

Subtheme Agricultural Policy:

**ALIGNING RENEWABLE ENERGY GOALS WITH RURAL LAND USE:
EDUCATIONAL NEEDS FOR SOLAR DEVELOPMENT CONTRACTS IN NEW YORK
AND MARYLAND**

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Abstract:

The rapid expansion of utility-scale solar projects in the U.S. brings opportunities and challenges to rural communities, affecting land use and agricultural practices. This growth, fueled by falling costs and supportive government policies, prompts states to diversify their energy portfolios with more renewables, creating tension over agricultural land use for solar development. Maryland and New York's ambitious renewable energy targets highlight the urgency of a nuanced understanding of these issues.

Our research emphasizes the importance of spatially informed decision-making at the individual landowner level to effectively address potential zoning and land-use conflicts. Preliminary findings suggest a significant need for educational resources that help landowners navigate negotiations and mitigate agricultural impacts. Additionally, our work identifies a gap in the knowledge base of rural attorneys, who require more comprehensive information to support landowners in the complex realm of solar energy contracts.

By focusing on the specific needs of rural communities, our study aims to promote equitable large-scale, ground-mounted solar development. This involves shaping policy interventions and offering targeted educational resources to ensure solar expansion meets clean energy goals while respecting rural land-use realities.

Keywords: Rural development, solar energy, agricultural policy, landowners education, renewable energy siting

1. Introduction:

The rapid expansion of utility-scale photovoltaic (USSPV) facilities, which generate electricity from solar radiation, is transforming the energy landscape. Developing USSPV facilities in the U.S. presents opportunities and challenges for rural communities, influencing land use patterns and agricultural operations. This growth, driven by precipitous declines in

technology costs and evolving state policies to bolster renewable energy portfolios, particularly for solar electricity generation, introduces increased competition for agricultural land. On the one hand, this competition pressures agricultural operations, inducing landowners to consider making arable land available for energy development and thereby reducing land available for farming. This change is particularly important for farmers who do not own land and depend on rental land for their operations.

On the other hand, it presents a significant opportunity for land-owning farmers to generate increased revenue. Such a landscape of competing interests affects land use patterns and agricultural operations differently across communities and sparks various economic implications. While some farming operations may face heightened pressures to reallocate agricultural land for solar development, others might find these ventures a lucrative avenue to alleviate financial strains, thereby diversifying and stabilizing rural economies.

In Maryland (MD), the Renewable Energy Portfolio Standard requires renewable energy (RE) to account for 50% of the state's energy production by 2030, with solar comprising 14.5 % (Renewable Energy Portfolio Standard, § 7-703). In New York (NY), the Climate Leadership and Community Protection Act mandates 100% zero-emission electricity generation by 2040, accelerating the demand for solar development. Though specific to two states, this emphasis mirrors a broader national push towards renewables.

The economic landscape for agricultural landowners is shifting towards Renewable Energy (RE) leases and occasionally land sales, particularly for USSPV developments, as a more lucrative alternative to traditional commodity farming operations. USSPV facilities require substantial acreage, and lease payments offer landowners in desirable locations considerably higher revenue than the returns from commodity production. For instance, transitioning farmland to solar generation in MD can yield approximately a 350 % increase in gross revenue per acre per year for landowners (Thilmany, 2022). This financial incentive, coupled with MD's RE generation goals, catalyzes the conversion of farmland, including prime farmland, into utility-scale solar facilities (Thilmany, 2022). Both state and local policies have long been adopted in New York, Maryland, and other states to preserve farmland and address conversion trends. These policy efforts have had mixed success and have historically been most associated with urban and suburban development pressures. Despite widespread social preferences for prioritizing solar development on "marginal," "previously disturbed," "low

impact,” or otherwise “underutilized” land, the economic benefits of solar leases make them an attractive option for many landowners of agriculturally productive land. This new and quickly evolving economic, policy, and land use regime underscores the need for a balanced approach considering RE expansion and preserving valuable agricultural lands.

Facing a lack of impartial resources tailored to landowner needs in negotiating renewable energy (RE) contracts, our research aimed to develop educational tools addressing these specific concerns. We conducted focus groups (FGs) with attorneys from Maryland (MD) and New York (NY) in late 2021 and early 2022, involving legal experts experienced in managing long-term RE leases. Emphasizing the urgency created by legal deserts, our primary objective was identifying critical information that attorneys believe should be included in Extension outreach materials. Unlike previous Extension efforts that mainly explained key RE lease terms to landowners, our focus shifted towards understanding attorneys' concerns in these agreements and directing our research and outreach efforts better to develop legal resources for landowners and agricultural service providers.

