



Santa Clara City
2603 Santa Clara Drive
Santa Clara, UT 84765
Phone: (435) 656-4690
Fax: (435) 879-5313

APPLICATION REQUIREMENTS FOR RENEWABLE NET METERING & INTERCONNECTIONS

Please read thoroughly all of the following information. With the help of your Installation Contractor, fully complete this Building Permit Application, all supporting documents, and the Santa Clara City Net Metering Agreement and submit to the Santa Clara City Building Department for review and approval.

Required Documents:

Initial

1. Read and Agreed to Appendix 1 of this Application. _____
2. Read and Agreed to Appendix 2 of this Application. _____
3. Completed Building Permit Application. _____
4. Signed Net Metering Agreement. _____
5. All equipment, signage and installation practices must meet NEC codes 690 & 705. _____
6. One-page site map and system one-line diagram must accompany this application. This document must indicate the location of the solar electric modules, inverter, batteries (if any), lockable disconnect switch, and point of connection with the utility system. All electrical equipment specifications and calculations must be shown on the one-line. Any signs/labels should be shown with their respective calculated values on the one-line. The installation address, installer's name and telephone number must also be included. _____
7. All datasheets for the proposed equipment (solar panels, inverters, cable, etc.) must be included in the application as well as a structural load design and letter from a structural engineer licensed in the State of Utah. _____
8. Labels shall be phenolic where exposed to sunlight. Hand-written marker pen labeling is not allowed. Labels shall be red background with white lettering. Lettering must be at least 3/8" in height. Please see Appendix 2 for a complete list of labels. _____
9. The Production meter shall be located on the exterior of the building near the net meter. In addition, the production meter socket, shall be a Milbank 125-Amp Ringless Single Phase (12/240) or equivalent Meter Socket. _____

APPENDIX 1

Customer uses more energy from the City

If the energy supplied by the City exceeds the electricity generated by the Customer and fed back to the City during the billing period, or a portion thereof if during the first or last month of power service to Customer, then the Customer shall be billed for the net energy supplied to Customer by the City's electric distribution system together with the appropriate customer Base Rate Charge (paid by other customers of the City in the same rate class) as well as the Solar Reliability Charge.

Customer produces more energy than it uses from the City

If, in a given monthly billing period, a Customer supplies more electricity to the electric distribution system than the City delivers to the Customer, the City will credit the customer for the excess at the current Renewable Power Rate. The Customer is still responsible to pay the Base Rate Charge and the Solar Reliability Charge. If the credit for energy supplied to the City is greater than the Base Rate and the Solar Reliability Charge, the credit will be applied to their next billing period.

End of year credit

If a customer has a kWh credit at the end of the fiscal year (year ending in June), the City will issue a refund to the Customer for the kWh credit at the Renewable Power Rate available within thirty (30) days of the end of the billing cycle.

Solar Reliability Charge

The Solar Reliability Charge reflects both the Customer solar PV system inverter's continuous AC name plate rated kW capacity, and the cost per kilowatt-hour (kWh) for Santa Clara City to meet the full power demand of net-metered customers. First, the Customer's estimated monthly kWh solar generation is calculated by multiplying the total kW capacity of the Customer's system times 149 kWh (estimated average solar generation per kW capacity per month in Santa Clara). Second, Santa Clara City Utility determines its cost per kWh by dividing its total operation expense by the total kWh it purchases during a given period. The Customer's Solar Reliability Charge is then calculated by multiplying the Customer's estimated monthly kWh solar generation, times the City's cost per kWh. Both the estimated average solar generation per kW capacity per month for Santa Clara, and Santa Clara's per kWh cost will be reviewed annually and adjusted by the City as needed.

For example only:

kW Size	Monthly kWh * Charge	SRC
1 kW	1 * 149 = 149 kWh * \$0.01376	\$2.05
2 kW	2 * 149 = 298 kWh * \$0.01376	\$4.10
3 kW	3 * 149 = 447 kWh * \$0.01376	\$6.15
4 kW	4 * 149 = 596 kWh * \$0.01376	\$8.20
5 kW	5 * 149 = 745 kWh * \$0.01376	\$10.25
6 kW	6 * 149 = 894 kWh * \$0.01376	\$12.30
7 kW	7 * 149 = 1,043 kWh * \$0.01376	\$14.35
8 kW	8 * 149 = 1,192 kWh * \$0.01376	\$16.40
9 kW	9 * 149 = 1,341 kWh * \$0.01376	\$18.45
10 kW	10 * 149 = 1,490 kWh * \$0.01376	\$20.50
11 kW	11 * 149 = 1,639 kWh * \$0.01376	\$22.55
12 kW	12 * 149 = 1,788 kWh * \$0.01376	\$24.60

To find your SRC charge, take the total kW installed and multiply by 149 kWh, to get your total estimated kWh solar generation per month. Then multiply by the City's per kWh cost of \$0.01376. In this example, the Solar Reliability Charge is \$2.05 per kW capacity.

