

California's climate emissions are falling, but cap-and-trade is not the cause

New data show that California's greenhouse gas emissions covered by the state's cap-and-trade system declined sharply in 2016, falling 16.4 million metric tons of carbon dioxide equivalent (MMtCO₂e) below 2015 levels—a drop of nearly 5%.

The new data are good news for state climate policy and suggest that California remains on track to meet or modestly exceed the state's 2020 climate target. However, key sectors—notably transportation fuel suppliers and refining—actually reported higher emissions in 2016, indicating potential challenges as the state prepares a strategy to deliver on its more ambitious 2030 target.

We conclude, based on available emissions and electricity data, that the state's cap-and-trade program is not driving observed reductions. The program may need further reforms if it is to make a significant contribution to reducing climate pollution in the coming years.

Progress in electricity, backsliding in fuels

Earlier this week the California Air Resources Board (ARB) released its 2016 Mandatory Reporting Regulation (MRR) data on greenhouse gas emissions under the state's cap-and-trade program. The progress reported in 2016 is almost entirely in the electricity sector, which saw a 17.4 MMtCO₂e decline year-on-year. Oil and gas production emissions also fell 2.1 MMtCO₂e, likely reflecting lower market prices for these commodities (BP 2017).

In contrast, transportation-related emissions rose significantly in 2016. Transportation fuel emissions—the largest category of emissions—increased by 1.8 MMtCO₂e in 2016. Similarly, the refining sector reported an increase of 1.2 MMtCO₂e. The state needs to reverse these trends

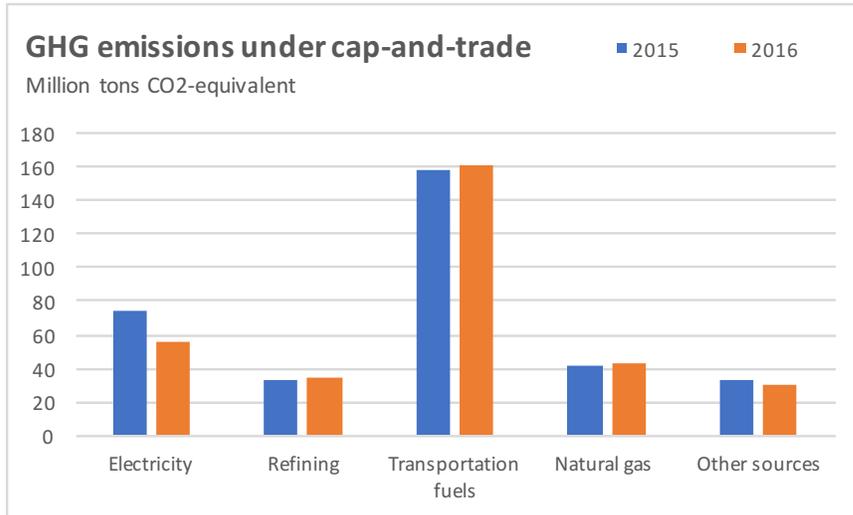
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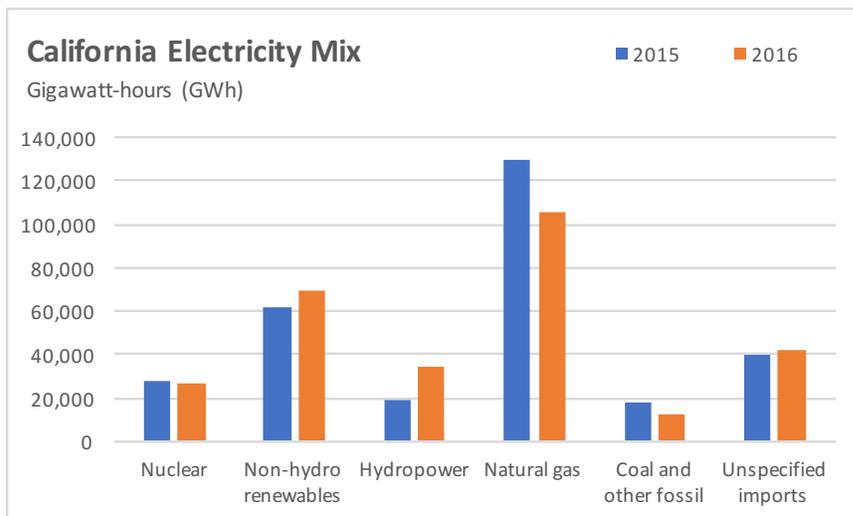
and achieve emissions cuts in transportation fuels and refining to reach its ambitious 2030 climate target.



