Visalia Solar Strategy

Increasing Renewable Energy Sources Utilized in the City of Visalia

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1.0 INTRODUCTION

The City of Visalia ("City") strives to maximize financial efficiency through the identification and implementation of cost-saving measures. In a market of rising electricity costs and legislative demand for renewable energy utilization, the City can reduce expenses while maintaining an environmentally conscious community. The City has undertaken a number of endeavors that have resulted in energy efficiencies, water conservation, recycling, and the use of alternative fuels.

The purpose of this document is to present the City's current understanding of financially-feasible renewable energy opportunities and to recommend a strategy for decreasing the City's electrical expenses through the increased utilization of renewable energy sources within Visalia's energy supply. Renewable energy sources, specifically photovoltaic (PV) solar energy systems, generally have several positive attributes, including the following:

- ✓ Predictable and stable cost structures – less exposure to fossil fuel price fluctuations
- ✓ Immediate cost reductions –reduced expenses when peak consumption is reduced by local power generation
- ✓ Low long-term costs – renewable energy sources are becoming increasingly cost-effective when viewed over the life of the energy source
- ✓ Essential environmental benefits – fewer greenhouse gas (GHG) emissions and less air pollution

Through the strategic deployment of financially-feasible solar projects, the City intends to reduce operating expenses, reduce future exposure to rising electricity costs, lower GHG emissions, and reduce the City's overall dependence on traditional energy sources. With a diversified energy infrastructure, the City can ensure financially efficient municipal operations in a future of rising electricity costs and increased demand.

2.0 BACKGROUND & NEED

The City proposes to be a renewable energy leader in the San Joaquin Valley through an integrated effort to lead by example and encourage cities, businesses and citizens to take steps improve energy efficiency and implement financially feasible renewable energy technologies. The City established the Natural Resource Conservation Division (Natural Resources) in 2007 to bring a greater guidance and a proactive approach to the City's resource protection efforts. Natural Resource's primary focus includes issues related to the following: water conservation, groundwater recharge, air quality, GHG reductions, energy efficiency and alternative energy, solid waste diversion (recycling/reuse), household hazardous waste, and other sustainability issues for the City. Natural Resources will be the lead in implementing the Visalia Solar Strategy, and will work collaboratively with other City departments to recommend and implement projects and policies that further the utilization of renewable technology in the community of Visalia.

2.1 Existing Strategies

There are a variety of planning tools and strategies utilized by the City to enhance the present and future quality of life in Visalia. Natural Resources understands the value in a holistic approach to strategic planning, and developed this strategy to complement other City and community planning efforts. The following is a summary of existing and/or pending projects with the potential to impact the deployment of solar in Visalia.

Energy Action Plan

Successful energy strategies include energy efficiency as the initial focus and then the generation of energy through renewable sources once energy efficiency opportunities have been utilized. To address energy efficiency, the City is completing an Energy Action Plan (EAP). The EAP demonstrates the City's commitment to creating and implementing energy efficiency goals and policies affecting local government operations. The primary objective of the City municipal EAP is the cost-effective reduction of electrical energy consumed by municipal operations. The EAP provides a framework for decision making regarding efficiency measures that result in the reduction of energy consumption and associated GHGs, in a manner consistent with the objectives of the California Public Utility Commission's (CPUC) California Long Term Energy Efficiency Strategic Plan (CEESP) and Assembly Bill 32 (AB 32). The City is aggressively pursuing energy conservation across its municipal operations and will continue to seek additional efficiencies that produce long-term cost savings.

The City is also interested in expanding its renewable energy generation capacity using the latest solar and other emerging technologies. However, the City is looking first to efficiency for reducing future energy demand before investing heavily in new renewable sources. This approach is consistent with the State of California's vision for long-term energy planning, as expressed in the CEESP. [1] The strategies of the EAP complement this strategy, and the two plans will be implemented in conjunction to ensure energy efficiency and renewable energy utilization.

Climate Action Plan

The City is preparing a draft Climate Action Plan (CAP), which includes energy and GHG inventories for the community and for municipal government operations. It is estimated that electricity accounts for 25% of Visalia's municipal emissions with approximately 232,586 MT CO2e (metric tons carbon dioxide equivalent) of emissions in the baseline year of 2005. The CAP builds on the framework of Visalia's General Plan with more specific actions that will be applied to achieve emission reduction targets consistent with California legislation. Natural Resources is working collaboratively with the Community Development Department to complete the CAP and coordinate GHG reduction measures with the strategies identified in the EAP and this solar strategy.

[1] City of Visalia Municipal Energy Action Plan, Environmental Science Associates and DNV KEMA, December 2012

Solar Roadmap

The City participated in the Southwest Solar Transformation Initiative (SSTI), part of the U.S. Department of Energy's (DOE) Rooftop Solar Challenge. SSTI represented a regional team of public and private partners committed to advancing solar power adoption across participating municipalities within the Southwest region. SSTI targeted communities in the Southwest because the solar resource is abundant, but its enormous potential has been largely untapped. The focus of the program was to drive solar market maturity via significant improvements in 5 key areas: Permitting, Planning and Zoning, Interconnection, Net Metering and Financing. Through this collaboration, a Solar Roadmap was developed for the City, and various components of that roadmap have been incorporated into this strategy. The Council recently authorized participation in Phase II of the DOE's Rooftop Solar Challenge, which will provide additional resources to advance the deployment of rooftop solar in Visalia and surrounding communities.

2.2 Local Need: Internal and External Factors

Summary of Electrical Consumption & Associated Fiscal Implications

The City of Visalia has approximately 630 Southern California Edison (SCE) electricity accounts. SCE accounts include City buildings and parks, landscape and lighting districts, streetlights and traffic signals, the Water Conservation Plant, and other infrastructure accounts such as water pumps. The City uses close to 17,000,000 kilowatt hours (kWh) of electricity annually, which costs nearly $3,000,000. The magnitude of the City's consumption presents a substantial fiscal opportunity, and renewable energy projects can provide an immediate solution to rising energy costs. According to the CPUC, average prices for Pacific Gas & Electric (PG&E) and SCE customers have increased 44 to 65 percent since 2000. This translates to average rate increases of nearly 6 percent annually[2].

