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Clean Peak Standards

Given the growth in renewable energy, policymakers are now considering how complementary policies may enable states to further incentivize clean energy growth.[1] Clean Peak Standards (CPSs) are intended to encourage clean resources during periods of peak energy demand. Similar to a Renewable Portfolio Standard (RPS), they do so by requiring retail electric providers to supply a minimum percentage of energy delivered to customers during peak hours to be derived from clean energy sources. This issue brief presents an overview of CPSs, including the objectives and design features of the policy, as well as steps taken by four states related to implementation of CPSs.

Context: Trends in Renewable Energy and Policy Implications

In recent years, renewable energy generation and capacity in the U.S. has increased. In 2017, renewable energy resources accounted for approximately 17 percent of electricity consumption in the U.S. electric power sector, up from approximately six percent in 2006.[2] More than half of the growth in renewable energy between 2000 and 2016 is attributed to state RPS policies, according to a recent study by Lawrence Berkeley National Laboratory.[3] Currently, 29 states and Washington D.C. have RPSs.[4]

Policymakers are now considering how to further incentivize clean energy growth. One option is to simply increase RPS targets or mandate procurement of specific renewables. For example, in June 2015, Hawaii passed legislation increasing its RPS target to 100 percent renewable electricity by 2045, making it the most aggressive requirement in the U.S.[5] In April 2018, when New Jersey passed legislation increasing the state's RPS targets to 35 percent by 2025 and 50 percent by 2030, the state also increased the solar carve-out target to 5.1 percent by 2021.[6] However, the Lawrence Berkeley National Laboratory study found that RPS's role in encouraging growth in renewable energy generation and capacity has been diminishing over time: while RPSs were responsible for 56 percent of renewable energy growth between 2000 and 2016, in 2016 alone, they were responsible for just 44 percent.[7]

[1] Generally, RPSs require retail electric providers to supply a minimum percentage of their retail load (in MWh) from renewable resources by a specified date.
[2] U.S. Energy Information Administration (EIA), "Renewable Energy Consumption: Electric Power Sector" (September 25, 2018), available at: https://www.eia.gov/renewable/data.php#summary; EIA, Total electric power industry annual summary statistics (December 17, 2017), available at: https://www.eia.gov/electricity/data.php.
[3] Lawrence Berkeley National Laboratory, "2017 Annual Status Report on U.S. Renewable Portfolio Standards" (July 2017), https://emp.lbl.gov/sites/default/files/2017-annual-rps-summary-report.pdf.
[4] National Conference of State Legislatures, State Renewable Portfolio Standards and Goals (July 20, 2018), available at http://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx
[5] Governor of the State of Hawaii, "Governor Ige Signs Bill Setting 100 Percent Renewable Energy Goal in Power Sector," (June 8, 2015), available at: https://governor.hawaii.gov/newsroom/press-release-governor-ige-signs-bill-setting-100-percent-renewable-energy-goal-in-power-sector.
[6] DSIRE, Renewable Portfolio Standard: New Jersey (last updated 6/8/18), available at: http://programs.dsireusa.org/system/program/detail/564.
[7] Lawrence Berkeley National Laboratory, "2017 Annual Status Report on U.S. Renewable Portfolio Standards" (July 2017), https://emp.lbl.gov/sites/default/files/2017-annual-rps-summary-report.pdf.

Some states are taking a more targeted approach to increasing renewables by focusing on peak demand periods. While clean energy can offer many benefits, such as reduced environmental externalities, the value of a clean resource will depend in part on when it is able to supply electricity to the grid (e.g., peak versus off peak).[8] As a result, increasing the ambition of an RPS in a state with existing renewable energy generation may be associated with less environmental benefits—as renewable energy is added, the marginal fossil generator displaced is increasingly efficient. An oversupply of generation, commonly addressed by curtailing renewable resources, can also diminish the return of these resources. For example, a 2014 California Independent System Operator (CAISO) study modeled a scenario in which California increased its RPS from 33 percent to 40 percent by 2024. CAISO found that a seven percent increase in the standard would only result in two percent decrease in carbon emissions in California, a disproportionate benefit they largely attributed to curtailment.[9]

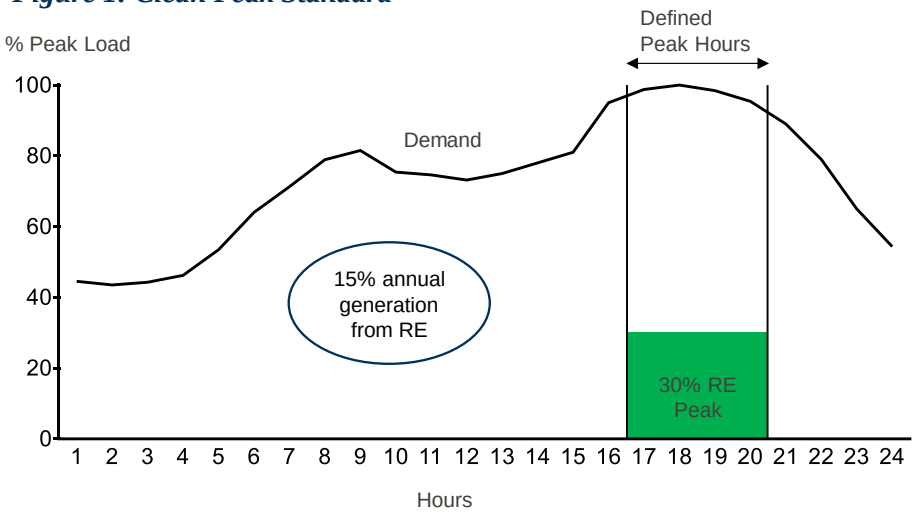
In addition, peak energy demand is commonly met with generation from peaker plants, which typically have a relatively higher carbon intensity rate and levelized cost of energy. This can lead to increased emissions and ratepayer cost during these periods.[10]

