California Public Utilities Commission

RENEWABLES PORTFOLIO STANDARD

Quarterly Report

4th Quarter 2011

Cost Reporting in Compliance with SB 836

I. ABOUT THE RPS AND THIS REPORT

California's Renewables Portfolio Standard (RPS) is one of the most ambitious renewable energy standards in the country

Public Utilities Code §§ 399.11 – 399.19, established in 2002 under Senate Bill 1078 (Sher) and modified in 2006 under Senate Bill 107 (Simitian), requires retail sellers (investor-owned utilities (IOUs), electric service providers (ESPs) and community choice aggregators (CCAs)) regulated by the California Public Utilities Commission (CPUC) to procure an additional 1% of retail sales per year from eligible renewable sources until 20% is reached, no later than 2010.

In 2011, Senate Bill SB 2 of the First Extraordinary Session (SB 2 (1x)) (Simitian) (Stats. 2011, ch.1) made significant changes to §§ 399.11-399.31; it increased the renewable target to 33% by 2020 and required both retail sellers and publicly-owned utilities to achieve a 33% RPS. The CPUC and the California Energy Commission (CEC) are jointly responsible for implementing the program.

While the RPS program is the primary vehicle for new utility-scale renewable energy development in California, there are other programs that stimulate development of customer-sited renewable generation. The California Solar Initiative (CSI) and Self-Generation Incentive Program (SGIP) provide incentives for customers to install renewable distributed generation technologies that directly serve their on-site load.[1] The electricity generated from power systems installed through CSI and SGIP may contribute to the RPS provided that RPS eligibility requirements established by the CEC are met. [2] Also, generation from these facilities indirectly contributes to the RPS by reducing electricity demand when serving customer load. Furthermore, it provides the customer clean, renewable, carbon-free electricity.

The Commission issues this report on the RPS program every quarter pursuant to the 2006 Budget Act Supplemental Report Item 8660-001-0462. This report focuses on California's three large IOUs: Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E). These IOUs currently provide approximately 68% of the state's electric retail sales and analyzing this data provides significant insight into the state's RPS progress.

[1] More information on the CSI and SGIP can be found on the CPUC's website: http://www.cpuc.ca.gov/PUC/energy/DistGen/.

[2] In the case of renewable customer generation, the system-owner owns the renewable energy credits (RECs), but could sell the RECs to retail sellers to contribute to the RPS targets.

II. EXECUTIVE SUMMARY

RPS Cost Reporting Pursuant to SB 836

- This report presents historical data on cost trends since the RPS program was first implemented.
- The weighted average time-of-delivery adjusted cost of all contracts approved from 2003-2011 was approximately 11.9 cents per kilowatt hour (kWh), with a range of 5.4 cents in 2003 to 13.3 cents in 2011. Most recently, bids from the 2011 RPS Solicitation, not yet available for inclusion in the report, show significantly lower costs than bids from the past few years, which will be reflected in future IOU contracts.
- The overall picture is that the renewable market is robust, competitive, and has matured since the start of the RPS program.

Status of RPS Procurement

- Collectively, the large IOUs reported in their August 2011 RPS Compliance Reports that they served 17.0% of their electricity with RPS-eligible generation in 2010. PG&E served 15.9% of its 2010 load[3] with RPS-eligible renewable energy, SCE with 19.3%, and SDG&E with 11.9%. Per the procurement requirements in SB 2 (1x), the utilities must average 20% RPS from 2011-2013, which all three utilities are projected to attain.
- Since 2003, 2,541 MW of new renewable capacity achieved commercial operation under the RPS program. Over 830 MW of new renewable capacity came online in 2011.
- The IOUs submitted 68 contracts representing 4,525 MW of renewable capacity in 2011. In the same time period, the CPUC approved 44 contracts representing 2,461 MW of renewable capacity.

Highlights of Recent and Upcoming Events

- On May 5, 2011, the CPUC began implementing SB 2 (1x) through the RPS Rulemaking (R.) 11-05-005. On December 1, 2011, the CPUC approved Decision 11-12-020, which establishes the new RPS procurement requirements for three compliance periods through 2020 (2011-2013, 2014-2016, and 2017-2020). On December 15, 2011, the CPUC approved Decision 11-12-052, which implements the new RPS portfolio content categories, set out in new Public Utilities Code § 399.16. A third proposed decision establishing new compliance rules is expected in the first quarter of 2012.

[3] This percentage does not include several PG&E contracts that are under CPUC review.

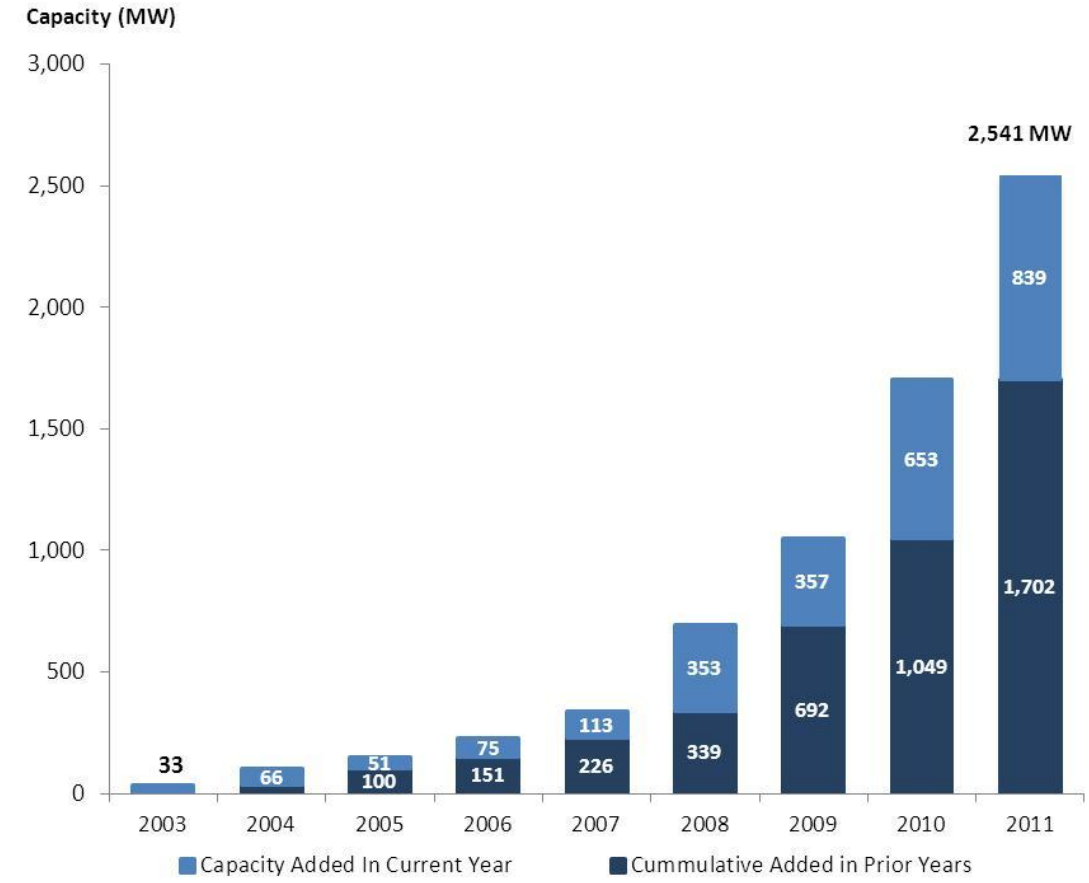
- On December 15, 2011, Energy Division issued a request for proposal (RFP) to solicit consulting services for the development of a new cost containment mechanism pursuant to SB 2 (1x), which directs the Commission to establish a limitation for each IOU on the procurement expenditures for all eligible renewable energy resources used to comply with the RPS. The Energy Division issued three more RFPs in 2012 to solicit additional RPS support services.
- On January 10, 2012, Administrative Law Judge DeAngelis and Commissioner Ferron issued a Ruling directing the IOUs to work together to create a uniform standard contract for the renewable feed-in tariff program. Energy Division staff will hold a workshop on February 22, 2012 for stakeholders to review the IOUs' proposed contract. The Ruling noted that a decision on program pricing and design is expected in the first quarter of 2012 and a second decision adopting a uniform contract is expected in the second quarter of 2012.
- On January 31, 2012, the three IOUs offered standardized, non-negotiable contracts to the successful bidders resulting from the first Renewable Auction Mechanism solicitation, which closed on November 15, 2011.

