Renewable Energy – Overview

Renewable energy is increasingly helping California meet its growing energy needs, reduce greenhouse gas emissions, and grow the state's economy. In August 2013, the California Energy Commission reorganized and launched the Renewable Energy Division to support the Energy Commission's strong commitment to California's renewable energy goals and policies.

RPS Generation Targets

California is a clean energy leader with an aggressive Renewables Portfolio Standard (RPS). This standard requires all utilities in the state to achieve the following RPS targets:

- An average of 20 percent of retail electricity sales from renewable sources in 2011-2013.
- 25 percent by the end of 2016.
- 33 percent by the end of 2020.
- No less than 33 percent per year after 2020.

In 2012, California served about 22 percent of retail electricity sales from facilities using renewable energy sources such as wind, solar, geothermal, biomass, and small hydroelectric.[1] The Energy Commission estimates this electricity was generated from about 12,300 megawatts (MW)[2] of wholesale renewable capacity, with an additional 1,800 MW of renewable self-generation that reduced retail electricity demand.[3]

Renewable Capacity in California

California's operating renewable energy capacity[4] grew from 14,100 MW in 2012 to 17,400 MW in 2013, composed of a mix of 15,500 MW of wholesale capacity and 1,900 MW of self-generation capacity. A total of 3,300 MW of renewable energy came online in California in 2013, increasing the state's renewable capacity by more than 20 percent.

1 Energy Commission staff estimate, based on data from the Renewable Net Short data, http://www.energy.ca.gov/2013publications/CEC-200-2013-001/CEC-200-2013-001.pdf for 2012 and the *Preliminary California Energy Demand Forecast*, June 2013. http://www.energy.ca.gov/2013_energypolicy/documents/2013-05-30_workshop/spreadsheets/.

2 Energy Commission staff revised the estimate for in-state 2012 wholesale capacity from 11,200 MW to 11,600 MW. The capacity increase reflects additional facilities reporting to the Energy Commission. The out-of-state capacity remained unchanged at 800 MW. In total, 12,300 MW of wholesale capacity was considered "in-state" for the RPS in 2012. (Totals do not sum due to rounding.)

3 Capacity in this context refers to nameplate capacity. Quantifying the amount of reduced retail demand from self-generation requires additional analysis, assuming technology capacity factors.

4 Unless otherwise noted, capacity figures in this document refer to nameplate capacity. Staff used net nameplate capacity (net nameplate excludes onsite parasitic load) for projects that are not yet operating but have environmental permits (Tables 6 through 9) and for the following two operating facilities: the 250 MW Genesis Solar Project and the 370 MW Ivanpah Solar Electric Generating System.

During the first quarter of 2014, preliminary data show that 180 MW of new wholesale renewables and 70 MW of self-generation have come on-line. As of March 2014, the Energy Commission estimates that 17,650 MW of RPS-eligible[5] renewable capacity is operating in California.[6]

Wholesale Renewable Energy Mix

Total wholesale capacity on-line by the end of 2013 for which the energy generated was sold to a utility or the market was about 15,500 MW. **Table 1** shows the mix by fuel type and includes out-of-state facilities for which the first point of interconnection is with a California balancing authority. Because they serve California loads, such facilities are considered in-state resources.

Preliminary data collected for this latest update show that, in 2014, an additional 180 MW of renewable capacity has come on-line, including 125 MW of solar thermal, 45 MW of biomass, and 10 MW of distributed solar PV.

Table 1: "In-State" Wholesale Renewable Capacity by Resource Type as of December 31, 2013[7]

Renewable Capacity	Biomass (MW)	Geothermal (MW)	Small Hydro (MW)	Solar PV (MW)	Solar Thermal MW	Wind (MW)	Total Renewable (MW)
California	**1,100**	**2,700**	**1,600**	**2,700**	**900***	**5,700**	**14,700**
Out-of-State	**-**	**100**	**-**	**400**		**300**	**800**
Total	**1,100**	**2,800**	**1,600**	**3,000**	**900**	**6,000**	**15,500**

Source: California Energy Commission based on Quarterly Fuel and Energy Report, source [8], CPUC RPS contract database [D1], and POU S-2 and S-5 Forms for 2013 [D2].

* Includes 370 MW (net capacity) from Ivanpah Solar Units 1 through 3 although those units technically did not start selling power under their PPA until the first few weeks of January 2014.

Note: Totals may not sum due to rounding. See notes for Table 2 for additional information about the data provided in Table 1.

Renewable Distributed Generation (20 MW or smaller, as of March 2014)

Governor Edmund G. Brown Jr. set a goal of installing 12,000 MW of renewable distributed generation in California by 2020. **Figure 1** shows progress toward that goal. The data include facilities that are used for self-generation and wholesale.

5 In some cases, definitive information was not available, and staff made assumptions about whether facilities were RPS-eligible. Facilities supplementing natural gas purchases with directed biomethane were not included in this calculation because the data need to be updated to account for recent regulatory changes in the RPS.