As a potential complementary policy to RPSs, CPSs specifically target the value of clean energy megawatt hours (MWhs) to the grid during peak hours to address these identified issues. The concept was first detailed in a whitepaper for the Arizona Residential Utility Consumer Office, written in December 2016.[11]

The Clean Peak Standard

CPSs require retail electric providers to supply a minimum percentage of energy delivered to customers during peak hours to be derived from clean energy sources. For example, a 25 percent CPS would mean that a load serving entity would have to ensure that 25 percent of MWh delivered to customers during a predetermined peak period came from qualifying clean resources. Electric generators or storage owners would be awarded "clean capacity credits" for supplying renewable energy to the grid during a "peak time window" and would be required to obtain a certain number of credits to comply with the standard. CPSs can be viewed as an expansion or as an added dimension of an RPS.

Figure 1: Clean Peak Standard



Benefits of CPS:

The objective of a clean peak standard is to focus investment in resources that will maximize value to the grid and to also avoid high

[8] Kyle Siler-Evans et al., "Marginal Emissions Factors for the U.S. Electricity System" (2012), Environmental Science & Technology, available at https://pubs.acs.org/doi/10.1021/es300145v; Maninder Thind et al., "Marginal Emissions Factors for Electricity Generation in the Midcontinent ISO" (2017), Environmental Science & Technology, https://pubs.acs.org/action/showCitFormats?doi=10.1021%2Facs.est.7b03047.

[9] CAISO, 2014 LTPP System Flexibility Study (August 26, 2014), slide 54, available at: https://www.caiso.com/Documents/Presentation_2014LTPPSystemFlexibilityStudy_SHcall.pdf.

[10] Northwest Power and Conservation Council, "Avoided Carbon Dioxide Production Rates in the Northwest" (March 13, 2018), available at: https://www.nwcouncil.org/sites/default/files/2018-1.pdf.

[11] Arizona Residential Utility Consumer Office, "Evolving the RPS: A Clean Peak Standard for a Smarter Renewable Future," prepared by Strategen Consulting (December 1, 2016), available at: https://static1.squarespace.com/static/571a88e12fe1312111f1f6e6/t/58405ac4d2b85768c5e47686/1480612551649/Evolving+the+RPS+Whitepaper.pdf.

rates of renewable energy curtailment, rather than simply adding additional renewables without consideration of when they are likely to be dispatched. Peak demand periods have the highest power prices, offering the potential for cost savings.

Policy Design and Additional Features

Design elements that may affect the overall efficacy of a CPS include:

- *Peak Window:* A predetermined set of hours, such as a four-hour period, anticipating when the peak is likely to occur. These are commonly when the cost of electricity generation is highest.
- *Qualifying Resources:* These resources will generally include renewable energy resources such as wind and solar and may also include broader measures such as energy storage and demand management.
- *Baseline and Increasing Stringency:* Many states have based their baseline on existing levels of renewable energy integration, with a gradually increasing target. The methodology of the baseline calculation, as well as the stringency of the annual target increases, will affect the overall efficacy of the program.
- *Implementation:* A CPS may be added as a carve out or multiplier to an existing RPS policy, or be added as a new, separate target.

Additional design features may include tradable compliance credits, locational adders, multi-part peak periods, or periodic reviews of the policy to ensure that new investments are continually aligned with market and electric system needs.

State Policies and Proposals

To date, two states have passed legislation related to CPSs, and two states are considering implementation of the concept.

Arizona

Shortly after publishing the commissioned whitepaper that detailed the CPS, the Arizona Residential Utility Consumer Office proposed a state CPS in 2016. On January 30, 2018, Arizona Corporation Commissioner Andy Tobin proposed a state Energy Modernization Plan that, among other provisions, would establish a "Clean Peak Target." As proposed, regulated utilities would establish a baseline based on existing levels of clean resources deployed during peak hours. The target would increase annually by 1.5 percent on average to reach 15 percent by 2030. The peak window would correspond to each utilities' four-hour period of peak value of approximately 4pm to 8pm during the summer. The proposal notes that "shoulder months may have a different four-hour window or may be split into two separate two-hour windows."[12] On July 5, 2018, Tobin proposed draft Clean Peak Standard regulations.[13] On August 14, 2018, the Arizona Corporation Commission opened a docket to review the proposal and other aspects of the Energy Modernization Plan.[14]

[12] Arizona Corporation Commission, "Arizona's Energy Modernization Plan (January 30, 2018), available at: https://www.azcc.gov/commissioners/atobin/letters/energyplan.asp.