III. PROGRESS TOWARDS A 33% RPS BY 2020

New Renewable Capacity Added in 2011

Since 2003, 2,541 MW of new renewable capacity achieved commercial operation under the RPS program. Over 830 MW of new renewable capacity came online in 2011, all of which was from wind and solar photovoltaic (PV) projects. 2011 showed the greatest increase in renewable generation since the beginning of the program.

Figure 1. RPS Capacity Installed Since 2003, By Year[4]



Source: California Public Utilities Commission, 4th Quarter 2011

[4] Figure 1 only includes new capacity under contract for 10 years or more.

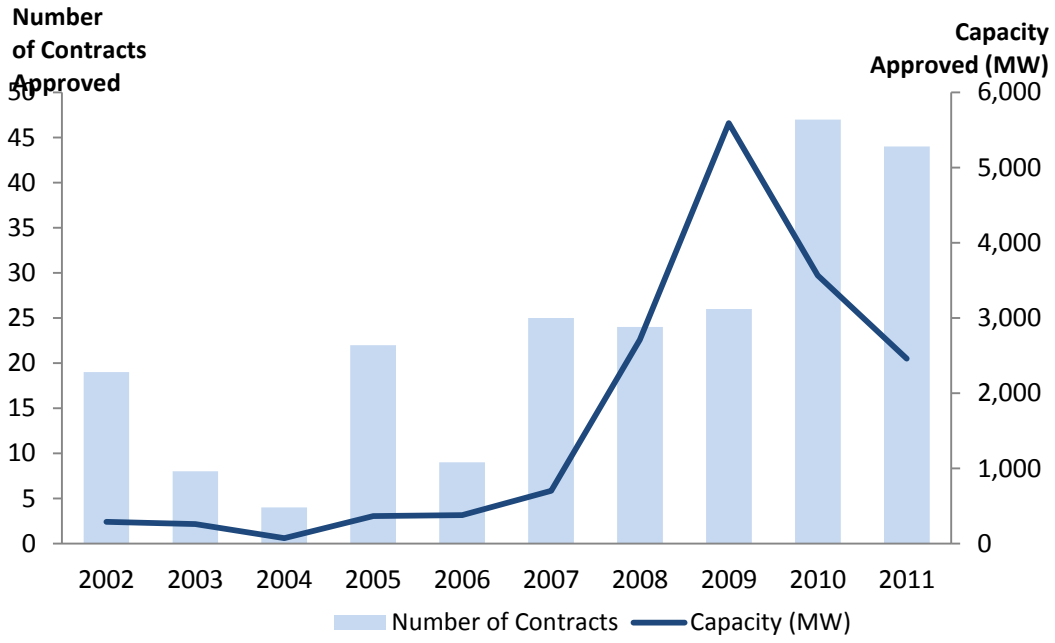
RPS Contracting Activities in 2011

From 2002 – 2011, the CPUC approved 189 contracts for over 17,000 MW of renewable capacity.[5] As Table 1 below shows, the CPUC approved an additional 33 contracts in the fourth quarter of 2011 for 1,510 MW. For the year, the CPUC approved 44 contracts for 2,461 MW.

Table 1. IOU RPS-Eligible Contracts Approved and Submitted in 2011

		PG&E		SCE		SDG&E		Large IOU Total	
		Number of Contracts	MW	Number of Contracts	MW	Number of Contracts	MW	Number of Contracts	MW
Q1	Approved	3	450	0	0	2	140	5	590
	Submitted	1	78	27	1,094	3	388	31	1,560
Q2	Approved	2	210	0	0	0	0	2	210
	Submitted	1	78	2	270	2	196	5	544
Q3	Approved	2	28	0	0	2	123	4	151
	Submitted	3	413	0	0	10	616	13	1,029
Q4	Approved	8	706	15	144	10	660	33	1,510
	Submitted	8	706	0	0	11	686	19	1,392
Total	**Approved**	**15**	**1,394**	**15**	**144**	**14**	**923**	**44**	**2,461**
	Submitted	**13**	**1,275**	**29**	**1,364**	**26**	**1,886**	**68**	**4,525**

Figure 2: RPS Contracts and Capacity Approved through 2011



Source: California Public Utilities Commission, 4th Quarter 2011

[5] This total is slightly lower than the figures from the Q3 2011 Report to the Legislature since it removes contracts that were approved but subsequently terminated.

IV. PROGRAM UPDATE

The CPUC has Established Key 33% RPS Market Rules

In D.11-12-052, the Commission implements new Public Utilities Code § 399.16, which establishes three new portfolio content categories (referred to as Category 1, Category 2, and Category 3) for RPS procurement. In general, Category 1 and 2 contracts contain energy bundled with renewable energy credits (RECs). In contrast, Category 3 contracts only contain unbundled RECs. The key characteristics of the three portfolio content categories are described in Table 2 below. SB 2 (1x) also set minimum procurement percentages for Category 1 procurement and maximum percentages for Category 3 (§ 399.16(c)). Finally, generation from procurement contracts and ownership agreements executed prior to June 1, 2010 is not subject to the portfolio content categories (§ 399.16(d)).