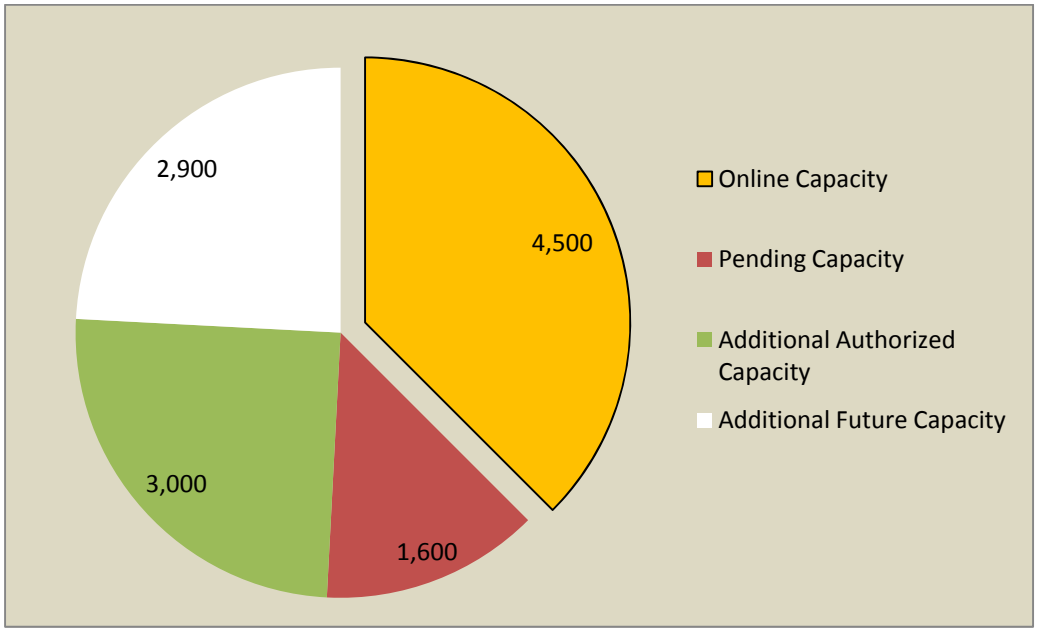
6 This includes 800 MW operating outside California with its first point of interconnection to a California balancing authority. Such resources are considered in-state resources, as they serve California loads.

7 This table includes facilities physically located out-of-state that have a first point of interconnection with a California balancing authority, which are considered in-state resources for the RPS. "California balancing authority" refers to a balancing authority primarily located in California with more than 50 percent of its end-use electric load physically located within the political boundaries of California. This includes balancing authority areas operated by the California Independent System Operator Corporation, Los Angeles Department of Water and Power, Balancing Authority of Northern California, Imperial Irrigation District, and Turlock Irrigation District. It does not include the Sierra Pacific Power Company (primarily serving Nevada), PacifiCorp West, and the Bonneville Power Administration-Transmission balancing authorities serving the Pacific Northwest.

By March 2014, California had nearly 4,500 MW of operating or installed distributed generation capacity, with an additional 1,600 MW pending.[8] California's distributed generation renewable energy programs could add another 3,000 MW if the programs are fully subscribed. If current programs succeed in transforming the market for renewable distributed generation and distributed generation solar PV costs continue to trend down, much of the nearly 2,900 MW of additional future capacity needed to achieve the 12,000 MW goal could occur through market mechanisms.

Past and current renewable distributed generation programs include utility feed-in tariffs along with state-mandated self-generation incentives such as the Self-Generation Incentive Program, the California Solar Initiative, the New Solar Homes Partnership, publicly owned electric utility (POU) solar programs, and the Emerging Renewables Program.

Figure 1: Renewable Distributed Generation in California
(20 MW or Smaller, Includes Wholesale and Self-Generation)



Source: California Energy Commission, based on sources [D1] through [D14]. Updated March 2014.

Renewable Siting – Wholesale Projects Expected After 2013

As of the end of 2013, an estimated 11,300 MW of renewable capacity were permitted throughout California that could come on-line in future years. Of this capacity, 4,000 MW have also secured a power purchase agreement with a utility, suggesting a high likelihood that the facilities will be constructed. Of the 4,000 MW, there are 2,800 MW of renewable energy projects with current permits and utility power purchase agreements that are expected to come on-line in 2014. Table 2 summarizes expected capacity additions in 2014 by resource and technology type.

8 Pending projects include projects with reserved incentive funding from a self-generation incentive program or projects that have secured a power purchase agreement.

Table 2: Estimated New Renewable Energy Capacity Expected in 2014

Resource/Technology	Capacity (MW)	Percent of Total
Solar PV	2,300	81%
Solar Thermal	400	14%
Wind	100	2%
Biomass	0	0%
Geothermal	100	2%
Total	2,800	100%

Source: California Energy Commission. Totals may not sum due to rounding. Updated March 2014

Renewable Energy – More Information

The Energy Commission is tracking progress toward achieving the state's RPS, the Governor's 12,000 MW goal for renewable distributed generation, the state's 3,000 MW goal for self-generation solar systems, and permitting and construction of new renewable energy facilities in California.

Renewables Portfolio Standard

The Energy Commission certifies eligible renewable energy resources that may be used to satisfy the RPS procurement requirements of retail sellers and POUs, and uses an accounting system to verify the RPS compliance of retail sellers and POUs (Pub. Util. Code, § 399.25). The California Public Utilities Commission (CPUC) is responsible for establishing RPS procurement requirements for retail sellers, determining compliance based on verified renewable generation data provided by the Energy Commission, and imposing penalties for noncompliance (Pub. Util. Code, § 399.13 – 399.17). The Energy Commission is responsible for establishing the RPS enforcement procedures and determining compliance for the POUs, and the California Air Resources Board (ARB) is authorized to impose penalties for noncompliance of POUs (Pub. Util. Code, § 399.30).

Building on previous RPS requirements in California, Senate Bill X1-2 (Simitian, Chapter 1, Statutes of 2011) established the following statewide portfolio targets: **an average of 20 percent of retail sales from eligible renewable resources by January 1, 2011, through December 31, 2013**; **25 percent by December 31, 2016; 33 percent by December 31, 2020; and no less than 33 percent in all subsequent years.**

Figure 2 shows the amount of renewable generation in California in 2011, excluding large hydroelectric generation, along with estimates of the amount of renewable procurement needed to meet the renewable targets for the 2011-2013, 2014-2016, and 2017-2020 compliance periods. The amount of potential renewable procurement if all retail seller RPS contracts and POU RPS contracts are realized is also shown in the graph.

The estimated renewable procurement needed for each RPS compliance period is based on the Energy Commission's forecast of retail sales that was adopted in 2012 (the mid case), multiplied by the applicable compliance period procurement targets for CPUC-regulated retail sellers and for POUs subject to Energy Commission RPS regulations. Factors that can affect retail sales include policy goals

for energy efficiency, self-generation, and combined heat and power, as well as expected levels of economic growth and population growth.

