CDRI

Coalition for Disaster Resilient Infrastructure

PREPARING FOR **CYCLONES**

ADVISORY TO **POWER SECTOR** UTILITIES

Enhancing the resilience of the power sector does not only mean strengthening its ability to anticipate and absorb shocks, but also improving its ability to recover from the effects of a hazardous event quickly and efficiently.[1]

In 2019, Cyclone Fani with its winds occasionally gusting at 205 kmph caused extensive damage to the power infrastructure in the state of Odisha, India.

At an estimated USD $1.2 billion, the power sector sustained maximum damage and losses out of all the social, productive, and infrastructure sectors.[2] CDRI has commissioned a detailed study to learn from the experience and enable the enhancement of the resilience of Power infrastructure to disasters, especially those emanating from extreme climatic events like cyclones.

Based on the learnings from phase one of this study, CDRI has prepared an advisory for concerned governments and power utilities to prepare for the cyclone season. The complete report of the study will be published shortly.

1 ESMAP, 2016, "Enhancing Power Sector Resilience"
2 Cyclone Fani - Damage, Loss and Needs Assessment (DLNA), Odisha State, 2019

With an aim of minimizing the impact on the power system and enable quick restoration and recovery activities, some suggested measures for the concerned government departments / power utilities are listed below:

A. Pre-impact Activities

1. **Create a webpage / section conspicuously visible** on the exiting website of the company for regular updates to power users on location wise nodal officers, updates on power outages, power restoration activities being undertaken and likely power restoration timelines (if required).
2. Create a **central war room**, where the overall monitoring and control of activities like grid supply status, damage to infrastructure, response and restoration coordination will be undertaken and also seek regular updates from the Meteorological Department and Disaster Management Agencies on the status of the cyclone.
3. Form **core teams across Generation, Transmission, and Distribution** utilities in the region, to coordinate (1) Material procurement & management, (2) Manpower arrangement & deployment (3) Logistic/ transportation, lodging and boarding, food etc. (4) Collection of field information and MIS preparation/ reporting, (5) Coordination with field offices through messengers.
4. Contact all **hospitals, nursing homes, other medical establishments (especially hospitals catering to COVID 19 and other critical patients in ICUs and oxygen wards)**, banks, along with government departments of disaster management, relief etc. in the likely impact areas to assess the availability of **backup power supply** like Diesel Generator sets (with sufficient fuel), and check the status of **secondary supply** (if any) to these establishments.
5. Inform all **critical installations** like airports, ports, railways, and major industries of likely power disruptions to enable them take measures for back-up power/safe handling of units.
6. **Constitute an emergency procurement committee** at appropriate levels to oversee immediate procurement requirements, rate negotiations with local vendors, coordination with vendors in other nearby regions.
7. Take **stock of and create inventory** list of critical material like power/distribution transformers, Low-Tension and High-Tension poles, conductors, ABC cables, location/substation, ERS towers, Cross-Arms, V-Cross Arms, GI Pin, