



# THE RENEWABLE JUNGLE

A Guide to California's  
Renewable Policies and Programs



January 2012

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# ABOUT DRA

*The Division of Ratepayer Advocates (DRA) is an independent consumer advocacy division within the California Public Utilities Commission (CPUC) that represents the customers of California's investor-owned utilities. DRA's statutory mission is to obtain the lowest possible rates for utility service consistent with safe and reliable service levels. In fulfilling this goal, DRA also advocates for customer and environmental protections.*

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# **THE RENEWABLE JUNGLE**

## ***A Guide to California's Renewable Policies and Programs***

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# I. Introduction

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California's landmark Global Warming Solutions Act of 2006<sup>1</sup> set the aggressive goal of reducing greenhouse gas (GHG) emissions to 1990 levels by 2020 to protect the state's environment and the health of its residents. Since the passage of this law, several more policies have been adopted to support and further this goal. Many of these policies are aimed at reducing emissions in the electricity generation industry, which is among the highest contributors to GHG emissions in California. Due to these new policies, electric generation is transforming from an industry dominated by fossil-fuel generation to one with a mixture of renewable generation, which produces electricity from natural resources -- such as sunlight, wind, and geothermal heat.

The California Public Utilities Commission (CPUC or Commission), the California Energy Commission (CEC), and other state agencies are responsible for establishing programs to encourage the development, installation, and purchase of renewable electricity. These programs provide financial incentives through guaranteed revenue streams, incentives and rebates, and/or lower electricity bills. CPUC-authorized renewable energy programs are funded by utility customers through their electricity bills. Renewable energy programs are numerous. Some have complex requirements for participation, and depending on program design, potentially significant costs for energy utilities, renewable energy and fossil fuel generators, and utility customers. Understanding the numerous renewable energy programs is challenging, but essential to determining whether program participation and customer funding of a program are worthwhile investments.

*The Renewable Jungle* is a guide that provides context as well as a compendium of California's renewable energy programs. The programs described are offered by California's three largest investor-owned utilities (IOUs): Pacific Gas and Electric Company (PG&E), San Diego Gas & Electric Company (SDG&E), and Southern California Edison Company (SCE).<sup>2</sup> The guide

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<sup>1</sup> Assembly Bill 32, Nunez, Chapter 488, Statutes of 2006.

<sup>2</sup> These three companies are referred to as "utilities" or "IOUs" throughout the Guide.

describes the various programs established to procure renewable energy in California, scope of each program and, to the extent possible, the costs to utility customers for each program. It also identifies some challenges with which policymakers, utilities, generators, and consumer advocates are currently grappling.

This guide is not a guide to legal requirements associated with renewable energy. The guide itself has no legal authority, and any discussion of legal requirements within it represents only DRA's observations or opinions. Readers who want information about legal requirements must consult the applicable statutes and decisions and reach their own conclusions. We have provided website links to the governing statutes and decisions only to make this research easier.

As much information as possible has been released in this guide, but certain data are confidential and cannot be revealed. The CPUC has deemed the prices of renewable generation contracts to be confidential for three years after the start of operations and to be public thereafter. The Commission found that releasing recent contract prices would increase the opportunity of market players to manipulate the market to the detriment of ratepayers.<sup>3</sup>

## II. Types of Renewable Energy

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Under the state's Renewables Portfolio Standard (RPS), the legislative mandate driving most of the renewable energy procurement, only particular technologies qualify as renewable. Notably, excluded technologies are: fossil-fueled generation, nuclear, and large hydroelectric.<sup>4</sup> Some of the RPS-eligible technologies are: photovoltaics, solar thermal, wind, certain biomass resources, geothermal, and small hydro facilities.<sup>5</sup> Highlighted below are the most prevalent of the eligible technologies.

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<sup>3</sup> For more information, see D.06-06-066: [http://docs.cpuc.ca.gov/word\\_pdf/FINAL\\_DECISION/57772.pdf](http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/57772.pdf)

<sup>4</sup> Large hydroelectric is defined as facilities over 30 megawatts (MW) (for more information, see the CEC's guidebook, "Renewables Portfolio Standard Eligibility," Fourth Edition, January 2011).

<sup>5</sup> Also eligible are: ocean wave, thermal, and tidal energy; fuel cells using renewable fuels; landfill gas; and municipal solid waste conversion, not the direct combustion of municipal solid waste.

**Table 1**  
**Types of Renewable Energy Resources<sup>6</sup>**

Renewable Resource	What is it?
Solar	The sun’s energy can be converted to electricity in two ways: 1) Photovoltaic (PV) or “solar cells,” which are grouped into panels; 2) Solar thermal power plants, which heat fluid to produce steam to power a generator.
Wind	Wind turbines use blades to collect wind’s kinetic energy. Wind turns the blades, which are connected to a drive shaft that turns an electric generator to produce electricity.
Geothermal	Geothermal power plants harness heat from the Earth’s core by drilling wells and piping steam or hot water to the surface to generate electricity.
Hydropower	Hydroelectric power plants convert water’s kinetic energy into electricity by forcing water, often held at a dam, through a hydraulic turbine that is connected to a generator.
Biomass	Biomass is the organic material from plants and animals, which when burned, produces steam for electricity generation and other energy uses.
Ocean Wave, Thermal, and Tidal	Energy conversion technologies that harness the energy in tides, waves, and thermal gradients in the oceans.
Fuel Cell (using renewable fuels)	A device capable of generating an electrical current by converting the chemical energy of a fuel directly into electrical energy. Fuel cells differ from conventional electrical cells in that the active materials such as, fuel and oxygen are not contained within the cell, but are supplied from outside.
Landfill Gas	Gas that is generated by decomposition of organic material at landfill disposal sites. The methane in landfill gas may be vented, flared, combusted to generate electricity or useful thermal energy onsite, or injected into a pipeline for combustion off-site.
Municipal Solid Waste	Residential solid waste and some nonhazardous commercial, institutional, and industrial wastes.

<sup>6</sup> Energy Information Administration: <http://www.eia.gov>.

### III. The Renewables Portfolio Standard (RPS)

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The pace of California's renewable energy transformation is set by the Renewable Portfolio Standard (RPS.) In 2002, Senate Bill 1078 (Sher, 2002) established the first RPS, which required CPUC-regulated retail electricity sellers<sup>7</sup> to purchase an additional 1% of retail sales per year from eligible renewable sources until 20% of sales is reached by 2017. The IOUs provide approximately 68% of California's electric retail sales. Subsequently, in 2006, Senate Bill 107 (Simitian, 2006) accelerated the schedule to achieve the 20% RPS goal by 2010. More recently, Senate Bill X1 2 (Simitian, 2011) requires CPUC-regulated retail sellers and publicly-owned utilities to achieve a 33% RPS by 2020.

Most of the electricity that contributes to the RPS is generated from large scale renewable energy projects. Large scale renewable energy projects have capacities ranging from 20 MW to 1,000 MW. One megawatt can power 1,000 homes. In addition to the RPS projects; there are initiatives that encourage the development of renewable generation by smaller scale retail utility customers through participation in programs such as the California Solar Initiative (CSI) and the Self-Generation Incentive Program (SGIP). These programs provide incentives for customers to install renewable generation technologies that primarily serve their own onsite load. Electricity generated from systems installed through CSI and SGIP does not currently count towards the RPS requirements, but instead directly reduces the amount of electricity that must be supplied by a retail electricity seller.<sup>8</sup>

#### **Investor-Owned Utilities' RPS Plans**

The investor-owned utilities submit annual renewable energy purchase plans to the CPUC. These plans, which are called RPS Procurement Plans, lay out the utilities' goals, strategies, and rules for purchasing renewable energy towards achieving the 33% RPS. Stakeholders, such as generators and consumer advocates representing utility customers, can provide input prior to

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<sup>7</sup> CPUC-regulated retail electricity sellers are IOUs, electric service providers and community choice aggregators.

<sup>8</sup> The CPUC recently issued guidelines for the purchase and sale of Renewable Energy Credits, which make it possible that electricity generated under CSI and SGIP will count towards RPS in the future. However, the CEC has yet to verify those facilities as RPS-eligible. See Rulemaking 11-05-005.

the Commission's approval of the plans.

### **Renewable Energy Credits**

Renewable Energy Credits (RECs) are certificates of proof that one megawatt-hour (MWh) of electricity was generated by an eligible renewable energy resource. They can either be sold "bundled" with the energy or "unbundled" as a separate commodity. They are effectively the "currency" used to demonstrate compliance with the RPS. Utilities must acquire RECs to demonstrate compliance with the RPS requirements. The California Energy Commission (CEC) tracks and verifies how many RECs each retail electricity seller has used for compliance with the RPS at the end of each year and the production of renewable energy associated with the RECs. The CEC provides that information in an annual report to the CPUC and the public, and then the CPUC determines whether a retail seller is in compliance with the RPS.

Tradable RECs (TRECs) are RECs that can be sold to utilities and other retail sellers either without the associated energy or with it. They are also referred to as "unbundled RECs." Unbundled RECs can still be bundled via "firming and shaping" agreements which combine a purchase of RECs with non-renewable power imported into California.<sup>9</sup> TRECs were created to provide the utilities with more flexibility to meet the RPS goal.

