



WDAT 406

***WDAT
Facility Study Report***

Revised August 14, 2013



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SOUTHERN CALIFORNIA EDISON COMPANY

EXECUTIVE SUMMARY

[REDACTED] applied to Southern California Edison ("SCE") for interconnection and wholesale distribution service for its proposed Solar Project pursuant to SCE's Wholesale Distribution Access Tariff ("WDAT") Small Generator Interconnection Procedures. SCE performed a Facility Study as requested by [REDACTED] for a 12 kV interconnection and distribution service from an existing 12kV distribution line ("Timco 12 kV"). [REDACTED]

[REDACTED] The request is for a WDAT photovoltaic ("PV") generation facility with a total capacity of 3.0 MW. The request is for service to commence by December 15, 2011¹.

The new generation, consisting of [REDACTED] The proposed project would receive interconnection service from SCE's existing Timco 12 kV out of Lucerne Substation via an overhead line extension to the [REDACTED] The generated power would be delivered to the California Independent System Operator ("CAISO") grid at the 115 kV bus of SCE's Victor Substation.

The purpose of this Facility Study is to determine²:

- The estimated cost for the Distribution Upgrades and Interconnection Facilities which were identified in the System Impact³.
- The estimated time required to complete the design and construction of the Distribution Upgrades and Interconnection Facilities which were identified on the System Impact.

Non-binding order of magnitude cost estimates for the required interconnection facilities and 12 kV system upgrades are as follows:

Interconnection Facilities/Automation

\$199.8 K

- Approximately 250 feet of primary 350 JCN underground cable
- Install approximately 1000 feet of new 1/0 ACSR line extension
- Install approximately 5 new poles
- 3-way Pad Mounted Gas Switch
- Switch Automation
- 12 kV Metering, CTs, PTs, and associated wiring

¹ Date as requested in the application. Actual operating date depends on design and construction requirements.

² This report supersedes the previous Facility Study Report dated January 19, 2012 in compliance with the latest SCE Interconnection Requirements.

³ Copy of the System Impact Study is provided as attachment A.

<u>Telemetry Requirements</u>	\$14.5 K
○ Centralized RTU	
<u>EH&S Interconnection Facilities</u>	\$194.4 K
○ Obtain licensing and permits and perform all required environmental activities for the construction of the following project elements if applicable: Construct a 1000 feet 12 kV overhead line extension from the existing Timco 12 kV line to the new 3-way switch.	
<u>Distribution Upgrades</u>	\$338.3 K
○ Install three new automated capacitor banks	
○ One three phase voltage regulator	
<u>Distribution Upgrades (Substation)</u>	\$58.3 K
○ Bi-directional watts transducer*	
<u>EH&S Distribution Upgrades</u>	\$41.8. K
○ Obtain licensing and permits and perform all required environmental activities for the construction of the following project elements if applicable: Install three new automated capacitor banks, and one three phase voltage regulator.	
ITCC (35%)	\$291.4 K
Total non-binding order of magnitude cost estimate	<u>\$1.138M</u>

*In the System Impact Study Report, it was stated the line section between the Customer's facility and the 12 kV Point of Interconnection is expected to experience reverse power flow of approximately 3.0 MW during minimum loading. Of that 3.0 MW, approximately 2.7 MW will flow back into the 12 kV bus at Lucerne 33/12 kV Substation. Therefore a new 3-Phase Bi-directional WATT Transducer will be required to monitor this reverse power flow. The Installation of the Bi-directional Transducer will takes approximately 18 months and will not be required to be in-service prior to interconnecting the Project to the distribution system

