alison F. Davis, Considerations for Future Utility Scale Solar Farm Developments, University of Kentucky (Sept. 2020), https://agecon.ca.uky.edu/files/considerations_for_future_utility_scale_solar_farm_developments_aec_staff_paper_498_davis_sept2020.pdf.
[45] U.S. Dept. of Agriculture, Handbook No. 18 (Oct. 1993), excerpt available at https://www.nrcs.usda.gov/wps/portal/nrcs/detail/null/?cid=nrcs143_014052.
[46]Grout, *supra* note 43, at 3. *See e.g.*, Solar Land Lease, What do Solar Developers Look for in a Property?, https://www.solarlandlease.com/what-do-solar-developers-look-for-in-a-property.
[47] Grout, *supra* note 40; Ellen Rosen, As Demand for Green Energy Grows, Solar Farms Face Local Resistance, New York Times (Nov. 2, 2021), https://www.nytimes.com/2021/11/02/business/solar-farms-resistance.html.

b. *Local Opposition*

Strong public support exists in the U.S. for wind and solar power and policies that increase the use of renewable energy for producing electricity.[48] Eighty-nine percent of citizens favor expanding solar power and 83% approve of wind power expansion, significantly higher than support for fossil fuels or nuclear energy.[49] High approval numbers for renewable energy often do not play out at the local level, however, and negative or "Not in My Backyard (NIMBY)" reactions to utility-scale wind or solar development are common.[50] Experts offer divergent reasons for strong local opposition to renewable energy development across the country. Those who support renewable energy in the abstract can reverse that opinion if they believe a development will cause economic or health problems or if the project raises aesthetics issues.[51] In fact, renewable energy proposals often prompt the pairing of strange bedfellows, as well as conflicts within given coalitions. For example, in the Flint Hills of Kansas proponents of a proposed wind project included the developers of the project, environmentalists focused on green energy, and landowners (mostly farmers) seeking to derive income from leasing their land to the developers for placement of turbines.[52] Opponents also included farmers, but those that wanted to maintain the landscape in its present condition, and environmentalists who were instead focused on aesthetics and ecology.[53]

More generally, proximity of a renewable energy facility to residences and different land types may also be a factor in NIMBYism.[54] Both the higher land use requirements and the siting of projects in areas where people have not

[48] Abel Gustafson, Republicans and Democrats Differ in Why They Support Renewable Energy, Energy Policy 141, 111448 (June 2020), https://doi.org/10.1016/j.enpol.2020.111448.
[49] Funk, *supra* note 24.
[50] *See, e.g.*, David R. Baker and Millicent Dent, NIMBYs Shoot Down Green Projects Next Door While Planet Burns, Bloomberg Green (Sept. 17, 2019), https://www.bloomberg.com/news/features/2019-09-17/nimbys-shoot-down-green-projects-next-door-while-planet-burns; Jan Ellen Spiegel, New Farmland Harvest—Solar Energy—Creating Political Sparks, Ct Mirror (Feb. 21, 2017), https://ctmirror.org/2017/02/21/new-farmland-harvest-solar-energy-creating-political-sparks/; Madeline Wells, SF Bay Area NIMBYs Reportedly in Favor of Green Energy Oppose Solar Farm in Their Backyard, SF Gate (Oct. 1, 2020), https://www.sfgate.com/home/article/About-SFGATE-15613713.php.
[51] Gross, *supra* note 31, at 9.
[52] Comment, Turbines v. Tallgrass: Law, Policy, and a New Solution to Conflict Over Windfarms in the Kansas Flint Hills, 54 U. Kan. L. Rev. 1131, 1135 (2006).
[53] *Id.*
[54] Juliet E. Carlisle, Utility-scale Solar and Public Attitudes Toward Siting: A Critical Examination of Proximity, Land Use Policy 58, at 491 (2016).

customarily encountered energy development can affect acceptance of wind and solar projects locally.[55] Environmental impacts, harm to wildlife, noise and nuisance interferences, and effects on property values are additional reasons people oppose wind development.[56] Some argue that opposition to energy projects is rational and understandable, usually driven by a concern for property values, sense of place, local environment, or distrust in energy companies.[57]

c. *Co-location of Renewables and Agricultural Uses*

Another topic increasingly raised in conjunction with utility-scale renewable energy concerns is "co-location," the intentional co-existence of different land uses on a parcel. Advocates of co-location claim that an "either/or" mentality drives policy and development decisions around utility-scale renewable energy installations.[58] Conventional land use approaches can force renewable energy to compete in a "zero-sum-game" with agriculture, while co-location is a more integrated approach that can maintain and improve both energy and food production security.[59]

