# Aggregating Emergency Response Capacity to Stabilize the Clean Grid Transition

Whitepaper

## How California Leveraged Grid-interactive Small Buildings as a Resource

8/25/2020



11911 Freedom Dr
Ste. 850
Reston, VA 20190

703 - 667 - 7000

Email: smartbuildings@gridpoint.com
Website: www.gridpoint.com

GRIDPOINT

# Aggregating Emergency Response Capacity to Stabilize the Clean Grid Transition

## How California Leveraged Grid-interactive Small Buildings as a Resource

During August 14 - 21, 2020 the California grid experienced Stage 3 emergency conditions as unforeseen circumstances left the CAISO (California Independent System Operator), a non-profit group which maintains the reliability of the statewide electric grid, with forecasted daily capacity shortages up to 4,400 MW. The deficit resulted in rolling blackouts Friday through Sunday across the state. By Monday, through a combination of dispatching existing demand response (DR) capacity and enabling automated voluntary end user conservation efforts, there was significant reduction in demand which prevented further blackouts. These events uncover clear risks utilities assume when transitioning their portfolios to include more renewable power, especially in regions subject to extreme weather. Dispatchable capacity available on-demand at scale will be required in the transition to a decarbonized grid.

## The Perfect Storm

No single factor caused this emergency. Instead, a confluence of events drove demand high, supply low, and threatened rolling blackouts:

### Heat Wave

Record breaking heat hit California on Friday, August 14th and lasted through the week. As residents and businesses increased air conditioning usage, demand was projected to approach the state's historical peak of 50,270 MW. The heat wave, also experienced in neighboring Nevada and Arizona, reduced capacity available for CAISO to purchase supplemental reserve capacity.

### Unplanned Traditional Generation Failures

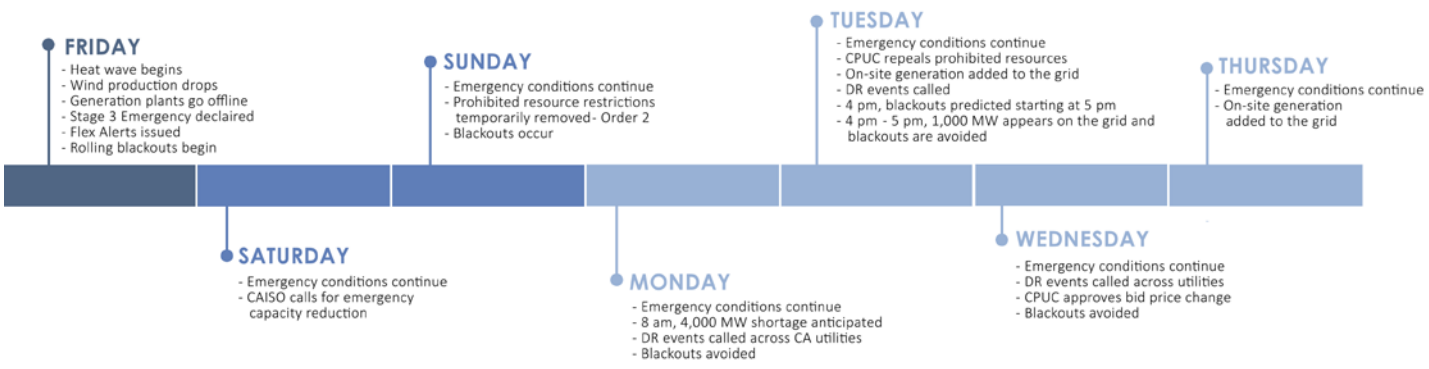
Multiple gas powered generation facilities went offline, transitioned into maintenance mode, or were otherwise underperforming throughout the state.

### Interrupted Renewable Generation

Wind power is an important energy source in California, usually increasing at 4 pm as solar generation declines. However, wind was unexpectedly reduced on Friday afternoon, further impacting capacity.