### **RPS Requirements**

In addition to setting the aggressive 33% RPS, Senate Bill X1 2 established that bundled renewable electricity is preferred over unbundled renewable electricity. In doing so, the bill established the following requirements for renewable energy to count toward the 33% RPS:

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<sup>9</sup> "Firming" is a process by which backup generation is used to ensure the reliability of an intermittent resource. "Shaping" is the "filling in" of an uneven production profile of a resource to create a consistent block of power.

- A specified minimum of renewable generation must be from bundled resources that can schedule energy to a California balancing authority<sup>10</sup> (at least 50% for the period of 2011 to 2013, rising to 65% by 2014 to 2016, and 75% by 2017 to 2020).<sup>11</sup>
- Up to 25% of procurement targets can be satisfied with unbundled renewable energy credits in 2011 to 2013, decreasing to 15% in 2014 to 2016, and 10% in 2017 to 2020.
- Unbundled energy that is firmed and shaped can account for the remainder of a utility’s RPS obligation in each compliance period.

Table 2 shows the percentage limits on bundled, unbundled, and firmed and shaped renewable procurement.

**Table 2**  
**Limits on Unbundled Renewable Procurement**

Compliance Period	Bundled	Unbundled	
		REC-only	Firmed and Shaped
2011-2013	At least 50%	Up to 25%	The remainder
2014-2016	At least 65%	Up to 15%	The remainder
2017-2020	At least 75%	Up to 10%	The remainder

<sup>10</sup> “Balancing authority” means the responsible entity that integrates resource plans ahead of time, maintains load-interchange-generation balance within a balancing authority area, and supports interconnection frequency in real time. See Public Utilities Code section 399.12 (b); see also Glossary of Terms Used in Reliability Standards adopted by the NERC Board of Trustees: February 12, 2008.

A “California balancing authority” is specifically defined in section 399.12 (d):

“California balancing authority” is a balancing authority with control over a balancing authority area primarily located in this state and operating for retail sellers and local publicly owned electric utilities subject to the requirements of this article and includes the Independent System Operator (ISO) and a local publicly owned electric utility operating a transmission grid that is not under the operational control of the ISO. A California balancing authority is responsible for the operation of the transmission grid within its metered boundaries which may not be limited by the political boundaries of the State of California.

<sup>11</sup> The “bundled” category includes: bundled electricity dynamically transferred to a California Balancing Authority, and energy that can be scheduled into a California Balancing Authority without substitution. See D. 11-12-052. To qualify for this category, resources must schedule the energy on an hour or subhourly basis to a California Balancing Authority.

## IV. Operational and Cost Challenges

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### Intermittency

The reliability of energy production from renewables varies greatly from technology to technology. This type of energy production is referred to as intermittent. For many renewable technologies, weather, season, and other factors can impact energy production, including unpredictable increases and decreases within minutes. The energy output of intermittent renewable production is supplemented by other resources on the grid, which the grid operator ramps up or down as intermittent resources increase or decrease production. Renewable energy that is imported into California is often firmed and shaped to address intermittency. Some firming and shaping arrangements tie a renewable facility with a conventional one that can “fill in” the renewable facility’s gaps in production to produce an even block of energy.

### Integration

An increasing concern among policymakers, and the California Independent System Operator (CAISO) which is responsible for operating the state’s grid, is the integration of renewables into the electric grid. Since the energy production from many renewable facilities can increase and decrease unpredictably, other energy resources have to ramp up and down “behind” renewables to meet the state’s electricity demand. The need to have power facilities available behind intermittent ones creates operational challenges that raise reliability and cost concerns. The CPUC and a variety of stakeholders are developing a methodology to calculate the integration costs of proposed renewable facilities. Once these costs are determined, the utilities will consider these costs when they are considering which renewable energy projects to contract with or develop. The costs associated with renewable integration will be recovered from all California electricity customers as part of the price of electricity.

### Calculating Indirect Costs and Benefits of Renewable Energy

Purchasing renewable power may decrease the cost of total energy procurement, or purchases, in ways that are challenging to account for. For example, most renewable energy sources help to avoid the costs of fossil fuel that would normally be used to generate electricity. However,

there are also the indirect costs of integrating renewables into the electric system discussed above. These are not directly accounted for in purchases of renewable energy because those contracts generally do not include the cost of fossil fuel back-up generation, grid upgrades, and energy storage needed to maintain grid reliability. A full accounting of these costs would alter the total ratepayer costs of renewable energy procurement methods. Nevertheless, it remains beyond the scope of this guide to account for such costs to ratepayers.

## V. Overview of California's Renewable Energy Programs

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California has 13 programs that are designed to encourage the development of renewable energy. Below are illustrations which show the renewable energy programs that contribute to achieving the 33% RPS (Figure 1), the length of time that these programs are authorized (Table 3), and a list of programs identified by technology type and the maximum amount of electricity generated that meet the RPS requirements (Table 4). Section VI describes each of the programs in Figure 1.

### The Relationships between the RPS and Renewable Energy Programs

Most, but not all of the renewable energy procured by IOUs count toward their RPS obligations. Programs which are "RPS-eligible" count toward the RPS and ones which are "RPS-ineligible" do not. The reason that certain programs are RPS-ineligible is usually due to the fact that the energy produced by them is difficult to measure or is not purchased by the utility directly.

For example, customers in the California Solar Initiative program have installed solar panels on their roofs and are generating electricity. However, their electric generation is "behind the meter" and cannot be counted as long as it is directly serving the household's or business' electricity needs. When the customer is not consuming as much electricity as is being produced, the electricity enters the grid and, therefore, crosses the utility meter. At that point, the amount of electricity being produced can be measured and can conceivably be counted toward the state's renewable energy goal.

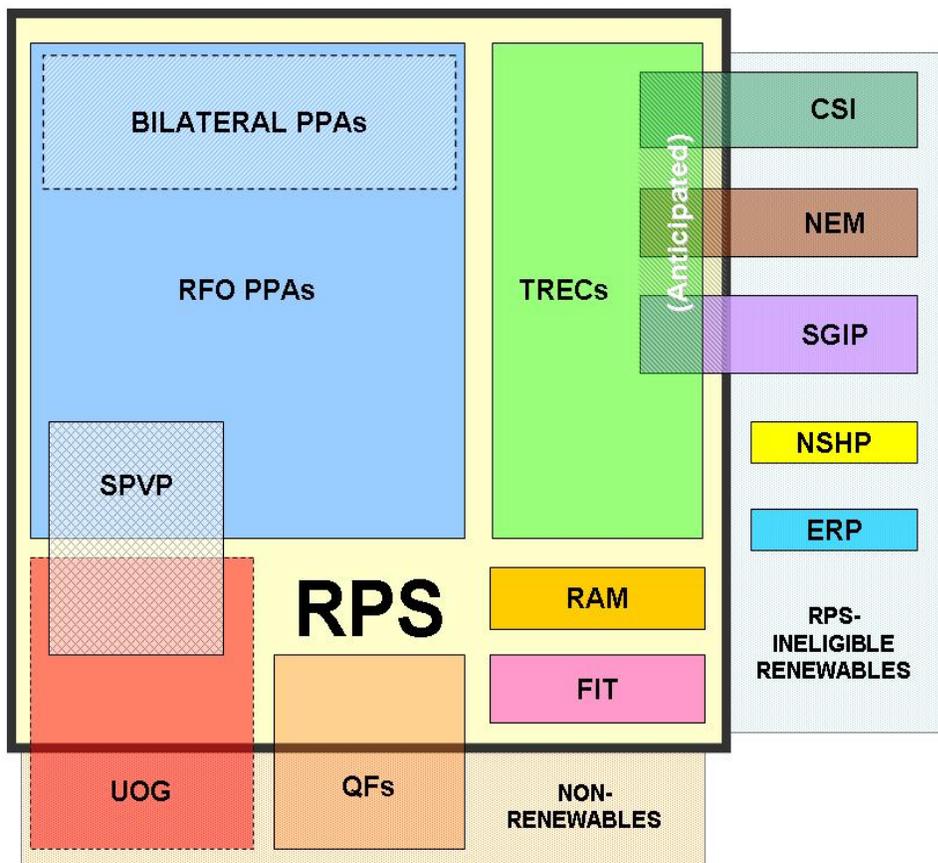
Electricity production which cannot be measured cannot contribute to a utility's RPS obligation, but does serve to reduce overall retail electricity sales since the customer's consumption is lowered. RPS is set as a percentage of a utility's retail sales. Therefore, the utility's RPS obligation is reduced.

Typically, a utility credits the electricity a customer produces against the customer's bill. However, if at the end of the year there is excess energy produced by the customer's system, the utility purchases that electricity from the customer. That purchase includes both the electricity itself and its associated Renewable Energy Credits (RECs). Those RECs may, in the future, count toward a utility's RPS obligations.

It should also be noted that some of the programs discussed below pre-date the RPS. For example, Qualifying Facility (QF) contract agreements substantially pre-date the RPS and as a result, these arrangements are not always structured to comply with the requirements of RPS. However, there have been contract and regulatory changes that allow renewable energy from QFs to be counted as RPS-eligible.

Figure 1 below illustrates the complex overlap of various renewable energy programs and how they relate to each other. As can be seen, some of the programs cannot be counted toward the state's RPS goals, either totally or partially, depending on the rules of the specific programs. See Section VI below for complete descriptions of each program.

