

Climate change will cut Calif.'s ability to make electricity just as more is needed – report

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Climate change will decrease California's ability to make electricity while creating heavier demands for it, and the state needs to ramp up planning now, energy leaders warned yesterday.

As temperatures increase, there's likely to be growing demand for electricity to run air conditioners. At the same time, changes in rainfall could affect the ability to use hydropower. And the risk of wildfires is expected to increase, which could threaten transmission lines.

The state needs to pursue continued efforts to cut greenhouse gas emissions while pursuing more renewable energy that can supply power, said Robert Weisenmiller, chairman of the California Energy Commission. There need to be adaptation measures to prepare for the impacts of warmer temperatures. There also needs to be more research on "what are the impacts of climate and how do we focus our energy in other areas to address those impacts," he said.

"All of us who look at the science issues look at it and say we have to move quickly," Weisenmiller added. "That said, the science is evolving, and we have some time. But unfortunately, the longer we wait, the more dramatic actions we have to take later."

The comments came as the commission on a 5-0 vote approved its "2013 Integrated Energy Policy Report." The 259-page document lays out key energy issues facing the Golden State and will be used as an advisory tool by the Legislature and Gov. Jerry Brown (D). Climate change was one of the issues cited.

Other issues include the need to provide enough power without the San Onofre nuclear power plant, which was closed last year. California also must meet growing energy demand with clean power as it seeks to cut greenhouse gases to 1990 levels by 2020, and by 2050 shrink them 80 percent below that 1990 point. The transportation sector must be further shifted away from fossil fuels to make that happen, the blueprint said.

The state will need to rely more on demand response, or the practice of getting consumers to conserve energy or shift their power consumption to non-peak hours, the report said.

Energy efficiency must play a major role, it said.

"Existing buildings represent great untapped potential for additional energy savings and account for nearly a fourth of California's greenhouse gas emissions," the report said. "More than 55 percent of existing residential buildings and more than 40 percent of existing nonresidential buildings were built before California building energy efficiency standards were in place."

Meanwhile, California also has a goal of making all new buildings zero net energy by 2020 for homes and 2030 for businesses. Those buildings would combine renewable power generation and efficiency measures so that they produce as much power as they use annually.

Hotter climate impairs power plants

In terms of climate change and its effect on electricity, the "Integrated Energy Policy Report" enumerates a number of problems California is likely to face in the years ahead.

For example, a study conducted by the Lawrence Berkeley National Laboratory for the state's "2012 California Climate Change Vulnerability and Adaptation Study" found that "higher temperatures would decrease the capacity of thermal power plants ... to generate electricity during particularly hot periods." Those include natural gas, solar thermal, nuclear and geothermal facilities.

"At higher temperatures, power plant cooling is less efficient, which, in turn, reduces the plant's efficiency and how much energy it can generate," it said.

California's natural gas-fueled plants, all told, can make about 44,000 megawatts. By the end of the century, the report said, that could be cut by as much as 10,000 MW on hot days, compared to a 7,600 MW maximum in the 1961-90 period.

That same Lawrence Berkeley study said that by the end of this century, "energy supplies would need to increase by nearly 40 percent to meet increased demand from climate change and offset lower capacity of thermal generating plants and substations, assuming no technology advancements or population changes."

Climate change also will affect hydropower, which currently makes about 15 percent of California's in-state generation on average. It also often is the biggest source of low-carbon power in hot months, when electricity demand peaks.

"Higher temperatures will mean that more precipitation falls as rain instead of snow," the "Integrated Energy Policy Report" said, "with remaining snowpack melting and running off earlier in the year. The system may not be able to store sufficient water for release in high-demand periods."

And about 20 power plants along California's coast and about 80 substations face the risk of flooding or partial flooding because of sea-level rise, it said.

Meanwhile, electricity demand will increase. The report projects an average annual growth of 0.88 to 1.82 percent with peak demand growth of as much as 1.92 percent through 2024.

California has studied how to deal with these problems in a number of analyses. Since 2006, the state has sponsored a series of climate change assessments. Nevertheless, the report said, "new data, knowledge, and analytical capabilities dictate the need for continuing research to help the state achieve its existing and future policy goals."

The commission plans to sponsor additional research on regional climate projections, energy-sector vulnerability, strategies to reduce climate risk and reducing greenhouse gas emissions.

In addition, commission staff are suggesting supporting development of greenhouse gas reduction targets for 2030 and metrics to track progress toward reduction goals.

Meanwhile, adaptation measures are needed because changes already are underway, Weisenmiller said. Looking at California temperatures from 1890 to now, he said, they've already risen about 2 degrees Fahrenheit. By 2020, they could be a few more degrees higher.

"By the time you get to 2050, it's staggering what the impacts could be," Weisenmiller said.

'Selling' power reductions

The California Energy Commission is working with a number of other agencies on planning for the future, including the California Public Utilities Commission and the California Independent System Operator (ISO), which manages the state's grid.

In terms of demand response, one of the options the ISO is looking at is allowing utilities or third-party aggregators, instead of just selling power supplies, to sell power conservation. The aggregator, for example, would say that it could have users cut back a specified amount at a specified time. It's known as selling "negawatts," because there's a power cutback.

"The idea is to just break down those barriers so that people power can compete alongside power plants," said ISO spokeswoman Stephanie McCorkle. She added that "demand response can be some of the cleanest, lowest-cost resources out there, and it can help with some of these local issues that we're seeing," like power shortages in the Southern California region that was served in part by San Onofre.

Power cutting programs have existed for many years in California and were used heavily during the power crisis of 2000-01. Companies receive financial incentives for agreeing to cut back or turn off power when asked.

The programs have not been without controversy, however. Some utilities in other parts of the nation have warned about relying too heavily on "negawatts," saying that big industrial and commercial entities may tire of having to repeatedly pull back power.

McCorkle said that the programs are voluntary. In some cases, though, companies that sign up pay penalties if they don't reduce when asked.

The programs mostly have targeted large commercial customers with higher power usage. There is talk of expanding them more to residential customers.

That would be "giving consumers the ability to not just be buyers of electricity but sellers of electricity," McCorkle said.

That has met with some opposition in the past from consumer groups, however. They argue that lower-income people don't have as many options in terms of when they do laundry or run a dishwasher.

Energy commissioners believes demand response could be expanded significantly if the right market structures and regulations were put in place.

"Demand response hasn't really been as big a part of the solution or as fast a part of the solution as we strongly suspect that it can be," said Andrew McAllister, a California energy commissioner. "These programs have been around for a while. It's just that the utilities partly, and just sort of the market structure in California hasn't really allowed them to scale."