In the agricultural context, co-location or "dual-use" deliberately locates agriculture within wind and solar installations.[60] Wind turbines can fit into an agricultural landscape with little disruption or displacement of the agricultural activities around them.[61] Because a farmer can engage in crop and livestock production beneath and up to the base of a wind turbine, agriculture co-locates easily with wind energy.[62] More difficult is the integration of agriculture on a solar installation site, an evolving area of research referred to as

[55] Gross, *supra* note 31, at 8.
[56] K.K. DuViver and Thomas Witt, NIMBY to NOPE—or YESS?, 38 Cardozo L. Rev. 1453, 1459-62 (2018).
[57] Sanya Carley and David Konisky, Will NIMBYs Sink New Clean Energy Projects? The Conversation (Aug. 11, 2021), https://theconversation.com/will-nimbys-sink-new-clean-energy-projects-the-evidence-says-no-if-developers-listen-to-local-concerns-164052.
[58] Greg A. Barron-Gafford, et al, Agrivoltaics Provide Mutual Benefits Across the Food-Energy-Water Nexis in Drylands, Nature Sustainability 2(9), at 1 (Sept. 2019), DOI:10.1038/s41893-019-0364-5, https://www.nature.com/articles/s41893-019-0364-5.
[59] *Id.*
[60] *Id.*
[61] *Id.*; Colin Tiernan, Idaho's Largest Wind Farm Planned Near Shoshone, Times-News (Mar. 20, 2020), https://magicvalley.com/news/local/idahos-largest-wind-farm-planned-near-shoshone/article_23864dbd-7660-54cd-869f-3a2b1ee351df.htm.
[62] Benjamin Retik, The Mutual Benefits of Wind and Energy and Agriculture, Guidehouse Insights (May 11, 2021), https://guidehouseinsights.com/news-and-views/the-mutual-benefits-of-wind-energy-and-agriculture.

"agrivoltaics."[63] Agrivoltaics involves raising and spacing solar panels to allow agricultural production around and beneath the panels.[64]

Co-location, particularly agrivoltaics, is offered as a strategy for overcoming the separation of food and energy production that occurs in the land use arena.[65] Research concludes that agrivoltaics can reduce land use competition[66] and increase land productivity.[67] Agrivoltaics may also affect the social acceptance of utility-scale renewable energy.[68] Solar industry officials believe local communities are more likely to support solar energy projects that involve agrivoltaics due to the multiple local benefits that "projects with personality" can provide a community.[69] Finally, combining solar power generation with agriculture could provide additional revenue to farmers, helping to protect farmland and keep food costs down.[70]

On the other hand, agrivoltaics presents concerns among the agricultural sector, including challenges with the adoption and integration of new technologies and uncertain market potential. Some accept the challenge with a willingness to help farmers determine how to continue to work solar facility lands for agriculture. States like New York and Maine advocate co-location and provide informational and technical assistance for farmers. [71] Like farmers, energy developers must also be willing to engage in co-location opportunities.

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[63] Model Solar Ordinance, *supra* note 3, at 6 (Agrivoltaics – A solar energy system co-located on the same parcel of land as agricultural production, including crop production, grazing, apiaries, or other agricultural products or services.)
[64] *Id.*
[65] Alexis S. Pascaris et al, Integrating Solar Energy with Agriculture: Industry perspectives on the Market, Community, and Socio-political Dimensions of Agrivoltaics, Energy Research & Social Science 75, at 1 (2021).
[66] Elnaz H. Adeh et al, Solar PV Power Potential is Greatest over Croplands. Scientific Reports, 9(1) (2019).
[67] Axel Weselek et al, Agrophotovoltaic Systems: Applications, Challenges, and Opportunities, a Review, Agronomy for Sustainable Development, 39(4) (2019), https://link.springer.com/content/pdf/10.1007/s13593-019-0581-3.pdf.
[68] Pascaris, *supra* note 65, at 5.4 page 10.; Lisa Prevost, Connecticut Solar Developers Enlist Sheep to Cut Grass and Ease Tensions, Energy News Network (Mar. 3, 2021) https://energynews.us/2021/03/03/connecticut-solar-developers-enlist-sheep-to-cut-grass-and-ease-tensions/.
[69] *Id.*
[70] Gross, *supra* note 28, at 13
[71] *See e.g.*, Harrison Dreves, Beneath Solar Panels, the Seeds of Opportunity Sprout, National Renewable Energy Laboratory, https://www.nrel.gov/news/features/2019/beneath-solar-panels-the-seeds-of-opportunity-sprout.html; Dual-Use of (Agrivoltaic) Solar Installations, Maine Dept. of Agriculture Conservation & Forestry (Dec. 2020), https://www.maine.gov/dacf/ard/resources/docs/dual-use-factsheet.pdf.

