

**PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA**

**ENERGY DIVISION**

**RESOLUTION E-4380  
December 16, 2010**

**R E S O L U T I O N**

Resolution E-4380. Pacific Gas and Electric Company.

**PROPOSED OUTCOME:** This Resolution finds that Pacific Gas and Electric Company has demonstrated that its renewable energy power purchase agreement with Solaren Corporation, approved by Resolution E-4286, complies with the Emissions Performance Standard and is eligible for cost recovery.

**ESTIMATED COST:** Costs of the power purchase agreement are confidential at this time.

By Advice Letter 3690-E filed on June 18, 2010.

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**SUMMARY**

**Pacific Gas and Electric Company's renewable energy power purchase agreement with Solaren Corporation complies with the Emissions Performance Standard and is eligible for cost recovery**

In Resolution E-4286, the California Public Utilities Commission (Commission) approved Advice Letter (AL) 3449-E and allowed for conditional cost recovery from a power purchase agreement (PPA) between Pacific Gas and Electric Company (PG&E) and Solaren Corporation (Solaren). Pursuant to Resolution E-4286, PG&E filed AL 3690-E on June 18, 2010 to request cost recovery for the Solaren PPA.

Under Resolution E-4286, the PPA between PG&E and Solaren would be fully recoverable in rates following a determination by the California Energy Commission that the technology contemplated in AL 3449-E is Renewables Portfolio Standard (RPS) eligible. Furthermore, within 90 days following the California Energy Commission (CEC) determining that the technology used in

the Solaren facility is an RPS-eligible technology, PG&E was required to demonstrate that the PPA in AL 3449-E complied with the Emissions Performance Standard (EPS)<sup>1</sup> by filing a Tier 3 Advice Letter with the Commission. On June 18, 2010, within 90 days of the CEC determining the Solaren facility's technology was a photovoltaic fuel type and, therefore, RPS eligible, PG&E filed AL 3690-E to demonstrate that the Solaren PPA complied with the EPS.

This resolution determines that PG&E's PPA with Solaren complies with the EPS and is eligible for cost recovery.

The following table provides a summary of the Solaren PPA:

<b>Generating Facility</b>	<b>Technology Type</b>	<b>Term (Years)</b>	<b>Capacity (MW)</b>	<b>Energy (GWh/yr)</b>	<b>Online Date</b>	<b>Location</b>
Solaren	Space based Solar Photovoltaic	15	200	1700	June, 2016	Geosynchronous Orbit and Fresno County, CA

## **BACKGROUND**

### **Overview of the Renewables Portfolio Standard (RPS) Program**

The California RPS Program was established by Senate Bill (SB) 1078, and has been subsequently modified by SB 107 and SB 1036.<sup>2</sup> The RPS program is codified in Public Utilities Code Sections 399.11-399.20.<sup>3</sup> The RPS program

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<sup>1</sup> RPS Eligibility Guidebook 3<sup>rd</sup> Edition. CEC pre-certification determines that a renewable facility not yet producing electricity will be RPS eligible when the facility starts to generate electricity for distribution to ratepayers. On April 26, 2010, the CEC pre-certified the Solaren facility as utilizing a photovoltaic fuel type and as eligible for the RPS program.

<sup>2</sup> SB 1078 (Sher, Chapter 516, Statutes of 2002); SB 107 (Simitian, Chapter 464, Statutes of 2006); SB 1036 (Perata, Chapter 685, Statutes of 2007).

<sup>3</sup> All further references to sections refer to Public Utilities (Pub. Util.) Code unless otherwise specified.

administered by the Commission requires each utility to increase its total procurement of eligible renewable energy resources by at least one percent of retail sales per year so that 20 percent of the utility's retail sales are procured from eligible renewable energy resources no later than December 31, 2010.<sup>4</sup>

Additional background information about the Commission's RPS Program, including links to relevant laws and Commission decisions, is available at <http://www.cpuc.ca.gov/PUC/energy/Renewables/overview.htm> and <http://www.cpuc.ca.gov/PUC/energy/Renewables/decisions.htm>.

## **NOTICE**

Notice of Advice Letter 3690-E was made by publication in the Commission's Daily Calendar. PG&E states that copies of the Advice Letter were mailed and distributed in accordance with Section IV of General Order 96-B.

## **PROTESTS**

Advice Letter 3690-E was not protested.

