Local Government

Solar Planning and Implementation Guide

July 2017

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List of Acronyms and Abbreviations

CEC	California Energy Commission
CPUC	California Public Utilities Commission
CREB	Clean Renewable Energy Bond
FIT	Feed-In-Tariff
FITC	Federal Investment Tax Credit
kW	Kilowatt
kWh	Kilowatt-hour
MW	Megawatt
NEM	Net Energy Metering
NEMA	Net Energy Metering Aggregation
NPV	Net Present Value
NREL	National Renewable Energy Laboratory
O&M	Operation & Maintenance
PCIA	Power Charge Indifference Adjustment
PPA	Power Purchase Agreement
PV	Photovoltaic
QECB	Qualified Energy Conservation Bond
REC	Renewable Energy Credit
ReMAT	Renewable Energy Market Auction Tariff
RES-BCT	Renewable Energy Self-Generation Bill Credit Transfer
RFP	Request for Proposal
RFQ	Request for Qualifications
SGIP	Self-Generation Incentive Program
TOU	Time-Of-Use
TEML	Tax Exempt Municipal Lease

Introduction & Opportunity

This report identifies opportunities available to local governments should they choose to pursue solar energy project(s), and provides direction on how to implement those projects. This document summarizes technical considerations for developing solar energy on local government lands and facilities by addressing the following topics:

- Solar Photovoltaic System Types
- Interconnection & Rate Structure
- Bill Credit Programs, Tariffs, and Tax Credits
- Financing Method
- Procurement Process
- Risks and Risk Management
- Case Studies
- Conclusion and Next Steps

Solar Photovoltaic System Types

Community-scale solar projects (those that are larger than small private installations, but smaller than large utility installations) most commonly take the form of three different Photovoltaic (PV) system types: Ground Mounted, Rooftop, and Carport. Each system will require a different approach, considerations, and site selection criteria. Table 1, Table 2, and Table 3 provides these criteria and other important considerations.

Table 1: Ground Mounted System Description

Criteria	Description
Space Requirements	1 MW of ground mounted solar requires roughly 4-5 acres of land.
Solar Resource	Solar resource can be defined as the amount of solar irradiation that falls on a given area of land. Areas with more sun exposure have the ability to collect more sunlight, and thus produce more energy. Factors that affect the solar resource of ground mounted systems include shading from nearby trees or buildings, the slope of the land, and the orientation of the land.
Technical Design & Performance	Panel efficiency can increase or decrease energy yield. The performance of a PV module will decrease over time due to environmental conditions in a process called degradation, and have a useful life of about 25 to 30 years. Modules can be either mounted on fixed-angle frames or on sun-tracking frames; fixed frames are cheaper and require less maintenance, but tracking systems can increase yield by up to 45%. Other important components of ground mounted systems that will affect production efficiency are transformers and inverters.
Interconnection Restraints	Proximity and access to the transmission infrastructure, as well as the capacity of the transmission lines, are important considerations and potentially limiting factors for ground mounted systems. The site must also contain an agency owned meter.
Permits & Licensing	Different land use ordinances, zoning requirements, and permits (e.g. electrical and building) must be taken into consideration for a ground mounted system.
Environmental Concerns	The project must comply with CEQA guidelines and will require an Environmental Impact Assessment. Avoiding sensitive ecological, cultural, and scenic resources is crucial. Ground mounted systems are often put on land that has already been disturbed.
Site Ownership	The project owner must obtain exclusive rights to build the solar project if they are not the property owner, and the developer must have full access to the site. This is usually negotiated through a land lease agreement with the property owner and/or site host.