III. State-Local Tensions

Locating uses within a community is most often a matter of local concern addressed through zoning laws. In some instances, states preempt local zoning authority for siting certain uses for public policy reasons.[72] As siting renewable energy has often proven to be a NIMBY issue[73] squarely at odds with state mandates on reaching renewable energy source standards,[74] some states have begun to remove local authority to regulate the siting of renewable energy. In doing so, however, few states have detailed legislation to navigate the overlap between siting renewable energy and the use of agricultural lands, a clash with which local regulators may have more intimate knowledge. On the other hand, deference to local knowledge and likely other reasons leads some states to maintain local regulation for the siting of renewables.

Local regulation of renewable energy projects typically varies widely, even within relatively small geographic areas.[75] For example, the Flint Hills in Kansas contains 12 counties.[76] Two of the counties have no zoning and, hence, no local regulation of renewable energy projects.[77] One county completely bans commercial wind farms.[78] The remaining nine counties regulate wind turbines in a wide range of ways.[79]

Local zoning authority granted by states not surprisingly often seeks to both preserve agriculture and promote renewables,[80] but rarely details how to balance these two goals when at odds with each other. Notably, of the few states that specifically address the overlap between siting renewables and the effect on agricultural lands, most merely require that siting or permitting authorities

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[72] CLOSUP: Center for Local State and Urban Policy, Appendix State-by-State Chart (Feb. 2021), http://closup.umich.edu/sites/closup.umich.edu/files/working-papers/closup-wp-50-Essa-Solar-Siting-Authority-Across-the-United-States.pdf; State Approaches to Wind Facility Siting, National Conference of State Legislatures (Sept. 2, 2020), https://www.ncsl.org/research/energy/state-wind-energy-siting.aspx.
[73] See *supra* Section II.b.
[74] *See, e.g.*, State Renewable Portfolio Standards and Goals, *supra* note 2.
[75] EZ Policies for Maryland, OpenEI, https://openei.org/wiki/Maryland/EZ_Policies.
[76] Turbines v. Tallgrass, *supra* note 52, at 1140.
[77] *Id.*
[78] *Id.*
[79] *Id.* at 1140-41,
[80] *See e.g.*, N.H. Rev. Stat. Ann. § 672:1 (West) (Neighboring sections of zoning authority show that renewables and ag are "important" and shouldn't be unreasonably affected, but doesn't account for when renewables and agriculture are in competition with each other); 53 Pa. Stat. Ann. § 10105 (West).

consult with the particular state's department of agriculture[81] or have a policy to consider effects[82] on agriculture with little detail. Several states have created state energy plans,[83] advisory councils, or similar projects with the purpose of understanding how to promote renewables with some level of consideration on the impacts to agriculture[84] or to promote cooperation with the agricultural community.[85] Other states have failed to include representatives from the agricultural community in these advisory groups.[86] One state specifically has a program for the protection of agricultural lands from development, but that development excludes wind energy facilities.[87] A few states have provisions to encourage pollinator habitats[88] or generally promote renewables to the agricultural community.[89] Meanwhile, a small handful of states have gone so far as to specifically consider siting renewables on agricultural lands based on soil quality,[90] or require an impact mitigation agreement[91] or environmental assessment[92] that includes agriculture.

