EMERGENCY MEDICAL SERVICES AGENCY
LOS ANGELES COUNTY

Healthcare Facility Emergency Power Resilience Playbook
Appendix Content

Hospitals in Los Angeles County are strongly encouraged to use this Emergency Power System Assessment and Benchmarking Worksheet to capture key details about their emergency power system's strengths and potential gaps. The Worksheet will also help hospitals compare their emergency power system capabilities and potential shortcomings against other hospitals in Los Angeles County using anonymized and aggregated benchmarking data. This Worksheet should be completed by the facility director or a qualified member of the engineering department. Hospitals can refer to the answers provided for the LAC EMS Agency's previous census of hospital emergency power systems to make completion of this Worksheet easier. NOTE: This worksheet is available as a downloadable Word file on the LAC EMS Agency's website.
Emergency Power System Assessment and Benchmarking Worksheet for Hospitals (To be completed by Facility Director or his or her staff)

Part I – Background Questions	
Name of facility	
Address of facility	
Name, title, and contact information of the person completing the worksheet	
Number of licensed acute care beds	
The date worksheet was completed	

Appendix B - Emergency Power System Assessment and Benchmarking Worksheet for Hospitals

Part II – Vulnerability Assessment with Benchmarking Data and Suggested Mitigation Strategies to Address Vulnerabilities (To be completed by Facility Director or other qualified personnel.) Completed document can help guide the Emergency Power System Review discussion.			
Section A – Hospital Benchmarking Data			
Question	**Answer**	**Benchmarking Data**	**Suggested Mitigation Strategies to Address Vulnerabilities**
Number of generators		The average number of generators is 3.41	If your facility is operating with a single generator, you should seriously consider installing a quick-connect device to enable rapid connection of a temporary replacement generator. Since single-generator facilities have no redundant emergency power, the failure of their only generator and the inability to quickly connect a temporary replacement puts patients at greater risk of an emergency evacuation. **(See Appendix I for additional information about quick-connect devices).**
What is the ratio of total kW generator power to the number of licensed acute care beds in your facility? (Add up the kW power of each generator in the emergency power system and divide this figure by the total number of licensed acute care beds.) The LAC EMS Agency recognizes that the number of staffed beds in a hospital is often significantly lower than licensed beds. Since the number of staffed beds fluctuates, the number of licensed beds was used to determine the ratio of kW generator power.		The average amount of generator power measured in kW per acute care licensed bed is 11 kW. Among the hospitals included in the census, the lowest kW-to-bed ratio is 0.44 and the highest is 57.25. There is no federal or state standard for the kW-to-bed ratio. This figure is provided as a guide for hospitals in LAC.	If your hospital has less than 5 kW per bed, consideration should be given to expanding your emergency power system.

Part II Continued– Vulnerability Assessment with Benchmarking Data and Suggested Mitigation Strategies to Address Vulnerabilities (To be completed by Facility Director or other qualified personnel.) Completed document can help guide the Emergency Power System Review discussion.			
Section A Continued – Hospital Benchmarking Data			
Question	**Answer**	**Benchmarking Data**	**Suggested Mitigation Strategies to Address Vulnerabilities**
How old are your generators?		The average age of the 271 generators included in the LAC EMS Agency census is 24.6 years. The suggested useful life of a generator is 30 years, based on *Roadmap to Resiliency*, a white paper on emergency power resilience published in 2017 by the American Society for Healthcare Engineering and Powered for Patients.	Any facility with a generator 30 years of age or older should develop plans to replace the generator as soon as possible.
What is the emergency power system runtime based on your facility's onsite fuel storage capacity? **See Generator Fuel Consumption Rate Chart in** Appendix S		The average runtime among hospitals in LAC included in the census is 100.35 hours based on full tanks. 34 hospitals have more than 100 hours, and of these, 5 have in excess of 200 hours of runtime. 44 hospitals have less than 100 hours of runtime, of which 14 have less than 40 hours of runtime. Of these 14 hospitals, 4 have a runtime between 20 and 30 hours and 2 have a runtime below 20 hours.	The federal government has established 96 hours as the ideal time a hospital should be able to operate its emergency power system before refueling. Hospitals with less than 40 hours of emergency power runtime should ensure that they have a contract with a secondary fuel supplier. In addition, the facility should ensure that it can make an immediate payment to this secondary fuel supplier during a power outage to ensure timely fuel delivery, especially if this provider is a new vendor for the facility. These facilities should also consider expanding their existing fuel system's capacity.

Part II Continued– Vulnerability Assessment with Suggested Mitigation Strategies to Address Vulnerabilities. (To be completed by Facility Director or other qualified personnel.) Completed document can help guide the Emergency Power System Review discussion.

Section B - General questions to help identify potential vulnerabilities in an emergency power system with mitigation strategies to address any gaps. (To be completed by the Facility Director or other qualified personnel.)

