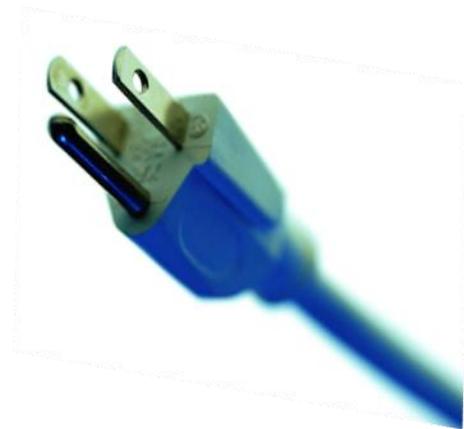




**Cal OES**  
GOVERNOR'S OFFICE  
OF EMERGENCY SERVICES

# Electric Power Disruption

## Toolkit for Local Government



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## Summary of Changes

The following changes have been made in this edition.

- Updates to reflect the California Emergency Management Agency
- Update of Stage Alert criteria
- Web links corrected/updated
- Updated Cal EMA to Cal OES

For any questions or comments regarding this plan, please contact the California Governor's Office of Emergency Services, Preparedness Division at (916) 845-8787.





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# Foreword, Purpose, and Scope

**Foreword** Electrical power disruptions can occur at anytime during the year, affecting the health and safety of Californians. Including power disruption in disaster planning efforts, can help to reduce the impact to communities.

**Purpose** Cal OES has developed this "Tool Kit" as a supplement to the *Emergency Planning Guidance for Local Governments* to identify possible actions that city and/or county governments can take to protect public health and safety during electric power disruptions, regardless of their cause. It also provides preparedness, response, recovery, and mitigation actions relevant to electric power disruptions.

**Scope** This "Tool Kit" identifies the types of electrical power disruptions, the types of customers potentially affected, and the types of facilities and populations with critical electrical needs.

The "Tool Kit" provides general planning assumptions for consideration by local government in anticipation and reaction to power disruptions, as well as typical criteria that may be used to identify those facilities and populations. This document is not prescriptive but is only intended as guidance.

# Disruption Classification, Notification Procedures and Outreach

**Classification of Disruptions** The electric power industry does not have a universal agreement for classifying disruptions. Nevertheless, it is important to recognize different types of outages are possible so that plans may be made to handle them effectively

Electric power disruptions can be generally grouped into two categories: Intentional and Unintentional. There are four types of intentional disruptions.

**Intentional (Planned) Scheduled** Some disruptions are intentional and can be scheduled. For example, a disruption may be necessary when components of the power system are taken out of service for maintenance or upgrading. Scheduled intentional disruptions can last from several minutes to several hours, and customers are usually notified in advance.

**Unscheduled** Some intentional disruptions must be done "on the spot." As a result, advance notice cannot be provided. For example, a fire department or a police department may request a disruption in service during a fire or an accident.

**Demand-Side Management** Some customers (i.e., on the demand side) have entered into an agreement with their utility provider to curtail their demand for electricity during periods of peak system loads. In return for agreeing to these disruptions, these customers receive a lower electric rate and/or a rebate.

**Load Shedding** When the power system is under extreme stress due to heavy demand and/or failure of critical components, it is sometimes necessary to intentionally interrupt the service to selected customers to prevent the entire system from collapsing. In such cases, customer service (or load) is cut, sometimes with little or no warning. One form of load shedding -called a "rotating blackout" - involves cutting service to selected customers for a predetermined period (usually not more than two hours). As power is restored to one block of customers, power to another block of customers is interrupted to reduce the overall load on the system.

**Unintentional  
(Unplanned)**

Unintentional or unplanned disruptions are outages that come with essentially no advance notice. This type of disruption is the most problematic. The following are categories to classify unplanned disruptions:

- accident by the utility or utility contractor, or others
- malfunction, or equipment failure, due, for example, to age, improper operation, excessive operation, or manufacturing defect; special subcategories cover broken fuse links and underground cable, joint, or termination failures
- overload on either the utility's equipment or a customer's equipment
- reduced capability, that is, equipment that cannot operate within its design criteria
- tree contact other than from storms
- vandalism, or intentional damage
- weather, including ice/snow, lightning, wind, earthquake, flood and broken tree limbs taking down power lines
- wildfire that damages transmission lines

**Notification  
Responsibilities**

What follows is a general description of notification responsibilities for electric power disruptions.

**California  
Independent  
System Operator**

The California Independent System Operator (CAISO) is tasked with managing the power distribution grid that supplies most of California, except in areas serviced by municipal utilities.

**Alerts**

CAISO uses a series of stage alerts to the media based on system conditions. The alerts are:

- Stage 1 - When the reserve margin falls below 7%
- Stage 2 - When the reserve margin falls below 5%
- Stage 3 - When the reserve margin falls below 3%  
Rotating blackouts become a possibility when Stage 3 is reached.

**Utilities**

Utilities generally rely on media releases to inform the public of electric power disruptions. Ongoing emergency coordination between city and county emergency managers and utility providers could enhance advance notification of electric disruptions and restoration coordination.

## **Outreach**

### **Utility Customers Defined**

The term "customer" in this document means the bill payer. A customer may be an individual homeowner, for example. In other words, the number of customers affected is not the same as the number of people affected. Disruption of electrical service to a single customer such as a company office building may, in fact, affect hundreds of individuals.

### **Utilities**

Utilities may provide the following information to public safety agencies, upon request:

- utilities service area,
- grid, and
- infrastructure information.

### **Cal OES**

Cal OES provides materials to the media, local governments and others on power conservation tips, notifications, preparedness and response activities.

# Preparedness Planning

The concepts used to prepare for floods, earthquakes, wildfires, and other emergencies should be used to plan for electric power disruptions. Electric power disruption plans should address actions to be taken during the four phases of emergency management: preparedness, response, recovery, and mitigation. The main difference is that rotating blackouts are brief, and possibly numerous over the entire summer and beyond, depending on weather and electrical supply. Such events may not merit activating an Emergency Operations Center or declaring an emergency, given the anticipated brief duration of electric disruptions.

