

Module Outline

LEGAL AND LIABILITY ASPECTS OF PV PROJECTS





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Relevance and Background

A successful solar energy project requires more than just the latest technologies. Securing long-term project site rights through leases that ensure control of the land for necessary uses, undisturbed access, exposure to solar irradiation, and flexibility for modifications based on emerging technologies or market changes, is crucial. Solar leases and easements vary based on the type of system, installation, business model, applicable law, and type of landowner or host. The solar business is complex due to the involvement of multiple stakeholders, such as farmers, power distribution companies (DISCOMs), and government agencies. Understanding legal issues can help project developers navigate potential issues and maximize opportunities.

Theme – Project Management

Competency – Procurement

Code of the Module – To3Co8M23

Learning Outcomes

After the presentation, the participants will be conversant with:

- Typical legal and liability issues arising out of a solar project and the importance of addressing them.
- Different legal and liability issues arising at different stages of a solar project cycle.
- Power purchase agreements (PPAs) as the bedrock of a solar project
 - Types of PPAs
 - Legal issues arising out of non-compliance of PPAs.


An overview of the above topics would equip the participants with the necessary tools to be well prepared before developing solar projects in their respective countries with minimum legal issues.

Method of Delivery

Duration	Resource Code	Resource Delivery
60 min.	M23 L01	Lecture on Legal Aspects and Liability Issues

M23 L01: Lecture Presentation

The MS PowerPoint presentation first introduces the participants to various legal and liability issues that can arise in a solar project and discusses the importance of addressing these. These issues arise at different stages in the project cycle and the participants will be made aware of the typical stages of a solar project and the legal and liability issues arising at each stage. A PPA is the bedrock of a solar project, so the presentation discusses the concept of a PPA and its benefits to the signing parties and



stakeholders. Finally, the presentation identifies possible legal and liability issues that can arise in the case of non-compliance with the PPA.

Key Topics to be Covered

- 1 Key Legal and Liability Issues for Solar Projects
- 2 Addressing Legal Aspects and Liability Issues
- 3 Typical Stages of Solar Projects
- 4 Legal and Liability Issues at Different Stages
- 5 PPAs – The Bedrock of Solar Projects
- 6 Benefits of PPAs
- 7 Types of PPAs
- 8 Possible Legal Issues on Non-Compliance of PPAs



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1 Key Legal and Liability Issues for Solar Projects

Solar power is an environment-friendly and sustainable source of energy that is often priced competitively, can help control rising energy costs and minimize environmental impacts. However, the process of generating, purchasing, or selling solar power is complex and involves multiple stakeholders, raising various legal and liability issues at various stages. This complexity spawns various legal and liability concerns at different phases, including critical aspects such as:

- **Land Use and Zoning:** Compliance with all applicable land use and zoning regulations is mandatory for solar projects, which may entail obtaining permits from local authorities and securing leases or easements from landowners.
- **Construction and Installation:** The installation of solar projects must adhere to all safety and quality standards, which may include hiring licensed contractors and having the project inspected by a certified professional.
- **Environmental Regulations:** Solar projects must adhere to all applicable environmental regulations. This can involve evaluating the project's potential impact on air quality, water quality, and wildlife.
- **Energy Regulation:** Some solar project owners may be required to obtain licenses or permits and comply with specific reporting requirements according to government regulations.
- **Liability:** Solar project owners and operators may be accountable for any harm inflicted upon individuals or property during the project's lifecycle, including responsibility for accidents that occur during construction and for damage caused by faulty solar panels.

2 Addressing Legal Aspects and Liability Issues

Addressing legal and liability issues in a timely manner is critical to the success of solar projects. Non-compliance with regulations can lead to:

- Project shutdowns
- Fines and penalties
- Environmental damage, which might jeopardize the project.
- Malfunctioning projects can cause injuries or property damage, leading to personal liability for project owners and operators.

Insurance can mitigate some risks. Consulting with an attorney or lawyer is crucial to ensure a solar project adheres to all relevant laws and regulations, to minimize legal liability and ensure its completion within the stipulated period. Specific liability issues that may arise in solar projects include:

- **Product Liability:** The manufacturer of solar panels may be liable for injuries or property damage caused by defective panels.
- **Workers' Compensation:** If a worker is injured during the construction or operation of a solar project, the project owner may be liable for workers' compensation benefits.
- **Property Damage:** If a solar project malfunctions and causes damage to property, the project owner may be liable for the damages.
- **Environmental Damage:** If a solar project causes environmental damage, the project owner may be liable for cleanup and remediation costs.

In order to understand the various legal and liability issue that arises from a solar project, it is important to first know about the various stages of a project. These are as follows.

3 Typical Stages of Solar Projects

First, let us understand the different stages in a solar project, as below:

- **Project Development:** Before a project can be built, several activities must occur. First, a concept is necessary, which may be requested by a company looking to improve its energy profile, a utility seeking to increase its renewable sources, or a community desiring to add greener energy to its neighborhood. Next, site selection and development take place, which involves a feasibility review, environmental studies on the area and land, city and state zoning and permitting requirements, and interconnection studies. Once development is complete, financing or funding for the project must be secured. The output of this phase is a feasibility report.
- **Engineering and Design:** The bulk of the project's design takes place in the engineering and design phase, although initial design can commence during the project development phase. Essential considerations include the project's intended purpose, local design prerequisites, optimal panel placement on the land, and the most effective method for mounting the panels. An assessment of the financial investment, financing structure and project cash flows is undertaken. The typical output of this phase is a detailed project report (DPR), which is submitted to a financier for raising finance for the project.
- **Construction:** Once financial closure is attained, construction of the project begins. This entails the procurement of materials such as modules, inverters, cables, and mounting structures. Construction starts with getting the site ready, setting up mounting structures, tracking systems, installation of modules and inverters, and wiring and cabling for power evacuation to the grid. Depending on the size of the project, the construction duration can be up to two years. Before it is connected to the grid, it is certified by relevant electricity/grid authorities.
- **Operations:** The typical lifespan of a solar panel is 20-25 years, meaning one can expect the initial equipment to generate energy for that duration, with regular maintenance to maximize its efficiency. At the end of their life cycle, panels must be replaced to ensure the project continues to produce power.
- **Decommissioning:** After the project's useful life and the power sale contract expiry, it must be decommissioned or disassembled. Solar modules, in particular, must be recycled as improper disposal of them can lead to significant environmental harm.

Various legal and liability issues like the ones mentioned earlier can occur at the above stages of the project cycle.

4 Legal and Liability Issues at Different Stages

Legal issues are documented in agreements so that the responsibilities of the parties are clearly laid out and litigation in future can be easily addressed. The following table summarizes the legal issues and agreements thereof and liabilities arising from a solar project, specifically a large one (>5MW).

S.N.	Stage of project	Legal issues and occurrence of liabilities
A. Project Development		
1	Land use and zoning	<p>Comply with all applicable land use and zoning regulations, including obtaining permits from local authorities, as well as securing leases or easements from landowners.</p> <p><u>Agreements:</u> Lease agreements with landowners</p> <p><u>Liabilities:</u> Non-compliance with a regulation or breach of an agreement can lead to ceasing or restricting operations, paying fines/ compensation, etc.</p>
2	Environmental regulations	<p>Comply with all applicable environmental regulations. This may involve assessing the potential impact of the project on air quality, water quality, and wildlife</p> <p><u>Agreements:</u> None</p> <p><u>Liabilities:</u> The authorities can issue directives mandating that polluters or violators cease or restrict their operations or activities that cause pollution until such violations are rectified. They may also require the payment of environmental compensation for the damage caused, install specified technology or equipment to ensure compliance, or disconnect electricity, water, or other provisions for such an industry. Additionally, they may initiate criminal proceedings against those responsible for the business activities of such violators.</p>
3	Financing	<p>Working with banks, investors, or government agencies.</p> <p><u>Agreements:</u> Shareholders' agreement, operating or limited partnership agreements, loan documentation and agreement</p> <p><u>Liabilities:</u> Non-compliance, especially on debt, makes the borrower liable for prosecution.</p>
4	PPAs	<p>Solar projects typically sell their electricity to a utility company. This requires a PPA, which is a contract that sets out the terms of the sale.</p> <p><u>Agreements:</u> PPA</p> <p><u>Liabilities:</u> Breach of condition(s) of the PPA attract penalties as mentioned in the PPA</p>
B. Engineering and design		
1	Design	<p>The design of a solar project must be meticulously planned to ensure its efficiency and cost-effectiveness. This necessitates collaborating with engineers and designers who have expertise in solar project development. Sometimes new technologies may be used like high-efficiency modules, trackers, etc.</p> <p><u>Agreements:</u> Technology license agreement</p> <p><u>Liabilities:</u> Sometimes designs may need the approval of authorities and non-compliance with approved designs may attract prosecution/fines</p>