### Lack of Sufficient Dispatchable Reserve and Emergency Capacity

Because distributed energy resources had not been prioritized to support the California grid at scale, existing capacity had to be paired with voluntary and unpaid participation




*Timeline of events August 14 - 20, 2020*

## Reactive Regulatory Changes

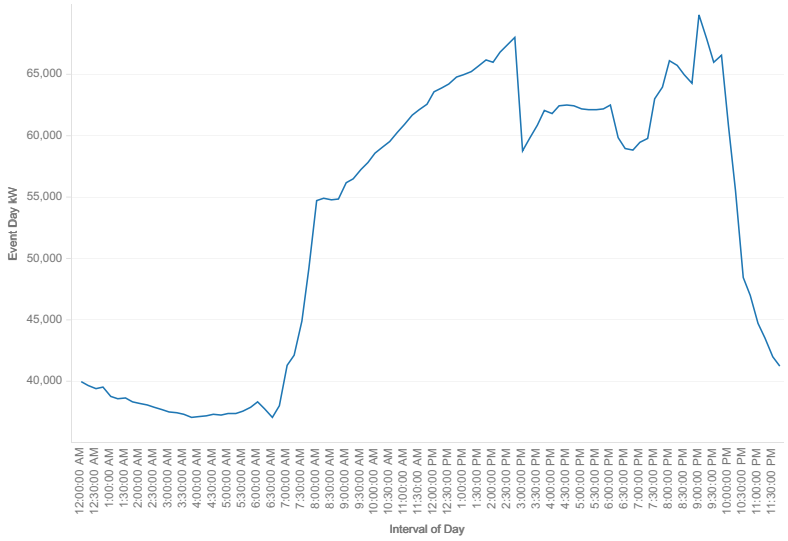
In reaction to low reserve capacity, CAISO grid operators requested on Friday, August 14th, that California investor owned utilites (IOUs) plan for rolling blackouts through Thursday, August 20th. The IOUs and Governor Newsom immediately called for Flex Alerts, scheduled demand response events, and issued official energy conservation recommendations for residential and commercial grid users.

As blackouts persisted and reserve capacity margins remained low, the California Public Utility Commission (CPUC) got creative and lifted restrictions on "prohibited resources" such as distributed natural gas fired generators. To best meet the demands in Northern California, the CPUC permitted a one-time rapid change in the Pacific Gas and Electric's (PG&E) Capacity Bidding Program (CBP), allowing for aggregators to modify bids to trigger more DR events for their sites under management.

## Importance of Flexibility in Reacting to Emergency Conditions

As an aggregator for commercial buildings utilizing Open Automated Demand Response (OADR) certified technology, GridPoint immediately responded to these emergency conditions. Within 20 minutes of a signaled emergency on Saturday (8/15), GridPoint's distributed load curtailment was underway across the state. As the high-risk conditions persisted through Thursday, GridPoint continued to work with customers to provide instantaneous, reliable, consistent load back to the California grid as-needed. GridPoint's curtailment strategies enabled participating business customers, many of which deemed essential during the COVID-19 pandemic, to continue business as usual while providing capacity to the grid.

## The Power of Aggregation at Scale




GridPoint's response to the emergency proves aggregating load across many small commercial sites through ADR technology utilizing real-time data has a substantial impact for the utility and a minimal impact on participating businesses. GridPoint worked with customers to voluntarily participate in curtailment throughout the emergency. These sites curtailed for a total of 116.5 hours as of Thursday evening (8/20), providing over 11.6 MWs of emergency capacity to the California grid and averaging 27 kW per site. This is equivelent of powering nearly 10,000 homes for a full year. The graph to the left shows an averaged daily trend of curtailment between August 14th and 20th.