Question	Answer	Guidance and Suggested Mitigation Strategies to Address Vulnerabilities
Do you have a generator service contract in place?	Yes or No	If no, a service contract should be executed immediately with a reputable service provider.
Do you have a written report addressing recommendations from your generator service provider on repairs or upgrades that should be considered for your emergency power system components?	Yes or No	If yes, have these repairs or upgrades been scheduled? If not, address any impediments to scheduling needed repairs or upgrades with facility leadership. If no, ask your service provider to provide a written report addressing recommended repairs or maintenance to address any known shortcomings in the emergency power system.
Do you have the ability to make an immediate payment to a fuel supplier during a power outage to ensure timely fuel delivery?	Yes or No	During prolonged power outages, generator fuel suppliers may prioritize delivery to customers who are not their primary supplier. In these situations, many fuel suppliers will only deliver fuel if they receive payment at the time of delivery. Facilities should be sure they have the means to make immediate payment for a fuel delivery if they still need to establish credit with a fuel supplier.
Do you have a written protocol addressing how emergency power system testing in your facility is conducted?	Yes or No	If no, such a protocol should be developed immediately. This protocol should include explicit communication protocols that provide clinical staff with advanced notice before any generator test is initiated to ensure that monitoring of any life support patients can be arranged during the test.
Do you have a generator rental contract in place that assures the delivery of a temporary replacement generator during a power outage?	Yes or No	If no, a contract should be established that includes language guaranteeing the delivery of a temporary generator when needed. Including these clauses in rental agreements carries a cost, which is why many hospitals will not implement this type of contract. The only way to ensure that a rental generator will be made available to a facility during an outage is to execute the correct type of contract.
Are there updates to the facility or electrical infrastructure being planned, or that should be considered, that could incorporate needed upgrades to the emergency power system?	Yes or No	If updates to the facility or its electrical infrastructure are being planned, discussions with a Mechanical, Electrical, and Plumbing (MEP) contractor should take place about opportunities to upgrade the facility's emergency power system.
Has your facility recently completed any repairs to its emergency power system or are any repairs currently scheduled?	Yes or No	If yes, the facility director should brief the administrator on these repairs.
In addition to conducting required testing on backup generators, do you routinely test switchgear equipment including automatic transfer switches?	Yes or No	If yes, speak with your generator service provider to assess options for testing switchgear equipment, including automatic transfer switches.
Has your facility performed maintenance on its emergency power system in accordance with the manufacturer's recommendations?	Yes or No	If yes, the checklist of completed maintenance activities and the list of scheduled maintenance activities should be provided to the facility administrator. If no, the checklist of recommended maintenance activities that have not been completed should be provided to the administrator to estimate the maintenance costs. These can be supplied by the facility's generator service provider.
Have you already identified locations for temporary generator installations on your campus?	Yes or No	If no, take the time to visit your facility and make suggestions for temporary generator locations. This step will also help determine how much cabling would be needed to connect a temporary generator. A facility's generator service provider can be helpful in addressing these questions.
What levels of investment would be needed to make incremental or significant improvements to your facility's emergency power system?		

Part II Continued– Vulnerability Assessment with Suggested Mitigation Strategies to Address Vulnerabilities. (To be completed by Facility Director or other qualified personnel.) Completed document can help guide the Emergency Power System Review discussion.		
Question	**Answer**	**Suggested Mitigation Strategies to Address Vulnerabilities**
Have appropriate personnel been trained on the manual operation of the diesel generators and overall emergency power system?	Yes or No	If no, schedule a training with your generator service provider as soon as possible to ensure that all engineering staff can manually operate the emergency power system.
Does your emergency power system have any unique cooling or operational requirements that may require special measures during a disaster (heat exchangers, cooling towers, etc.)?	Yes or No	If yes, discuss with your emergency power service provider and ensure that all engineering staff are aware of any unique requirements and can address these during a power outage. If unsure, check with your generator service provider.
Do you have a protocol established with input from your utility for detaching and reattaching to your electric utility during power outages?	Yes or No	If no, speak with your utility to determine what this protocol is. Be sure to document the protocol and ensure that all members of the engineering staff understand how to implement the protocol.
Is your water system dependent on power for water pressure due to building elevation? If so, is your water system supported by emergency power?	Yes or No	If no, ask your generator service provider, or an electrical contractor, whether your current emergency power system could accommodate any pumps needed to ensure proper water pressure. If there is no current capacity, ask for a cost proposal for expanding emergency power to enable the connection of water system pumps.
If your generator and its components, including fuel tanks, are not above the floodplain and safe from other water surges such as dam and water tower breaks, are system components encapsulated and protected from a flood?	Yes or No	If no, work with generator service providers or other contractors to install floodproofing devices.