Another factor impacting the economics of solar utilization is the CPUC final decision on SCE's 2012 General Rate Case. The new rates include mandatory time-of-use (TOU) rates for all non-residential customers effective January 1, 2014. The new rate structure approved in the final decision issued November 29, 2012 includes an overall 7.7% increase in electricity rates, and the increases were implemented January 1 and April 1, 2013.[3] The increase in electricity rates and changing tariff structure provide additional financial incentive for the City to identify solar opportunities at municipal facilities.

[2] http://c0688662.cdn.cloudfiles.rackspacecloud.com/downloads_pdf_White_Paper_Calif_Elec_Prices.pdf

[3] SCE Spring 2013 Electricity Outlook, May 3, 2013

GHG Reductions

In addition to the potential fiscal opportunity associated with implementation of solar technologies, there are also State actions driving clean energy production. In 2006, the Legislature passed and Governor Schwarzenegger signed AB 32, the Global Warming Solutions Act of 2006, which set the 2020 greenhouse gas emissions reduction goal into law. Under a business-as-usual scenario, Visalia community's emissions are projected to grow by approximately 36% to 1,265,770 MT CO2e by 2020 from the original baseline year 2005. Visalia's municipal operations emissions are expected to grow approximately 69% to 27,831 MT CO2e by 2020. These emissions projections are based on Visalia's population growth, which is forecasted to increase by approximately 52% from 2005 to 2020.[4]

The Air Resources Board (ARB) recommends a voluntary GHG emissions reduction goal for California local governments of 15% below the baseline year of 2005 by 2020 so that municipal and community-wide emissions are in line with the State's AB 32 reduction target. While the final GHG reduction goals have not yet been adopted by the City, Natural Resources will work to assure the Visalia Solar Strategy's action items are included in the CAP, and the associated GHG reductions are quantified and reported in future GHG reduction analyses.

Local Market Potential

Solar energy makes sense for California. Each new solar panel helps to clean our air, fight global warming, improve the reliability of our electricity grid, boost the economy, and create much-needed jobs.[5] The SSTI project identified 18,256 solar viable residences in the City of Visalia, which have the potential to produce 93.1 megawatts (MW) of solar electricity. It is clear that Visalia's climate is conducive to solar electricity generation, and there is substantial opportunity in the local market for residential, commercial, and government solar utilization.

2.3 Utility Tariff Considerations

There are a variety of SCE tariff considerations which could impact the feasibility of solar utilization at City-owned facilities. The CPUC regulates the investor-owned utilities (IOUs), including SCE, and approves rates and special tariffs through a General Rate Case process that occurs every three years. The following tariffs have been approved for SCE, and impact the financial feasibility of solar utilization:

1) Net Energy Metering (NEM): Solar photovoltaic systems produce energy during the day with peak energy production in the afternoon. Things are simple if a facility's peak energy usage matches the renewable energy production; however, if energy

[4] Draft Climate Action Plan, May 2013 (in preparation)
[5] http://www.frontiergroup.org/reports/californias-solar-cities-2012

usage is constant or peaks at different times than the renewable generation, then proper utilization of the renewable generation is problematic. The CPUC implemented the Net Energy Metering (NEM) tariff to address this issue. This enables the utility customer to generate more renewable energy than is used at the time generated and credit that to the energy used at other times, essentially spinning the electric meter backwards if more energy is generated than used and forward when more energy is used than generated.

The amount of NEM tariff allowed in each utility's service area is established by the CPUC (usually in response to legislation) and is limited. Currently, net-metered systems are limited to 5% of a utility's service territory. The CPUC issued a decision in May 2012 to more clearly define "aggregate customer peak demand" for all utilities. The CPUC decision also stipulates that NEM will be suspended for new customers at the end of calendar year 2014, pending the outcome of further CPUC proceedings. If NEM is no longer allowed, solar utilization at 24-hour facilities and individual residences may not be financially feasible, and it would also dramatically impact solar utilization for commercial and industrial applications. It is anticipated that NEM will be continued beyond 2014 in some form; however, the City should factor the potential of diminishing availability of NEM tariff into analysis of solar utilization at City-owned facilities.

2) Option R Rate: The typical non-residential SCE electricity bill includes charges for actual electricity consumed and a demand charge based on the peak amount of power used. Demand charges are based on the highest number of kilowatts (kW) drawn from the system, and are assessed by SCE based on 15-minute intervals with the largest 15-minute interval establishing the rate for the month. Demand charges are assessed regardless if a solar system is installed, and can be as expensive for the ratepayer due to irregularities in the weather and when the maximum amount of power is used. For example, if there are 15 minutes of cloud cover the demand charges could be equivalent to pre-solar bills. The Option R rate provides an advantage for renewable energy users by reducing demand charges in exchange for higher energy use charges. This rate structure benefits facilities that operate from 8 am to 5 pm with larger consumption during peak hours. For example, City Hall North (Visalia Transit Center) would benefit from the Option R rate; the WCP and Transit Operations Center would not benefit as much from the Option R rate, due to consistent 24-hour operations schedule. The inability to utilize the Option R rate could impact the financial feasibility of solar utilization at City-owned facilities and businesses in the City which operate primarily during traditional business hours. Participation in Option R is limited to a cumulative installed distributed generation output capacity of 150 megawatts (MW) for all eligible rate groups in SCE's service territory. In March 2013 there were approximately 31 MW remaining.

3.0 SOLAR ACTION STRATEGIES

The City of Visalia has developed a three-pronged approach to communitywide deployment of solar technologies.

