San Francisco Department for the Environment

Solar+Storage for Resilience

Emergency Plan Review

EPR

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1 Introduction

Municipalities, States, and the Federal Government plan and prepare for disaster recovery. The Federal Emergency Management Agency (FEMA) is an agency of the United States Department of Homeland Security whose primary purpose is to coordinate the response to a disaster that has occurred in the United States and that overwhelms the resources of local and state authorities.

In the event of a citywide, countywide or stateside emergency declaration, the resources of the area and each of its municipalities should work together for the mutual benefit of all residents and visitors. In turn, the Federal Government is responsible for supporting both the state and local government in accordance with Title 44 “Emergency Management and Assistance” and the Robert T. Stafford Act of the Code of Federal Regulation.

Municipalities and States are responsible for preparing their own plans for emergency response. FEMA requires that every local jurisdiction in the United States develop and adopt an all-hazards mitigation plan as a condition to be eligible for disaster-related assistance and requires jurisdictions to update their plans every five years. To guide local entities, FEMA has produced the Comprehensive Preparedness Guide 101 which provides guidance for developing emergency operations plans. The guide promotes a common understanding of the fundamentals of risk-informed planning and decision making to help planners examine a hazard or threat and produce integrated, coordinated, and synchronized plans. The Comprehensive Preparedness Guide 101 is the foundation for State and local emergency planning in the United States. The guide integrates key concepts from national preparedness policies and doctrines, as well as lessons learned from disasters, major incidents, national assessments, and grant programs.

The San Francisco Solar+Storage for Resilience Project plans to integrate renewable photovoltaic generation with energy storage to provide power to facilities that are used in an emergency and require electricity for their continued operation. This report investigates the content of the existing disaster plans for San Francisco and other researched State plans to determine if existing plans identify the buildings that are to be used in an emergency and also the electricity needs of such buildings. Applicable content from the referenced reports has been reproduced in this document to provide context. This report highlights the content of the researched reports and also provides commentary on the observations made and the applicability to a Solar+Storage for Resilience strategy to provide electricity.

2 Plans Researched

The primary research work has focused on San Francisco's response to an emergency, the plans San Francisco has in place to deal with such events, and the role that Solar+Storage for Resiliency can play in the emergency response plans. In order to compare other municipality's responses to disasters and to determine if Solar+Storage for Resiliency is suitable for other areas of the country emergency management plans from the City and County of San Francisco (CCSF) and the wider United States were reviewed.

2.1 San Francisco

The following San Francisco plans were reviewed:

- CCSF All-Hazards Strategic Plan
- CCSF Emergency Response Plan and ESF Annexes
- CCSF Energy Assurance Strategy
- CCSF Hazard Mitigation Plan

2.2 Wider U.S

The following plans of other cities were reviewed:

- San Diego, California - Emergency Operations Plan
- St. Louis, Missouri - Emergency Operations Plan
- Austin, Texas - Emergency Operations Plan
- Baltimore, Maryland - Disaster Preparedness Plan
- Portland, Oregon - Local Energy Assurance Plan

2.3 Comparison Criteria

In order to provide a comparison between the San Francisco Hazard Mitigation Plan and other cities plans, the below metrics were reviewed in each plan to determine their key differences with respect to the Solar+Storage for Resiliency project.

- Long term power outages identified as a risk
- Back-up generation needs identified
- Solar as a generation technology identified
- Energy storage identified as a generation/storage technology
- Microgrids identified

3 San Francisco Disaster Preparedness

The San Francisco Department of Emergency Management (SFDEM) is an active partner in the Solar+Storage for Resilience Project.

The SFDEM leads the City in planning, preparedness, communication, response, and recovery for daily emergencies, large-scale citywide events, and major disasters. SFDEM is the vital link in emergency communication between the public and first responders, and provides key coordination and leadership to City departments, stakeholders, residents, and visitors. Four San Francisco plans that relate to emergency operations have been reviewed through the lens of where Solar+Storage for Resiliency can play a role.

3.1 CCSF All-Hazards Strategic Plan – 2008

3.1.1 Purpose

The All-Hazards Strategic Plan is intended to enhance the City's ability to deter, prevent, respond to, and recover from acts of terrorism and natural and human-caused disasters through the development of one common preparedness vision and strategy.

The strategic planning effort is designed to assist citywide senior leadership in directing programmatic efforts, accomplishing results, ensuring accountability, and properly allocating limited resources for five years before the plan is updated. The Strategic Plan reflects the expertise of stakeholders from all levels of government, public and private agencies, and non-profit organizations. The Strategic Plan is designed to serve as a long-term guide that is able to direct both short- and long-term efforts of City and non-governmental agencies to accomplish a single emergency management and homeland security vision and mission.

3.1.2 Content

The San Francisco emergency management stakeholders identified 20 strategic goals that have been organized into mission areas that align with the Department of Homeland Security Target Capabilities List: common, prevent, protect, response, and recover. These goals are provided in the table below:

Table 1: San Francisco Strategic Goals

Strategic Goal	Description
1	Develop, maintain, and sustain a citywide, comprehensive, risk-based emergency management and homeland security program.
2	Enhance the City's emergency management and homeland security training and exercise program.
3	Ensure sufficient voice and data communications capabilities are in place to allow for effective inter-agency, multi-jurisdictional communication.
4	Improve community disaster preparedness and response capabilities.
5	Secure City leadership's commitment and adequate, sustainable funding for emergency management and homeland security capabilities, and define the DEM/DES role.
6	Build the City's threat-gathering and analysis capabilities.
7	Strengthen chemical, biological, radiological, nuclear, and explosive detection capabilities.
8	Develop and implement a comprehensive critical infrastructure protection program.

9	Ensure consistent use of the National Incident Management System and the Incident Command System.
10	Improve the functional and operational capabilities of Department Operating Centers.
11	Identify and formalize a resource logistics and distribution strategy.
12	Coordinate and participate in regional efforts to effectively utilize volunteers.
13	Coordinate and participate in regional efforts to effectively manage donations.
14	Improve chemical, biological, radiological, nuclear, and explosive/weapons of mass destruction/hazardous materials response and decontamination capabilities.
15	Work with regional groups to develop evacuation and/or shelter-in-place plans and procedures.
16	Strengthen joint information centers, emergency public information, and warning capabilities.
17	Enhance public health, healthcare, and medical examiner readiness.
18	Strengthen mass care (sheltering, feeding, and related services) capabilities.
19	Enhance structural damage assessment capabilities.
20	Build the City's capabilities to restore lifelines and facilitate economic and community recovery following a major incident.

The strategic goals where there is a role for Solar+Storage is strategic goals, 4,16,17,18 and 20 where the restoration of lifelines such as power are required to provide essential services. Within the plan, several objectives are recorded with respect to the recovery of services such as electricity:

- Establish a citywide recovery planning workgroup to organize, implement, maintain, and improve recovery planning activities.
- Integrate critical infrastructure/key resource providers for City lifelines, private businesses, professional associations, regional organizations, and NGOs into workgroups. Educate senior leadership and elected officials on the need for recovery planning and provide them information about their roles in supporting and sustaining recovery planning efforts.