Renewable Power Rate

The renewable power rate is calculated from the weighted average cost of power Santa Clara City receives from its' energy sources. Additionally, the rate includes the cost of transmission, schedule, and reserves and factors in the Solar Reliability Charge. The renewable power rate will be review annually and adjusted as needed.

Santa Clara's Renewable Power Rate is \$.04 per kWh.

APPENDIX 2

Signs & Labels

NEC Article	Required Location for Label	Wording
690.5 (c)	Utility-interactive inverter, battery enclosure	"WARNING: ELECTRIC SHOCK HAZARD IF A GROUND FAULT IS INDICATED, NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED"
690.10 (c)	Single source systems only	"WARNING: SINGLE SOURCE 120 VOLT SUPPLY, DO NOT CONNECT MULTI-WIRE BRANCH CIRCUITS"
690.14 (c)(2)	AC & DC disconnects	"PHOTOVOLTAIC SYSTEM DC DISCONNECT" "PHOTOVOLTAIC SYSTEM AC DISCONNECT"
690.17	Placed on the disconnect from the solar panels to the PV system	"WARNING: ELECTRIC SHOCK HAZARD. DO NOT TOUCH TERMINALS. TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION."
690.35 (f)	For ungrounded systems. On each junction box, combiner box, and disconnect.	"WARNING: ELECTRIC SHOCK HAZARD. THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED."
690.53	DC disconnects. This section must be completed if a main inverter system is being installed	"Operating current _____ Operating voltage _____ Maximum system voltage _____ Short circuit current _____ Maximum rated output current of the charge controller (if used) _____"
690.54	At the interactive points of interconnection, usually the main service	"Rated AC output current _____ Normal operating AC voltage _____"
690.56 (b)/ 705.10	At the electrical service and at the photovoltaic inverter if not located at the same location. Every effort should be made to have the inverter and AC & DC disconnect near the electrical service.	A directory providing the location of the service disconnect means and the photovoltaic system disconnecting means.
Utility Requirement	Back-fed panel boards, inverter output OCPD	"WARNING: INVERTER OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE"
Utility Requirement	On conduit, raceways, enclosures, mark every 10', at turns, above or below penetrations	"CAUTION: SOLAR CIRCUIT"
Utility Requirement	Main electrical service.	"WARNING: MULTIPLE SOURCES OF POWER. A PV SYSTEM IS PRESENT. DISCONNECT ALL POWER SOURCES BEFORE SERVICING"

SANTA CLARA CITY
SOLAR PERMIT APPLICATION



Building Dept: 435-656-4690

Date of Application:				Date Issued:		Permit No. SAC	
▼ CUSTOMER INFORMATION ▼				▼ BUILDING FEE SCHEDULE ▼			
Owner Name:				Valuation:			
Property Address:				Building Fees:		\$	
Phone #:		Email:		Plan Review Fees:		\$	
Lot #:		Subdivision:		Application Fee:		\$	25 00
Tax ID:		Service Size:		Net Meter Fee:		\$	275 00
▼ CONTRACTOR INFORMATION ▼				Maintenance Deposit:		\$	500 00
Contractor:		State Lic. No.:		State Fee (1%):		\$	
Contractor Email:				➤➤ TOTAL:		\$	
Contractor Address:		Phone:		▼ CITY POWER DEPARTMENT USE ONLY ▼			
Contractor City:		State:		Zip:			<u>Received</u> <u>Approved</u>
Contact Name:		Phone:		Complete Application			
▼ SOLAR SYSTEM INFORMATION ▼				Site / Facility Layout Diagram			
System Type: ☐ Utility Interactive ☐ Dedicated Circuit ☐ Stand-Alone				Facility One-Line Diagram			
kW AC Installed Capacity:		kW AC (Maximum 12)		Net Meter Agreement			
Solar Electric Module Manufacturer:				Engineering			
Model Number:				Program Sequence Summary			
Power Rating per Module:		(DC Watts)		Type of Class:	☐ Class 1 (1 to 10 kW)	☐ Class 2 (10 to 1000 kW)	
Number of Modules:				▼ APPROVALS ▼			
Total Array Output:		(DC Watts)		Signature of Power Director:		Date:	
Conductor Type:		AWG or kcmil:		Signature of Building Official:		Date:	
Number of Conductors:				Comments:			
Are you installing a combiner box with fuses? ☐ Yes ☐ No Size:							
Inverter Manufacturer:							
Model Number:				▼ SIGNATURES ▼			
Inverter's Continuous AC Name Plate Rating:		(AC Watts)		I hereby certify that I have read and examined this application and know the same to be true and correct. All provisions of laws and ordinances governing this type of work will be complied with whether specified herein or not the granting of a permit does not presume to give authority to violate or cancel the provisions of any other state or local law regulating construction and that I make this statement under penalty of perjury.			
Number of Inverters:							
Total Inverter Output:		(AC Watts)					
Inverter's Peak Efficiency:				The Maintenance Deposit is refundable after final inspection if site is kept clean and final inspection is passed.			
Solar Electric Array Location: ☐ Rooftop ☐ Pole Mount ☐ Ground Mount							
Inverter Location: ☐ Indoor ☐ Outdoor							
Utility-accessible AC Disconnect Switch Location:				Signature of Owner:		Date:	
Does this system include batteries or generator backup: ☐ Yes ☐ No				Print Name:		Date:	



RENEWABLE NET METERING & INTERCONNECTION AGREEMENT

This Net Metering and Interconnection Agreement ("Agreement") is made and entered into as of this _____ day of _____, 20__, by the City of Santa Clara, a municipal corporation and political subdivision of the State of Utah herein referred to as the "City" and _____, herein referred to as the "Customer" located at _____, Santa Clara, Utah, 84765.

RECITALS

WHEREAS the City Council of the City of Santa Clara adopted the Renewable Net Metering & Interconnection agreement Policy ("Net Metering Policy"), effective February 24, 2016, to encourage and regulate the orderly installation and maintenance of parallel renewable energy systems interconnected with the City's existing electric distribution system;

WHEREAS, pursuant to the City's Net Metering Policy, Customer wishes to install, operate, and maintain a renewable energy net metering facility, no greater than 12 kilowatts, interconnected with the City's existing electric distribution system;

WHEREAS, the City intends to credit against customers total electric energy usage that portion supplies by the Customer's own renewable energy net metering facility; and

WHEREAS, customer wishes to sell and the City wishes to purchase any excess energy produced by the Customer's renewable energy net metering facility;

AGREEMENT

NOW, THEREFORE, the parties mutually agree and covenant as follows:

1. Renewable Energy Net Metering Facility:

Customer's renewable energy net metering facility (the "Facility") shall mean the generating facility described in Exhibit A attached hereto. The Facility shall consist of a solar (Photovoltaic) generating facility located on the Customer's premises, that is interconnected with and operates in parallel with the City's electric transmission and distribution facilities, and is intended to primarily offset part or all of the Customer's own electrical requirements. The design, installation, and operation of the Facility shall comply in all aspects with the City's Net Metering Policy. Customer shall be responsible for the design, installation and operation of the Facility and for obtaining and maintaining all required permits and approvals as well as payments of all applicable fees related thereto. This Agreement is applicable only to the renewable energy net metering facility described in Exhibit A and Customer shall not make any modification to the Facility without the prior written consent of the City.

2. Term: **Initial:** _____

This Agreement shall commence on the date established above and shall remain in effect until terminated by either party upon thirty (30) days prior written notice, provided, however, that this Agreement will terminate automatically upon:

- a. Any change of ownership of Customer, if Customer is not an individual;
- b. Any change in ownership of the Facility or the premises upon which the Facility is located;
- c. Any change in the location of the Facility; or
- d. Removal of the Customer from the utility account associated with the Facility.

The City reserves the right to review, modify, or amend this Policy at a minimum of every three (3) years. The City reserves the right to modify or amend the Solar Reliability Charge (SRC), and/or the Renewable Power Rate, as described in Exhibit B, at any time during the contract period, upon thirty (30) days written notice to the Customer.