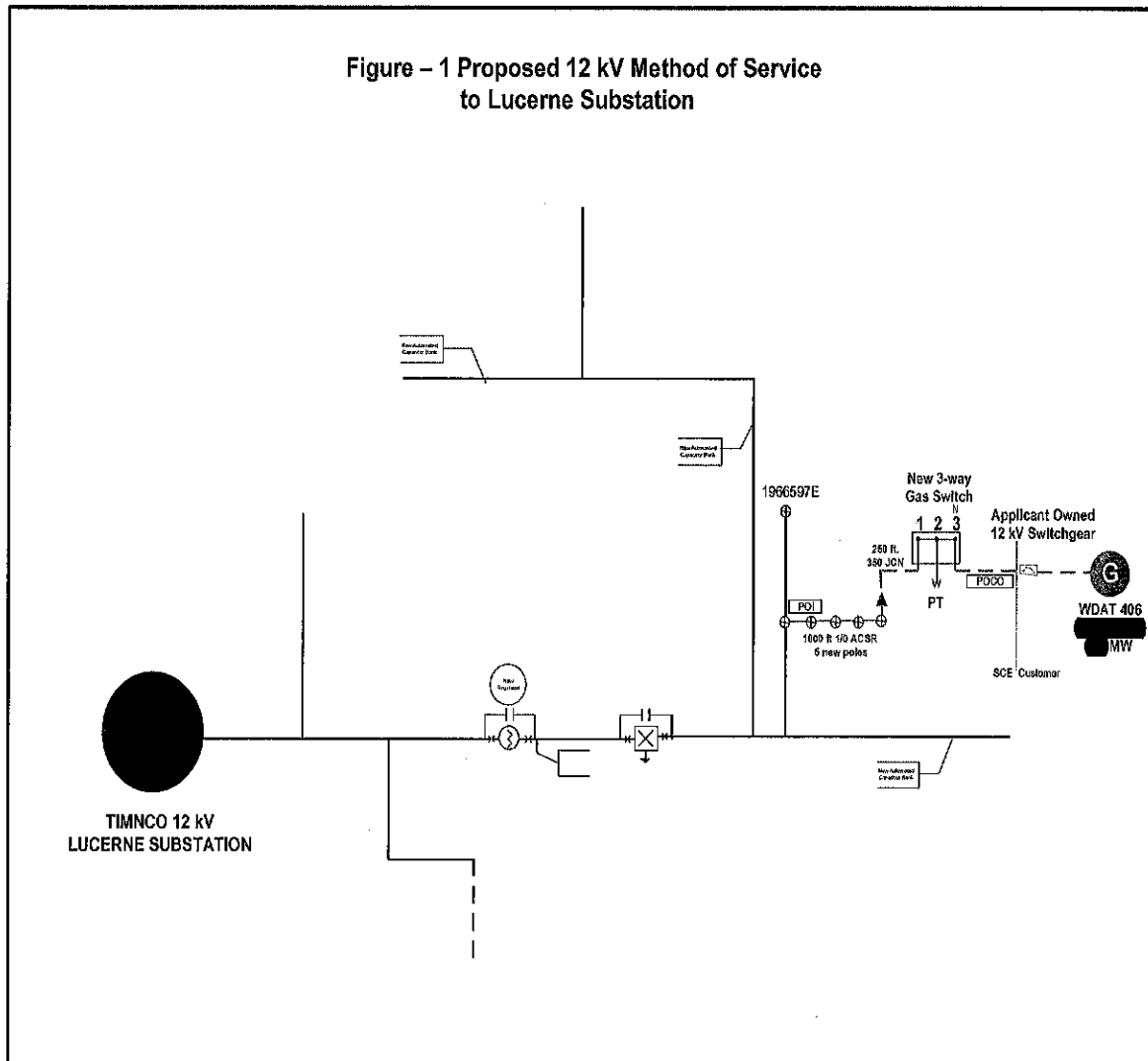
CONTENTS

	<u>PAGE</u>	
I. INTRODUCTION		5
VI. PART A: SUMMARY		6
Attachment A: System Impact Study		

I. INTRODUCTION

██████████ applied to Southern California Edison (“SCE”) for interconnection and wholesale distribution service for its proposed Solar Project pursuant to SCE’s Wholesale Distribution Access Tariff (“WDAT”) Small Generator Interconnection Procedures. SCE performed a Facility Study as requested by ██████████ for a 12 kV interconnection and distribution service from an existing 12kV distribution line (“Timco 12 kV”). The interconnection is an ██████████

██████████ The request is for a WDAT photovoltaic (“PV”) generation facility with a total capacity of 3.0 MW. The request is for service to commence by December 15, 2011⁴.



⁴ Date as requested in the application. Actual operating date depends on design and construction requirements.

The new generation, consisting of thin film photovoltaic panels, six (6) 500 kW SMA SC 500U inverters, and three (3) 1000 kVA 0.208/12 kV transformers. The proposed project would receive interconnection service from SCE's existing Timco 12 kV out of Lucerne Substation via an overhead line extension to the applicant owned 12 kV switchgear. The generated power would be delivered to the California Independent System Operator ("CAISO") grid at the 115 kV bus of SCE's Victor Substation.

The purpose of this Facility Study is to determine:

- The estimated cost for the Distribution Upgrades and Interconnection Facilities which were identified on the System Impact.
- The estimated time required to complete the design and construction of the Distribution Upgrades and Interconnection Facilities which were identified on the System Impact.

VI. SUMMARY

1. Distribution Upgrades will include the installation of three automated capacitor banks the replacement of three single phase regulator with a new three phase regulator and one 3- Phase Bi-directional transducer. The cost estimate for the distribution upgrades not including ITCC is \$338.3 K⁵
2. Interconnection facilities include the installation of a new 3-way Automated Pad Mounted Gas Switch, installation of 5 new poles and a 12 kV overhead line extension of approximately 1000 ft of 1/0 ACSR conductor and 250 ft. of underground primary cable between the existing overhead line and the Applicant's 12 kV switchgear. Metering CTs, PTs, meters and associated wiring. The cost estimate for the required interconnection facilities not including ITTC is \$199.8 K⁶
3. Real-time telemetry will be required. Utilizing SCE's centralized RTU method of telemetry, the cost estimate required by PSC and Telecom is \$14.5 k. Cost estimate does not include 35% ITCC. Additional information on the proposed method of telemetry will be provided during the results meeting. In the event that the centralized RTU method is not feasible for this project, the cost and scope of telemetry may increase significantly to include a dedicated RTU as required by SCE's Interconnection Handbook. This alternate method of telemetry has an approximate cost of \$155.0 K, including ITCC.
4. Non-binding order of magnitude cost estimates for the required interconnection facilities and system upgrades are as follows, these do not include cost any civil construction required by the interconnection.