Figure 2: Renewable Generation for California and RPS Procurement Goals

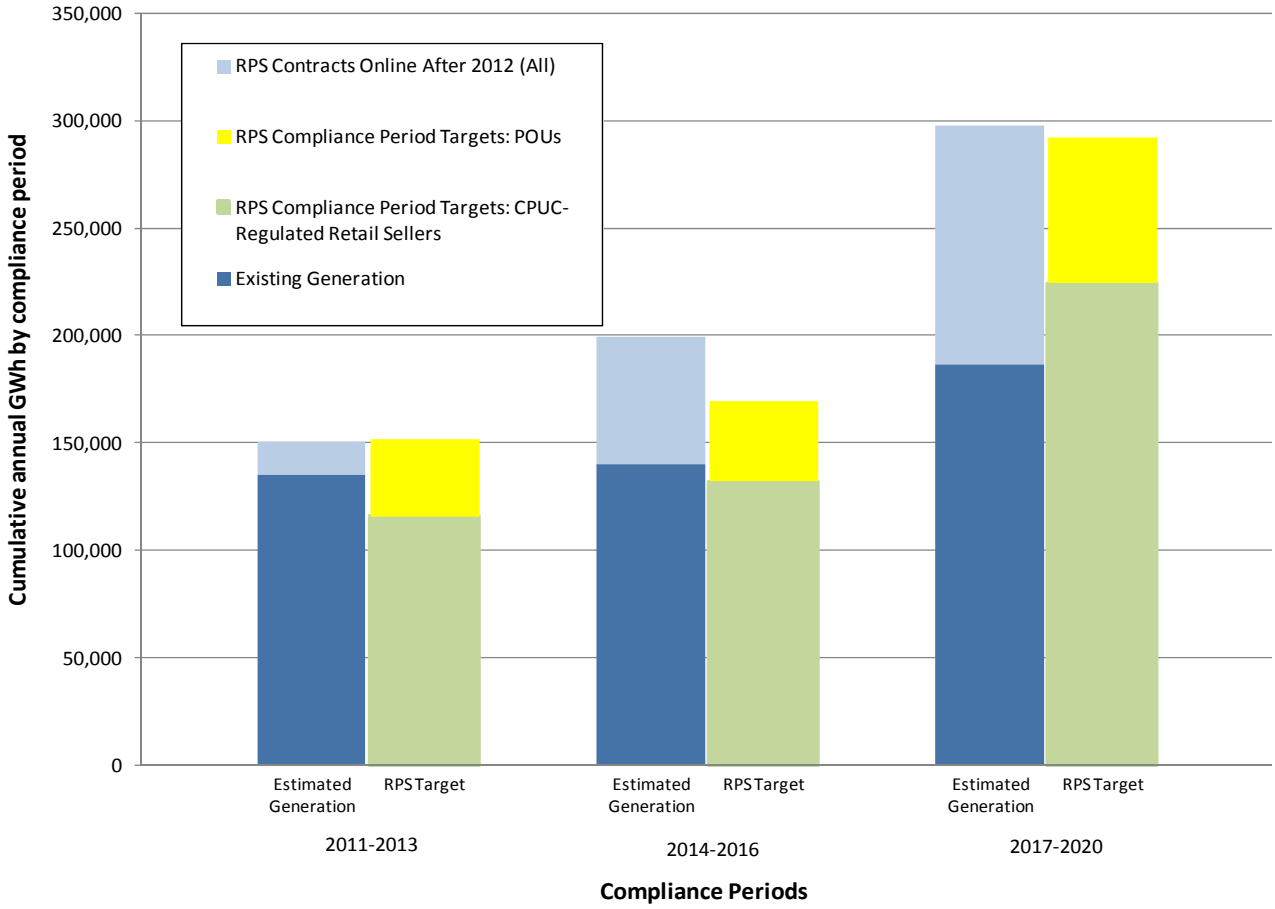


Figure 2 was last updated in October 2013. Actual 2013 facility generation and POU updates will not be available until mid-2014
Source: California Energy Commission Total System Power (accessed August 20, 2013) and estimate of forecasted RPS procurement using Energy Commission Resource Adequacy S-5 Forms (Filed August 6, 2013), CPUC RPS Project Status (August, 20, 2013), and CPUC RPS Preliminary Annual Compliance Filings August 1, 2012 (accessed August 20, 2013). Excludes out-of-state POU contracts on-line after 2012.

Figure 3 shows renewable generation procured for California from 1983-2011 by resource type.

Figure 3: California Renewable Energy Generation by Resource Type (In-State and Out-of-State)