## **DISCUSSION**

### **Pacific Gas and Electric Company requests a finding that a power purchase agreement with Solaren Corporation complies with the Emissions Performance Standard**

On December 3, 2009 Pacific Gas and Electric Company (PG&E) filed Advice Letter (AL) 3449-E requesting California Public Utilities Commission (Commission) review and approval of a power purchase agreement with Solaren Corporation (Solaren) for a first of its kind space based solar facility.<sup>5</sup> On

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<sup>4</sup> See, Pub. Util. Code § 399.15(b)(1).

<sup>5</sup> Under the 15 year Solaren PPA, PG&E will procure 1,700 gigawatt-hours of energy per year (GWh/yr) from a first of its kind space based solar project built and operated by Solaren. The project, as proposed, will provide electricity from a space based solar facility that will convert solar energy into radio frequency (RF) and transmit the RF to a receiver station in Fresno, CA. The Fresno receiver station will convert the RF to electricity and distribute the grid ready renewable electricity to California ratepayers.

December 3, 2009, the Commission adopted Resolution E-4286 which conditionally approved AL 3449-E. The conditions for Commission approval included:

- PG&E could not rely on the Solaren PPA for procurement planning purposes until certain project milestones were met.
- PG&E must abide by an agreement reached with DRA concerning when and how PG&E can use the Solaren PPA for earmarking under the flexible compliance rules.
- PG&E could not use the PPA in its minimum quantity calculations until project construction began.
- Cost recovery for the Solaren PPA is conditioned upon the project meeting two requirements. First, the California Energy Commission (CEC) must determine that the technology contemplated in AL 3449-E was Renewables Portfolio Standard (RPS) eligible.<sup>6</sup> Second, within 90 days of the CEC determining RPS eligibility, PG&E was required to file a Tier 3 advice letter with the Commission to demonstrate that the Solaren PPA complied with the Emissions Performance Standard (EPS).

With regards to the cost recovery requirements outlined above, the CEC pre-certified the Solaren project on April 26, 2010, determining the Solaren facility will produce energy from a solar photovoltaic fuel type technology and will be RPS eligible when it comes on-line.<sup>7</sup> Pursuant to Resolution E-4286, PG&E filed Advice Letter (AL) 3690-E on June 18, 2010, within 90 days of the CEC making a determination that the technology was RPS eligible. PG&E asserts, in AL 3690-E, that the Solaren PPA has met the conditional requirement for cost recovery because the CEC has determined the project is RPS-eligible and because the project complies with the EPS pursuant to Decision (D.) 07-01-039. Specifically,

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<sup>6</sup> Resolution E-4286.

<sup>7</sup> RPS Eligibility Guidebook 3<sup>rd</sup> Edition. The CEC pre-certification process is designed for developers who are seeking a preliminary determination that their renewable facility's technology will be eligible for the RPS when the facility begins to generate electricity.

PG&E asserts that the Solaren facility will not use fossil fuels to generate electricity and, therefore, will not produce any greenhouse gas (GHG) emissions.

Energy Division finds the Solaren PPA meets the conditional requirements for cost recovery set forth Resolution E-4286. However, the PPA between PG&E and Solaren is still subject to the other conditions stated in Resolution E-4286.<sup>8</sup>

**PG&E requests that the Commission issue a resolution containing the following findings:**

1. Finds the Solaren project will comply with the EPS.
2. Supersedes Finding 25 of Resolution E-4286 by finding that the CEC has determined that the technology contemplated in AL 3449-E is an RPS eligible technology and therefore that any procurement pursuant to the PPA is procurement from an eligible renewable energy resource for purposes of determining PG&E's compliance with any obligation that it may have to procure eligible renewable energy resources pursuant to the California Renewables Portfolio Standard (Public Utilities Code Section 399.11 et seq.) ("RPS"), D.03-06-071 and D.06-10-050, or other applicable law.
3. Supersedes Finding 26 of Resolution E-4286 by finding that the CEC has determined that the technology contemplated in AL 3449-E is an RPS eligible technology and therefore that all procurement and administrative costs, as provided by Public Utilities Code section 399.14(g), associated with the PPA shall be recovered in rates.
4. Adopts the following finding of fact and conclusion of law in support of CPUC Approval:
  - a. The PPA is consistent with PG&E's 2008 RPS procurement plan.
  - b. The terms of the PPA, including the price of delivered energy, are reasonable.
5. Adopts the following finding of fact and conclusion of law in support of cost recovery for the PPA:
  - a. The utility's costs under the PPA shall be recovered through PG&E's Energy Resource Recovery Account.