3. Definition of Net Energy:

Net Energy is the difference between electrical energy consumed by the Customer from the City's electric distribution system and the electrical energy generated by the Customer and fed back into the City's electric distribution system.

4. Measurement of Net Energy:

Bi-direction metering equipment ("Net Meter") shall be installed to measure the flow of electrical energy in each direction. The bi-directional metering equipment shall be installed at the Customer's expense. The bi-directional metering equipment shall be used to provide information necessary to accurately bill or credit Customer and to collect electrical generating system performance information for research purposes.

A Production Meter will also be installed by the City, at the City's expense, near the bi-direction meter. The Production Meter shall be used to measure the flow of electrical energy from the Facility for research purposes and determining total usage of the connection.

5. Purchase of Energy and Payment:

- A. The City shall measure the net energy produced or consumed by the Customer during each billing period, in accordance with normal metering practices.
- B. If the energy supplied by the City exceeds the electricity generated by the Customer and fed back to the City during the billing period, or any portion thereof, then the customer shall be billed for:
 - i. The appropriate customer base charge paid by other customers of the City in the same rate class;
and
 - ii. The monthly Solar Reliability Charge as described in Exhibit B;
and
 - iii. The net energy supplied to Customer by the City's electric distribution system.

- C. If the energy generated by Customer and distributed back to the City's electric distribution system during the billing period, or any portion thereof, exceeds the energy supplied to the Customer by the City's electric distribution system, then the customer shall be billed for:
- i. The appropriate customer base charge paid by other customers of the City in the same rate class;
and
 - ii. The monthly Solar Reliability Charge as described in Exhibit B;
and
 - iii. Credit for the net excess kWh's generated during the billing period at the Renewable Power Rate as described in Exhibit B, with this kWh credit appearing on the Customer's bill for the following billing period.
- D. The City will purchase a Customer's excess kWh at the end of each billing cycle by crediting the Customer at the Renewable Power Rate Available as defined in the Renewable Net Metering Program.
- E. If a home with a Renewable Resource is sold, any remaining credits will be applied to the electrical billing for kWh consumption with any remaining unused credits above the total billing will be paid to the customer at the Renewable Power Rate Available within thirty (30) days.
- F. Net Metering credit shall only be applied to offset part or all of the Customer's own electrical requirements at a single metering point exclusively. Net Metering credit shall not be applied to multiple meters owned by a single Customer at separate locations.
- G. This agreement is between the electric Customer and the City. Nothing in this policy allows for the purchase or sale of energy produced by the Customer to or from a third party. Renewable Resources on rental units are not eligible for Net Metering under this policy.

6. Interconnection:

Customer shall provide the electrical interconnection on its side of the bi-directional metering equipment in accordance with the City's Net Metering Policy. The City may make such modifications to the City's system as are reasonably necessary to accommodate the Facility in accordance with the City's Net Metering Policy. The cost for such modifications will be due in advance of construction. Customer shall ensure at its own expense that the Facility includes all equipment necessary to meet applicable safety, power quality and interconnection requirements established by the City's Net Metering Policy, as may be amended from time to time by other applicable City policies and ordinances, by applicable state law and by the National Electric Code ("NEC"), National Electric Safety Code ("NESC"), the Institute of Electrical and Electronic Engineers, Inc. ("IEEE") – standard 1547 for Interconnecting Distributed Resource with Electric Power Systems and Underwriters Laboratories Inc. ("UL") – standard 1741, Inverters, Converters and Controllers for use in Independent Power Systems. Customer shall not commence parallel operation of the Facility until the City has inspected the Facility, including all interconnection equipment and issued a written approval in accordance with the City's Net Metering Policy, which includes a stipulated start time and following which operations in parallel are permitted.

7. Disconnect Device:

Customer shall furnish and install, on its side of the bi-directional metering equipment a safety

disconnect device capable of fully disconnecting and isolating the Facility from the City's electric distribution system. The disconnect device shall be located adjacent to the City's bi-directional metering equipment or other location approved by the City and shall be of the visible break type in a metal enclosure that can be secured by a padlock. The disconnect device shall be accessible to the City's personnel at all times and shall conform to the National Electric Code Standards. The City shall have the right to disconnect the Facility from the City's electric distribution system when necessary to maintain safe and reliable electrical operation condition or if in the City's sole judgement, the Facility at any time adversely affects the operation of the City's electric distribution system or the quality and reliability of the City's service to other customers. The City shall have the right to require that the Facility remain disconnected until such time as the City determines, in the sole discretion, that the condition(s) required the disconnection have ended or been corrected. The City shall have the option of requiring ongoing testing of disconnection equipment.

