

Without critical reforms, demand response programs are not ready to scale

Date: July 10, 2023

SUMMARY: After a thorough review of California’s demand response performance to date and program requirements, the Public Advocates Office concludes that the state’s current demand response portfolio may erode grid reliability, unnecessarily raise customer bills, and negatively affect local air pollution in communities. We recommend that policymakers: (1) align demand response programs with minimum reliability requirements established by the state’s grid operator, (2) eliminate payments to non-compliant demand response providers and phase out ratepayer funding of cost-ineffective programs, and (3) establish stronger protocols to ensure that demand response does not increase local air pollution through the use of more on-site diesel or other fossil fuel backup generator use.

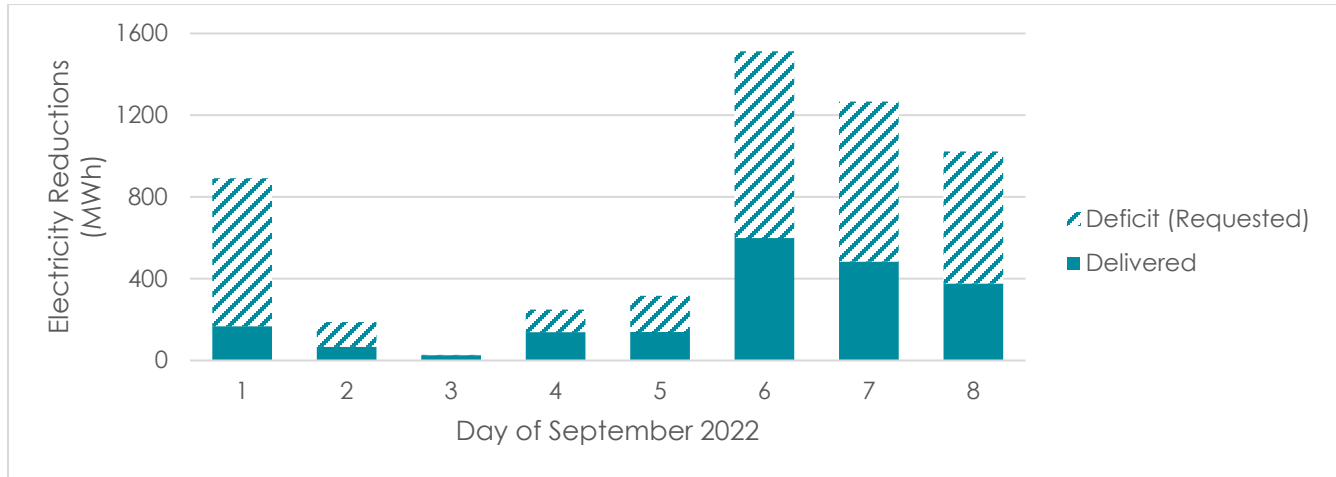
Demand response is failing to realize its potential as an affordable, clean energy solution.

When the electric grid is most strained, typically on extremely hot days when millions of households turn on power-hungry air conditioners, virtually all power plants and other grid support tools are running at full throttle to meet demand. With hotter days driven by climate change, Californians are increasing their electricity use in the summer months. Rather than solely build new power plants to increase supply, the state has also supported efforts that aim to reduce demand predictably and flexibly. Historically, large energy customers, such as factories and universities, could get paid to reduce their consumption when the grid is threatened by black outs (“demand response”). To expand the demand response market beyond the largest electricity consumers, third-party companies have bundled many smaller users that could participate together in demand response to simulate, and get compensated as, a single large energy consumer. This bundling is called “demand response aggregation”. If done properly, demand response and demand response aggregation could deliver many of the same benefits as traditional energy efficiency programs that eliminate the need for often-costly grid infrastructure and the associated pollution.

The state’s portfolio of demand response has not performed well by basic measures and has been an unreliable resource for grid operators. In a review of demand response aggregator performance during last summer’s high electricity use days, the California Independent System Operator (CAISO) documented that third party demand response only supplied 36% of the reduced demand that they had committed to provide.¹ Figure 1 illustrates the performance of demand response aggregators during the critical 8-day stretch in September 2022 that coincided with the text alert from California’s Office of Emergency Services.