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<sup>8</sup> Resolution E-4286 placed certain conditions on the Solaren PPA, as stated above.

6. Supersedes Findings 19-21 of Resolution E-4286 by adopting the following findings with respect to resource compliance with the EPS:
  - a. The PPA is a covered procurement subject to the EPS because it is a new contract commitment with a baseload generating facility. However, because this facility would not generate power through the combustion of fossil fuels and would not produce any greenhouse gas as a direct byproduct of its conversion of solar energy into grid-ready renewable electricity, the facility meets the EPS.

**Energy Division evaluated the Solaren PPA for compliance with the Emissions Performance Standard using the following criteria:**

- Applicability of the Emissions Performance Standard to the Solaren PPA.
- Assessment of Solaren technology to determine if it is an RPS eligible technology that is exempt from the Emissions Performance Standard.
- Lifecycle analysis of the Solaren PPA to determine compliance with the Emissions Performance Standard.
- Compliance of the Solaren PPA with the Emissions Performance Standard requirements.

**Applicability of the Emissions Performance Standard to the Solaren PPA**

The policy objective of the EPS is to encourage the development of power plants that meet California's growing energy needs while minimizing new power plant GHG emissions.<sup>9</sup> The EPS applies to certain types of generation and financial commitments known as covered procurements. Generally, any long term baseload generation contract signed by a Load Serving Entity (LSE) such as PG&E is considered a covered procurement.<sup>10</sup> Under SB 1368, § 8341(d), baseload generation is defined as electricity generation from a power plant designed to provide electricity at an annualized capacity factor of 60 percent or greater and a long term contract is a contract that has a 5 year or longer delivery

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<sup>9</sup> See, D.07-01-039.

<sup>10</sup> See, D.07-01-039.

term.<sup>11</sup> The EPS establishes a minimum emissions requirement for any long term contract for baseload generation power supplied to California ratepayers.

The Solaren contract, according to information provided by PG&E, is for a term of 15 years, which is longer than the minimum requirement of 5 years to establish a long term contract under the statute.<sup>12</sup> PG&E also states the contract capacity is 200 meagwatts (MW) and the annual expected energy produced is 1,700 GWh/yr. Therefore, the Solaren facility will have a capacity factor of 97 percent, making it a baseload generating power plant.<sup>13</sup>

The Solaren PPA is considered covered procurement and is subject to the Emissions Performance Standard under the criteria set forth in D.07-01-039 and SB 1368

**Assessment of Solaren technology to determine if it is an RPS eligible technology that is considered upfront by the Commission to be in compliance with the Emissions Performance Standard**

Under D.07-01-039, a Load Serving Entity (LSE) does not have to demonstrate EPS compliance for certain renewable resources such as solar thermal, wind, geothermal, and certain types of biomass. Such renewable resources are determined upfront by the Commission as being in compliance with the EPS. Although the Solaren PPA is for a space based solar facility, the facility is not a solar thermal, wind, geothermal, or a specific type of biomass project under D.07-01-039. Therefore, the Solaren facility is not per se compliant with the EPS and must comply with emissions requirements set forth in D.07-01-039.

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<sup>11</sup> See also, D.07-01-039.

<sup>12</sup> See, SB 1368, § 8340(j).

<sup>13</sup> SB 1368, § 8340(a). The capacity factor to determine whether a project is baseload generation is calculated by taking the contract capacity of 200 MW, multiplying it by 8,760 (the total number of hours the project will theoretically produce energy during the year) and dividing this number from the projected yearly amount of energy produced (1,700 GWh/yr in this case). Therefore, the total capacity factor will equal  $1,700 / (200 * 8,760) \approx 97\%$ .

Solaren facility is not per se compliant with the EPS and must comply with emissions requirements set forth in D.07-01-039.

### **Lifecycle analysis of the Solaren PPA to determine compliance with the Emissions Performance Standard**

Under the EPS, emissions calculations are limited to the generation of the facility and not the stages of production the facility passes through, such as research and development, construction, or maintenance.<sup>14</sup> Therefore, the emissions calculation for the Solaren facility will not take a lifecycle approach but will be limited to the direct emissions of the power plant when it produces energy.

Emissions compliance of the Solaren PPA is limited to the generation facility and not the lifecycle net emissions of the generation facility, as stated in D.07-01-039

### **Compliance of the Solaren Corporation power purchase agreement with the Emissions Performance Standard requirements**

Under the interim EPS compliance rules set forth in D.07-01-039 and SB 1368, all new contracts for baseload generation facilities cannot emit more carbon dioxide (CO<sub>2</sub>) than a Combined Cycle Gas Turbine (CCGT) power plant that, as adopted by the Commission, equals 1,100 pounds of carbon dioxide per megawatt-hour. As such, the greenhouse gas (GHG) emissions from the Solaren facility must comply with the EPS limit of emitting no greater than 1,100 pounds (lbs) of carbon dioxide per megawatt-hour (CO<sub>2</sub>/MWh).<sup>15</sup>

The CEC has pre-certified the Solaren facility as RPS eligible and concluded that annual fossil fuel usage of the facility is 0.00%. Furthermore, according to PG&E, the Solaren project will use a solar facility in space to transmit energy to a Receive Station in Fresno, California for distribution to the local transmission grid. PG&E asserts that this process of energy generation from the Solaren

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<sup>14</sup> D.07-01-039, Findings of Fact 205.

<sup>15</sup> Under the interm rules set forth in D.07-01-039 and SB 1368, all new contracts for baseload generation facilities cannot emit more CO<sub>2</sub> than a Combined Cycle Gas Turbine power plant that, as adopted by the Commission, equals 1,100 pounds of carbon dioxide per megawatt-hour.

facility will not result in the combustion of fossil fuels and will not produce any net GHG emissions. Consequently, the Solaren PPA will be compliant with the EPS as it will not produce any net GHG emissions as a direct byproduct of its conversion of space based solar energy into grid ready renewable electricity.<sup>16</sup>

Consistent with SB 1368 and D.07-01-039, the Solaren PPA is compliant with the emissions requirements for a long term baseload generation contract

### **RPS Eligibility and CPUC Approval**

Pursuant to Pub. Util. Code § 399.13, the CEC certifies eligible renewable energy resources. Generation from a resource that is not CEC-certified cannot be used to meet RPS requirements. To ensure that only CEC-certified energy is procured under a Commission-approved RPS contract, the Commission has required standard and non-modifiable “eligibility” language in all RPS contracts. That language requires a seller to warrant that the project qualifies and is certified by the CEC as an “Eligible Renewable Energy Resource,” that the project’s output delivered to the buyer qualifies under the requirements of the California RPS, and that the seller uses commercially reasonable efforts to maintain eligibility should there be a change in law affecting eligibility.<sup>17</sup>

The Commission requires a standard and non-modifiable clause in all RPS contracts that requires “CPUC Approval” of a PPA to include an explicit finding that “any procurement pursuant to this Agreement is procurement from an eligible renewable energy resource for purposes of determining Buyer's compliance with any obligation that it may have to procure eligible renewable energy resources pursuant to the California Renewables Portfolio Standard (*Public Utilities Code Section 399.11 et seq.*), Decision 03-06-071, or other applicable law.”<sup>18</sup>

Notwithstanding this language, the Commission has no jurisdiction to determine whether a project is an eligible renewable energy resource, neither can the Commission determine prior to final CEC certification of a project, that “any

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<sup>16</sup> D.07-01-039. *See also*, SB 1368.

<sup>17</sup> *See, e.g.* D. 08-04-009 at Appendix A, STC 6, Eligibility.

<sup>18</sup> *See, e.g.* D. 08-04-009 at Appendix A, STC 1, CPUC Approval.

procurement” pursuant to a specific contract will be “procurement from an eligible renewable energy resource.”

Therefore, while we include the required finding here, this finding has never been intended, and shall not be read now, to allow the generation from a non-RPS eligible resource to count towards an RPS compliance obligation. Nor shall such finding absolve the seller of its obligation to obtain CEC certification, or the utility of its obligation to pursue remedies for breach of contract. Such contract enforcement activities shall be reviewed pursuant to the Commission’s authority to review the utilities’ administration of contracts.