SOURCE: ARB (2017a)

Hydropower and renewable electricity increased in 2016

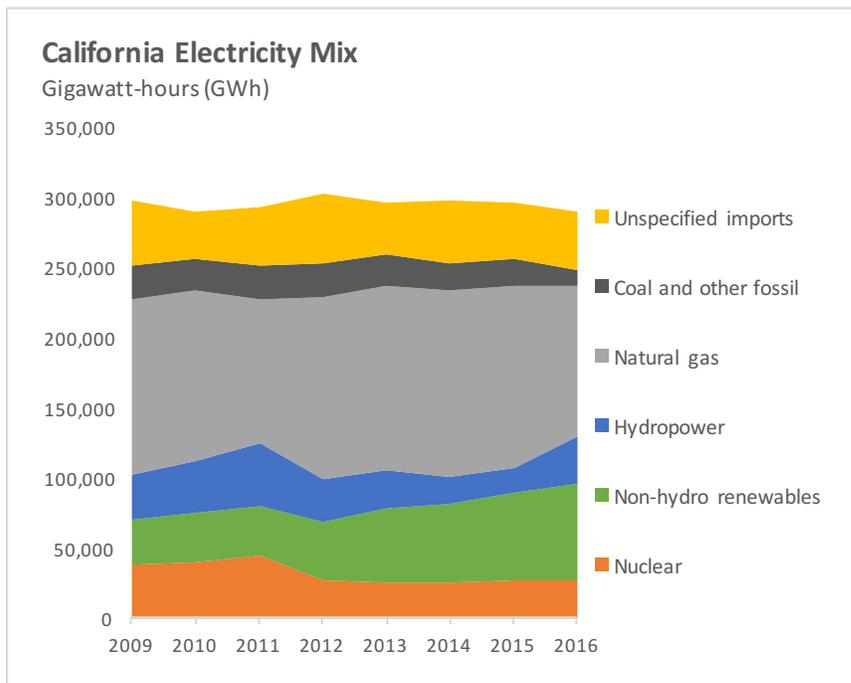
California's electricity sector continued to evolve in 2016. Low-carbon generation from both hydropower and non-hydro renewable energy increased significantly in 2016. In contrast, natural gas-fired electricity generation fell precipitously and imported coal power continued its steady decline.



SOURCE: CEC (2017)

Viewed over a slightly longer time period, the state’s electricity sector has continued its transition away from fossil energy.

After the closure of the SONGS nuclear power plant in early 2012, the state experienced a significant decrease in zero-carbon energy and an increase in natural gas consumption. Since then, the share of low- and zero-carbon resources has steadily climbed, buffeted by the inter-annual variability of hydropower. In 2016, hydropower supplies increased significantly as California’s record drought eased.



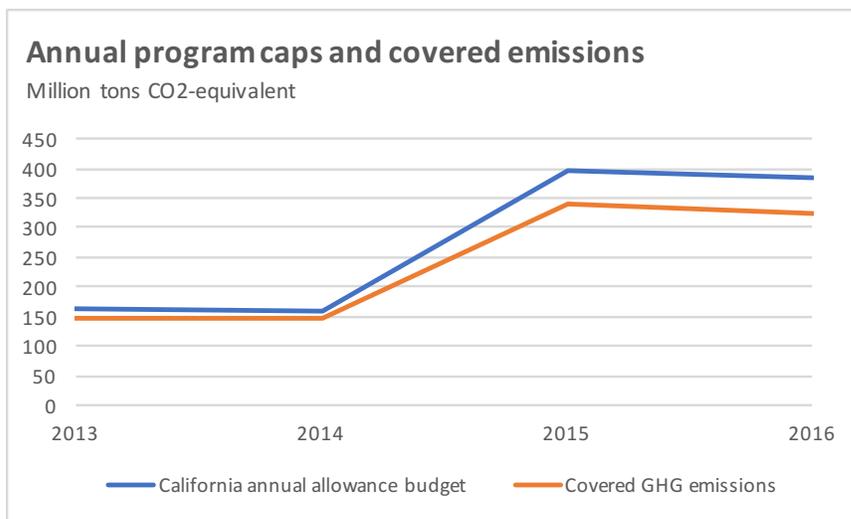
SOURCE: CEC (2017)