**Figure 1**  
**Relationship of Renewable Energy Programs**  
 (RPS Programs: Defined by Black Box Outline)



- CSI = California Solar Initiative
- ERP = Emerging Renewables Program
- FIT = Feed-in Tariff
- NEM = Net Energy Metering
- NSHP = New Solar Homes Partnership
- PPA = Power Purchase Agreement
- QFs = Qualifying Facilities
- RAM = Renewables Auction Mechanism
- RFO = Request for Offers
- RPS = Renewables Portfolio Standards
- SGIP = Small Generator Incentive Program
- SPVP = Solar Photovoltaic Program
- TRECs = Tradable Renewable Energy Credits
- UOG = Utility Owned Generation

Note: Program Boxes are not to scale.

**Length of Time Authorized for Renewable Energy Programs**

Each renewable energy program is authorized by the legislature or the CPUC for a specific length of time. Table 3 shows the inception and term of the state’s renewable programs. Some have been functioning for a number of years, and even pre-date the RPS, such as the Qualifying Facilities (QF) program; while others, such as the Renewable Auction Mechanism, recently came into effect.



**Table 4 – Renewable Programs by Technology and Output**

<b>Output</b>	<b>Solar PV</b>	<b>Wind</b>	<b>Other</b>
<b>Less than 1 MW</b>	California Solar Initiative New Solar Homes Partnership Emerging Renewables Program Net Energy Metering	Emerging Renewables Program Small Generator Incentive Program Net Energy Metering	Net Energy Metering
<b>1-3 MW</b>	Feed-in Tariff Renewables Auction Mechanism Solar Photovoltaic Program Request for Offers Power Purchase Agreement Bilateral Power Purchase Agreement	Feed-in Tariff Renewables Auction Mechanism Small Generator Incentive Program Request for Offers Power Purchase Agreement Bilateral Power Purchase Agreement	Feed-in Tariff Renewables Auction Mechanism Request for Offers Power Purchase Agreement Bilateral Power Purchase Agreement
<b>1-20 MW</b>	Solar Photovoltaic Program Request for Offers Power Purchase Agreement Renewables Auction Mechanism Bilateral Power Purchase Agreement	Request for Offers Power Purchase Agreement Renewables Auction Mechanism Bilateral Power Purchase Agreement	Request for Offers Power Purchase Agreement Renewables Auction Mechanism Bilateral Power Purchase Agreement
<b>Greater than 20 MW</b>	Request for Offers Power Purchase Agreement Utility Owned Generation Solar Photovoltaic Program Bilateral Power Purchase Agreement	Request for Offers Power Purchase Agreement Utility Owned Generation Bilateral Power Purchase Agreement	Request for Offers Power Purchase Agreement Bilateral Power Purchase Agreement Utility Owned Generation

## **The Cost of Renewable Energy Programs to Utility Customers**

The ways and amounts that utility customers pay for renewable energy varies. Customers pay by price per kilowatt hour set in individual contracts negotiated by the utilities with independent power producers and approved by the CPUC (e.g., Qualified Facility contracts, Power Purchase Agreements) or by tariffs that allow program participants or subscribers to select an agreement with terms that include published prices per kilowatt hour (e.g., Feed-in Tariffs, Net Energy Metering). Customers also fund incentives (e.g., the California Solar Initiative) and rebates (e.g., Emerging Renewables Program) to program participants who invest in and install renewable generation facilities on their premises.

Currently, customers pay a higher price for electricity generated by renewable energy sources versus electricity generated by fossil-fuel. Overall, policymakers agree that paying higher prices for renewable energy is necessary to achieve the state's goal of reducing GHG emissions and that renewable energy will eventually achieve price parity with non-renewable energy. But, how much is too much? Will the price of renewable energy eventually be competitive with fossil-fuel generation? Should the CPUC only approve low cost renewable energy technologies and programs? Some factors to consider when answering these questions are: whether production costs will decline, whether the state can reduce the need for expensive transmission projects, and the need to have a diverse portfolio of renewable energy sources. A more diverse portfolio may cost more than a less diverse one. Not only the cost of a specific renewable technology, but the cost of integrating the energy into the state's electricity grid must be considered when assessing the cost of renewable energy. Finally, renewable energy may become more economic in the future if the alternative, fossil-fueled electricity becomes more expensive. Tables 5 and 6, provide information on how much utility customers pay for each renewable energy program. These tables include costs that have already been incurred, if any, and costs projected to be incurred. Table 5 describes RPS-Eligible Programs and Table 6 describes RPS-Ineligible Programs. Data is often unavailable or difficult to obtain with complete certainty, so many of the figures below are approximate.<sup>12</sup>

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<sup>12</sup> Because most of the projected expenditures on renewable energy programs are confidential, the data of the three IOUs are presented in aggregated form. Certain market-sensitive information is kept confidential so that participants cannot game the market.

**Table 5 - RPS-Eligible Programs:<sup>13</sup> Cost to Utility Customers**

Program	Program Purpose	Cost to Utility Customers
<b>Feed-in Tariff (FiT)</b>	<p>To encourage the development of new renewable energy resources.</p> <p>To provide a simple and streamlined mechanism for small generators to sell electricity to utilities without complex negotiations and delays, typical of larger contracts.</p>	<p>Current tariff rate utility customers pay to FiT participants is set at 2009 Market Price Referent (MPR): 8.8 to 14.1¢/kWh, depending on contract length and start date. Per existing CPUC ruling to implement SB 32 and SBX1 2, the CPUC is currently determining a new market price in <a href="#">R.11-05-005</a>, which is likely to be different.</p>
<b>Qualifying Facilities (QFs)</b>	<p>To encourage non-utility development of distributed<sup>14</sup> alternative energy resources, primarily co-generation or Combined Heat and Power, which generates heat and electricity in one process. Some of these projects qualify as renewable energy.</p>	<p>Utility customers paid a total of \$20.7 billion for electricity generated by renewable QFs from 2003 to 2020.<sup>15</sup> Customers paid approximately \$80 per MWh from 2003 to 2020.<sup>16</sup></p>
<b>Renewables Auction Mechanism (RAM)</b>	<p>To promote competition, elicit the lowest costs for ratepayers, encourage the development of smaller scale RPS resources that can utilize existing distribution infrastructure, and streamline the procurement process of near-term renewable resources.</p>	<p>As the RAM is just being implemented, no cost information is available at this time.</p>
<b>Solicited RPS Power Purchase Agreements (PPAs)</b>	<p>To provide a competitive process for renewable energy purchases.</p>	<p>Utility customers will have paid an estimated \$20.8 billion from 2003 to 2020.<sup>17</sup> \$105.85 per MWh for 2003 to 2020.<sup>18</sup></p>

<sup>13</sup> Programs which produce electricity that satisfy the requirements of the Renewables Portfolio Standard and which “count” toward the IOUs’ obligations under the RPS.

<sup>14</sup> It should be noted that not all QFs are interconnected at the distribution level. Some are interconnected at the transmission level which, depending on the definition, may disqualify them from being considered “distributed.”

<sup>15</sup> Data from May 2011 DRA Data Request 001-A to the utilities.

<sup>16</sup> Data from May 2011 DRA Data Request 001-A to the utilities.

<sup>17</sup> Data from May 2011 DRA Data Request 001-A to the utilities and subsequent revisions.

<sup>18</sup> Data from May 2011 DRA Data Request 001-A to the utilities and subsequent revisions.

**Table 5 (cont’d) - RPS-Eligible Programs: Costs to Utility Customers**

Program	Program Purpose	Cost to Utility Customers
<b>Bilaterally Negotiated RPS Power Purchase Agreements (PPAs)</b>	To capture opportunities that were not bid into a solicitation or were not successful. Projects were either not ready at the time of the RFO or have changed since the RFO.	Utility customers will have paid an estimated \$13.3 billion from 2003 to 2020. <sup>19</sup> \$99.30 per MWh for 2003 to 2020. <sup>20</sup>
<b>Solar Photovoltaic Program (SPVP)</b>	To provide an opportunity for distributed solar photovoltaic (PV) projects limited from participation in either CSI or RPS.  To facilitate the development of new solar PV projects in IOUs’ service territories, near load, and where there is surplus capacity on the existing distribution system.	Maximum allowable price for the utility-owned portion of the program: <sup>21</sup> <ul style="list-style-type: none"> <li>▪ PG&amp;E customers pay \$295/MWh.</li> <li>▪ SCE customers pay \$260/MWh.</li> <li>▪ SDG&amp;E customers pay \$235/MWh.<sup>22</sup></li> </ul>
<b>Tradable Renewable Energy Credits (TREC)</b>	To provide more options and flexibility for RPS-obligated load-serving entities—which include the IOUs, energy service providers, and community choice aggregators—to comply with RPS mandates in both the near and longer term.	There was a price cap of \$50/TREC and the utilities are currently forecasting procurement of 27,574 GWh in 2010 to 2013 <sup>23</sup> suggesting total expenditures for that period will be no more than \$1.4 billion. Under new legislation, the TREC has been essentially eliminated and replaced with three categories of renewable products.
<b>Utility-Owned Generation (UOG)</b>	To give the IOUs flexibility in attaining the lowest-cost generation, if the electricity produced from the UOG is cost competitive with the PPAs.	No associated costs yet. <sup>24</sup>

<sup>19</sup> Data from May 2011 DRA Data Request 001-A to the utilities and subsequent revisions.

<sup>20</sup> Data from May 2011 DRA Data Request 001-A to the utilities and subsequent revisions.

<sup>21</sup> The program is split into utility-owned and privately owned components. Each IOU must meet a certain MW goal of utility-owned and privately-owned installations. The privately-owned installations are being bid into a competitive process and the utility-owned portion has a set maximum price shown here.