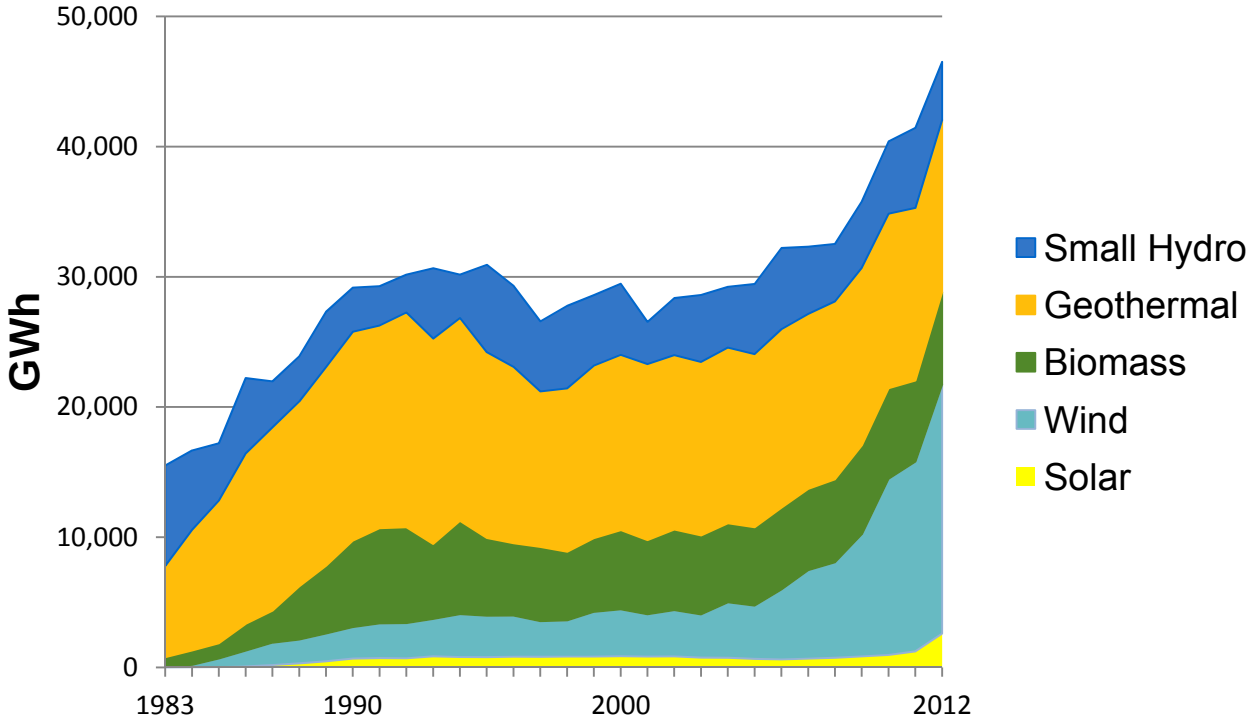


Figure 3 was last updated in October 2013. Actual 2013 facility generation and POU updates will not be available until mid-2014.
Source: California Energy Commission based on sources [1] through [7] listed near the end of this document.

Table 3 shows the capacity of wholesale renewable energy facilities on-line as of the end of 2012 by county. The table provides data on the number of facilities and MW by fuel type. Some facilities are physically located out-of-state but are electrically connected to the California Independent System Operator (California ISO) and are therefore included in **Table 3.**

Table 3: Summary of In-State[1] Wholesale Renewable Projects On-Line in 2013

State	County	Biomass[2]		Geothermal		Small Hydro[3]		Solar PV[4]		Solar Thermal[5]		Wind[6]		Total	
		Count	MW	Count	MW	Count	MW	Count	MW	Count	MW	Count	MW	Count	MW
AZ	Yuma							1	243					1	243
CA	Alameda	3	20					14	20			9	353	26	393
CA	Amador	1	23			1	14							2	37
CA	Butte	2	21			10	70	5	7					17	98
CA	Calaveras					4	32	1	2					5	34
CA	Colusa	1	29											1	29
CA	Contra Costa	2	7					10	12			2	107	14	126
CA	El Dorado					6	67							6	67
CA	Fresno	2	56			2	44	27	177					31	276
CA	Glenn					1	5							1	5
CA	Humboldt	3	61											3	61
CA	Imperial			20	705	8	93	7	599					35	1,396
CA	Inyo			3	302	11	80							14	383
CA	Kern	2	45			5	75	16	167			19	2,898	42	3,184
CA	Kings							7	108					7	108
CA	Lake			6	418	2	6	3	3					11	426
CA	Lassen	2	47			1	30							3	77
CA	Los Angeles	9	152			19	205	22	398	1	8			51	763
CA	Madera	1	13			7	61	2	2					10	76
CA	Marin							1	2			1	1	2	3
CA	Mariposa					1	9							1	9
CA	Mendocino					2	13	1	1					3	14
CA	Merced	2	13			3	38	5	5			1	21	11	77
CA	Mono			4	54	5	96							9	150
CA	Monterey	4	13					5	5					9	18
CA	Napa	1	2					2	2					3	4
CA	Nevada					10	81					1	1	11	82
CA	Orange	6	82			3	12							9	94
CA	Placer	3	52			9	89	1	1					13	142
CA	Plumas	2	40			4	28							6	67
CA	Riverside	3	59			6	50	9	419	1	125	14	711	33	1,364
CA	Sacramento	1	9			1	14	26	116					28	139
CA	San Benito							1	1					1	1
CA	San Bernardino	3	6			11	38	28	105	10	770			52	919
CA	San Diego	11	37			4	13	6	38			1	50	22	137
CA	San Francisco	1	2					7	13					8	16
CA	San Joaquin	3	32			1	11	2	4			1	56	7	103
CA	San Luis Obispo	2	4			1	4	4	240					7	248
CA	San Mateo	2	13					1	1					3	14
CA	Santa Barbara	2	4											2	4
CA	Santa Clara	4	8					19	26					23	34
CA	Santa Cruz	2	5					2	3					4	7
CA	Shasta	5	129			20	86	1	1			1	101	27	317
CA	Sierra					2	14							2	14
CA	Siskiyou					5	72							5	72
CA	Solano							10	13			15	1,443	25	1,456
CA	Sonoma	1	2	12	1,238	1	3	8	9					22	1,252
CA	Stanislaus	1	24			6	21	3	28					10	73
CA	Sutter							2	2					2	2
CA	Tehama					3	21	3	2					6	23
CA	Trinity					4	9							4	9
CA	Tulare	2	13			7	38	9	121					18	172
CA	Tuolumne	2	30			7	61							9	91
CA	Ventura	1	3			2	2	1	1					4	6
CA	Yolo	2	32			1	12	6	6					9	49
CA	Yuba	1	2			1	2	1	1					3	5
NV	Churchill			1	65									1	65
NV	Clarke							2	143					2	143
UT	Beaver											2	304	2	304
Total		**95**	**1,086**	**46**	**2,782**	**197**	**1,616**	**281**	**3,047**	**12**	**903**	**67**	**6,047**	698	15,480