8. Operational Standards:

Customer shall furnish, install, operate and maintain in good order and repair, all without cost to the City, all equipment required for the safe operation of the Facility in parallel with the City's electric distribution system. This includes, but is not limited to, equipment necessary to:

- a. Establish and maintain automatic synchronism with the City's electric distribution system; and
- b. Automatically disconnect the Facility from the City's electrical distribution system in the event of overload or outage of the City's electrical distribution system.

The Facility must be designed to operate within allowable operating standards for the City's electric distribution system. The Facility must not adversely affect the quality or reliability of service provided to the City's other customers. The City shall have the right to periodically inspect the Facility.

9. Installation and Maintenance:

Except for the bi-directional and production metering equipment owned by the City, all equipment on Customer's side of the delivery point, including the required disconnect device, shall be provided and maintained in satisfactory operating condition by Customer and shall remain the property and responsibility of the Customer. The City will bear no responsibility for the installation or maintenance of Customer's equipment or for any damage to property as a result of any failure or malfunction thereof. The City shall not be liable, directly or indirectly for permitting or continuing to allow the interconnection of the Facility or for the acts or omission of Customer or the failure or malfunction of any equipment of Customer that causes loss or injury, including death, to any party.

10. Indemnity and Liability:

Customer shall defend, hold harmless, and indemnify the City and its directors, officers, employees and agents against any and all loss, liability, damage, claim, cost charge, demand or expense (including any direct, indirect or consequential loss, liability, damage, claim, cost, charge, demand, or expense including attorney's fees) for injury or death to persons, including employees of the City and Customer or damage to property, including property of the city and Customer, arising out of or in connection with (a) the engineering, design, construction, maintenance, repair, operation, supervision, inspection, testing, protection or ownership of the Facility or (b) the making of placements, additions, betterment of or reconstruction of the Facility. Customer's duty to indemnify the City hereunder shall not extend to loss, liability, damage, claim, cost charge,

demand, or expense resulting from interruptions in electrical service to the City's customers other than the Customer or resulting from the negligent, willful, or intentional acts of the City.

11. Pre-Operation Inspection:

Prior to interconnection, the Facility and associated interconnection equipment must be inspected and approved by the City and by any other governmental authority having jurisdiction.

12. Access:

Authorized City employees shall have the right to enter upon Customer's property at any time for the purposes of inspection and/or operating the disconnect device and meters or making additional tests concerning the operation and accuracy of the City's meters.

13. Merger:

This agreement constitutes the entire agreement of the parties with respect to the subject matter contained herein and supersedes any prior such agreements. There are no other agreements, written or oral, except as specifically provided herein.

The City reserves the right to modify or amend this Net Metering Agreement, the City's avoided cost rate, the Renewable Power Rate or the Solar Reliability Charge, upon reasonable advance notice to the Customer (30 days).

14. Governing Law and Venue:

This Agreement shall be construed according to the laws of the State of Utah. The parties agree that venue for all legal actions, unless they involve the cause of action with mandatory federal jurisdiction, shall be the Fifth District Court for the State of Utah. The parties further agree that the Federal District Court for the District of Utah shall be the venue for any cause of action with mandatory federal jurisdiction.

15. Notices:

All notices required herein, and subsequent correspondence in connection with this agreement shall be mailed to the following:

City of Santa Clara
ATTN: City Attorney
2603 Santa Clara Drive
Santa Clara, UT 84765

Such notices shall be deemed delivered following the mailing of such notices in the United States mail. Adequate notice shall be deemed given at the addresses set forth herein unless either party of a change of address gives written notice.

16. Counterparts:

This Agreement may be executed in counterparts each of which shall be an original and shall constitute one of the same agreements.

17. Application Provisions:

The City shall make Net Metering available to eligible Customers on a first-come, first-served basis. Single or multiple Net Metering connections to a City owned transformer, which create an

The City reserves the right to restrict the amount of kW (“kilowatts”) installed per connection. The maximum allowed for Residential Customers is 12 kW. Commercial customers shall not be allowed under this policy and shall be reviewed by the City under a separate review and approval process, which may include a system impact study. Renewable Resource connection to transmission lines within the City are prohibited.