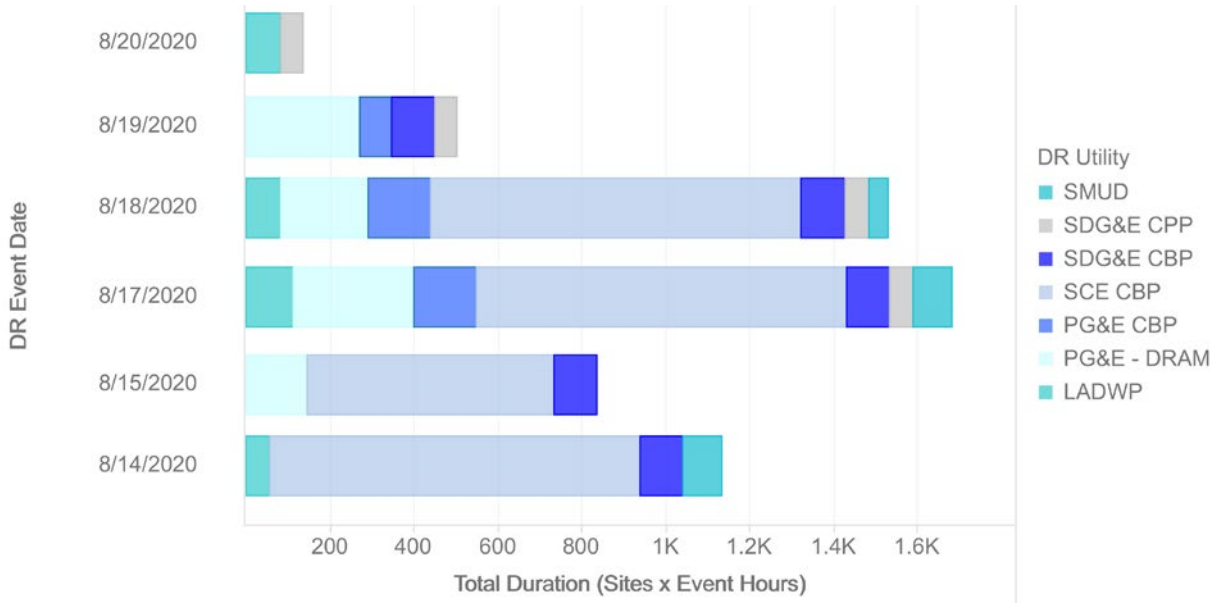
| FRIDAY 8/14 | SATURDAY 8/15 | MONDAY 8/17 | TUESDAY 8/18 | WEDNESDAY 8/19 | THURSDAY 8/20 | TOTAL |
|---|---|---|---|---|---|---|
| 1.24 MW | 2.27 MW | 3.1 MW | 2.95 MW | 1.85 MW | 0.3 MW | 11.68 MW |

*Daily and total capacity contributions August 14 - 20, 2020*

## Real-time Asset-level Performance Reporting

By installing main-load and asset-level submetering, GridPoint can confirm precisely how much each site contributed to abating this crisis through its grid-interactive technology. Key values in the platform go beyond simple comfort controls and leverage the capability of measurement and verification displayed in real-time reporting. The CPUC acknowledged an estimated 1000 MW that appeared on August 18th which assisted in preventing blackouts, but there is uncertainty in how or where this capacity was generated. This is an example of how access to behind-the-meter insights can help measure and manage the impact of emergency and reserve capacity. GridPoint reporting is available to utility partners in near real-time and can be used to adjust curtailments and event dispatches.

*Daily snapshot of event curtailment duration by utility territory*




Visualizing the power of small, flexible loads aggregated to scale puts into perspective how valuable it is to rapidly install OADR technology. The capacity figures are demand response-specific and separate from ongoing annual electricity and natural gas savings driven by GridPoint's grid-interactive technology. Traditional emergency capacity is among the most carbon intensive resources that utilities call upon and OADR-driven flexible capacity reduces the need for fossil fuel-intensive power. Across GridPoint sites under management in California, the average annual metered energy savings are 10.5%. Hannon Armstrong (HASI), an investment firm focused on climate change solutions, recognizes GridPoint's technology as one of the most impactful in their portfolio.