Table 2: Characteristics of RPS Portfolio Content Categories

Category	Characteristics
Category 1	• At least 75% of RPS generation in 2020. • The renewable facility has its first point of interconnection to the Western Electricity Coordinating Council transmission or distribution grid within the metered boundaries of a California balancing authority (CBA); or • Generation from the renewable facility is scheduled into a CBA without substituting electricity from any other source; or • Generation from the renewable facility is scheduled into a CBA pursuant to a dynamic transfer agreement.
Category 2	• Buyer simultaneously purchases energy and associated RECs from the RPS-eligible generation facility, where the purchased energy must not in practice be already committed to another party, without selling the energy back to the generator; • Renewable generation is firmed and shaped with substitute electricity that is scheduled into a CBA within the same calendar year as the generation from the facility; and • Substitute electricity provides incremental electricity to the buyer.
Category 3	• No more than 10% of RPS generation in 2020. • Unbundled RECs originally associated with generation from an RPS-eligible facility, including unbundled RECs that do not qualify under the criteria of Category 1 and 2.
Exemption (§ 399.16(d))	• Any contract or ownership agreement originally executed prior to June 1, 2010 is not subject to the portfolio content categories.

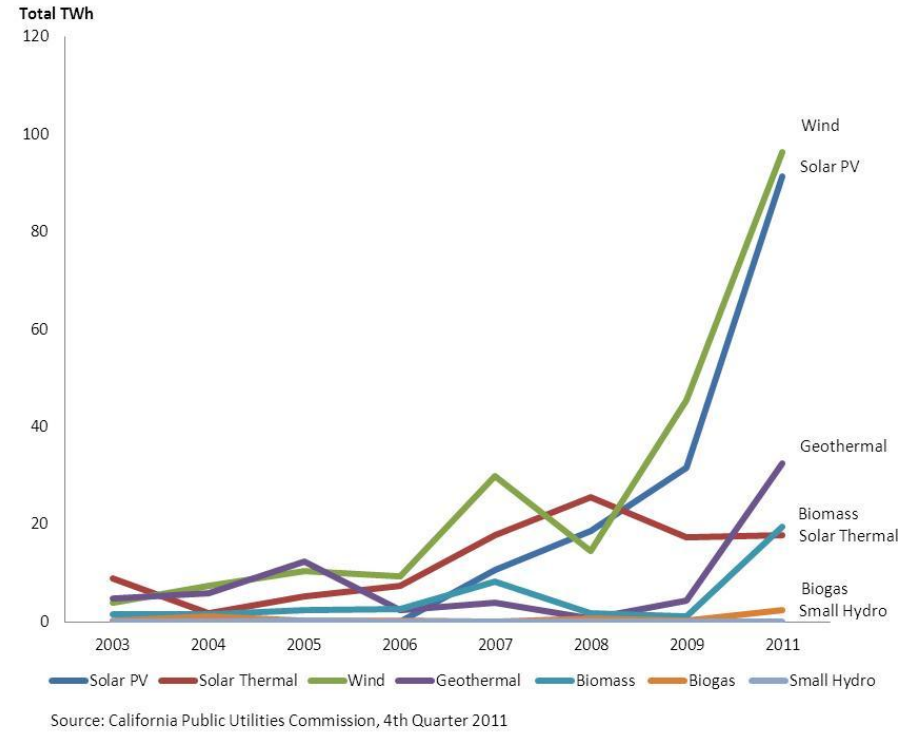
The 2011 RPS Solicitation was Robust

The IOUs' 2011 RPS Solicitation closed in August 2011 and the IOUs received a very large market response. Specifically:

- Over 1,000 unique bids[6] and 3,000 proposals from over 260 sellers were submitted, representing approximately 91,000 MW of proposed renewable capacity.
- Total generation from unique bids was greater than 250,000 gigawatt hours (GWh), or 4.5 times the demand needed to meet the 33% RPS in 2020, which is forecast to be about 61,000 GWh.
- The number of unique bids increased 250% from the 2009 RPS Solicitation.[7]
- The number of sellers increased 150% from the 2009 RPS Solicitation.

Figure 3 below shows the increase in unique bids received in 2011 compared to prior years by technology and the quantity of generation. Proposed renewable generation bid into the 2011 solicitation increased for all technologies except for small hydroelectric (small hydro). In the 2011 RPS Solicitation solar PV bid in almost the same amount of generation as wind. It is important to note that solar PV did not participate in the RPS program until the 2007 RPS Solicitation. This fact highlights the dramatic growth of the solar PV market in California's RPS.

Figure 3. Renewable Energy Generation Bid into RPS Solicitations by Technology



Source: California Public Utilities Commission, 4th Quarter 2011

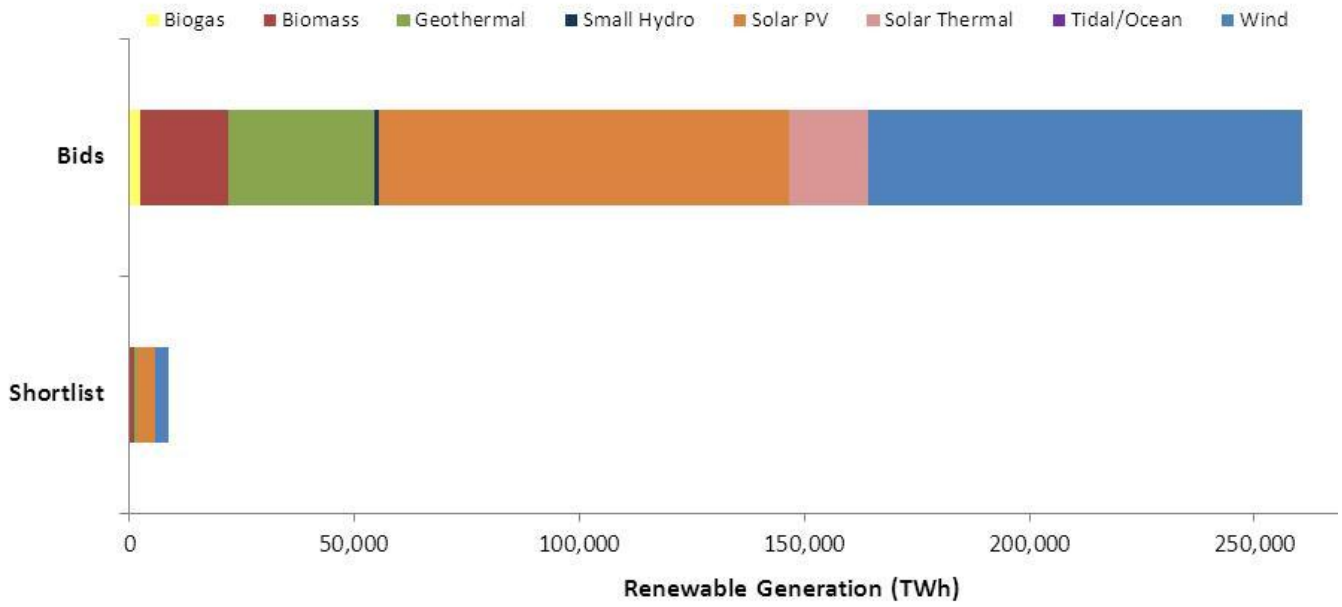
[6] Sellers may bid the same project into an IOU's solicitation multiple ways; sellers may also bid the same project into each IOU's solicitation. Staff removed this redundancy to the extent possible when determining the number of unique project proposals.