At the same time, total electricity generation used to meet California demand declined, likely due to a combination of energy efficiency policies and the growth of behind-the-meter distributed energy resources—most notably solar photovoltaics. Behind-the-meter resources are not explicitly tracked by the CEC and therefore contribute to the reduction in the CEC’s generation data.

Cap-and-trade not likely to have driven observed reductions

The reductions in emissions reported under the cap-and-trade program in 2016 are most likely due to factors other than the cap-and-trade program itself. Three reasons explain this conclusion.

First, total emissions under the cap-and-trade program remain far below annual program limits, resulting in the continued buildup of unused allowances in the program (LAO 2017, Busch 2017). As a result, the cap itself is not binding and therefore any impacts from the program would be attributable instead to either (1) expectations about the future stringency of the program or (2) the impact of the market's carbon price on behavior.



SOURCE: ARB (2017a, 2017b)

Second, it is highly unlikely that firms made any financial decisions in 2016 on the basis of expected future program stringency because the post-2020 future of the program was in serious doubt (Coghlan & Cullenward 2016) prior to the July 2017 passage of AB 398. If anything, covered firms exhibited a risk-averse attitude with respect to the future of the program, as evidenced by a collapse in demand at quarterly auctions (Cullenward & Coghlan 2016). These factors make it highly unlikely that the changes in emissions observed in 2016 are attributable to expectation about the program's extension to significantly deeper targets in the post-2020 period.

Third, the impact of the market's explicit carbon price is likely limited because the reductions observed in MRR emissions largely occurred in

sectors that are not responsive to California's modest carbon price. The biggest changes in the electricity sector occurred due to larger hydropower supplies, which depend on rainfall and water management, not carbon prices. Similarly, the growth in renewable energy is driven largely by non-pricing policies, such as procurement of utility-scale projects under the state Renewable Portfolio Standard and deployment of behind-the-meter resources that are eligible for the state's Net Energy Metering policy. Any reduced demand from energy efficiency policies is similarly unlikely to be affected by carbon pricing.

In contrast, carbon pricing might have played a role in encouraging additional divestment from imported coal resources. Carbon pricing might also have marginally decreased overall consumption of natural gas in the electricity sector. Because these prices are unlikely to significantly affect the supply of low-carbon non-fossil resources, however, the impact of carbon pricing on electricity sector emissions was likely limited in 2016.

Implications for state climate policy

Emission reductions observed in the 2016 MRR data are excellent news for California and are consistent with the state maintaining a trajectory to meet or modestly exceed its 2020 climate target.

Despite emission reductions in the electricity sector, however, both transportation fuels and refining emissions modestly increased in 2016. The state will need to reverse these trends as it pursues its substantially more ambitious 2030 climate target.

A close look at the data indicates that the cap-and-trade program itself is unlikely to be responsible for the reductions reported in 2016. The primary reason the cap-and-trade program has not played a large role in driving emission reductions to date is that emissions continue to fall below program caps, leading to a buildup of unused allowances in private-sector and ARB accounts that depresses current market prices and enables covered emitters to maintain their emissions farther into the future than post-2020 program caps might nominally suggest. Whether and to what extent ARB addresses the market oversupply problem in its AB 398 rulemaking process will have important implications for the market price and stringency of the overall program going forward.

References

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About Near Zero

Near Zero is a non-profit environmental research organization based at the Carnegie Institution for Science on the Stanford University campus. Near Zero provides credible, impartial, and actionable assessment with the goal of cutting greenhouse gas emissions to near zero. This research note is for informational purposes only and does not constitute investment advice.

Data used in this research note are available at our website.

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