

Solar Proposal

Solar San Miguel



August 24, 2010



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Table of Contents

Executive Summary.....	1
Company Qualifications.....	2
Project Experience	8
Management Team.....	11
System Specifications	14



City of Madera Wastewater Treatment Facility, 1.16MW Dual Axis Trackers, California

Executive Summary

We appreciate this opportunity to submit a proposal to provide Engineering and Procurement services in support of the Solar San Miguel Solar project. REC Solar has designed and installed more than 5,000 solar projects over the past ten years and is one of the country's oldest and most experienced solar EPC contractors.

REC Solar understands the highly cost competitive nature of developing solar projects which requires project developers to carefully balance the needs of investors seeking to maximize IRR's and mitigate risk with utilities which seek very low \$/MWhr rates when negotiating PPA agreements.

REC Solar focuses on reducing project cost, using standard system designs and construction processes and providing high quality equipment and materials to insure reliable operation over the service life of the system. We reduce cost through intelligent design and efficient use of labor and materials without cutting corners on the quality of equipment or materials used.

We very much look forward to supporting you on this project and have the capacity to get started immediately with the engineering support. Please let us know if you have any questions.

Sincerely,

Matthew Woods

General Manager

Company Qualifications

REC Solar specializes in the design and construction of grid-tied, solar electric power systems, offering affordable solar solutions for residential, commercial, government and utility clients. We have a fully integrated, vertical business model offering comprehensive, turnkey solar solutions that include state-of-the-art equipment, expert engineering design, top-quality construction, on-going service and support and affordable financing programs.

Company History

REC Solar was founded in 1997 with a focus on quality, professionalism, and service. We have grown to become one of the leading solar providers in the U.S. with over 5,000 completed systems in Arizona, California, Colorado, Hawaii, New Jersey, Connecticut, and Oregon, generating billions of kilowatt hours of electricity. We have provided solar solutions for a wide variety of customers and facilities including big-box retailers, agricultural farms, federal, state and city governments, non-profits, medical centers, schools, universities, small businesses and public utilities. For the past 4 years, REC Solar has been ranked by the California Energy Commission as among the top five providers in the state—attesting to our acceptance and value by our customers.

REC Solar is a wholly owned subsidiary of Mainstream Energy Corporation, which also owns AEE Solar, the 3rd largest distributor in North America with a customer base of over 1,500 dealers. Mainstream Energy is 20 percent owned by REC Group ASA, one of the top solar companies in our industry. The unique relationship REC Solar enjoys with Mainstream Energy and REC Group provides direct access to high quality solar panels from one of the world’s leading suppliers and also insures that REC Solar has stable financial backing and the ability to deliver and support your solar power needs in the future.

Project History

Examples of Relevant Completed Projects		
Customer	Site Location	System Size (DC Watts)
Costco Wholesale	Multiple Locations	14,506,000
Albertsons	Multiple Locations	456,750
Allwire, Inc.	Chowchilla	484,260
Castle Rock	Delano	1,134,000
City of Hayward	Hayward	1,151,920
City of Madera	Madera	1,158,080
Dept. Veteran Affairs	Multiple Locations	5,136,600
Harris Freeman & Co	Anaheim	309,600
Kapolei Inline Hockey	Kapolei	257,400
VBZ	Richgrove	1,184,400
Longs Drugs Kauai	Lihue	109,500
Mission Foods	Panorama	184,800
Nestle Purina	Flagstaff	427,050

Financial Information

REC Solar

REC Solar is a profitable company that has consistently grown both revenues and profits over the past 13 years. We stress a very conservative approach in our financial management, enabling organic growth and ensuring our long-term viability. This has led to growth in excess of 70% year-over-year for the last 10 years, and landed us on *Inc 500's* list as the *13th Fastest Growing Energy Company* in the United States. Our company also has a very positive credit history as evidenced by our strong relationships and robust credit lines with our supply partners.