[7] The IOUs did not hold an RPS solicitation in 2010.

IOU 2011 RPS Solicitation Shortlist Reflects New Procurement Requirements per SB 2 (1x)

SB 2 (1x) established three compliance periods for the utilities to achieve a 33% RPS: 2011-2013, 2014-2016, and 2017-2020. SCE and PG&E are fully procured for the first compliance period (2011-2013) and SDG&E is projected to procure enough generation to meet the first compliance period requirement. All three utilities are projected to exceed the procurement requirements for the second compliance period (2014-2016) even after assuming a 40% project failure rate for new projects. The three IOUs generally shortlisted projects from the 2011 RPS Solicitation in alignment with their respective compliance need in order to achieve 33% by 2020. For example, all three IOUs are still procuring for the third compliance period (2017-2020), but SCE did not select any projects with online dates in the first or second compliance periods. As shown in Figure 4 below, the three IOUs shortlisted over 30 proposals consisting of biomass, geothermal, small hydro, wind, and solar PV, representing approximately 3% of renewable generation that was bid into the 2011 RPS Solicitation.

Figure 4. 2011 Renewable Energy Generation Bids and Shortlist by Technology



Source: California Public Utilities Commission, 4th Quarter 2011

2011 RPS Solicitation Pricing

Bid prices in the 2011 RPS Solicitation were highly competitive compared to bids prices from the 2009 RPS Solicitation and contract prices approved by the CPUC in 2010 and 2011. The average bid price in the 2011 RPS Solicitation was approximately 30% lower than the average bid price in the 2009 RPS Solicitation.

In conclusion, results from the 2011 RPS Solicitation indicate that the market, especially for solar PV, has matured meaningfully over the last two years, as measured by an increase in experienced market developers, an increase in projects with high viability, and a significant decrease in bid prices.

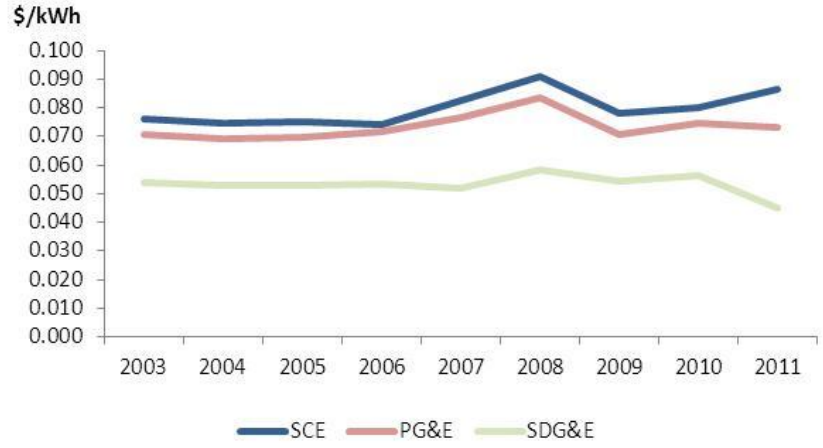
V. IOU RPS Procurement Costs

Senate Bill 836 (Padilla, 2011)

Senate Bill 836 (Public Utilities Code § 911) requires the CPUC to report to the Legislature "the costs of all electricity procurement contracts for eligible renewable energy resources, including unbundled renewable energy credits, and all costs for utility-owned generation approved by the commission. The first report shall include all costs commencing January 1, 2003. Subsequent reports shall include only costs for the proceeding calendar year." See Attachment A for detailed tables containing this information. Per the statutory requirements, the tables in Attachment A show weighted average time-of-delivery (TOD)[8] adjusted delivered renewable energy costs per year[9] as well as the weighted average TOD-adjusted contract price of any contracts approved by the CPUC for that year. Due to the confidentiality requirements in § 911, some of the costs in Attachment A have been redacted.

Figure 5 below compares the weighted average TOD-adjusted cost of delivered renewable energy by year in dollars per kilowatt hours ($/kWh) for each IOU. The increase in 2008 may be explained by two factors. First, most of the energy came from renewable qualifying facilities (QFs), whose energy payments fluctuate based on the cost of natural gas. Since gas prices were very high in 2008, the price paid to the renewable QFs was higher in 2008 compared to other years. Second, 2008 was a low hydro year and, as a result, low-cost hydro generation did not factor into the average procurement costs to the same extent it did in other years.

Figure 5. Weighted Average TOD-Adjusted Cost of Delivered Renewable Energy by Year (2003 – 2011)



Source: California Public Utilities Commission, 4th Quarter 2011

[8] Actual renewable energy payments are adjusted by each IOU's individual TOD factors and the time that a project generates electricity. For example, since solar PV generates electricity on peak, its electricity is more valuable and the solar PV generator receives a higher payment based on the TOD adjustment.

[9] This includes QFs that did not require CPUC approval but count towards RPS compliance.

Figure 6 below shows the weighted average TOD-adjusted cost of contracts approved by the CPUC in that year. From 2003 to 2011, contract costs have increased from 5.4 cents to 13.3 cents per kWh. One important reason for this this increase is that the IOUs contracted with existing renewable facilities at the beginning of the RPS program and with mostly new facilities in later years. In order to meet the ambitious 20% and 33% RPS targets, the IOUs have to contract with new facilities, which require higher contract costs to recover the capital needed to develop a new facility. Other reasons for the contract cost increase include changes in technology mix, increases in commodity costs, and demand exceeding supply. In addition the cost numbers in this report are nominal and not adjusted for inflation. Finally, as noted in Section IV, bids from the 2011 RPS Solicitation, not yet available for inclusion in the report, show significantly lower costs than bids in prior years, which will be reflected in future IOU contracts. Furthermore, contracts approved in 2011 represent contracts that likely began negotiations in 2009, and the renewable market has matured significantly since then, resulting in the prospect that prices in future years will be lower still.