Interestingly, far more states than those currently with legislation on the books have recently considered bills that squarely deal with the intersection between agriculture and siting renewables, indicating this conflict is thoroughly ripe. Given how many of these bills have failed, the conflict is also proving to be a contentious one. Interestingly, the content of these bills gives considerable insight into potential mechanisms for addressing issues arising from siting renewables on agricultural lands, much of which is included with Section IV's summary of recommended practices.

[81] *See, e.g.*, Minn. Stat. Ann. §216B.243 (West); W.S.A. 101.175 (In Wisconsin, installation of renewables must involve consultation with department of agriculture).
[82] *See, e.g.*, Mont. Code Ann. §90-4-1001 (West); N.J. Stat. Ann. §4:1C-32.6 (West).
[83] *See, e.g.*, 30 V.S.A. §202b.
[84] N.D.C.C. §54-63-01, -03; 4 Pa. Code §6.232. Interestingly, at least one state has the Department of Agriculture administering its grant and subsidized loan program for renewables. S.C. Code §46-3-260.
[85] Va. Code Ann. §45.1-391 (West) (Solar Energy Center promotes cooperation with agriculture).
[86] *Id.* §45.2-1710 (new energy plan does not mention agriculture).
[87] Ohio Rev. Code Ann. §931.02 (West).
[88] Mo. Ann. Stat. §261.500 (West).
[89] Miss. Code. Ann. §69-46-5 (West); N.D.C.C. § 54-63-01, -03; Va. Code Ann. §45.1-39 (West).
[90] H.R.S §205-2.
[91] 55 ILCS 5/5-12020.
[92] Tenn. Code Ann. §65-17-105 (West).

IV. Summary of Recommended Practices

A review of existing laws and pending bills reveals several strategies. Recognizing the need to better anticipate how renewables can be brought onto agricultural lands while *minimizing conflicts*,[93] numerous manuals, handbooks, toolkits, and factsheets have been created by a range of entities—agricultural interest groups, renewable energy interest groups, universities, state task forces, and more. The Connecticut Department of Environmental Quality refers to the "balance trap," arguing that balancing two conflicting goals results in "diminishment of both pursuits."[94] Integration or harmonization of goals provides a better solution,[95] with an example being the enlistment of sheep to cut grass below solar panels and ease tensions between solar development and local opinion.[96] Co-location integrates and harmonizes. The intentional combining of uses through agrivoltaics is proactive and planned, not reactive.

From the birds' eye view, renewable siting regulation to minimize conflict with agriculture has manifested in several forms: primarily state-level regulation, primarily local-level regulation, and hybrid approaches.[97] Between all of these, numerous concerns come up repeatedly:

- protecting quality soils,
- involving agricultural leaders in decision-making,
- planning through mapping,
- the benefits of dual-use or agrivoltaics, and
- planning for decommissioning.[98]

First, renewable energy and agriculture policymakers must be brought together to create cohesive policy that clearly defines state and local control with regard to the placement of wind and solar facilities and the protection of agricultural lands. The resulting policies will likely involve protection of quality soils. For the

[93] OR. H 2520 (2021) (would fund the creation of rules specifically for this purpose).
[94] Energy Sprawl in Connecticut, *supra* note 27, at 9.
[95] *Id.*
[96] Prevost, *supra* note 68.
[97] *See, e.g.*, State Approaches to Wind Facility Siting, *supra* note 72.
[98] More complex efforts to preserve agricultural lands through land use have included to exempt portions of agricultural lands with renewables from participating in the trade of development rights, or to require an equivalent amount of agricultural land that is used for renewables to be placed under deed restriction limiting it to traditional agricultural use. MA S 2174/H 3346 (2021).

most protected soils, involving state-level agricultural boards or departments[99] in decision-making during the siting process or even requiring that such entity issue a letter of attestation as a pre-requisite to a power purchase agreement[100] may enable better navigation of renewable-agriculture conflicts. More generally, whether imposed at the state level or local level, maintaining quality soils in agricultural production appears to be a recurring concern, and often soil quality is determined by federal definitions.[101]

Second, comprehensive mapping should be developed to inform both state and local decision-making on the siting of renewables, detailing categories of agricultural lands, including prime farmlands and other soil categories; current placement of wind and solar installations, both on-farm and utility-scale; wind energy potential; solar energy potential; transmission lines and other utility infrastructure; and areas experiencing increasing drought or otherwise experiencing decreasing arability.

