

[Redacted]

Facilities Study

January 27, 2014



SOUTHERN CALIFORNIA

**EDISON**

An *EDISON INTERNATIONAL*<sup>SM</sup> Company

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**Southern California Edison**

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**I. Executive Summary**

[REDACTED] applied to Southern California Edison ("SCE") for distribution service under the terms of SCE's Wholesale Distribution Access Tariff ("WDAT") for their proposed [REDACTED]. The project is a 20 MW photovoltaic generation facility that will be owned and operated by [REDACTED]

A System Impact Study ("SIS") dated March 1, 2011 was prepared to address the impacts of the Project to the SCE Distribution System and the portion of SCE's electrical system that is part of the CAISO controlled grid. However, as part of the Facilities Study, a re-assessment of the Distribution System impacts was required due to [REDACTED] request to change the Point of Interconnection ("POI") and method of service of the Project to interconnect to Vestal Substation instead of the Vestal-Kern River 3 66 kV line as originally requested.

**FOR ADDITIONAL DETAIL OF THE ORIGINAL SIS, REFER TO THE FOLLOWING EXHIBIT:**

- **EXHIBIT A: SYSTEM IMPACT STUDY EXECUTIVE SUMMARY**

Below is a summary of the changes to the Distribution SIS dated March 1, 2011:

**II. System Impact Study Results**

**Power Flow** – The Project did not trigger any new base case or emergency (N-1) overloads requiring distribution level mitigations as a result of the changes to the Project.

**Short Circuit Duty** – The addition of the Project resulted in increases of three-phase short-circuit duties by 0.1kA or more at one (1) distribution substation. The circuit breaker interrupting capabilities were reviewed at this substation, and it was determined that zero (0) circuit breakers are required to be upgraded as part of the Project.

**Distribution Voltage Control** – The results of the distribution voltage control in the previous SIS did not change.

**III. Facilities Study Assumptions**

- A. The customer will be building a 66 kV collector substation which will be approximately 1 mile from Vestal Substation.
- B. The customer will build the 66 kV gen-tie line from their collector substation to the first structure/vault outside of Vestal Substation.
- C. Any required upgrades at facilities not owned by SCE are not included in the Facilities Study.
- D. The schedule for the Environmental Impact Statement and/or Environmental Impact Report and all other regulatory filings required for the Project are not included in the Facilities Study.

#### IV. Facilities Study Scope and Cost Estimate

##### IV – A Facilities Study Scope

Pursuant to FERC's orders 2006-A (Small Generators) and 2003-A (Large Generators) all Facilities Studies are required to provide the customer with its "maximum possible funding exposure", which shall include the costs of upgrades that are reasonably allocable to the Interconnection Customer at the time the estimate is made, and the costs of any upgrades not yet constructed that were assumed in the interconnection studies for the Interconnection Customer but are, at the time of the estimate, an obligation of an entity other than the Interconnection Customer."

To comply with the FERC orders, the Scope of Work and Cost Estimate for all elements required for the interconnection are presented for the following two cases:

**CASE A: All facilities required exclusively by the Project**

And

**CASE B: All additional facilities that may be required by the Project**

The facilities included on Case B are those additional facilities required to remedy situations caused by earlier projects, placed ahead in the Application Queue, and are expected to be implemented by them.

However, in the event that any of these earlier projects withdraws or modifies their application in accordance with applicable tariff allowances, [REDACTED] may become responsible for any or all of these additional facilities.

SCE will own, operate, construct, and maintain a new 66 kV position at Vestal Substation to interconnect the Project.

##### **CASE A:**

##### **Substation:**

##### Vestal Substation

- Extend 66 kV bus
  - Two low profile deadend bus structures and foundations
  - Twelve bus insulator assemblies
  - Bus conductor
- Equip a 66 kV position
  - Two circuit breakers
  - Four sets of disconnect switches
  - Two line protection relays
  - Two [REDACTED]
  - Overhead conductor
  - Ground grid study

##### **Sub-Transmission:**

Install one tubular steel pole, one underground vault, 2,700' of underground cable, and 200 circuit feet of overhead conductor to the customer owned structure outside of Vestal Substation property.