Property Owner / Customer

On the _____ day of _____, 20_____, personally appeared before me,
_____, personally known to me or proved to
me on the basis of satisfactory evidence to be the person whose name is signed in the foregoing document
and acknowledged before me that he/she signed it voluntarily for its stated purpose.

SANTA CLARA CITY

ATTEST:

6

"EXHIBIT A"
NET METERING AND INTERCONNECTION AGREEMENT

SECTION 1 – CUSTOMER INFORMATION

Name: _____
Owner Address: _____
City, State, Zip: _____
Mailing Address (if different): _____
Phone: () _____ Mobile: () _____
Email: _____

SECTION 2 – NET METERING FACILITY INFORMATION

System Type: Solar (PV)
Generator Size (kW AC): _____
Inverter Manufacturer: _____ Model #: _____
Inverter Serial #: _____ Inverter Power Rating: _____
Inverter Location: _____

SECTION 3 – INSTALLATION INFORMATION

Licensed Electrician: _____ Contractor #: _____
Electrician Address: _____
City, State, Zip: _____
Phone: () _____ Mobile: () _____
Email: _____

SECTION 4 – CERTIFICATIONS

The Facility has been installed to my satisfaction and I have been given Facility warranty information and an operations manual. I have been instructed regarding the properly operation of the Facility and associated equipment. In addition, the installation has received all necessary local, state and federal approvals and certifications.

Signed (Owner): _____ Date: _____

Stipulated Start-up Date: _____

“EXHIBIT B”
SOLAR RELIABILITY CHARGE & RENEWABLE POWER RATE

Solar Reliability Charge

The Solar Reliability Charge reflects both the Customer solar PV system inverter’s continuous AC name plate rated kW capacity, and the cost per kilowatt-hour (kWh) for Santa Clara City to meet the full power demand of net-metered customers. First, the Customer’s estimated monthly kWh solar generation is calculated by multiplying the total kW capacity of the Customer’s system times 149 kWh (estimated average solar generation per kW capacity per month in Santa Clara). Second, Santa Clara City Utility determines its cost per kWh by dividing its total operation expense by the total kWh it purchases during a given period. The Customer’s Solar Reliability Charge is then calculated by multiplying the Customer’s estimated monthly kWh solar generation, times the City’s cost per kWh. Both the estimated average solar generation per kW capacity per month for Santa Clara, and Santa Clara’s per kWh cost will be reviewed annually and adjusted by the City as needed.

For example only:

kW Size	Monthly kWh* Charge	SRC	To find your SRC charge, take the total kW installed and multiply by 149 kWh, to get your total estimated kWh solar generation per month. Then multiply by the City’s per kWh cost of \$0.01376. In this example, the Solar Reliability Charge is \$2.05 per kW capacity.
1 kW	1 * 149 = 149 kWh * \$0.01376	\$2.05	
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11 kW	11 * 149 = 1,639 kWh * \$0.01376	\$22.55	
12 kW	12 * 149 = 1,788 kWh * \$0.01376	\$24.60	

