



[Home](#) → [electricity](#) → [total system power](#)

## Total Electricity System Power

---

### Total System Power for 2012: Changes from 2011

In 2012, Total System Power<sup>1</sup> for California was 302,000 gigawatt-hours (GWh), about 3 percent higher than 2011. The primary factors for this increase include warmer weather and modest recovery from the Great Recession. Temperatures in California were above normal during the winter, spring, and summer, while the state experienced one of its top ten warmest fall seasons in 2012.<sup>2</sup> Greater population and economic growth in some of the state's regions have increased the saturation of central air conditioning. In addition, there has been some increased use of air conditioning in traditionally cooler regions of the state such as the Bay Area.<sup>3</sup>

California's in-state electricity production declined by almost one percent in 2012 to 199,101 GWh from 200,987 GWh the year before. However, net imports from the Northwest and Southwest, combined, more than made up this difference. Energy imports from the Northwest in 2012 increased by 12 percent, due primarily to an increase in wind generation along with increased biomass and small hydro imports. The Pacific Northwest had seasonal precipitation totals amongst its ten wettest in 2012. Accordingly, small hydro imports increased from near zero levels in 2011, 6 GWh, to a modest 204 GWh in 2012.

Biomass imports by California utilities increased 144% to 1,025 GWh for 2012 from 419 GWh in 2011. However, it is not known if this was due to increased power deliveries from newly-built biomass power plants or already existing plants.

California's in-state electric generation from coal dropped by 50 percent with the closure of 7 petroleum coke plants over 2012. GWF Power Systems alone shut down five plants in Contra Costa County. Stockton Cogeneration has plans to convert its offline petroleum coke facility to biomass, but so far no actions have been taken. Buena Vista Biomass completed conversion of its Jackson Valley facility from burning lignite to biomass in 2012.

In 2012, in-state electricity production at large hydroelectric facilities (those over 30 megawatts (MW) nameplate) decreased by almost 37 percent. This significant decrease coincided with California experiencing one of its driest years, which followed a wet 2011. 2011 will be remembered for its being a year with heavy and late-melting Sierra snowpack. Statewide precipitation for winter 2012 was the third driest in 118 years according to the National Climatic Data Center. Generally, when snowmelt and runoff is plentiful in California, as in 2011, more low-cost hydroelectric energy is available, especially during the spring and fall months, as well as during the off-peak hours of summer (afternoon and evening hours). Therefore, in wet years, commitment and dispatch of natural gas-fired power plant generation is reduced ("displaced"). However, this displacement did not occur as much in 2012, when reduced in-state hydroelectric generation was offset by increases in natural gas-fired generation and imports of hydroelectric generation.

With generally low hydroelectric availability in 2012, natural gas generation in California increased by 33 percent to 121,716 GWh, an increase of 30,000 GWh over the previous year. Coinciding with the low hydroelectric availability, Southern California Edison permanently ceased power operations at the San Onofre Nuclear Generation Station (SONGS) due to concerns over the leaking steam generator tubes that released radioactive steam. The loss of electric generation from SONGS alone accounted for approximately nine percent, or 18,000 GWh, of California's total in-state generation. The SONGS outage reduced nuclear generation in California by about 50 percent. These two factors, lower in-state hydroelectric availability and the SONGS outage, were the primary reasons for the 33 percent increase in natural gas generation in 2012.

Wind facilities in California significantly increased output in 2012 reflecting the continued siting of new projects. Wind saw an increase in generation of 31 percent, helped in part by in-state capacity additions of roughly 1,000 MW per year over the past three years. However, this rate of capacity growth may slow as the amount of land available in prime wind areas becomes more scarce.

Solar photovoltaic energy also experienced significant commercial-scale capacity additions totaling 800 MW in 2012. Annual energy totals for solar rose to 2,609 GWh from 1,234 GWh in 2011. Solar capacity additions are occurring in California, Nevada and Arizona. Recent additions include, but are not limited to, the California Valley Solar Ranch in San Luis Obispo County, Catalina Solar in Kern County, Copper Mountain in Clarke County, Nevada, and Agua Caliente in Yuma County, Arizona. Despite concerns that solar projects in California may begin to reach limitations on available land, large PV capacity additions are still expected in 2013 and 2014.

Reporting requirements for Total System Power are limited to projects rated at 1 MW and larger. Because most solar PV systems on residential households and businesses are less than 1 MW, data on these installations is not collected. As more installations of solar PV and other "behind the meter" distributed generation technologies take place, along with continued gains in energy efficiency, displacement of power delivered by utilities as represented on within Total System Power may be impacted. As distributed generation systems become a more significant portion of the state's generation mix, it may be appropriate to reconsider the exclusion of these smaller, systems from the Total System Power summary.

<sup>1</sup>Total System Power is defined as the annual total energy requirement for all load serving entities with end-use loads in California, including self-generation supply for combined heat and power, and other non-utility served loads from power plants that are 1 megawatt and larger in nameplate capacity.