Mainstream Energy

Mainstream Energy is the majority shareholder of REC Solar. Mainstream Energy consists of two successful renewable energy operating companies: REC Solar (Integration) and AEE Solar (Distribution). Mainstream Energy is exclusively involved in the North American solar market. To further support its growth strategies Mainstream Energy took in a \$40.0MM equity investment in 2008 by the REC Group ASA in exchange for a 20% equity stake in the organization. The investment by the REC Group ASA provides significant balance sheet strength to Mainstream Energy as well as strategic sourcing of product at the most competitive prices in the marketplace.

REC Group

The REC Group is one of the world's largest solar equipment manufactures. With operations in Europe, the United States, and Asia, REC Group manufactures silicon, wafers, cells, and modules. The company maintains a very strong balance sheet with equity in excess of \$2 billion and cash reserves of more than \$1 billion. Consistent with REC Solar, this partner continues to grow revenues and profits, having reported revenues in excess of \$1.5 billion and very strong EBIT. The company is listed on the Oslo Stock Exchange and has a market capitalization in excess of \$4 billion, placing it among the world's highest capitalized solar companies.



REC Group, Singapore Factory, 2010

Bonding/Insurance

REC Solar carries general commercial and liability insurance and currently has a bonding capacity of ~\$50 million. Insurance limits and bonding capacity can be increased if required for a specific project.

Name of Insurance Broker: Arthur J. Gallagher Insurance Brokers of California, Inc.

Broker Contact: Brendan Quinlan

Broker Phone Number: 415-536-4020

1. Commercial General Liability Insurance (CGL) covering bodily injury and property damage liability, personal and advertising injury liability, products completed operations and contractual liability with a \$1,000,000 Per Occurrence and \$2,000,000 General Aggregate limit.
2. Commercial Automobile Liability Insurance covering bodily injury and property damage liability, including coverage for owned, non-owned and hired vehicles with a Combined Single Limit of \$1,000,000 Per Occurrence.
3. Workers Compensation Insurance as required by the applicable law of the state in which the work is being performed, including Employers Liability with \$1,000,000 for bodily injury by accident and \$1,000,000 for bodily injury by disease.
4. Umbrella/Excess Liability Insurance on an occurrence basis with \$5,000,000 Per Occurrence and \$5,000,000 in the Aggregate in excess of the limits provided by Employer's Liability, Commercial General Liability and Commercial Automobile Liability.

Please refer to the Appendix of the proposal for a copy of our Certificate of Insurance.

Licensing

REC Solar has an experienced group of licensed contractors and installers which has established us as one of the leading solar energy system contractors in the nation.

Arizona: K-11 License # ROC252827

California: C-10, License #750184

Colorado: C-10, Electrical Contractor License #7080
Master Electrician License #29194

Hawaii: C-13, License # C-28011

New Jersey: Electrical Contractor License # 34EI01550000
Home Improvement Contractor License # 13VH02198000

Oregon: CCB License # 180464

Our Services and Capabilities

REC Solar's innovative, turnkey solar electric solutions are offered through a comprehensive process that takes your system purchase from concept to commissioning. There is no faster, easier way to obtain a cost-saving, environmentally friendly solar electric system for your facility.

The major activities included in our end-to-end process include:

- Perform site feasibility studies and rate analysis
- Assist you with identifying and acquiring funding
- Engineer a comprehensive, optimized design
- Manage the project implementation
- Construct and install a quality system
- Install real-time, web-based monitoring
- Provide on-going operations and maintenance support

Feasibility Studies

REC Solar performs feasibility studies to determine the viability, size potential, and anticipated savings of installing a solar power system at your facility, helping ensure that our solution can deliver to meet your objectives.

Initially, a site evaluation is performed to determine factors such as roof construction, electrical system specifications, and utility interconnection requirements to determine the suitability of installing solar. We then review your electric bills to determine historical utility usage, and we complete a rate analysis and a cost savings analysis. Then, using satellite imaging and computer modeling, a design engineer determines the ideal system size and energy production potential in order to deliver the maximum benefit of solar installed.

The result of the feasibility analysis phase is a preliminary design of the best system we would propose to meet your site or building's unique characteristics, your targeted energy offset requirements and required rate of return on investment. These results are presented in a feasibility report, providing you with a design layout, a technical summary of the system, a project schedule, and our proposed installation price. In addition we provide a complete financial analysis and environmental benefits overview.

