Power Purchase Agreements

OVERVIEW

This document is designed to help Better Buildings, Better Plants, and Better Climate Challenge partners learn about power purchase agreement (PPA) options. For more information about renewable energy and other renewable electricity procurement options, please see the Renewable Energy Resources Hub.

Power Purchase Agreements (PPAs)

A power purchase agreement (PPA) is a contract between a renewable energy developer and an electricity consumer, often called an "offtaker." The offtaker purchases renewable energy and renewable energy certificates (RECs) from a specific power generation asset at a set price ($/MWh) that is usually lower than their utility's retail price. Unlike the fluctuating cost of fossil fuels or the market rate for electricity, the fixed energy price of a PPA can help insulate organizations from increasing utility costs. Responsibility for installing, maintaining, and operating equipment usually falls on the developer, reducing liability for the offtaker. Organizations with limited space can use PPAs for renewable energy procurement as the development and their facilities do not need to be in the same location.

PPAs promote clean energy on the grid and generate RECs for offtakers to purchase. Organizations can compare renewable energy developers and projects to find the ones that best align with their sustainability goals. The two most common types of PPAs are Physical and Virtual PPAs and their structure dictates how energy is delivered to a facility and its cost. This overview provides information on how the most common types of PPAs operate.

Physical (PPAs)

In a physical PPA, a renewable energy developer delivers electricity directly to an offtaker's facility or to their local utility electric grid. The developer owns, operates, and maintains the renewable asset for the duration of the PPA contract. The rate offered to the offtaker is usually lower than the local utility retail electricity price and can be fixed or escalated by a set percentage every year to cover inflation, decreased system efficiency, O&M costs, and increases in retail electricity prices. Physical PPA contracts are typically long-term and can range from 10 to 25 years, after which the offtaker typically has the option to extend the contract term, purchase the system from the developer, or have the system removed from the property. Contract terms specify whether the offtaker or the developer will own and retire the associated RECs. Note that only RECs that have been retired can be used to claim renewable energy usage for carbon and renewable energy accounting purposes. There are two main types of physical PPAs:

1. Onsite Physical PPAs: The offtaker provides physical space onsite or nearby for the developer to build, maintain, and operate renewable energy generation equipment. The generated electricity is delivered to the offtaker "behind the meter" through a direct connection (Figure 1). The offtaker's local

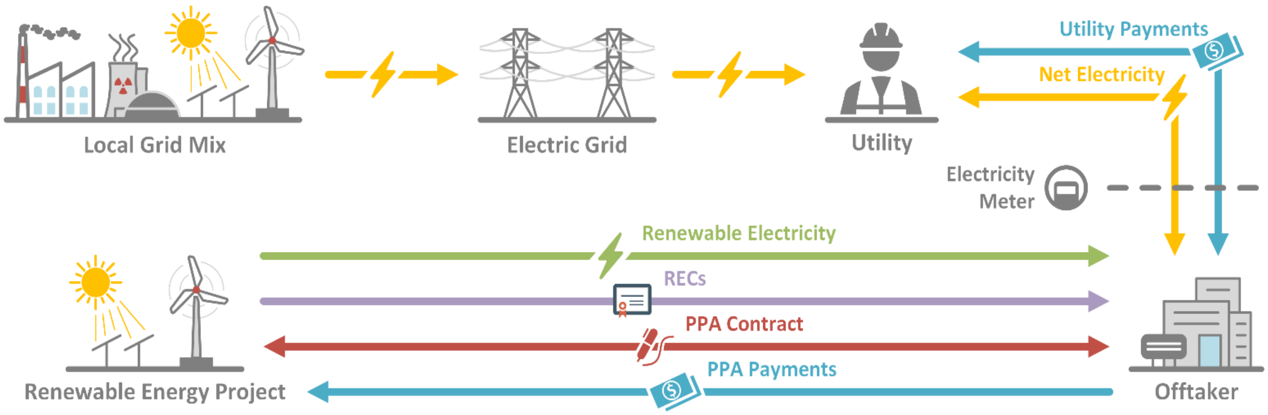

Figure 1: Structure of an Onsite Physical Power Purchase Agreement

utility still provides electricity to the facility when the system does not produce enough energy to meet facility demand. When the system generates excess energy, that electricity can often be sold back to the utility at an agreed upon price in a process called net metering or net billing. Although many states and utilities have adopted some form of net metering or net billing, many cap the total amount of electricity that can be sold back to the grid.