Figure 6. Weighted Average TOD-Adjusted Cost of Contracts Approved (2003 – 2011)[10]

Source: California Public Utilities Commission, 4th Quarter 2011

Table 3 below shows the total weighted average TOD-adjusted cost of contracts approved by IOU. The IOUs have very similar total average contract costs from 2003-2011.

Table 3: Total Weighted Average TOD-Adjusted Cost of Contracts Approved (2003-2011)

IOU	Total Weighted Average TOD-Adjusted Contract Cost ($/kWh)
SCE	0.118
PG&E	0.119
SDG&E	0.113

[10] The CPUC did not approve any PG&E contracts in 2003. The CPUC only approved two contracts for SDG&E in 2007 and the price is not revealed to protect confidentiality per § 911.

VI. RECENT AND UPCOMING EVENTS

Table 4. Recent and Upcoming Events

Timing	Deliverable	Notes
November 10, 2011	Decision 11-11-012	The decision directs SCE to update terms and conditions in its existing feed-in tariff contract (CREST) in order to address stakeholder concerns that the previous contract was not financeable. Following the decision, sellers submitted 52 contracts for 70.5 MW, representing a 2,000% increase in renewable capacity under this program.
December 1, 2011	Decision 11-12-020 Establishing New RPS Procurement Quantity Requirements for Retail Sellers	The decision establishes the new RPS procurement requirements for three compliance periods through 2020 (2011-2013, 2014-2016 and 2017-2020) and each year thereafter, set out in Pub. Util. Code § 399.15(b).
December 15, 2011	Decision 11-12-052 Implementing Portfolio Content Categories	The decision implements the new RPS portfolio content categories, set out in Pub. Util. Code § 399.16.
December 15, 2011	Cost Containment Request for Proposal (RFP)	Energy Division issued an RFP to solicit consulting services for the development of a new cost containment mechanism. Senate Bill 2 (1x) directs the Commission to establish a limitation for each IOU on the procurement expenditures for all eligible renewable energy resources used to comply with the RPS. The Energy Division issued three more RFPs in January to solicit additional RPS support services.
January 24, 2012	Cost Containment Ruling	ALJ Simon mailed a Ruling requesting comments on the new RPS cost containment mechanism. The Ruling asks parties to comment on the timeframe the cost limitation will cover, what costs it will include, and how it may be applied to the Commission's review of RPS power purchase agreements.
January 31, 2012	Renewable Auction Mechanism (RAM) Contracts Awarded	The three investor-owned utilities offered a standard contract to the successful bidders resulting from the first RAM solicitation, which closed on November 15, 2011.
February 22, 2012	Renewable Feed-in Tariff (FIT) Workshop and Ruling	ALJ DeAngelis and Commissioner Ferron mailed a Ruling on January 10, 2012, directing the utilities to create one standard contract for the renewable feed-in tariff program. Energy Division staff will hold a workshop on February 22, 2012 to review the utilities' proposal and to discuss areas of disagreement between stakeholders. The Ruling notes that a decision on program pricing and design is expected in the first quarter of 2012 and a second decision adopting a uniform contract is expected in the second quarter of 2012.

Timing	Deliverable	Notes
First Quarter, 2012	Amended Scoping Memo and Ruling of Assigned Commissioner on 2012 RPS Procurement Plans	The amended scoping memo and assigned Commissioner ruling will establish the scope and schedule for Commission consideration of 2012 Renewables Portfolio Standard Procurement Plans
First Quarter, 2012	Proposed Decision Establishing RPS Compliance Rules	The proposed decision will establish new RPS compliance accounting rules and will address RPS compliance obligations of retails sellers through 2010.

ATTACHMENT A

INVESTOR-OWNED UTILITY RPS DELIVERED ENERGY AND CONTRACT COST DATA PER SENATE BILL 836 (PUBLIC UTILITIES CODE § 911)

About Tables A-1 through A-3

Tables A-1 through A-3 below show for each investor-owned utility (IOU) the weighted average time-of-delivery (TOD) adjusted delivered renewable energy costs per year as well as the weighted average TOD-adjusted contract price of all RPS contracts approved by the CPUC for that year. Per the confidentiality requirements in Public Utilities Code § 911, some of the costs in Attachment A are redacted. In addition:

- Pricing figures were redacted if a) the Power Purchase Agreement (PPA) is not already public on the CPUC's website per the CPUC's confidentiality rules, or b) there were less than three facilities in each category. If there was only one facility in a category, however, and its PPA is already available on the CPUC's website, than the price information for that facility is public. In addition, all qualifying facility contracts that do not require CPUC approval, feed-in tariff contracts, contracts with municipal governments, and utility-owned generation (UOG) costs are public.
- All figures represent weighted averages, using the amount of production (kilowatt hours or kWh) as the means to give weight to pricing averages. All figures are nominal values.
- All cost numbers have been adjusted for TOD factors since generators are paid based on their load profile, which is correlated with each IOU's TOD factors. For example, since solar PV generates electricity on peak, its electricity is more valuable and the solar PV generator receives a higher payment based on the TOD adjustment.
- The "Average Cost of Contracts Approved" column includes all CPUC approved contracts except terminated contracts. It includes facilities that are operating or in development; it does not include pending contracts before the CPUC and it does not include RPS contracts approved prior to 2003.
- The "Average Cost of Delivered Energy" column represents the total weighted average payments made to renewable generators for that year.
- Pacific Gas & Electric (PG&E) had one project that was classified as "Space Solar" that was approved in 2009. This project has been placed into the solar PV technology category.
- In 2009 and 2010, the CPUC approved programs authorizing the IOUs to pursue solar PV UOG. Since the CPUC does approve UOG contracts, no contract cost is provided in the following tables. The CPUC did set energy-based cost caps, however, for SCE and PG&E. The CPUC set SCE's UOG Solar PV cost cap at $0.26/kWh averaged over the five year program and set PG&E's UOG Solar PV cost cap at $0.295/kWh for each project.
- Contracts are classified with the product content categories consistent with new § 399.16 and Decision (D.) 11-12-052. Accordingly, there are no Category 3 unbundled renewable energy credit (REC) currently in the IOUs' RPS portfolio.
- Self-reported IOU data was used to create the following tables. Given the short time-frame to complete this analysis and the volume of data, the tables may contain small errors.