Research Problem: This research delves into the urgent, evolving challenges posed by the rapid growth of RE projects, such as utility-scale solar development, to determine additional information and resources needed by stakeholders in the Northeast and Mid-Atlantic.

1.1 Objectives:

- This study leverages FG group discussions with legal experts to achieve a multifaceted understanding of utility-scale solar development leasing contracts and their long-term impacts on landowners. Our investigation is grounded in the following objectives:
- Gather Stakeholder-Driven Insights: By engaging with attorneys experienced in renewable energy (RE) leasing, we collect qualitative data that capture the complexities of these agreements. This ensures our research reflects the practical realities and nuanced perspectives of those directly involved in RE negotiations.
- Inform Extension Outreach Materials: Using the insights from these attorneys, we are developing Extension outreach materials that are deeply informed by stakeholder

experiences. These resources will improve landowners' understanding and negotiation capabilities for utility-scale solar photovoltaic (USSPV) leases.

- **Support Sustainable Rural Development:** Our study equips landowners with the knowledge and tools to effectively engage with RE opportunities and challenges as the RE sector grows. By synthesizing attorney insights, we create resources that empower rural landowners to make informed decisions aligned with sustainable development.
- **Enhance Legal Frameworks and Negotiation Strategies:** We analyze attorney experiences and advice to illuminate effective legal frameworks and negotiation strategies for USSPV contracts. Our goal is to improve outcomes for landowners, ensuring contracts are fair and conducive to mutually beneficial and sustainable RE projects.

2. Methodology:

In this project, we held FGs with attorneys to explore concerns in negotiating USSPV contracts. Experienced attorneys shared insights to guide research and help develop resources that empower landowners to secure fairer, long-term RE leases.

2.1 Contact & Distribution Efforts

Attorneys were recruited through various methods, including personal contacts and State Bar Associations, to recruit potential FG participants. The attorneys recruited had experience negotiating USSPV contracts on behalf of rural landowners, developers, or lenders.

Attorneys in NY, experienced in negotiating USSPV contracts for landowners or representing developers, were recruited through the project lead's connections. Email recruitments were sent out that included a link to a Google form to sign up for FG times (Kay, 2021).

MD attorneys were recruited through the Maryland State Bar Association's (MSBA) Agriculture Law sections listserv, a network within a non-profit that connects legal professionals specializing in agricultural issues. This section, averaging 150 members annually, often handles renewable energy (RE) leases for rural landowners. An email was circulated through this listserv to enlist attorneys for focus groups, with respondents later contacted to schedule these sessions (Goeringer, 2021).

2.2 IRB-Specific Processes

Cornell University's Institutional Review Board (IRB) reviewed and approved exemption for the proposed FGs and met the IRB standards for the integrity and protection of human research subjects. All FGs were conducted online using Zoom provided by Cornell University and the University of Maryland. Before going through the focus group questions, we collected signed informed consent from each participant through a Qualtrics form.

The Zoom FGs were secured with passwords, and meetings were locked after starting to ensure privacy. Discussions were standardized using pre-written questions, unknown to participants until asked. Each session was recorded for transcription purposes. To protect privacy, names in the transcripts were anonymized as "Participant N," and a key linking these pseudonyms to participant demographics was securely stored on a shared drive. Several participants did not show up after confirmation. In the cases where only one participant participated, we referred to those FGs as interviews when there was only one individual.

2.3 Data Collection and Analysis

- Each FG session was video-recorded with the participants' consent, and Zoom transcripts were produced. The transcripts were anonymized to maintain confidentiality and labeled with participant identifiers for reference. Two individuals then reviewed the transcripts for accuracy before coding.
- The analysis of FG transcripts followed a systematic approach aimed at identifying recurring themes, patterns, and insights relevant to the research questions. The following steps outline the methodology employed:
- Familiarization: Transcripts were cleaned and reviewed fully to thoroughly understand the content and context, enabling researchers to immerse in the data and identify initial themes or topics of interest.
- Coding: A thematic coding framework was created from research questions and emergent themes from the familiarization phase. Text segments were manually coded to align with these predetermined themes.
- Note-taking: Detailed notes under each theme captured observations and insights from the transcripts, summarizing key points and recording analytical reflections for later analysis.