Table 2: Rooftop System Description

Criteria	Description
Space Requirements	The space requirements for rooftop varies depending on panel efficiency and location, but a rough estimate is about 100 square feet for 1 kW of solar. Larger roofs have the ability to support larger PV systems, and can take advantage of economies of scale.
Solar Resource	The orientation of the roof is a significant factor of the solar irradiation that a roof receives. Solar irradiation is best captured by south facing or horizontal surfaces, and while most roofs were not made with this in mind, most of the solar energy can be captured by roofs that are facing within 30° of true south. Shade free roofing is optimal.
Technical Design & Performance	Technical considerations for rooftop panels are similar to ground mounted PV systems. One important consideration for rooftop is the condition of the roof and its expected lifetime. PV panels typically have a 20-25 warranty and a slightly longer lifetime. If the life of the roof does not extend beyond the life of the solar panels, the PV system should not be built. Scheduled repair of the roof should also be considered if it falls within the useful life of the PV system.
Interconnection Restraints	Grid connection for rooftop systems is usually not an issue as the PV system is almost always close to the facility meter.
Permits & Licensing	Rooftop systems typically avoid land-use and zoning requirements for new development, but might require more extensive permitting procedures and structural review (e.g. building, electrical, etc.).
Environmental Concerns	Rooftop solar arrays do not require the extensive environmental review that ground mounted systems must undergo.
Site Ownership	Agency owned buildings should be primarily considered for a rooftop system.

Table 3: Carport System Description

Criteria	Description
Space Requirements	Carports are raised solar arrays, tall ground mounted systems that are installed in existing parking lots and require additional materials for structural support. Carports offer a unique opportunity to transform unused, previously disturbed land into a source of renewable energy, and can be utilized at facilities that do not have a sufficient roof or nearby land capable of supporting other systems.
Solar Resource	Same as ground mounted.
Technical Design & Performance	Carports are typically more expensive and take slightly longer to build than rooftop systems. Carports provide shading for cars and go hand in hand with Electric Vehicle integration, often combined with EV charging infrastructure.
Interconnection Restraints	Grid connectivity issues are often not an issue, as long as the facility has an agency owned meter.
Permits & Licensing	Same as ground mounted systems.
Environmental Concerns	For existing parking lots, environmental concerns are generally minimized due to the fact that parking lots offer no environmental benefit.
Site Ownership	Same as ground mounted systems.

Interconnection & Rate Structure

There are many factors and technicalities that must be taken into consideration when connecting the power system to the grid. For ground mounted systems specifically, grid proximity, access, and capacity are important when selecting a site. Sites that don't have direct access to the grid will require new transmission and distribution infrastructure to be built, at the expense of the agency. The agency must also ensure that the infrastructure has the capacity to support the PV system being installed; this is a potential limiting factor for site selection and system size for ground mounted systems. Additionally, the site will require an agency owned meter, a necessary component to measure the amount of energy that is exported to the grid.

Interconnection procedures for projects in PG&E territory are laid out in Electric Rule 21, a tariff that describes the interconnection, operating and metering requirements for distributed generators, as well as the fees associated with interconnection. The agency must apply to interconnect with PG&E's distribution grid using a Rule 21 application. Interconnection fees are waived entirely for Net Energy Metering (NEM, see Section 4.3 for

Battery Storage

Battery Storage is a type of energy storage system that stores excess energy generated from a renewable system and releases the energy during periods of peak load, resulting in a more leveled load profile and lower demand charges in peak periods. Battery storage can be especially effective when employed as part of an incentivized demand-response program. Recent advancements in energy storage technology, particularly in lithium-ion and flow batteries, have dropped the price of battery storage systems significantly over the past decade, making battery storage and PVs a more accessible option. Incentives are currently available to help offset the cost of battery storage. Starting May 2017, the California Public Utilities Commission's (CPUC) Self-Generation Incentive Program (SGIP) alone is allocating a total of $447 million to energy storage applicants through 2019.

Microgrids

A microgrid is an integrated energy system with local loads, generating assets and energy storage devices. These systems include solar arrays, microgrid controllers, management software, and battery storage. The benefits of having such a system is utility bill savings and energy system redundancy and independence in the case of a power outage.

more information), and are waived up to $5,000 for solar projects that are less than 1 MW and do not sell the energy back to the grid. Projects that do not fit these criteria may be subject to significant fees over the duration of the project's implementation. PG&E also has a pre-interconnection application that provides a first analysis of interconnection capacity and constraints. The pre-interconnection application costs $300 and would be used to ensure project feasibility prior to releasing a Request for Proposal (RFP) (if the site has already been selected) or submitting a full interconnection application.