<sup>22</sup> All rates are post-TOD (time of day) adjusted. For final decisions see [D. 10-04-052](#) for PG&E, [D.09-06-049](#) for SCE, and [D.10-09-016](#) for SDG&E.

<sup>23</sup> TREC procurement data only made public by PG&E and SCE (see public versions of utilities’ RPS compliance reports at CPUC’s Renewables website: <http://www.cpuc.ca.gov/PUC/energy/Renewables/> ). SDG&E data omitted.

<sup>24</sup> The IOUs do not currently own and operate any major renewable projects.

**Table 6 - RPS-Ineligible Programs:<sup>25</sup> Cost to Utility Customers**

Program	Program Purpose	Cost to Utility Customers
<b>California Solar Initiative (CSI)</b>	To increase small solar generation in California while assisting in development of economies of scale for such installations.	\$2.167 billion of utility customer funds budgeted for CSI and sub-programs. \$784 million for CSI publicly-owned utilities program. \$250 million for CSI solar heater program.
<b>Emerging Renewables Program (ERP)<sup>26</sup></b>	To reduce the net cost of generating equipment using emerging renewable technologies, thereby stimulating substantial sales of such systems.	Rebates funded by utility customers are \$2.50/W for the first 10 kW of capacity and \$1.50/W thereafter.
<b>Net Energy Metering (NEM)</b>	To support direct customer investment in distributed renewable energy generation, including customer-sited solar PV systems.	Average net costs amount to \$0.12/kWh-exported. The total subsidy has not been estimated. Annual Net Surplus Compensation expenditures paid by utility customers expected to be approximately \$0.5 million. <sup>27</sup>
<b>New Solar Homes Partnership (NSHP)</b>	To help create a self-sustaining market for energy efficient, new solar homes.	\$400 million budgeted of utility customer funding.
<b>Small Generator Incentive Program (SGIP)</b>	To encourage the deployment of distributed generation in California.	Utility customers paid \$623 million from 2001 to 2009 (additional \$98 million reserved for active projects). 2010 budget: \$83 million.

<sup>25</sup> Programs which produce electricity that do not satisfy the requirements of the Renewables Portfolio Standard and which do not “count” toward the IOUs’ obligations under the RPS.

<sup>26</sup> The ERP program is administered by the California Energy Commission and was temporarily suspended on March 4, 2011.

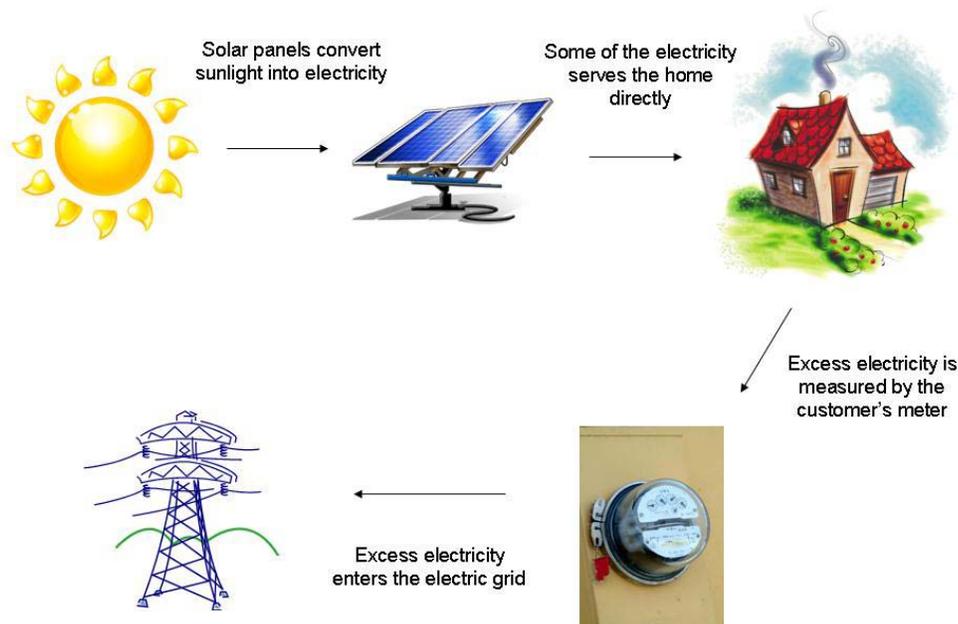
<sup>27</sup> See D.11-06-016, footnote 21.

## VI. Compendium of Renewable Energy Programs

This section of the guide describes the numerous renewable energy programs available in California. The section is divided into two areas: RPS-Eligible and RPS-Ineligible programs. Each program description provides the origin of the program’s authorization, the funding source, the purpose and program description, energy and/or capacity amounts, cost impacts, and the current status of the program.

A number of programs exist to promote renewable energy generation “on the customer side of the meter”—that is, generation that is both produced and consumed on the customer side of the meter. Customer-side generation includes the California Solar Initiative (CSI) program and the Self-Generation Incentive Program (SGIP). As Figure 2 below shows, these customers produce renewable energy and feed some of it back into the distribution system. These projects decrease retail sales, effectively reducing the amount of both conventional and renewable generation required to meet demand on the distribution system.

**Figure 2**  
**Renewable Generation by Customers**



Since energy produced at a customer's home, for example, is on the customer's side of the meter, the utility does not know how much energy was produced until it "crosses" the meter. In addition, utilities only officially purchase the excess energy a customer produces each year. So, the energy produced on the customer side of the meter generally does not go toward any utility's RPS requirement, however, since that electricity serves the home itself, the utility's retail sales are reduced to that customer. The utility's RPS obligation, which is a percentage of retail sales, is reduced as well. Only the excess electricity that a utility purchases from a customer may in the future count directly toward its RPS obligation.<sup>28</sup> Some programs are measured in terms of capacity and others in terms of energy.<sup>29</sup>

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<sup>28</sup> See D.11-06-016, p. 3.

<sup>29</sup> **Capacity** is the amount equal to the highest level of electricity that can be generated from a facility to meet peak load. Capacity is expressed as Kilowatts (KWs), Megawatts (MWs), Gigawatts (GWs) or Terawatts (TWs).

1 Terawatt (TW) = 1000 Gigawatts (GWs) = 1,000,000 Megawatts (MWs) = 1,000,000,000 Kilowatts (KWs). **Energy** is the total amount of electricity supplied to meet demand and is expressed as a rate of consumption in Kilowatt-hours (KWh), Megawatt-hours (MWh), and so on. One MWh of energy can sustain an average of 1,000 homes for one hour.

**RPS-Eligible Renewable Generation**

**Solicited RPS Power Purchase Agreements**

<p><b>Legislation/Decision</b></p>	<p><a href="#">SB 1078</a> (Sher, 2002) and <a href="#">SBX1 2</a> (Simitian, 2011) mandate a competitive procurement process for eligible renewable energy resources (which include, but are not limited to solar, wind, geothermal, small hydro, and eligible biomass). The statutes mandate that IOUs seek competitive bids from project developers in line with approved long-term renewable procurement plans, for which Decision <a href="#">(D.)04-06-014</a> established standard contract terms. The statutes also require utilities to select renewable resources that are least-cost, including the direct costs of renewable energy generation and some indirect costs such as necessary transmission upgrades. In addition, utilities are required to consider renewable resources that best fit their system needs. Least-Cost / Best-Fit criteria were determined in <a href="#">D.04-07-029</a>.</p>
<p><b>Purpose</b></p>	<p>To provide a competitive process for renewable energy procurement.</p>
<p><b>Description</b></p>	<p>California's three large electricity IOUs issue annual solicitations for renewable energy. The RPS solicitation process is the primary, though not exclusive, policy framework for the development of utility-scale renewable energy in California.</p> <p>To meet RPS requirements, IOUs issue a Request for Offer (RFO) each year and receive bids<sup>30</sup> from renewable energy project developers that wish to provide energy to the utility. Each IOU then evaluates and ranks</p>

<sup>30</sup> Utilities can accept renewable energy bids from anywhere within the Western Electricity Coordinating Council (WECC).

## ***RPS-Eligible Renewable Generation***

### **(Continued: Solicited RPS Power Purchase Agreements)**

<b>Description</b>	these bids on a Least-Cost / Best-Fit (LCBF) <sup>31</sup> basis. Those bids found to best align with LCBF are included on a short-list to be pursued for negotiations. After negotiating terms with renewable energy project developers and executing contracts, the IOU submits an Advice Letter or Application to the CPUC seeking final approval of a power purchase agreement (PPA or contract) with the project developer. The Commissioners of the CPUC then vote on a proposed decision or resolution, which either approves or denies the contract.
<b>Capacity/Energy</b>	<b>Goal:</b> 33% of retail energy by 2020, with interim targets for 20% by the end of 2013 and 25% by the end of 2016. <b>Progress:</b> Estimated 197 Terawatt hours (TWh) in 2003-2020. <sup>32</sup>
<b>Program Costs</b>	\$20.8 billion in 2003-2020. <sup>33</sup> \$105.85 per MWh for 2003-2020. <sup>34</sup>
<b>Status</b>	Ongoing.