Renewable Power Rate

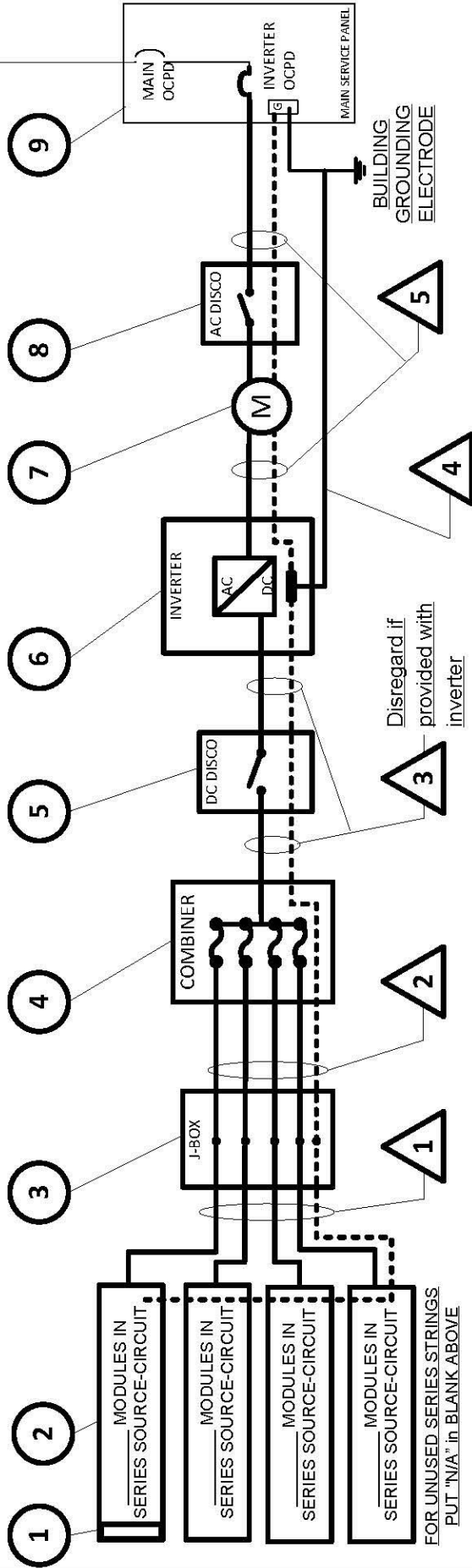
The renewable power rate is calculated from the weighted average cost of power Santa Clara City receives from its’ energy sources. Additionally, the rate includes the cost of transmission, schedule, and reserves and factors in the Solar Reliability Charge. The renewable power rate will be review annually and adjusted by the City as needed.

Santa Clara’s Renewable Power Rate is \$.04 per kWh.

STANDARD STRING SYSTEM ELECTRICAL DIAGRAM

EQUIPMENT SCHEDULE		
TAG	DESCRIPTION	PART NUMBER
1	SOLAR PV MODULE	
2	PV ARRAY	
3	J-BOX (IF USED)	
4	COMBINER (IF USED)	
5	DC DISCONNECT	
6	DC/AC INVERTER	
7	SANTA CLARA POWER METER	
8	AC DISCONNECT (IF USED)	
9	SERVICE PANEL	

____ VAC, ____ A MAIN, ____ A BUS, ____ A INVERTER OCPD
(SEE NOTE 5 FOR INVERTER OCPDs, ALSO SEE GUIDE SECTION 9)



CONDUIT AND CONDUCTOR SCHEDULE				
TAG	DESCRIPTION OR CONDUCTOR TYPE	COND. GAUGE	NUMBER OF CONDUCTORS	CONDUIT TYPE
1	USE-2 ☐ or PV WIRE ☐			
2	BARE COPPER EQ. GRD. COND. (EGC)			
3	THWN-2 ☐ or XHHW-2 ☐ or RHW-2 ☐			
4	INSULATED EGC			
5	DC GROUNDING ELECTRODE COND.			
6	THWN-2 ☐ or XHHW-2 ☐ or RHW-2 ☐			
7	INSULATED EGC			

Contractor Name, Address and Phone:		One-Line Standard Electrical Diagram for Small-Scale, Single-Phase PV Systems	
Site Name:		Site Address:	
System AC Size:		FSCM NO	
Drawn By:	SIZE	DWG NO	REV
Checked By:	SCALE	NTS	DATE

NOTES FOR STANDARD STRING SYSTEM ELECTRICAL DIAGRAM

PV MODULE RATINGS @ STC (Guide Section 5)

MODULE MAKE	
MODULE MODEL	
MAX POWER-POINT CURRENT (I_{MP})	A
MAX POWER-POINT VOLTAGE (V_{MP})	V
OPEN-CIRCUIT VOLTAGE (V_{OC})	V
SHORT-CIRCUIT CURRENT (I_{SC})	A
MAX SERIES FUSE (OCPD)	A
MAXIMUM POWER (P_{MAX})	W
MAX VOLTAGE (TYP 600V _{DC})	V
VOC TEMP COEFF (mV/°C or %/°C)	
IF COEFF SUPPLIED, CIRCLE UNITS	

NOTES FOR ALL DRAWINGS:

OCPD = OVERCURRENT PROTECTION DEVICE
NATIONAL ELECTRICAL CODE® REFERENCES SHOWN AS (NEC XXX.XX)

INVERTER RATINGS (Guide Section 4)