Table A-1: Southern California Edison, Weighted Average TOD-Adjusted Cost of Delivered Renewable Energy and Average Cost of Contracts

	2003		2004		2005		2006		2007		2008		2009		2010		2011		Totals	
Technology Type by Project Size	**Average Cost of Delivered Energy ($/kWh)**	**Average Cost of Contracts Approved ($/kWh)**	**Average Cost of Delivered Energy ($/kWh)**	**Average Cost of Contracts Approved ($/kWh)**	**Average Cost of Delivered Energy ($/kWh)**	**Average Cost of Contracts Approved ($/kWh)**	**Average Cost of Delivered Energy ($/kWh)**	**Average Cost of Contracts Approved ($/kWh)**	**Average Cost of Delivered Energy ($/kWh)**	**Average Cost of Contracts Approved ($/kWh)**	**Average Cost of Delivered Energy ($/kWh)**	**Average Cost of Contracts Approved ($/kWh)**	**Average Cost of Delivered Energy ($/kWh)**	**Average Cost of Contracts Approved ($/kWh)**	**Average Cost of Delivered Energy ($/kWh)**	**Average Cost of Contracts Approved ($/kWh)**	**Average Cost of Delivered Energy ($/kWh)**	**Average Cost of Contracts Approved ($/kWh)**	**Average Cost of Delivered Energy ($/kWh)**	**Average Cost of Contracts Approved ($/kWh)**
Biogas																				
0-3 MW		0.1005	0.0415		0.0416		0.0418		0.0425		0.0420		0.0412	0.1039	0.1034				0.0489	0.1020
+3-20 MW	0.0442	0.1005	0.0521		0.0645		0.0581		0.0545	0.0664	0.0418		0.0404	0.1050	0.0971	0.1005	0.1036		0.0658	0.0967
Subtotal	**0.0442**	**0.1005**	**0.0487**		**0.0564**		**0.0536**		**0.0505**	**0.0664**	**0.0419**		**0.0408**	**0.1047**	**0.0991**	**0.1005**	**0.1036**		**0.0609**	**0.0976**
Biomass																				
0-3 MW	0.0438		0.0615		0.0782		0.0702		0.0724	0.0687	0.0869		0.0872	0.1004	0.0919		0.0859		0.0699	0.0892
+3-20 MW	0.0615		0.0680		0.0781		0.0723		0.0762	0.0915	0.0830		0.0790	0.1007	0.0858		0.0898		0.0737	0.0931
+20-50 MW	0.0809		0.0799		0.0801		0.0802		0.0852		0.0885		0.0902		0.0899		0.0924		0.0852	
+50-200 MW																				
Subtotal	**0.0735**		**0.0758**		**0.0795**		**0.0778**		**0.0836**	**0.0910**	**0.0877**		**0.0882**	**0.1006**	**0.0892**		**0.0920**		**0.0824**	**0.0929**
Geothermal																				
+3-20 MW	0.0765		0.0775		0.0794		0.0813		0.0851		0.0900		0.0900		0.0911		0.0941		0.0840	
+20-50 MW	0.0873		0.0854		0.0855		0.0843		0.0903		0.0916	[redacted]	0.0885		0.0894		0.0913		0.0881	[redacted]
+50-200 MW	0.0680	0.0380	0.0640		0.0642		0.0643		0.0734		0.0847	0.0890	0.0850		0.0858	[redacted]	0.0878		0.0726	0.0766
+200 MW		0.0663							0.0773	[redacted]	0.0891		0.0525		[redacted]		[redacted]		0.0655	0.0841
Subtotal	**0.0754**	**0.0530**	**0.0720**		**0.0726**		**0.0722**		**0.0799**	[redacted]	**0.0882**	**0.0883**	**0.0780**		**0.0787**	[redacted]	**0.0785**		**0.0773**	**0.0797**
Small Hydro																				
0-3 MW	0.0786		0.0802	0.0718	0.0942		0.0846		0.0845		0.0975	0.0938	0.0823		0.0837		0.0840		0.0853	0.0931
+3-20 MW	0.1062		0.1061		0.1081		0.0979		0.1330		0.1550	0.0938	0.0886		0.0872		0.0809		0.0990	0.0938
+20-30 MW	0.0486	0.0340	0.0403		0.0405		0.0398		0.0418		0.0467	0.1196					0.1196		0.0446	0.3950
Subtotal	**0.0653**	**0.0340**	**0.0558**	**0.0718**	**0.0705**		**0.0641**		**0.0596**		**0.0945**	**0.1085**	**0.0883**		**0.0873**		**0.0869**		**0.0733**	**0.3263**
Solar PV																				
0-3 MW																0.2322	0.1535	0.1421	0.1535	0.2025
+3-20 MW																0.1610		0.1240		0.1416
+20-50 MW												[redacted]	[redacted]		[redacted]		[redacted]		[redacted]	0.1185
+200 MW																[redacted]				[redacted]
Subtotal												[redacted]	[redacted]		[redacted]	**0.1682**	[redacted]	**0.1260**	[redacted]	**0.1604**
Solar Thermal																				
0-3 MW	0.0577		0.0587		0.0848		0.0842												0.0613	
+3-20 MW													[redacted]		[redacted]	0.0650	[redacted]		[redacted]	0.0650
+20-50 MW	0.1317		0.1345		0.1519		0.1529		0.1492		0.1501		0.1328		0.1386		0.1384		0.1415	
+50-200 MW	0.1631		0.1651		0.1804		0.1767		0.1786		0.1778		0.1513		0.1407	[redacted]	0.1469		0.1621	[redacted]
+200 MW												[redacted]				[redacted]				[redacted]
Subtotal	**0.1449**		**0.1476**		**0.1645**		**0.1639**		**0.1622**		**0.1622**	[redacted]	**0.1412**		**0.1396**	**0.1572**	**0.1426**		**0.1509**	**0.1552**
Wind																				
0-3 MW	0.0588		0.0592		0.0622		0.0637		0.0718		0.0898		0.0520		0.0547		0.0531		0.0644	
+3-20 MW	0.0687		0.0710		0.0718	0.0744	0.0708		0.0795		0.0950		0.0651		0.0691		0.0689		0.0732	0.0744
+20-50 MW	0.0708		0.0730		0.0722		0.0715	0.0648	0.0777	0.0744	0.0850		0.0672	0.0814	0.0723	[redacted]	0.0705		0.0732	0.0833
+50-200 MW	0.0717		0.0726		0.0707		0.0708		0.0772	0.0724	0.0885	0.1180	0.0722	0.1034	0.0758	[redacted]	0.1018		0.0849	0.1139
+200 MW	0.1020		0.1020		0.1020	0.1120							0.0444	0.0968	0.0697	[redacted]	0.0773		0.0676	0.0991
Subtotal	**0.0711**		**0.0730**		**0.0721**	**0.1086**	**0.0711**	**0.0648**	**0.0781**	**0.0734**	**0.0886**	**0.1180**	**0.0636**	**0.0968**	**0.0715**	[redacted]	**0.0852**		**0.0755**	**0.1054**
UOG Hydro																				
0-3 MW	0.0301		0.0405		0.0334		0.0331		0.0716		0.0486		0.0556		0.0586				0.0443	
+3-20 MW	0.0156		0.0217		0.0186		0.0186		0.0335		0.0332		0.0317		0.0325				0.0247	
+20-30 MW	0.0124		0.0138		0.0135		0.0154		0.0207		0.0250		0.0289		0.0265				0.0175	
Subtotal	**0.0173**		**0.0226**		**0.0199**		**0.0205**		**0.0358**		**0.0356**		**0.0350**		**0.0357**				**0.0266**	
UOG Solar																				
0-3 MW												0.2600	0.3700	0.2600			0.3144	0.2600	0.3323	0.2600
Subtotal												0.2600	0.3700	0.2600			0.3144	0.2600	0.3323	0.2600
Grand Total	**0.0759**	**0.0518**	**0.0747**	**0.0718**	**0.0752**	**0.1086**	**0.0742**	**0.0648**	**0.0827**	**0.0913**	**0.0912**	**0.1168**	**0.0781**	**0.0969**	**0.0801**	**0.1521**	**0.0863**	**0.1260**	**0.0799**	**0.1179**