Rate structure can have a significant impact on a solar project's financial performance. With on-site solar projects, the facility will most likely be on an E-19 or E-20 rate structure, which require three consecutive months of peak demand of greater than 499 kW and 999 kW, respectively. Option R, available to E-19 and E-20 rate payers, requires that at least 15% of the annual energy consumption comes from on-site solar power. Under Option R, the demand charges are reduced and generation charges are increased – meaning the price for kWh will increase, but peak demand charges are significantly reduced. This is beneficial to NEM solar facilities that produce energy on off-peak times but still consume energy at peak demand.

Bill Credit Programs, Tariffs, and Tax Credits

Several bill credit programs, tariffs, and tax credits are available for local governments to take advantage of; however, the recent enrollment increases for some of these programs places pressure on potential local governments to implement renewable energy projects and enroll for participation in these programs before their program caps are met.

Net Energy Metering

NEM is a special billing arrangement that provides credits to customers with renewable energy (usually PV) for the full retail value of the electricity their system generates. Excess electricity generated by the system that is not used by the customer goes through their meter and back to the utility, earning a credit for the customer's account. At the basic level, NEM applies to one system and one meter. NEM is most common for residential PV systems, but can be utilized by local governments for larger solar projects as well.

In 2016, a new statewide net metering policy, referred to as Net-Metering 2.0 was created by the CPUC. While the fundamental mechanism for crediting solar system owners for excess generation remains the same, Net-Metering 2.0 contains a few changes, including mandating time-of-use (TOU) rates for solar customers and requiring solar customers to pay non-bypassable charges on all electricity consumed from the grid. PG&E's new TOU rates value electricity highest in afternoons and evenings, when most solar systems are not producing electricity.

Net Energy Metering Aggregation

Net Energy Metering Aggregation (NEMA) allows one renewable generator, the Generating Account, to earn credits which can then be applied to an arrangement of Aggregated Accounts. The aggregated accounts must be on property adjacent to the renewable generator, and must be under the same ownership as the generating account. The generator is limited to a capacity of 1 MW. This option gives more flexibility when choosing solar project sites because the PV system can share its credits between multiple sites, providing opportunities for larger PV systems and economies of scale.

The Renewable Energy Self-Generation Bill Credit Transfer Program

The Renewable Energy Self-Generation Bill Credit Transfer Program (RES-BCT) was established in 2009 and is administered by Investor Owned Utilities. It allows a local government with one or more renewable energy generating facilities to export energy to the grid and receive generation credits (bill credits) that offset electricity bills at other "benefitting" accounts owned by the same local government. In effect, it is NEM with the advantage of being able to apply the bill credits to facilities that are not on or adjacent to the generating facility. Up to 50 sites, called Benefiting Accounts, can receive the bill credits earned by the Generating Account. RES-BCT allows a local government to choose the best renewable energy site in its jurisdiction, qualified by both solar resource and economic viability, and simultaneously offset its most expensive facilities.

An agency may choose to directly purchase the PV system, or buy the resulting energy from the third-party developer who can retain ownership. There is a maximum capacity of 5 MW per generating account – which is much larger than other bill credit program capacities – allowing the local government to take advantage of economies of scale and secure better project pricing.

There are certain limitations to RES-BCT. For one, the bill credit may only be applied to the generation component of a facility's electricity bill, and not the demand charge. The bill credit is also subject to a departing load fee, called the Power Charge Indifference Adjustment (PCIA).

The PCIA is deducted from the generation component of the bill, and is calculated annually. The purpose of the PCIA is to reimburse PG&E for costs incurred on behalf of the departing load.

As of the first quarter of 2017, PG&E has 23 customers that are utilizing RES-BCT, and has met 49.3 MW of the 105.25 MW program cap. According to PG&E's website as of June 2017, "Of the cap of 105.25 MW, 49.3 MW has been fully subscribed interconnected and in the midst of the interconnection process."

Feed-In-Tariffs

A Feed-In-Tariff (FIT) offers a guarantee of payments from the Investor Owned Utility to the renewable energy developer for the electricity produced, generally awarded as a long-term contract set over a period of 15-20 years. This policy could be utilized by an agency should it wish to generate a revenue stream from its renewable energy production. Currently, the FIT program offered by PG&E is the Renewable Energy Market Auction Tariff (ReMAT). ReMAT offers 10, 15 or 20-year power purchase agreements (PPAs) to purchase wholesale power generated from small renewable energy projects sized up to and including 3 MW (AC).