<sup>31</sup> Each utility uses a CPUC-approved “Least-Cost / Best-Fit” (LCBF) method to evaluate proposed projects in a utility’s annual RFO. Projects are compared relative to each other, rather than a predetermined standard, on both quantitative costs -- such as transmission upgrades and time-of-delivery considerations -- and qualitative factors such as project viability and location. Also, utilities pursue a diverse set of generation technologies to mitigate the uneven load profile of certain renewables and thus evaluate individual projects on the basis of their portfolio needs.

<sup>32</sup> From solicited RPS power purchase agreements only.

<sup>33</sup> Data from May 2011 DRA Data Request 001-A to the utilities and subsequent revisions.

<sup>34</sup> Data from May 2011 DRA Data Request 001-A to the utilities and subsequent revisions.

**RPS-Eligible Renewable Generation**

**Bilaterally Negotiated RPS Power Purchase Agreements**

<p><b>Legislation/Decision</b></p>	<p>In 2003, <a href="#">D.03-06-071</a> allowed for a utility and a generator to enter into bilateral agreement (contracts) outside of the competitive solicitation process. This decision was amended by <a href="#">D.09-06-050</a> in 2009, which determined that bilateral agreements should be reviewed according to the same processes and standards as contracts that come through a solicitation. <a href="#">D.06-10-019</a> clarified that bilateral agreements are not eligible for Above-Market Funds.<sup>35</sup></p>
<p><b>Purpose</b></p>	<p>To capture renewable projects that were either not successful in the solicitation or were not ready to bid into the solicitation.</p>
<p><b>Description</b></p>	<p>IOUs may pursue bilateral agreements for renewable energy outside of the RFO solicitation process. Prior to 2010, the main distinction was that bilateral agreements, which were expected to cost more than competitively procured contracts, could not be eligible for Above-Market Funds. Since the full commitment of such funds occurred, there is effectively no meaningful difference between bilateral and solicited contracts, beyond how they enter the procurement process.</p> <p>Utilities and project developers sometimes use bilateral contracts to avoid the burden of the RFO process. Whereas the RFO process creates a portfolio of possible projects against which a particular proposal can be compared, bilateral contracts may enter the procurement process at any time, effectively allowing IOUs to choose the portfolio against which</p>

<sup>35</sup> As a measure intended for cost-containment, the California legislature has mandated that the CPUC maintain an account of “Above-Market Funds” (AMFs), which are allocated to each utility for competitively-sourced renewable projects above the Market Price Referent (MPR). The CPUC keeps a running total of AMFs for contracts which have received CPUC approval, and AMFs are paid out only as a renewable project delivers energy. Each utility was allocated a set amount of AMFs, which were previously collected from ratepayers through the Public Goods Charge included on monthly bills. Upon exhausting its share, each utility can continue to bear above-market renewable costs on a voluntary basis with CPUC approval. The AMFs were fully allocated by the end of 2009. Since then, the utilities have continued to procure renewable energy on a voluntary basis with CPUC approval.

**(Continued: Bilaterally Negotiated RPS Power Purchase Agreements)**

	to compare such contracts. As a result, the timing and use of bilateral contracts is increasingly strategic. Additionally, contracts that fail to proceed through the RFO process can be resubmitted as a bilateral contract offer.
<b>Capacity/Energy</b>	<p><b>Goal:</b> 33% of retail energy by 2020, with interim targets for 20% by the end of 2013 and 25% by the end of 2016.</p> <p><b>Progress:</b> Estimated 134 TWh in 2003-2020.<sup>36</sup></p>
<b>Program Costs</b>	<p>\$13.3 billion estimated for 2003-2020.<sup>37</sup></p> <p>Estimated \$99.32 per MWh for 2003-2020.<sup>38</sup></p>
<b>Status</b>	Ongoing.

<sup>36</sup> From bilaterally negotiated RPS power purchase agreements only.

<sup>37</sup> Data from May 2011 DRA Data Request 001-A to the utilities and subsequent revisions.

<sup>38</sup> Data from May 2011 DRA Data Request 001-A to the utilities and subsequent revisions.

## ***RPS-Eligible Renewable Generation***

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## RPS-Eligible Renewable Generation

### Tradable Renewable Energy Credits (TREC<sub>s</sub>)

<b>Legislation/Decision</b>	CPUC decision <a href="#">D.10-03-021</a> , as modified by <a href="#">D.11-01-025</a> , initially established the rules for using TREC <sub>s</sub> for RPS compliance. In addition, <a href="#">D.11-01-026</a> applied the TREC usage limit rule to energy service providers (ESPs). The recently enacted <a href="#">SBX1 2</a> (Simitian, 2011) further modifies TREC usage and limits. With the new legislation, the term 'TREC' is no longer in use.
<b>Purpose</b>	<p>To provide more options and flexibility for RPS-obligated load-serving entities to comply with RPS mandates in both the near and longer term.</p> <p>To provide additional flexibility and incentives for the development of RPS-eligible generation by supplying useful revenue options for generation developers.</p>
<b>Description</b>	<p>RPS-obligated retail sellers can buy, sell, and trade RECs separately from their underlying energy; such tradable RECs (or TREC<sub>s</sub>) can be used for compliance with the RPS. The RECs from bundled<sup>39</sup> contracts currently delivering RPS-eligible energy may be unbundled and traded separately from the associated energy. Moreover, RECs from bundled contracts scheduled to deliver RPS-eligible energy in the future may be traded on a forward basis separately from the associated energy.</p> <p>All TREC<sub>s</sub> must be associated with RPS-eligible energy generated on or after January 1, 2008 and tracked in Western Renewable Energy Generation Information System (WREGIS) to be used for RPS compliance. RECs that are produced in non-RPS programs (such as CSI and SGIP) can be sold to utilities for RPS compliance purposes.<sup>40</sup></p>

<sup>39</sup> The term "bundled" refers to the sale of RECs along with delivered energy. Unbundled RECs are those that are effectively separated from delivered energy.

<sup>40</sup> See [D. 11-08-016](#).

## RPS-Eligible Renewable Generation

(Continued: Tradable Renewable Energy Credits)

<p><b>Capacity/Energy</b></p>	<p><b>Goals:</b> Up to 25% of procurement targets can be satisfied with unbundled tradable Renewable Energy Credits (TREC) from 2011 to 2013, decreasing to 15% from 2014 to 2016 and 10% from 2017 to 2020.<sup>41</sup></p> <p><b>Progress:</b> 5 million TREC (equivalent to 5 TWh) were used for compliance in 2010, representing 3% of retail sales and 17% of RPS procurement targets.<sup>42</sup></p> <p>The utilities are currently forecasting procurement of 27,574 GWh – or 27,574,000 REC -- in 2010-2013.<sup>43</sup></p>
<p><b>Program Costs</b></p>	<p>There was a price cap of \$50/TREC, and the utilities are forecasting procurement of 27,574 GWh in 2010-2013,<sup>44</sup> suggesting total expenditures for that period will be no more than \$1.4 billion.</p>
<p><b>Status</b></p>	<p>Ongoing.</p>

<sup>41</sup> As defined in SBX1 2 (Simitian, 2011).

<sup>42</sup> March 2011 Compliance Reports.

<sup>43</sup> Only PG&E and SCE have made TREC procurement data for 2010-2013 public as these totals do not include SDG&E. Data from May 2011 DRA Data Request 001-A to the utilities.

<sup>44</sup> TREC procurement data only made public by PG&E and SCE (see public versions of utilities’ RPS compliance reports at CPUC’s Renewables website: <http://www.cpuc.ca.gov/PUC/energy/Renewables/>). SDG&E data omitted.

**RPS-Eligible Renewable Generation**

**Qualifying Facilities (QFs)**

*Only a portion of QF projects generate renewable energy*

<p><b>Legislation/Decision</b></p>	<p>Under the <a href="#">Public Utility Regulatory Policies Act of 1978</a> (PURPA), electric utilities were required to purchase energy and capacity from independent power producers that are qualifying co-generation facilities and qualifying small power production facilities (QFs). To implement the purchase requirements of PURPA, the CPUC required California investor-owned electric utilities to enter into long-term power purchase agreements with QFs and approved the applicable terms, conditions, and pricing provisions.</p> <p>The <a href="#">Energy Policy Act of 2005</a> significantly amended the purchase requirements of PURPA, authorizing waivers of the obligation of utilities to purchase electricity offered to it by a QF if the Federal Energy Regulatory Commission (FERC) finds the QF has non-discriminatory access to competitive wholesale electricity markets. The statute permits such waivers for a particular QF or on a “service territory-wide basis.”</p>
<p><b>Purpose</b></p>	<p>To encourage non-utility development of alternative energy resources, primarily co-generation and renewables.</p> <p>To increase the amount of environmentally beneficial and efficient generation on California’s grid.</p>
<p><b>Description</b></p>	<p>Qualifying Facilities (QFs) are a distinct class of energy producer which consists of either 1) small-scale producers of commercial energy whose primary energy source is renewable; or 2) producers who happen to generate electric energy as a byproduct of other activities, for example a co-generation or Combined Heat and Power facility. When a Qualifying Facility meets the FERC’s requirements for ownership, size, and efficiency, utility companies are obligated to purchase energy from these facilities at rates equal to the avoided cost of the generation.</p>

## RPS-Eligible Renewable Generation

<b>(Continued: Qualifying Facilities)</b>	
	<p>FERC waived California’s three major electric utilities’ mandatory purchase obligation of QFs over 20 MWs, pursuant to a settlement agreement approved at the CPUC. The settlement requires the electric utilities to increase their Combined Heat and Power (CHP)/QF capacity by 4,000 MW and contribute 6.7 million metric tons of greenhouse gas reductions.<sup>45</sup></p>
<b>Capacity/Energy</b>	<p><b>Goals:</b> Although there are goals for Combined Heat and Power facilities, there are no specific renewable energy goals in the CHP/QF program.</p> <p><b>Progress:</b></p> <ul style="list-style-type: none"> <li>▪ 8332 MW of capacity as of January 2011 (3724 MW (45%) from renewable sources).<sup>46</sup></li> <li>▪ 330 TWh 2003-2010 of energy<sup>47</sup> (138 TWh (42%) from renewable sources).<sup>48</sup></li> </ul>
<b>Program Costs</b>	<p>\$20.7 billion for renewable QFs in 2003-2020.<sup>49</sup> Approximately \$80 per MWh from 2003 to 2020.<sup>50</sup></p>
<b>Status</b>	<p>Ongoing. Some non-renewable QF deliveries may convert to renewable fuels resulting in additional eligible renewable resources to meet the RPS.</p>

<sup>45</sup> Determined by California Air Resources Board’s AB 32 Scoping Plan. Measurements are in carbon dioxide equivalent.