3.1.3 Summary

The All-Hazards Plan was completed in 2008 and sets out strategic goals for San Francisco. The plan is a strategic-level plan and the scope of the document is not to investigate particular buildings used in disaster preparedness or technologies to solve the issues identified. The report highlights 20 goals and details steps required to implement the goals. The Solar+Storage for Resilience Project can be one of the solutions for the implementation of strategic goals 4,16,17,18 and 20.

3.2 CCSF Emergency Response Plan – 2010

3.2.1 Purpose

The Emergency Response Plan (ERP) addresses the roles and responsibilities of the CCSF during all-hazards emergency response. Specifically, the ERP identifies and describes CCSF's interaction with regional, State, and Federal entities, the role of the San Francisco Emergency Operations Center (EOC), and the coordination that occurs between the EOC and City departments and agencies.

In addition to this plan, every department within CCSF maintains a departmental Continuity of Operations Plan (COOP), which shall be consistent with the provisions of the ERP.

3.2.2 Content

The document describes in detail the function and responsibilities of the San Francisco EOC and other emergency coordination entities such as the Department Operating Centers (DOC).

The CCSF EOC is the central coordination point for multi-agency emergency management coordination. The purpose of a multi-agency coordination point is to provide a location to collect and disseminate information, provide a common operating picture of citywide response activities, and facilitate actions necessary to protect residents and property of CCSF during a citywide event.

The EOC exchanges information with DOCs and other governmental and non-governmental agencies in order to maintain a comprehensive situational analysis. It also serves as CCSF's Multi-Agency Coordination Center, thereby ensuring that all response systems are interconnected and complementary rather than duplicative.

The EOC is located at a secure facility within the jurisdiction. If this EOC site is not operable, a secondary location will be designated as the alternate EOC site. Relocation to the alternate EOC site may be considered when any of the following situations are encountered:

- Structural or non-structural damage that make the building unsafe or uninhabitable
- Loss of power, water, phone service, or other utilities occurs.

3.2.3 Summary

The ERP document describes the function of how agencies coordinate in an emergency to deliver services. The ERP does not identify buildings other than the EOC and DOC as this is the focus of the document. The document does highlight contingencies should electricity not be available. The document does not state the level of power required at each building type nor does it state if emergency power is provided to these buildings.

The EOC and DOC buildings are included in San Francisco's emergency plans and will be investigated for their suitability for Solar+Storage as part of the Solar Pathways Project.

3.3 CCSF Emergency Response Plan – Water and Utilities Annex #12

3.3.1 Purpose

The Water and Utilities Annex to the ERP provides guidance on local assistance and resources to enable restoration of water systems and utilities after a large-scale event in the City. The purpose of this function is to identify water system and utility shortfalls, assist water system and utility providers with requests for emergency response assistance, and coordinate private and public sector response efforts to ensure timely restoration of water systems and utilities following a large-scale disaster or event.

3.3.2 Content

The Water and Utilities Annex supports emergency response operations through the facilitation of assessment and restoration of damaged water and utilities infrastructure systems within CCSF. This annex details the procedures, responsibilities, and concept of operations during a potential, imminent, or declared emergency. Specific objectives are as follows:

- Coordinate status reporting of all utility systems.
- Coordinate the restoration and repair of disrupted municipal services with utility services, such as the water and wastewater.
- Coordinate with utility service providers for the assessment and restoration of disrupted non-municipal services, such as cable, Internet, landline phone, cell phone, gas, and electric.

3.3.3 Summary

The Water and Utilities Annex describes the organizational structure and roles that will be utilized to coordinate utility restoration after a major disruption but does not go into any detail about energy needs or priorities.

3.4 CCSF Energy Assurance Strategy – 2013

3.4.1 Purpose

The purpose of the Energy Assurance Strategy (EAS) is to provide a pathway for San Francisco to become more resilient to any type of hazard that disrupts or threatens the energy supply.

Cities such as San Francisco generally have not assessed their energy readiness in emergency or disaster situations. The conventional wisdom is to assume that generator back-up systems are in place and they would sustain the community's needs in a power emergency. We have seen in recent disasters e.g., Hurricane Sandy, that energy contingency planning has been uncommon, and that response and recovery efforts have been impeded because sufficient planning for energy and fuel needs have rarely been implemented.

Energy assurance planning is consistent with disaster readiness, climate action, and emergency response planning efforts.

3.4.2 Content

The EAP has clear objectives and these are replicated below:

- Identify energy assurance stakeholders, both public and private, and incorporate them into the planning process.

- Assess San Francisco's infrastructure systems, explore energy and resource needs, map existing energy infrastructure and supplies, and identify continuity gaps for better emergency energy access and use.
- Incorporate energy assurance in citywide planning efforts as appropriate and feasible.
- Build local energy awareness about and expertise on the dependencies and interdependencies among emergency service systems and their inherent energy needs.

This EAS outlines a plan of action to develop and implement a robust City-adopted plan. The plan, which was originally intended to be developed over the course of 24 months, was slated to perform the below tasks:

- Develop criteria for identifying key assets, both public and private, and including contact information.
- Identify key asset emergency energy availability and needs.
- Identify emergency energy dependencies and interdependencies and their corresponding continuity gaps.
- Include a process for maintaining a current key asset database.
- Identify emergency and capital planning processes into which energy assurance planning should be integrated.
- Include a process for regular interagency coordination to bridge the gap between the emergency planning process and energy assurance planning efforts, as well as an ongoing review and update of the EAS.

The EAS provides significant details on San Francisco and items that relate to energy such as the following:

- physical setting
- demographics
- existing land use
- community planning districts
- development trends

The EAS identifies the types of key buildings within the city that should be provided with power following an emergency event. Key assets are essential services, infrastructure, or facilities that support vital every day and emergency operations in San Francisco. The EAS development process will entail engaging with a wide array of stakeholders to conduct additional research on the municipal and non-municipal (i.e., commercial, residential, and other public and private) key assets and related information.

As of the preparation of the EAS Strategy, the following main sectors were known to include key assets of critical importance to emergency planning efforts:

- municipal (e.g., City Hall, emergency operations centers, fire houses, police stations, hospitals, public transit facilities and operations, community gathering facilities, and critical lifelines)
- State (e.g., highways and key state buildings)
- commercial (e.g., gas stations, grocery stores and food suppliers, pharmacies, and banks)
- residential (e.g., senior housing, hospice care, and emergency housing sites)
- other public and private services (e.g., community centers, hospitals and clinics, waste management facilities and services, the San Francisco Port and water-based transportation providers, and San Francisco International Airport)

The EAS documents the city energy profile to provide a basic overview of San Francisco's energy supply and demand as it relates to the various sectors that make up San Francisco (i.e., municipal, residential, transportation). The EAS recommends development work to include coordination with the local electric utilities (Pacific Gas and Electric Company [PG&E] and the San Francisco Public Utilities Commission) staff to identify and document the energy substations, service areas, potential vulnerabilities, and resiliency opportunities.