Table A-2: Pacific Gas and Electric, Weighted Average TOD-Adjusted Cost of Delivered Renewable Energy and Average Cost of Contracts

Technology Type by Project Size	2003 Average Cost of Delivered Energy ($/kWh)	2003 Average Cost of Contracts Approved ($/kWh)	2004 Average Cost of Delivered Energy ($/kWh)	2004 Average Cost of Contracts Approved ($/kWh)	2005 Average Cost of Delivered Energy ($/kWh)	2005 Average Cost of Contracts Approved ($/kWh)	2006 Average Cost of Delivered Energy ($/kWh)	2006 Average Cost of Contracts Approved ($/kWh)	2007 Average Cost of Delivered Energy ($/kWh)	2007 Average Cost of Contracts Approved ($/kWh)	2008 Average Cost of Delivered Energy ($/kWh)	2008 Average Cost of Contracts Approved ($/kWh)	2009 Average Cost of Delivered Energy ($/kWh)	2009 Average Cost of Contracts Approved ($/kWh)	2010 Average Cost of Delivered Energy ($/kWh)	2010 Average Cost of Contracts Approved ($/kWh)	2011 Average Cost of Delivered Energy ($/kWh)	2011 Average Cost of Contracts Approved ($/kWh)	Totals Average Cost of Delivered Energy ($/kWh)	Totals Average Cost of Contracts Approved ($/kWh)
Biogas																				
0-3 MW	0.0731		0.0723		0.0721		0.0778		0.0827		0.0857	0.0978	0.0723	0.0999	0.0771	0.1040	0.0731	0.1090	0.0762	0.1043
+3-20 MW	0.0700		0.0712		0.0694		0.0758		0.0822		0.0829		0.0838		0.0637		0.0668		0.0738	
Subtotal	**0.0706**		**0.0714**		**0.0699**		**0.0762**		**0.0823**		**0.0835**	**0.0978**	**0.0819**	**0.0999**	**0.0657**	**0.1040**	**0.0678**	**0.1090**	**0.0743**	**0.1043**
Biomass																				
0-3 MW	0.0450		0.0474		0.0474		0.0481		0.0471					0.1102			0.1602	0.1090	0.0470	0.1094
+3-20 MW	0.0760		0.0711		0.0744		0.0765	0.0592	0.0830	0.1199	0.0892		0.0798	0.0670	0.0858		0.0758		0.0792	0.0854
+20-50 MW	0.0757		0.0747		0.0767		0.0817		0.0893		0.0954		0.0857	0.0693	0.0888	[redacted]	0.0821		0.0833	0.1140
+50-200 MW	0.0771		0.0773		0.0778		0.0827		0.0867		0.0874		0.0881		0.0891		0.0796		0.0829	
Subtotal	**0.0757**		**0.0738**		**0.0760**		**0.0802**	**0.0592**	**0.0867**	**0.1199**	**0.0923**		**0.0843**	**0.0689**	**0.0881**	[redacted]	**0.0803**	**0.1090**	**0.0820**	**0.1065**
Geothermal																				
0-3 MW	0.0581		0.0675		0.0670		0.0696		0.0837		0.0922		0.0636		0.0758		0.0596		0.0705	
+3-20 MW	0.0737		0.0747		0.0750		0.0779	0.1140	0.0814		0.0689		[redacted]		0.0685		0.0693		0.0746	0.1140
+20-50 MW	0.0674		0.0638		0.0639		0.0658		0.0800		0.0840								0.0677	
+50-200 MW	0.0633		0.0610		0.0622		0.0635		0.0677	0.0636	0.0847	0.0949	0.0539		0.0654		0.0588		0.0656	0.0782
+200 MW															0.0645	[redacted]	[redacted]		[redacted]	0.0775
Subtotal	**0.0660**		**0.0638**		**0.0644**		**0.0662**	**0.1140**	**0.0704**	**0.0636**	**0.0836**	**0.0949**	**0.0543**		**0.0650**	[redacted]	**0.0591**		**0.0658**	**0.0790**
Small Hydro																				
0-3 MW	0.0682		0.0681		0.0727		0.0734		0.0807		0.0912	0.0953	0.0684	0.1024	0.0726	0.0962	0.0702	0.0987	0.0734	0.0991
+3-20 MW	0.0720		0.0721		0.0682	0.0575	0.0660		0.0768		0.0915		0.0668		0.0681	0.1139	0.0621		0.0707	0.0654
+20-30 MW	0.0825		0.0803		0.0825		0.0759		0.0731		0.0941		0.0857	0.0815	0.0805	0.1014	0.0757		0.0797	0.0912
Subtotal	**0.0734**		**0.0727**		**0.0729**	**0.0575**	**0.0703**		**0.0766**		**0.0920**	**0.0953**	**0.0729**	**0.0844**	**0.0731**	**0.1031**	**0.0698**	**0.0987**	**0.0740**	**0.0822**
Solar PV																				
0-3 MW	0.0591		0.0643		0.0788		0.0742		0.0762	[redacted]	0.0844		0.0684		0.0455	0.1304	0.0452	0.1291	0.0652	0.1306
+3-20 MW												[redacted]	0.1177	0.1390	[redacted]	0.1674	0.2265	0.1139	0.1954	0.1520
+20-50 MW															[redacted]	0.1388	[redacted]		[redacted]	0.1388
+50-200 MW																[redacted]	[redacted]	[redacted]	[redacted]	0.1336
+200 MW														[redacted]		[redacted]				0.1325
Subtotal	**0.0591**		**0.0643**		**0.0788**		**0.0742**		**0.0762**	[redacted]	**0.0844**	[redacted]	**0.1177**	**0.1318**	**0.1737**	**0.1379**	**0.1868**	**0.1299**	**0.1780**	**0.1348**
Solar Thermal																				
+50-200 MW																0.1386				0.1386
+200 MW																[redacted]				[redacted]
Subtotal																**0.1440**				**0.1440**
Wind																				
0-3 MW	0.0683		0.0686		0.0655		0.0696		0.0804		0.0981		0.0601		0.0679		0.0629		0.0719	
+3-20 MW	0.0686		0.0685	0.0457	0.0618		0.0662		0.0728		0.0678		0.0695		0.0698		0.0586		0.0673	[redacted]
+20-50 MW	0.0696		0.0698		0.0667	0.0572	0.0714		0.0752		0.0720		0.0721		0.0734	[redacted]	0.0777		0.0721	[redacted]
+50-200 MW	0.0714		0.0722		0.0564	0.0566	0.0572		0.0631		0.0604	0.0880	0.0781	0.0920	0.0730	0.1312	0.0815	0.1175	0.0742	0.1035
+200 MW	0.0687		0.0684		0.0660		0.0702		0.0765		0.0725		0.0740	0.0957	0.0732		0.0711		0.0716	0.0957
Subtotal	**0.0694**		**0.0695**	**0.0457**	**0.0623**	**0.0568**	**0.0658**		**0.0714**		**0.0669**	**0.0880**	**0.0759**	**0.0945**	**0.0728**	**0.1263**	**0.0774**	**0.1175**	**0.0723**	**0.1003**
UOG Small Hydro													0.0715							
0-3 MW	0.0322		0.0322		0.0333		0.0340		0.0343		0.0351		0.0340		0.0356		0.0373		0.0342	
Subtotal	**0.0322**		**0.0322**		**0.0333**		**0.0340**		**0.0343**		**0.0351**		**0.0340**		**0.0356**		**0.0373**		**0.0342**	
UOG Solar																				
0-3 MW													0.2700		0.2700		0.2700		0.2700	
+3-20 MW																	0.1807		0.1807	
Subtotal													**0.2700**		**0.2700**		**0.1970**		**0.2080**	
Grand Total	**0.0708**		**0.0694**	**0.0457**	**0.0696**	**0.0569**	**0.0719**	**0.1026**	**0.0764**	**0.0693**	**0.0834**	**0.0912**	**0.0709**	**0.1080**	**0.0745**	**0.1353**	**0.0732**	**0.1212**	**0.0736**	**0.1188**