Objective 1: Municipal Solar Deployment

Objective 2: Secondary Use of City-Owned Property for Utility Scale Solar Projects

Objective 3: Community Solar Initiatives

In order to prioritize the recommended actions within this strategy, each action is categorized as High, Medium, or Low priority. Natural Resources will focus on the high priority items first, and then move onto the medium and low priority action steps.

Objective 1: Municipal Solar Deployment

Visalia will strive to implement financially-feasible solar systems at City-owned facilities when the following occur:

1) Payback period is less than the useful life of the system
2) The remaining lifespan of the facility is at least 20 years
3) Minimum Return on Investment is at least 10% over the useful life of the system

There is opportunity within the City municipal facilities to install roof- and ground-mount solar. To achieve the City's goal of implementing financially-feasible solar at City-owned facilities, the City will implement solar deployment at City facilities in two phases. Phase I consists of sites that have already been identified as potential candidates for solar utilization, and Phase II consists of future sites to be determined or sites that require additional analysis to determine the feasibility of solar implementation.

To evaluate if solar is feasible at City-owned facilities, staff will conduct an initial analysis to determine if the site meets the three criteria identified in Objective 1. The analysis includes a review of the following:

- **Sizing Analysis**: How much electricity does the facility use annually? What size system would be needed to meet electricity needs?
- **Financial Analysis**: Complete a conservative 25-year cash flow projection to determine if the system is financially feasible. Will the solar system save the City money? Projections

typically are based on energy usage costs (excluding demand charges) with an average inflation factor for SCE electricity costs (conservatively assumed at 3%).

- **Site Analysis**: If it is a roof-mount system, does the existing roof have a remaining life of at least 20 years? Will the City operate this facility for at least 20 years? Are ground-mount shade structures feasible, or are there obstructions such as trees, light poles etc.? Will the configuration of the site change in the future?

Once a site is deemed a strong candidate for on-site solar utilization, Natural Resources staff will meet with the respective departments to identify potential barriers to solar implementation and develop a financial strategy for proceeding with the project (as applicable).

One component of Objective 1 is identifying the most advantageous procurement strategy. According to *PURCHASING POWER: Best Practices Guide to Collaborative Solar Procurement*[6], aggregating solar installation sites is one method of collaborative solar purchasing. By putting a group of potential sites out for bid together, the aggregated purchase can attract higher competition, accomplish community goals faster, and reduce transaction costs. This is especially useful for rooftop and on-site (as opposed to large utility-scale) solar installations. For example, the Silicon Valley Collaborative Renewable Energy Procurement (SV-REP) Project, launched by Joint Venture: Silicon Valley Network's Public Sector Climate Task Force, estimated that the benefit of site aggregation was calculated to be 12 percent below standard vendor pricing, and participating agencies saved 75 to 90 percent in administrative costs and time compared to an individual (non-collaborative) procurement. By utilizing a bulk purchase strategy, the City can be more efficient in procuring and managing municipal solar installation projects.

The following action steps details the strategy for implementing Objective 1: Municipal Solar Deployment:

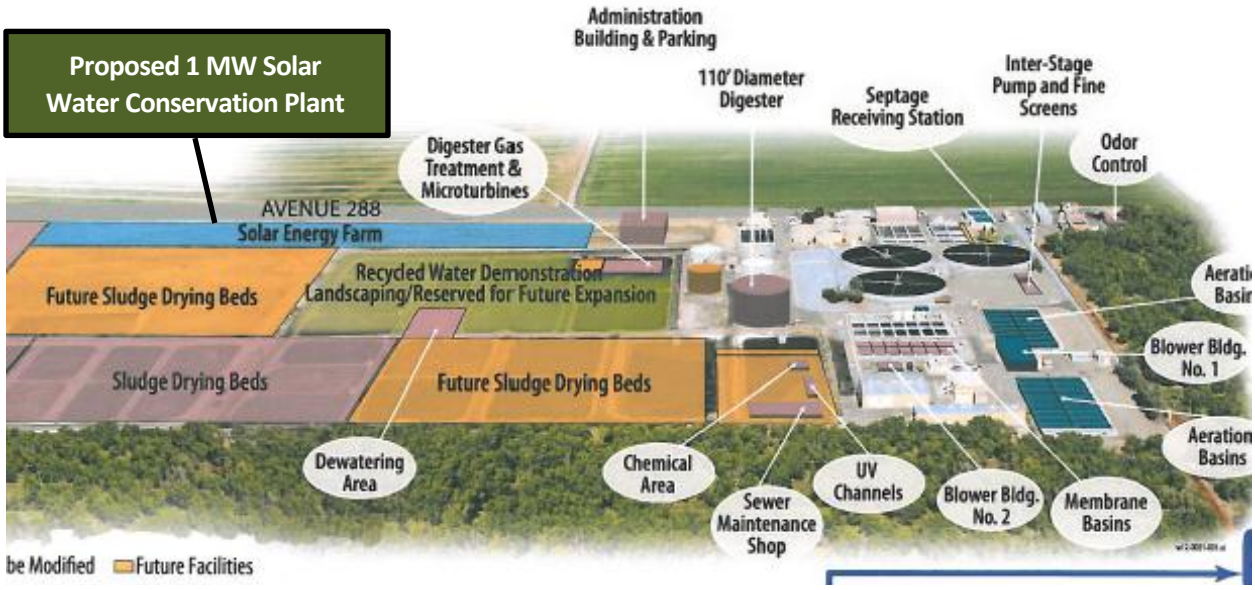
Action 1.1: Water Conservation Plant [High]

The City of Visalia is planning a minimum 1 MW solar photovoltaic system as a component of the Water Conservation Plant (WCP) Upgrade Project. The system would be installed west of the new administration building. This facility would occupy approximately 8 acres of land within the plant's footprint. The solar panels would be ground mounted on a single-axis tracking system to improve overall system efficiency. According to the California Solar Initiative's Expected Performance Base Buydown (EPBB) calculator, the system is anticipated to produce approximately 2,325,000 kWh/yr.

