

The Los Angeles Department of Water and Power (LADWP) and the Los Angeles World Airports (LAWA) jointly submit this response to the City of Los Angeles Council Motion 17-0971-S2. This initial response outlines initiatives either in progress or for consideration to further mitigate LAX exposure to a potential major power outage as well as improve the LAX response to and operational capacity during an extended interruption of electrical power. Subsequent to this initial response, LADWP and LAWA will report quarterly on the status of the following action plan.

### **Action Plan and Timeline**

#### Immediate Actions currently in progress:

1. Jointly update the LAX Airport Response Coordination Center (ARCC) emergency communication protocol with LADWP for power anomaly response and dispatch. .
2. LAWA will ensure continued monthly testing and exercise of all back-up generators and uninterruptable power supplies (UPS).
3. LADWP will perform testing and maintenance of its transmission protection system every six years. At the Receiving Station that services LAX, the transmission protection system maintenance testing is 100 percent complete for 2017 scheduled testing. For 2018, 29% of the station is due for testing. This 2018 testing will be completed by December 31, 2018 as required by the North American Electrical Reliability Corporation (NERC). LADWP will take immediate action for equipment requiring replacement or repair.
4. LADWP will validate the status of all maintenance and inspection routines to ensure all activities are on schedule. LADWP will take immediate action for equipment requiring replacement or repair.
5. LADWP's 34.5-kV Circuit Design Group will investigate opportunities to replace cable based on condition based assessment and testing for all 34.5-kV circuits serving LAX. Cables meeting the replacement criteria will be replaced.
6. LADWP has commissioned an independent power reliability expert from Electric Power and Energy Consulting (EPEC) to prepare a report to assess whether LAX could have a similar blackout to that which impacted Atlanta's Hartsfield-Jackson International Airport on December 17, 2017. LADWP will review the findings and recommendations from EPEC and make system modifications/improvements where appropriate.
7. LAWA is assessing available back-up generator power capacities to compare inventory to what more may be needed (standby power).
8. LADWP will inspect all substructures where the four of the five circuits delivering power to the central terminal area (CTA) are collocated, assess for any possible vulnerability, and then develop an action plan to incorporate into the overall development plan for the CTA and LAX.
9. LADWP will evaluate risks and propose actions, short and or long term, including those recommended by EPRI in a utility grid and station study for LADWP.

Actions proposed to be taken as a result of the above results will be included in a reporting matrix that will track progress and be presented quarterly to the Committee.

Short Term Actions: which will begin immediate consideration and if determined worthwhile will be completed by January 2020:

1. LAWA will develop with LADWP an emergency response procedure to shed non-essential load within LAX during a large outage scenario.
2. LAWA will implement the IEEE 1686 standard for new equipment purchases as recommended by the Electrical Power Research Institute (EPRI).
3. LAWA will implement the recommended equipment modifications identified by EPRI in their LAX Power Quality Assessment Study dated December 2017.
4. LAWA will consult with LADWP to enable Central Utility Plant (CUP) cogeneration during an emergency or LADWP power outage to allow continued cooling to terminals, parking structure lighting and operation, and CTA traffic signal operation.
5. LAWA will add generators for parking structures and traffic signals not connected to the CUP.

Long Term Mitigations: which will begin immediate consideration and if determined worthwhile will be completed beyond 24 months:

1. Investigate the feasibility of rearranging RS-N circuits to eliminate single points of failure to the CTA and develop and action plan as required.
2. Consider a new Receiving Station X (RS-X) and a corresponding micro-grid dedicated to serving LAX. Considerations may include the following:
  - a. LADWP and LAWA's management are negotiating a new Power Reliability Memorandum of Understanding (MOU) for Power Reliability at LAX to: construct a new RS-X; underground all new electrical construction on LAX's campus to improve reliability; and include provisions for green and sustainable power sources, and smart-grid technologies.
  - b. RS-X would be directly supplied from four LADWP 230-kV transmission underground cables, and the station will not be shared with non-LAX loads.
  - c. All cables from RS-X would be divided into two redundant/separate underground conduit duct banks.
  - d. All equipment and cables would be new.
  - e. Share power from Central Utility Plant (CUP), solar, fuel cells, batteries, within RS-X micro-grid as a back-up.
  - f. Develop a back-up plan, in case of a catastrophe to RS-X, with associated infrastructure support to enable RS-N to supply LAX via back-up switches or dead-end/de-energized cables between strategic LADWP substructures.
3. Additional LAWA considerations
  - a. Provide additional stand-by generator power for partial terminal operations in addition to life safety systems.
  - b. Expand inventory of mobile generators for operational back-up.
  - c. Designate new or additional emergency terminal, instead of just Terminal 2.