At the state level, preserving agricultural lands may be rooted in concerns over food security, desires to preserve the aesthetics of the countryside, or an interest in protecting the "small farmer,"[102] all of which are squarely at odds with state measures for meeting renewable energy goals.[103] From this perspective, renewable-agriculture conflicts may be lessened through requirements that comprehensive plans and their required land use maps consider the placement of renewables within local communities.[104] State-level mapping of current placement of renewables, existing energy infrastructure, agricultural lands and their various levels of quality, and renewable potential placement may inform

[99] CT. H 5175 (2021).
[100] HI. S 942 (2021).
[101] *See* 7 C.F.R. § 657.5. "The protection of prime soils and prime farmland should be prioritized. Other farmland and marginal farmland should be pursued for standard ground-mounted solar array, dual-use should also be considered, if possible (AFT, 2020).5 If solar projects are still proposed on prime soils, they should be agricultural dual-use projects, ensuring continued production is prioritized. Dual-use projects will be a challenge for lands that have been used for crop and livestock production but would be better suited for small animal grazing, i.e., sheep (but not goats)." Solar Siting Guidelines for Farmland, American Farmland Trust New England, Northampton, MA: American Farmland Trust, (Jan. 2020), https://s30428.pcdn.co/wp-content/uploads/2020/01/AFT-solar-siting-guidelines-Jan-2020.pdf.

[102] Schmidt-Perkins, *supra* note 44, at 5.
[103] State Renewable Portfolio Standards and Goals, *supra* note 2.
[104] Farmland Solar Policy Design Toolkit, Solar Energy Initiative, at 8 (2020), https://farmandenergyinitiative.org/wp-content/uploads/2020/08/Final-FSPP-Toolkit-Report.pdf.

this decision-making as well.[105] And, as renewable development occurs, states may consider maintaining a database or mapping to catalog the actual transition of agricultural lands to renewable energy production,[106] something the USDA does at the national level.[107] The mapping can both direct renewable energy facilities to certain areas and determine areas for possible co-location.

Co-location or dual use with livestock, crops, and pollinator habitats shows promise and should be encouraged. Where renewables are allowed, agrivoltaics,[108] also known as co-location or dual-use, [109] can deploy renewable facilities so that some level of agriculture may continue. Agrivoltaics ranges from traditional crop production or livestock pasturing beneath solar panels or wind turbines all the way to simply requiring pollinator friendly ground cover[110] and buffer areas.

Another strategy is creating a distinction in regulation between renewables utilized exclusively for on-farm use (accessory renewables[111]), which can be considerable given, for example, the cost of pumping irrigation water,[112] and

[105] Schmidt-Perkins, *supra* note 44, at 6. ("But perhaps the biggest obstacle to striking a balance between maintaining prime land for agriculture and developing plots to achieve renewable energy targets is that there is no statewide mapping of 'preferred' land."). *See, e.g.*, Renewable EnerGIS, Hawaii State Energy Office, http://geodata.hawaii.gov/energis; Zoning for Renewable Energy Database, Michigan Department of Environment, Great Lakes, and Energy, https://www.michigan.gov/climateandenergy/0,4580,7-364-85453_85461-519951--,00.html; Liam Neimeyer, As solar power moves in, a Kentucky farm community wonders about its future, Hoptown Chronicle (Feb. 22, 2021), https://hoptownchronicle.org/as-solar-power-moves-in-a-kentucky-farm-community-wonders-about-is-future/ (combining farmland data from the USDA and solar power data from PJM Interconnection to generate mapping).

[106] VA. H 2023 (2021).

[107] *See supra* notes 16—21.

[108] *See supra* Section I.c.

[109] N.J. S 3484 (2021) (incentivizes dual-use).

[110] Grow Solar, *supra* note 29, at 10 (Ground Cover Standards Perennial grasses and wildflowers planted under the panels, between arrays, and in setback or buffer areas will substantially mitigate the stormwater risks associated with solar arrays, and result in less runoff than typically seen from many types of agriculture. Moreover, establishing and maintaining native ground cover can have important co-benefits to the community or the property owner. Native grasses can be harvested for forage and wildflowers and blooming plants can create pollinator and bird habitat, and maintaining the site in native vegetation will build soils that can be turned back into agriculture at the end of the solar farm's life.); Model Solar Ordinance, *supra* note 3, at 12 (If appropriately established, these ground cover standards also likely reduce maintenance costs and limit the need for chemical weed management, which also improves water quality outcomes.); *Id.* at 14 (The groundcover at solar farms will protect agricultural soil, build nutrients, prevent erosion, and improve topsoil quality at the site.).