The EAP also mentions technologies where Solar+Storage may have a role. The EAP notes that because renewable energy resources are regenerated constantly and over a shorter period of time than conventional energy sources, renewable energy is a good fit for a long-term approach to increasing energy resiliency. The EAP references a 2012 Californian Energy Commission document.

"Renewable energy can play a significant role in energy assurance planning by helping to ensure energy continuity, stabilize energy costs, and offset supply disruptions. . . By harnessing renewable energy resources, local governments build energy resilience and reduce reliance upon fossil fuels. Renewable energy systems can also provide backup power for critical infrastructure facilities during an energy emergency" (California Energy Commission, 2012).

The EAS provides a broad overview of the generator and storage tank capacity within city municipal buildings. This EAS does not currently include all City departments, commercial, residential, or any other public or private key asset holders.

The 2013 EAS identifies a suite of actions that directly relate to the Solar+Storage for Resiliency Project. The actions are extracted below from the EAS:

Action/Project	**Energy Assessment of Key Facilities & Emergency Services**
Description	Identify critical electric loads and fuel needs for key public assets, including emergency operations center, fire and police departments, hospitals, schools, etc. Identify existing backup generation and renewable energy assets. Determine if other key facilities are pre-wired for backup generation. Identify onsite fuel storage (type and capacity). Integrate database into EAS and other emergency management plans. Identify gaps in energy assurance at critical facilities, and strategies to address them. Identify opportunities to integrate renewable energy, energy storage, and cleaner back-up generation into key facilities for ongoing use, as well as emergency power generation.
Time Frame	12-24 months
Estimated Cost	50% of one full time staff member
Possible Funding Source	TBD

Action/Project	Private Sector Engagement & Energy Assessment of Key Facilities
Description	Work with private sector (e.g. through Lifelines Council) to identify critical services and facilities for emergency recovery, such as grocery stores, pharmacies, gas stations, banks, and community centers. Identify critical electric loads and fuel needs for key private assets during emergency operations. Identify existing backup generation and renewable energy assets. Determine if other key facilities are pre-wired for backup generation. Identify onsite fuel storage (type and capacity). Integrate database into EAS and other emergency management plans. Identify business case for private businesses to integrate energy assurance actions into their operations. Identify private sector energy assets that could be used in support of city's emergency response (e.g. mobile generators, solar and battery-based EV charging stations.
Time Frame	12-24 months
Estimated Cost	10% of one full time staff member
Possible Funding Source	TBD

3.4.3 Summary

The EAS differs from various types of municipal response and long-term development plans, such as the General Plan, Emergency Operations Plans, and local hazard mitigation plans that do not address energy interruptions or the resulting impacts in depth. The EAP will fill preliminary planning gaps that exist between the emergency and energy operational spheres.

The implementation of the above actions and all of the other recommendations with the EAS were based upon grant funding. Unfortunately, the actions that directly relate to the Solar+Storage for Resilience Project have not been funded at this time.

While the current version on the EAS does not specifically address microgrid development for critical facilities, it would be recommended for a future EAS to investigate this strategy. Some sample language is suggested below:

Identify microgrid zones where critical electric loads are in a proximate location. Electric loads shall be for key public assets, including emergency operations center, fire and police departments, hospitals, schools, etc. Generation and storage assets may be able to be shared between the buildings in emergency operations mode by identifying such zones in partnership with the local utility.

3.5 CCSF Hazard Mitigation Plan - 2014

3.5.1 Purpose

The Hazard Mitigation Plan (HMP) represents San Francisco's commitment to making the city safer and more resilient by taking steps to reduce the risk from hazards before they occur. The plan describes the city's natural and human-made hazards, identifies actions the City can take to reduce their effects, and establishes a process for implementing the plan. Having a FEMA-approved plan makes San Francisco eligible for federal hazard and flood mitigation grant funding before and after a Presidentially declared disaster.

3.5.2 Content

This report reviews the HMP with respect to if energy surety is planned out and where there are opportunities for Solar+Storage to be integrated into the plan to increase resilience. This report also assesses other HMPs from around the country. In order to make some general comparisons between the plans, three key aspects of each HMP has been reviewed.

1. Hazard identification
    - identifies risks and hazards affecting the population
2. Building identification
    - key buildings identified
    - building operations plan identified e.g., functions without electricity/gas
    - emergency electrical loads identified
3. Electricity impacts identified
    - considered impact of wide-scale power loss
    - considered likely durations of power outage
    - highlighted a power restoration plan
    - detailed a temporary generation plan

Hazard Identification

The HMP provides a list and detailed analysis of all hazards that are likely to be encountered in San Francisco, these include the following:

1. Seismic hazards
    - ground shaking
    - ground failure (landslide and liquefaction)
    - tsunami
2. Weather-related hazards:
    - drought
    - flood (coastal and storm water ponding)
    - heat
    - landslide
    - wind
3. Other hazards
    - reservoir failure

- wildfire
- urban conflagration
- human-caused (hazardous material, weapons of mass destruction, energy supply, and terrorism)

Building Identification

The HMP defines an essential building or infrastructure as a public or private facility that provides essential products and services to the general public including important public safety, emergency response, and disaster recovery functions. The HMP groups the important citywide buildings by department and this summary is shown below:

Department		Number of Facilities and Infrastructure
Acronym	Name	
DOT	Department of Transportation	1
FAMSF	Fine Arts Museums of San Francisco	3
GSA	General Services Agency	2
HAS	Human Services Agency	12
JUV	Juvenile Probation Department	1
MTA	Municipal Transportation Agency	79
PORT	Port of San Francisco	164
REAL ESTATE	Real Estate Division	9
RPD	Recreation and Parks Department	107
SFAC	San Francisco Arts Commission	5
SFFD	Fire Department	44
SFPD	Police Department	13
SFPL	Public Library, San Francisco	20
SFPUC	Public Utilities Commission	67
SFFD	Sherriff Department	4
SFUSD	Unified School District, San Francisco	130
TIDA	Treasure Island Development Authority	25
WMPAC	War Memorial and Performing Arts Center	2
	Total	**1,049**

Source: CCSF Real Estate Division, Risk Management, SF Enterprise GIS, 2013.

The HMP does not provide individual building operations plans for operation without electricity/gas, nor does it define what the emergency electrical loads within the building are. It is also important to note that the HMP includes all buildings that could conceivably be used by the CCSF in an emergency. This is to ensure that the buildings are not excluded from FEMA funding should the building be used in a disaster and it not have been recorded on this list. The above list was not screened for a particular emergency, rather it states buildings which have the potential to be used for disaster preparedness and recovery.