S.N.	Stage of project	Legal issues and occurrence of liabilities
2	Construction planning	<p>The construction of a solar project must be carried out in compliance with all applicable safety and quality standards, which may necessitate engaging licensed contractors and having the project inspected by qualified professionals.</p> <p><u>Agreements</u>: EPC agreement with licensed contractors, supply contracts for equipment, interconnection agreement with utility for power offtake</p> <p><u>Liabilities</u>: Engaging non-licensed contractors can attract prosecution/fines</p>
C. Construction		
1	Safety	<p>The construction of a solar project must be carried out in a safe manner. This may involve implementing safety procedures and training workers on how to work safely around solar equipment</p> <p><u>Agreements</u>: As part of the EPC agreement</p> <p><u>Liabilities</u>: The project owner and contractor may be liable for any injuries or property damage caused during construction. It is important to have adequate insurance coverage in place to protect against these risks</p>
D. Operations		
D	Operations	<p>Once a solar project is operational, it is important to maintain it properly. This may involve regular inspections, cleaning, and repairs</p> <p><u>Agreements</u>: O&M agreement with O&M provider, administration service agreement with a third party (if any), etc.</p> <p><u>Liabilities</u>: Penalties for lower generation as mentioned in the PPA</p>
E. Decommissioning		
E	Decommissioning	<p>As a solar project reaches its end-of-life, it must be safely dismantled and recycled in an environmentally friendly manner, possibly with the help of a specialized contractor</p> <p><u>Agreements</u>: NA</p> <p><u>Liabilities</u>: The project owner may be held responsible for any environmental harm inflicted during demolition, and it is crucial to have sufficient insurance coverage to safeguard against such hazards.</p>

5 PPAs – The Bedrock of Solar Projects

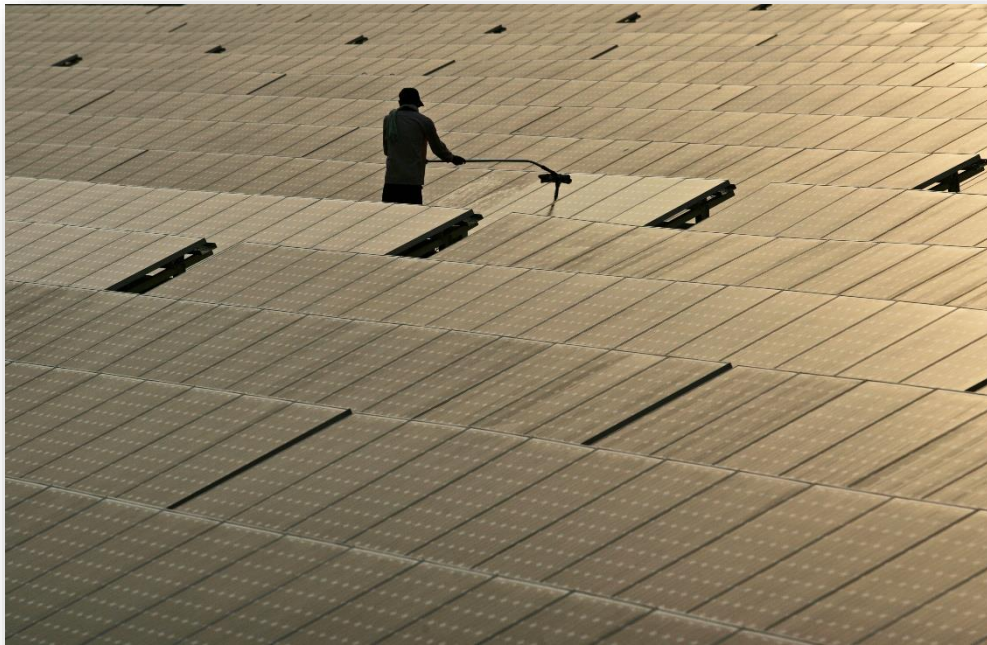
To encourage the use of solar energy, governments initially provide financial incentives, in the form of feed-in-tariffs (FITs), generation-based incentives (GBIs), and tax breaks. As technology improves, solar assets become cheaper to build, leading to increased development. However, as the market shifts from subsidized projects to open markets, solar investors must find alternative sources of security to replace government subsidies. PPAs are the alternative. Apart from meeting compliances on land use, environmental and safety issues, a PPA is the document that governs a solar project and outlines any legal issues that may arise between the seller and off-taker due to non-compliance.

Typically, the purpose of a PPA is to purchase solar energy from a generator, and helps to bypass the capital expenditure and risk associated with building a solar power system. A PPA enables a solar generator to:

- **Finance The Project:** Large-scale renewable energy, including solar projects often require third-party funding, such as from banks, lenders, or finance providers. However, these third parties are unlikely to provide funding without security. In the absence of government subsidy, a solar PPA can offer that assurance to financiers. A PPA provides a buyer's commitment to pay a fixed price per megawatt-hour (MWh) for a long-term period (10-25 years) for the electricity generated by the project. From a lender's perspective, it is important to consider the creditworthiness of the energy seller as a counterparty risk. Lenders may call counterparties with strong credit profiles bankable to finance the project's cash flows.