## **Local Governing Boards**

Initiation of the planning process may require action by the governing board in the form of a resolution or ordinance that provides local guidance, identifying goals and objectives, and providing the authority, intent, and composition of the planning team.

## **Planning Team**

The planning team should be agencies and departments that make up the general emergency management structure since the same problems experienced in other disasters could happen during power disruptions. A planning team may include the following, as determined by the city/county governments:

- management or executive
- city or county counsel
- emergency management
- law enforcement
- fire services
- emergency medical services
- human services (county welfare or city community services, etc)
- schools
- public health agencies
- hospitals and care homes
- community-based organizations
- disability and older adult service providers
- operational area
- public works departments
- utility providers

## **General Planning Assumptions**

In drafting a plan, the following assumptions should be considered by local governments:

- Power disruptions may be caused by lightning strikes, wildfires, accidents, intentional acts and maintenance.
- Government agencies should reduce electricity consumption, providing an example to the public to conserve.
- Emergency service providers use electricity to conduct their public safety duties. Many of them are exempt from rotating blackouts, having been identified by the California Public Utilities Commission (PUC) as "essential", and they may also have limited back-up generation capacity.
- Some emergency service providers may not be exempt from rotating blackouts because they have not been designated as "essential."
- The State itself cannot mandate energy efficiency for local government agencies, but can inform local agencies of its importance and encourage reduction strategies where possible.
- Rotating blackouts may increase the need for emergency services, thus causing emergency service providers to use more electricity, not less.
- The Standardized Emergency Management System (SEMS) and National Incident Management System (NIMS) should be used when appropriate in responding to impacts of electric power disruptions.

# Essential and Critical Facilities

## **Essential Facilities**

The loss of electrical service to some facilities can significantly affect public health and safety. Essential facilities as described in this document include police and fire stations, hospitals, nursing homes, water pumping stations, railroad crossings, and industrial facilities that handle hazardous materials. Many of these facilities may have received exemptions from utilities from rotating blackouts.

## **Critical Facilities**

### Suggested ways of identifying Critical Facilities

Critical facilities are buildings, areas, or systems that could experience significant impacts if electrical service was lost. While every home, office, commercial establishment, or industrial factory would be affected by the loss of electricity, some are more vital to the community well being than others. Suggested guidelines for identifying a facility as "critical" could include the following:

## **Impact on Orderly Functioning**

At some facilities, the loss of electrical service can cause significant disruption to the orderly functioning of government, business, and private citizen activities. Although direct health and safety issues may not be a consideration, the loss of electric service can have significant consequences. Examples of these types of facilities include traffic intersections, where heavy congestion can develop; elevator-served, high-rise buildings, where people can be forced to climb many steps to get into or out of the building; auditoriums, where loss of power can create difficulties for a large number of people exiting the facility; and facilities equipped with security alarms triggered by loss of power and that require numerous investigations by local government response personnel.

## **Impact on the Economy**

Some facilities may experience significant economic loss as a result of electrical service disruptions. Examples include industrial factories, food-handling establishments (restaurants, supermarkets), and computer-based businesses. Facility owners may experience economic impacts in the short term (e.g., food spoilage), or the municipality may experience impacts in the long term, such as relocation of businesses that cannot cope with frequent power disruptions.

## **Impact on Other Infrastructures**

Loss of electrical service at some facilities can affect other infrastructures. For example, loss of power at a telephone switching office can interrupt communications, and loss of power at a natural gas compressor station can affect gas delivery. In worst-case conditions, these effects, known as "infrastructure interdependencies," can cascade with drastic consequences.

In applying these general guidelines, more specific criteria should also be considered to ensure that available resources are properly allocated. It is important to identify critical facilities as those that will require significant local government response (e.g., fire, police, emergency medical services, public works) during an electrical power disruption.

Currently, no universally accepted criteria exist for identifying "critical facilities" in all situations. Nevertheless, the table below is offered as a guide.

### **Types of Typical "Critical" Facilities**

<b>Type of Facility</b>	<b>Example</b>	<b>Typical Criteria That Can Be Applied to Determine Criticality</b>
Emergency Services	Police stations Fire stations Paramedic stations Emergency communication transmitters	All facilities considered critical
Water System	Water supply pumping stations Wastewater pumping stations and treatment plants	Facilities needed to provide sufficient pumping capacity to maintain minimum flow rates and minimum pressure
Transportation	Traffic intersections Aviation terminals and air traffic control Railroad crossings Electric rail systems	Major traffic intersections only All aviation facilities All protected rail crossings All electric rail systems
Communications	Telecommunications and Information Technology Infrastructure	All facilities considered critical
Medical	Hospitals, nursing homes Mental health treatment facilities Specialized treatment centers Rehabilitation centers	All facilities that require a state license to operate Facilities with any patients on electrically powered life support equipment
Schools	Nursery schools, kindergarten, elementary and high schools,	All schools when in session

	colleges, business and trade schools	
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<b>Type of Facility</b>	<b>Example</b>	<b>Typical Criteria That Can Be Applied to Determine Criticality</b>
Day Care	Registered day care facilities Sitter services After school centers	All facilities that require a state license to operate
Senior	Senior citizen centers Retirement communities	All facilities that require a state license to operate
Social Services	Homeless/transient shelters Missions and soup kitchens Youth, family, and battered person shelters Heating/cooling shelters	Facilities that require regular fire safety inspections
Detention Centers	Jails Youth detention centers	All facilities
Community Centers	Libraries Civic centers Recreational facilities	Facilities that require regular fire safety inspections
Public Assembly	Sports stadiums, concert auditoriums, theaters, cinemas, religious facilities, shopping malls, conference centers, museums, art centers	Facilities that require regular fire safety inspections
Hotels	Hotels, motels, boarding houses	Facilities that require regular fire safety inspections
High-rise Buildings	Apartments, condos, office buildings	Buildings seven stories or higher
Food Service	Restaurants Grocery stores Supermarkets Food processing facilities	Facilities required to register under tax laws Facilities with significant food quantities stored on the premises

Industry	Hazardous material handling	All facilities
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### Gathering of Critical Facility Information

Local governments can gather information on critical facilities from various sources. Many local governments already have assembled a list of important facilities as a result of other emergency planning activities.