Staff is currently evaluating the financial feasibility of increasing the size of the system at the WCP up to 5 MW in the future. Preliminary assessment indicates that all of the electricity generated from a

[6] World Resources Institute, April 2011

5 MW system could be utilized on-site at the WCP, resulting in close to a net-zero facility. Natural Resources is evaluating the long-term potential for increasing solar utilization at the WCP and will continue monitoring opportunities to utilize financially-feasible renewable energy sources.



Action 1.2 Roof- and Ground-Mount Solar [High]

Natural Resources has identified the potential to install financially-feasible roof- or ground-mount solar at the following City facilities:

1. Transit Maintenance & Operations (M&O) Facility
2. Corporation Yard-Fleet
3. Solid Waste Operations
4. CNG Fueling Site
5. Anthony Community Center
6. Riverway Sports Park

Each of these facilities appears to yield the minimum 10% return on investment through the utilization of either the purchase of the system, a Power Purchase Agreement (PPA) or pre-paid PPA. A complete description of the PPA financing model can be found in Section 4.4.

Staff recommends that the City proceed immediately with an aggregate Request for Proposal (RFP) for the installation of the following systems. It should be noted that the system sizes are estimates, and the final design will be determined through the RFP, contract negotiation and design process:

Facility Name	Service Address	Estimated System Size (kW)
Transit M & O	525 N CAIN ST	250 kW
Corporation Yard – Fleet	336 N BEN MADDOX	140 kW
Solid Waste Operations	309 N CAIN ST	30 kW
CNG Fueling Site	439 N CAIN ST	350 kW
Anthony Community Center	345 N JACOB ST	70 kW
Riverway Sports Park	3611 N DINUBA	210 kW
Total Capacity Phase I RFP:		**1.05 MW**

Exhibit A details the potential location of solar installation at the above indicated facilities.

The City of Visalia should strive to aggregate similar types of projects, and if feasible, procure the above PV systems in one RFP package. The bid package should include a request for pricing for the purchase of the systems and pricing through a PPA structure and a pre-paid PPA, to ensure the most competitive financing package.

Action 1.3 Other City-owned Facilities [Low]

Phase II of this action item includes the evaluation of additional city facilities which may be good candidates for solar utilization, and Natural Resources will continue working with the various City departments to identify sites for potential solar installation. Sites will be identified based on potential to reduce electrical expenses for the City.

Staff has initiated a preliminary analysis of the Convention Center, and recommends solar installation during Phase II because of the age of the roof. The Convention Center would require a new roof prior to solar installation. Additionally, a structural analysis should be completed to evaluate the structural impacts of the solar equipment since the Exhibit Hall can have substantial interior loads at various events. The following graphic indicates the general location where solar could be utilized at the Convention Center.

Objective 2: Secondary use of City-Owned Property for Utility Scale Solar Projects

Evaluate City-owned site larger than 40 acres to assess the potential for a secondary use, such as a land lease to develop a utility scale solar project.

Action 2.1: Evaluate Solar Land Lease Potential as a secondary use at Basin 4 [Medium]

Established in 2002 under Senate Bill 1078, accelerated in 2006 under Senate Bill 107 and expanded in 2011 under Senate Bill 2, California's Renewables Portfolio Standard (RPS) is one of the most ambitious renewable energy standards in the country. The RPS program requires investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33% of total procurement by 2020. There are a variety of solar programs operated through SCE and other California Independent System Operator Corporation (CAISO) members that facilitate the development of large scale solar facilities, many of which were enacted in response to the RPS requirement.

Basin 4 is a 160-acre retention basin owned by the City of Visalia. This site has been identified for the potential development of a "solar farm" and could be made available via a land lease for this purpose. Natural Resources will continue to evaluate this opportunity, including the identification of site constraints (such as the slope and the depth of the basin), planning and zoning requirements for this type of lease, availability of an electric meter on site to connect with the grid, and other site characteristics which could potentially impact the feasibility of a lease opportunity. Natural Resources will also evaluate the development potential of the site, including future needs for

stormwater layoff, receipt of treated effluent from the WCP, recharge, development, increasing the depth, equipment storage, etc. Many external factors also impact the feasibility of solar at Basin 4, such as SCE tariff structures and ability to interconnect to the grid. Natural Resources will evaluate all of these factors, prior to commencing with a project recommendation.

Action 2.2: Evaluate Solar Land Lease Potential as a secondary use at other City-Owned Sites >40 acres [Low]

Natural Resources will develop a list of City-owned properties larger than 40 acres, and evaluate identified sites for potential to lease the sites as a secondary use to a third-party entity interested in developing large solar projects. The evaluation will include an analysis of planning and zoning requirements for a solar land-lease, applicable permits, and the interconnection requirements needed to support this type of project.

Objective 3: Community Solar Initiatives

Continue efforts to educate the community, including local businesses and residential consumers, on the benefits of solar utilization, and work to implement programs and partnerships that promote the deployment of solar technology.

Action 3.1: Integrate Solar Friendly Language in Planning & Building Regulations [High]

Implementing a regulatory framework that is solar friendly and removes potential barriers to the installation of solar will help assure large scale deployment of solar in the community of Visalia. Reducing installation costs through streamlined local rules and regulations can significantly improve the market environment for solar energy technologies. By encouraging solar ready building guidelines, residential solar utilization will become more cost effective. Additional examples of solar friendly planning and building codes include standards for mitigating aesthetic and safety concerns associated with some solar energy installations.