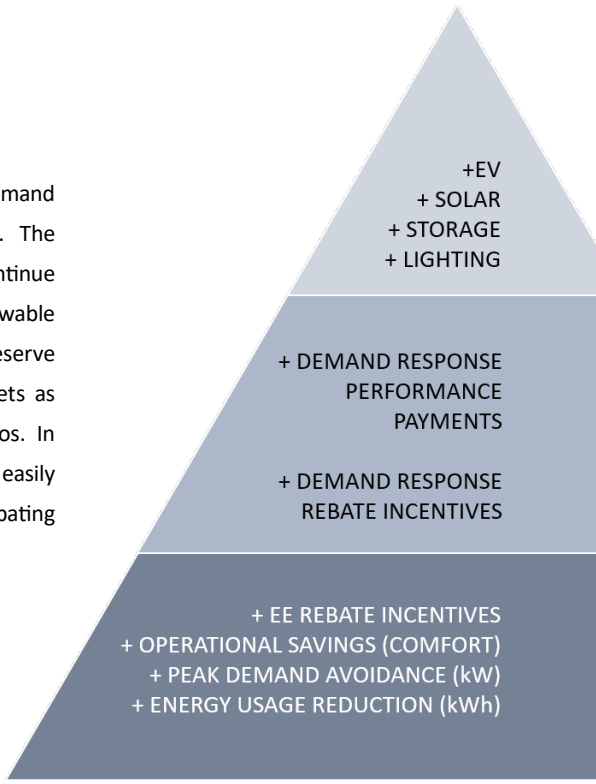
*"GridPoint's solution has among the highest CarbonCount, a measure of environmental benefit in terms of metric tons of carbon emissions avoided per $1,000 invested, across our portfolio of EE, solar, and wind investments with a CarbonCount of around 5.10 vs 0.30 for an average solar project."*

**Guy Van Syckle,**
Senior Manager, Hannon Armstrong

## Opportunity for Scale

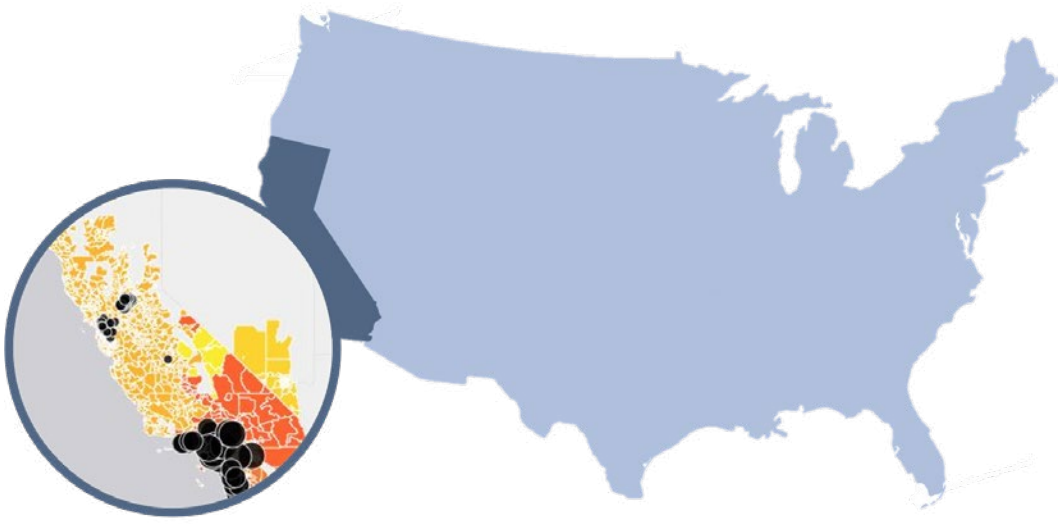
GridPoint's success was due in large part to its customers who permitted GridPoint's Demand Response Team to respond to emergency conditions with their voluntary curtailment. The confluence of events that contributed to these emergency conditions are going to continue to happen as the United States energy grid transitions to higher quantities of renewable generation. To prepare for similar events, utilities need to proactively increase flexible reserve capacity. Partnering with OADR technology providers to engage underutilized markets as grid-interactive resources is a cost effective and direct path to advance reserve portfolios. In between industrial facilities that can alter operations, and residential customers who are easily incentivized, are millions of smaller commercial buildings who are not currently participating in demand response.