Federal Investment Tax Credit

The Federal Investment Tax Credit (FITC), also referred to as the Solar or Commercial ITC, allows non-public owners of renewable energy systems to take a one-time tax credit for a percentage of qualified installed costs. Local governments with tax-exempt status can still take advantage of the ITC by hiring a third party developer with a tax appetite to collect the ITC – often done through a PPA. Currently the tax credit for solar is 30%, however the ITC will sunset to 26%, 22%, and 10% during the years 2020, 2021, and all future years, respectively.

The FITC is currently the only incentive that a public agency is likely to receive. The California Solar Initiative was a rebate program offered by the State, but is now closed. The price of solar has decreased since then and such a rebate is not necessary to make a project economically feasible.

Financing Methods

There are two main routes for financing a mid-scale solar project: Third-Party Ownership and direct Ownership.

Third-Party Ownership

Local governments can secure solar projects through financing arrangements in which the developer of the project ends up being the owner, as well. The two most common arrangements are (PPAs) and Solar Leasing. An agency is still eligible to enroll in the RES-BCT or NEM programs, should it choose to do so, through third-party ownership.

Power Purchase Agreements

A PPA is a long-term contract in which a solar purchaser buys power from a project developer at a negotiated rate for a specified term without taking ownership of the system. A PPA is arranged between two or three parties: the developer, the recipient or customer, and an investor. The developer procures, builds, and operates the system, and can either invest tax equity into the project themselves or sell the system to a tax equity investor. The investor, who has a tax appetite, can take advantage of the FITC (described above). The investor monetizes the tax incentives and leases the project to the developer, who then passes on these savings to the recipient in the form of a lower electricity rate through the PPA.

Power Purchase Agreement Advantages:

1. No/low up-front cost.
2. Allows tax-exempt entity to benefit from federal tax incentives.
3. A predictable and lower cost of electricity for 15–25 years.
4. No need to deal with complex system design and permitting process.
5. No operating and maintenance responsibilities.

Through this agreement, the recipient can achieve lower long-term electricity rates than are often offered by its utility company. The PPA specifies the annual escalator, or how much the price of the electricity increases each year, which is often less than the price increase from a utility provider. The PPA also specifies the buy-out terms, which provides terms in which the system can be purchased, removed, or amended into another PPA at the end of the life of the contract (usually 15-20 years). According to Kyle Kearney, the VP Product Development of

Borrego Solar, PPAs are the dominant form of financing for local governments, but do not always provide the highest overall savings compared to other financing options.

Solar Leasing

A solar lease allows a local government to benefit from a PV system in exchange for monthly lease payments, usually on a 15-20 year lease agreement. The combination of known lease payments and lower electricity bills typically leads to an immediate reduction in electricity costs and provides increased savings over time. At the end of the lease, an agency will have the option to purchase the system at a reduced cost, renew the lease, or remove the system. A lease has virtually the same advantages as a PPA.

Direct Ownership

An agency also has the option to finance the project and directly purchase the PV system. Under this scenario, a local government can choose to enroll in a bill credit program, such as RES-BCT, or sell the electricity it generates, creating a source of revenue. An agency will also retain ownership of the Renewable Energy Credits (RECs) – tradable, non-tangible energy commodities – that its project generates. While operation and maintenance (O&M) and system removal are typically handled by the developer and specified in a PPA or lease, this is not always the case for a scenario in which the system is purchased. Under a direct purchase scenario, O&M can be handled by the developer, for a fee, or remain under local government control. The agency will be in charge of removing the system at the end of its life.

Direct Purchase Advantages:

1. Potentially the best long-term savings and lowest levelized cost
2. Savings expected to increase over time
3. Direct control over asset
4. Local government retains RECs and environmental attributes
5. Local government receives any non-tax based incentives and rebates

Public agencies can fund renewable energy projects through energy-specific loans and bonds issued by the state and federal government. Financing opportunities are available to local governments at competitive interest rates and can allow solar projects to be funded with zero capital investment. Table 4 describes the different financing options.