[REDACTED]  
[REDACTED]  
FACILITIES STUDY

**Telecommunication:**

Install lightwave, channel, and associated equipment and extend diverse fiber optic cable supporting protection and SCADA for the interconnection.

**Corporate Environmental Health and Safety and Real Properties:**

Provide mapping, survey, title work, land acquisition labor, licensing, and other activities related to Vestal Substation, gen-tie line, and telecommunication requirements.

**Power Systems Control:**

Install one Remote Terminal Unit (RTU) at the customer's facility to monitor generation data, weather data, and relay protection status alarms.

Add points to the RTU at Vestal Substation to monitor the new tie line data and associated circuit breakers, and relay protection status alarms.

**Metering Services Organization:**

Install a SCE retail meter in tandem with the customer's ISO meter. Customer is to provide the voltage and current transformers and metering cabinet.

**CASE B:**

**There are no Case B elements for this project.**

**IV – B Facilities Study Cost Estimate**

**CASE A** Identifies the cost of all facilities that are required exclusively by the Project.

**CASE B** Identifies the cost of all upgrades required that were triggered by earlier Applicants placed ahead of the Project in the Application Queue.

In the event that any Applicant, presently placed ahead of the Project in the Application Queue, withdraws its Application, the system would need to be re-evaluated. The new evaluation may conclude that the Project would now trigger any of these upgrades and would then become responsible for some or all of the upgrades identified on Case B.

For Distribution Provider's Interconnection Facilities, costs will be shared in the Small Generator Interconnection Agreement with [REDACTED] unless one of those projects agrees to pay for the entire cost or withdraws.

The total estimated cost of all elements of the interconnection as identified above in the Facilities Study Scope is as follows:

CASE A:	\$	8,054,006
CASE B:	\$	0
TOTAL MAXIMUM COST EXPOSURE:	\$	8,054,006

**SEE EXHIBIT B: COST SUMMARY**

**V. Conclusions**

- A. The estimated cost for the Interconnection is approximately \$8,054,006 for Case A with the potential additional cost of \$0 for Case B for a total Maximum Cost Exposure of \$8,054,006.
- B. The time required to complete the proposed project will be 27 months after receiving project authorization and funding. This time includes engineering, material procurement and construction. This timeframe is subject to final verification by SCE of available resources at the time of the Project. The 27 month period does not include the time required for the preparation of the Environmental Impact Statement and/or Environmental Impact Report as required per CEQA and NEPA, if required, as well as any other approvals and permits to be provided by the CPUC or other regulatory agencies.  
**A detailed Project Schedule will be provided during the Engineering and Design Phase of the Project.**
- C. The costs indicated in the attached tables are shown 2014 Dollars and are not firm. These are only preliminary estimates based on conceptual engineering and system unit costs, and are subject to change based on the final design and actual material costs. This Facilities Study and cost estimates as presented are valid for a period of 90 days.
- D. The estimated Project Cost will be reconciled to actual costs upon closure of the subject work orders. The necessary billing adjustments will be made at that time.
- E. Study results may be affected by changes in other projects ahead of the queue in the area. A re-study may be required if there are changes in the project queue or the scope of projects ahead in the queue.
- F. Although study results reflect no adverse impact on the high-voltage CAISO controlled transmission system with the addition of the project, the Interconnection Customer will still be required to adhere to all applicable WECC policies including, but not limited to, the WECC Generating Unit Model Validation Policy. For example, the Interconnecting Customer will be required to provide validated dynamic models for the proposed project within the timelines identified in the WECC policy. The latest policy is available on the WECC website at [www.wecc.biz](http://www.wecc.biz).