¹ CAISO. *Demand Response Issues and Performance 2022* at p.17.

Figure 1. Third-party Demand Response Providers’ Daily Requested Energy (5pm to 9pm) compared to Delivered Energy from September 1 to September 8, 2022.



Source: 2022 Combined Subpoena for General Resource Adequacy information necessary for the CPUC to evaluate Resource Adequacy program and policies.

2022 was not an outlier as demand response in California has consistently underperformed, based on other analyses from public agencies. Findings include:

- **2019.** The federal agency in charge of regulating electricity markets recently investigated and fined two of the largest commercial demand response aggregation companies for grossly overrepresenting what they could deliver to the California grid in 2019.²
- **2020.** Over 33% of the demand response resources counted for grid stability (“resource adequacy”) requirements did not deliver during the August 2020 extreme heat events.³ For example, third party demand response provided only 41% of their scheduled reductions during the August 14, 2020 highest-alert grid emergency, according to an interagency CAISO, CEC, CPUC report.⁴
- **2021.** Only 30% of Demand Response Auction Mechanism contracts were able to provide the minimum energy their contracts required throughout the year.

The reliability of the state’s power grid is impaired when demand response providers miss their targets by such wide margins, as the state’s grid operator counts on them to deliver when called on. Any shortfall in demand response must be addressed by use of supply-side resources, which

² 183 FERC ¶ 61,136, May 22, 2023 at p. 2.

“Enforcement determined that between January and June 2018, a substantial majority of the bids Ohm made were bids that it could not reasonably expect to fulfill in violation of this section of the Tariff because its bids exceeded the registered metered load of all its customers.”

“Enforcement determined that between February and August 2019, a substantial majority of the bids Leap made were bids that it could not reasonably expect to fulfill in violation of this section of the Tariff because Leap’s bids exceeded the registered metered load of all its customers.”

³ CAISO. *DMM Report on system and market conditions, issues and performance: August and September 2020* at p. 3

⁴ CAISO, CEC, and CPUC. *Final Root Cause Analysis Mid-August 2020 Extreme Heat Wave* at p. 56

are already extremely challenged and constrained during grid emergencies. This is particularly concerning as it is at the top of the state's loading order and should play a more constructive role in maintaining reliability.

Demand response incentive and payment structures unnecessarily inflate costs.

Program structures are encouraging sub-optimal performance and outcomes. Under current rules, demand response aggregators self-report on how their resources performed and the program provides them performance-based incentives.⁵ The Public Advocates Office identified 70 cases in August 2020 where demand response aggregators received payments for grid services they simply did not provide. Based on these cases, demand response aggregators reported between 1.5 to 22 times more energy delivered to the utilities than they did to the grid operator (CAISO). Consequently, they received significantly more payments from ratepayer-funded utility programs than if they reported the same performance to the grid operator.

Other terms also allow demand response participants and third-party aggregators to be compensated for committing to a specific response or level of reduced demand, with minimal risks for underperformance. The current demand response incentive and payment structures serve to:

1) Reward undesirable behavior

- Demand response aggregators typically bid at or near the market price cap, even in periods where energy prices are low. This results in resources not being selected by the market, yet aggregators collect their full capacity payments from ratepayers without providing any grid benefits.
- The Emergency Load Reduction (ELRP) Pilot, a demand response program is intended to be used during periods where supply resources are tight and demand for electricity is high. This ratepayer-funded program pays the market maximum regardless of actual costs during a given day.
- Payments to underperforming demand response portfolios divert payments to power plants and other resources with higher demonstrated performance and lower costs.

2) Minimize risks for underperformance

- Demand response aggregators sized the majority of their bids just under the penalty threshold.⁶ This means those resources face no financial penalties if they are not available to dispatch in the market. Moreover, these resources do not face any penalties for failure to perform when they are dispatched.

⁵ Cal Advocates identified 70 unique DRAM resources that reported providing utilities over 100% more load reduction than was reported to CAISO.