The San Francisco DEM have quantified which buildings within San Francisco have critical, essential, desirable, and non-essential power needs following a wide scale loss of power. A full list of these buildings is contained within Appendix A.

Critical Facilities require electricity to operate in under 24 hours following an emergency. Essential facilities require power within 24-72 hours following an emergency. Desirable facilities require power at the 72 hour point in time. Facilities deemed non-essential from a power needs standpoint do not require electricity for continued operation. The DEM maintains a list of city owned and private facilities used in disaster response. There are 1,263 buildings within the DEM maintained list, some of these are private facilities which is why this is greater than the 1,049 city buildings identified in the HMP. Of these 1,263 buildings, 225 have power needs in an emergency. 127

buildings have critical power needs (<24), 20 have essential power needs (24-72) and a further 78 have desirable (72+) power needs.

Electricity Impacts Identified

The HMP identifies electricity outages as an issue that the city may face. These issues are repeated below.

San Francisco is dependent on an adequate energy supply for the functioning of four critical sectors: industrial, transportation, residential, and commercial. Because San Francisco operates on a just-in-time basis with the delivery of energy resources, any disruption to the energy supply chain may create a shortage that is felt immediately. The HMP identifies that energy supplies may be disrupted in two ways:

- Intentional: Outages that are planned or scheduled, such as for maintenance; unscheduled disruptions, which are generally done on the spot; demand-side management disruptions done as part of an agreement during periods of peak system loads; and load-shedding disruptions done when the system is under extreme stress due to heavy demand or the failure of energy facilities.
- Unintentional: Outages that are unplanned. These outages may be caused by a utility company accident, an equipment malfunction or failure, vandalism or terrorism, weather, excessive operation, or overload of the system.

Energy shortages in San Francisco generally take the form of short-term interruptions in basic electrical service which, though inconvenient to users, do not pose a threat to public health and safety. A prolonged, widespread service interruption, which is an assumed risk following a large local earthquake event, will pose a much greater threat to San Francisco's overall health and safety. There will be a cascading impact on other essential infrastructure, such as fuel and water systems that require electricity for fuel pumps to operate.

PG&E is the gas and electricity utility provider for most local residents and business. While San Francisco operates its own municipal power system, the Hetch Hetchy Power System, PG&E distributes the Hetch Hetchy electricity to all San Francisco's municipal facilities, services, and customers. San Francisco Public Utilities Commission customers include San Francisco International Airport, San Francisco General Hospital, the San Francisco Municipal Railway, Police, Fire, and city residences and businesses in the Hunters Point Shipyard and on Treasure Island.

Other than the Great 1906 San Francisco Earthquake and Fire, San Francisco has experienced citywide blackouts during the 1989 Loma Prieta earthquake and December of 1999. Severe shaking associated with the 1989 quake caused PG&E power plants located in Potrero Hill and Hunters Point to trip off almost immediately. Local electric distribution lines were also hard hit. Lines broke or slapped together, arcing or shorting out transformers. Power was fully restored three days later. In 1999, a problem at a PG&E substation in San Mateo blacked out the city for a day.

Geographically, all of San Francisco is susceptible to an energy supply disruption. However, as with extreme heat events, the human impact from such events may vary. Persons who are older, who have few economic resources, or who rely on electric power for life-saving medical equipment, such as respirators, will be extremely vulnerable in power outages of this magnitude.

3.5.3 Summary

While the HMP does include power supply failure as a hazard, the HMP does not detail a power restoration plan or how temporary generators can play a role in providing power to buildings following an emergency.

However, the HMP does recognize and identify a potential mitigation measure to provide local power in an emergency. The HMP recommends that the use of solar and energy storage is implemented to power electrical

backup systems such as communications systems, city government fuel stations, water filtration systems, and water supply stations.

4 Other Emergency Management Plans

This section reviews other HMPs/Emergency Management Plans to determine if other municipalities are addressing the power needs of buildings in an emergency and if technologies such as Solar+Storage are identified as potential solutions. The review is not an exhaustive list of all of such plans and only a small sample have been reviewed.

4.1 San Diego, CA

4.1.1 Hazard Identification

The plan lists and provides information on all of the hazards that San Diego County is susceptible to.

4.1.2 Building Identification

The San Diego plan identifies both the buildings and their operational responsibility in emergency situations. An extract from the San Diego document is shown below:

AGENCIES	Planning, training & exercising	Notifications	Communications	Incident Command/ Scene Management	Triage & Treatment	Transportation	Field Treatment Site	First Aid Stations	Medical Evacuation	Special Resources	OA EOC	Medical Mutual Aid
All Affected Agencies	X											
San Diego Healthcare Disaster Council (SDHDC)	X											
County of San Diego Sheriff's Communication Center		X	X									
ARES		X	X									
Local Fire Departments	X	X	X	X	X	X	X			X	X	X
Local Law Enforcement	X	X	X	X		X			X	X	X	
California Highway Patrol (CHP)				X		X			X			
Local Base Hospitals	X	X	X		X		X		X			
Local Hospitals	X	X	X		X		X		X			
Healthcare Association of San Diego & Imperial Counties			X								X	
Local Ambulance Association			X			X			X			
Aeromedical	X		X		X	X			X			
County of San Diego EMS	X	X	X	X			X		X	X	X	X
County of San Diego Public Health Services / Emergency Preparedness	X	X	X	X			X	X		X	X	
Public School Districts							X	X				
American Red Cross – San Diego & Imperial Counties Chapters	X							X	X	X	X	
San Diego Blood Bank			X							X		
County of San Diego Office of Emergency Services (OES)	X	X	X							X	X	X

4.1.3 Electricity

The San Diego plan does not provide details on the impact of a wide-scale power outage, nor does it provide estimated power outage durations. However, the plan sets out the roles and responsibilities to prioritize the restoration of facilities/utilities, whether public or privately owned, which are essential to the health, safety, and welfare of citizens (sanitation, water, electricity, road, street, and highway repair).

The document has an Appendix (J) which states who shall coordinate the allocation of engineering resources (construction equipment, materials, etc.) required for emergency debris clearance, route recovery, shelter construction, utilities restoration, and other engineering operations. The local utility, San Diego Gas and Electric is tasked to provide initial and updated damage assessments including the number of gas and electric outages, the areas impacted, the number of customers affected, an overall estimated restoration time as well as estimated restoration times for each outage, workforce status including the use of mutual assistance crews, and any critical operational issues or conditions.

San Diego also has a stand-alone plan for energy titled "Energy SAP Operational Area Energy Resiliency Plan." This document could not be located for a detailed review.

4.1.4 Summary

Like the San Francisco plan, the San Diego emergency operations plan does include power supply failure as a hazard. However, the plan does not detail a power restoration plan or how temporary generators can play a role in providing power to buildings following an emergency.