- **Grouping:** Similar codes were clustered into broader thematic categories for structured data organization, aiding in identifying overarching patterns and relationships across themes.
- **Counting Mentions:** The frequency of each theme was counted to quantify its prevalence in discussions, offering insights into the topics' salience and prominence.
- **Pulling Quotes:** Representative quotes from transcripts highlighted key themes and supported analyses. Each quote was documented with participant identifiers and transcript locations to ensure findings' transparency and verifiability.

2.4 Analysis and Interpretation

After completing coding, note-taking, grouping, counting mentions, and pulling quotes for each transcript, the data were synthesized to identify common patterns, divergent perspectives, and overarching insights. The analysis was iterative, involving constant comparison and refinement of codes and themes to capture the complexity and richness of the data.

3. Preliminary Findings

3.1 Demographic and Characteristics of the Participating Attorneys in the Focus Groups

From NY efforts, we hosted two FGs with twelve attorneys, in all. The first was held on December 20, 2021, and the second on January 12, 2022. We had one attorney FG from MD efforts with four attorneys on May 20, 2022. Additionally, we conducted one interview with an additional attorney on April 19, 2022. Our FGs and interview efforts included four transcribed Zoom sessions with seventeen licensed attorneys. From the information and conversations, we gathered the following demographic information about the participants: 88.2% (n=15) were male, and 11.8 % (n=2) were female.

The attorneys participating in the four sessions are licensed across seven states, extending beyond MD and NY (Figure A). Among the seventeen attorney participants, twelve were licensed in only one state, while five held licenses in multiple states. To determine the proportional representation by state, we tallied all the states represented by attorneys, totaling

twenty-five bar licenses among the seventeen participants. Each license was treated as one unit out of the twenty-five to calculate the proportional representation by jurisdiction.

The majority of participants, 44 % (n=11), are licensed in NY, whereas MD licensed attorneys represented 8 % (n=2) of the participants (Figure A). Other jurisdictions licensing attorneys represented are Florida (n=1), Georgia (n=1), Michigan (n=1), Virginia (n=1), Arizona (n=1), Pennsylvania (n=3), and Washington D.C. (n=4). Attorneys will often be licensed in more than one jurisdiction; for example, attorneys in MD will often be licensed in neighboring jurisdictions such as Delaware, Virginia, West Virginia, or Washington D.C. to provide better client services. Being licensed in multiple jurisdictions requires one to meet the qualifications for that jurisdiction (either taking a bar exam or practicing law for a minimum number of years in a neighboring state).

