

Q&A on Statewide Power Shortages or Problems on the Regional Electric Grid - What happens in Anaheim?

What follows is an informational refresher regarding Anaheim's preparedness in the event of sustained unexpectedly high summertime temperatures, and/or regional electric grid concerns that result in power shortages in and around California. Bear in mind that power shortages can occur with no warning, given that electric transmission lines and/or generators can become inoperative with no notice. Should that occur, there can be greater regional demand for electricity than regional supply; the only way the power grid can recover is to shed load (e.g. separate some customers from their electric supply) until more power becomes available. This document is intended to answer the following questions.

1. What is load shedding and why is it performed?
2. Is load shedding the same thing as a rotating power outage or blackout?
3. In what ways and for how long would Anaheim be affected by load shedding?
4. What advance planning has taken place, external to as well as within the City, given this potential for load shedding that we cannot otherwise control?
5. Would we get any warning to shed load? What information sources are available to keep customers informed both in advance of the possibility and during an event?
6. What specifically will happen in Anaheim if load shedding is ordered by the regional grid operator?

1. What is load shedding and why is it performed?

The City of Anaheim is part of the State's electric system. The state itself is also electrically interconnected with fourteen other states as well as parts of Canada and Mexico. When a problem occurs on the regional electric grid, all electric utilities can be affected, including Anaheim, despite Anaheim having already made appropriate arrangements to meet all of Anaheim's needs for electricity. In other words, regardless of the fact that Anaheim has enough resources to cover our need for electricity, we may still be ordered to participate in load shedding in order to prevent prolonged or uncontrolled blackouts throughout the State or throughout the region. "Load Shedding" is the generic term for customers being automatically or manually disconnected from the power grid, typically in order to electrically stabilize the region as a whole. Our Utility would be ordered by the California Independent System Operator (CAISO) to open the circuit breakers to one or several (depending on the severity) of our approximately 100 circuits that supply our customers, interrupting the flow of power to everyone on that circuit for roughly one hour. At the end of that hour, if the emergency condition still existed, that circuit(s) would be reenergized, and a different circuit(s) de-energized, again for an hour, until the emergency condition was over.

The CAISO would be giving this same relative order to all Utilities in whatever portion of the regional electric grid that was experiencing a problem, and the amount of required load shedding would be based on the relative size of the utility. As an example, if Anaheim were required to shed 100 customers off the system in order to help salvage the stability of the regional electric grid, SCE would likely be shedding 4,000 customers; it's all an issue of relative size. Another way to understand why Anaheim sheds load, even when we did not cause the problem; if the

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entire grid goes down (electrically collapses), Anaheim will experience significant, widespread power outages for undetermined periods of time, despite the fact that our Utility neither caused, nor contributed to, the initial conditions leading to a major grid problem. Therefore, given how negatively we will be impacted should problems on the regional grid worsen, it behooves all participants, including Anaheim, to take actions to support the grid in times of emergency in order that a bad situation not rapidly worsen.

2. Is load shedding the same thing as a rotating power outage or blackout?

Generally speaking, yes. When Anaheim is ordered by the regional grid operator to manually disconnect large groups of customers from Anaheim's power grid in order to assist in stabilizing the region, (or customers are disconnected by automatic computerized actions intended for that same purpose) that is referred to as load shedding. If the emergency situation continues for an hour, Anaheim will restore the power to those customers originally disconnected, and disconnect a different group; in other words, "rotating" the outage; which is why the term rotating power outage originated. The rotation insures that no one group of customers is disproportionately impacted. Another term used in the media is "rolling blackout" which is equivalent to rotating outage. Either way, it means that electricity to customers has been interrupted. Load shedding and rotating power outages are, however, different from the more common types of outages that typically result from such things as a car hitting a pole or a storm blowing down a power line. In the latter instances, power may not be restored in one hour, given that the problems are related to the physical electric infrastructure, not with the supply of electricity as with a rotating outage. In those instances, power may not be restored until repairs are made to the associated electric equipment. Customers may not be able to immediately discern whether or not a loss of power is related to problems with the physical infrastructure or whether rotating outages were ordered; nevertheless, the result is the same. The duration of the outage, when ordered by the CAISO will typically be one hour; while when the outage relates to problems with the infrastructure, the outage duration cannot be estimated immediately.