Interconnection Facilities/Centralized RTU	\$14.5 K
Interconnection Facilities Upgrades and Automation	\$199.8 K
Interconnection Facilities/EH&S	\$194.4 K
Distribution Upgrades/Electrical	\$338.3 K
Distribution Upgrades/Substation	\$58.3 K
Distribution Upgrades/EH&S	\$41.8 K
<hr/>	
ITCC (35%)	\$291.4 K
Total non-binding order of magnitude cost estimate	<u>\$1.138 M</u>

5. DESIGN OF DISTRIBUTION UPGRADES & INTERCONNECTION FACILITIES

Design of the Distribution Upgrades and Interconnection Facilities is expected to be completed within **60 business days** from receipt of the following deliverables:

- Execution of the Generator Interconnection Agreement (GIA)
- Approved panel drawings in compliance with SCE's Electrical Service Requirements (ESR):
<http://www.sce.com/AboutSCE/Regulatory/distributionmanuals/esr.htm>
- Customer information sheet
- Street improvement plans (if available)
- Street improvement plans (if available)
- Unique address for the Point of Interconnection
- Public right-of-way (street) base maps, as required by the interconnection
- Site plot plan on a 30:1 scale or digital file
 - Easement/lease agreement(s)
 - Grading plan(s)
 - Sewer and storm plot plan(s)
- Landscape, Sprinkler, Pedestal Location

6. CONSTRUCTION OF DISTRIBUTION UPGRADES & INTERCONNECTION FACILITIES

Construction of the Distribution Upgrades and Interconnection Facilities is expected to be completed within **90 business days** with the exception of the Bi-directional WATT transducer and from receipt of the following deliverables. These deliverables must be provided by the Interconnection Customer within 30 calendar days from the GIA effective date:

- Completion of SCE's final design
- Interconnection Customer provides payment of any remaining balance in accordance with the GIA Payment Schedule
- Underground civil construction is released by SCE inspectors

7. ADDITIONAL REQUIREMENTS

The Interconnection Customer must comply with the following:

- All civil construction related to SCE's Interconnection Facilities and Distribution Upgrades must be completed and approved by SCE inspectors prior to SCE scheduling the electrical construction of the Interconnection Facilities and Distribution Upgrades.
- All protection settings must comply with the SCE's interconnection requirements. These requirements can be downloaded at:
 - <https://www.sce.com/wps/portal/home/regulatory/open-access-information/>
- A Final Commissioning Test will be performed to verify that the interconnection requirements have been met.
- The IC shall provide SCE with an electrical single line diagram that represents the final system design to be included in the GIA. The IC is responsible for the cost of civil work which is required for the distribution and interconnection electrical facilities. The

IC shall install all equipment necessary to comply with generation output ramp rates as provided by the Distribution Provider.

8. DISCLOSURE OF STUDY ASSUMPTIONS

- Current distribution standards are being updated to address generation interconnection systems. The proposed method of service in this report is subject to change during final design to comply with the updated distribution design standards.
- This Facility Study does not include costs associated with environmental studies which may be required for the licensing or permitting of the proposed generating facility.
- This study assumes that all easements required for the construction of Distribution Upgrades and/or Interconnection Facilities will be secured in a timely manner to accommodate the requested in-service date.
- This report does not consider potential milestone setbacks that could result from the local jurisdiction requiring underground construction of distribution facilities. SCE encourages the Interconnection Customer to consult with the local jurisdiction to identify existing underground ordinance to reduce the risk of complication associated with said ordinance.
- This study does not include analysis related to the following system variability conditions, et. al.
 - Generator ramp rate: Solar photovoltaic generator's increasing output profile during sunrise, i.e. system start-up
 - Generator output variability: Solar photovoltaic generator's output variation correlated with weather conditions, i.e. cloud cover
 - This study assumes that the Interconnection Customer's generating facility will include all equipment, software, and appropriate controls necessary to maintain the generator output profile per SCE requirements. The Interconnection Customer will be responsible for maintaining designated voltage levels under all conditions, including but not limited to the conditions identified above. Upon execution of the GIA, SCE will provide the Interconnection Customer with the required ramp rate control parameters. The ramp rate controls will be a function of the generation penetration on the distribution system, as well as SCE's distribution system configuration (additional parameters maybe considered, as need). Changes to the ramp rate control scheme may be required as determined by increased generation, changes in the distribution system topology, or other changes in the distribution system.
- Applicable to projects requesting primary service: This study does not include analysis related to coordination of system protection equipment. A coordination study may be required during final engineering. The coordination study may identify additional interconnection requirements such as installing new protection equipment, reprogramming and/or relocating existing protection equipment. The additional scope of work may have an effect on the Interconnection Customer's requested in-service date.

Attachment A – System Impact Study

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