A key piece of data on critical facilities for electric power disruption planning is the current electrical service at each facility. Besides general information about a facility, it is important to gather the following details:

- utility providers feeder line(s) that serve the facility,
- availability of electric power backup systems,
- type of backup system (e.g., diesel generator, battery system),
- maximum operation time of backup system,
- availability of rapid connection capability for hook-up of portable generators, and
- suitability of the facility as a temporary shelter during widespread, extended outages.

A sample critical facilities survey form (**Attachment 1**) has been included with this document to assist in assessing critical facilities vulnerability.

In addition to using a survey form to gather information, local governments can conduct on-site inspections of selected facilities to determine the specifics of their electric power supply system and to identify any necessary enhancements.

### Prioritization of Critical Facilities for Response

Once the information on critical facilities has been gathered, priorities should be established for response. Some facilities may require an immediate response in the event of any disruption of service because of the potential for immediate or significant public health and safety impacts. Other facilities may require a response only in the event of a lengthy disruption. If a widespread disruption affects numerous critical facilities, it may be necessary to allocate available response resources (e.g., police, fire, emergency medical) to those facilities most in need. This type of "facility triage" may already exist in other local emergency response plans.

Response priorities for critical facilities will vary according to local requirements and needs. Some factors to be considered are:

- *Length of time before the occurrence of serious impacts.* Critical facilities that may warrant a more rapid response.
- *Nature of potential impacts.* Critical facilities that involve potential public safety impacts may warrant a more rapid response than those with just potential inconvenience impacts

- *Availability of backup power supplies.* Critical facilities with backup generation capability may not need immediate response.
- *Number and groups of people potentially affected.* Critical facilities where a large number of people would be affected may warrant a more rapid response than those where only a few would be affected. Also, critical facilities that serve primarily older adults or children may require more rapid response than other facilities .

## **Other Considerations**

### **Special Considerations for Infrastructure Interdependencies**

As noted previously, in some critical facilities, the loss of electrical service could affect other infrastructures (e.g., telephone switching offices, natural gas compressor stations). These installations, many owned and operated by private companies, are not usually included on a local government's critical facility list. Nevertheless, it is in the best interest of the local government to identify these facilities and discuss with the owners how their facilities should be treated during a power disruption. There could be situations in which the local government could assist the company owner in protecting the facility from, and/or mitigating against, any damage from power disruptions. Such actions should be developed and prioritized by the local government as needed to prevent a cascading infrastructure failure.

The following table may be used as a general guide when deciding how to prioritize critical facility response:

### Suggested "Critical" Facility Prioritization

Critical Facility Response Priority	Examples of the Types of Critical Facilities That May Be Included in This Priority Class
<p><b>Immediate Response</b></p> <ul style="list-style-type: none"> <li>• Highest priority for response under any disruption conditions</li> <li>• Potential for immediate, serious impacts</li> <li>• Most of these high-priority facilities will have or should have power backup capability</li> </ul>	<p>Emergency services facilities, including police, fire, and emergency medical services            Medical facilities, for example, hospitals, care facilities, etc.            Road intersections            Railroad crossings            Populations on life support equipment</p>
<p><b>Response in First 2 Hours</b></p> <ul style="list-style-type: none"> <li>• High priority for response for all disruptions up to 2 hours</li> <li>• Contact is initiated with all facilities in this category to determine needed response</li> </ul>	<p>Medical facilities, including nursing homes, care homes and medical offices            Schools, especially nursery schools and elementary schools            High-rise buildings</p>
<p><b>Respond in First 6 Hours</b></p> <ul style="list-style-type: none"> <li>• Priority for response when disruptions last longer than 2 hours</li> <li>• Response needed within 6 hours</li> <li>• Contact is initiated with all facilities in this category to determine the necessary response</li> </ul>	<p>Water facilities, including water supply and wastewater treatment</p>
<p><b>Response on Call</b></p> <ul style="list-style-type: none"> <li>• Lower priority, but still critical</li> <li>• Response is made upon a request for assistance from a facility</li> </ul>	<p>Public assembly            Commercial or industrial property</p>

# Vulnerable Customer Groups

## **Individuals Dependent on Electric Power**

Vulnerable customer groups are different from "essential" or "critical" facilities in that these are individual customers not in a group setting.

## **Identification of Individuals Dependent on Electric Power**

Individuals dependent on electric power are people who would be seriously affected by a disruption in electrical service, including individuals who use electrically powered medical support equipment, people with disabilities, and others with access and functional needs. For those people who use medical support equipment (e.g., respirators, automatic medication dispensers), short-term disruptions can be serious or even life threatening.

Some utilities have already identified these individuals and have procedures for notifying them of power disruptions.

## **Gathering of Information on Individuals Dependent on Electric Power**

Collecting information on individuals dependent on electric power can require a great deal of effort and resources. To be genuinely useful, the information must be kept up to date. Ways to gather this information could include: 1) using existing government agency contacts, 2) coordinating with local area agencies on aging, 3) coordinating with community-based organizations, 4) relying on self-reporting, and 5) having utilities request the information from their customers. **Attachment 2 Vulnerable Populations Identification** is designed to be sent to customers by utilities to develop a database of vulnerable customers.

How social service and emergency response lists are compiled and updated varies widely among communities. In any case, a local government that decides to compile a list of individuals dependent on electric power should first consult with local social service and emergency response organizations to determine whether this information is already available. In addition to local organizations, county and state organizations are also potential sources of this information.