Funding Assistance

REC Solar helps you identify and take advantage of the various incentives offered by government agencies and utilities as well as provides assistance in accessing the various financing opportunities available. The following are some of the funding methods we can help you with:

- **Rebates** – We provide full administration of utility rebates on your behalf
- **Renewable Energy Credits** – Purchase and resale of RECs services
- **Grants** – Aid in filing for financial assistance such as the Department of Treasury federal grant program
- **Funding Assistance** – REC Solar has relationships with banks, leasing companies and the top power purchase agreement providers in the country. REC Solar will work with you to provide the best financing solution for the project.

Design and Engineering

With the data obtained from the site evaluation and feasibility study, our engineering department completes the design of your solar electric system including location and specification of all equipment and points of interconnection.

The system designs are certified by third party engineers, who are licensed in the states where we operate. These certifications ensure that the design is compliant with the local electrical and structural engineering standards in your area.



With tens of megawatts of solar power systems installed, REC Solar’s engineers are dedicated to creating system designs that are compliant with industry standards and best practices.

Project Management

REC Solar has a history of managing large, complex, multi-site and even multi-state projects. Our innovative process of delivering an end-to-end turn-key solution helps ensure that you receive a fully integrated solar electric system. Our project managers have direct oversight and interact with each of our dedicated specialists including engineering, procurement, construction, and electrical teams thereby ensuring a successful implementation.

We work hard to make sure your system is managed efficiently and effectively to deliver a quality system and minimize the impact on your staff and to your site. Project management of an installation of this size is critical and that’s where our dedicated team of project managers who manage solar all day every day are specialist and identifying the critical drivers to every project and working with you closely to deliver on our promise of satisfaction.

The project manager assigned to your installation will oversee every step of the process from the initial kick off meeting, on-going status meetings and provides a single point of contact for you with REC Solar so you get the level of service you deserve. The project managers at REC Solar understand that your satisfaction is their top priority and delivering on time and on budget is key to our success.

Construction and Interconnection

REC Solar's installation team consists of a diverse group of electrical foreman, solar installers, material handlers, safety inspectors and site supervisors. Being one of the largest solar installers in the country, we have the staff available to coordinate and manage the teams necessary to install a project of this scale.



An experienced construction management team is critical to successful project execution and our dedicated teams have installed many megawatts of solar. During the construction phase of your project you can expect the following from us:

- **Pre-construction meeting** – Set schedules, review the plan, prepare your team
- **Material procurement** – Acquire solar panels, inverters, mounting components, junction boxes, wire, hardware
- **Labor selection** – Determine members of mechanical, electrical, site cleanup teams
- **Site preparation** – Inspect the site and make all necessary improvements including safety modifications in preparation for construction to begin
- **Material delivery** – Take possession of all materials and inspect and stage
- **Solar array installation** – Construct structure and mount panels
- **Electrical installation** – Construct the inverter pad and run DC wiring to the pad
- **Grid interconnection** – Install the AC wiring and connect to the grid
- **System start-up** – Inspect, test, and commission the solar electric system

REC Solar manages the entire project from start to finish, even bringing in specialized contractors when needed to address unique challenges.

Project Experience

The following list represents a sample of REC Solar commercial customers and projects installed within the last several years. Many of these companies have agreed to provide professional references, and additional references are available upon request.



Costco Wholesale, Multiple Sites & States

Overall Project Size: 14.5 MW

Project Description: Under the Costco solar program, REC Solar is responsible for the turnkey design, engineering, and installation of solar systems placed on 21 Costco warehouses. All roof equipment and racking was mounted with a proprietary standing seam clamp system which eliminated all roof penetrations and set screws typically associated with seam clamps. These systems utilized stainless steel, aluminum and PVC construction materials with UV shade plates over all PVC conduit to prevent degradation.



Dept. of Veterans Affairs, Multi-Sites & States

Overall Project Size: 4.8 MW

Project Description: In 2009, through our federal GSA contract, REC Solar was awarded a multi-site, multi-state 1.9 MW job which is currently under construction. Expected to be completed in mid-2010, this solar investment will be the Department of Veterans Affairs largest renewable energy project to-date. In 2010, REC Solar was awarded an additional 2.9 MW site in Tucson, Arizona and 200 kW in Riverside, California.