4.2 St. Louis, MO – Emergency Operations Plan – 2013

4.2.1 Hazard Identification

The St. Louis County Emergency Operations Plan is designed to consider all hazards to which the County and its inhabitants may be vulnerable. All reasonable hazards are assessed in the plan.

4.2.2 Building Identification

The St. Louis plan identifies both the buildings and their operational responsibility in emergency situations. An extract from the St. Louis document is shown below and was extracted from the health and sheltering appendix:

Primary Department	Function (See above for details)
Health	➢ Feeding ➢ Emergency first aid ➢ Household Pets and Service Animals ➢ General, Specialized, Medical, and Non-conventional Shelters
Human Services	➢ Disaster Welfare Information ➢ Facilitated reunification ➢ Support unaffiliated volunteers and unsolicited donations ➢ Voluntary Agency Coordination
Housing Authority	➢ Facilitate reunification ➢ Disaster Housing assistance
Parks and Recreation	➢ Sheltering ➢ Bulk distribution ➢ Household Pets and Service Animals ➢ General, Specialized, Medical, and Non-conventional Shelters
Police	➢ Mass Evacuation

4.2.3 Electricity

The St. Louis document describes several Emergency Support Functions (ESF) that document responses to certain events. ESF #12 is titled Energy and assesses energy system damage and estimations on the impact of energy system outages within affected areas. Additionally, ESF #12 provides information concerning the energy restoration process such as projected schedules, percent completion of restoration, and geographic information on the restoration. ESF #12 also provides technical expertise to the utilities, conducts field assessments, and assists government and private-sector stakeholders to overcome challenges in restoring the energy system.

Within the document, the term energy includes producing, refining, transporting, generating, transmitting, conserving, building, distributing, maintaining, and controlling energy systems and system components. All energy systems are considered critical infrastructure.

The scope of ESF #12 is as follows:

- Addresses significant disruptions in energy supplies for any reason, whether caused by physical disruptions of energy transmission and distribution systems, unexpected operational failure of such systems, or unusual economic events.
- Acts as the primary point of contact with the energy industry for information sharing and requests for assistance from private- and public-sector owners and operators.
- Maintains lists of energy-centric critical assets and infrastructures, and continuously monitors those resources to identify and mitigate vulnerabilities to energy facilities.
- Restoration of normal operations at energy facilities is the responsibility of the facility owners.

Should an energy incident occur, the private sector normally takes the lead in the rapid restoration of infrastructure-related services. Appropriate entities of the private sector are integrated into ESF #12 planning and decision-making processes.

In coordination with local governments, public utilities prioritize plans and actions for the restoration of energy during response and recovery operations.

ESF #12 coordinates with other ESFs to provide timely and accurate energy information, recommends options to mitigate impacts, and coordinates repair and restoration of energy systems.

ESF #12 coordinates preliminary damage assessments in the energy sector to determine the extent of the damage to the infrastructure and the effects of the damage on the local energy system.

4.2.4 Summary

Like the San Francisco plan, the St. Louis emergency operations plan does include power supply failure as a hazard, and the St. Louis plan also details a power restoration plan. The plan, however, does not detail how temporary generators can play a role in providing power to buildings following an emergency.

4.3 Austin, TX

4.3.1 Hazard Identification

The Emergency Operations Plan is considered an all-hazards plan that establishes the framework for how the City of Austin responds to disasters, regardless of initial cause or hazard. All reasonable hazards are assessed in the plan.

4.3.2 Building Identification

While the Austin plan does not specifically have a list of the buildings that shall be utilized in an emergency, the document lists each department that has a role in the plan and the function that the department must perform. One example (many more are within the document) of such a role is provided below.

Library Department

- In conjunction with the Emergency Operations Center, assists the American Red Cross and other volunteer relief agencies in collecting, inventorying, sorting, and distributing donated goods and services
- Branch libraries serve as dissemination points for emergency public information to citizens in an emergency, particularly during long-term power outages when radio and television may not reach some segments of the community.
- Branch libraries serve as collection points for information from citizens about their specific emergency needs including missing persons, lost and found pets, etc.
- Provides public Internet stations that may serve as communication points for City staff and the public.
- The Austin History Center provides assistance with damage recovery of documents through training sessions and distributed information.

4.3.3 Electricity

The Austin plan does not provide details on the impact of a wide-scale power outage nor does it provide estimated power outage durations. However, the plan sets out the roles and responsibilities to prioritize the restoration of facilities/utilities.

The Public Utilities Group is responsible for coordinating plans and emergency actions to provide emergency power, water, and telecommunications with alternative energy sources to support emergency response and recovery efforts.

The Public Utilities Group is staffed with personnel from:

- Austin Energy
- Austin Water Utility
- telecommunication providers

The Public Utilities Group is responsible for preparing an initial response to loss of utility for 1-7 days including emergency and short-term repair to lifeline utilities as well as for the primary recovery phase, 7-30 days including the restoration of lifeline utilities (e.g., power).

Austin Energy, the City's electric utility department, produces local electric power with electric usage fluctuating with weather changes and industrial growth. Loss of power is a possibility to any specific area of the city, as well as the entire city. Austin is subject to severe thunderstorms, windstorms, and occasional ice storms that can result in extensive and lengthy failures of electrical power and other utilities. These failures may require the evacuation of populations if repairs cannot be made within a few hours.

As the primary energy provider for the City of Austin, Austin Energy shares the responsibilities of planning and response of the utility systems with Austin Water Utility. Austin Energy:

- maintains the City's electric generation, transmission, and distribution systems
- restores electrical power after outages according to pre-established restoration priorities

- establishes and maintains temporary electrical power at emergency response facilities, such as hospitals and community centers that may be serving as emergency shelters or providing emergency healthcare
- coordinates with the Public Information Officer of the EOC to inform the media:
    - about power outages
    - when energy curtailment measures are necessary to reduce system demand

4.3.4 Summary

Like the San Francisco plan, the Austin emergency operations plan does include power supply failure as a hazard. The Austin plan also details a power restoration plan. The plan, however, does not detail how temporary generators can play a role in providing power to buildings following an emergency.

4.4 Baltimore MD

4.4.1 Hazard Identification

In order to determine the most feasible and effective mitigation and adaptation recommendations for Baltimore, natural hazards that threaten the city had to be identified and defined. All reasonable hazards are assessed in the plan.