Utilities can also gather this type of information from their customers via a questionnaire enclosed in their bills.

Whatever technique is used, it is extremely important to maintain the privacy of the individuals.

# Response Concept of Operations

## Concept of Operations

Local government notifications of power disruptions is dependent on arrangements between local emergency managers and the utility that serves the jurisdiction.

## Response to a Notice of An Electric Power Disruption

Response to an electrical power disruption notice should include: initiating deployment of available backup systems, alerting the public, providing them with preparedness tips and moving emergency response equipment and personnel into rapid response positions. Early implementation could decrease the magnitude and impact of any outages.

### Suggested Local Government Response to Electrical Disruption Notifications

Action	Agency/Department Initiating Action
Alert local government departments/agencies of potential disruptions such as police, fire, emergency medical, and public works.	Local emergency manager
Establish contact with the electric utility representatives.	Local emergency manager
Advise residents and businesses in the jurisdiction. Include notice to check the status of any back-up equipment, and to reduce electric consumption.	Local electric utility
Check the status of local government communication equipment, the availability of generators and fuel.	Public works
Reconfigure traffic patrols to accommodate the flow of traffic through intersections where traffic control devices are inoperable.	Law enforcement
Alert public to reduce consumption.	Local electric utility through media

<b>Action</b>	<b>Agency/Department Initiating Action</b>
Reduce local government electricity consumption.	All local government departments
Position crews to operate backup equipment.	Public works
Delay emergency responders shift changes.	Jurisdictional police, fire, emergency medical, public works
Open shelters for persons who may need a cool (in summer) or warm (in winter) place. Consider the use of public pools for extended hours and other public buildings as cool shelters.	Care & Shelter Coordinator
Proclaim an end to the alert.	Local emergency manager

**Response During a Disruption**

This section addresses procedures for actual disruptions, which may occur without warning at any time of the year.

Limited disruptions affect only a few select customers and extend for short periods of time (less than approximately 2-4 hours). The primary focus is to respond to the needs of individuals dependent on electric power and/or critical facilities that may be affected. The following chart presents possible actions.

## Suggested Response to Limited Disruptions

Action	Agency/Department Initiating Action
Determine the possible impact on critical facilities and/or individuals dependent on electric power.	Local government emergency manager
Dispatch personnel to deal with: traffic issues that include inoperable traffic control devices, railroad crossing gates, downed power lines, fire and security alarms, medical calls.	Police Fire Emergency medical services

### Response to Extended Disruptions

Extended disruptions affect a larger area, multiple use customers, and may last for a relatively long time (up to 6 hours or longer). The focus of the response is to identify critical facilities and individuals dependent on electric power that may be affected and to dispatch personnel to provide assistance. This action could be taken in advance of receiving calls for assistance. Emergency responders may require some prioritization of response.

## Suggested Response for Extended Disruptions

Action	Agency/Department Initiating Action
Establish contact with local electric utility representative.	Local government emergency manager
Determine the possible impact on critical facilities and/or individuals dependent on electric power. Establish response priorities.	Local government emergency manager
Advise emergency responders (e.g., police, fire, emergency medical services) of the extent of the disruption. Request assistance based on information obtained during phone calls with the affected facilities and individuals.	Local government emergency manager

<b>Action</b>	<b>Agency/Department Initiating Action</b>
Dispatch personnel to deal with: Traffic issues Security issues Downed power lines Fire and security alarms Medical needs Critical facility needs Affected local government facilities	Police Fire Emergency medical services Public works
Coordinate with the local electric utility provider to provide support for repair crews.	Local government emergency manager

**Response for Large Area Disruptions**

When large areas of the jurisdiction, or perhaps the total jurisdiction, are without electric power, the response is essentially the same as for an extended disruption. The only distinction is that a complete prioritization of responses is necessary because local government resources may not be adequate to meet all the needs for assistance. In addition, it may be necessary to ask for activation of the EOC and/or operational area, as mutual aid may be required. A region wide disruption that affects large portions of local jurisdictions and more than one city or county may involve invoking general disaster plans and activating the Regional and State EOCs.

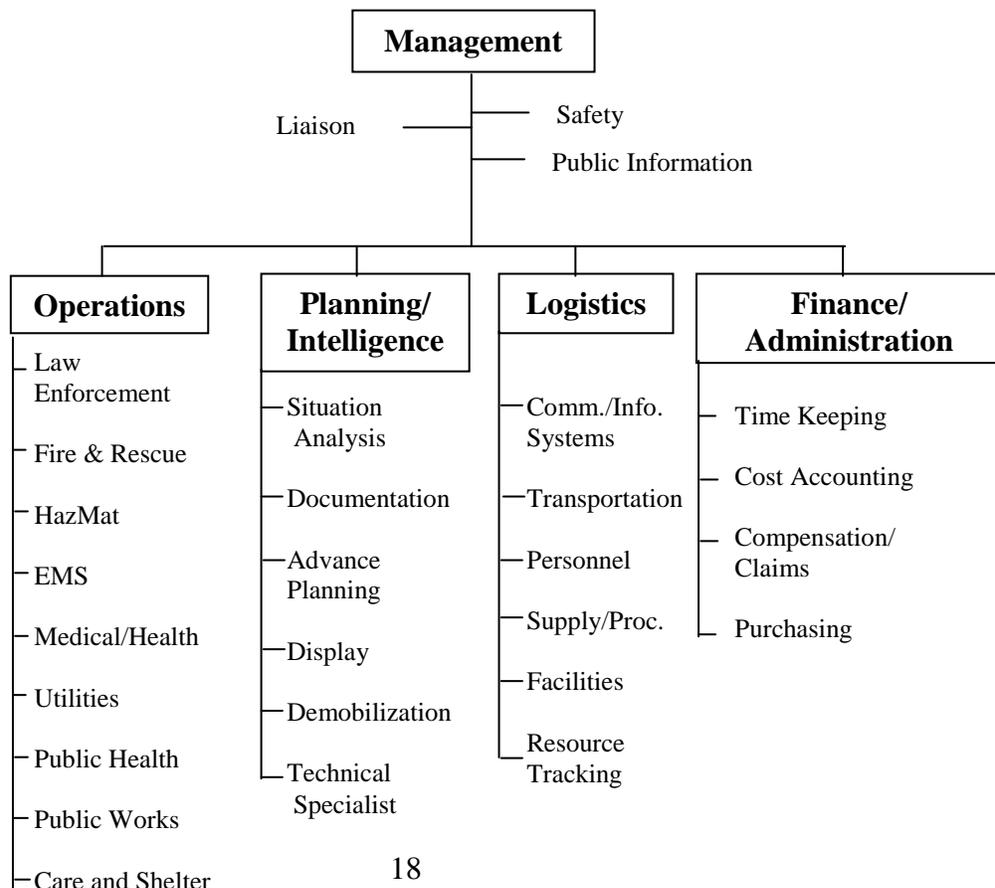
The response actions for large area disruptions are the same for extended disruptions with the following additions:

**Suggested Response for Large Area Disruptions**

<b>Action</b>	<b>Agency/Department Initiating Action</b>
Evacuate residents to shelters as needed (e.g., cooling shelters or heated facilities depending on weather conditions).	Emergency medical services, police

Action	Agency/Department Initiating Action
Recall emergency staff.	Police, fire, emergency medical services, public works, and others as necessary.
Proclaim a local emergency.	Local government emergency services director or governing body
Activate EOC and activate/request Operational Area activation.	Local government emergency manager
Request assistance under mutual aid.	Local government emergency manager

**SEMS EOC Organization** The following is an example of what the SEMS structure could be for a large jurisdiction in response to a region wide electrical disruption. The affected jurisdiction would determine the level of activation necessary.



## Recovery

Although power disruptions may be brief, the response and recovery actions could overlap. Documenting effective lessons-learned will improve future responses.

Before a disruption is over and while response actions are still being undertaken, the local electric utility may need support from the local government (e.g., police, fire, public works) to gain entry to equipment sites, to secure repair sites from unauthorized access, or to provide other support services. It is important for local governments to have an established procedure for providing this support to the utility. The communication protocol for the local electric utility to request this support and manner in which local government personnel can provide it should be established before any emergency situation.

Local government staff should be cognizant to avoid dangerous exposure to unfamiliar equipment or attempting repairs on electrical utility equipment because of potential safety and liability risks.

Immediately after any electrical power disruption event, it is important for the local jurisdiction to evaluate its capabilities and take appropriate action in preparation of future similar events. When the power returns, all backup and emergency equipment should be returned to standby and be ready for subsequent disruptions.

Further, after a power disruption, an after action review could help to identify any weaknesses in the overall process and to make corrections. This type of debriefing can help prepare for the next disruption.

## Suggested Recovery Actions

Action	Agency/Department Initiating Action
Provide support to the local electric utility repair crews that must repair equipment on public or private property.	Police, fire, public works
Upon notice from the local utility that the situation has been restored to normal, proclaim an end to the event.	Local government emergency director Local government representative
Inform local government departments to revert to normal operations.	Local government emergency manager Local government representative
Shut down emergency generation and coordinate the retransfer to local electric utility power.	Local electric utility representative, Public works
Remove portable generators and return them to storage.	Public works
Return backup equipment to standby status and replenish fuel supplies.	Public works
Reset traffic signals.	Public works
Repair buildings, grounds, and street damage.	Public works
Complete damage reports if an emergency was proclaimed.	Local government emergency manager Local government representative
Hold a debriefing.	Local government emergency manager Local government representative
Conduct an after action review.	Local government emergency manager

# Mitigation

Local governments can take steps that will improve their ability to cope with electric power disruptions in the longer term. These steps include, but are not limited to, the use of building codes, zoning ordinances, climate action plans and growth and development projections.

## **Building Codes**

Building codes are used to ensure that construction in a community meets minimum standards required for public health and safety and for quality workmanship. Building codes can also be used to increase a community's ability to deal with disruptions to the electric power infrastructure by requiring facilities to be adequately prepared for power disruptions, and increase the efficiency of power consumption.

Modification of a building's use can significantly affect electrical service requirements, which may or may not be readily identified on building permits. Some examples of this type of project include the following:

- Conversion of conventional commercial or industrial facilities to computer-based company operations with extensive computer equipment and air-conditioning requirements;
- Conversion of a commercial building to residential condominiums; and
- Rehabilitation of residential buildings to increase their electrical service.

Local governments can use zoning change requests, permit applications, economic development plans, or other means to identify modification to rehabilitation projects.

Communities that adopt building codes as part of their municipal code - thus making compliance mandatory - frequently use several codes developed by national organizations. While model codes provide basic guidance, municipalities often amend and modify them to meet specific local requirements.

**Zoning Ordinances**

Zoning ordinances stipulate the type of land use that is acceptable in various locations in a community. Zoning can significantly affect the electric power requirements of an area. For example, an area zoned "residential" will have a very different electricity load profile than an area zoned "commercial" or "industrial."

There are two ways in which zoning can affect the electric power infrastructure. First, zoning plays a role in determining the location of a site for electric power facilities, including power plants, transmission lines, and substations. The current trend of constructing many small and medium scale "peaker" power plants has ignited zoning controversies.

It is important for a community to understand that the location (or restrictions on the location through zoning) of electric power facilities within its boundaries may (or may not) directly affect the reliability of the power supply to that community. A community that is home to a peaker plant, for example, does not necessarily have more reliable service. Likewise, not having a power plant does not imply decreased reliability. Electric power plants are built to provide power to the entire electric grid, not just to the area in which they are located. However, a distribution substation, which connects customers to the grid, will directly affect the reliability of electrical service in the area in which it is located.