Source: California Energy Commission

Notes on Table 3: Summary of In-State Wholesale Renewable Projects On-Line in 2013
For the Overview section, the results of this table were rounded to 12,000 MW to account for uncertainty in the data. This table represents RPS-eligible wholesale suppliers of electricity. It does not include self-generation.
Sources: California Energy Commission Quarterly Fuels and Energy Report (QFER), source [8]; CPUC RPS contract database [D1]; and POU S-2 and S-5 Forms for 2013 [D2]. QFER collects data 45 days after each calendar quarter for power plants 10 MW and larger and annually for plants from 1-10 MW. Plants under 1 MW are not required to report under QFER. The data depict facilities on-line as of December 17, 2013.
1. Facilities physically located out-of-state that have a first point of interconnection with a California balancing authority are considered in-state resources for the RPS.
2. “Biomass” does not include roughly 90,000 MWh generated by natural gas plants using out-of-state landfill and digester gas transported through the natural gas pipeline. Two facilities are not included as they are not RPS-certified: Southeast Resource Recovery (Long Beach) and Commerce Refuse To Energy (Commerce).
3. The Small Hydro category includes all RPS-eligible hydroelectric facilities that are rated from 1 MW to 30 MW. It also includes a few larger facilities that may qualify for a load-serving entity's RPS program.
4. Solar PV represents wholesale installations only. It does not include PV installed under a net metering agreement. Data represent on-line capacity from operating plants. Some projects are developed in multiple phases, and the final project may have a larger capacity.
5. Includes 370 MW (net capacity) from Ivanpah Solar Units 1 through 3, even though they technically did not start selling power under their PPA until the first few weeks of January 2014.
6. The federal renewable electricity production tax credit may impact the reported 2012 capacity for wind generation as it created an incentive to have wind projects "placed in service" by December 31, 2012. In January 2013, the production tax credit changed the determination of facility eligibility by allowing "under construction" to qualify for the credit. This change in federal tax rules may also impact 2013 reported wind capacity as it may include wind areas under construction. More information can be found here: http://dsireusa.org/incentives/incentive.cfm?Incentive_Code=US13F.

12,000 MW Distributed Generation

Figure 1 in the Overview shows progress toward the Governor’s goal of 12,000 MW of renewable distributed generation by 2020. Through March 2014, 4,500 MW of renewable distributed generation projects were operating in California, including 2,480 MW of wholesale and 2,030 MW of self-generation. During the first quarter of 2014, 10 MW of wholesale distributed solar and 70 MW of self-generation solar became operational. **Table 4** summarizes on-line and pending renewable distributed generation by fuel type.

Table 4: Renewable Distributed Generation Resources, On-Line, and Pending Projects

Resource	Online (MW)	Pending (MW)	Total (MW)
Biomass	510	50	560
Geothermal	140	0	140
Small Hydro	1,030	10	1,030
Solar	2,840	1,480	4,320
Wind	20	20	40
Unknown	0	90	90
Total	***4,500***	***1,700***	***6,200***

Source: California Energy Commission based on sources [D1] through [D14]. Total may not sum due to rounding. Updated March 2014.

Table 5 provides California county-specific data used in **Figure 1 and Table 3**.

Table 5: Capacity of On-Line and Pending Distributed Generation Systems by County (as of December 2013)

County	On-Line Capacity (MW)	Pending Capacity (MW)	County	On-Line Capacity (MW)	Pending Capacity (MW)
Alameda	115	13	Riverside	183	41
Amador	16	2	Sacramento	141	0
Butte	123	1	San Benito	5	0
Calaveras	14	0	San Bernardino	258	186
Colusa	6	1	San Diego	219	71
Contra Costa	95	33	San Francisco	34	0
El Dorado	56	1	San Joaquin	56	54
Fresno	270	85	San Luis Obispo	32	6
Glenn	8	1	San Mateo	46	5
Humboldt	31	0	Santa Barbara	22	5
Imperial	158	40	Santa Clara	161	8
Inyo	44	0	Santa Cruz	24	2
Kern	151	379	Santa Rosa	1	0
Kings	127	64	Shasta	129	0
Lake	15	0	Sierra	14	0
Lassen	12	0	Siskiyou	45	0
Los Angeles	410	178	Solano	41	28
Madera	59	2	Sonoma	74	1
Marin	20	0	Stanislaus	32	0
Mariposa	10	0	Sutter	11	2
Mendocino	20	2	Tehama	30	6
Merced	47	23	Trinity	9	0
Mono	77	0	Tulare	160	32
Monterey	38	3	Tuolumne	71	0
Napa	32	1	Ventura	46	11
Nevada	59	0	Yolo	51	3
Orange	146	21	Yuba	11	1
Placer	121	2	Unknown	329	238
Plumas	21	0	**Total Capacity**	**4,535**	**1,556**

Source: California Energy Commission based on sources [D1] through [D14]. Updated March 2014.

3,000 Megawatts of Self-Generation Solar Systems

As stated on the Go Solar California website, **Senate Bill 1** (Murray, Chapter 132, Statutes of 2006) set the following goals for installed self-generation photovoltaic systems:

> **3,000 megawatts of solar energy systems on new and existing residential and commercial sites by 2017 and placing solar energy systems on 50 percent of new homes by 2020.**

There are three parts to the 3,000 MW goal:

1. 1,940 MW for IOUs for commercial buildings and existing homes (including low-income programs) as part of the California Solar Initiative.
2. 700 MW for the POUs.
3. 360 MW for IOUs for the New Solar Homes Partnership (NSHP).

As of March 2014, the California Solar Initiative program, provided incentives for nearly **1,480 MW of installed capacity** and reserved funding for more than **250 MW of pending capacity** toward achieving the goal of **1,940 MW for commercial buildings and existing residential buildings** in IOU service territories.[9]

Based on annual SB 1 reports submitted to the Energy Commission in 2012, **POUs have installed nearly 160 MW toward the 700 MW goal.**[10]

As of March 2014, the NSHP had more than **36 MW of installed capacity and an additional 47 MW of capacity pending (40 MW of which received a funding reservation) toward the program goal of 360 MW.** As the market recovers from the housing crisis of the past few years, builders and homeowners are submitting applications at a faster pace to reserve NSHP funding for their projects. NSHP funding reserved for new home construction projects has increased from a low of about $18.3 million in 2009 to almost $47 million in 2012.[11] In 2013, the NSHP reserved more than $45 million.