Natural Resources will continue working with the Community Development Department to integrate solar friendly language in planning and building standards. There are a variety of resources available to assist in the integration of solar strategies. For example, the California Energy Commission is a resource for the development of codes and ordinances that facilitate communitywide solar deployment. Information can be found at:

http://www.energy.ca.gov/localgovernment/planning_resources/example_ordinances.html

Action 3.2: Develop Streamline Solar Permitting Procedures [High]

Natural Resources will continue working with the Community Development Department to identify opportunities to develop streamlined solar permitting, including standard application forms and efficient turnaround of applications.

Action 3.3: Collaborate on Regional Bulk Purchase Program [Medium]

Bulk buy programs enable the consumer to benefit from the economies of scale achievable when groups of people and/or organizations make a group purchase. There is potential in the San Joaquin Valley to establish regional bulk purchase programs to facilitate the utilization of solar for residential purposes. Natural Resources is currently working with the San Joaquin Valley Clean Energy Organization (SJVCEO) to explore the development of a regional bulk purchase program, and will continue to pursue collaborative partnerships to develop programs for the advancement of residential and commercial solar utilization.

Action 3.4: Continue Supporting Local Solar Efforts [High]

There are a variety of local programs working to advance the deployment of solar in Tulare County. The City of Visalia acknowledges these efforts as integral in regional efforts to expand the portfolio and offering of renewable energy resources. GRID Alternatives is one non-profit working to empower communities in need by providing renewable energy and energy efficiency services, equipment and training[7]. GRID Alternatives works collaboratively with communities and local organizations to identify specific needs and to develop renewable energy solutions that are environmentally, socially and economically sustainable. Currently, GRID Alternatives' core program is the Solar Affordable Housing Program, which includes training community volunteers and job trainees from all walks of life to install solar electric systems with low-income homeowners. To date, GRID has installed 17 residential solar systems in Visalia that are projected to generate 3,344,221 lifetime kWh production and result in $556,918 value produced over the systems' lifetime. Natural Resources will continue working with GRID to expand the accessibility of solar to lower-income households in Visalia and the surrounding community.

GRID Alternatives solar installation in Visalia

[7] http://www.gridalternatives.org/mission-history

Another local solar effort is the job training program offered by the non-profit Proteus Inc. Proteus offers a job training program designed to prepare students to work in the solar industry. Students will gain the knowledge and skills necessary to design and install PV solar systems. The students will also receive an introduction to the North American Board of Certified Energy Practitioners (NABCEP) Photovoltaic Entry Level Certificate of Knowledge exam requirements. The overall course objective is to prepare students for an entry level position in the solar industry[8].

Sequoia Energy Services (SES), a division of the local Visalia-based non-profit Community Services Employment Training (CSET), also offers solar services for local residents.

Natural Resources will continue working with organization like GRID, Proteus and CSET, to further expand local market potential and community education and outreach opportunities.

4.0 POTENTIAL FINANCING MECHANISMS

There are a variety of financing mechanisms available for the development of solar projects in the City of Visalia. This section is intended to serve as a guide to understanding the financial mechanisms available for the implementation of solar, and provide some general direction regarding financing potential solar projects.

4.1 Conventional Financing & Purchase

Financing the purchase of solar allows the City to reduce the risk associated with rising electricity costs by exchanging a monthly electricity bill that is subject to inflation, for a monthly financing payment, which is often fixed over the term of the loan. There are a variety of low-interest conventional financing options that could be utilized to finance the purchase of solar power systems.

One low-interest financing option is through the California Energy Commission (CEC). The CEC provides loans to schools, hospitals, local governments, special districts, and public care institutions to finance energy efficiency improvements. The CEC loan program provides up to $3,000,000 at 1% interest; feasible projects must be able to repay the principle and interest within 15 years of loan origination.

Capital funds for the development of solar may also become available through other improvement projects, like the WCP Upgrade project. Funding from Clean Water State Revolving Fund Program (CWSRF) may be utilized to finance solar in conjunction with the WCP capital improvement project. Natural Resources will continue seeking opportunities to integrate solar with other capital development projects.

[8] http://www.proteusinc.org/index.php/solar-installation

Natural Resources will also continue to monitor emerging funding opportunities, such as Proposition 39 and the cap-and-trade proceeds, to identify grant and/or low-interest financing opportunities to fund solar projects and ultimately reduce the City's overall electricity expenses.

4.2 Tax Exempt Lease

Natural Resources will also explore structuring financing as a tax-exempt lease. A tax exempt lease purchase (TELP) agreement is a unique lease structure available only to tax-exempt organizations, such as government, education and not-for-profit entities. Leases are structured so that the full cost of the project assets is amortized over the lease period. Contracts typically include a nominal purchase option (e.g. $1) which the lessee is expected to exercise at the end of the lease period. Given these structural elements, lessees may actually take title to the assets upon execution of the lease agreement, while the lessor retains a security interest in the assets during the contract. For energy efficiency projects, lease payments are generally structured so that energy savings resulting from the equipment are sufficient to cover principal and interest payments. Lease rates are lower than financing for commercial entities because interest paid to the lessor is not subject to federal taxes.[9]

4.3 Power Purchase Agreement (PPA)

The Power Purchase Agreement (PPA) financing model is a "third-party" ownership model, which requires a separate, taxable entity ("system owner") to procure, install, and operate the solar PV system on a consumer's premises (i.e., the government agency). The government agency enters into a long-term contract (typically referred to as the PPA) to purchase 100% of the electricity generated by the system from the system owner.[10] The advantages of a PPA model include:

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

A PPA has the potential to save the City funding if the cost/kWh is fixed below the cost of electricity through SCE, and the annual escalator (if any) is consistent with market increases in electrical pricing. Additionally, PPA's often include a purchase provision, which could allow an opportunity to purchase the solar infrastructure at a substantially reduced rate after the owner has realized the anticipated return, including the benefit from the tax credit and depreciation.

