Policies Affect Energy Affordability, Reliability

The production, transmission and cost of energy continue to be an issue for California's residents, business community and economy. In order for the state to remain competitive, opinion leaders should adopt policies to minimize costs while upgrading and expanding the energy system to electricity customers while meeting the state's environmental goals. Reliability and affordability need to be at the forefront of California's energy policies. Multiple, and sometimes competing, regulations placed on the energy sector affect the price and availability of energy.

Electricity prices have increased over the last decade and are anticipated to increase an additional 26%–42% by 2020. The 2000–01 energy crisis and numerous energy mandates have made the per kilowatt hour cost of energy in California higher than the national average and significantly higher than neighboring states.

According to a study released by Navigant, "Energy costs in California are expected to increase sharply in the next several years as a result of several contributing factors. In particular, the cost of providing electricity service to California ratepayers is projected to increase at a more significant pace compared to historical rate increases. These cost increases are based on several factors—some of which are necessary to maintain reliable service to retail customers. These include the need to modify and/or replace an aging generation fleet, upgrade distribution systems and modify or expand electrical transmission systems. However, there are direct and indirect energy system costs primarily attributable to specific California policies focused on greenhouse gas reduction and other environmental objectives." (*Preliminary Assessment of Regulatory Cost Drivers in California's Energy Market,* August 16, 2013)

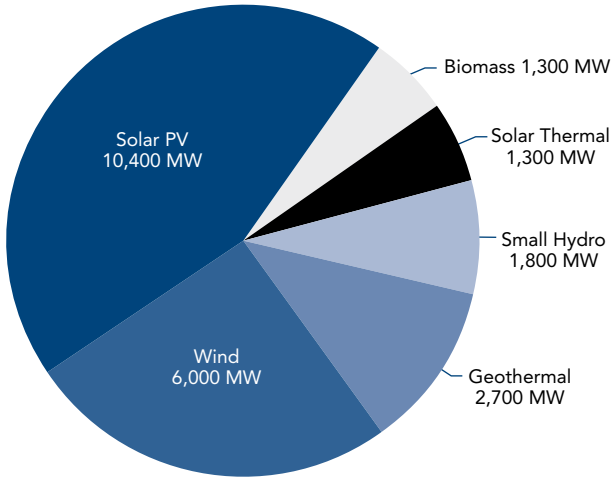
Renewable Energy Expansion/Implementation

California has one of the most ambitious renewable energy mandates in the country. With the passage of SB 350 (de León; D-Los Angeles; Chapter 547, Statutes of 2015), California will increase the Renewable Portfolio Standard (RPS) to 50%, allow for the creation of a regional energy market, and double the energy savings in existing buildings. While the implementation of this legislation is in its infancy, there is movement on the components, and they all carry significant changes for California's energy market.

The RPS is a regulation which mandates that a utility company procure a specified amount of its energy generation from eligible renewable resources. In California, those resources include: small hydro, solar, wind, biomass, biogas, fuel cells, geothermal and some tidal technologies. The first RPS was signed into law in 2002, requiring utilities to procure 20% of their electricity from eligible renewable energy resources by 2010. In 2011, the RPS was increased to 33% by 2020, and in 2015 the RPS was increased to require utilities to procure at least 50% of their electricity from eligible renewable resources by 2030.

In-State Renewable Capacity by Resource Type, Includes Self-Generation (As of June 30, 2016)

Total Estimated Capacity: 23,600 MW



Source: California Energy Commission staff, based on *Quarterly Fuel and Energy Report.*

With the passage of a 50% RPS, the current program was modified to ease compliance for utilities beginning in 2021.

- Requires utilities to procure at least 65% of their contracts for 10 years or longer, allowing 35% of contracts to be short term, permitting more contracting flexibility for utilities.
- Allows banking of specified renewable resources, which will permit a utility to procure excess power to keep and apply toward a future compliance period.

Currently, 26% of energy in the state comes from renewable resources eligible under the RPS and utilities are on target to meet the 2020 RPS mandate. Given the new 50% RPS mandate and other energy policies that are being implemented simultaneously, however, there are concerns about the price and intermittency of the electricity being purchased.

Regional Energy Market

A regional energy market has the potential to reduce energy costs in all participating states by integrating a diverse portfolio of resources on one coordinated grid. SB 350 included intent language to transform the California Independent System Operator (CAISO) into a regional organization, upon the approval of the Legislature. The CAISO must prepare specified governance modifications, conduct studies on the impacts of a regional market, and receive approval by the Legislature no later than December 31, 2017.