Table 4: Solar Financing Options

Loan or Bond	Description
California Energy Commission 1% Loan	The CEC offers 1% loans for energy efficiency and renewable energy projects, including mid-scale solar projects, for public entities. The loan is capped at $3 million and can cover 100% of project costs. As of June 2017, the remaining funds available are $311,000, with zero applicants on the waiting list. The next major replenishment of funding will be between $6 and $7 million and is expected in December 2017.
Qualified Energy Conservation Bonds (QECBs)	A QECB is a tax credit bond that enables local government issuers to borrow money at attractive rates to fund energy conservation and renewable energy projects. It is among the lowest-cost public financing tools because the U.S. Department of the Treasury subsidizes the issuer's borrowing costs. As of August, approximately 39% ($1.32 billion) of the $3.2 billion in funds have been issued.
Clean Renewable Energy Bonds (CREBs)	Clean Renewable Energy Bonds may be used by entities primarily in the public sector to finance renewable energy projects. CREBs are tax credit bonds that allow the bondholder to receive a federal tax credit, and for the issuer to receive a direct subsidy. The bond must be issued within 3 years after the applicant receives notification of an approved allocation. As of March 2016, over $450 million of funding remained for CREBs, with an expected 1-1.5% interest rate.
Tax-Exempt Municipal Leases (TEMLs):	In a TEML, the lease provider does not pay taxes on the lease revenue, which allows lenders to offer very low interest rates to public entities. Current rates fall in the 2-3.5% range with 15-25 year lease terms. It is a simple financing structure which allows the financing agreements to be finalized faster and reduce transaction costs. The least can also be paid off early. Projects must be at least $2 million.

Procurement Process

A solar "Request for Proposal" outlines the PV product or service requirements, the contract terms, and the bidding process. Once the proposals are received, they are evaluated according to the goals of the issuing agency and a vendor is selected. The RFP would differ between different ownership scenarios. In a direct ownership scenario, the local government would issue an RFP to select a solar developer who would design, procure, install and commission a project.

Solar Project Phases:

1. Feasibility Analysis
2. Project Development
3. Construction
4. Operation & Maintenance
5. Decommissioning or Exit Strategy

In the case of third-party ownership, a local government would request bids that are based on the PPA pricing, the annual price escalator, production guarantees, buy-out options and end of term options. Once a solar PPA provider is selected, it is the solar company that will contract and

pay for the actual installation of the system. It is important to have clearly defined goals before issuing an RFP. Individual project goals will affect how each proposal is evaluated.

Steps of the Solar Procurement Process:

1. Develop a Request For Proposal (RFP)
2. Issue the RFP
3. Administer the RFP
4. Evaluate bids based on predetermined criteria
5. Selecting the winning bidder

A Request for Qualifications (RFQ) can be substituted for an RFP if the local government wishes to integrate multiple solar projects simultaneously. This method of procurement streamlines the process of project development by selecting one vendor who can design and install all of the PV systems. If an agency should wish to incorporate a battery storage system with its PV system, they should be procured simultaneously. This has the following benefits: (1) It keeps the soft costs lower overall because the local government is only hosting one site walk; (2) The sizing of the systems depends on each other, with some optimization that takes place (3) The storage system is eligible for the 30% ITC as long as it is charged at least 75% by the solar array.

Risks and Risk Management

Undergoing a solar project does not come without risk. Site risks can involve CEQA compliance, geotechnical factors, and infrastructure constraints. Climate and weather variability is another risk that can affect the overall economic feasibility of a PV system. These risks can be mitigated by choosing an experienced solar developer who has demonstrated familiarity with similar projects.

Perhaps the most pertinent risks to solar projects in California are policy and regulatory changes. As the state with the most aggressive renewable energy goals, California's energy policies and tariffs will be in constant revision over the next decade. Policies such as the departing load fee, or (PCIA), is calculated behind closed doors using controversial methods, and currently has no regulation to restrict its increase. The PCIA is a critical factor for making a solar project "pencil out", and can make it hard to predict the long run financial success of a project. Along with the PCIA, rate structure is an important factor that can significantly impact financial performance. An additional regulatory risk is potential changes to time-of-use" rates that could reduce the value of energy sold back to the grid and therefore affect the overall financial performance of a project.