<sup>46</sup> Data from the Jan 2011 semi-annual Co-generation and Small Power Production reports.

<sup>47</sup> Data from ERRRA filings.

<sup>48</sup> Data from Mar 2011 Compliance Reports (“Pre-2002 contracts”).

<sup>49</sup> Data from May 2011 DRA Data Request 001-A to the utilities.

<sup>50</sup> Data from May 2011 DRA Data Request 001-A to the utilities.

**RPS-Eligible Renewable Generation**

**Renewable Auction Mechanism (RAM)**

<p><b>Legislation/Decision</b></p>	<p>The Renewable Auction Mechanism (RAM) evolved from the CPUC’s inquiry into expanding the existing Feed-in Tariff (FiT) program. In 2010, <a href="#">D.10-12-048</a> established the RAM as an alternative to expanding the FiT and widened the scope of eligible projects.</p>
<p><b>Purpose</b></p>	<p>To promote competition, elicit the lowest costs for ratepayers, encourage the development of smaller scale RPS resources that can utilize existing distribution infrastructure, and streamline the procurement process of near-term renewable resources.</p> <p>To complement the RPS solicitation process by reducing transaction costs and providing a procurement opportunity for smaller RPS-eligible projects, which have not been able to effectively participate in the annual RPS solicitations.</p>
<p><b>Description</b></p>	<p>The RAM is a simplified and market-based procurement mechanism for renewable distributed generation (DG) projects up to 20 MW and on the system side of the meter. The RAM program is intended to provide a win-win situation for both developers and ratepayers. Projects are selected starting with the lowest and most viable bid to elicit low-cost, near-term development of RPS-eligible resources. The RAM program provides a simple standard contract for each utility and allows all projects to be submitted to the CPUC through an expedited regulatory review process. The RAM relies on a market-based auction pricing structure, utilizes project viability screens, and selects projects based on least-cost rather than on a first-come / first-serve basis at an administratively-determined price. This program applies only to IOUs; Publicly-Owned Utilities (POUs) and Energy Service Providers (ESPs) are not eligible to participate. Each IOU is required to hold two auctions per year for two years. The RAM effectively replaces SCE’s voluntary Renewables Standard Contract (RSC) program, although SCE may continue to submit executed contracts from its 2010 RSC for approval.</p>

## ***RPS-Eligible Renewable Generation***

### **(Continued: Renewable Auction Mechanism)**

<b>Capacity/Energy</b>	<p><b>Goals:</b> 1000 MW capacity (SCE: 748.4 MW; PG&amp;E: 420.9 MW; SDG&amp;E: 154 MW) for the first two years and on an as-needed basis subsequently.</p> <p><b>Progress:</b> RAM was recently established and there is not yet procurement under the mechanism.</p>
<b>Program Costs</b>	<p>The IOUs' first RAM auctions closed on November 15, 2011, but cost data has not been finalized at this time.</p>
<b>Status</b>	<p>The first RAM auctions were held in the fall of 2011. The IOUs plan to finalize their shortlist of bids by the first quarter of 2012.</p>

## RPS-Eligible Renewable Generation

### Feed-in Tariffs (FiT)

<b>Legislation/Decision</b>	<p><a href="#">Assembly Bill (AB) 1969 (Yee, 2006)</a> added <a href="#">Public Utilities Code (PU Code) Section 399.20</a>, authorizing tariffs and standard contracts for the purchase of eligible renewable generation from public water and wastewater facilities that are 1.5 MW or less. In 2007, <a href="#">D. 07-07-027</a> authorized additional tariffs to customers other than the public water and wastewater customers in PG&amp;E and SCE service territories. <a href="#">Resolution E-4137</a> approved the final tariffs and standard contracts and set the effective date of the tariffs as February 14, 2008. <a href="#">Senate Bill (SB) 380 (Kehoe, 2008)</a> amended <a href="#">PU Code Section 399.20</a> to create one tariff that applies to all IOU customers. <a href="#">SB 32 (Negrete McLeod, 2009)</a> expanded eligibility to POUs and increased the eligible project size to 3 MW. On January 27, 2011, the CPUC issued a <a href="#">Ruling</a> requesting briefs to implement SB 32. R.11-05-005 has continued the implementation process which is still ongoing.</p>
<b>Purpose</b>	<p>To encourage the development of new renewable energy resources. To provide a simple and streamlined mechanism for small generators to sell electricity to utilities without complex negotiations and delays that are typical of larger contracts.</p>
<b>Description</b>	<p>Feed-in Tariffs (FiT) provide a fixed-price, non-negotiable contract to participating small renewable generators sized up to 3 MW.<sup>51</sup> Currently, customers are paid for the energy they produce at a price based on the 2009 "Market Price Referent," which approximates the levelized cost of equivalent conventional generation adjusted for time-of-use factors. The program started February 14, 2008.<sup>52</sup> Implementation of the FiT, including the required price, for facilities between 1.5 and 3 MW is ongoing. A new pricing mechanism is being discussed in R. 11-05-005.</p> <p>Per <a href="#">SB 32</a> (Negrete, McCleod, 2009), any customer can now sell renewable power under the Feed-in Tariff terms to both IOUs and POUs.</p>

<sup>51</sup> The current facility size limit is 1.5 MW but it will soon be raised to 3 MW in R.11-05-005.

<sup>52</sup> The FIT effectively replicates SCE's similarly-structured CREST program (California Renewable Energy Small Tariff).

## RPS-Eligible Renewable Generation

(Continued: Feed-in Tariffs)

	<p>Customers who sell energy to utilities under Feed-in Tariff terms also transfer the Renewable Energy Credits (RECs) associated with the sold energy. Facilities that have participated in the California Solar Initiative (CSI), Self-Generation Incentive Program (SGIP), or other ratepayer funded generation incentive program, including net metering tariffs, can switch to the FiT but may need to refund the incentives they received upon switching. The CPUC is currently deciding how the refund amount should be calculated and structured.</p>
<p><b>Capacity/Energy</b></p>	<p><b>Goals:</b> As of the publication date of this document, there were no stated minimum renewable energy goals in the FiT program. There is a cap of 750MW.</p> <p><b>Progress:</b> 478 MW.<sup>53</sup></p>
<p><b>Program Costs</b></p>	<p>Current tariff price is the 2009 Market Price Referent (MPR): 8.8 – 14.1¢/kWh, depending on contract length and start date. Per existing ruling to implement <a href="#">SB 32</a> and <a href="#">SBX1 2</a>, the CPUC is currently determining a new market price in Rulemaking <a href="#">R.11-05-005</a>, which is likely to be different.</p>
<p><b>Status</b></p>	<p>The CPUC is determining a new market price for the program as well as a number of other details in its ongoing <a href="#">R.11-05-005</a>. A decision is targeted for the first quarter of 2012.</p>

<sup>53</sup> 135 MW currently from CREST.

**RPS-Eligible Renewable Generation**

**Solar Photovoltaic Program (SPVP)**

<p><b>Legislation/Decision</b></p>	<p>On June 18, 2009, Decision <a href="#">D.09-06-049</a> authorized a five-year solar PV program to develop up to 500 MW of solar PV facilities in the range of 1 to 2 MW in SCE’s service area.</p> <p>On April 22, 2010, <a href="#">D.10-04-052</a> authorized a five-year solar PV program to develop up to 500 MW of solar PV facilities in the range of 1 to 20 MW in PG&amp;E’s service area.</p> <p>On September 2, 2010, <a href="#">D.10-09-016</a> authorized a five-year solar PV program to develop up to 100 MW of 1-5 MW solar PV projects in SDG&amp;E’s service area.</p>
<p><b>Purpose</b></p>	<p>To provide an opportunity for distributed solar PV projects limited from participation in either CSI or RPS.</p> <p>To facilitate the development of new solar PV projects in the IOUs’ service territories, near load, where there is surplus capacity on the existing distribution system.</p>
<p><b>Description</b></p>	<p>The CPUC authorized SCE, PG&amp;E, and SDG&amp;E to own and operate solar PV facilities (Utility Owned Generation - UOG) as well as to execute solar PV power purchase agreements with independent power producers (IPP) through a competitive solicitation process.</p> <p>Utilities are required to execute contracts with IPPs through a competitive Solar PV Request for Offers (RFO) solicitation process. The Solar PV RFO must occur at least once per year.</p>

## RPS-Eligible Renewable Generation

(Continued: Solar Photovoltaic Program)

Utility	Eligible Project Size	Participating Buyers and Sellers	Eligible Technologies
SCE	1 – 2 MW	250 MW UOG 250 MW IPP	Solar PV Primarily Rooftop
PG&E	1 – 20 MW	250 MW UOG 250 MW IPP	Solar PV Primarily Ground-Mount
SDG&E	1 – 5 MW	26 MW UOG 74 MW IPP <sup>54</sup>	Solar PV Primarily Ground-Mount

UOG projects require a two-step process. Each utility issues a Request for Information (RFI) from industry participants capable of providing PV modules and/or engineering, procurement, and construction services. Suppliers responding to the RFI are then evaluated and qualified suppliers selected through the RFI process are invited to submit proposals through a Request for Proposal (RFP) process.