[9] http://www.presidentsclimatecommitment.org/node/6567
[10] http://www.nrel.gov/docs/fy10osti/46668.pdf, Power Purchase Agreement Checklist

A pre-paid PPA has all of the components of a traditional PPA, including the benefit of production guarantees and maintenance/part replacement by the system owner, but the cost of the electricity over 20 years is pre-paid at initial contract execution. This model capitalizes on the time value of money, therefore driving down the cost/kWh.

Natural Resources will continue to explore the utilization of PPAs as a financing tool in situations where low-interest capital financing is not available.

4.4 Property Assessed Clean Energy (PACE) Program

Property Assessed Clean Energy (PACE) programs allow local government entities to offer renewable energy project loans to eligible property owners. Through the creation of financing districts, property owners can finance renewable onsite generation installations and energy efficiency improvements through a voluntary assessment on their property tax bills.[11] PACE programs benefit property owners by providing the opportunity to implement energy efficiency and/or renewable energy projects, without the upfront capital expense. Additionally, this financing mechanism removes the risk of selling the property in the future, as the debt is assessed in first position against the property and remains on the property tax bill in the event of sale or transfer of property.

The City has passed a resolution to participate in the statewide CaliforniaFIRST program. The County of Tulare also passed a resolution in April 2013 to participate in the CaliforniaFIRST program, which was required for Visalia to be eligible to participate. The CaliforniaFIRST program provides financing to non-residential buildings, which include multifamily (5 or more units), industrial and agricultural properties.[12]

4.5 Tax Exempt Bonds

Tax exempt bonds are bonds issued by a municipal, county or state government, whose interest payments are not subject to federal income tax, and sometimes also state or local income tax. The California Clean Energy Authority (CCEA) utilizes tax-exempt bonds to generate capital to fund solar projects for other public entities. CCEA is able to offer tax-exempt bond financing through the joint-power's bond-issuing authority. Tax exempt bonds are one tool available for the City in financing large solar installation, but should be weighed against CEC and special purpose financing which often carry a lower interest rate. Bonds could be a financial tool utilized to finance a Regional Bulk Purchase Program as identified in Action 3.3.

[11] http://energycenter.org/index.php/public-affairs/property-assessed-clean-energy-pace
[12] https://californiafirst.org/participating_areas

4.6 Incentives and Tax Credits

California Solar Initiative (CSI)

The CSI is the solar rebate program for California consumers that are customers of the investor-owned utilities - Pacific Gas and Electric (PG&E), SCE, and San Diego Gas & Electric (SDG&E). The CSI program is a key component of the Go Solar California campaign for California.[13] There are two types of incentives available through the CSI:

1. Expected performance-based buy down (EPBB) — For solar projects less than100 kW until 2008, and less than 50 kW after 2008, an up-front incentive based on an estimate of the system's future performance is provided.

2. Performance-based incentives (PBI) —A flat cents-per-kWh monthly payment for all metered output (for the initial 5 years of operation) from eligible solar systems equal to or greater than 100 kW (50 kW after 2008). Any project size may opt in to receive this type of incentive.[14]

Information about CSI can be found at:
www.gosolarcalifornia.ca.g

The CSI program has a total budget of $2.167 billion between 2007 and 2016 and a goal to install approximately 1,940 MW of new solar generation capacity.[13] Incentives are obligated at different step levels based on the number of MW generated at each incentive level. The CSI Trigger Tracker[14] shows how many MWs worth of rebates are available in the current incentive step level.

Natural Resources will monitor the CSI Trigger Tracker to maximize the incentive potential for each solar project the City intends to install and own.

Federal Tax Credits

Tax credits are available for eligible systems placed in service on or before December 31, 2016, for entities paying federal taxes. The credit is equal to 30% of expenditures, with no maximum credit. Eligible solar energy property includes equipment that uses solar energy to generate electricity, to heat or cool (or provide hot water for use in) a structure, or to provide solar process heat. Hybrid solar lighting systems, which use solar energy to illuminate the inside of a structure using fiber-optic distributed sunlight, are also eligible.

Because the City is a tax-exempt entity, the federal tax credit only impacts the financial return of a solar project when it is financed through a PPA or other third-party ownership mechanism, as the tax

[13] http://www.gosolarcalifornia.ca.gov/csi/index.php
[14] http://www.csi-trigger.com/

credits are utilized by the developer and incorporated into the fee structure of the PPA. In order to sell the tax credits, the system owner must be a special purpose entity (SPE) established by developer to own the system assets. The SPE limits the developer's liability in connection with a solar system to the developer's investment in the SPE, and permits the system to be financed on a "project" basis.[15] This model is currently being utilized by the California Clean Energy Authority, acting as a joint power authority (JPA), in conjunction with tax-exempt bonds, and could be a financial tool utilized to finance a Regional Bulk Purchase Program as identified in Action 3.3.

Overall, there are a variety of financing models available for the deployment of solar in Visalia. Natural Resources will evaluate each project and determine which financing avenue yields the largest return for the City based on the availability of capital financing and other market conditions at the time of project implementation.

5.0 TIMELINE & MONITORING

Time is of the essence in the implementation of this strategy due to the declining solar incentives, limited Option R rate, and the expiration of the NEM tariff in December 2014. Additionally, tax laws regarding the depreciation of solar equipment also change after 2013, which impacts the financial feasibility of solar projects. Implementation of the high priority items will begin immediately, with the medium/low action items following completion of high priority projects. Natural Resources will review this report annually and provide a status update report to the City Council. The report will include an update of the projects completed, including any performance data. Additionally, Natural Resources will report on the status of open projects, and any projects that were deemed not to be financially feasible and removed from the Visalia Solar Strategy. This strategy is intended to be a living document, which evolves with changing City priorities, changes in the solar market, and other internal and external factors.

