

## California's grid geeks: Deep green in the time of Trump

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*An illustration of North America at night, based on NASA data.*

*This exclusive six-part series takes an in-depth look at California's transition to over 50 percent renewable electricity. In the face of President-elect Trump's apparent indifference to global warming, the state has become a beacon of hope for climate activists. The entire series will appear [here](#), with [part II appearing here](#) on Friday.*

"You can't bullshit the electric grid," he said.

I was talking with Jim Caldwell, a no-nonsense

engineering adviser to the Sacramento-based Center for Energy Efficiency and Renewable Technologies (CEERT). We were at the Center's November retreat, an annual event that brings together a cross-section of California's most informed energy wonks.

When it comes to CEERT, it is tempting to paraphrase renowned cultural anthropologist Margaret Mead: "Never doubt that a small group of committed geeks can change the world. Indeed, it is the only thing that ever has."



*California Senate President pro Tempore Kevin de León*

I came to the retreat to start ground-truthing what it takes to reliably operate a very large electric grid — the California system covers roughly 80 percent of the state and over 30 million users — once renewable generators provide most of the energy. That is now California's target for 2030. Other states (New York, Iowa, Vermont and Hawaii

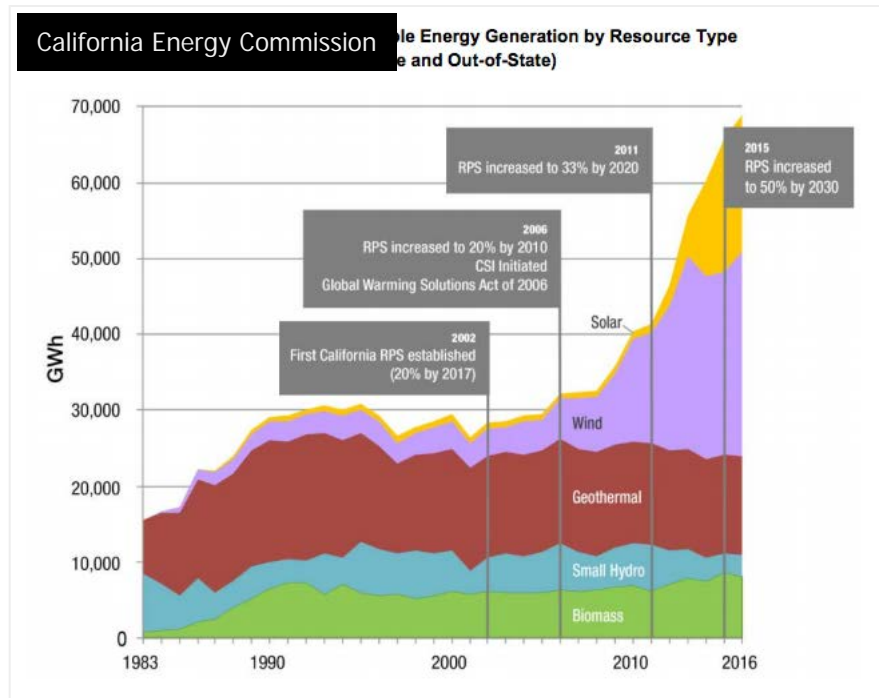
among them) have similar goals.

As Caldwell is quick to tell you, the solution involves much more than simply adding energy storage or substituting more wind or solar generation for the 55 percent of energy the state now derives from natural gas-fired generation. The key is to have the right mix. What you choose must also keep the grid properly synched, instantaneously balancing supply and demand, and maintaining the standard frequency and voltage needed to avoid blackouts. "You can't bullshit the grid."

I was also in California to probe how a low carbon grid would advance the state's equally ambitious plan to roughly halve greenhouse gas (GHG) emissions by 2030 from the rest of the economy. That goal was written into law in 2016 by amendments to the historic California Global Warming Solutions Act of 2006, which first set

strict economy-wide carbon reduction targets. The law is being implemented by one of the state's environmental agencies, the Air Resources Board (ARB), chaired by Mary Nichols, a longtime ally of Gov. Jerry Brown.