[13] Arizona Corporation Commission, regarding Docket No. E-00000Q-16-0289; Review, Modernization and Expansion of the Arizona Energy Standards and Tariff Rules and Associated Rules (July 5, 2018), available at: http://images.edocket.azcc.gov/docketpdf/0000189786.pdf.

[14] Arizona Corporation Commission, Docket No. RU-00000A-18-0284, available at: http://edocket.azcc.gov/Docket/DocketDetailSearch?docketId=21658#docket-detail-container2

California

In 2017, the California Legislature considered two bills relating to Clean Peak Standards: AB 1405 and SB 388. Both bills were influenced by Arizona's proposal and whitepaper for the Arizona Residential Utility Consumer Office.[15] On October 12, 2017, Governor Jerry Brown signed SB 388, the less prescriptive of the two bills, regarding an integrated resource plan in relation to peak demand.[16] It became effective on January 1, 2018.

SB 388 directs state regulatory entities to "consider" how clean energy can play a larger role in meeting peak demand, with the objective of achieving the state's energy goals at the least cost to ratepayers. In this vein, the legislation directs regulatory entities to consider policies that might help entities meet peak demand loads "while minimizing the use of fossil fuels and utilizing low-carbon technologies and electrical grid management strategies." SB 388 does not order the CPUC and CEC to implement a CPS, but rather to achieve objectives similar to those of a CPS however the entities best see fit. This could include the creation of clean peak targets.

Massachusetts

In 2018, the Massachusetts Legislature considered several bills relating to Clean Peak Standards.[17] On August 9, 2018, Massachusetts Governor Charles Baker signed H. 4857 (190th), "An Act to Advance Clean Energy."[18] The legislation grants broad authority to the Massachusetts Department of Energy Resources (DOER) to implement a Clean Peak Standard, with policy provisions to be determined by the Department. Specifically, the legislation states that "not later than December 31, 2018, [DOER] shall determine the current percentage of kilowatt-hours sales to end-use customers in the commonwealth from existing clean peak resources during the seasonal peak load hours." This will be used to establish a "baseline minimum percentage of kilowatt-hours sales to end-use customers that shall be met with clean peak certificates" beginning on January 1, 2019.

New York

Since 2016, New York has also been considering how to best address peak demand through potential regulatory "clean peak actions." The objectives of these potential actions were detailed in an Energy Storage Roadmap, released by the New York State Department of Public Service (DPS) and the New York State Energy Research and Development Authority (NSYERDA) in June 2018.[19] In the roadmap, the agencies recommended that regulatory entities continue to explore how to more effectively value changes in marginal emissions based on changes in time of day or season and to encourage cost-effective investments, with a particular focus on how storage can play a role in achieving these objectives. In addition, the agencies recommended that regulatory entities continue to examine "the manner in which energy storage either co-located with renewables or separately installed could increase renewable utilization, reduce curtailment, and reduce ramping rates in the future as larger levels of renewables are deployed." In the roadmap, the agencies stated that clean peak actions implemented to achieve these objectives may take the form of rate design, incentives, mechanisms to reward flexible capacity,

[15] Robert Walton, "California bills propose 'clean peak' standard to boost renewables deployment," UtilityDive (March 21, 2017), available at: https://www.utilitydive.com/news/california-bills-propose-clean-peak-standard-to-boost-renewables-deployme/438554/.

[16] California Legislature, SB No. 388, Integrated Resource Plan: Peak Demand, available at: http://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB338.

[17] *See, e.g.*, Massachusetts Legislature H.4438 (190th), H.4318 (190th)). H. 4857 (190th).

[18] Massachusetts Legislature, Bill H. 4857, available at: https://malegislature.gov/Bills/190/H4857.

[19] NYS DPS and NYSERDA, "New York State Energy Storage Roadmap," Case 18-E-0130, In the Matter of Energy Storage Deployment Program, available at: https://www.ethree.com/wp-content/uploads/2018/06/NYS-Energy-Storage-Roadmap-6.21.2018.pdf.

and/or REC procurements, among others. In August, the PSC stated that it intends to issue an order by the end of 2018 establishing mechanisms and programs to meet the state's 2025 energy storage target.[20]

Conclusion

As detailed in this issue brief, states are demonstrating interest in how to address the costs and emissions associated with peak demand periods. This interest may be particularly prevalent for states projected to experience future increases in peak energy demand. States are also expressing interest in how to avoid high rates of renewable energy curtailment. States may be able to achieve these goals by implementing policies that have the effect of encouraging targeted investments to meet time-based grid and market needs. CPSs represent one policy option that may be able to help achieve these goals. Clean peak standards could further aggravate the economic challenges that some generators are experiencing due to low power prices. However, states continue to explore the option as they seek to integrate more renewables.

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[20] NYS DPS and NYSERDA, NYS Energy Storage Roadmap, Albany Technical Conference (August 21, 2018), available at: http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7B79C78B69-FF83-4C71-B9F6-7835336E211F%7D.