INVERTER MAKE	
INVERTER MODEL	
MAX DC VOLT RATING	V
MAX POWER @ 40°C	W
NOMINAL AC VOLTAGE	V
MAX AC CURRENT	A
MAX OCPD RATING	A

NOTES FOR ARRAY CIRCUIT WIRING (Guide Section 6 and 8 and Appendix D):

- 1.) LOWEST EXPECT AMBIENT TEMPERATURE BASED ON ASHRAE MINIMUM MEAN EXTREME DRY BULB TEMPERATURE FOR ASHRAE LOCATION MOST SIMILAR TO INSTALLATION LOCATION. LOWEST EXPECTED AMBIENT TEMP _____ °C
- 2.) HIGHEST CONTINUOUS AMBIENT TEMPERATURE BASED ON ASHRAE HIGHEST MONTH 2% DRY BULB TEMPERATURE FOR ASHRAE LOCATION MOST SIMILAR TO INSTALLATION LOCATION. HIGHEST CONTINUOUS TEMPERATURE _____ °C
- 2.) 2005 ASHRAE FUNDAMENTALS 2% DESIGN TEMPERATURES DO NOT EXCEED 47°C IN THE UNITED STATES (PALM SPRINGS, CA IS 44.1°C). FOR LESS THAN 9 CURRENT-CARRYING CONDUCTORS IN ROOF-MOUNTED SUNLIT CONDUIT AT LEAST 0.5" ABOVE ROOF AND USING THE OUTDOOR DESIGN TEMPERATURE OF 47°C OR LESS (ALL OF UNITED STATES).
- a) 12 AWG, 90°C CONDUCTORS ARE GENERALLY ACCEPTABLE FOR MODULES WITH I_{sc} OF 7.68 AMPS OR LESS WHEN PROTECTED BY A 12-AMP OR SMALLER FUSE.
- b) 10 AWG, 90°C CONDUCTORS ARE GENERALLY ACCEPTABLE FOR MODULES WITH I_{sc} OF 9.6 AMPS OR LESS WHEN PROTECTED BY A 15-AMP OR SMALLER FUSE.

SIGNS-SEE GUIDE SECTION 7

SIGN FOR DC DISCONNECT	
PHOTOVOLTAIC POWER SOURCE	
RATED MPP CURRENT	A
RATED MPP VOLTAGE	V
MAX SYSTEM VOLTAGE	V
MAX CIRCUIT CURRENT	A
WARNING: ELECTRICAL SHOCK HAZARD—LINE AND LOAD MAY BE ENERGIZED IN OPEN POSITION	
SIGN FOR INVERTER OCPD AND AC DISCONNECT (IF USED)	
SOLAR PV SYSTEM AC POINT OF CONNECTION	
AC OUTPUT CURRENT	A
NOMINAL AC VOLTAGE	V
THIS PANEL FED BY MULTIPLE SOURCES (UTILITY AND SOLAR)	

NOTES FOR INVERTER CIRCUITS (Guide Section 8 and 9):

- 1) IF UTILITY REQUIRES A VISIBLE-BREAK SWITCH, DOES THIS SWITCH MEET THE REQUIREMENT? YES ☐ NO ☐ N/A ☐
- 2) IF GENERATION METER REQUIRED, DOES THIS METER SOCKET MEET THE REQUIREMENT? YES ☐ NO ☐ N/A ☐
- 3) SIZE PHOTOVOLTAIC POWER SOURCE (DC) CONDUCTORS BASED ON MAX CURRENT ON NEC 690.53 SIGN OR OCPD RATING AT DISCONNECT
- 4) SIZE INVERTER OUTPUT CIRCUIT (AC) CONDUCTORS ACCORDING TO INVERTER OCPD AMPERE RATING. (See Guide Section 9)
- 5) TOTAL OF _____ INVERTER OCPD(s). ONE FOR EACH INVERTER. DOES TOTAL SUPPLY BREAKERS COMPLY WITH 120% BUSBAR EXCEPTION IN 690.64(B)(2)(a)? YES ☐ NO ☐

Notes for One-Line Standard Electrical Diagram for Single-Phase PV Systems

Contractor Name, Address and Phone: _____ _____ _____	
Drawn By: _____	SIZE FSOM NO _____
Checked By: _____	SCALE NTS _____
	DATE _____
	SHEET _____