



Renewable Energy Production Opportunities at Water and Wastewater Utilities

Reduce Operating Costs, Reliance on the Grid, and Carbon Dioxide Emissions
Using Renewable Energy with Little-to-No Upfront Costs

Energy costs are a major concern for water-wastewater utilities and municipal officials. Across the U.S., municipalities spend almost \$4 billion annually on energy, consume almost three percent of the nation's energy resources, and contribute about 45 million tons of greenhouse gases per year.

Power Purchase Agreements (PPAs)

Power Purchase Agreements (PPAs) are an excellent way to initiate and fund renewable energy projects in the water sector. PPAs in the water sector are finance contracts between a water/wastewater utility owner, and a third-party renewable energy developer that owns, operates, and maintains the renewable energy system. In exchange for upfront costs and maintenance, the signatory must commit to buying the energy from the provider at a predetermined rate (delineated in the contract) for a period commonly lasting 15-20 years. This financial arrangement ensures stable and often lower-cost electricity with zero maintenance costs.

Benefits to Participating Utilities

- | | | |
|--|---|---|
| <input checked="" type="checkbox"/> FEWER UPFRONT COSTS | <input checked="" type="checkbox"/> AIR QUALITY PERMIT COMPLIANCE | <input checked="" type="checkbox"/> LOWER OPERATING COSTS |
| <input checked="" type="checkbox"/> LOWER ESCALATORS | <input checked="" type="checkbox"/> RENEWABLE ENERGY GENERATION | <input checked="" type="checkbox"/> STABLE ENERGY COSTS |
| <input checked="" type="checkbox"/> ZERO MAINTENANCE | <input checked="" type="checkbox"/> MINIMAL OUTLAY AND OVERSIGHT | <input checked="" type="checkbox"/> LESS RISK |
| <input checked="" type="checkbox"/> CO ₂ REDUCTIONS | <input checked="" type="checkbox"/> 15-30% ENERGY SAVINGS | <input checked="" type="checkbox"/> LOWER GRID DEMAND |

These CA utilities have recently entered into PPAs and drastically lowered their CO₂ emissions while saving energy and money:¹

| Utility Name | Treatment Capacity, Million Gallons per Day (MGD) for Wastewater Utilities | Expected Annual Energy \$\$ Savings | Generating Capacity (kW) | *Est. Annual CO ₂ Reductions (pds) |
|--|--|-------------------------------------|--------------------------|---|
| Inland Empire Utilities Agency (Solar) | 53 MGD | \$500,000 | 3,500 kW | 5,918,012 |
| Inland Empire Utilities Agency (Fuel Cell) | 45 MGD | Same Price as Grid | 2,800 kW | 15,529,157 |
| San Diego MWD (Fuel Cell) | 175 MGD | \$338,000 | 4,500 kW | 24,957,575 |
| San Diego County Water Authority (Solar) | 100 MGD | \$85,000 | 1,800 kW | 3,043,549 |
| Thousand Oaks (Solar) | 14 MGD | \$200,000 | 584 kW | 987,462 |
| Thousand Oaks (Cogen) | 14 MGD | \$60,000 | 940 kW | 5,194,501 |
| Rancho California Water District (Solar) | 5 MGD | \$152,000 | 1,100 kW | 1,859,946 |
| TOTALS: | 347 MGD | \$1,335,000 | 15,224 kW | 61,041,540 |

¹ If your utility would like to be added to this list, please contact Eric Byous at Byous.Eric@epa.gov.



* CO₂ Calculations are based on 2007 eGRID subregion output emission rates for the Western Electricity Coordinating Council California (WECC).² 730 (average hours in a month) x # of months (9 months for off-peak demand emissions + 3 months for peak demand emissions) x kW (project size) = kWh x eGRID CO₂ lb / kWh x capacity factor (25% for solar, 90% for fuel cells) = Estimated annual CO₂ reductions. The calculations for peak and off-peak demand were calculated separately and added together for the total CO₂ emissions. Because fuel cells have a high capacity factor and run during off-peak hours, we calculated peak demand for biogas as 6 hours per day for three months (90 days), which is, 540 hours of the total 8760 hours in a year.