### **COMMENTS**

Public Utilities Code section 311(g)(1) provides that this resolution must be served on all parties and subject to at least 30 days public review and comment prior to a vote of the Commission. Section 311(g)(2) provides that this 30-day period may be reduced or waived upon the stipulation of all parties in the proceeding.

The 30-day comment period for the draft of this resolution was neither waived nor reduced. Accordingly, this draft resolution was mailed to parties for comments on November 16, 2010.

No comments were submitted.

### **FINDINGS AND CONCLUSIONS**

1. The Commission conditionally approved Pacific Gas and Electric Company’s power purchase agreement with Solaren Corporation in Resolution E-4286.
2. Resolution E-4286 approved cost recovery for the power purchase agreement between Pacific Gas and Electric Company and Solaren Corporation provided the California Energy Commission determined the technology contemplated in Advice Letter 3449-E is a Renewables Portfolio Standard eligible technology.
3. Resolution E-4286 required that, within 90 days following California Energy Commission determination that the technology contemplated in the power purchase agreement between Pacific Gas and Electric Company and Solaren Corporation is RPS eligible, Pacific Gas and Electric Company file a Tier 3

advice letter demonstrating the project's compliance with the Emissions Performance Standard.

4. The California Energy Commission has determined that the technology proposed to be used in the power purchase agreement between Pacific Gas and Electric Company and Solaren Corporation is Renewables Portfolio Standard eligible pursuant to the California Renewables Portfolio Standard under Public Utilities Code Section 399.11 et seq., Decision 03-06-071, Decision 06-10-050, or other applicable law.
5. The immediately preceding finding shall not be read to allow generation from a non- Renewables Portfolio Standard eligible renewable energy resource under the Solaren Corporation power purchase agreement to count towards an Renewables Portfolio Standard compliance obligation. Nor shall that finding absolve Pacific Gas and Electric Company of its obligation to enforce compliance with the Solaren Corporation power purchase agreement.
6. Energy Division used several criteria to determine whether the power purchase agreement between Pacific Gas and Electric Company and Solaren Corporation is in compliance with the Emissions Performance Standard.
7. The power purchase agreement between Pacific Gas and Electric Company and Solaren Corporation is considered covered procurement and subject to the Emissions Performance Standard as set forth in Decision 07-01-039 and Senate Bill 1368.
8. Pursuant to Decision 07-01-039, a Load Serving Entity does not have to demonstrate Emissions Performance Standard compliance for certain renewable resources such as solar thermal, wind, geothermal, and certain types of biomass.
9. The Solaren technology is not per se compliant with the Emissions Performance Standard and, therefore, must comply with emissions requirements set forth in Decision 07-01-039.
10. The emissions compliance of the power purchase agreement between Pacific Gas and Electric Company and Solaren Corporation is limited to the generation facility and not the lifecycle net emissions of the generation facility, as stated in Decision 07-01-039.
11. The Solaren facility will not produce any net GHG emissions as a direct byproduct of its conversion of space based solar energy into grid ready renewable electricity.

12. The power purchase agreement between Pacific Gas and Electric Company and Solaren Corporation is compliant with the greenhouse gas emissions requirements pursuant to Decision 07-01-039 and Senate Bill 1368.
13. Payments made by Pacific Gas and Electric Company under the approved Solaren Corporation power purchase agreement are fully recoverable in rates over the life of the agreement, subject to Commission review of Pacific Gas and Electric Company's administration of the agreement.
14. The power purchase agreement between Pacific Gas and Electric Company and Solaren Corporation is subject to all other conditions set forth in Resolution E-4286.
15. Advice Letter 3690-E should be approved effective today without modifications.

**THEREFORE IT IS ORDERED THAT:**

1. Pacific Gas and Electric Company's power purchase agreement with Solaren Corporation filed in Advice Letter 3690-E is compliant with the Emissions Performance Standard.

This Resolution is effective today.

I certify that the foregoing resolution was duly introduced, passed and adopted at a conference of the Public Utilities Commission of the State of California held on December 16, 2010; the following Commissioners voting favorably thereon:

/s/ PAUL CLANON  
PAUL CLANON  
Executive Director

MICHAEL R. PEEVEY  
President  
DIAN M. GRUENEICH  
JOHN A. BOHN  
TIMOTHY ALAN SIMON  
NANCY E. RYAN  
Commissioners