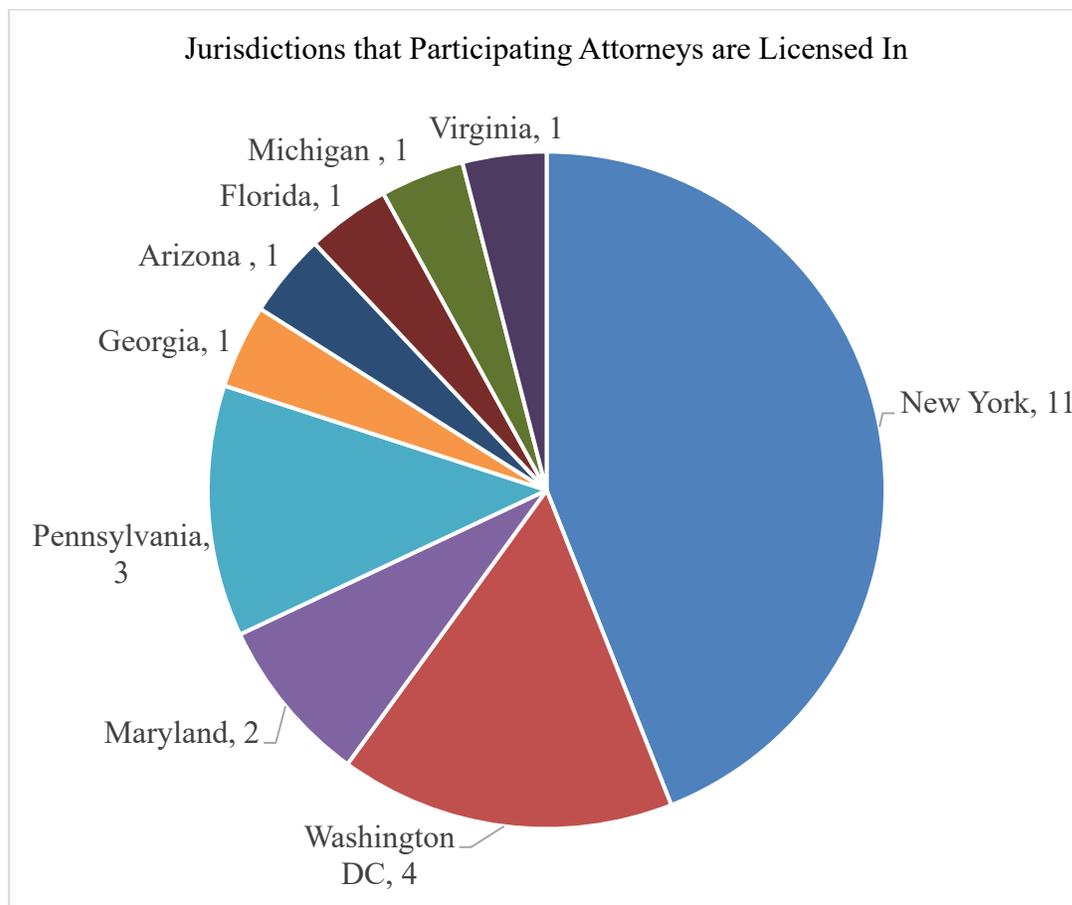


Figure A: Distribution of Participating Attorneys by Jurisdictional Licensing

We also collected data on the tenure of attorneys in the legal profession. Most participants, 56.25% (n=9), reported having over twenty-one years of experience as attorneys (Figure B). This metric is crucial as it provides insight into the expertise and perspective participants bring to the discussions.