4.4.2 Building Identification

The Baltimore plan provides comprehensive details including addresses of the buildings that form part of the disaster recovery plan. A summary of the buildings that form part of the plan is shown below:

Table 4–1 Critical Facilities Located in Baltimore City

Critical Facility	Number
Hospitals	15
Police Stations	10
Fire Stations	41
Schools (Public and Private)	235
Colleges	15
Government Facilities	374
Banks	54
Grocery Stores	48
Hardware Stores	37
Gas Stations	238
Water Pumps	15
Electrical Cooperatives	-
Wastewater Treatment Facilities	3
Sewage Treatment Facilities	12
Drinking Water Treatment Facilities	11
Critical Roadways	61
311 and 911 Operation Centers	-
Hazardous Waste Facilities	-
Total	**1169**

Source: Baltimore City Enterprise Geographic Information Services and HAZUS

4.4.3 Electricity

The City's electricity supply and power grid system ensures that Baltimore's residents are not left without power in a hazard event. Most importantly, critical facilities that perform emergency response activities throughout the duration of a hazard event need reliable power supplies. Forward thinking actions facilitate a Continuity of Operations Plan during hazard events and prevent power outages of any significant scale. Beyond strengthening existing systems, increasing system redundancy is determined as a vital measure for protecting critical infrastructure from power outages. The City will explore options for creating a redundant electrical infrastructure as a result of the plan.

Baltimore has strategies for addressing electrical resilience within the plan. These are summarized in this section. The Baltimore document provides interesting reading as it has significant details on each of the strategies:

- Protect and enhance the resiliency and redundancy of electricity systems.
    - Work with the Maryland Public Service Commission to minimize power outages from the local electric utility during extreme weather events by identifying and protecting critical energy facilities located within the city.
    - Evaluate the City of Baltimore utility distribution system and identify underground utility districts.
    - Support collaboration with the Maryland Public Service Commission to implement various smart grid solutions that will provide the city with real-time access to data during events.
    - Identify, harden, and water seal critical infrastructure relative to electrical, heating, and ventilation hardware within the flood plain.
    - Increase resiliency in our energy generation system by encouraging the development of decentralized power generation and developing fuel flexibility capabilities.
    - Develop a comprehensive maintenance and training program for City employees at facilities with backup generators to ensure proper placement, hook-up, and function during hazard events.
    - Install external generator hookups for critical city facilities that depend on mobile generators for backup power.
    - Partner with the Public Service Commission and the local electric utility to evaluate protecting power and utility lines from all hazards.
    - Determine low-laying substation vulnerability and outline options for adaptation and mitigation.
    - Evaluate and protect low-laying infrastructure-switching vaults, conduits, and transformers.
- Ensure backup power generation for critical facilities and identify key infrastructure during power outages.
    - Investigate off-grid, on-site renewable energy systems, generators, and technologies for critical facilities to ensure redundancy of energy systems.
    - Seek funding to purchase and install generators for all city buildings designated as critical to agency functions.
    - Develop combined heat and power cogeneration plants at identified critical facilities.

- Evaluate and ensure backup power generation is available to healthcare facilities (nursing homes, critical care facilities, hospitals, etc.).

4.4.4 Summary

The Baltimore plan has the most detail on critical facilities to be used in an emergency. While the plan does not detail how generators e.g. Solar+Storage can play a role in providing power to buildings following an emergency, the plan states that this action should be investigated in future work.

5 Other Energy Assurance Plan

This section has reviewed other EAPs to determine if other municipalities are addressing the power needs of buildings in an emergency and if technologies such as Solar+Storage are identified as potential solutions. The review is not an exhaustive list of all of such plans and only the Portland EAP has been reviewed.

5.1 Portland

5.1.1 Purpose

Energy assurance is the confidence that energy will be available when needed. Stakeholders participating in the Portland Local EAP (LEAP) process reviewed Portland's reliance on energy and the vulnerability of the energy supply and developed recommendations on what the city and community should do to ensure greater energy assurance in the face of future energy disruptions.

5.1.2 Content

The Energy Annex to the LEAP details how Portland will respond to a major energy disruption. The Annex states that responding to a major energy disruption in Portland will not be easy. First and foremost, the bulk of the energy infrastructure in the region is not owned or maintained by the City of Portland or other public sector agencies. However, the Energy Annex provides a framework to guide the City's response during an energy disruption.

In the event of any emergency, the City's response priorities are life safety, incident stabilization, environmental protection, and property conservation. Priority is given to provide emergency assistance to vulnerable populations.

When the energy supply is disrupted, the City will work collaboratively with critical infrastructure owners and operators to help get facilities back online as quickly as possible.

Priority energy restoration will focus on critical facilities which include hospitals, 9-1-1 centers, emergency coordination centers, and other government facilities, shelters, water and wastewater treatment facilities and pump stations, fire stations, and schools, among others.

The Annex also has an improvement plan on how Portland can improve their energy resiliency:

- Formalize the relationship between the public and private sectors.
- Expand the city's portfolio of high efficiency buildings and renewable energy technologies, and pursue alternate energy sources for critical facilities and essential functions.
- Encourage community resilience to an energy disruption.
- Ensure the EAP informs bureau-specific and citywide continuity of operations plans and utility asset management plans.
- Certify more damage assessment teams.
- Improve the process for emergency notifications.
- Conduct drills.
- Recommend changes to the Oregon Department of Energy's Fuel Allocation Program.

The Portland LEAP also sets out how the city will respond to a widespread loss of energy.

- Immediate goals and objectives (first 72 hours)
    - The City will implement immediate emergency response operations as described in the City of Portland Basic Emergency Operations Plan. The cause of the energy disruption will influence which bureaus lead unified command during the immediate response period.
    - Command and coordination will occur in the field with limited assistance from the City Emergency Control Center (ECC) /Emergency Operations Center (EOC) until the ECC/EOC is fully activated. The Disaster Policy Council will convene as soon as possible.
    - City objectives will provide a starting point for the response and will be modified as needed.
    - Immediate objectives include:
        - Assessing citywide continuity of operations and provision of essential services and maintaining situational awareness for response and recovery.
        - Conducting rapid assessment of damage and impacts to the community. Private sector energy partners will be contacted for situation status information (outage information, hazardous environments, and asset protection measures).
        - Coordinating priorities for energy restoration with utility providers.
        - Turning off power in hazard areas as appropriate to minimize cascading effects.
        - Ensuring outage information and restoration updates are communicated to the public.
- Short-term goals and objectives (72 hours to 10 days)
    - Short-term goals and objectives will focus on the short-term restoration of essential city services and critical infrastructure system restoration.
    - Communication and coordination with regional jurisdictions and mutual aid agencies will be re-established as soon as possible. However, an energy disruption may cause communications to be limited.
    - As resources arrive from outside the city, they will be integrated into local response operations to ensure a coordinated and unified response.
    - The ECC/EOC will coordinate with private sector liaisons including the Public Utilities Commission, Multnomah County, and the State of Oregon. This will be done through normal communication channels whenever possible and migrate to redundant communication technology (amateur radio, satellite phones) and in-person communication when primary systems are not functioning.
    - The ECC will designate staging areas and begin planning to accommodate emergency personnel and resources. ECC objectives will include:
        - Coordinating establishment of systems to fuel and maintain generators providing power to critical facilities and those providing essential services.
        - Continuing frequent messaging to the public, utilizing all available methods.
        - Establishing a Recovery Unit in Planning Section of ECC/EOC.