<sup>2</sup><http://www.ncdc.noaa.gov/sotc/national/2012/13>

<sup>3</sup>Source: California Energy Demand 2013-2024 Preliminary Forecast, Volume 2: Electricity Demand by Utility Planning Area, Page 11, May 2013 CEC-200-2013-004-SD-V2

### 2012 Total System Power in Gigawatt Hours

Fuel Type	California In-State Generation (GWh)	Percent of California In-State Generation	Northwest Imports (GWh)	Southwest Imports (GWh)	California Power Mix (GWh)	Percent California Power Mix
Coal	1,580	0.8%	561	20,545	22,685	7.5%
Large Hydro	23,202	11.7%	12	1,698	24,913	8.3%
Natural Gas	121,716	61.1%	37	9,242	130,995	43.4%
Nuclear	18,491	9.3%	-	8,763	27,254	9.0%
Oil	90	0.0%	-	-	90	0.0%
Other	14	0.0%	-	-	14	0.0%
Renewables	34,007	17.1%	9,484	3,024	46,515	15.4%
Biomass	6,031	3.0%	1,025	23	7,079	2.3%
Geothermal	12,733	6.4%	-	497	13,230	4.4%
Small Hydro	4,257	2.1%	204	-	4,461	1.5%
Solar	1,834	0.9%	-	775	2,609	0.9%

Wind	9,152	4.6%	8,254	1,729	19,135	6.3%
Unspecified Sources of Power	N/A	N/A	29,376	20,124	49,500	16.4%
Total	199,101	100.0%	39,470	63,396	301,966	100.0%

Source: [QFER](#) and SB 1305 Reporting Requirements. In-state generation is reported generation from units 1 MW and larger

Contact: Michael Nyberg, [Mnyberg@energy.ca.gov](mailto:Mnyberg@energy.ca.gov)

Data as of August 1, 2013

[2011 Total System Power](#)  
[2010 Total System Power](#)  
[2009 Total System Power](#)  
[2008 Total System Power](#)  
[2007 Total System Power](#)  
[2006 Gross System Power](#)  
[2005 Gross System Power](#)  
[2004 Gross System Power](#)  
[2003 Gross System Power](#)  
[2002 Gross System Power](#)

## Total System Power: Definition and Calculation Method

The California Code of Regulations (Title 20, Division 2, Chapter 2, Section 1304 (a)(1)-(2)) requires owners of power plants that are 1 megawatt (MW) or larger in California or within a control area with end users inside California to file data on electric generation, fuel use, and environmental attributes. Filings are submitted to the Energy Commission on a quarterly and annual basis. These filings cover all types of electric generation: wind, solar, geothermal, natural gas, hydroelectric, coal generators, and others. The reporting requirement includes facilities that have generation for onsite use, and non-retail generation with reversible turbines used to pump water. (Some of these facilities use electricity to store water in later months, while others pump water at night to generate electricity during subsequent daytime hours). Energy Commission staff collect and verify these reports to compile a statewide accounting of all electric generation serving California.

Balancing Authorities (formerly known as Control Area Operators) are also required to report net amounts of electricity flowing across transmission ties from other Balancing Authority Areas.<sup>3</sup> These quarterly reports of electricity imports and exports are at least transparent and do reflect a net import requirement for California.

The net electricity imported from outside California (total imports minus exports) are separated into two geographical regions: the Northwest (NW) and the Southwest (SW) based on the source of the reported import.<sup>4</sup> This allocation of imports by specific fuel type is determined by utilities reporting under the Power Source Disclosure Program, described more fully below.

"Unspecified power" is the amount of energy that not specifically claimed by a utility under the Power Source Disclosure Program. This category includes spot market purchases, wholesale power marketing, purchases from pools of electricity where the original source of fuel determined, and "null power". Null power is the generic electricity commodity that remains when the renewable attributes (Renewable Energy Credits, or RECs) are sold separately.

Total System Power is the sum of all in-state generation plus net electricity imports (by fuel type) plus unspecified power. Total System Power cannot be used to track the state's progress for the Renewable Portfolio Standard (RPS) program due to the intricacies, nuances, and special requirements of the RPS legislation. For more

information on the RPS program, please visit the following website address: <http://www.energy.ca.gov/portfolio/> .

<sup>3</sup> The boundaries of electrical California's Balancing Authority Areas do not correspond precisely with the state's geographic boundaries.

<sup>4</sup> The Northwest includes Alberta, British Columbia, Idaho, Montana, Oregon, South Dakota, Washington, and Wyoming. The Southwest includes Arizona, Baja California, Colorado, New Mexico, Nevada, Texas, and Utah.

## Power Source Disclosure Program

The Power Source Disclosure Program requires retail electricity providers report purchase and sales information to the Energy Commission and their retail customers. The Power Source Disclosure Program was authorized by Senate Bill 1305 (Stats. 1997, Chapter 796, Statutes of 1997), and revised in October 2009 by Assembly Bill 162 (Stats. 2009, Chapter 313). Consistent with the original legislation, retail suppliers of electricity are required to disclose to consumers "accurate, reliable, and simple-to-understand information on the sources of energy that are (being) used..."; (Public Utilities Code Section 398.1(b)).