A regional energy market also increases the reliability of power delivery as energy losses can be devastating to businesses. A regional grid would increase reliability by providing operators

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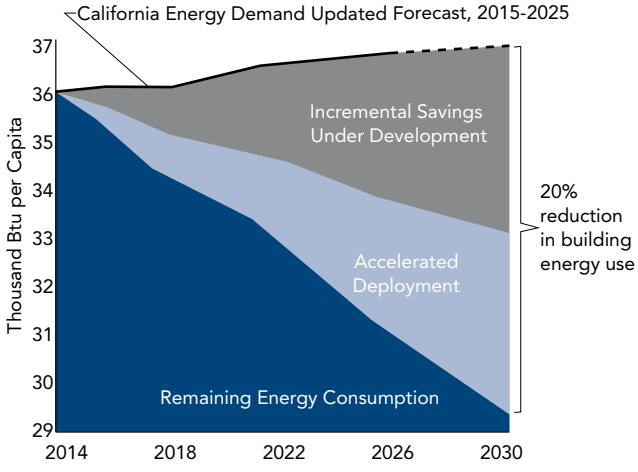
Reduced Building Energy Consumption per Capita by Doubling Energy Savings



Source: California Energy Commission, *Existing Buildings Energy Efficiency Action Plan* (September 2015).

a better system that integrates diverse sources of renewable energy throughout the Western Region. For example, when there is excess generation of energy from solar power within the state, and demand is low, that energy can be exported cheaply to other states. Likewise, when there is an abundance of wind generation in the Northwest and creating a surplus, that energy can be imported to meet demand in California.

While the efforts to reform the CAISO into a Regional Energy Market have continued, the CAISO has also grown the Energy Imbalance Market (EIM) that it started in 2014. The EIM is a voluntary program that allows system operators to conduct real-time grid coordination so the ISO market systems can identify changes in supply and demand and move power over a broad area, reducing system costs. At the outset the EIM included coordination between the CAISO and Pacificorp, but has expanded to include NV Energy, APS and Puget Sound Energy with more participants pending.

Under SB 350, the CAISO is required to produce a study on the environmental and economic impacts of a regional grid as well as provide a governance proposal by the end of 2017. On September 15, 2016, the final environmental and economic study was submitted to the Governor's office. A governance proposal also was submitted and it is anticipated that legislation to address the governance design for a regional grid will be pursued in early 2017.

Transmission Limitations

Financing transmission projects relies on a developer's ability to justify the cost and satisfy state and federal cost recovery regulations. Moreover, developers must satisfy both state and federal environmental regulations. Developers must seek approval from at least three state agencies and several federal agencies, depending on the location of the project. Assuming agency approval is forthcoming, developers still must overcome opposition from various interest groups, which often takes the form of legal challenges. Given the rigors of the approval process, transmission upgrades and construction can take anywhere from five to 20 years to complete.

Recently, the California Energy Commission (CEC), California Public Utilities Commission (CPUC), and the CAISO reported the results from the Renewable Energy Transmission Initiative (RETI) to help identify the transmission projects needed for the state. The RETI found that numerous new transmission lines and upgrades to existing transmission lines throughout the state need to be made to meet growing electricity demands and to provide renewable sources of energy. Detailed information from the report, the *2020 Renewable Transmission Conceptual Plan*, is broken down by area and time of year and can be found at *www.caiso.com*. The most recent 2015–2016 Transmission Plan released by the CAISO identified a need for 14 transmission projects with an estimated $288 million price tag to maintain system reliability.

The CEC, CPUC and CAISO are all participating in the newly formed RETI 2.0 to help the state achieve its current energy policy goals for a 50% RPS and inform future transmission planning cycles.

Existing Building Energy Efficiency

SB 350 set a goal of doubling the energy savings in existing buildings, which includes both electricity and natural gas. To achieve this goal, there will have to be coordination among agencies and an incentive for upgrades. To ensure that energy efficiency savings are being made, and are cost-effective, the CPUC is required to conduct a comprehensive review of the feasibility, costs, barriers and benefits to achieving the energy savings.

To complement the provisions of SB 350, AB 802 (Williams; D-Carpinteria, Chapter 590, Statutes of 2015) was enacted to aid building owners in achieving energy efficiency goals. There are two components of AB 802: the benchmarking of energy data and a re-examining of utility energy efficiency incentives. Before the passage of AB 802, electrical and gas corporations were allowed to offer energy efficiency incentives only for measures that improved buildings beyond existing efficiency codes and standards. The CPUC will now be required to authorize incentives for energy efficiency upgrades for projects that would improve a building's efficiency beyond its current condition. This will allow incentive programs to reach more buildings, lower costs and improve efficiency throughout the state.