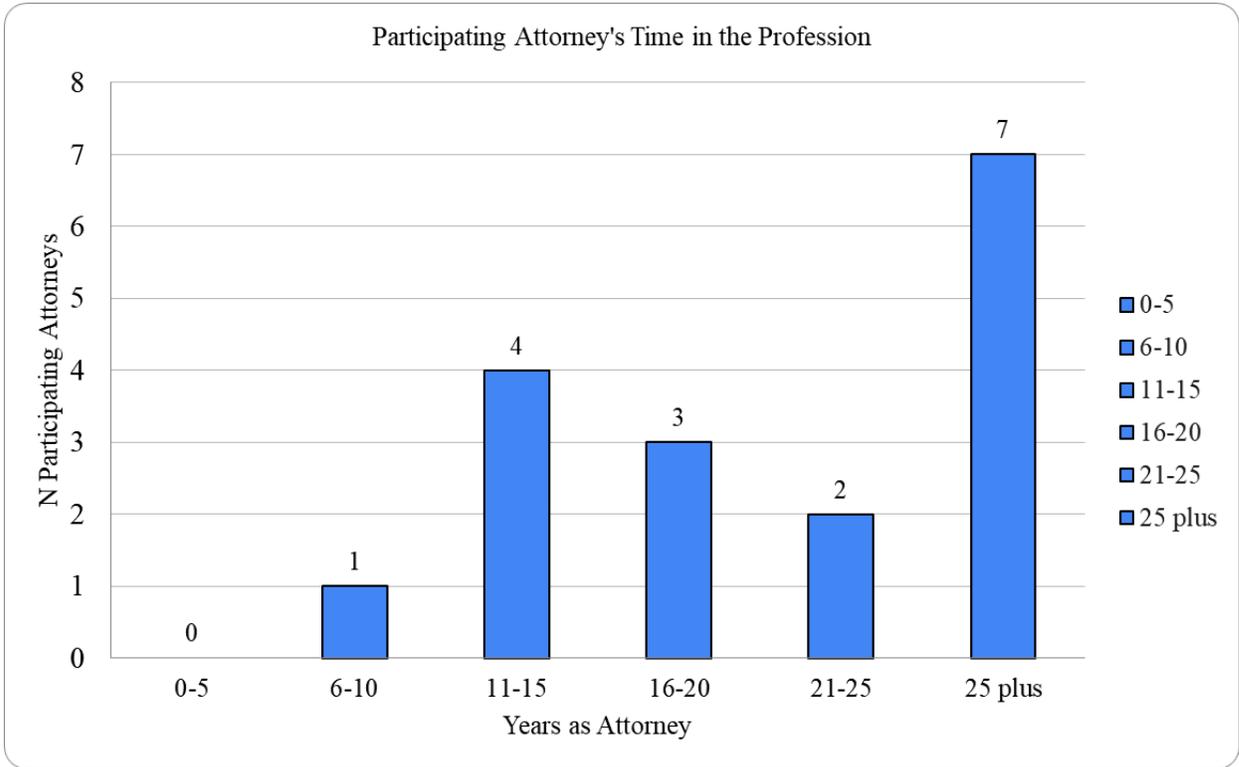


Figure B: Tenure of Participating Attorneys in the Legal Profession

NY attorneys participating in legal FGs have identified a notable trend in their lease and contract structures approach, particularly in renewable energy. These attorneys frequently compare historical oil and gas industry practices when navigating newer RE leases. They reflect on the complexities and nuances of oil and gas lease structures as they adapt strategies to address emerging challenges in USSPV developments.

Furthermore, in analyzing public opinion and the USSPV project permitting process, attorneys draw on parallels from their experiences in the wind energy industry, noting similar regulatory landscapes, stakeholder engagements, and challenges during permitting. By leveraging insights from past experiences in related industries, NY attorneys are better equipped to navigate the state's evolving legal terrain of renewable energy development.

3.2 Specific, coded recommendations and information from attorneys:

We have derived the most frequently mentioned topics and suggestions in Table 1 through coding and counting results.

Category	Points Echoed	Number of Attorneys Participant s in Explicit Agreeance (out of sixteen)	Number of FG Sessions Topic was Touched (out of 4)
Landowners' Negotiation Rights	Landowners have a right to negotiate option terms and prices – rights they should exercise. Landowners should not just take the first offer they receive.	3	3
Preparing Clients for Complex Projects	Attorneys reflected on preparing for complex projects, where specific details can derail the entire endeavor, involves managing a lengthy process with varying activity levels over time. “It’s not a done deal when they sign the options agreement.”	4	2
Specifying Non-Development Zones/Easements	What do you think you are leasing? And what do you want to lease?	6	3
Attorneys advocate for	Financial protections for their clients like the inclusion of restoration bonds or	8	4

	reimbursement of attorney fees, especially during the options period.		
Inclusion of Insurance Provisions	Insurance requirements imposing undue costs on landowners	4	3
Attorneys negotiation focus	Indemnification - Banks seek to transfer environmental liability	3	3
Landowners' Profile	Primarily current or previous farmers	5	2
Timing of Landowner Outreach	There are a few proactive landowners, but landowners usually wait until the last minute after signing agreements before seeking counsel.	3	2
Low Percentage Seeking Legal Counsel	–	5	2
Reasons for Not Seeking Counsel	Fear of losing out on a deal and time pressure from the developers, one attorney compared it to a “used car salesman.”	3	2
Attorney Concerns	Parsing out legitimate solar development companies	4	2
Landowners' Primary Concerns	Lease rates, payment structures, and preserving agricultural land	4	3
What Companies Do Not Negotiate On	Their lender's clause involves outside investors or the company's “capital stack.”	3	3

Importance of University Research	One attorney specifically states: “University research is vital.”	3	2
Developer Lease Agreements	Attorneys do not frequently see developers interested in lease purchase agreements.	6	3

Table 1: Attorney Recommendations in Solar Lease Negotiations

Our research found significant variability in the lease rates reported by participants, as outlined in Table 2. The lowest rate mentioned was \$500 per acre per year, while the highest rate reported was \$4,000 per year. Additionally, some participants suggested that these rates will likely increase over time. Geographical disparities in rental rates were also apparent, with higher rates observed closer to metropolitan areas. Attorneys from Pennsylvania and certain southern NY regions noted higher rates, particularly in areas near New York City and Long Island. Interestingly, only one attorney from Pennsylvania mentioned including an escalation clause in a rental agreement, stipulating a 2% annual rate increase.