3. In what ways and for how long would Anaheim be affected by load shedding?

Generally there are 6-types of notices that the CAISO employs to identify the severity of the situation, each notice type increasing in severity. The notice starts with a Restricted Maintenance notice followed by an Alert notice which then escalates to a Warning notice, and then moves to so called "stages;" Stage-1, Stage-2 and Stage-3. Load shedding will only take place at Stage-3 (the greatest level of severity), and is the only time that Anaheim will be affected. In the event that a Stage-3 is issued by the CAISO, we will be required to shed load for at least 1-hour. If load shedding is called for past the first hour, customers affected for the first hour will have their circuit re-energized and another circuit will be de-energized. This process will be repeated every hour as long as the Stage-3 is in effect. In the past when a Stage-3 has been ordered, it has typically lasted anywhere from 1 to 3-hours. The highest risk days for load shedding are weekdays wherein it's been hot for a few days already, and the regional grid has already been stressed in a variety of ways. The "highest risk" hours for load shedding typically coincide with the highest temperature/electric demand portion (aka the peak) of the day. There is quite a variation during summer months, and we can "peak" anytime between noon and 5pm.

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4. What advance planning has taken place, external to as well as within the City, given this potential for load shedding that we cannot otherwise control?

Any number of things can lead to the regional electric system becoming over taxed. In order to relieve the situation, the CAISO is tasked with ensuring that plans are in place to ensure the stability of the State's electric power grid. To that end, every year, prior to the start of summer, all utilities in the State work with the CAISO on procedures to manage these kinds of situations. Information on each organization's plans is gathered and verified to determine how much load is available to be voluntarily shed before having to institute any mandatory load shedding. Further, communication systems are tested to ensure that information for key personnel in each organization is up to date.

In addition to the planning that occurs at the regional level, key City Departments within Anaheim also collaborate for summer. APU routinely coordinates with Police, Traffic, Electric, Fire and City Manager's Office to review the Department's load shedding coordination procedures and conducts tests to ensure that personnel are properly trained and prepared should load shedding be required.

5. Would we get any warning to shed load? What information sources are available to keep customers informed both in advance of the possibility and during an event?

There are some instances when there will be little to no warning of a load shedding event; such instances are loss of a major transmission line or generation resource that causes the regional grid to become unstable, causing automatic load shedding to take place. Automatic load shedding refers to instances in which the reaction time required to save the power grid from totally collapsing across 14 different states can only be achieved through the use of fast acting computerized equipment where the difference in preventing a total collapse can be measured in milliseconds. Having said that, there are many instances where there will be warnings leading up to load shedding, especially in cases of extreme hot weather. In these instances the CAISO will put out messages via the "FlexAlert" web site (<http://www.flexalert.org>). Flex Alerts are urgent, voluntary calls to conserve electricity use. The CAISO has six separate and distinct processes in the event of high electric load within the State, and are described in summary form below.

Restricted Maintenance – As early as 72-hours in advance of the possibility that any routine maintenance on transmission lines or power plants could threaten grid reliability, the CAISO notifies all participating utilities of restricted maintenance. All utilities with generation assets in the State are required to seek permission for any maintenance in the Restricted Maintenance window.

Alert - As early as 24 hours prior to an event taking place, the CAISO will use the FlexAlert system to issue messages to the public via television, radio, and the Internet to conserve electricity. It provides an early warning of possible electricity outages, a heads up if you will, allowing the public to better prepare for service interruptions; and it also encourages energy conservation in order to help prevent the need to shed load by reducing the overall demand for

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electricity.

Warning - Activated an hour ahead when there may be a shortfall. Conservation requested from IOUs and Public Utilities under their control. Any Voluntary load reduction programs that can be called upon may be triggered at this point.

Stage 1 – As early as 12 to 6 hours prior to an event taking place, the CAISO will strongly urge energy conservation throughout the State through a variety of media outlets.