Implementation of AB 32 / Passage of SB 32

Implementation of AB 32, The Global Warming Solutions Act of 2006, has increased electricity costs throughout the state. Roughly 20% of the state's greenhouse gas (GHG) emissions are associated with the energy sector. Electric utility producers were among the first industries to be affected by the regulations,

coming under the cap on January 1, 2013. This means the electric utility producers are allowed only a certain volume of GHG emissions per year.

The mechanism that has been set up for the utilities to comply with their GHG obligation is complicated, and has been designed in a way to help create a market for the state's auction. Electric utility producers are given all their GHG allowances for free, but are required to sell them in the auction. In return, they have to purchase whatever allowances they need to comply with their GHG emission cap. The revenue they receive from selling their allowances is returned only to certain classes of ratepayers.

The Legislature passed SB 32 (Pavley; D-Agoura Hills, Chapter 249, Statutes of 2016), which set a new goal of reducing GHG emissions to at least 40% below 1990 levels by 2030. SB 32 also stated the emission reductions should be prioritized in disadvantaged communities. Passed in conjunction with SB 32 was AB 197 (E. Garcia; D-Coachella, Chapter 250, Statutes of 2016), which mandates that GHG emission reductions first be made at large stationary sources, including power generation facilities. This mandate will have a direct impact on the cost of complying with California's climate change programs. Currently, the California Air Resources Board is in the process of developing its 2030 Scoping Plan, the roadmap for achieving the state's GHG emission reduction goals. Within the scoping plan, it is anticipated that much emphasis will be put on the energy sector's need to further reduce emissions and develop a near-zero carbon emission strategy. (For more information, see the *Issues Guide* article on Climate Change.)

Distributed Generation

Another tool intended to help California meet its RPS goal is distributed generation. Distributed generation is electricity, generally renewable, produced on-site or near where electricity is consumed. Governor Edmund G. Brown Jr. set a goal for California to receive 12,000 megawatts (MW) of its electricity (about 5%–8% of current consumption) from distributed generation by 2020.

California has made progress toward achieving the Governor's 12,000 MW renewable distributed generation goal; more than 8,200 MW of distributed generation was online as of October 2016. Incentives often are provided to encourage utility customers to participate in distributed generation. The incentives include rate subsidies or programs that will benefit the customer who is participating in the program, but will come at a cost to all utility customers.

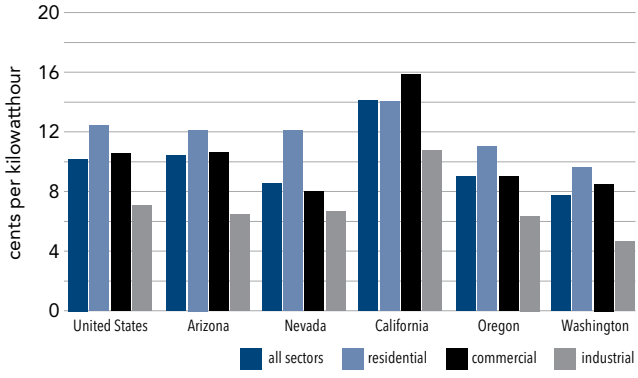
Net Energy Metering

Net energy metering (NEM) is a type of distributed generation and is an additional tool available to encourage on-site renewable generation. NEM is a program that uses a bidirectional meter to track the "net" difference between the amount of electricity produced and the amount consumed in each billing period. Customers with renewable energy installed on site that are able to take advantage of NEM are able to offset the cost of their energy by selling back to the utility company the excess energy not consumed on site. The NEM cap is set at 5% of aggregated peak load.

In May 2012, the CPUC clarified the definition of the aggregated peak demand in a way that will bring more NEM customers under the cap than the definition used previously.

In January 2016, the CPUC approved a decision establishing a NEM successor tariff to continue to encourage on-site renewables and allow growth for the NEM program beyond the 5% cap. The successor tariff includes a one-time interconnection fee, non-bypassable charges and time of use electricity pricing for residential customers. This rate change has been made to better align the cost of energy for NEM successor customers more closely with those of non-NEM customers. The NEM successor tariff is already in place in the San Diego Gas & Electric territory. For the remaining investor-owned utilities, the successor tariff will take effect on July 1, 2017, or upon a utility reaching the 5% program limit, whichever comes first.

Average Retail Electricity Price



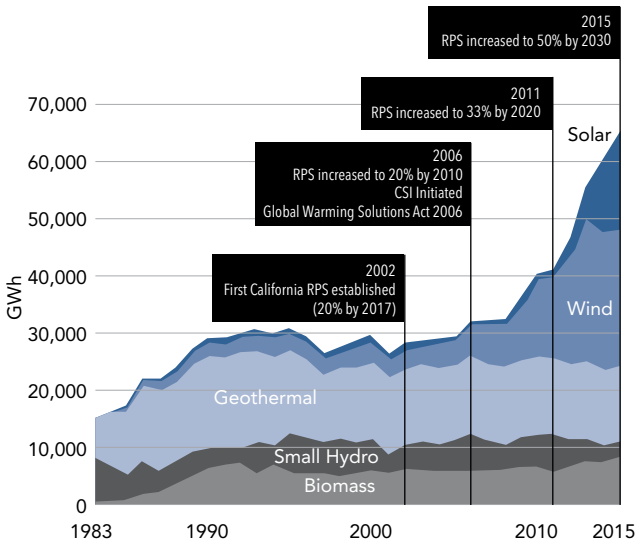
Source: U.S. Energy Information Administration

Energy Storage

Although renewable energy presents a great alternative to traditional energy sources, it comes with limitations. Because the amount of renewable energy available depends greatly on the climate (solar, wind, water), the state's energy providers need to be able to store energy so that it is available when needed. AB 2514 (Skinner; D-Berkeley, Chapter 469, Statutes of 2010) directed the CPUC to require utilities to procure energy storage systems. The legislation instructed the CPUC to open a proceeding by March 1, 2012 to consider adopting these requirements. The CPUC issued the final rule on September 3, 2013, requiring investor-owned utilities to purchase 1,325 MW worth of energy storage projects by 2020.

In 2016, the Legislature passed AB 2868 (Gatto; D-Glendale, Chapter 681, Statutes of 2016), which requires the three largest investor-owned utilities to file applications for programs and investments to accelerate widespread deployment

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



Source: California Energy Commission staff, based on *Quarterly Fuel and Energy Report.*

of distributed energy storage systems with the CPUC for its review and approval.

Although there have been some promising advances, energy storage technology is in its early stages and still is expensive. Prices are expected to fall over the next 15 years as technology advances, but utilities will be required to make investments before 2020. California's energy experts agree that in order to maintain grid reliability, the state must have a generation mix with complementary resources, as well as storage systems in place to ensure the lights stay on.

Aging Power Plants and Once-Through Cooling

Once-Through Cooling (OTC) is the process by which a power plant system uses open intakes to pump water from an ocean, estuary or bay to cool generators or turbines and then discharges the water after one cycle of cooling. This process increases the temperature of the water surrounding the discharge site of the power plant, thereby having an impact on the aquatic life in the area. The State Water Resources Control Board adopted a policy to phase out OTC and, as a result, the 18 existing power plants to which the OTC policy applies will need to be replaced or retrofitted.

By 2020, it is forecasted that California power plants generating more than 15,000 MW of energy from fossil fuels will be retired, replaced or divested. Loss of current power plants will increase the need to find replacements as well as increase costs for Californians. California is further limited on what types of power may be used to serve the current and increased demand for energy. Although energy conservation, energy efficiency standards and increased energy sources have helped keep supply greater than demand, continued population and economic growth edges the state closer to an imbalance between supply and demand.

At this point, most plants have phased out OTC systems, while those in the Los Angeles area will have until 2029 due to the city's more complex and challenging power needs. The Diablo Canyon nuclear power plant has until 2024 to comply, but a proposal pending before the CPUC would instead shut down the plant by 2025 when its current licensing expires, replacing its electricity generation through combined use of renewable sources, energy storage, energy efficiency and changes to the power grid.

Smart Grid Technology

Smart grid technology modernizes the electric grid by using a distribution system that allows for two-way information flow from a customer's meter: both inside the house/building to thermostats, appliances and other devices, and from the house/building back to the utility. A smart grid can include a variety of operational and energy measures, such as smart meters, smart appliances, renewable energy resources, energy efficiency resources, demand response measures, and energy storage.

Because the existing grid is increasingly costly to maintain and will not be able to meet the demands placed on it in the future, smart grid technology is a reliable, efficient, affordable and interoperable system that, according to the CPUC, is a better fit for integrating and accommodating renewable technology.