1. Offsite Physical PPAs: The developer delivers energy within the offtaker's local electricity market "outside the meter" and not directly to their facility (Figure 2). The offtaker still receives all its electricity from the grid but can use RECs from the PPA to reduce its market-based Scope 2 emissions. Offsite PPAs are only available to facilities in deregulated electricity markets where customers can choose between generators. Large organizations benefit from offsite PPAs since substantial volumes of renewable energy can be purchased with a single transaction without land constraints. Organizations can also directly engage with specific projects or promote renewable energy in their area.

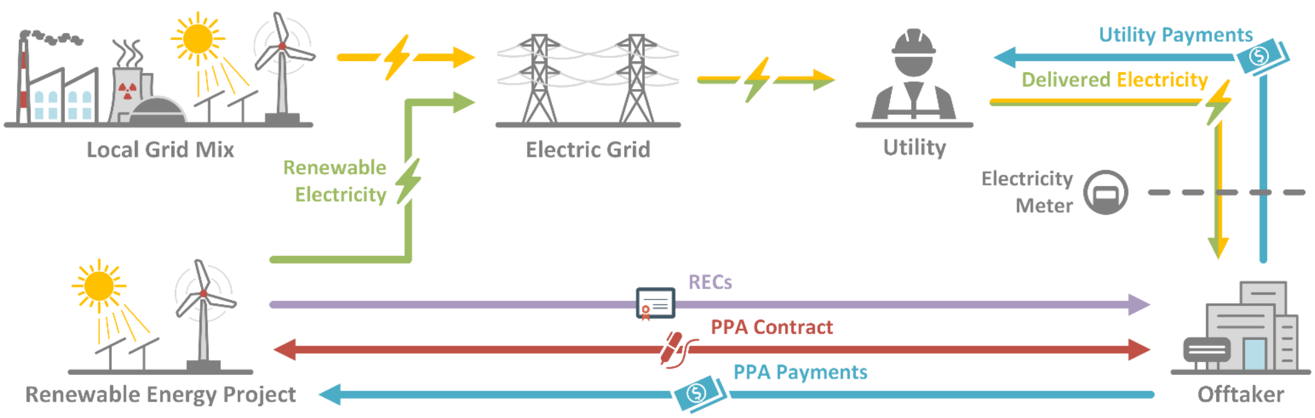

Figure 2: Structure of an Offsite Physical Power Purchase Agreement.

A **Sleeved PPA** is a type of offsite physical PPA where the local utility company acts as an intermediary between the offtaker and the developer (Figure 3). The utility takes electricity directly from the developer and bundles it with the offtaker's delivered energy for a fee, usually called a **sleeving fee**. If renewable energy does not meet the offtaker's demand, the utility company supplies additional grid electricity. Sleeved PPAs are good options for buyers who are not well-versed in power markets. The utility company takes on the risks associated with price fluctuations while offering electricity to the buyer at a fixed price. Sleeved PPAs are available to buyers in deregulated markets but can also be offered as utility Green Power products in regulated markets.