Another goal of SB 1 was to transform the solar market such that solar energy systems are a viable mainstream option for both homes and businesses by 2017. A key component of transforming California's commercial and residential solar markets is the continued decline in prices of photovoltaic systems. From 1998 to 2012, installed system costs have declined from $12 per watt to under $6 per watt.[12] Median installed system costs, in 2013, continued this downward trend. Median prices reported to the California Solar Initiative program were $5 per watt in 2013.[13] Analysts at the U.S. Department of Energy (DOE) SunShot Initiative expect photovoltaic system prices to continue to decline.[14]

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9 http://www.californiasolarstatistics.ca.gov/reports/agency_stats/, updated December 17, 2013.

10 http://www.energy.ca.gov/sb1/pou_reports/. Data reported through December 31, 2012.

11 http://www.gosolarcalifornia.ca.gov/about/nshp.php, last updated April 15, 2013.

12 Galen Barbose, Naïm Darghouth, Samantha Weaver, and Ryan Wiser. Lawrence Berkeley National Laboratory, July 2013. *Tracking the Sun VI An Historical Summary of the Installed Price of Photovoltaics in the United States from 1998 to 2012*.

13 Barbose, *op. cit.*

14 U.S. DOE, November 2012. SunShot: *Photovoltaic (PV) Pricing Trends: Historical, Recent, and Near-Term Projections*. http://www.nrel.gov/docs/fy13osti/56776.pdf.

The U.S. DOE SunShot Initiative has set a goal of reducing total installed home PV system costs to $1.50/watt by 2020. Although module prices continue to decrease, the current trajectory "does not achieve the SunShot targets by 2020."[15] Nonhardware module prices have become a major driver for PV system prices.[16] A recent National Renewable Energy Laboratory (NREL) study has found that aggressive strategies are needed to reduce nonhardware system costs (soft costs) to meet the 2020 target. **Figure 4** shows a potential roadmap to reducing soft costs and achieving the 2020 target.

Figure 4: Residential PV Soft-Cost Reduction Roadmap Targets

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Customer Acquistion ($/W)	$ 0.67	-	-	$ 0.53	$ 0.49	$ 0.45	$ 0.41	$ 0.36	$ 0.28	$ 0.19	$ 0.12
Permitting, Inspection, and Interconnection ($/W)	$ 0.20	-	-	$ 0.18	$ 0.16	$ 0.15	$ 0.13	$ 0.11	$ 0.10	$ 0.06	$ 0.04
Installation Labor ($/W)	$ 0.59	-	-	$ 0.51	$ 0.46	$ 0.42	$ 0.36	$ 0.30	$ 0.24	$ 0.19	$ 0.12
Other Soft Costs ($/W)	$ 1.86	-	-	$ 1.30	$ 1.14	$ 0.97	$ 0.82	$ 0.68	$ 0.56	$ 0.48	$ 0.37
Financing (WACC %-real)	-	-	9.90%	9.4%	8.8%	8.2%	7.7%	7.7%	4.8%	3.4%	3.0%
Total Soft Costs ($/W)	$ 3.32	-	-	$ 2.25	$ 2.25	$ 1.99	$ 1.72	$ 1.45	$ 1.18	$ 0.92	$ 0.65
Total System Costs ($/W)	$ 6.60	-	-	$ 4.99	$ 4.49	$ 3.99	$ 3.49	$ 3.00	$ 2.50	$ 2.00	$ 1.50

Legend					
	Roadmap Target		Realizable		Medium Uncertainty
			Low Uncertainty		High Uncertainty

Source: Kristen Ardani, Dan Seif, Robert Margolis, Jesse Morris, Carolyn Davidson, Sarah Truitt, and Roy Torbert. *Non-Hardware ("Soft") Cost-Reduction Roadmap for Residential and Small Commercial Solar Photovoltaics, 2013-2020.* National Renewable Energy Laboratory. August 2013. www.nrel.gov/publications. Individual values may not sum due to rounding.

Renewable Energy Facility Siting in California

The Energy Commission has statutory responsibility for licensing thermal power plants 50 MW and larger along with associated infrastructure associated with the plant, such as transmission lines to the first point of interconnection with the grid, fuel supply lines, and water pipelines, among others. The Energy Commission's 12-month, one-stop permitting process is a certified regulatory program under the California Environmental Quality Act (CEQA) and includes many opportunities for public participation. Although coordinated with all state, local, or regional agencies, the Energy Commission's certification addresses all CEQA requirements for new power plants under its jurisdiction and is in-lieu of all permits otherwise required by local, regional, or state agencies. The Energy Commission also coordinates with all applicable federal agencies to ensure that certification incorporates the necessary conditions to address any federal requirements.

The Energy Commission has made substantial progress on renewable energy facility siting. **Table 6, Table 7, and Table 8** provide status data and details on recent renewable energy siting cases that are under Energy Commission jurisdiction.

Table 6: California Energy Commission-Jurisdictional Renewable Energy Facility Status for Approved Projects Operational, Under Construction, or Under Preconstruction

15 Kristen Ardani, Dan Seif, Robert Margolis, Jesse Morris, Carolyn Davidson, Sarah Truitt, and Roy Torbert. *Non-Hardware ("Soft") Cost-Reduction Roadmap for Residential and Small Commercial Solar Photovoltaics, 2013-2020.* National Renewable Eerngy Laboratory. August 2013. www.nrel.gov/publications.