Although there will be an upfront investment, it is believed that end-use customers will benefit by having more information and tools to manage their electricity usage and thereby the ability to educate themselves on where they can conserve or alter their energy consumption to save on utility bills.

Natural Gas

California ranks the second highest in consumption of natural gas in the United States and natural gas plays an important role in California's energy sector as a flexible energy source. In addition to helping integrate intermittent renewable electricity and generating electricity, it also is used for cooking, space and water heating, as well as transportation.

Natural gas-fired power plants can be ramped up quickly to produce energy in order to help maintain grid stability while integrating the intermittent renewables. To ensure that the state is using natural gas in the most effective way possible, AB 1257 (Bocanegra; D-Pacoima; Chapter 749, Statutes of 2013) requires the CEC to evaluate and recommend natural gas strategies to reduce greenhouse gas (GHG) emissions and cultivate a clean energy economy to ensure the efficient use of natural gas. The final report was released in November 2015.

On October 25, 2015, the State of California was informed of a natural gas leak at the Aliso Canyon natural gas storage facility in Southern California. Natural gas is commonly stored in depleted natural gas or oil fields, like Aliso Canyon, that

are close to consumption centers in order to take advantage of existing wells, and infrastructure such as pipeline connections. The leak at Aliso Canyon released approximately 90,000 metric tons of methane into the atmosphere before it was plugged on February 18, 2016.

In response to the leak, numerous pieces of legislation were introduced in 2016. The legislation with the most direct impact on Aliso Canyon was SB 380 (Pavley; D-Agoura Hills; Chapter 14, Statutes of 2016). SB 380 put into process inspections of the storage facility, as well as a ban on all injections of natural gas until the wells are inspected and cleared, creating the potential for an energy crisis due to this important energy asset potentially being offline for several months, if not longer.

The California Chamber of Commerce participated with a large coalition of organizations in attempting to amend this bill to ensure ongoing energy reliability.

Need for Coordinated Planning

Planning needs to be coordinated throughout the state's various energy programs. Currently, more than a dozen programs aim to support energy efficiency development and alternative energy in California. A report released by the Legislative Analyst's Office on December 19, 2012, stated: "The state currently lacks a comprehensive framework that fully coordinates these activities to help ensure that the state's goals are being achieved in the most cost-effective manner." As a result, there is program duplication and policies in place that are not aligned with legislative priorities, in turn making it difficult to know the effectiveness of the various energy programs. In the end, this lack of coordination increases the cost of energy and makes California less competitive.

A report by the Little Hoover Commission, *Rewiring California: Integrating Agendas for Energy Reform*, also summarized the complexities of the laws and regulations affecting energy production and the associated costs in California: "...the Renewable Portfolio Standard is being implemented simultaneously with numerous other far-reaching policies, including GHG reduction and the associated cap-and-trade program; regulations to reduce the use of coastal water to cool power plants; the expansion of distributed electricity generation to 12,000 megawatts; and potential regulations dictating water flow from the state's hydroelectric facilities to improve the health of the Delta's ecosystem. On its own, each policy or regulation could influence electricity rates and reliability. Combined, the impact is far greater."

CalChamber Position

As California pursues its clean energy goals, the driving force for the state's energy policies needs to be maintaining a reliable, efficient and affordable energy system. Although the economic downturn has reduced energy demand in the short-term, demand is expected to grow as the economy recovers. It is important that when making energy decisions, policymakers and stakeholders be flexible enough to respond to future fluctuations in the economy in a way that enables the state to continue to develop and adopt energy policies and technologies that are critical for long-term reliability and economic growth.

With the various new programs undergoing implementation, California will be required to have a far more diversified portfolio of energy sources. In order for the state to meet these requirements for energy efficiency, renewable standards and greenhouse gas reductions, projects must be streamlined through the approval process, which means that effective inter-agency collaboration and communication is necessary.

It is critical that California's electricity generation keeps pace with its growing population and increasing demand. The state should focus its attention on flexible resources to sustain future economic growth and to ensure renewables are able to come on line in time to keep up with the various programs being implemented across agencies.

Maintaining and expanding the state's energy infrastructure is vital to the economic growth of California. Moreover, investments must be made in natural gas pipelines to move gas more efficiently to where it is needed. Continued research and development is needed in technologies like smart grid that help advance energy efficiency goals, reduce costs and increase grid reliability. With the implementation of the renewable portfolio standard, research and development in energy storage will be necessary to keep up with daily energy demands.

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