### Capacity/Energy

**Goals:** 1,100 MW.

**Progress:** SCE and PG&E each have approved PPAs for 50 MW with IPPs. SCE has approximately 43 MW of UOG in progress.

### Program Costs

Maximum allowable utility-owned price for PG&E is \$295/MWh, for SCE is \$260/MWh, and for SDG&E is \$235/MWh.<sup>55</sup> Costs of the IPP portion of the program are not yet known.

### Status

Utilities are negotiating agreements with developers under the program. Both SCE and SDG&E have filed petitions to modify capacity allotment.

<sup>54</sup> The 74 MWs from SDG&E’s IPP portion was consolidated with the RAM program per a decision granting SDG&E’s Petition to Modify the RAM and Solar Energy Program. The 74 MWs of IPP from SDG&E’s SEP will now be subject to the RAM auction program protocols and the \$235/MWh price cap has been removed in favor of competitive solicitation.

<sup>55</sup> All rates are post-TOD (time of day) adjusted. For final decisions see [D. 10-04-052](#) for PG&E, [D.09-06-049](#) for SCE, and [D.10-09-016](#) for SDG&E.

**RPS-Eligible Renewable Generation**

**Utility-Owned Generation (UOG)**

*Only a fraction of utility-owned facilities generate energy from renewable sources*

<p><b>Legislation/Decision</b></p>	<p><a href="#">California Public Utilities Code § 1001</a> requires utilities to obtain permission from the CPUC to build and own generation facilities and infrastructure. <a href="#">D.04-12-048</a> and <a href="#">D. 07-12-052</a> instructed IOUs, when seeking approval for Utility-Owned Generation (UOG), to compare the cost of the UOG project to competitively solicited bids from project developers. <a href="#">SBX1 2</a> (Simitian, 2011) encouraged the procurement of utility-owned renewables for up to 8.25% of all retail sales—therefore, up to 25% of all renewable energy sales.</p>
<p><b>Purpose</b></p>	<p>To retain flexibility in attainment of lowest-cost generation. UOG may be warranted under several circumstances: mitigation of developer market power, generation from “preferred resources” (i.e., in line with environmental interests), expansion of existing utility-owned facilities benefiting from unique opportunities (e.g., resulting from bankruptcy or settlements associated with existing facilities), and creation of assets that meet unique reliability needs.</p>
<p><b>Description</b></p>	<p>While a functional competitive energy market in California is the stated goal of CPUC regulation, in the interim California has a “hybrid market” in which some generation is competitively sought, while other generation is utility-owned. UOG includes but is not limited to: 1) utility-built resources; 2) Engineer, Permit, and Construct (EPC) resources; and 3) Purchase and Sale Agreement (PSA) acquired resources.</p> <p>Although California energy market restructuring has mandated that new generation be sought competitively (i.e., through bids from project developers), the CPUC approves utility-owned renewable energy generation outside of a competitive solicitation on a case-by-case basis via an IOU Application. IOUs may bring such Applications at any time and must indicate the exceptional circumstances justifying ownership of proposed generation. IOUs are better insulated from</p>

## RPS-Eligible Renewable Generation

<b>(Continued: Utility-Owned Generation)</b>	
	<p>project risk than independent project developers, but the UOG model effectively shifts the costs and risks of project development to ratepayers, regardless of actual facility performance. Typically, UOG operates on a cost-of-service model wherein ratepayers do not pay more than the actual cost of the facility plus a utility’s approved rate of return on its investment.</p>
<b>Capacity/Energy</b>	<p><b>Goals:</b> There are no stated renewable energy goals for UOG generally (except IOU Solar PV programs). However, <a href="#">SBX1 2</a> (Simitian, 2011) encouraged the procurement of UOG up to 8.25% of all retail sales—therefore, up to 25% of all renewable energy sales.</p> <p><b>Progress:</b> No major procurement yet.<sup>56</sup></p>
<b>Program Costs</b>	<p>No associated costs yet.</p>
<b>Status</b>	<p>Ongoing. No major utility-owned renewables have yet been procured outside of the IOU Solar PV Program.</p>

<sup>56</sup> In [D.11-03-036](#), the CPUC rejected PG&E’s Application for Manzanita Wind Project. In addition, some small hydroelectric facilities are utility-owned.

## ***RPS-Ineligible Renewable Generation***

### **California Solar Initiative (CSI)**

#### **Legislation/Decision**

In 2005, the CPUC began developing the California Solar Initiative (CSI) program under the Governor's [Executive Order](#) and later in 2006, under state law. First, the CPUC and California Energy Commission (CEC) issued a joint report in June 2005 that developed an analysis of key issues related to development and implementation of the CSI. On December 15, 2005, the CPUC issued [D.05-12-044](#), an order that modified existing solar incentive levels and directed CPUC staff to provide recommendations on the program's design. On March 2, 2006, the CPUC opened Rulemaking [\(R.\)06-03-004](#) to work with parties through public comment to develop the program.

On January 12, 2006, the CPUC issued an [Interim Order Adopting Policies and Funding For the California Solar Initiative](#) as part of its Rulemaking [R.04-03-017](#). The CPUC was nearing an August 24, 2006 Commission vote on proposed incentive level design, administrative structure, and planning schedule, when [Senate Bill \(SB\) 1](#) (Murray, 2006) was signed into law on August 21, 2006. While SB 1 codified the state's commitment to the creation of a self-sustaining solar market, it also introduced several unanticipated requirements for the program. In order to conform to state law, the CPUC worked with parties and then issued a proposed decision for public comment on SB 1's impacts on the CSI program. This decision was adopted by the CPUC on December 14, 2006. The program launched on January 1, 2007.

CSI augmented two prior solar programs administered by the CPUC and the CEC through the end of 2006 (CSI started on January 1, 2007): 1) the CPUC's Self-Generation Incentive Program (SGIP), which provides incentives to solar projects over 30 kW; and 2) the CEC's Emerging Renewables Program (ERP), which provides incentives to solar projects under 30 kW.

## ***RPS-Ineligible Renewable Generation***

**(Continued: California Solar Initiative)**

<p><b>Purpose</b></p>	<p>To increase generation in California from solar energy sources. To assist in development of economies of scale for solar installations.</p>
<p><b>Description</b></p>	<p>The CSI program provides upfront incentives for solar systems under 1 MW in capacity installed on existing residential homes, as well as existing and new commercial, industrial, government, non-profit, and agricultural properties within the service territories of the state’s three investor-owned utilities. Incentives to program participants decline as increasing levels of MW are installed.</p> <p>In addition to the general market program, the CSI program has four other program components, each with their own program administrator and 10-year budgets:</p> <ul style="list-style-type: none"> <li>▪ A research, development, and deployment (RD&amp;D) program provides grants to solar technologies that can advance the overall goals of the CSI Program. The RD&amp;D program is administered through its program manager, Itron. It has a budget of \$50 million.</li> <li>▪ The Single-family Solar Affordable Solar Housing (SASH) program provides solar incentives to single family low-income housing. The SASH program is administered by program manager GRID Alternatives. It has a budget of \$108 million.</li> <li>▪ The Multifamily Affordable Solar Housing (MASH) program provides solar incentives to multifamily low-income housing. The MASH program has a budget of \$108 million.</li> </ul> <p>Additionally, the CSI program extends to customers within the service territories of POUs. This portion of the program is administered separately by the POUs and started in January 2008.</p>

## ***RPS-Ineligible Renewable Generation***

(Continued: California Solar Initiative)

<b>Capacity/Energy</b>	<p><b>Goals:</b></p> <ul style="list-style-type: none"> <li>▪ 1940 MW (190 MW from low-income applicants) for IOUs by 2017.</li> <li>▪ 700 MW for POUs by 2017.</li> <li>▪ Install 200,000 solar water heaters, which displaces 585 million therms of gas by 2017.</li> </ul> <p><b>Progress:</b> As of the end of 2010, the IOU portion of CSI had achieved almost 400 MW of installed capacity.<sup>57</sup></p>
<b>Program Costs</b>	<ul style="list-style-type: none"> <li>▪ \$2.167 billion budgeted for CSI and sub-programs from beginning of 2007 to end of 2016.</li> <li>▪ \$784 million for CSI POU program.</li> <li>▪ \$250 million for CSI solar heater program.</li> </ul>
<b>Status</b>	Ongoing.

<sup>57</sup> See [2010 CSI Impact Evaluation](#).