- **Hedging Future Cash Flow Risks:** For financiers, PPAs offer security that the project will generate a return on their investment upon completion, by reducing cash flow uncertainty. PPAs allow the sale of a project's future energy generation over the long term to the off taker. Typically, parties sign a PPA contract before the project commences. For investors, entering into long-term PPA contracts is a way to manage volatility risk.
- **Locking Future Energy Price:** Electricity prices can fluctuate frequently and a PPA provides the seller with a predictable income stream, while the buyer benefits from a fixed cost for a certain amount of energy.





6 Benefits of PPAs

For RE project owners	For electricity buyers	For lenders
<ul style="list-style-type: none">• Enables raising of finance of the project.• Reduces risks by allocating them among the contractual parties	<ul style="list-style-type: none">• Locks long-term electricity cost.• Enables buyer to indirectly fund a project and receive “green attributes” like Renewable Energy Certificates	<ul style="list-style-type: none">• Offers revenue certainty.• Helps them claim their contribution to development of the renewable industry

7 Types of PPAs

Broadly there are three types of PPAs, as below:

- **Behind-the-Meter PPAs:** A behind-the-meter PPA is entered into between the seller of solar electricity and the buyer, when the former makes an investment, installs the system at the premises of the buyer, and sells the electricity generated to the latter at a tariff mentioned in the PPA. Selection of the buyer can be through a competitive bidding process on tariff. The electricity generated feeds into the load side of the electricity meter; hence, the name behind-the-meter. In general, the tariff of solar electricity is lower than that of the grid. Solar rooftop projects under net metering are a typical example.
- **Sleeved PPAs:** In a sleeved PPA, the intermediate utility company mediates the transfer of funds and electricity between a solar project and the buyer. The utility company takes the electricity directly from the solar project, "sleeves" it to the buyer at the point of intake and charges a fee for the service. If the purchased solar energy does not suffice to meet the buyer's energy needs, the utility company is also responsible for providing the additional power required.



- **Virtual PPAs:** A virtual PPA is a contract signed between a solar generator and a large consumer, where the former sells electricity to the consumer at a pre-agreed price, known as the strike price. The consumer receives the solar energy attribute (green energy credits) associated with the traded power, while the difference between the strike price and the wholesale market price forms the basis of the actual price settlement between the two parties. If the market price is higher than the strike price, the power producer pays the difference to the consumer. Conversely, if the market price is lower, the consumer pays the difference. This type of settlement structure is known as Contracts-for-difference (CfD).



8 Possible Legal Issues on Non-Compliance of PPAs

Non-compliance with a PPA in a solar project can lead to a number of legal issues, including:

- **Termination of the PPA:** If a party fails to honor the terms of the PPA, the other party may have the right to end the agreement. This can result in significant financial penalties for the party in breach, as they may be required to compensate the other party for any losses incurred.
- **Damages:** The non-breaching party may be entitled to damages for any losses incurred due to the breach, such as lost profits, additional expenses, and other financial damages.
- **Injunctive Relief:** In certain situations, the non-defaulting party may be able to obtain an injunction to prohibit the defaulting party from continuing to breach the PPA. This could involve mandating the defaulting party to undertake specific actions, such as completing the project or paying the agreed-upon price for the power.
- **Litigation:** If the parties are unable to settle their dispute through negotiation, they may be forced to pursue litigation, which can be expensive and time-consuming, and with no guarantee of who will win the case.

Some examples of non-compliance are, (a) failure to meet the project's completion date; (b) failure to provide the agreed-upon amount of power; (c) failure to pay the agreed-upon price for the power; and (d) breach of any other terms of the agreement. Thus, while entering into a PPA for a solar project, it is important to carefully review the agreement and understand the rights and obligations. Both parties should also seek legal advice to ensure that they are protected in the event of a breach.



Further Reading

Law of Solar: A Guide to Business and Legal Issues

[\(https://www.stoel.com/legal-insights/special-reports/the-law-of-solar/chapters/solar-project-property-rights-securing-your-place\)](https://www.stoel.com/legal-insights/special-reports/the-law-of-solar/chapters/solar-project-property-rights-securing-your-place)

Power Purchase Agreements (PPAs) and Energy Purchase Agreements (EPAs)

[\(https://ppp.worldbank.org/public-private-partnership/sector/energy/energy-power-agreements/power-purchase-agreements\)](https://ppp.worldbank.org/public-private-partnership/sector/energy/energy-power-agreements/power-purchase-agreements)