City of Madera Wastewater Treatment Facility

Project Size: 1.16 MW

Project Description: REC Solar was awarded the engineering, procurement and construction of the solar array at the Wastewater Treatment Facility. The system will utilize dual axis tracking to optimize power output. Power will be sold to the City under a 20-year power purchase agreement rate starting below the City's current cost of power.



VBZ Cold Storage Facility, Delano, CA

Project Size: 1.16MW

Project Description: REC Solar was hired to design, procure and install a custom solar ground mount installation on approximately four acres at the VBZ Cold Storage site in Delano, CA. The project goal was to design the highest quality system possible for the lowest lifetime kWh hour cost.



Castlerock Cold Storage Facility, Delano, CA

Project Size: 1.16MW

Project Description: REC Solar was hired to design, procure and install a custom solar ground mount installation on a neighboring cold storage facility just down the road from VBZ. The solar system will help offset the cost of electricity at the grape cold storage facility. This similar project is scheduled for August 2010 completion.



Poway Unified School District, Poway, CA

Project Size: 694 kW

Project Description: REC Solar designed and installed solar systems on 4 Poway Unified School District campuses spread across 16 buildings. All work was permitted under the California Department of State Architects (DSA). The systems are owned and operated by Honeywell Building Solutions. REC Solar will also be conducting educational sessions for students, parents, and teachers.



Athenian School, Danville CA

Project Size: 221 kW

Project Description: REC Solar worked with the Athenian School to install a custom solar system on the hillside above the school's sports fields. REC Solar completed significant geotechnical analysis to ensure the hillside was stable and able to support the solar array. REC Solar installed over one hundred, 15 foot piers to support the hillside system.



Allwire, Inc., Chowchilla, CA

Project Size: 484 kW

Project Description: This system included a roof-mounted array mounted to the top of a corrugated metal roof. REC Solar’s responsibilities included the professional structural analysis of the building and the full design and construction of the system.



Longs Drug Stores, Multi-Sites in Hawaii

Overall Project Size: 316 kW

Project Description: REC Solar is working with Longs Drug Stores as it rolls out solar across its facilities. REC Solar has completed three (3) systems, starting in Kauai, Hawaii. The system was designed to resist Hawaii’s corrosive conditions and hurricane wind speeds.



DuPont, Pioneer Parent Seed Facility, Kauai, HI

Project Size: 282 kW

Project Description: REC Solar designed and installed this fixed tilt, ground mounted system on the southern part of the island of Kauai. The system site is located at the mouth of the Waimea Ditch with the array expected to be exposed to 1-2 feet of flowing water during the rainy season. The site was also within 1km of the ocean and directly exposed to ocean trade winds. The array was designed with corrosion resistance as the first priority.



Mission Foods, Panorama City, CA

Project Size: 185 kW

Project Description: Mission Foods, a subsidiary of Gruma Corporation, is a manufacturer of tortillas and tortilla-related products based in Irving, Texas. The company procured a 185KW solar electric system from REC Solar for their manufacturing facility in Panorama City, California. REC Solar used our proprietary racking solution for the design of the mounting system.

Management Team

The reputation we maintain for quality in the solar industry has resulted in a higher than average ratio of candidates who come to REC with PhD's, MBA's, professional licenses, and advanced engineering degrees. Our experienced construction management team has enabled us to attain a reputation as a consistent and efficient solar provider focused on customer satisfaction and quality workmanship. More than 95% of customers are "satisfied" with their customer experience, resulting in over 30% of new business volume coming from referrals. (Source: Internal client surveys)

REC has received several awards and recognition over the past year, including Inc Magazine's *13th Fastest Growing Energy Company* in the United States, Angie's List *Super Service Award*, Mitsubishi Electric *Supplier of the Year Award*, Best of the Bay *Best in Service Award* in the San Francisco Bay Area and was nominated for Wall Street Journal's *Best Workplace Award*.

Every project has corporate level management from REC Solar Headquarters in San Luis Obispo as well as local construction management at the site. REC Solar will oversee quality of service and product and is the prime contractor responsible for all of the project work.