According to *Solar Powering Your Community: A Guide for Local Governments*[16], "Commissioning a solar energy system refers to testing the system after installation and certifying that it operates as expected and is installed according to the design plans. For systems installed under power purchase agreements (PPAs), independent commissioning is typically not necessary because it is in the project developers' best interest to ensure optimal performance because they are selling the electricity to the host customer on a per-kilowatt basis. For systems that are owned directly by local governments, however, commissioning can be an important step in ensuring safety and performance. After a solar energy system is installed, it can be difficult for the local government to determine whether the system is working correctly. Photovoltaic (PV) systems have few moving parts, and if the PV system is connected to the utility grid, the electricity supplied to the building is not interrupted whether the PV system is working correctly or not." Natural Resources strongly recommends that commissioning is

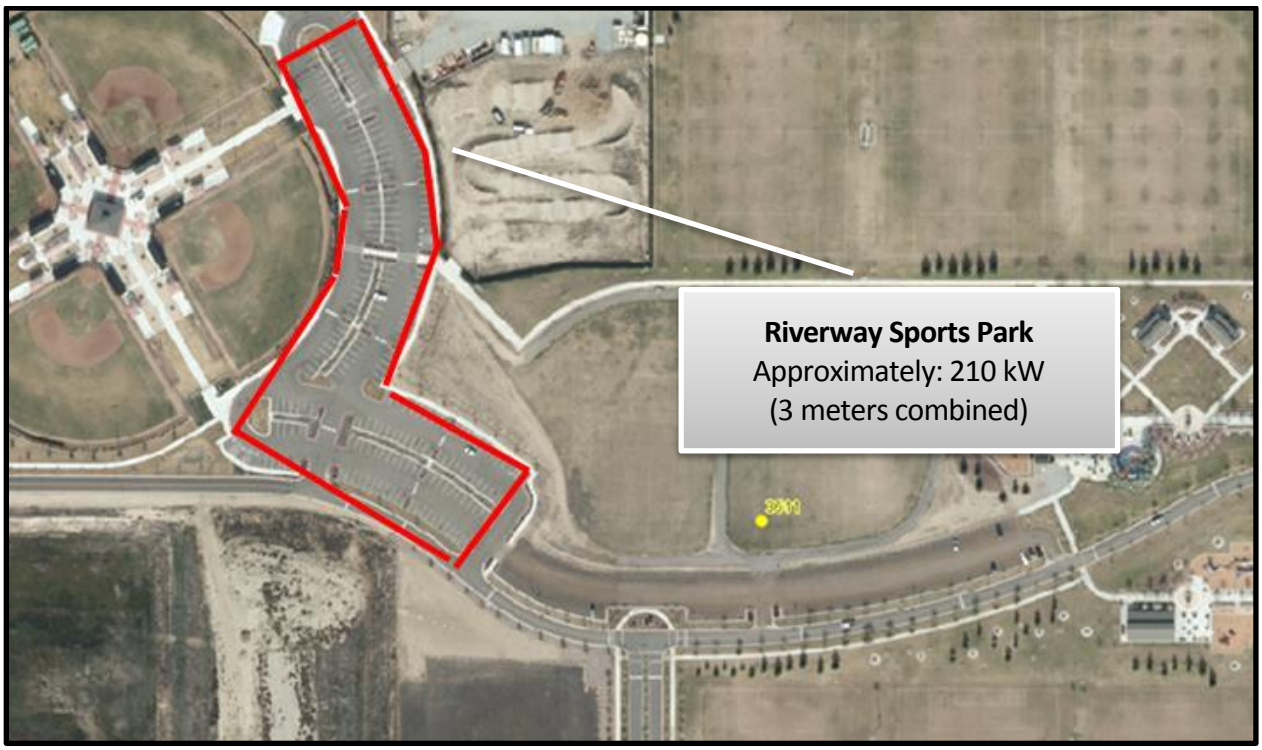
[15] Commercial Finance: The Dark Arts of Leverage, Tax Equity, Leases and More, Solar Power International 2009, October 26, 2009

[16] U.S. Department of Energy, January 2011

included in each municipal solar installation, including the installation of an ongoing data collection and monitoring system, to ensure that actual production output is monitored upon completion of each project and through the useful life of the system.

EXHIBIT A: POTENTIAL SITES
Action 1.2 Roof- and Ground-Mount Solar


Transit Maintenance &
Operations
Approximately: 250 kW


Riverway Sports Park
Approximately: 210 kW
(3 meters combined)