ARB's strategy largely centers on a three-part approach. It begins with energy conservation. California is already a national model but is intent on doing much more, such as doubling energy efficiency in buildings.



Second, ARB wants to wring as much carbon dioxide as possible from the electricity sector (the initial plan calls for the sector to reduce global warming emissions roughly 70 percent below 1990 levels). The third part of the plan involves backing-out oil-based transport (cars, some trucks, buses), as well as natural gas-fired boilers and appliances, by transferring the energy demand to a new "carbon-lite" electric grid. As a result, a re-powered electric grid is more or less the lynchpin for the whole endeavor.

The center's retreat took place just two days after the November elections. A Santa Ana wind had pushed the temperature into the high 80s in La Jolla. I left Washington, D.C., the day before in a cold autumnal rain, carrying over the mood from the election night watch

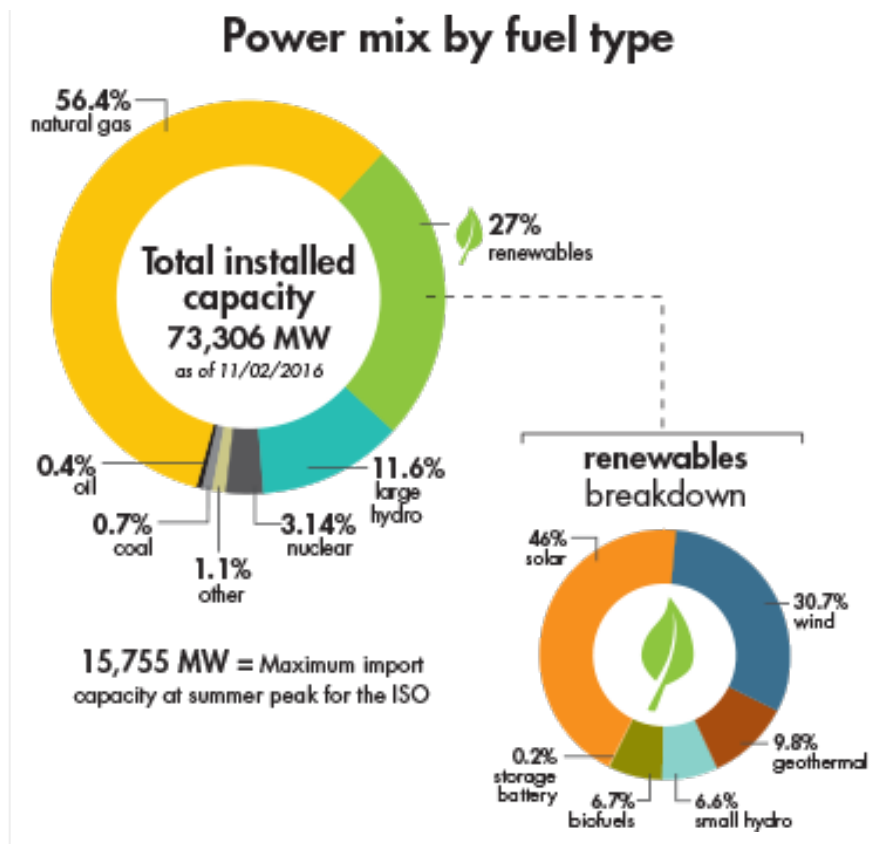
party I attended. It was hard to believe I was still in the same country.

Californians were disoriented, too. As the program began, one participant read out a press release from the state's legislative leaders: "Today, we woke up feeling like strangers in a foreign land," said Senate President pro Tempore Kevin de Leon and Assembly Speaker Anthony Rendon. But "[w]e have never been more proud to be Californians."