16 Ardani, *op. cit.*

Projects On-Line	Type	Status	Capacity (MW)	County
Bottle Rock Geothermal Restart − U.S. Renewables Group	Geothermal	Operational	10*	Lake
Genesis Solar Energy Project − NextEra Energy	Solar Thermal	Operational	250	Riverside
Ivanpah Solar − BrightSource, NRG Energy, Google	Solar Thermal	Operational	370	San Bernardino
		Subtotal:	**630**	
Approved and Under Construction	**Type**	**Status**	**Capacity (MW)**	**County**
Abengoa Mojave Solar Project − Mojave Solar LLC	Solar Thermal	Under Construction	250	San Bernardino
		Subtotal:	**250**	
Approved and Under Pre-construction	**Type**	**Status**	**Capacity (MW)**	**County**
Rice Solar Energy Project - Rice Solar Energy LLC / SolarReserve LLC	Solar Thermal	Preconstruction	150	Riverside
Blythe Solar − NextEra Blythe Energy Center LLC	Solar PV	Preconstruction	485	Riverside
		Subtotal:	**635**	

*While the Bottle Rock facility was approved for 55 MW of capacity, it has been generating only around 10 MW due to steam supply issues.
Source: California Energy Commission, [http://energy.ca.gov/sitingcases/all_projects.html].
Updated March 2014. Capacity represents net nameplate capacity and excludes onsite and parasitic loads.

Table 7: California Energy Commission-Jurisdictional Renewable Energy Facility Status for Projects Not Under Construction

Not Under Construction	Type	Status	Capacity (MW)*	County
Black Rock 1, 2, and 3 Geothermal Power Project (formerly Salton Sea Geothermal) - Cal Energy	Geothermal	On Hold	159	Imperial
Victorville Hybrid Gas-Solar − City of Victorville (513 MW Gas + 50 MW Solar)	Solar Thermal/ Natural Gas	On Hold	50	San Bernardino
Beacon Solar Energy Project − LADWP	Solar PV**	Solar Thermal License Terminated; Solar PV License Approved by Kern County	250	Kern
Imperial Valley Solar (Formerly SES Solar Two) − Imperial Valley Solar LLC	Solar Thermal	License Terminated; Project Cancelled; Future Renewables Not Planned on This Site.	[709]	Imperial
Palmdale Hybrid Gas-Solar − Summit Power Group LLC (formerly City of Palmdale) (520 MW Gas + 50 MW Solar)	Solar Thermal/ Natural Gas	On Hold	50	Los Angeles
Calico Solar − Calico Solar LLC (formerly K Road)	Solar Thermal	Project Cancelled; License Terminated	[663.5]	San Bernardino
Ridgecrest Solar Power Project − Solar Millenium, LLC	Solar Thermal	Suspended During Review	250	Kern
Hidden Hills Solar Electric Generating System − BrightSource Energy, Inc.	Solar Thermal	Suspended During Review	500	Inyo
Rio Mesa Solar Electric Generating Facility − BrightSource Energy	Solar Thermal	Project Cancelled	[500]	Riverside
		Subtotal:	**1,259**	

*Megawatts (MW) shown in [] are not included in totals.

**Previously reviewed by Energy Commission as a solar thermal project; LADWP plans to install 250 MW of PV.
Source: Energy Commission
Updated March 2014. Capacity represents net nameplate capacity and excludes onsite and parasitic loads.

Table 8: California Energy Commission-Jurisdictional Renewable Energy Facility Status for Projects Under Review

Projects In Review	Type	Status	Capacity (MW)	County
Palen Solar Electric Generating System − Palen Solar Holdings, LLC	Solar Thermal	Under Review Amendment to Power Tower	500	Riverside
		Subtotal:	**500**	
Total for All Projects Approved (Tables 5 and 6) and Under Review (Table 7):			**3,274**	

Source: California Energy Commission, [http://energy.ca.gov/sitingcases/all_projects.html]. Updated March 2014. Capacity represents net nameplate capacity and excludes onsite and parasitic loads.

Table 9 shows all renewable energy projects in California, including those outside the Energy Commission's jurisdiction, that have received environmental permits. The information includes projects that are in preconstruction or under construction. The table shows the number of projects and capacity by county and by renewable technology type (for example, wind, wind repowering, solar PV, solar PV/natural gas combo, solar thermal projects not yet filed with the Energy Commission). The data were last updated December 2013.

Due to frequent changes in project circumstances (for example, loss of developer financing, delays in obtaining power purchase agreements, and inability to meet other agencies' permitting requirements), project status data are fluid. Therefore, the renewable energy siting information presented in **Tables 6 through 9** reflects a snapshot in time relative to the status of projects in the Energy Commission siting database.

Table 9: Renewable Projects That Have Received Environmental Permits

	Biomass/ Landfill Gas		Solar PV		Solar Thermal		Geothermal		Wind		Small Hydro		Total	
County	**Count**	**MW**	**Count**	**MW**	**Count**	**MW**	**Count**	**MW**	**Count**	**MW**	**Count**	**MW**	**Count**	**MW**
Amador											1	1	1	1
Butte			3	3									3	3
Contra Costa			1	19									1	19
Fresno			19	417									19	417
Glenn			1	38									1	38
Imperial			14	1,394			5	465					19	1,859
Inyo			1	1									1	1
Kern			24	1,663					8	993			32	2,657
Kern and Los Angeles			1	579									1	579
Kings			13	551									13	551
Lake							1	55					1	55
Los Angeles			23	937							1	4	24	941
Madera			1	90									1	90
Merced			4	115									4	115
Placer			3	5									3	5
Riverside			10	1,853	1	150							11	2,003
Sacramento			1	2									1	2
San Benito			2	401									2	401
San Bernardino			16	276	1	250							17	526
San Diego			2	52					1	200			3	252
San Luis Obispo			2	311									2	311
Sonoma							2	98					2	98
Stanislaus	1	2	5	270									6	272
Tulare			8	108									8	108
Tuolumne			1	2									1	2
Yolo			3	5									3	5
Total	**1**	**2**	**158**	**9,089**	**2**	**400**	**8**	**618**	**9**	**1,193**	**2**	**5**	**180**	**11,300**

Source: California Energy Commission. Totals may not sum due to rounding. Updated in March 2014. Capacity represents net nameplate capacity and excludes onsite and parasitic loads.