⁶ Resource Adequacy Availability Incentive Mechanism (RAAIM)

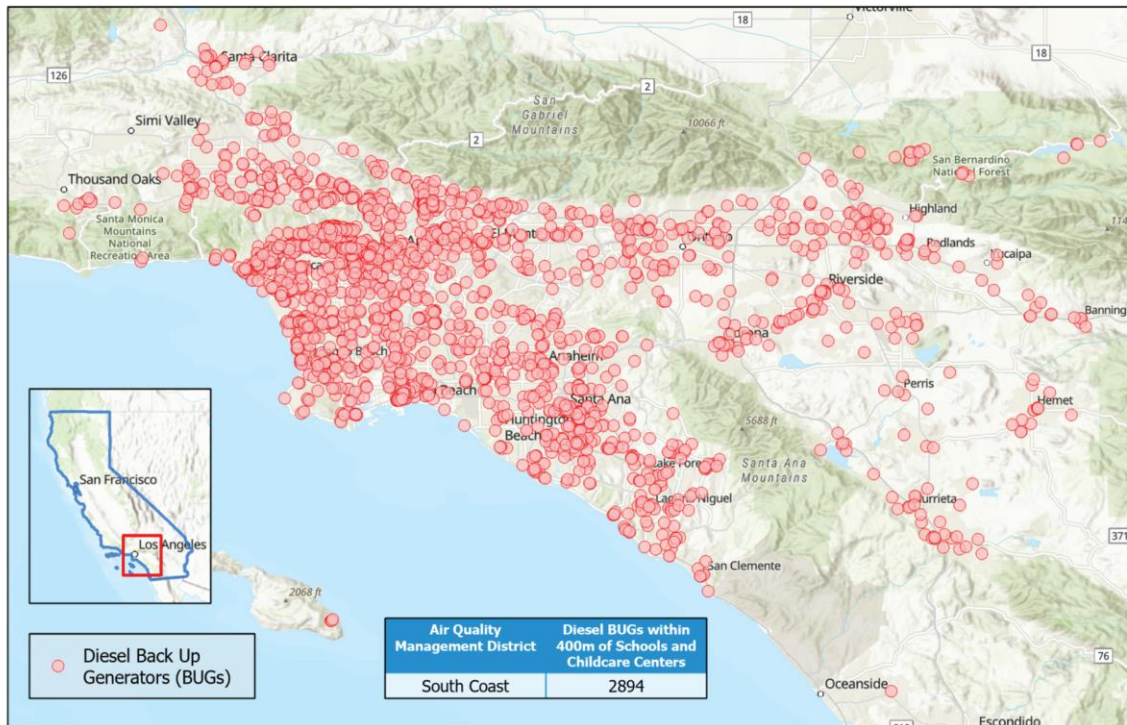
- Under the Emergency Load Reduction Program structure, participants can also receive payments when they increase grid use under certain conditions.

Demand response may also increase pollution in vulnerable communities.

Instead of turning off electricity use, it is unclear if some demand response participants simply shift from grid electricity consumption to on-site, backup generators (BUGs) when called on. This can create harmful health outcomes for surrounding communities.⁷ Most existing backup generators use diesel as fuel, one of the most polluting ways to make electricity in the state. Backup diesel generators produce significantly more air pollution and toxics than the grid average. For example, they produce 200 to 600 times more nitrous oxide (NOx) emissions - a federally regulated air pollutant that contributes to smog - than utility-scale natural gas power plants.

Disadvantaged communities and populations may be particularly at risk. For example, in the six most populous Air Quality Management Districts (AQMD),⁸ over 4,600 BUGs are located in disadvantaged community tracts and 5,200 BUGs are located within 400m of a school or childcare facility.

Figure 2. Diesel Backup Generators within 400m of Schools and Childcare Centers in South Coast AQMD



Source: California Public Utilities Commission (Public Advocates Office)

⁷ Cornell University’s Energy and the Environment Research Laboratory. *Diesel Backup Generators*. (Accessed June 2023) <https://energy.mae.cornell.edu/research-2/micro-environmental-air-quality/distributed-generation/diesel-bugs/>

⁸ South Coast, Bay Area, Sacramento, San Joaquin, Santa Barbara, and San Diego

Fossil fuel-backed demand response is discouraged under current rules. Yet, there is a historical lack of data on what is occurring in practice. No state program requires demand response participants to install inexpensive monitoring equipment on their on-site, backup generators. The Commission has also created exceptions through the Emergency Load Reduction Program and some stakeholders are proposing additional exceptions or ways to weaken the prohibition.⁹ The Commission should initiate stronger actions to ensure demand response does not increase health burdens for vulnerable communities and undermine California's environmental goals.

