

US EPA ARCHIVE DOCUMENT



Renewable Energy Opportunities at Water and Wastewater Utilities



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.



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

Public-Private Partnerships (PPP)

Public-Private Partnerships provide an excellent avenue for water treatment facilities who are interested in procuring renewable energy systems. Municipalities can upgrade their infrastructure to meet public service needs with little to no upfront costs, typically through a power purchase agreement (PPA) with a third party developer. PPA's benefit utilities by establishing stable energy pricing (delineated in the contract) for a period commonly lasting 10-20 years; in return, the developer provides the upfront costs and maintenance for the desired renewable energy system. Aggregated purchasing among multiple facilities can provide additional savings from lowered transaction costs.

Benefits

- Little to no upfront costs
- Stable energy pricing
- No balance sheet burden
- No maintenance costs
- Performance risk tied to developer
- Greenhouse gas emissions reductions
- Lower operating costs
- Air quality permit compliance

Contract Considerations

- Define bonuses and penalties for over- and under-performance
- Establish performance requirements
- Contract length and termination conditions
- Define ownership of the renewable energy certificates (REC)
- Include cap of power and specify terms of maintenance to be managed by developer



Wastewater Facilities with Renewable Energy in the Pacific Southwest

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

Utility	Treatment Capacity (million gallons per day)	Estimated Annual Energy Savings	Generating Capacity, System Type	*Estimated annual CO ₂ reductions (million pounds)
Ina Road Water Pollution Control Facility (Tucson, AZ)	37.5	\$1,260,000	3.3 MW Cogeneration	31.0
Pinal Creek Wastewater Treatment Facility (Globe, AZ)	1.2	\$37,000	0.495 MW Solar	1.3
Hill Canyon Wastewater Treatment Plant (Thousand Oaks, CA)	14	\$60,000	0.860 MW Cogeneration	4.6
Hill Canyon Wastewater Treatment Plant (Thousand Oaks, CA)	14	\$200,000	0.750 MW Solar	1.2
Inland Empire Utilities Agency (Chino Hills, CA)	45	same price as grid	2.8 MW Fuel Cell	15.0
Moorpark Wastewater Treatment Plant (Moorpark, CA)	3	\$250,000	0.958 MW Solar	1.6
Santa Rosa Water Reclamation Facility (Murrieta, CA)	5	\$152,000	1.1 MW Solar	1.8
San Diego County Water Authority (San Diego, CA)	240	\$3,000,000	4.5 MW Fuel Cell	24.0
Twin Oaks Valley Water Treatment Plant (San Diego, CA)	100	\$85,000	1.8 MW Solar	2.9
San José-Santa Clara Regional Wastewater Facility (San Jose, CA)	167	\$4,000,000	1.4 MW Fuel Cell	7.5
Kihei Wastewater Treatment Facility (Maui County, HI)	7.5	\$500,000	1.9 MW Solar	5.9
TOTAL	634	\$9,544,000	20 MW	97.0

* CO₂ Calculations are based on 2009 eGRID subregion output emission rates (http://www.epa.gov/cleanenergy/documents/eGRIDzips/eGRID2012V1_0_year09_SummaryTables.pdf) for the Western Electricity Coordinating Council California (WECC). 730 (average hours in a month) x # of months (9 months for off-peak demand emissions + 3 months for peak demand emissions) x MW (project size) = MWh x (eGRID CO₂ lb / MWh) x capacity factor (25% for solar, 90% for fuel cells and cogeneration) = 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 and cogeneration have a high capacity factor and run during off-peak hours, we calculated peak demand as 540 hours and off-peak as 8,220 hours.

Resources

Solar

Sample PPA:

<http://ci.thousand-oaks.ca.us/civica/filebank/blobdload.asp?BlobID=13792>

Sample RFP:

<http://www.ci.thousand-oaks.ca.us/civica/filebank/blobdload.asp?BlobID=13765>

Solar Electric Power Association:

<http://www.solarelectricpower.org/>

Solar Energy Industries Association:

<http://www.seia.org/>

EPA overview on solar PPA's:

<http://www.epa.gov/greenpower/buygp/solarpower.htm>

EPA webinar on solar PPA's:

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



Biogas (Fuel Cell)

Sample PPA:

<http://ci.thousand-oaks.ca.us/civica/filebank/blobdload.asp?BlobID=13794>

Sample RFP:

<http://www.toaks.org/civica/filebank/blobdload.asp?BlobID=13793>

FEMP fact sheet:

http://www1.eere.energy.gov/femp/pdfs/bamf_wastewater.pdf

EPA overview:

<http://www.epa.gov/chp/markets/wastewater.html>

American Biogas Council:

<https://www.americanbiogascouncil.org/>



Facilities that serve rural communities (< 10,000 people) may be eligible for a USDA loan or loan guarantee:

<http://www.rurdev.usda.gov/UWEP/HomePage.html>

Technical Assistance:

- 🌿 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.
- 🌿 NREL Technical Assistance Webinars: Provides 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/tech_deployment/state_local_activities/webinars.html
- 🌿 NREL 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/tech_deployment/tech_assistance_cities.html