**Growth and Development Projections**

All electric power companies develop projections of long-term demand as a starting point for planning the expansion of electric power generation, transmission, and distribution facilities. Projections are made for a range of planning horizons (from 1 to 20 years) and for a range of geographical resolutions (for the entire system to individual distribution substations and feeder lines). In general, the shorter the planning horizon and the larger the geographic resolution used, the more likely the demand forecast will be reasonably representative of the actual situation.

Zoning affects the electric power infrastructure because it influences and is influenced by the type and rate of development.

# Power Disruption Safety Tips

This section provides some preventative actions that can be taken by the general population, older adults, people with disabilities, and others with access and functional needs to be better prepared during power disruptions.

## General Public

### What Should I Do?

- Meet with your family and/or neighbors to discuss the disruptions and how to prepare and respond.
- Have a plan for medically fragile friends and relatives. If they use life support equipment, know if the equipment has a battery backup and test it.
- Know and watch for signs of heat stress, particularly in small children, older adults, and medically fragile.
- Cordless telephones may not work during a power disruption, so consider keeping a standard phone plugged into a second phone jack in case it is ever needed. A cellular phone is also a good backup option, but be aware that in a widespread emergency any communication network may quickly become overloaded with calls.
- When an electrical disruption occurs, turn off all appliances, computers, and lights except for one that will indicate when power has been restored.
- Food Safety - Perishable food should not be held above 40 degrees for more than 2 hours. During a power disruption, do not open the refrigerator or freezer, as an unopened refrigerator will keep food cold enough for a couple of hours. If the refrigerator was out for more than 2-4 hours, perishables should be discarded.

## During Summer

- Be aware of days of extreme heat predictions by listening to the radio, TV, and/or monitoring the news.
- Stay indoors and avoid extreme temperature changes.
- Wear light colored, lightweight, and loose fitting clothing.
- Make appointments for the doctor, shopping, etc., in the morning.
- Prevent dehydration by drinking at least 6-8 glasses of fluids every day.
- Avoid alcohol and caffeine. They both dehydrate the body.
- Avoid any direct exposure to the sun. If you must go outside, wear sunscreen, and a hat and conduct outdoor activities during the coolest part of the day.

## During Winter

- If you go outside for any reason, dress for the season and expected conditions.

- For cold weather, wear several layers of loose-fitting, lightweight, warm clothing rather than one layer of heavy clothing. Outer garments should be tightly woven and water-repellent.
- Mittens are warmer than gloves.
- Wear a hat.
- Temporarily shut off heat to less-used rooms.
- If using kerosene or propane heaters, maintain ventilation to avoid build-up of toxic fumes.
- Keep heaters at least three feet from flammable objects
- Refuel kerosene or propane heaters outside.
- Conserve fuel, if necessary, by keeping your house cooler than normal.

## Special Concerns

- Health concerns associated with a rise in temperature include heat cramps, heat fatigue, heat syncope, heat exhaustion, or heat stroke.

General signs and symptoms of heat related health problems include weakness, dizziness, nausea, and/or muscle cramps.

### **For heat cramps, heat fatigue, or heat syncope:**

You should stop the activity which caused the symptoms and move to a cooler environment if feasible. If you have other medical concerns, you should contact your physician.

### **For heat exhaustion:**

Seek immediate medical attention. Do everything possible in the interim of medical advisement including moving to a cooler environment as feasible, minimize activity, drink water or juice, and use cool wet cloths on the body.

Signs and symptoms of heat stroke include sudden high temperature, headache, rapid heartbeat, difficulty breathing, rapid breathing, profuse sweating, muscle rigidity, confusion/altered mental status, and/or possible seizures.

### **For heat stroke:**

Call 911 immediately, as this is a medical emergency. Be sure to move to a cooler environment as feasible, apply cold water compresses to the body, or immerse your body in cool water while waiting for medical transport.

**Frostbite:** Frostbite is a severe reaction to cold exposure that can permanently damage its victims. A loss of feeling and a white or pale appearance in fingers, toes, or nose and ear lobes are symptoms of frostbite.

**Hypothermia:** Hypothermia is a condition brought on when the body temperature drops to less than 90 degrees Fahrenheit. Symptoms of

hypothermia include uncontrollable shivering, slow speech, memory lapses, frequent stumbling, drowsiness, and exhaustion.

**For Frostbite or Hypothermia:**

If frostbite or hypothermia is suspected, begin warming the person slowly and seek immediate medical assistance. Warm the person's trunk first. Use your own body heat to help. Arms and legs should be warmed last because stimulation of the limbs can drive cold blood toward the heart and lead to heart failure. Put person in dry clothing and wrap their entire body in a blanket.

Never give a frostbite or hypothermia victim something with caffeine in it (like coffee or tea) or alcohol. Caffeine, a stimulant, can cause the heart to beat faster and hasten the effects the cold has on the body. Alcohol, a depressant, can slow the heart and also hasten the ill effects of cold body temperatures.

**What Will I Need? An Emergency Kit Should Include:**

- A 10-day supply of any needed medication or medical supplies.
- A first aid kit for your home.
- A battery-powered radio with fresh batteries (this may be your only source of information during the disruptions).
- Flashlight or battery powered lantern and extra batteries.
- Additional supplies for special needs (i.e. infants, older adults, and pets).
- Have reserve supply of bottled water.
- Alternate ways to heat home, if necessary, i.e., dry firewood for a fireplace or woodstove, or kerosene for a kerosene heater.

**Older Adults  
and/or Persons  
with Disabilities**

- Contact the local electrical utility company in advance about any specific needs regarding machines or other life-sustaining devices that depend on electricity. If lack of electricity would create an immediate threat to life or safety, local public safety agencies should also be given advance notification.
- To expedite emergency response, house numbers should be readily visible from the street.
- For people using battery-powered mobility or breathing equipment, assure that batteries are fully charged each day. Contact your medical equipment provider to be aware of their ability to assist during a power disruption.
- Establish a support network of friends and neighbors who can check in periodically if the power is out, to assure that assistance is available if needed.