California policymakers must address systemic problems in its demand response programs prior to scaling them beyond their current budgets.

Despite the aforementioned issues, budgets for demand response programs continue to grow. The state's demand response portfolio is paid for by Californians through their taxes and monthly power bills.

The CPUC has authorized ratepayer-funded demand response pilot programs on the order of \$3 million per year. The state's three main investor-owned electric utilities are proposing to scale these unproven, ratepayer-funded programs to nearly three-quarters of a billion dollars from 2024 to 2027.¹⁰ Similar to other Commission pilot programs, demand response programs are not held to the same cost-effectiveness standards as regular programs. For example, SDG&E's portfolio delivered only 50 cents of value for every dollar of ratepayer funds invested in 2017. The amount of value decreased to 20 cents invested in 2022. Looking to the future, utilities are requesting additional funding to implement and scale them. For example, PG&E is requesting \$442 million dollars in pilot funding for program years 2024-2027, which is over 56% of the total budget request.

Outside the CPUC, the California Energy Commission is also receiving significant funds from the legislature to administer additional demand response programs. For example, the Demand Side Grid Support Program received \$200 million in last year's budget and seems poised to receive increases of similar magnitude as part of this year's budget.

Recommendations to improve and reform the state's demand response portfolio.

Demand response can play an important role in improving reliability and environmental outcomes. However, evidence from recent history shows that the current trajectory is not sustainable.

⁹ "PG&E proposes the temporary suspension of the PR restrictions for customers participating in BIP, which is a reliability program (i.e., RDRR in CAISO market), between 2024 and 2027." Pacific Gas and Electric Company 2023-2027 Demand Response Programs, Pilots, and Budgets 2024-2027 Full Proposal Prepared Testimony at p. 2-11.

¹⁰ For 2024-2027, the IOUs are requesting: PG&E-\$441.6M, SCE:\$201.7M, and SDG&E:\$96.5M. For comparison, the Commission approved pilot budget totals for 2017-2022 as follows: PG&E: \$9.2M, SCE: \$2.4M, SDG&E: \$5.9M

Policymakers need to reform program terms to ensure ratepayer funds are being used judiciously and potential benefits are realized.

Demand response programs encourage customer-side actions that reduce their electric demand in response to grid emergencies, periods of extremely high energy prices, or grid congestion. The programs *can* be a cost-effective way to support grid reliability and the state's climate goals. As documented in detail above, the programs are falling well short of their potential. The Public Advocates Office identifies three key reforms to get demand response programs back on track:

- (1) Align demand response programs with minimum reliability requirements established by the state's grid operator. The state's grid operator, the California Independent System Operator, sets dispatch requirements that all generation resources must meet. These requirements should be applied to demand response as well. Demand response that does not meet resource adequacy requirements harms reliability and should not be considered an alternative to performing resource adequacy products.
- (2) Eliminate payments to non-compliant demand response providers and minimize funding to cost-ineffective programs. Demand response payments should not be provided to customers who do not reduce their energy consumption during the grid's emergency events or when called upon. To maximize their value, policymakers should only scale California Public Utilities Commission programs that are cost-effective.
- (3) Establish stronger protocols to ensure that demand response does not increase local air pollution by increasing on-site diesel or other fossil fuel backup generator use. Demand response is at the top of the state's loading order (with energy efficiency) because it is assumed to be a clean resource. Therefore, state programs should implement meaningful and effective methods to ensure diesel and other resources that degrade air quality are not used to provide demand response.

The Public Advocates Office represents utility customer interests before the California Public Utilities Commission and in other forums. We develop recommendations that advance the state's climate goals in the most affordable ways for ratepayers.

For additional information, visit our website at www.publicadvocates.cpuc.ca.gov or email publicadvocatesoffice@cpuc.ca.gov.