Anthony Community Center
Approximately: 70 kW

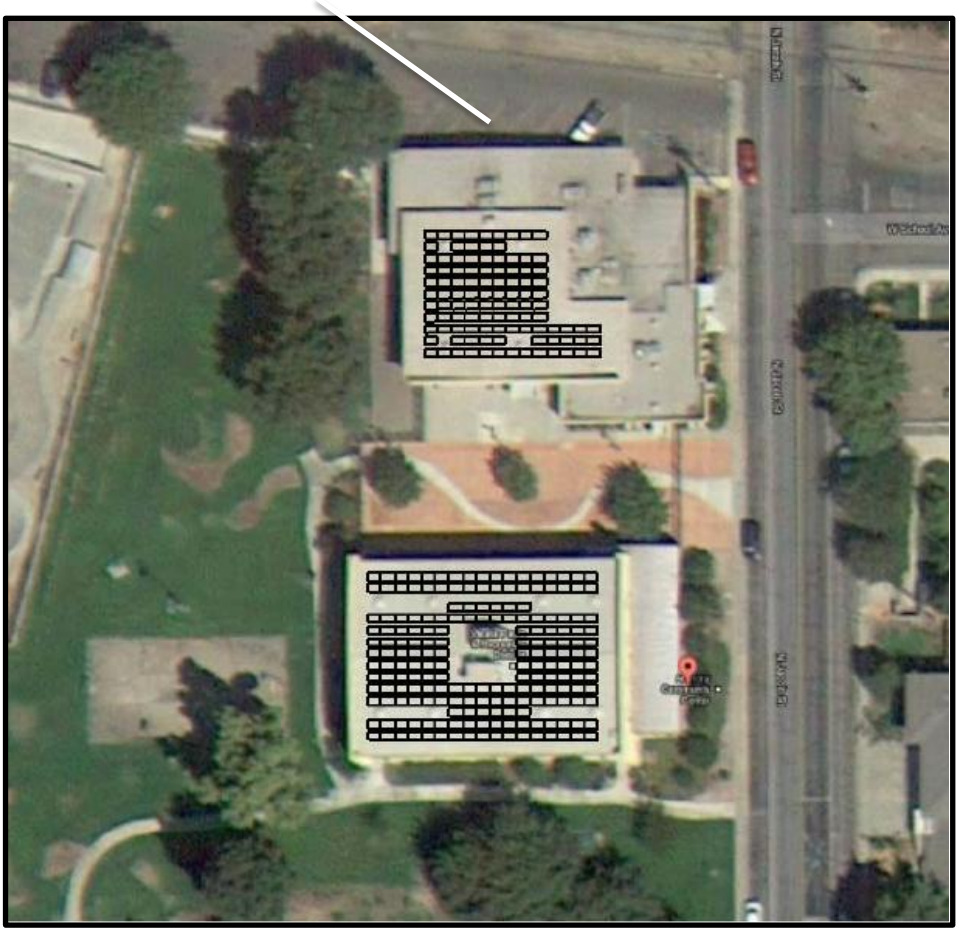


EXHIBIT B: GLOSSARY OF TERMS

AC (Alternating Current): The direction of electrical current reverses, usually many (60) times per second. Electricity transmission networks use AC because voltage can be controlled with relative ease.[17]

ARRAY: Any number of Photovoltaic modules connected together electrically to provide a single electrical output. An array is a mechanically integrated assembly of modules or panels together with support structure (including foundation and other components, as required) to form a free-standing field installed unit that produces DC power. [20]

CALIFORNIA SOLAR INITIATIVE (CSI): The California Solar Initiative (CSI) is the solar rebate program for California consumers that are customers of the investor-owned utilities - Pacific Gas and Electric (PG&E), Southern California Edison (SCE), San Diego Gas & Electric (SDG&E).[22]

CUSTOMER AGGREGATION PROGRAM: A program that coordinates group purchases of solar energy systems, helping defray some of the up-front costs of solar installations by giving aggregated individuals or businesses a discounted rate for bulk purchases of solar energy systems.[18]

DC Direct Current: A one way flow of electric current. Typical sources of direct currents are electric cells, rectified power units and direct current generators. This is the current flow produced by a solar system. To be used for typical 120 volt or 220 volt household appliances, it must be converted to AC (alternating current).[20]

GRID: A system of high tension cables in a region that distributes electricity to homes, businesses, and other buildings**.**[19]

GRID TIED/GRID CONNECTED: A solar system that is connected to the power grid and uses the grid as a backup source of power.[22]

GROUND MOUNT: A solar electrical system that is mounted on the ground instead of on a roof.[22]

INTERCONNECTION: The process of hooking up a solar electrical system to the power grid.[22]

INVERTER: A device that converts electricity from DC to AC.[20]

KILOWATT (kW): 1000 watts.[20]

KILOWATT-HOUR: Unit of energy used to perform work (energy and work are equivalent in units, energy being the potential value and work the achieved value).[20]

[17] http://solarexpert.com/solar-pool/solar-glossary/
[18] http://www4.eere.energy.gov/solar/sunshot/resource_center/sites/default/files/solar-powering-your-community-guide-for-local-governments.pdf
[19] http://www.sunrunhome.com/solar-for-your-home/guide/how-solar-works/terminology/

NET METER: An electricity meter that spins both forward and backwards. It can track how much electricity your solar system puts into the power grid and how much electricity your home pulls out of the grid.[22]

PHOTOVOLTAIC CELL: A device composed of specially prepared semiconductor material or material combinations exhibiting the ability to convert incident solar energy directly into electrical energy.[20]

RENEWABLE ENERGY SELF-GENERATION BILL CREDIT TRANSFER PROGRAM (RES-BCT): The RES-BCT program (formerly AB 2466) was established by the Legislature effective January 1, 2009 and is codified in Section 2830 of the Public Utilities Code. It allows a Local Government with one or more eligible renewable generating facilities to export energy to the grid and receive generation credits to benefitting accounts of the same Local Government (AB 1031 expanded applicability to universities). AB 512, signed into law in 2011 and effective on January 1, 2012, further modified this program to increase the generator size limit to 5 MW per generation account.[20]

SOLAR PANEL: A collection of solar modules connected in series, in parallel, or in series- parallel combination to provide greater voltage, current, or power than can be furnished by a single solar module. Solar panels can be provided to furnish any desired voltage, current, or power. They are made up as a complete assembly. Larger collections of solar panels are usually called solar arrays.[20]

STAND-ALONE SYSTEM (SA): A system which operates independently of the utility lines. It may draw supplementary power from the utility but is not capable of providing power to the utility.[20]

TIME-OF-USE (TOU) RATES: A utility billing system in which the price of electricity depends upon the hour of day at which it is used. Rates are higher during the afternoon when electric demand is at its peak. Rates are lower during the night when electric demand is off peak.[21]

TRACKING PANELS: Solar panels that can change the direction they face to follow the sun's movements.[22]

VISALIA : A city situated in the agricultural San Joaquin Valley of California, approximately 190 miles north of Los Angeles, 230 miles southeast of San Francisco, and 36 miles west of Sequoia National Park. The population was 124,442 at the 2010 census. Visit us at: www.ci.visalia.ca.us

WATT: Unit of power. Power is the rate of using energy to do work.[20]

[20] http://www.pge.com/b2b/newgenerator/ab2466/
[21] http://www.solarcity.com/learn/solar-glossary.aspx