- Keep a flashlight or lantern equipped with fresh batteries within easy reach, so that some light is immediately available if the power does go out. For people with limited reach or grasping ability, inexpensive battery-operated touch lamps are a good option. Such lights can be installed in areas of greatest use, and are small enough to be carried in an emergency. Do not use candles or oil lamps for light in an emergency, as they can be fire hazards.
- Store supplies of medicine and drinking water so they will be readily accessible in the event of a power disruption. Some household water supplies may be disrupted during power disruptions.
- Assemble a 10-day supply of prescription medications and durable medical goods and store them in a convenient location, in the event that a prolonged electrical disruption or other emergency should require evacuation.
- A copy of emergency contact numbers and current prescriptions should be stored in the same location.

## **Final Note**

### **Legal and Regulatory Requirements**

Some solutions considered in planning for a local electric power disruption cannot be implemented without obtaining special legal and regulatory authority. Local governments should fully engage legal counsel to ensure that all necessary authorizations are in place.

Further, some actions could subject the local government to liabilities. Again, proper legal measures should be in place to address these liabilities.

### **Coordination With the Local Electric utility**

A local electric power disruption preparedness plan should be coordinated with the local electric utility service providers. Many aspects of a plan require close cooperation between the local government and the utility. These issues should be worked out and agreed upon in advance, before the disruption occurs, to ensure an efficient and effective response.

## Information Sources

The information in this guidance is based on materials that were developed by Cal OES, the City of Chicago, California's utilities and numerous public and private sector agencies. For more information, please see the following websites:

California Governor's Office of Emergency Services

[www.caloes.ca.gov](http://www.caloes.ca.gov)

California Energy Commission

[www.energy.ca.gov](http://www.energy.ca.gov)

California Independent System Operator

[www.caiso.com](http://www.caiso.com)

California League of Cities

[www.cacities.org](http://www.cacities.org)

California State Association of Counties

[www.csac.counties.org](http://www.csac.counties.org)

California Utilities Emergency Association

[www.cueainc.com](http://www.cueainc.com)

Emergency Medical Services Authority

[www.emsa.ca.gov](http://www.emsa.ca.gov)

Pacific Gas and Electric

[www.pge.com](http://www.pge.com)

San Diego Gas and Electric

[www.sdge.com](http://www.sdge.com)

Southern California Edison

[www.sce.com](http://www.sce.com)

## Bibliography and References

Energy Crisis Safety Fact Sheet for Seniors  
Fresno-Madera Area Agency on Aging  
<http://www.fmaaa.org/factsheet.htm>

Governor's Executive Order D-38-01  
State of California, Governor's Office, June 1, 2001

Implementation Plan for Executive Order D-38-01 Final Draft  
State of California, Office of Emergency Services, June 14, 2001

Safety in a Power Outage  
California Department of Public Health, Be Prepared California  
<http://www.bepreparedcalifornia.ca.gov/BeInformed/NaturalDisasters/Pages/Safety+in+a+Power+Outage.aspx>

State of California Multi-Hazard Mitigation Plan (2010) Cal OES  
[http://hazardmitigation.caloes.ca.gov/docs/2010\\_SHMP\\_Final.pdf](http://hazardmitigation.caloes.ca.gov/docs/2010_SHMP_Final.pdf)

State of California Emergency Plan (2009) Cal OES  
<http://www.caloes.ca.gov/PlanningandPreparedness/Pages/Documents-and-Publications.aspx>

Summer Safety Tips  
Fresno-Madera Area Agency on Aging  
<http://www.fmaaa.org/summersafetytips.htm>

City Response Program for Electrical Power Emergencies  
City of Chicago, Department of the Environment

Chicago Energy Emergency Response Plans  
City of Chicago, Department of the Environment

Critical Infrastructure Assurance Guidelines for Municipal Governments:  
Planning for Electric Power Disruptions  
Metropolitan Mayors Council, City of Chicago, U.S. Department of Energy

## **Attachments**

**Attachment 1:** Sample Critical Facilities Utilities Form

**Attachment 2:** Vulnerable Population Identification Tips and Samples

# Attachment 1

## Sample Critical Facilities Survey Form

(Referred to on page 10. Always consult legal counsel before deciding to use this sample.)

City of \_\_\_\_\_  
County of \_\_\_\_\_

Date: \_\_\_\_\_

Facility Name: \_\_\_\_\_

### Location Information

Facility Address: \_\_\_\_\_  
\_\_\_\_\_ Zip Code: \_\_\_\_\_

Street/Road Intersection (if no street address is available): \_\_\_\_\_  
\_\_\_\_\_

Facility Geographical Coordinates (if known):

Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_

### Contact Information

Contact Person – Business hours: \_\_\_\_\_

Phone: \_\_\_\_\_ Mobile Phone: \_\_\_\_\_  
Fax: \_\_\_\_\_ Email: \_\_\_\_\_

Contact Person – Non-business Hours: \_\_\_\_\_

Phone: \_\_\_\_\_ Mobile Phone: \_\_\_\_\_  
Fax: \_\_\_\_\_ Email: \_\_\_\_\_

**Facility Category** (*check all that apply and circle the subcategory in parentheses*):

- Emergency Services (police, fire, emergency medical, disaster agency, 911 center)
- City/County Office
- Water Facility (water supply, well, water tower, pumping station, wastewater treatment, lift station)
- School (pre-school, kindergarten, grade school, middle school, high school, college, trade school)
- Community Center (library, municipal recreation facility)
- Transportation (road intersection, rail crossing, airport)
- Telecommunications Facility (switching office, transmitter, repeater)
- Medical (hospital, emergency center, medical office, nursing home, assisted living, animal care)
- Public Congregation (recreation facility, auditorium, place of worship, theater, shopping center)
- Day Care (children, handicapped, elderly)
- Multi-unit Residential (low rise, high rise, senior)
- Hotel
- Other Government Facility
- Commercial
- Industrial
- Other (specify) \_\_\_\_\_