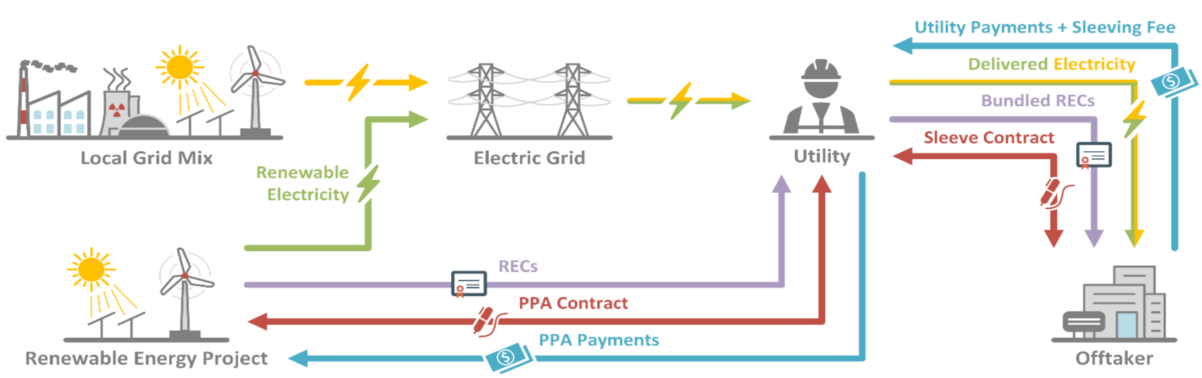

Figure 3: Structure of a Sleeved Physical Power Purchase Agreement.

Virtual (Financial) PPAs

In a virtual PPA, the offtaker and the generation project do not need to be in the same market. This gives buyers more options for renewable energy purchasing and allows them to take advantage of PPAs even in regulated markets or if physical space limits installing generation equipment. Offtakers enter into a long-term contract with the developer but continue to receive electricity from their local utility at retail price (Market A in Figure 4). The developer sells their electricity at wholesale price to the market where the generation occurs (Market A or B). The offtaker agrees to pay the developer a fixed rate for the renewable electricity. If the developer sells their electricity for more than the fixed rate, the offtaker receives the extra revenue. If the energy sells for less than the fixed rate, the offtaker pays extra to cover the difference. These **balancing payments** guarantee the developer always receives the agreed upon fixed rate for their generated electricity. RECs from the virtual PPA can be retired to reduce market-based Scope 2 emissions.

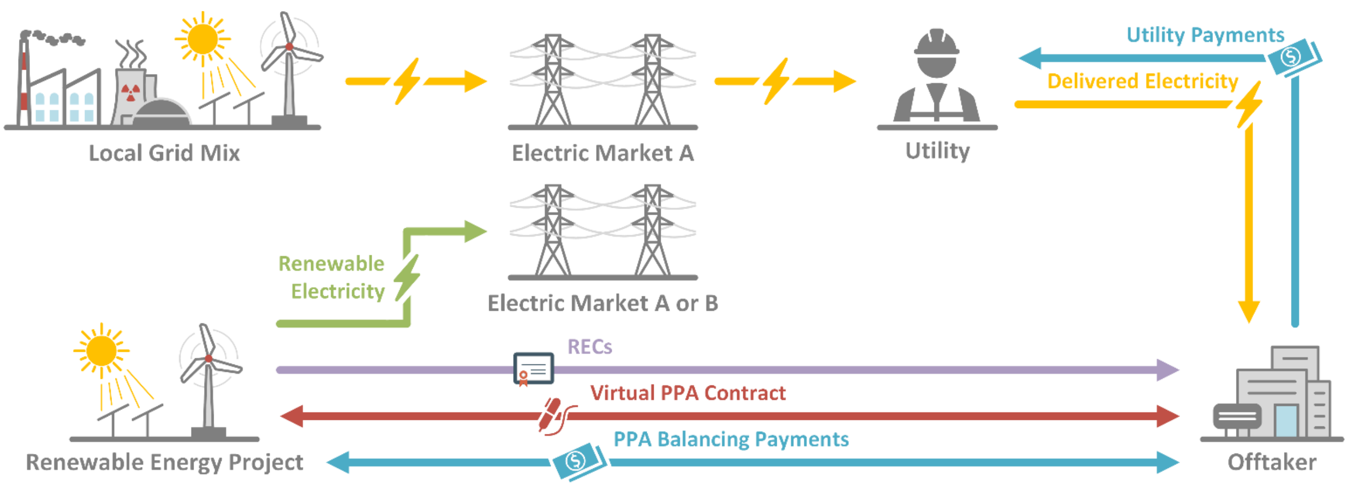

Figure 4: Structure of a Virtual Power Purchase Agreement.