The statutes require electricity suppliers inform their consumers about the types of generation resources used to provide their electricity. Suppliers are required to use a format developed by the Energy Commission called the Power Content Label. The statutes also require utilities to submit a detailed report of their fuel mix to the Energy Commission. These reports are available to the public upon request to the supplier.

Changes made by SBX1-2 (Chapter 1, Statutes of 2011) affecting the eligibility requirements for electricity products considered to be eligible under California's Renewable Portfolio Standard (RPS) also affect procurement claimed on the Power Content Labels. Because of this, revisions to the Power Source Disclosure Program have been delayed until the POU 33% RPS Regulations are further developed. However, changes to the Power Source Disclosure Program, as outlined in AB 162, do not require adoption of the new regulations to become effective. The requirements of AB 162 and the portions of SB 1305 not changed by AB 162 constitute current, effective law.

## Unspecified Power

The term unspecified power is used in the context of allocating fuel types of power generation serving the state of California. California uses a variety of fuel types for power generation including natural gas, hydroelectric, geothermal, and other renewable and non-renewable sources. Unspecified power refers to the situation where the original fuel type of the generator is unknown. This only applies to power imported from out of state.

## What is Unspecified Power?

Prior to 2009 there was no category allowed for "unspecified power" in the Net System Power Report - everything had to be allocated under Net System Power. Accordingly, the Electricity Analysis Office (EAO) developed a generation profile mix of the Northwest and Southwest. Essentially, EAO calculated a Total System Power profile for each region. From these profiles, EAO allocated specified claims and then prorated the remainder of the resource mix to the unspecified category. The problem with this methodology was that it treated all unspecified imports as if they were made up of a mix of resources. This method combined both base load power and marginal power as equal. Obviously this was not a good methodology to follow but at the time it was the only one available.

The averaging methodology applied to the old Net System Power reports was widely recognized as flawed because it overestimated the role of baseload plants in the western spot market. Baseload plants selling to California are/were tied to long-term contracts. Most of the unspecified imports are spot market sales that represent about half of the imports. These sales primarily occur when there is surplus generation on the market that is less expensive than variable costs of some California plants.

System averaging does not reflect rate based utility portfolios, dispatch dynamics and short-term market transactions. Surplus, or marginal generation, is what typically serves the spot market. Hydro and coal used to be the marginal resource through the mid-1990's, but load growth surpassed coal generation capacity. Generally, hydroelectric and natural gas-fired electricity generation are considered the marginal generation sources in the interconnected western electricity system. There may be some surplus coal available during off-peak periods, but California generators are usually at minimum load levels during these periods.

The Total System Power table does not show all long-term coal contracts. Most of these are associated with smaller public owned utilities. However, at most, the volume will push the fractional totals by only a few percentage points. The new Power Source Disclosure regulations are expected to reveal these transactions [draft regulations posted May 5, 2011 in Docket 2010-PSDR-01]. In addition, Air Resources Board's mandatory reporting requirements should already be collecting coal imports.

The Power Source Disclosure Program, modified in 2009, allows for "unspecified" imports. Now, EAO can accurately assess specified claims for imports and leaves the remaining unspecified imports as just that, imports not traceable to source fuel type(s).

## **Methodology for Determining Unspecified Power within Total System Power**

For out of state imports, the Energy Commission collects quarterly electric energy import data from Balancing Authorities (BA) within California. The BAs report both imports and exports (exchanges) from other BAs both within California and those out of state. The difference between imports and exports results in net imports.

The net imports are mapped, based on the originating BA, to either the Northwest or Southwest import categories. The Northwest includes Alberta, British Columbia, Idaho, Montana, Oregon, South Dakota, Washington, and Wyoming. The Southwest includes Arizona, Baja California, Colorado, New Mexico, Nevada, Texas, and Utah.

California utilities make specified claims on imported power that directly match a fuel type to an out of state resource. For example, a California-based utility will make a specified claim for wind generation from the Oregon-Washington border (Northwest). Once all of the utilities' specified claims have been accounted for, any remaining net imported power is classified as unspecified power.

Generally, the unspecified power category would be comprised of short-term market purchases from those power plants that do not have a contract with a California utility. Much of the Pacific Northwest spot market purchases are served by surplus hydro and newer gas-fired power plants. The Southwest spot market purchases would be comprised of new combined cycle power and some coal. Generally, a marginal supply approach for the determination of spot market supply would yield the most accurate assessment of power included in the unspecified power category.

Finally, there is the issue of null power. Null power refers to power that was originally renewable power but from which the renewable energy credits have been unbundled and sold separately. Null power is not attributable to any technology or fuel type.

[Conditions of Use](#) | [Privacy Policy](#)

Copyright © 2008 - 2013 State of California