- Long-term goals and objectives (11 to 30 days)
    - Identify requirements and funding sources for restoration and repair of essential services and critical facilities.
    - Long-term goals and objectives will focus on transition from near-complete efforts of short-term goals and objectives to sustained emergency operations.
    - Focus on permanent restoration of critical services and repair of infrastructure.
    - In bringing systems back online, explore opportunities to harden critical infrastructure e.g., back-up generators, diversifying fuel and fuel delivery systems, and seismically retrofitting vulnerable infrastructure.

5.1.3 Summary

The Portland LEAP is a similar document to the San Francisco EAS in that it identifies electricity outage as a real risk and discusses a strategy for how some of these risks can be mitigated. Like the San Francisco document Solar+Storage is recommend for a future investigation to determine the effectiveness.

6 Summary Comparison Matrix

Each of the assessments is presented below in a single table to allow an easy comparison with the plans that were assessed.

Plan	Long term power outages identified as a risk	Back-up generation needs identified	Solar as a generation technology identified	Energy storage identified as a generation/storage technology	Microgrids identified
San Francisco HMP	Yes	No	Yes, identified for future for investigation	Yes, identified for future for investigation	No
San Diego EOP	Yes	No	No	No	No
St. Louis EOP	Yes	No	No	No	No
Austin EOP	Yes	No	No	No	No
Baltimore DPP	Yes	Yes, identified for future for investigation	Yes, identified for future for investigation	Yes, identified for future for investigation	No
Portland LEAP	Yes	Yes, identified for future for investigation	Yes, identified for future for investigation	Yes, identified for future for investigation	No

7 Conclusions and Recommendations

San Francisco and other selected emergency operation and hazard mitigation plans were reviewed in order to determine if there are opportunities for Solar+Storage for Resilience to be integrated into such emergency planning. This document has reviewed each of the reports to discover the content, the hazards that were identified, which buildings form part of the cities' emergency response plans, and how a lack of electricity may impact operations.

At the present time, San Francisco's emergency response suite of plans do not clearly identify the following information that was investigated:

- building identification
    - building operations plan identified e.g., functions without electricity/gas
    - emergency electrical loads identified
- electricity impacts identified
    - highlighted a power restoration plan
    - detailed temporary generation plan

The San Francisco EAP starts to lay out the framework for answering the above questions and to put together a comprehensive energy strategy. The EAP makes reference to solar coupled with energy storage as a vehicle to ensure this resilience. The follow-up work from the EAP that was due to investigate the detailed feasibility was not completed due to budget constraints.

Similar to San Francisco, other research plans failed to detail a comprehensive strategy for how to ensure energy resilience to critical buildings. Baltimore provides plans to improve the energy supply resilience and the topics covered by Baltimore ensure that there is a role for Solar+Storage for Resilience. Likewise the Portland LEAP recognizes a role for Solar+Storage with the two below recommendations:

- *Increase resiliency in our energy generation system by encouraging the development of decentralized power generation and developing fuel flexibility capabilities.*
- *Investigate off-grid, on-site renewable energy systems, generators, and technologies for critical facilities to ensure redundancy of energy systems.*

The majority of the hazard plans should be used as a reference when integrating internal plans into strategic, citywide operational plans; the plans researched do not replace the responsibility a department has in developing and testing its own emergency plans. With that end in mind, the plans can help establish the relationships, responsibilities, and general guidelines for departments and agencies to use in developing their detailed emergency plans. It can be used to help create emergency checklists; field emergency plans; and develop departmental emergency plans, emergency-related standard operating procedures, and emergency-related general orders.

In each of the plans researched there is a clearly identified need to provide electricity following an emergency, but no concrete plans have been developed showing how to achieve this with renewable technologies. As part of the SunShot Program, this project will provide a road map of how to integrate Solar+Storage for Resilience. This project via the road map production task will develop the optimum placement of Solar+Storage in San Francisco in order for this work to be replicated in other jurisdictions. The most likely place to include the Solar+Storage strategy is within municipalities' EAPs.

For future revisions of the San Francisco plans we would recommend that further screens are performed for buildings that require critical power to ensure the list of buildings suitable for a Solar+Storage installation are clearly identified. The DEM have produced a list and this is located in Appendix A. A feasibility and financing strategy are recommended to be developed to guide how Solar+Storage could be implemented in a resilient power strategy. It is recommended that the microgrid zones that the SolarPathways project has identified are leveraged in future plan revisions and expanded upon.

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Appendix A

Buildings with Critical Power Needs

A1 Buildings with Critical Power Needs

The San Francisco DEM have quantified which buildings within San Francisco have critical, essential, desirable, and non-essential power needs following a wide scale loss of power.

Critical Facilities require electricity to operate in under 24 hours following an emergency. Essential facilities require power within 24-72 hours following an emergency. Desirable facilities require power at the 72 hour point in time. Facilities deemed non-essential from a power needs standpoint do not require electricity for continued operation. The DEM maintains a list of city owned and private facilities used in disaster response. There are 1263 buildings within this list. Of these, 225 have power needs in an emergency. 127 buildings have critical power needs (<24), 20 have essential power needs (24-72) and a further 78 have desirable (72+) power needs. The table below details all of the facilities that have power needs in an emergency.

Facility	Power Needs (hours)
1399 Marin - Maintenance Facility	<24
A P Giannini Middle	72+
Abraham Lincoln High	24-72
Airport - San Francisco (SFO)	<24
Animal Shelter	24-48
Annunciation Greek Orthodox Cathedral	72+
Balboa High	72+
Bayview Police Station	<24
Bernal Heights Rec Center	72+
Bethel AME Church	72+
Bethel Christian Church	72+
Betty Ong (Old Chinese) Rec Center	24-72
Bill Graham Civic Auditorium	24-72
Blood Centers of the Pacific	<24
Buena Vista / Horace Mann	72+
Building Inspection (DBI)	<24
Bureau of Lighting & Power	<24
Calif Pacific Medical Ctr - Annex	<24
California Convalescent Hospital	<24
California Pacific Medical Center	<24
California Pacific Medical Center	<24
California Pacific Medical Center - Davies Campus Hospital	<24
California Pacific Medical Center - St. Luke's Campus	<24