Case Studies

The following case studies give insight into mid-scale solar projects completed by other Counties and local stakeholders.

Ventura County

Since 2011, Ventura County has put in four 1 MW solar projects – three ground mounted systems and one carport system. The County also has various, smaller rooftop projects that were either previously installed or are in the works. The Ventura County General Services Agency and Public Works Department have a philosophy and practice of putting solar on new County buildings, or buildings with new roofs, if it is feasible. By doing so, they cut costs on facility costs and place emphasis on sustainability as a County objective.

All projects utilize NEM and were installed by REC Solar, with the initial site selection having been done internally. The GSA lead the charge on the projects, and picked sites that were 24 hour facilities, have high load profiles, have good solar resource, and had the available land and proximity to the facility. The County received about a $1 million rebate per project from the California Solar Initiative, and chose to retain ownership of all of the projects. Two of the projects were funded with money set aside for renewable energy deployment, and the other two were financed with bonds. Table 5 provides additional detail.

1 MW Ground Mounted solar array at the Todd Road Jail Facility in Santa Paula. Photo courtesy of Ventura County.

By selecting a project developer based in San Luis Obispo County, Ventura was able to support regional jobs and economic activity. Interestingly, a representative from Ventura mentioned that their sustainability initiatives had also helped them to achieve a higher credit rating as a County.

The Department of Energy selected Ventura County as a case study for their SunShot Solar Outreach Partnership. In the study, the following takeaways from Ventura's solar experience are listed:

- Involve the local utility from the beginning.
- Hire seasoned design-build contractors, and consider experience and reputation, as well as cost.
- Establish a central point of contact and a project manager to coordinate communication and project implementation.
- Ensure that long-term concerns (e.g., routine maintenance) are clearly addressed during the planning phases, and that responsibility for such concerns is assigned from the beginning.

Table 5: Ventura County Solar Projects

Site	Type	Acquisition Method	System Size (MW)	Annual Energy Generation (KWH)	Program
Wastewater Treatment Plan, Moorpark CA	Solar	Owned	1.0	1,704,000	NEM, CSI
Tod Road Jail, Santa Paula CA	Solar	Owned	1.0	1,704,000	NEM, CSI
Government Center, Ventura CA	Solar	Owned	1.0	1,704,000	NEM, CSI
Juvenile Justice Center	Solar	Owned	1.0	1,704,000	NEM, CSI
Saticoy Operations Yard	Solar	PPA	0.2	262,416	N/A
Saticoy Operations PWA	Solar	PPA	0.2	306,720	N/A
Vanguard	Solar	PPA	0.2	267,530	N/A
Total:			**4.6**	**7,652,666**	
Note: CSI stands for California Solar Initiative, which used to provide rebates for solar projects.					

Yolo County

In 2010, Yolo County was paying $1.4 million for its electric bill. By using various financing techniques, Yolo County created a revenue stream that completely eliminated its electric bill. It now produces 152% more energy than it consumes, and sells its excess electricity back to PG&E through a FIT for profit. The County started with a 1 MW ground mounted PV system on its

Justice Campus using NEM to offset bill charges for three nearby buildings. Site selection was done in-house and without the aid of outside consultants. The PV system was financed with funding from a combination of federal and state financing sources, including a CEC loan, Clean Renewable Energy Bonds (CREB), and Qualified Energy Conservation Bonds (QECB). The system is estimated to earn $10 million over 25 years. Table 6 provides additional detail.

5 MW Ground Mounted solar array at the Grasslands Regional Park in Davis. Photo courtesy of Yolo County.

In 2013, 5.8 MW of ground mounted PV systems were installed. These systems use RES-BCT to offset electricity charges for several County facilities, and also sell energy back to PG&E.

Yolo County secured $23 million of zero-capital investment for its renewable projects, and is estimated to earn $60 million of projected revenue over 35 years from the projects. Yolo has received national recognition and acclaim for its success in becoming a net-positive electrical consumer. It received the EPA's Green Power Leadership Club Award, as well as the Green California Summit Leadership Award. It has also been distinguished by the Wall Street Journal and the National Renewable Energy Laboratory (NREL).

Table 6: Yolo County Solar Projects

Site	Type	Acquisition Method	System Size (MW)	Annual Energy Generation (KWH)	Program
Health Building, Woodland	Solar	Owned	0.2	250,000	NEM
Beamer Cottonwood, Woodland	Solar	Owned	0.8	1,304,818	NEM
Justice Campus, Woodland	Solar	Owned	1	2,230,186	NEM
Grasslands, Davis	Solar	Owned	2.5	4,983,167	RES-BCT
Grasslands, Davis	Solar	Owned	2.5	4,983,167	E-PWF
Total:			**7.0**	**13,751,338**	

Santa Clara County

In 2008, Santa Clara County formed a Renewable Energy Taskforce that was in charge of auditing, identifying, and documenting County facilities and opportunities for renewable energy deployment. In the same year, they entered into a Joint Procurement Agreement with eight other public agencies in the South Bay. A Memorandum of Understanding was signed by all participating agencies to indicate their agreement to participate in the electric power procurement process.

After eligible sites were selected by third party consultants, an RFP was issued for the development of PV systems. The RFP bundled the sites by size so that projects of similar sizes were bid on simultaneously by developers. The agencies selected Borrego Solar and Ecoplexus to develop about 6 MW of solar projects, half of which were carport and the other half rooftop. The projects were originally going to be financed through a joint PPA, but the County managed to secure a QECB which was applied to about 4 MW which are now County-owned. The other 2 MW, financed through a PPA, are owned by the developers. No upfront capital was used to build the projects; however, County development funds were used to cover the costs of consultants. The County utilized NEM through PG&E for all 6 MW of production to offset their electrical costs at the sites of their solar projects. These costs are offset with bill credits earned through the power that is generated by their PV systems.

706 kW carport PV installation at the Gilroy Health Center. Photo courtesy of Santa Clara County.

441 kW carport PV installation at the Valley Health Center in San Jose. Photo courtesy of Santa Clara County.

In 2014, Santa Clara County looked into more options for renewable energy. Without partnerships from any other public agencies, the County issued a RFQ for renewable energy developers. Out of 10 responses, the County selected SunPower. The two entered a development agreement in which SunPower took one year to identify project sites and design the PV systems for the sites. This analysis was performed for free, in exchange for exclusive rights to build the projects. Six sites were selected, totaling 11 MW of capacity (see table below). All of the projects will be ground mounted PV systems. The projects were arranged to be financed through a PPA, but the County once again secured federal financing, this time in the form of aCREB. The contracts were renegotiated so that the County owned all of the projects. An ongoing O&M agreement was signed with SunPower, giving SunPower responsibility of O&M. The projects are expected be completed in late 2016.

Santa Clara's newest installment of renewables utilizes PG&E's RES-BCT program. The RES-BCT program allows energy generated at one site to earn bill credits that can be used to offset electricity bills at other County owned sites. Of the 6 projects, 5 are using RES-BCT. Santa Clara County identified about 50-60 benefitting accounts that would be suitable to receive the bill credits from the solar projects. Of these, about 3 dozen were selected.

In total, the projects will account for about $3 million in bill charges. It should be noted, however, that these refer to the generation component of electricity bill, which is usually around 50-60% of the total bill. Other important considerations that were taken into account for the economic feasibility of this project were the electric rate schedules of the facilities that are hosting the sites, and the PCIA. The PCIA, for example, was $0.01 per kWh at the start of the projects, but has been raised to $0. 23 since then – a 130% increase. Table 7 provides additional detail.

Table 7: Santa Clara County Solar Projects in Construction or Recently Completed

Site	Type	Acquisition Method	System Size (MW)	Annual Energy Generation (KWH)	Program
Hellyer Landfill, San Jose	Solar	Owned	2.7	4,521,825	RES-BCT
Malech Road, San Jose	Solar	Owned	3.8	6,359,265	RES-BCT
Guadalupe Expressway, San Jose	Solar	Owned	2.1	3,416,490	RES-BCT
Reid Hillview Airport, San Jose	Solar	Owned	1.0	1,722,600	RES-BCT
San Martin Airport, San Martin	Solar	Owned	1.3	2,239,380	RES-BCT
Holden/James Ranch, Morgan Hill	Solar	Owned	.4	732,105	NEM-A
Total:			**11.3**	**18,991,665**	

Alameda County

Alameda County has implemented a broad range of renewable energy projects. The County installed its first solar electric system on the Santa Rita Jail in 2002. By August 2005, Alameda County had installed eight PV systems totaling over 1.3 Megawatts. Table 8 provides additional information.