How to Get Started:

- ✓ Know the type of energy you wish to generate and propose a site.
- ✓ Obtain permission from the building owner/managers.
- ✓ Calculate your energy needs based on average and peak demands.
- ✓ EPA strongly recommends the completion of a comprehensive energy audit (completed by an auditor experienced in water/wastewater) as part of any energy management effort.
- ✓ Know your energy costs so you can negotiate savings.
- ✓ Consider adding grants and other rebates to increase your savings.
- ✓ Contact your utility to determine their requirements including: additional metering requirements and departing load charges which may affect your decision.
- ✓ Research the feed-in tariff guidelines for your energy provider and negotiate the terms. Consult the Federal Regulatory Commission's website for advice: <http://www.ferc.gov/industries/electric/geninfo/mbr/authorization.asp#skipnavsub>.
- ✓ Contact a PPA firm to get the ball rolling. Once you have chosen a firm, you can request preliminary designs and pricing.

Industry Advice:

- 💧 Before signing a PPA, consult other entities that have entered into a PPA with the power provider you're considering. This will give utilities a true indicator of their quality of work and customer service.
- 💧 To ensure better pricing for everyone over the term of the PPA, negotiate a joint³ Request for Proposal (RFP) and PPA. If the project is large enough, renewable energy companies will likely visit the site, draft preliminary designs, and estimate project costs.
- 💧 Consult an attorney who is familiar with renewable energy contracts.
- 💧 Ensure the "cap of power"⁴ is included in the PPA and that the RFP specifies the company that will be responsible for repairs and maintenance. Repairs and maintenance should be done in a timely manner; therefore, the contract should specify travel time, ability to obtain parts, etc.
- 💧 Negotiate the escalator (energy utility rate) based on past utility trends.
- 💧 Don't install more renewable energy than you need, unless the cap of power is included in the PPA.
- 💧 Ensure that the contract includes the latest renewable energy technology available by consulting with industry professionals and other entities that have entered into PPAs.
- 💧 Make certain that the project adheres to local planning and building codes.
- 💧 Set performance standards in the PPA. Provide incentives for equipment operation during times where grid power is most expensive and financially incentivize the PPA to reward outstanding performance.

² http://www.epa.gov/cleanenergy/documents/egridzips/eGRID2010V1_0_year07_SummaryTables.pdf

³ Joint meaning: a collaborative effort involving multiple facilities, cities within a county, etc.

⁴ The "cap of power" has to do with the Feed-in Tariff contractual guidelines. Will your utility be charged by its renewable energy provider for generating excess electricity? Can your utility sell the excess electricity back to the grid? If so, how much? These are questions that all utilities should try and answer.

Learn More:

California Solar Center: <http://www.californiasolarcenter.org/sppa.html>

EPA Webinar: http://www.epa.gov/greenpower/events/july28_webinar.htm

Solar Alliance: <http://www.solaralliance.org/home/index.html>

Solar Electric Power Association: <http://www.solarelectricpower.org/>

Solar Energy Industries Association: <http://www.seia.org/>

California Public Utilities Commission: <http://www.cpuc.ca.gov/PUC/energy/Procurement/Procurement/ppa.htm>

DOE Sample PPAs: http://www1.eere.energy.gov/femp/financing/ppa_sampledocs.html

Fuel Cell PPA Sample: <http://www.green.ca.gov/EnergyPrograms/FuelCells.htm>

Solar, Thousand Oaks RFP: <http://www.ci.thousand-oaks.ca.us/civica/filebank/blobload.asp?BlobID=13765>

Technical Assistance:

1) Solution Center: EECBG and SEP grantees and sub-grantees are eligible for technical assistance, which includes RFP reviews: <http://www1.eere.energy.gov/wip/solutioncenter/>.

The Solution Center's sidebar contains a wealth of information on various renewable energy systems including: events calendars, "peer-peer resources," project resources, case studies, and a guide to local governments.

2) NREL Technical Assistance Webinars: They provide information on state and local policies and programs affecting renewable energy and energy efficiency technology deployment, project financing, and technical innovations that can drive market growth: http://www.nrel.gov/applying_technologies/state_local_activities/webinars.html.

Technical Assistance: Utilities can request assistance in the following categories: program design, project assistance, contract assistance, financing policy and programs, planning, policy analysis, and skills development: http://www.nrel.gov/applying_technologies/state_local_activities/technical_assistance.html.