Rental Rate Estimates and Ranges (\$ per acre, per year)	Participant Note and Context (State)
\$500 - \$1,000	The general range for NY
\$800 - \$1,100	For utility-scale solar in PA
\$800 - \$1,500	The average range in NY
\$900 - \$1,000	The average range in NY
\$1,000	For community-scale solar in NY
\$1,200	In Western NY
\$1,200	In Upstate NY

\$1,500	For community-scale solar with technologies that optimize energy capture in PA
\$1,900	For Central NY in and around Tompkins County
\$2,500	The highest end of the range seen by one attorney in NY
\$3,000 - \$4,000	The highest end of the range is in South/Downstate NY near New York City and Long Island

Table 2: Solar Lease Rental Rate Estimates and Ranges

Furthermore, variations in rental rates are closely linked to factors such as project size, type, and location. Generally, utility-scale or industrial-scale projects command lower rates, ranging from \$800 to \$1100, with higher rates typically found in the eastern regions compared to the west. In contrast, smaller, community-scale projects usually see rental rates around the \$1500 mark. However, advancements in technology significantly impact these figures. For instance, a Pennsylvania attorney noted that rental rates could escalate to between \$2200 and \$2600 for projects employing 600-watt bifacial panels with tracking technology, compared to traditional 400-watt setups. This technological enhancement allows for more efficient energy capture on less land area—19 acres versus 35 acres—highlighting how innovations in solar technology directly impact the profitability of solar developers and influence the rental rates paid out to landowners.

Our research obtained valuable data on the typical duration of lease commitments, as detailed in Table 3. A total of six participants explicitly outlined the timeframes of these commitments. Each participant’s time range, from the shortest to the longest commitment, is documented (Table 3), accompanied by paraphrased details provided by the attorneys and the respective states referenced.

Length of time commitment, in years	The State that the Attorney was referencing
5 – 10 with options to renew	Arizona

20 – 25	New York
30 years with 5-year risers	Georgia & Florida
Over 30 years	New York
Upwards of 35 years	New York
20 with another 20 to renew, to a total of 40 years	Maryland

Table 3: Duration of Lease Commitments Provided by Attorneys

Multiple attorneys in the FGs also highlighted the importance of landowners viewing lease payment offers as negotiable terms rather than fixed windfalls. Understanding that payment amounts can vary among landowners within the same project highlights the importance of bargaining power and negotiation skills in maximizing economic outcomes.

The economics of solar development projects significantly influence landowners leasing their land. While promising, initial lease terms and project scopes are potential rather than contractual and may change due to factors like soil conditions, bedrock presence, and regulatory requirements. It's crucial to distinguish between option payments, which give developers the right but not the obligation to lease land, and lease payments made during active use. Property tax assessments can also impact project profitability and lease terms. Educating landowners on these dynamic factors helps them make informed decisions and negotiate terms that meet their expectations.

Even proactive, business-minded landowners often face challenges in negotiating competitive lease terms. While some secure favorable pricing without legal help, attorneys emphasize the need for active negotiation to advocate for their interests effectively. A significant barrier is the prevalence of non-disclosure agreements in contracts, which limit access to critical information and widen the knowledge gap among stakeholders. This issue will be further explored using upcoming FG data from landowners. Additionally, Table 2, which lists disclosed lease rental rates, could enhance transparency and give landowners a better-informed starting point for negotiations.

A NY attorney, often representing developers in RE lease negotiations, stresses the essential need for landowners to have legal counsel. They point out that RE lease agreements involve significant rights and long-term commitments, making skilled legal guidance critical. Despite developers benefiting from reduced costs when landowners skip legal advice, the attorney strongly advocates for comprehensive legal support to protect landowner interests during negotiations.

This advocacy for legal representation unveils a broader opportunity for landowners to bolster their positions as economic agents in these agreements. However, an underlying hesitation among landowners to engage with legal professionals has been observed, which might be further elucidated by insights from landowner FGs. A plausible hypothesis for this reluctance is the significant challenge posed by legal deserts within rural communities. According to data from the American Bar Association for 2020, approximately 1,300 counties across the U.S. suffer from a scarcity of legal services, with less than one attorney per 1,000 residents — some areas entirely devoid of legal professionals (Paxton, 2023). Such a scenario forces residents, including landowners considering solar lease agreements, to undertake lengthy journeys, sometimes spanning hours, to access basic legal services (Paxton, 2023). Such barriers not only impede the ability of landowners to secure necessary legal support but also deepen the economic and informational asymmetries between landowners and developers. Addressing this gap, therefore, becomes paramount in empowering landowners to navigate lease negotiations more effectively and equitably.