## RPS-Ineligible Renewable Generation

### New Solar Homes Partnership (NSHP)

<b>Legislation/Decision</b>	The legislature expressly authorized the CEC to create the New Solar Homes Partnerships (NSHP) in 2006 in <a href="#">Senate Bill (SB) 1</a> (Murray, 2006). <sup>58</sup>
<b>Purpose</b>	The primary goal of the NSHP is to help create a self-sustaining market for energy efficient, new solar homes. Additional goals include home builders incorporating high levels of energy efficiency with high performing solar systems as standard features and home buyers demanding energy efficient, solar homes.
<b>Description</b>	The NSHP provides financial incentives and other support for installing eligible solar energy systems on new residential buildings that receive electricity from the state's three investor-owned utilities. The NSHP program provides two incentive structures, one for conventional or market-rate housing and another for qualified affordable housing projects.
<b>Capacity/Energy</b>	<b>Goals:</b> 400 MW by 2016. <b>Progress:</b> To be determined.
<b>Program Costs</b>	\$400 million budgeted from beginning of 2007.
<b>Status</b>	Ongoing.

<sup>58</sup> See CEC Docket Number 06-NSHP-01 for full details.

## RPS-Ineligible Renewable Generation

### Net Energy Metering (NEM)

<p><b>Legislation/Decision</b></p>	<p>In 1995, California adopted net metering for wind and solar systems with capacity size of 10 kilowatts (kW) or less under <a href="#">California Public Utilities Code 2827</a>. Net metering was expanded in 2001 to include systems sized up to 1 megawatt (MW) and again in 2003 to introduce a pilot program for biogas digesters and fuel cells. <a href="#">AB 920</a> (Huffman, 2009), requires California utilities to compensate Net Energy Metering (NEM) customers for electricity produced in excess of onsite load over a 12-month period, starting January 1, 2011. In July of 2011, the CPUC approved a standard rate of compensation for NEM customers who generate excess electricity in <a href="#">D.11-06-016</a>. This Net Surplus Compensation (NSC) rate is the market price of brown power added to a market index of renewable premiums.</p>
<p><b>Purpose</b></p>	<p>To support direct customer investment in grid-tied distributed renewable energy generation, including customer-sited solar PV systems.</p> <p>To reduce uncertainty for customer-generators with respect to system sizing, short-term fluctuations in generation, and interconnection.</p>
<p><b>Description</b></p>	<p>Customers who install small solar, wind, biogas, and fuel cell generation facilities (1 MW or less) to serve all or a portion of onsite electricity needs are eligible for the state's net metering program. NEM allows a customer-generator to receive an energy credit for power generated by their onsite system and fed back to the utility. The credit is used to offset the customer's electricity bill.</p> <p>NEM provides a long-term, predictable benefit tied to market value (bundled retail rates) for the customer, improving the financial viability of Distributed Generation (DG) investments. NEM allows customers to be paid the retail rate for their excess electricity generation.</p> <p>Most NEM projects pay little to no charges to interconnect to the utility</p>

**RPS-Ineligible Renewable Generation**

<b>(Continued: Net Energy Metering)</b>	
	<p>grid. In addition, NEM customers do pay non-bypassable charges, such as the Department of Water Resources surcharge and the Public Goods Charge,<sup>59</sup> but based on net rather than gross consumption.</p> <p>Almost all customer-generators on a NEM tariff are solar PV installations, with over 40,000 residential and non-residential accounts enrolled in California's NEM program.</p>
<b>Capacity/Energy</b>	<p><b>Goals:</b> There are no stated goals for capacity or energy deliveries from NEM.</p> <p><b>Progress:</b> 386 MW installed projects on NEM at the end of 2008.</p>
<b>Program Costs</b>	<p>Average NEM net costs amount to \$0.12/kWh-exported. The total subsidy has not been estimated.</p> <p>Annual Net Surplus Compensation (NSC) expenditures are expected to be approximately \$0.5 million.<sup>60</sup></p>
<b>Status</b>	Ongoing.

<sup>59</sup> The Public Goods Charge (PGC) is a non-bypassable surcharge to fund public goods research, development, and demonstration; energy efficiency activities; and low income assistance programs.

<sup>60</sup> See [D. 11-06-016](#), footnote 21.

## RPS-Ineligible Renewable Generation

### Small Generator Incentive Program (SGIP)

*Note: Only a portion of SGIP projects generate energy from renewables*

#### Legislation/Decision

In 2000, [Assembly Bill \(AB\) 970](#) (Ducheny, 2000) required the CPUC to initiate load control and distributed generation activities. In 2001, [Decision D.01-03-073](#) spurred the establishment of SGIP. SGIP was modified in 2004 by [D.04-12-045](#), which incorporated air quality standards for eligible programs and altered incentives.

[D.01-03-073](#) originally established incentives for solar photovoltaics (PV), wind turbines, fuel cells, microturbines, internal combustion (IC) engines, and gas turbines. Solar PV technologies were removed from SGIP beginning January 1, 2007 when the California Solar Initiative was created. Gas turbines, microturbines, and IC engines were removed from the program, as of January 1, 2008 by AB 2778,<sup>61</sup> which limited SGIP to wind and fuel cell generating technologies. In [D.08-11-044](#), the CPUC included Advanced Energy Storage (AES) technologies in SGIP, if the AES is coupled with a wind or fuel cell generating technology.

In 2009, [Senate Bill \(SB\) 412](#) (Kehoe, 2009) extended SGIP through 2015 and authorized the CPUC to expand eligibility of technologies for the SGIP based on greenhouse gas emissions reductions. The CPUC issued D.11-09-015 to conform the SGIP to requirements of SB 412.

#### Purpose

To spur market transformation for clean distributed energy resource technologies.

To encourage the deployment of distributed generation in California.

To give preference to new renewable energy capacity.

To ensure deployment of clean self-generation technologies having low and zero operational emissions.

<sup>61</sup> Stat. 2006, Chap. 617.

## RPS-Ineligible Renewable Generation

### (Continued: Small Generator Incentive Program)

<p><b>Description</b></p>	<p>SGIP provides financial incentives for the installation of new, qualifying self-generation equipment installed to meet all or a portion of the electric energy needs of a facility and is administered by PG&amp;E, SCE, SoCalGas, and the California Center for Sustainable Energy (CCSE).<sup>62</sup> The SGIP was originally designed to complement the CEC’s Emerging Renewables Program (ERP) by providing incentive funding to self-generation units.</p> <p>There is no maximum size for SGIP systems, but incentives are available only for the first 3 MWs of a project and decline after the first MW based upon a tiered incentive structure approved by the CPUC. Minimum project size for eligibility is 30 kW for wind and renewable fuel cells as long as the CEC’s Emerging Renewable Technologies program remains in place. There is no minimum for other eligible generation and storage technology.</p>
<p><b>Capacity/Energy</b></p>	<p>A total of 227 MW installed as of December 13, 2010.</p> <p>868,000 MWh delivered in 2009 – 63,000 tCO<sub>2</sub>e avoided.</p> <p>Cumulative GHG reductions since 2005 of over 561,000 tCO<sub>2</sub>e.</p>
<p><b>Program Costs</b></p>	<p>\$623 million paid in incentives from 2001-2009 (additional \$98 million reserved for active projects).</p> <p>2010 budget: \$83 million.</p>
<p><b>Status</b></p>	<p>Ongoing.</p>

<sup>62</sup> CCSE is SDG&E’s program administrator for SGIP.

## RPS-Ineligible Renewable Generation

### Emerging Renewables Program (ERP)

<p><b>Legislation/Decision</b></p>	<p><a href="#">Senate Bill (SB) 1038</a> (Sher, 2002) authorized the use of public goods charge funds collected from electricity ratepayers from January 1, 2002 through December 31, 2006 to support the Renewable Energy Program, the precursor to the Emerging Renewables Program (ERP). The enactment of <a href="#">SB 1250</a> (Perata, 2006)<sup>63</sup> provided new authority to use funds collected over the succeeding five years (2007-2012) to support the ERP, and incentives for solar energy were split between the CPUC and the CEC. Incentives for wind and fuel cells continued under the CEC.</p> <p>The program was temporarily suspended on March 4, 2011.</p>
<p><b>Purpose</b></p>	<p>To reduce the net cost of generating equipment using emerging renewable technologies and thereby stimulate substantial sales of such systems. Increased sales of generating equipment are expected to encourage manufacturers, sellers, and installers to expand their operations and reduce their costs per unit.</p> <p>To encourage the siting of small, reliable distributed generating systems throughout California in locations where the produced electricity is both needed and consumed.</p>
<p><b>Description</b></p>	<p>The ERP, administered by the California Energy Commission, provides rebates and production incentives to end-use consumers who purchase and install renewable energy technologies, specifically small (&lt; 50 kW) wind systems and fuel cells (&lt; 30 kW) using renewable fuels for onsite generation. The system must be interconnected to the utility distribution grid, unless the system is a fuel cell system used for backup generation for emergency, safety, or telecommunication purposes. The program started January 1, 2007.</p>

<sup>63</sup> Chapter 512, Statutes of 2006.

## ***RPS-Ineligible Renewable Generation***

(Continued: Emerging Renewables Program)

<b>Capacity/Energy</b>	<p><b>Goals:</b> There are no stated energy capacity goals for ERP.</p> <p><b>Progress:</b> TBD.</p>
<b>Program Costs</b>	<p>Rebates are \$2.50/W for the first 10 kW of capacity and \$1.50/W thereafter.</p>
<b>Status</b>	<p>Was temporarily suspended March 2011, but restarted in November 2011.</p>