**EXHIBIT A**

**SYSTEM IMPACT STUDY**

**EXECUTIVE SUMMARY**

**(ORIGINAL DATED MARCH 1, 2011)**

**WDT390**

**WDAT  
SYSTEM IMPACT STUDY**

**March 1, 2011**



SOUTHERN CALIFORNIA  
**EDISON**  
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## EXECUTIVE SUMMARY

[REDACTED] applied to Southern California Edison ("SCE") for interconnection and wholesale distribution service for its proposed [REDACTED] pursuant to SCE's Wholesale Distribution Access Tariff ("WDAT") Small Generator Interconnection Procedures. SCE performed a System Impact Study as requested by Solis for a 66kV interconnection and distribution service from an existing 66kV distribution line. The interconnection is an applicant owned 66kV Interconnection Switchyard, which will be located approximately 0.8 miles east of Vestal 220/66kV Substation. The request is for a WDAT photovoltaic ("PV") generation facility with a total capacity of 20MW. The initial request is for service to commence by December 31, 2011<sup>1</sup>.

The new generation project consists of photovoltaic cell panels, [REDACTED]

[REDACTED] The proposed project would receive interconnection service from SCE's existing 66 kV circuitry out of Vestal Substation via an overhead line extension to the applicant owned 66kV Interconnection Switchyard. The generated power would be delivered to the California Independent System Operator ("CAISO") grid at the 220 kV bus of SCE's Vestal Substation.

The purpose of this System Impact Study is to determine the effect of the proposed generation addition on the SCE distribution system and the portion of SCE's electrical system that is part of the CAISO controlled grid, and to identify in general additional Interconnection Facilities, Distribution Upgrades, additions or modifications, or other facilities required to provide the requested service. The study was performed in two parts: Part A (performed by SCE's Distribution Field Engineering department) examines impacts related to that part of the SCE distribution system energized at less than 220kV and also briefly summarizes the results of Part B, while Part B (performed by SCE's Generation Interconnection Planning department) examines impacts and facilities related to the portion of the SCE electrical system energized at 220kV and above (the bulk power system), and impacts and facilities associated with the CAISO controlled portion of the SCE grid. This is the Part A study report; a detailed report of the Part B study results is included as Attachment B.

The Part A study was performed for expected year 2011 through 2019 projected peak load conditions as well as 2011 through 2019 minimum load conditions.

The Part A System Impact Study consisted of a power flow analysis, three-phase short circuit duty analysis and circuit voltage profile analysis. The analyses were performed to determine whether the energy associated with the [REDACTED] can be transmitted through SCE's distribution system to the ISO grid at the 220kV bus of Vestal Substation without creating the need for modifications to SCE's distribution system and/or to the ISO grid. The study showed that, with the [REDACTED] on-line:

- Based on the requested 66kV service line, the addition of the 20 MW [REDACTED] resulted in inadequacies in the protection of the distribution line.

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<sup>1</sup> Actual operation date is dependent on the completion of design, procurement, and construction.

- Based on the new proposed method of service, under both peak load and light load conditions, the addition of the 20 MW [REDACTED] resulted in no violations of SCE's thermal loading criteria under base case and N-1 conditions for the SCE distribution system.
- The addition of the 20 MW [REDACTED] resulted in voltage rise not exceeding allowable Rule 2 limits.
- The addition of the 20 MW [REDACTED] resulted in increases of three-phase short-circuit duties by 0.1kA or more at two (2) distribution substations. The circuit breaker interrupting capabilities were reviewed at these substations and it was determined that zero (0) circuit breakers are required to be upgraded as part of the [REDACTED]. However, there are six (6) 12kV breakers at Delano 66/12kV Substation, which require replacement under a SCE project prior to energizing the [REDACTED]. [REDACTED] can choose to fund the breaker replacement with an agreement on a schedule for SCE to repay the funds.

- Non-binding order of magnitude cost estimates for the required interconnection facilities and 66 kV system upgrades are as follows

Distribution Upgrades(66kV Substation Upgrades)	\$8.760 M
Distribution Upgrades(New 66kV Line)	\$4.548 M
One Time	\$1.931 M
Interconnection Facilities	\$1.040 M
Telemetry Requirements	\$1.216 M
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Total non-binding order of magnitude cost estimate	\$17.495 M

**Cost B:**

Total non-binding order of magnitude cost "B" estimate	\$38.038 M
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Note: [REDACTED] may be subjected to the cost "B" estimate, depending on the operation date of the [REDACTED] and any queued project. In the event that the cost "B" applies to the [REDACTED] a re-study may be required to adequately identify the required facilities and cost estimate.