Executive Management

Angiolo Laviziano

Chief Executive Officer

Angiolo Laviziano is the Chief Executive Officer of REC Solar. He has over 10 years experience in the global solar market. He joined REC Solar in 2005 with the vision to combine business success with the goal to create sustainable energy solutions.

Prior to joining REC Solar in 2005, Angiolo was one of the founding members at Conergy AG – one of the largest solar companies in the world at that time. As CFO and Chief Sales Officer he was instrumental in Conergy's rapid growth into the international solar market in Europe, Asia, South America and United States. Before that he worked at an investment bank in Hong Kong and at the Prime Minister's Office of Laos where he helped the country to become an eco-tourism destination.

Angiolo has published and presented a number of articles and papers in PV-related scientific magazines and at conferences. He received a Masters degree in Business from the Koblenz School of Corporate Management in Germany and a Ph.D. degree in Financial Economics from the University of Hong Kong.

Kam Mofid

President

Kam Mofid is President of REC as well as its corporate parent, Mainstream Energy. In this position, Kam is responsible for the overall management of the company's two business units, REC Solar, and AEE Solar. Additionally, he is responsible for charting and implementing the company's strategic growth initiatives.

Kam has served with distinction in key leadership positions in major global organizations in the automotive, aerospace, and industrial firms. Prior to joining

Mainstream Energy he led the “green technology” arm of Teleflex Inc. as Group President where he dramatically grew the company’s capabilities and market position in alternative fuels, emission reduction, power management, and climate control products and technologies. Prior to Teleflex, Kam was Director of Global Materials and Logistics at United Technologies’ Pratt and Whitney division, a world leader in design and manufacturing of commercial and military jet engines.

Kam holds a B.Sc. degree in Electrical Engineering from the University of Waterloo, in Waterloo, Ontario, Canada, a M.Sc. degree in Manufacturing Management from Kettering University in Flint, Michigan, and a M.Sc. degree from Georgia Institute of Technology’s school of Industrial & Systems Engineering in Atlanta, Georgia.

David Termond

Chief Financial Officer

David Termond is Chief Financial Officer of REC Solar as well as its corporate parent, Mainstream Energy, where he is responsible for the company’s overall financial activities and leads several departments, including business unit finance, tax and controllership.

A finance veteran from the high tech industry, he previously was Vice President and Corporate Controller at E2Open. He was responsible for managing the company’s worldwide cash, debt, foreign exchange, capital structure, risk management and benefits plan administration.

Before that, he was Vice President of CIT Finance for McKesson, the nation’s largest and oldest health care services company. David holds an MBA from Pennsylvania State University and a BA in Economics from Marquette University.

Matthew Woods

VP Sales and Business Development

Matthew Woods manages all sales activities for REC Solar. He currently oversees all sales regions in six states with annual sales growth over 75 percent. Under his leadership, REC Solar has grown to become one of the largest solar system integrators in the United States.

“My passion is providing the best solar solution to our customers” says Matthew. “At REC Solar we deliver great value and impeccable service to our clients every day. We are not just another installer – we pride ourselves in being a partner that our customers can trust before, during and after the installation of their solar system.”

Matthew previously worked in the financial services industry as a district sales manager for a Fortune 500 company and the US banking division for Comerica Bank. He has a B.S. in Finance and Economics from California Polytechnic State University, San Luis Obispo.

Ethan Miller**Vice President of Operations**

Ethan Miller is the Vice President of Operations and oversees the implementation, engineering, and materials procurement service of all solar projects. This includes commercial and residential projects installed through REC Solar's 15 branch locations and the corporate team responsible for large government, utility and commercial projects. Since 2001, Ethan has managed the engineering and installation of REC Solar projects witnessing firsthand the evolution of the US solar industry. During his experience at REC Solar, Ethan has personally managed over 4,500 projects totaling over \$250 million in value. He has a BS in Mechanical Engineering with a focus in renewable energy from California Polytechnic State University, San Luis Obispo. He holds REC Solar patents on currently utilized custom racking solutions. His knowledge of solar technology and installation best practice has earned him participation in several solar energy committees where he stays up to date on industry advancements.