Table 8: Santa Clara County Solar Projects in Construction or Recently Completed

Site	Type	System Size
Santa Rita Jail	Rooftop	1.18 MW
Office of Emergency Services	Rooftop	117 kW
Winton Avenue Government Building	Rooftop	234 kW
Wiley Manual Courthouse	Rooftop	85 kW
Environmental Health Services	Rooftop	97kW
Hayward Public Works	Rooftop and Solar Tracking Carport	303kW
Fremont Hall of Justice	Rooftop and Solar Tracking Carport	250kW

California Polytechnic State University

Cal Poly recently broke ground on a solar farm that will generate renewable energy, create Learn by Doing opportunities for students, and save the University millions of dollars. The 18.5-acre solar farm is slated for completion in winter 2017. It will include more than 16,000 individual solar panels with a capacity of 4.5 megawatts (AC) and will generate more than 11 million kWh per year — enough to power more than 1,000 homes, or about 25 percent of Cal Poly's total needs.

The solar farm will use single-axis tracking technology to follow the sun across the sky, producing approximately 30 percent more energy than a stationary system and help mitigate risks of changing time-of-use periods. In addition to the energy and environmental benefits, the energy produced by the solar farm will result in direct savings on Cal Poly's utility bills totaling about $17 million over 20 years. The solar farm is being financed by REC Solar via a PPA, which allows Cal Poly to purchase energy at a lower rate, without paying any upfront costs for the system construction and maintenance.

Cal Poly utilized staff to conduct much of the initial site selection of using Google Earth Pro and an online PG&E interconnection tool. The initial project concept was then presented to the Vice President and President of Cal Poly, who provided approval to proceed with project development. Consultants were used to verify the feasibility of the site, help develop the RFP, and negotiate the contract. A CEQA analysis was completed before issuing the RFP.

The RFP specifies a PPA as the financing method for the project, allowing Cal Poly to take advantage of the 30% ITC. The RFP uses a Cost after Qualification process, in which the vendor submits their bid package with their qualifications and pricing in separate sealed envelopes. The qualifications of the vendors are evaluated based on a set of criteria, and after a vendor has been qualified, the pricing envelope is opened. The vendor proposal with the highest project Net Present Value (NPV) will enter contract negotiations.

Cal Poly chose to apply for the RES-BCT tariff for several reasons: it allows the energy to be generated away from campus while still offsetting campus bills, the system can be up to 5 MW, and the generated energy is valued at a commercial rate instead of the campus rate (which is lower than the commercial rate). Interestingly, Cal Poly has one major main campus benefitting account because it has its own substation, and is thus billed as one account. The campus substation account has a non-export service agreement with PG&E which means that only 50% of its minimum load can be generated from onsite resources without active load management.

The project is subject to PCIA and other related charges. Overall, the project uses a Design-Build-Operate-Maintain model.

Conclusion and Next Steps

Local governments throughout California have a pressing opportunity to take advantage of the solar resources at its disposal. Programs like RES-BCT and NEM, and incentives such as the FITC, are time sensitive and will become less attractive or phase out in the near future.

The first step to move forward with a solar project is for a local government to start the site selection process. Identifying a project site can be done through 1) in-house GIS analysis, or 2) contacting a solar developer or consultant. There are also numerous free tools available, such as the PV Watts solar resource identifier from NREL, Google Earth, and an online PG&E interconnection and capacity verification tool.

Following site selection, an RFP can be issued to solicit project proposals from solar developers. Concurrently, a local government can start the application for energy-specific bonds (e.g. QECB, CREB, and CEC Loan) should it wish to do so. The outcome of these steps will be a clean, local, and dependable source of energy that reduces costs, generates revenue, supports the local economy, and achieves important policy goals.