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SMART ENERGY DESIGN ASSISTANCE CENTER

Power Purchase Agreements for Large Solar Projects

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Many organizations are considering adding solar to their electricity mix. This guide discusses power purchase agreements (PPA) for the procurement of large solar projects from a customer perspective. It introduces the initial planning and request for proposals (RFP) to solicit bids from developers.

What is a PPA?

A PPA is a financial arrangement between a customer and a third-party developer, in which the developer builds, owns, operates, and maintains the solar system, and the customer agrees to purchase the electricity for a predetermined period and price.

PPAs are attractive for many customers because they are not required to provide the capital. The developer is responsible for financing, construction, operation, and maintenance.

PPAs can be structured for systems hosted on-site by customers or remotely off-site. Many PPAs last 20-25 years, though they commonly range from 5-30 years.

Initial Planning

How much solar do you want to buy?

Developers need to know how much solar electricity you will purchase. This can be an exact value, for example 3 million kWh per year, or a range for flexibility in the RFP, for example 1.5 million – 3 million kWh per year.

Do you intend to host the solar system on-site?

On-site solar systems can offer advantages if there is enough suitable space available. Large systems are often located on rooftops or on land near a building or electrical connection. On an Illinois site without obstructions, estimate around 1 acre of total system area per 300,000 kWh of annual electricity generation. A customer who wants 3 million kWh per year will need about 10 acres of suitable area to host an on-site system. Systems can also be located on ponds and detention basins with floating solar, or they can be built as solar canopies over parking areas. A feasibility assessment is recommended early in the process.



Ground Mount Solar PV System - stationary



*[Floating Solar. FPV Installation in Walden, Co.](#)
[Photo by Dennis Schroeder.](#)*

Building the RFP

A well-crafted RFP is critical to obtaining responsive proposals with reliable pricing quotes, so that the procurement team can select the developer that best meets the customer's needs. The RFP contains information about the customer's specifications and preferences. Due to the complexity, customers often retain consultants for specialized assistance. The items below summarize key information that should be addressed in the RFP and in developers' proposals.

Pricing:

The proposed price of electricity, stated in terms of \$ per kWh, is the main factor in evaluating proposals. Customers can require a fixed price, with no escalation during the PPA term for assurance of long-term price stability. Alternatively, they can allow pricing escalation, which can reduce the initial electricity price but increase pricing in later years. The developer proposal should provide annual cashflow analysis for all proposed scenarios, so that the customer can evaluate lifetime costs.

Electricity generation and usage:

The RFP should specify how much electricity (kWh per year) is desired. The proposals should provide schedules of the estimated annual electricity generation for each year of the PPA term.

Location:

The customer should specify whether they intend to host the system on-site or instead purchase electricity from off-site. The RFP should identify available on-site locations, if applicable, and proposals should define the system location and include a visual model, such as satellite image with superimposed solar arrays.

Incentives and Renewable Energy Credits (RECs):

Tax credits and the sale of RECs can reduce the pricing. The developer can sell the RECs to reduce the pricing, or the customer can retain ownership of the RECs to support greenhouse gas reduction goals. The proposals should explain the pricing basis and the impact of incentives.

Financial Capacity, Qualifications, and Experience:

The RFP should require proposals to include information, such as client reference and financial statements, that allows the procurement team to assess the developers' ability to successfully deliver the project and remain financially solvent.

Equipment Specifications, Warranty, and Performance Monitoring:

The RFP and proposals should address standards and warranties for system components, such as the solar panels, inverters, and mountings, and they should define the approach for system monitoring.

Specifications and Requirements for On-Site Systems:

For on-site systems, the RFP and the proposals should address some additional considerations.

- System design layout and electrical connections
- Landscape design. Typical options include grass, rock, or pollinator plants. Landscaping with pollinator plants is increasingly prevalent. Refer to the [Solar Site Pollinator Scorecard](#).
- Details about parking and access roads for construction
- Details about fencing or screening
- Customer recourse in the event of system non-performance during the PPA term
- Availability and pricing scenarios for early buy-out by the customer
- Contingencies if the developer sells the system to a different owner or goes out of business
- Plan for system decommissioning and site restoration at the end of the term



Solar array over pollinator plants



Solar array over grass

Project Development Timeframe

After the customer selects a developer, the project can move forward with PPA negotiation; utility interconnection permitting; and construction. This can take 2-5 years depending on the project size.

Resources

1. [Solar RFP: Minnesota Solar Energy Procurement Workshop](#). This slide deck presents detailed information about solar project development.
2. [Solar Power Purchase Agreements](#) (U.S. Environmental Protection Agency). This website provides resources and links on solar PPAs.
3. [Procurement Specifications Templates for Onsite Solar Photovoltaic](#) (U.S. Department of Energy). This guide provides guidance on specifications that can be used in solar RFPs.
4. [University of Illinois at Urbana-Champaign Solar Farm RFP](#). This document was used for a large solar project and can be used as a reference for developing an RFP.

Who We Are

The Smart Energy Design Assistance Center assists buildings and communities in achieving energy efficiency, saving money, improving indoor air quality, and becoming more sustainable. SEDAC is an applied research program at the University of Illinois at Urbana-Champaign.

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