Table A-3: San Diego Gas & Electric, Weighted Average TOD-Adjusted Cost of Delivered Renewable Energy and Average Cost of Contracts

	2003		2004		2005		2006		2007		2008		2009		2010		2011		Totals	
Technology Type by Project Size	**Average Cost of Delivered Energy ($/kWh)**	**Average Cost of Contracts Approved ($/kWh)**	**Average Cost of Delivered Energy ($/kWh)**	**Average Cost of Contracts Approved ($/kWh)**	**Average Cost of Delivered Energy ($/kWh)**	**Average Cost of Contracts Approved ($/kWh)**	**Average Cost of Delivered Energy ($/kWh)**	**Average Cost of Contracts Approved ($/kWh)**	**Average Cost of Delivered Energy ($/kWh)**	**Average Cost of Contracts Approved ($/kWh)**	**Average Cost of Delivered Energy ($/kWh)**	**Average Cost of Contracts Approved ($/kWh)**	**Average Cost of Delivered Energy ($/kWh)**	**Average Cost of Contracts Approved ($/kWh)**	**Average Cost of Delivered Energy ($/kWh)**	**Average Cost of Contracts Approved ($/kWh)**	**Average Cost of Delivered Energy ($/kWh)**	**Average Cost of Contracts Approved ($/kWh)**	**Average Cost of Delivered Energy ($/kWh)**	**Average Cost of Contracts Approved ($/kWh)**
BioGas																				
0-3 MW	0.0484		0.0498		0.0507		0.0604		0.0518		0.0524		0.0584	0.1004	0.0637	0.1173	0.0648		0.0566	0.1084
+3-20 MW	0.0503		0.0499		0.0503	0.0583	0.0505	0.0756	0.0508		0.0548		0.0548		0.0568		0.0569		0.0530	0.0640
Subtotal	**0.0500**		**0.0498**		**0.0504**	**0.0583**	**0.0532**	**0.0756**	**0.0512**		**0.0542**		**0.0558**	**0.1004**	**0.0589**	**0.1173**	**0.0596**		**0.0540**	**0.0803**
Biomass																				
+3-20 MW												[redacted]			[redacted]		[redacted]		[redacted]	[redacted]
+20-50 MW	0.0553		0.0553		0.0576		0.0597	0.0647	0.0564		0.0725		0.0680		0.0719		0.0700		0.0635	0.0647
Subtotal	**0.0553**		**0.0553**		**0.0576**		**0.0597**	**0.0647**	**0.0564**		**0.0725**	[redacted]	**0.0680**		**0.0740**		**0.0707**		**0.0639**	[redacted]
Geothermal																				
+20-50 MW															[redacted]	[redacted]	[redacted]		[redacted]	[redacted]
Subtotal															[redacted]	[redacted]	[redacted]		[redacted]	[redacted]
Small Hydro																				
+3-20 MW		0.0537							0.0568		0.0529		0.0512		0.0513		0.0515		0.0527	0.0537
Subtotal		**0.0537**							**0.0568**		**0.0529**		**0.0512**		**0.0513**		**0.0515**		**0.0527**	**0.0537**
Solar PV																				
+3-20 MWh																		0.1460		0.1460
+20-50 MWh																	[redacted]	0.1321	[redacted]	0.1321
+50-200 MWh										[redacted]								0.1347		0.1366
Subtotal										[redacted]							[redacted]	**0.1344**	[redacted]	**0.1360**
Wind																				
+3-20 MW			0.0520		0.0519		0.0512		0.0526		0.0527		0.0525		0.0524	[redacted]	0.0673		0.0555	[redacted]
+20-50 MW	0.0414		0.0491	0.0518	0.0492		0.0490		0.0495		0.0501		0.0506		0.0503		0.0388	0.1170	0.0462	[redacted]
+50-200 MW			0.0492		0.0492		0.0492		0.0492		0.0492	0.0310	0.0500	[redacted]	0.0454	[redacted]	0.0299	0.1170	0.0422	0.0921
Subtotal	**0.0414**		**0.0501**	**0.0518**	**0.0495**		**0.0492**		**0.0495**		**0.0498**	[redacted]	**0.0502**	[redacted]	**0.0464**	**0.1145**	**0.0338**	[redacted]	**0.0440**	**0.0912**
Grand Total	**0.0539**	**0.0537**	**0.0529**	**0.0518**	**0.0529**	**0.0583**	**0.0535**	**0.0657**	**0.0517**	[redacted]	**0.0582**	**0.0344**	**0.0545**	**0.1088**	**0.0561**	**0.1145**	**0.0449**	**0.1327**	**0.0521**	**0.1132**