Kevin Mackamul**Director Utility Project Development**

Kevin is a veteran in the solar industry, having worked on many projects and with leading PV companies since 1981. Kevin has designed MW's of solar projects with a tracking technology that he owns IP for. Kevin was most recently the Director of Engineering for Regenesys Power where he designed several large scale multi-MW solar projects.

System Specifications

REC 225 PE-US Modules

REC Solar has designed the proposed systems based on the REC Group PE-US solar module (or equivalent equal). With a rating of 225 Watts this proven module offers many features that make it ideal for this installation.

- **Efficiency** - REC Group modules have an industry leading CEC efficiency-to-nameplate rating in excess of 87%.
- **Tight Power Tolerances** - REC Group panels come out of the factory boasting a very narrow acceptable range of output power compared to nameplate rating. Maximum power output tolerance of +/-2%.
- **25-Year Power Output Guarantee** - These modules are guaranteed to be producing at least 80% of their original power at year 25 under standard warranty conditions.
- **Factory Tested Quick Connectors** - The quick connectors greatly reduce wiring time and eliminate field wiring and safety problems. These allow for easy installation.
- **Reputation** - REC Group is one of the largest producers of PV grade silicon in the world and a standard for quality with other module manufacturers throughout the world. That is why so many panel manufacturers use REC Group silicon, wafers, and cells.
- **Certification Testing** - REC modules are certified according to UL1703 (by CSA) and listed on the CEC listing. For Europe the modules are certified according to IEC 61215 and 61730 (by TÜV).



REC Group modules utilize 60 high efficiency, multi-crystalline square cells. The module has a PTC rating of 199.7 watts, and an efficiency of 13.7%. See power output profiles below. The glass used in the construction of the module is treated so that performance is not compromised in low-lighting conditions. The rear junction box has built-in bypass diodes to minimize the effects of shading. Anodized aluminum frames are bonded to the laminates to provide resistance to heavy wind and snow loads.

Advanced Energy Solaron Inverter

The Solaron inverter is highly efficient and reliable, with its robust, bipolar architecture and patented, soft-switching technology, achieves 98% efficiency.

- The Solaron PV inverter achieves breakthrough 98% efficiency - the highest efficiency commercially available. This extraordinary cost-per-watt reduction means immediate out-of-the-pocket savings and a greater return on your total-system-cost investment.
- Reduces Energy Loss and Noise with an Advanced Transformerless Design Conventional inverter designs with integrated transformers are less efficient and produce a high-pitched hum. Solaron inverters truly transformerless design not only reduces energy losses but reduces size, weight, and noise, giving greater flexibility for commercial installations to place the inverter wherever most convenient.
- Consumes Half the Current with the Same Power, Using bipolar Architecture The Solaron PV inverter's bipolar architecture with high-differential PV voltage consumes half the current for the same power, minimizing component energy losses for higher efficiency.
- Optimizes Power Generation with Higher-Voltage, Soft-Switching Technology Solaron's higher-voltage IGBTs and patented, soft-switching technology optimizes power generation for clean, smooth, stable power delivery. This technology eliminates large electrolytic capacitors, a common point of failure, and the high switching frequency contributes to quieter inverter operation.
- Reduces Unnecessary Losses with a Quieter Air-and-Liquid Cooling Method the Solaron PV inverter uses a combination method of air and liquid cooling to reduce energy consumption and noise, and to maximize efficiency.

REC Solar Proprietary Mounting System-Series 350

- Modules tilted at a 20 degree pitch in order to obtain lowest LCOE.
- Engineered to minimize materials along with labor and handling costs, resulting in lower total system costs and LCOE
- Multiple footing options, including driven piles, concrete footings and pre-cast ballasted footings, which will be selected on a site by site basis in order to optimize racking system for the site.
- All structural members to be galvanized steel or anodized aluminum
- All hardware to be galvanized or stainless steel
- Complies with 2006 IBC wind gust criteria
- Approved for wind loads up to 120 MPH
- Proprietary theft deterrent hardware system