Aggregate PPAs

PPAs are usually single-offtaker and are often better suited for large corporations with high electricity usage. Small and medium-sized organizations (SMOs), therefore, face challenges in gaining access to PPAs due to limited contracting expertise and lower energy demand that does not meet minimum buying requirements for developers. This leaves SMOs with fewer options for renewable energy procurement. Aggregate PPAs provide SMOs access to renewable energy by bringing multiple SMOs together into a larger buying group to negotiate a PPA contract as one entity.

In many effective aggregate PPAs, a large corporation (referred to as the anchor tenant) brings together SMOs into a buying consortium to meet developer requirements. The anchor tenant takes most of the generated electricity and the SMOs fill in to take the remaining load. This enables SMOs to access long-term renewable resources and reduce their Scope 2 emissions. If the associated SMOs are in the supply chain of the anchor tenant, the anchor can realize the additional benefits of reducing their own Scope 3 emissions

Case Studies

The following case studies highlight successful PPA projects from three Better Buildings, Better Plants partners. For more information on these companies and other projects they have implemented, please visit the Better Buildings Solution Center website.

Trane Technologies (Onsite PPA)

In 2018, Trane Technologies built an onsite Photovoltaic (PV) system at their Trenton, NJ, residential HVAC Manufacturing facility. Trane partnered with their local utility in a cost-sharing program to purchase and install 5,500 PV panels that generate more than 2,000 MWh of annual electricity, accounting for 15% of the facility's energy use[1]. The power company owns and trades the generated RECs to finance their cost share, and Trane purchases matching RECs from other markets to keep their renewable energy claims. During low production, the facility can export electricity to the grid, reducing costs and supporting clean energy for the local community.

Colgate-Palmolive Company (Virtual PPA)

In 2023, Colgate-Palmolive Company signed a 20-year virtual PPA for a solar energy farm located outside of Waco, Texas[2]. The 209-megawatt Markum Solar Farm will be a long-term source of clean, renewable energy in the U.S. With start-up anticipated in 2025, the project is expected to produce the equivalent of 100% of Colgate-Palmolive's U.S.-based operational electricity needs.

Valvoline Global (Aggregate PPA)

In 2022, Valvoline Global joined with four other Walmart supply chain partners to execute an aggregate PPA purchase of renewable energy from the Ørsted Sunflower Wind Farm located in Marion County, Kansas[3]. The project is expected to generate approximately 250,000 MWh of annual new green electricity. Joining the aggregate PPA will directly help Valvoline meet its long-term emission reduction targets. The purchase is part of Walmart's Project Gigaton™, which aims to avoid one gigaton of GHG emissions from their global supply chain by 2030[4]. Walmart and Schneider Electric jointly developed the Gigaton PPA program in 2020 under Project Gigaton™ to increase education on and access to renewable energy procurement options for their supply chain companies.

1 https://web.archive.org/web/20230921195947/https://blog.tranetechnologies.com/en/home/our-environment/energy-improvements-in-trane-technologies-facilities.html
2 https://web.archive.org/web/20231104232232/https://investor.colgatepalmolive.com/node/41661/pdf
3 https://web.archive.org/web/20240304054608/https://csr.valvoline.com/pdf/Valvoline%E2%80%932022-CSR_final.pdf
4 https://web.archive.org/web/20231226192308/https://perspectives.se.com/blog-stream/first-cohort-for-renewable-energy-supply-chain-program-announced-gigaton-ppa

Authors and Acknowledgments

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DOCUMENT AVAILABILITY

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