Additional References:

For more information on the Renewables Portfolio Standard, please visit the following page: http://www.energy.ca.gov/portfolio/index.html. For more information on investor-owned utility, electric service provider, and community choice aggregator progress, see the RPS Quarterly Reports and the Status of RPS Projects, available at http://www.cpuc.ca.gov/PUC/energy/Renewables/index.htm.

Also, see the project viability information available at http://www.cpuc.ca.gov/NR/rdonlyres/CFD76016-3E28-44B0-8427-3FAB1AA27FF4/0/FourthQuarter2010RPSReporttotheLegislature.pdf (page 4) and http://www.cpuc.ca.gov/PUC/energy/Renewables/procurement.htm (Project Viability Calculator).

For more information on the *Bioenergy Action Plan* and the latest proceeding, see http://www.energy.ca.gov/bioenergy_action_plan/index.html.

For more information on the amount of new renewable procurement required to achieve 33 percent by 2020 (also known as the Renewable Net Short), see http://www.energy.ca.gov/2013_energypolicy/documents/.

For further information on all (renewable and nonrenewable) Energy Commission-jurisdictional power plants, see http://energy.ca.gov/sitingcases/all_projects.html.

Sources:

Wholesale Renewables

The following data sources were used to prepare the figures:

[1] California Hydroelectric Statistics and Data. Total Hydroelectricity Production (In gigawatt-hours; includes imports). http://energyalmanac.ca.gov/renewables/hydro/index.html. (For 1983-1996, small hydropower is estimated as 13 percent of all hydropower reported on this table.)

[2] California Biomass and Waste-to-Energy Statistics and Data. Biomass and Waste-to-Energy Electricity Production for 1983-1996. These data include two waste-to-energy plants that are not RPS-eligible. http://energyalmanac.ca.gov/renewables/biomass/index.html.

[3] California Geothermal Energy Statistics and Data. Geothermal Electricity Production. These data used for 1983-1996. http://energyalmanac.ca.gov/renewables/geothermal/index.html.

[4] California Solar Energy Statistics and Data. Solar Thermal Electricity Production. These data used for 1983-1996. http://energyalmanac.ca.gov/renewables/solar/index.html.

[5] California Wind Energy Statistics and Data. Wind Electricity Production. These data used for 1983-1996. http://www.energy.ca.gov/wind/index.html.

[6] California Electrical Energy Generation, 1997 to 2011. Total Production, by Resource Type (gigawatt-hours). http://energyalmanac.ca.gov/electricity/electricity_generation.html. (For 1997-2001, small hydropower is estimated as 13 percent of all hydropower reported on this table).

[7] Gross System Power from the Net System Power Report (2002-2006) and Revised Total Electricity System Power for California (2007-current). In-state and imports. http://www.energyalmanac.ca.gov/electricity/total_system_power.html.

[8] The Quarterly Fuel and Energy Report is data collected consistent with California Code of Regulations, Title 20, Division 2, Chapter 3, Section 1304 (a) (1)-(3). For more information, please contact Michael Nyberg, Michael.Nyberg@energy.ca.gov.

[9] Status of RPS Projects. CPUC tracks contracts for projects that are on-line, under development, and pending CPUC approval. Withdrawn and cancelled projects are also included. The project list is updated monthly. http://www.cpuc.ca.gov/PUC/energy/Renewables/

[10] California Energy Commission Energy Facility Status of Power Plant Projects since 1996. http://www.energy.ca.gov/sitingcases/all_projects.html.

Renewable Distributed Generation

The following data sources were used to prepare the figures:

[D1] California Public Utilities Commission, http://www.cpuc.ca.gov/PUC/energy/Renewables

[D2] California Energy Commission, S-2 and S-5 Supply Forms from 2013 available at http://energyalmanac.ca.gov/electricity/s-2_supply_forms_2013/ and http://energyalmanac.ca.gov/electricity/s-5_supply_forms_2013/

[D3] Southern California Edison SB 32 procurement http://www.sce.com/EnergyProcurement/renewables/crest.htm

[D4] Pacific Gas and Electric SB 32 procurement http://www.pge.com/b2b/energysupply/wholesaleelectricsuppliersolicitation/standardcontractsforpurchase/

[D5] San Diego Gas & Electric SB 32 procurement http://www.sdge.com/regulatory-filing/654/feed-tariffs-small-renewable-generation

[D6] SMUD: https://www.smud.org/en/business/environment/solar-for-your-business/feed-in-tariffs.htm

[D7] LADWP: https://www.ladwp.com/ladwp/faces/ladwp/commercial/c-gogreen/c-gg-localrenewableenergyprogram?_adf.ctrl-state=ano50oi7c_4&_afrLoop=237938105011783

[D8] SCE Renewable Standard Contract Offer http://www.edison.com/pressroom/pr.asp?bu=&year=0&id=7502

[D9] Self-Generation Incentive Program: http://energycenter.org/index.php/incentive-programs/self-generation-incentive-program

[D10] New Solar Homes Partnership https://www.newsolarhomes.org/WebPages/Public/Reports.aspx

[D11] California Solar Initiative http://www.californiasolarstatistics.ca.gov/

[D12] Senate Bill 1 Solar PV: http://energy.ca.gov/sb1/pou_reports/index.html

[D13] Historical generation in California: http://energyalmanac.ca.gov/electricity/web_qfer/

[D14] Data from the California ISO on facilities interconnected in 2013.

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- POU RPS Progress: Angela Gould, Angela.Gould@energy.ca.gov.
- Wholesale Renewable Capacity Larger than 1 MW nameplate: Michael Nyberg, Michael.Nyberg@energy.ca.gov.
- Renewable Energy Facilities Permitting: Joseph Merrill, Merrill.Joseph@energy.ca.gov.

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Next update:

The next quarterly update in August 2014 will provide new generation and operational statistics for 2013 and update estimated progress toward achieving the following state goals:

- 3,000 MW Self-Generation Solar
- 12,000 MW Distributed Generation with renewables
- Renewables Portfolio Standard targets
- Permitting and construction of new renewable energy facilities in California