Ray Tracking Horizontal Single Axis Tracker

- Shade Avoidance Technology maximizes energy production by eliminating energy-robbing track-to-tracker shading
- Complete PV racking system, supplied with module-specific, pre-drilled panel mounts and hardware
- Multiple footing options, including driven piles, concrete footings and pre-cast ballasted footings, which will be selected on a site by site basis in order to optimize racking system for the site.
- All structural members to be galvanized steel or anodized aluminum
- All hardware to be galvanized or stainless steel
- Complies with 2006 IBC wind gust criteria
- Approved for wind loads up to 120 MPH
- Proprietary theft deterrent hardware system
- Simple and elegant, with just two moving parts – the actuator and one structural element that rotates on a bearing surface
- Automatic nighttime 10° stowing mode allows rain and dew to run off, helping to keep the panels clean, and minimize wind loads during non-tracking hours
- Tracker mechanism is welded to the vertical posts for a permanent connection and maximum strength



Wiring

- All wiring methods and installation practices conform to the (2008 NEC) and local building codes
- All underground circuits to be direct burial cable, or contained in PVC or RMC.
- All underground RMC to be protected from contact with soil
- Exposed PV solar panel wiring will be USE-2 or RHW-2 U.V. resistant, 90 degree C, wet rated. All exposed cables, such as module leads will be secured with mechanical or other sun-light resistant means.
- Long straight conduit runs, 100 feet or more, will have expansion fittings.
- Fuses and wires subject to transformer inrush current will be sized according to manufacturer.
- All DC materials will be listed for 1000 VDC.
- Connectors to be torqued per device listing or manufacturers recommendations.
- Splices/connectors will be insulated with approved means. UL listed electrical tape alone is not suitable as the only insulation means. follow manufacturers instructions for application of insulating product. exception: connectors used for grounding will not be insulated.
- All conductors to be copper.
- Voltage drop for proposed PV system to be limited to 2% dc and 1.5% ac.

Grounding

- Equipment grounding conductors and system grounding conductors will have as short a distance to ground as possible and a minimum number of turns.
- All Non-current carrying metal parts will be checked for proper grounding; noting that terminal lugs bolted on an enclosure's finished surface may be insulated because of paint/finish. as needed, remove paint/finish to ensure proper grounding.
- Modules will be bonded to the facility grounding electrode through the combined use of direct bury, AL/CU rated lay-in type lugs attached to the module frames, equipment grounding conductors compliant with NEC 250.122 and the building steel compliant with NEC 250.136.
- The connection to the module or panel of this proposed solar electric system will be so arranged that removal of a module or a panel from the photovoltaic source circuit does not interrupt a grounded path to another photovoltaic source circuit.
- Grounding system components will be listed for their purpose, including but not limited to ground rods, grounding lugs, grounding clamps, etc. grounding devices exposed to the elements will be rated for direct burial.

Disconnecting Means

- Means will be provided to disconnect all current carrying conductors of the photovoltaic power source from all other conductors in the building.
- Where a circuit grounding connection is not designed to be automatically interrupted as part of the ground-fault protection system required by section 690-5, a switch or circuit breaker used as a disconnecting means will not have a pole in the grounded conductor.
- The disconnecting means will not be required to be suitable as service equipment and will be rated in accordance with section 690-17.

Disconnection of Photovoltaic Equipment

- Means will be provided to disconnect equipment such as inverters from all ungrounded conductors of all sources if the equipment is energized from more than one source, the disconnecting means will be grouped and identified.
- Dead front mechanical means will be provided to disconnect a fuse from all sources of supply if the fuse is energized from both directions and is accessible to other than qualified persons. Such a fuse in a photovoltaic source circuit will be capable of being disconnected independently of fuses in other photovoltaic source circuits.
- All disconnects and combiners will be secured from unauthorized and unqualified personnel by either lock or location.

Switch Gear

REC Solar will specify and provide AC switchgear for the project. The design will include pads, wiring and cabling to the switchgear in accordance with all applicable codes and best industry practices. The following provisions will also be required:

- Switchgear will meet requirements per NEMA, ANSE, IEEE, and UL Standards
- Switch accessibility will meet all jurisdictional and utility requirements
- Switchgear should have a single main disconnecting means, bolt type, with visible blades.