[111] NHSEA Model Solar Zoning Ordinance (2018), https://docs.wixstatic.com/ugd/c6c29c_c3f6d0279dfe4037bfb95bfa28b041e5.pdf.

[112] Co-locating Renewable Energy Resources and Agricultural Operations: Challenges and Opportunities, TomKat Center for Sustainable Energy, Stanford University, at 17 (Aug. 2019), https://stanford.app.box.com/s/fk6n5ymzp2qk3uszqql6g2m26if3u0xw.

utility-scale renewable facilities.[113] In delineating a threshold between various renewable facility sizes, protecting agricultural land may be best served by definitions based on land use footprint, i.e. acreage, rather than or in conjunction with array capacity, electrical load, or consumer type.[114] In avoiding prime farmlands, areas experiencing increasing drought may be appropriate for transitioning farmlands no longer able to produce to solar farms.[115]

Lastly, planning for the decommissioning of wind and solar facilities to revert to agricultural use is an important consideration. A commitment to revert solar or wind "farms" back to agricultural lands at the end of the facilities' lifespan is a common requirement of land use regulation of renewable energy facilities.[116]

Additional recommended practices by developers, while not formalized in state or local land use laws, may help reduce local opposition and the NIMBY impacts of wind and solar facility development. For instance, in New York, a developer reduced the size of a proposed facility from 500 to 245 acres in response to local resident concerns that the project would have too large an impact on the pastoral setting.[117] Some developers have learned that offering to screen developments from view and incorporate pollinator habitats and agrivoltaics can also win community support.[118] And in a recent mediation ordered by the Hawaii Public Utilities Commission, Kahana Solar agreed to a legally enforceable "community benefits" package that will provide $55,000 per year over a 25-year period in funding for community groups and a pledge to hire local workers at an agreed upon prevailing wage in the West Maui community where the solar facility would locate on former pineapple fields.[119] While the result of an intervention in the utilities approval process by the West Maui Preservation

[113] Farmland Solar Policy Design Toolkit, *supra* note 104, at 9.
[114] *Id.* at 15-16.
[115] Sammy Roth, California Farmers are Planting Solar Panels as Water Supplies Dry Up, Los Angeles Times (Jul. 31, 2019), https://www.latimes.com/business/la-fi-agriculture-farmlands-solar-power-20190703-story.html.
[116] Planning and Zoning for Solar Energy, *supra* note 3.
[117] Rosen, *supra* note 44.
[118] *Id.*; John Flesher and Tammy Webber, Bees, sheep, crops: Solar developers tout multiple benefits, AP News, Nov. 4, 2021.
[119] Report of Parties and Participants on Mediation, *In the Matter of the Application of Maui Electric Company, Limited*, Public Utilities Commission of the State of Hawaii, No. 2020-0141 (Oct. 15, 2021), https://dms.puc.hawaii.gov/dms/DocumentViewer?pid=A1001001A21J15B01424A01661. *See also* Brittany Lyte, How a Maui Solar Farm Reached An 'Unprecedented' Deal With Neighbors, Honolulu Civil Beat (Nov. 21, 2021), https://www.civilbeat.org/2021/11/how-a-maui-solar-farm-reached-an-unprecedented-deal-with-neighbors/.

Association, the case offers insight into mediated and voluntary approaches that can remedy local opposition to facility development while also addressing land consumption and co-location issues.

V. Remaining Issues

Siting renewables on agricultural lands has consequences well beyond that not-so-simple act, consequences with the potential to be both positive[120] and negative. From a land use perspective, rural communities are going to be significantly impacted by changes to the landscape, community character, the local economy, and the numerous domino effects from what promises to be an imminent and significant change in agricultural America. Much more research is needed to understand the full range of land use issues and mitigate adverse impact during this transition.