Stage 2 - As early as 6 to 4 hours prior to an event taking place, the CAISO will begin to request assistance from neighboring States in the form of additional generating units to assist in maintaining an adequate electrical supply. Additionally, they will advise all IOUs and Public Utilities under their control statewide, to be prepared and ready to “drop load,” otherwise called load shedding.

Stage 3 – As early as 1 hour to 10 minutes prior to an event taking place, the CAISO will issue a notice of potential load interruptions to all IOU’s and Public Utilities under their control.

In all three Stages, the CAISO will continue to use the FlexAlert system to keep the public informed. Additionally, the members of the public can also sign up to receive alerts directly to their computer or phone from the FlexAlert web site. They can also sign up via Facebook and Twitter for information as well.

From a citywide perspective, we are also encouraging our customers, via bill inserts and on our Anaheim.net website, to sign up for these FlexAlert messages. Further, we are encouraging our customers to sign up and stay informed via our own system called the Anaheim Alert System. Through this system customers can receive information on power outage affecting their homes and businesses directly related to what is happening in Anaheim in the event of hot summer weather.

On Anaheim’s main webpage, we have placed a link to the Anaheim “PowerWatch” webpage so that customers can quickly see if their particular area will be affected in the event that load shedding is ordered by the CAISO.

Additionally, customers can call 714-765-3300 and speak directly to a customer service representative to receive more information about outages in our area.

6. What specifically will happen in Anaheim if load shedding is ordered by the regional grid operator?

In the event that Anaheim Public Utilities (Anaheim Utility) is required to shed load by the CAISO, APU’s internal Load Shedding Process is initiated.

Sufficient circuits (500 to 5000 residents per circuit) will be de-energized or “dropped” until our obligation to shed load is satisfied. Anaheim has roughly 100 circuits feeding customers, and each circuit outage will last no more than one-hour per circuit before the affected circuit is

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restored and a new one dropped. Typically a Stage 3 Alert lasts anywhere between 1 and 3-hours, therefore the likelihood of the same circuit being affected over the course of a Stage 3 Alert is remote.

The circuits that will be initially impacted are listed on the Anaheim PowerWatch webpage; the outages will likely be limited to just one or two circuits, and once a circuit has experienced load shedding, it will drop to the bottom of the entire list. As far as timing goes, we drop the identified customer circuits, as opposed to waiting to measure the efficacy of our voluntary efforts, because we must quantifiably demonstrate that we have dropped the required amount of load within 10-minutes of the order being issued by the CAISO. As mentioned previously, if the Utility fails to drop the required amount of load, the financial penalties could run into the tens of millions of dollars, so it important that we shed our identified circuits first, then verify that load shedding of our buildings and voluntary customers has occurred. We expect that we can identify, within the hour, whether or not our voluntary efforts are quantifiably effective. Once that is verified, it may not be necessary to drop more or other circuits, in which case the circuits that were initially dropped could be restored and no other circuits would be affected.

Immediately after our obligation to drop load has been satisfied, Anaheim will initiate a process of voluntary load dropping. The effort is intended to accumulate sufficient “voluntary” load to drop that will equate to our obligation, and therefore allow us to restore the circuits that were dropped. In practice, and depending on the magnitude of the event, all of these things might happen near the same time or in a slightly different order.

The process identifies City-owned buildings, as well as commercial and industrial businesses that have volunteered to shed either a portion, or their entire load, to accommodate the load shedding directive from the CAISO. The order in which APU will request voluntary load shedding is as follows:

1. City Buildings (~5 MW)
2. Voluntary Customer Programs (~ 15 MW)

SUMMARY:

This is a high level outline of the procedure that will be used in the event that load shedding is initiated by the CAISO and is meant only to summarize the process that occurs when such an event takes place.

Once again, as outlined earlier, Anaheim Public Utilities has more than enough capacity to cover the City’s load despite sustained high electric loads in California. Nevertheless, load shedding, should it be ordered, cannot otherwise be avoided, only mitigated. APU will continue to coordinate with other city departments and customers that agree to voluntarily shed load to minimize the impacts to Anaheim residents and businesses.