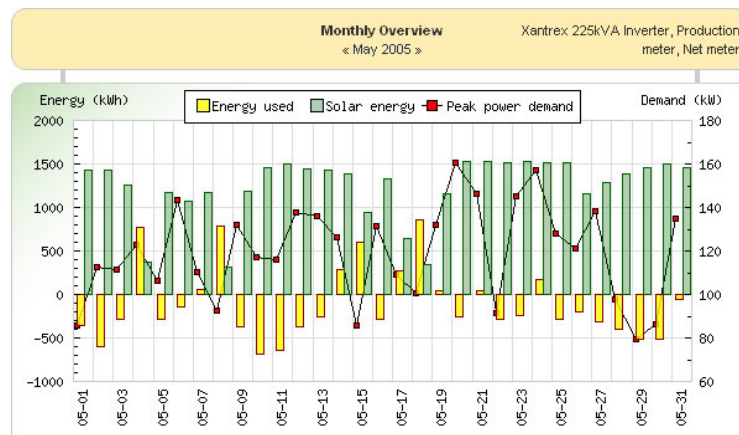
RETrack3 Energy Grade Monitoring – Energy ReCommerce

REC Solar has included the Energy ReCommerce (ERI) data acquisition system in this proposal. The remote monitoring system provides live monitoring of system operation and revenue-grade metering for billing, energy management, and monitoring for Renewable Energy Certificate production. The RETrack3 monitoring kit includes RETrack internet gateway / data logger, revenue grade energy meter and web interface through MYPVDATA.

This monitoring solution is a combination of proprietary technology and an open platform which provides flexibility and allows the MYPVDATA web interface to incorporate information from other monitoring systems and consolidate legacy sites into one user interface.

Additional parameters that make RETrack3 the preferred monitoring product for this project:

- Collects data both synchronously and asynchronously from sources such as the ERI Internet Gateway/Data logger, Modbus/TCP energy meters, ftp servers, and remote http servers.
- Data is validated at the source, by time stamp and validation key generation to ensure accuracy.
- Validation key insures that every sample can be tested for correct source, and value.
- Data is collected in the Information Server, and processed with one or more modules, such as data logging, production performance analysis, alarming, and rate analysis.
- Provides power and building demand monitoring and net metering.
- Real-time power values available at 15-minute intervals.
- Performance alarming available.
- Cellular connection option.
- 5 years Monitoring and hosting service on MYPVDATA.com



Step-up Transformers

REC Solar will specify and provide isolation/step-up transformers for the project. The design will include pads, wiring and cabling to those transformers in accordance with all applicable codes and best industry practices. Transformers will be rated for inverter source operation. The following provisions will also be required:

- Transformers will meet transformer efficiency standards set forth in the Department of Energy “Energy Conservation Program for Commercial Equipment: Distribution Transformers Energy Conservation Standards; Final Rule” published October 12, 2007.
- Transformers will be rated for inverter source operation and the environment in which they will operate.
- Transformer will be supplied with a no load tap changer with high voltage taps: 2@ 2.5% above and below nominal voltage – fully rated.
- Transformer will be supplied with a fused disconnect switch on the transformer high voltage side to isolate the transformer in case of an internal fault. The switch/transformer configuration will be designed for loop feed.
- Transformers will be either dry-type or less-flammable oil insulating fluid.
- Enclosure finish will be designed for a thirty year service life.
- Accessories to include liquid level and pressure/vacuum gauges, a dial-type thermometer with SPDT alarm contacts, a pressure relief valve, and a drain valve with sampler.
- Transformer cooling type: ONAN / ONAF / ONAF; oil natural circulation air natural circulation / oil natural circulation air forced circulation.

Fencing/Security

REC Solar will design the security system for all ground mounted equipment, which will include the following guidelines:

- Security fencing can be furnished and installed as follows: Six (6) foot high standard galvanized chain link fence with three strands of barbed wire on 45° angle support arms.
- Gates, as required for vehicular access, will be a minimum of 2 sections, each 10 feet wide.
- Perimeter signage will be provided and installed every 200 feet along the perimeter fence approximately 24” wide and 10” high, stating in both English and Spanish to keep out due the dangerous high voltage of the system.

Appendix