**Electrical Service**

Feeder Circuits (if known): \_\_\_\_\_

Current Electrical Service Inputs (if known): \_\_\_\_\_

Voltage (V): \_\_\_\_\_ No. of Phases: \_\_\_\_\_ No. of Wires: \_\_\_\_\_

## Backup Equipment

Is an On-site Backup Generator Available? Yes \_\_\_ No \_\_\_

If Yes, Give Type of Generator: \_\_\_ Diesel: \_\_\_ Natural gas: \_\_\_ other: \_\_\_

Generator Capacity (kw): \_\_\_\_\_

Portion of the Facility's Normal Load that the Generator can handle: \_\_\_\_\_%

On-site Fuel Storage Capability / Time Generator can operate before refueling: \_\_\_\_\_

Generator Transfer Switch: Automatic: \_\_\_ Manual: \_\_\_

Uninterruptible Power Supply (UPS) available: Yes \_\_\_ No \_\_\_

UPS Capacity (amp-hours): \_\_\_\_\_

Equipment Connected to UPS: \_\_\_\_\_

Time UPS can operate before recharging: \_\_\_\_\_

Rapid connection switches for portable generation available: Yes \_\_\_ No \_\_\_

## Shelter Capability

Is the Facility available as a shelter?

For Summer cooling: Yes \_\_\_ No \_\_\_

If Yes, give the approximate shelter capacity (No. of people): \_\_\_\_\_

For Winter warming; Yes \_\_\_ No \_\_\_

If Yes, give the approximate shelter capacity (No. of people): \_\_\_\_\_

If Yes, are toilets and shower facilities available? Yes \_\_\_ No \_\_\_

## Additional Comments:

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## **Attachment 2**

### **Vulnerable Population Identification**

(Referred to on page 13. Always consult legal counsel before deciding to use this sample.)

The following is a sample tool that public safety agencies may use to request information directly from vulnerable (i.e., life support) customers. Its use is as follows:

1. Public safety agencies that desire additional information regarding vulnerable persons within their jurisdiction may create a letter and/or survey. This letter should be developed in consultation with the affected utility. An example is provided.
2. Public safety agencies may then request the utilities to send out the letter to those customers that may be vulnerable to power-outages included within the public safety agency's jurisdiction. The public safety agency should consult with the utilities to determine the appropriate recipients of the letter and/or survey.
3. Utility customers that want to self identify their vulnerability to power outages may return the completed survey directly to the public safety agency.
4. Public safety agencies are responsible for maintaining the confidentiality of the personal information (name and address) of any customer that replies to the survey.

(Always consult legal counsel before deciding to use this sample.)

## **Sample Public Safety Agency Letter and Form For Identifying Power-Outage-Sensitive Individuals**

Dear resident:

You or someone at this address has been identified by your power utility as a resident on the life support and/or medical baseline rate. Therefore, you may be more sensitive to power interruptions. Your local public safety agency is identifying individuals that may be particularly vulnerable during electrical power outages. These are individuals that use life-sustaining equipment at their homes due to serious medical conditions, significant physical or mental impairments, or other limitations and would be adversely affected by an interruption in power. If you believe you qualify and would like to participate, please complete and return the attached survey. Your participation is appreciated but is completely voluntary.

Please note that your participation to this survey does not imply any additional services or obligations toward you from your local public safety agency. This information may be used to assist your local public safety agency to develop emergency plans or procedures to better serve the community during electrical power outages. The local public safety agency will determine the appropriate use of this information

Completed surveys should be sent to the following address:

*Name of Public Safety Agency  
Mailing Address  
City, State, Zip Code*

\_\_\_\_\_  
(Signed)

For questions, additional surveys, or information contact:

\_\_\_\_\_  
(Name of Public Safety Agency)

\_\_\_\_\_  
(Telephone)

***Public Safety Agencies: Please treat as confidential all individual personal information contained in accompanying forms.***

(Always consult legal counsel before deciding to use this sample.)

## Sample Power-Outage-Sensitive Survey Form

For \_\_\_\_\_

(Name of Public Safety Agency)

Date: \_\_\_\_\_

Name: \_\_\_\_\_

Street Address: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Mailing Address: \_\_\_\_\_ Zip Code: \_\_\_\_\_

City/County: \_\_\_\_\_

Phone: (\_\_\_\_) \_\_\_\_\_ Mobile Phone: \_\_\_\_\_

E-Mail: \_\_\_\_\_

Reason For Power-outage Sensitivity: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**Do you have any medical equipment that requires uninterrupted electric power?**

Yes \_\_\_\_\_ No \_\_\_\_\_

**What type of electrically powered medical equipment do you use?** \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**How often do you use this equipment?** \_\_\_\_\_

**During what periods of the day do you use this equipment?** \_\_\_\_\_

\_\_\_\_\_

**Do you have a backup power supply for this equipment (e.g., battery)?**

Yes \_\_\_\_\_ No \_\_\_\_\_

**If yes, please describe the backup power supply and approximately how long it can operate the equipment:**

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*Please read the following, sign, and return this form to:*

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*Name of Public Safety Agency  
Mailing Address  
City, State, Zip Code*

The undersigned understands and agrees that the above information is for informational purposes only and shall not be construed under any circumstances to create any special duty or relationship of any kind between the undersigned and the \_\_\_\_\_ to provide police, fire or emergency services beyond those afforded to the general public.

(Name of Public Safety Agency)

The undersigned understands and agrees that the names, telephone numbers, and nature of the medical condition listed above can be released to the emergency and law enforcement agencies responding to a call for assistance and that this information may be broadcast by dispatchers over emergency radio frequencies to responding emergency personnel.

Signature: \_\_\_\_\_

***Public Safety Agencies: Please treat as confidential all individual personal information contained in accompanying forms.***