Our state "has long set an example for other states to follow... and we are not going to allow one election to reverse generations of progress at the height of our historic diversity, scientific advancement, economic output and a sense of global responsibility," continued de Leon and Rendon. Even though "California was not part of this nation when its history began... we are clearly now the keeper of its future."

Heads were nodding all around the conference table. It was an emotional moment. There were some moist faces. People were struggling to come to grips with the election's impact.

California ISO



"Keeper of the future." CEERT and its allies long have seen themselves as prime keepers of California's clean energy future. The center's board includes some of the nation's largest environmental organizations (the Natural Resources Defense Council, the Environmental Defense Fund, the American Lung Association) as well as leading wind and solar developers (Berkshire Hathaway Energy, Iberdrola, EDF Renewable Energy, 8Minute Energy, SunPower).

The center's mission is much more than a job for most of the directors — perhaps especially so for V. John White, CEERT's co-founder and executive director of 25 years; it is a calling. Under a new administration, this calling had just been elevated to one of national consequence. California, the keeper of the nation's energy future.

For a group of grid geeks, White may seem an unlikely leader. He studied political science, not engineering, and after college began his career analyzing air pollution problems, not power outages. He never has worked for an electric company and learned the political ropes in Sacramento as a legislative staffer while working for the

Sierra Club.

Now in his 60s, with a broad friendly countenance, an ever-present fedora and dapper dress, White easily could be mistaken for the owner of a popular jazz club. You would be wrong, of course. After a few hours of conversation, it is obvious why he has held together such a diverse and prominent group of energy partisans for 25 years, and why the governor's office and legislators return his calls.



*V. John White, CEERT*

As one CEERT member put it:  
"Companies change and legislators are here for maybe six or eight years. When you're talking about energy, John is tenacious and has the kind of long-term institutional memory that others sorely need."

That capacity was often on show in La Jolla as White dissembled on a score of issues, from the intertwined fortunes of geothermal developers and water rights in southern California to the shifting cast of legislators on key committees. White's ability to look ahead and back at the same time also has led him to work for solutions that will stand the test of time and are inclusive (given its diverse membership, the CEERT typically works by consensus).

This talent seems to have been nurtured by White's early negotiations on air quality issues ("you have to engage the guy who is responsible for the problem as well as those who are bearing the brunt of it") and leavened by his long experience in building coalitions on scores of environmental issues.

White put it to me this way: "I try to imagine what success would look like on something, like our carbon goal, and then work through what needs to happen to get there... It's like a [Wayne] Gretsky thing, always trying to skate where the puck is going to be."





**“We are not going to allow one election to reverse generations of progress at the height of our historic diversity, scientific advancement, economic output and a sense of global responsibility.”**

The center's recent low carbon grid study, directed by Caldwell, is a case in point. Drawing on a prior consulting report funded by the state's utilities, which had confirmed the basic feasibility of a step-increase in renewables, the center's work looked at how to get the job done as cheaply as possible. It focused on long-term carbon cuts (where the puck should be going) rather than the nominal share of renewables, and sketched out some possible playbooks.

The \$2 million effort was backed by a score of clean energy companies and carried out in conjunction with a modeling team from the Department of Energy's National Renewable Energy Lab in Boulder, Colorado. It was also helped by similar work being done by the Oakland office of the Union of Concerned Scientists, another CEERT member. The collaborative effort underlying the study reaffirmed the group's reputation as a *de facto* brain trust for the electric grid and a reliable guardian of the end game — a deep green California power sector.

"We knew that this was not a linear process," White told me. "We were really concerned with how you get to 50 percent renewables, and how that would deliver on carbon, and how it would impact the costs you have for going to 80 percent or more. If large carbon cuts are what you are aiming for, you can't just raise the level of renewables. That won't do it... You can't expect that every

increase in the renewables standard equates to a comparable decrease in overall emissions."

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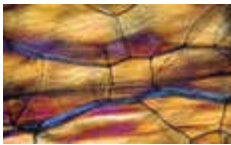
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