**EXHIBIT B**

**COST SUMMARY**

# WDT390 -

## Cost Estimate Summary (2014 Dollars)

Scope: Interconnect 20 MW at the Vestal Substation 66 kV bus

No.	Element	Interconnection Facilities (Subject to ITCC)	Distribution Upgrades (Subject to ITCC)	One Time Cost (Not Subject to ITCC)	ITCC** (35%)	Total
	Sub-Transmission					
1	Gen-tie	2,306,989 \$	- \$	- \$	807,446 \$	3,114,435 \$
	Subtotal					3,114,435 \$
	Substations					
1	Extend 66 kV bus	- \$	275,846 \$	- \$	96,546 \$	372,392 \$
2	Equip a 66 kV line position - IF	344,842 \$	- \$	- \$	120,625 \$	465,467 \$
3	Equip a 66 kV line position - DU	- \$	972,661 \$	- \$	340,431 \$	1,313,092 \$
4	Install a pair of line protection relays	194,975 \$	- \$	- \$	68,241 \$	263,216 \$
5	Install a pair of LSFB relays	- \$	194,975 \$	- \$	68,241 \$	263,216 \$
6	Perform Ground Grid Study	- \$	- \$	11,063 \$	- \$	11,063 \$
	Subtotal					2,683,247 \$
	Telecommunication					
	Install lightning, channel & associated equipment and extend FO cable to support SCADA and line protection of approx. 1 mile radial gen tie	920,821 \$	- \$	- \$	322,287 \$	1,243,108 \$
	Subtotal					1,243,108 \$
	Corporate Environmental Health and Safety					
1	Activities to support the Interconnection Facilities	400,822 \$	- \$	- \$	140,218 \$	541,040 \$
2	Activities to support the Distribution Upgrades	- \$	25,246 \$	- \$	8,836 \$	34,082 \$
	Subtotal					574,922 \$
	Licensing					
1	Activities to support project - N/A	- \$	- \$	- \$	- \$	- \$
	Subtotal					- \$
	Real Properties					
1	Activities related to the gen tie and access easement	211,592 \$	- \$	- \$	74,057 \$	285,649 \$
	Subtotal					285,649 \$
	Metering Services					
1	Retail Meter at the Generation Facility	33,809 \$	- \$	- \$	11,833 \$	45,642 \$
	Subtotal					45,642 \$
	Power System Control					
1	RTU at the generation facility	49,298 \$	- \$	- \$	17,254 \$	66,552 \$
2	Point additions at Vestal	- \$	- \$	35,450 \$	- \$	35,450 \$
	Subtotal					102,002 \$
	<b>Total</b>	<b>4,462,748 \$</b>	<b>1,468,728 \$</b>	<b>46,513 \$</b>	<b>2,076,017 \$</b>	<b>8,054,006 \$</b>

\* Pursuant to FERC Order 2003A, ITCC is not collected on Reliability Upgrades and One Time Costs.

\*\* ITCC cost may be satisfied with a letter of credit in accordance with the tax provisions of the LGIA.

\*\*\* The ITCC included in this cost estimate was computed using a 35% rate. Because of recent enactment of H.R. 4853, the Tax Relief, Unemployment Insurance Reauthorization and Job Creation Act of 2010, and upon formal acceptance by the CPUC of SCE's advice letter (filed on December 27, 2010), this rate may change for electric CIAC recorded or received after September 8, 2010 through December 31, 2011.

Cost estimate is only an estimate based on 2014 constant dollars and actual cost is subject to change depending on project construction date, and inflation IC's requested O.D.(if- service) is beyond the estimated O.D. of a work element, the IC's requested O.D. is used. Does not include ITCC.