GridPoint has been providing flexible capacity to the grid from commercial buildings for over 15 years. The technology is designed to provide ongoing value to the end users through energy cost reductions and operational savings. As energy generation transitions towards renewables, with the increasingly extreme weather and the lack of reliability of fossil-fuel sourced generation resources, reliable on-demand flexible capacity and real-time data are becoming a priority for utilities to best manage their bulk distribution systems.




*Combining technology benefits creates greater value and accelerates adoption*

Overcoming barriers to end user participation are key to scaling demand response technologies and programs as well as to providing the widespread grid benefits of on-demand flexible capacity. GridPoint addresses the key barriers of entry by offering customers Energy Management as-a-Service (EMaaS), which enables participation without up-front capital. Additionally, GridPoint's patented energy management algorithms focus on customer and employee comfort and managing building performance risks. By tracking and analyzing billions of real-time data points, GridPoint can ensure demand response program participation does not adversely impact onsite business operations. Taking a solution-oriented approach, energy management providers can meet the diverse needs of utilities and end users, leading to successful and repeatable program performance.

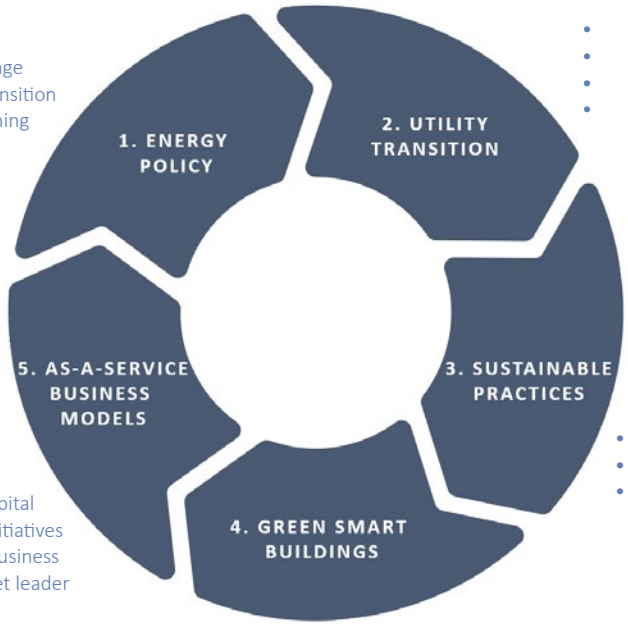


*Heat map of DR events called across California*

## Path to Decarbonization

Delivering a value stack to customers breaks down adoption barriers. Society-wide there are additional factors driving commercial adoption of OADR enabled smart buildings platforms:

- Demands to address climate change
- Political push for clean energy transition
- Renewables top of mind for planning
- Calls for carbon legislation




- Pressure to transform generation mix
- Wavering support for existing fossil fuel sources
- EV charging expected to further drive demand
- Challenged to handle while maintaining resiliency

- 86% of S&P 500 publish sustainability reports
- Focused on footprint, energy, supply chain & waste
- Programs are increasingly expected by customers

- Desire for tech, but often have limited capital
- Preference to focus capital on revenue initiatives
- Open to models allowing focus on core business
- Winning requires being recognized market leader

- Predictive maintenance and cost reduction are top drivers
- Need tools for command, control and situational awareness
- Pay-for-performance models proliferate and expand scope
- Growth in LEED-certified buildings, but most are retrofits

While the focus of clean energy tends to be on renewables, there are clear gaps between existing infrastructure and new distributed energy resource (DER) technologies currently available at scale. Demand response will play a pivotal role in the transition by acting as the bridge between traditional generation assets, distribution planning, and the new needs of the dynamic DER-driven grid of the 21st Century. The key lies in proactively engaging new technologies, leveraging automation, and rapidly deploying capacity to assure resource adequacy. The grid emergency in California shows that the future is now. Utilities must adopt and scale grid-interactive, behind-the-meter technology, such as GridPoint's, to support the path to decarbonization through DER integration and more dynamic grid management.