3.3 Overall Focus Group Insights

The FGs offered critical insights into the leasing process and information gaps in agricultural land leases for solar development. A notable finding was the scarcity of impartial and reliable leasing resources. Our outreach materials, designed to address these gaps, are based on landowner needs identified in the FGs for making informed decisions. Meanwhile, other land grants are developing similar materials, but few are grounded in stakeholder insights from their respective states. Using insights from our legal FGs, we can offer introductory guidance for landowners hesitant about or unable to access legal counsel.

4. Discussion

This research enhanced the understanding of the ground-mounted USSPV development process by creating improved legal outreach tools for landowners, focusing on concerns highlighted in the attorney FGs. The developed educational resources facilitate effective contract negotiations and minimize disruptions to the agricultural industry, reflecting stakeholder needs and allowing more efficient negotiations. Additionally, this research offers potential opportunities to inform policy interventions at local, state, and national levels and to provide targeted educational resources for rural communities.

One limitation to note is the gender imbalance in our focus groups: 87.5% male (n=14) and 12.5% female (n=2) attorneys participated, which does not reflect the legal profession where, as of 2022, 38.68% of lawyers are women (Bureau of Labor Statistics, 2023). Despite this, our FGs offer valuable insights into rural landowners' concerns with these agreements.

One future solution could be to enrich data collection by integrating insights from informal conversations with landowners and attorneys and feedback from landowner workshops. Such informal exchanges often provide valuable anecdotal evidence and perspectives that enhance the findings from formal focus groups. Additionally, employing quantitative and qualitative research methods could offer a more comprehensive understanding of the decision-making processes related to RE leases. This might include surveys for quantitative data and qualitative analysis through interviews and focus groups. Given the survey resistance among landowners, alternative methods like in-depth interviews, FGs, or participatory research approaches should be considered to gain deeper insights into stakeholder perspectives and preferences.

We plan to integrate findings from landowner FGs into subsequent iterations of this ongoing work, thereby enriching the discussion with empirical insights directly from stakeholders. Additionally, analyzing transcripts from already-conducted interviews with non-landowner stakeholders like Extension agents and municipal representatives could reveal more about the broader ecosystem of RE leases. These perspectives are crucial for understanding the regulatory, economic, and community dynamics of USSPV projects. Combining these data sets will enhance our understanding of various stakeholders' viewpoints and better inform attorneys working in rural settings.

Since rural areas may have limited internet access, future FGs, and interviews might need to be conducted in person. Initially, our FGs were planned as in-person events, but COVID-19 restrictions necessitated a shift to virtual sessions, which may have affected participation levels.

5. Conclusion:

Our stakeholder-driven research on RE leases in MD and NY has illuminated the current status of leases, processes, and the informational needs surrounding them. By leveraging this data, we aim to bridge the informational gaps between solar developers and landowners, ensuring more equitable lease agreements.

Our analysis of FG transcripts has provided deep insights into participating attorneys' experiences, perspectives, and attitudes. These insights have significantly enhanced our understanding of USSPV leasing agreements. Attorneys in the study consistently emphasized the importance of landowners meticulously negotiating their rights and terms in solar lease agreements. This is particularly crucial in complex projects, where initial agreements can significantly limit future negotiations.

A significant finding from our discussions was the strong advocacy for including decommissioning or restoration bonds in solar leases, a practice adapted from the fossil fuel industry. These bonds ensure funds are available to dismantle the solar infrastructure at the end of its lifespan and restore the land, thus protecting landowner interests. Despite the clear benefits, a low percentage of landowners seek legal counsel, often due to time pressures or fears of missing out on opportunities. From the attorneys' viewpoints, while landowners are primarily concerned with financial returns and preserving agricultural land, companies often show little flexibility in their financial terms.

Additionally, university research has been recognized as a crucial resource, with a noticeable trend toward including options to purchase in lease agreements. We will continue to analyze and code results from the completed landowner and stakeholder FGs, further enriching our understanding of stakeholder perspectives. This ongoing effort will enhance our ability to foster positive change in RE leases' dynamic and evolving landscape.

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