VI. List of Key Resources for Wind and Solar Energy and Agricultural Land Uses

An Opportunity for Maryland to Get Solar Siting Right, Dru Schmidt-Perkins, Abell Foundation (Sept. 2017), https://abell.org/sites/default/files/files/Solar%20Siting%20Report%209_10_19.pdf.

Clean Energy in Agriculture: A Colorado Study, Center for the New Energy Economy, Colorado State University (Apr. 2018), http://ruralenergy.colostate.edu/wp-content/uploads/2020/04/CNEE-Report-on-Clean-Energy-in-Agriculture-Colorado-April-2018-1.pdf.

[120] Mapping may also include preferred locations in "wellhead protection area[s] for the purpose of removing agricultural uses from high-risk recharge areas." Model Solar Ordinance, *supra* note 3, at 14. Also consider the potential for renewable development in the floodplain. *Id.* at 16. "In 2018, researchers at the Department of Energy's Argonne National Laboratory found that stable pollinator populations facilitated by pollinator-friendly solar farms allowed nearby agricultural land to be pollinated and, ultimately, boosted crop yields. Planting pollinator-friendly vegetation in solar farms provides multiple ecological and economic benefits to stakeholders. Using native plants as ground cover can help recharge groundwater, reduce erosion, and improve soil carbon sequestration." Abby Neal, Pollinator-Friendly Solar Installations Benefit Wildlife, Farmers, Climate, Environmental and Energy Study Institute (Mar. 2020), https://www.eesi.org/articles/view/pollinator-friendly-solar-installations-benefit-wildlife-farmers-climate.

Co-Locating Renewable Energy Resources and Agricultural Operations: Challenges and Opportunities, Brown et al., TomKat Center for Sustainable Energy, Stanford University (Aug. 2019), https://stanford.app.box.com/s/fk6n5ymzp2qk3uszqql6g2m26if3u0xw.

Considerations for Future Utility Scale Solar Farm Developments, Alison Davis, Department of Agricultural Economics, University of Kentucky (Sept. 2020), https://agecon.ca.uky.edu/files/considerations_for_future_utility_scale_solar_farm_developments_aec_staff_paper_498_davis_sept2020.pdf.

Dual-use (or Agrivoltaic) Solar Installations, Fact Sheets, Maine Department of Agriculture, Conservation, and Forestry (Dec. 2020), https://www.maine.gov/dacf/ard/resources/docs/dual-use-factsheet.pdf.

Energy Sprawl in Connecticut, Connecticut Council on Environmental Quality (2017), EnergySprawlinConnecticutpdf.pdf.

Farmland Solar Policy Design Toolkit, Genevieve Byrne, Farm and Energy Initiative (May 2020), https://farmandenergyinitiative.org/wp-content/uploads/2020/08/Final-FSPP-Toolkit-Report.pdf.

Governor's Task Force on Renewable Energy Development and Siting, Final Report (Aug. 2020), https://governor.maryland.gov/wp-content/uploads/2020/09/REDS-Final-Report.pdf.

Grow Solar: Local Government Solar Toolkit for Planning, Zoning, and Permitting, Brian Ross and Abby Finis, Great Plains Institute (Jun. 2017), https://ilcounty.org/file/195/IllinoisSolarToolkit_June2017.pdf.

Innovative Site Preparation and Impact Reductions on the Environment Project (InSPIRE), U.S. Department of Energy National Renewable Energy Laboratory (Oct. 2021), https://openei.org/wiki/InSPIRE.

Model Solar Ordinance for Indiana Local Governments, Great Plains Institute (Dec. 2020), https://eri.iu.edu/documents/in-solar-ordinance-2020-december.pdf.

Planning and Zoning for Solar Energy, American Planning Association (2014), https://planning-org-uploaded-media.s3.amazonaws.com/document/product_EIP_E_IP30.pdf (with model ordinances, permitting applications, and decommissioning plan).

Renewables, Land use, and Local Opposition in the United States, Samantha Gross, Brookings Institution (Jan. 2020), https://www.brookings.edu/wp-content/uploads/2020/01/FP_20200113_renewables_land_use_local_opposition_gross.pdf.

Technical Guidance for Utility-scale Solar Installation and Development on Agricultural, Forested, and Natural Lands (Jan. 2021), https://www.maine.gov/dacf/ard/resources/docs/dacf-solar-guidance-182021.pdf.