Calvary Presbyterian Church	72+
Castro Mission Health Center (Health Center #1)	<24
CDD Administration	<24
Central Gardens Convalescent	<24
Central Police Station	<24
Central Radio Station (1 Xmas Tree Rd)	<24
Central Shops	<24
Chinatown Public Health Center (Health Center #4)	<24
Chinese Hospital & Clinics	<24
Christ Church Lutheran ELCA	72+
City College of SF	72+
City Hall	24-72
City of Refuge Church	72+
CNG Gas Station	<24
Congregation Emanu-El	72+
Controller's Office (CO)	<24
Corpus Christi Church	72+
County Jail #1 & #2	<24
County Jail #7	<24
Curry Senior Service Center	<24
Davies Symphony Hall / Zellerbach Rehearsal Hall	72+
Dr Martin Luther King Middle	72+
Embarcadero YMCA	72+
Emergency Operations Center	<24
Epiphany Elementary	72+
Eureka Valley Rec Center	72+
Fire Department (SFFD)	<24
Fire Station 01	<24
Fire Station 02	<24
Fire Station 03	<24
Fire Station 05	<24
Fire Station 06	<24
Fire Station 07 / Division of Training	<24
Fire Station 08	<24
Fire Station 09	<24
Fire Station 10	<24
Fire Station 11	<24
Fire Station 12	<24
Fire Station 13	<24
Fire Station 14	<24
Fire Station 15	<24

Fire Station 16	<24
Fire Station 17	<24
Fire Station 18	<24
Fire Station 19	<24
Fire Station 20	<24
Fire Station 21	<24
Fire Station 22	<24
Fire Station 23	<24
Fire Station 24	<24
Fire Station 25	<24
Fire Station 26	<24
Fire Station 28	<24
Fire Station 29	<24
Fire Station 31	<24
Fire Station 32	<24
Fire Station 33	<24
Fire Station 34	<24
Fire Station 35 (Fire Boat House)	<24
Fire Station 36	<24
Fire Station 37	<24
Fire Station 38	<24
Fire Station 39	<24
Fire Station 40	<24
Fire Station 41	<24
Fire Station 42	<24
Fire Station 43	<24
Fire Station 44	<24
Fire Station 48 - Treasure Island	<24
Fire Station 49	<24
First Unitarian Universalist Church	72+
Flynn Division - Motor Coach	<24
Fort Mason Center Herbst Pavillion Pier 2 & 3	72+
Francisco Middle	72+
Galileo High School	24-72
Gas Station	<24
Gene Friend Rec Center @ SOMA	24-72
General Services Agency (GSA)	<24
George Washington High	24-72
GGP -- County Fair Building/Hall Of Flowers	72+
GGP -- Kezar Stadium	72+
GGP -- Senior Center	72+

GGP -- Sharon Arts Studio	72+
Glen Park Rec Center / Glenridge Nursery School	72+
Grace Cathedral	72+
Hall of Justice Gas Station	<24
Hamilton Rec Center and Pool	24-72
Hayes Convalescent Hospital	<24
Holy Trinity Greek Orthodox Church	72+
Human Resources (DHR)	<24
Human Services Agency (HSA)	<24
Ingleside Police Station	<24
Jackson Clubhouse and Playground	72+
John O'Connell High	72+
Jones Memorial United Methodist	72+
Joseph Lee Rec Center	24-72
Kaiser Permanente Medical Center - San Francisco	<24
King American Ambulance	<24
KIRKLAND DIVISION	<24
Laguna Honda Hospital	<24
Laurel Heights Convalescent	<24
Lick-Wilmerding High School	72+
Lowell High	72+
Maint. Shops\Admin. Offices	<24
Marina Middle	24-72
Maxine Hall Health Center (Health Center #2)	<24
Medical Examiner's Office (MEO)	<24
Mercy High School	72+
Millbrae Yard	<24
Minnie & Lovie Ward Rec Center	24-72
Mission Bay Convalescent Hospital	<24
Mission High	24-72
Mission Police Station	<24
Mission Rec Center / Mission Arts Center	24-72
Moscone Center South	24-72
Moscone Center West	24-72
Moscone Rec Center	24-72
MTA: Enforcement (DPT)	<24
NCIS (French-American International School)	72+
Nob Hill Masonic Auditorium	72+
Northern Police Station	<24
Notre Dame Des Victoires Church	72+
Ocean Park Health Center (Health Center #5)	<24

Old St. Mary's Church	72+
Palega Rec Center	72+
Park Police Station	<24
PCII-PCIIMS-CA-003151	<24
Philip and Sala Burton High	72+
Pier 1	<24
Police Department (SFPD)	<24
Potrero Hill Health Center	<24
Potrero Hill Rec Center	72+
Presidio Community YMCA	72+
Presidio Middle	72+
Presidio YMCA Letterman Gym	72+
Providence Baptist	72+
Public Health (DPH)	<24
Public Safety Building - Medical Examiner/SFPD DOC/Fire station	<24
Public Utilities Commission (PUC)	<24
Public Works (DPW)	<24
Raoul Wallenberg High	72+
Rec-Park Maint Yrd Fuel Stn	<24
Recreation and Parks Dept. (RPD)	<24
Richmond Police Station	<24
Richmond Rec Center	24-72
Riordan High School	72+
Sacred Heart Cathedral Preparatory	72+
Saint Francis Memorial Hospital	<24
Saint Mary's Medical Center	<24
San Francisco City Clinic	<24
San Francisco General Hospital	<24
San Francisco VA Medical Center	<24
Sanchez Elementary	72+
Scottish Rite Masonic Center	72+
SF Christian Center	72+
SFFD - Headquarters	<24
SFPD Tactical Company	<24
Sheffield Convalescent Hospital	<24
Sheriff's Department (SFSD)	<24
Silver Avenue Health Center (Health Center #3)	<24
SOUTHEAST COMMUNITY FACILITY	72+
Southeast Health Center	<24
Southeast Water Pollution Control Plant	<24
Speedway Meadows	72+

St. Anne's Church	72+
St. Anthony's Church	72+
St. Cecilia Church	72+
St. Elizabeth's Church	72+
St. Ignatius College Preparatory	72+
St. John's Presbyterian Church	72+
St. Mark's Lutheran Church	72+
St. Mary's Cathedral	24-72
St. Marys Medical Center	<24
St. Mary's Rec Center and Playground	72+
St. Paul's Catholic Church	72+
St. Peter and Paul Church	72+
St. Philip's Church	72+
St. Vincent De Paul	72+
Stonestown Family YMCA	72+
Stonestown YMCA Annex Building	72+
Sunol Valley Water Treatment Plant	<24
Sunset Rec Center	24-72
Taraval Police Station	<24
Technology, Department of	<24
Tenderloin Police Station	<24
Tenderloin Rec Center	72+
Tesla Portal / Tesla Treatment Facility	<24
Thurgood Marshall High	72+
Transit Operations (MUNI)	<24
Treasure Island Administration Building	<24
Treasure Island Gym (Bldg #402)	72+
Treasure Island Oasis Event Venue	72+
UCSF Medical Center & Children's Hospital	
UCSF Medical Center (Mt Zion)	<24
Unified School District (USD)	<24
University of SF - Koret Center	72+
University of SF - Memorial Gym	72+
Upper Noe Rec Center	72+
War Memorial Opera House	72+
West Sunset Clubhouse	72+
Woh Hei Yuen Clubhouse	72+
Youth Guidance Center	<24
Zion Lutheran Church	72+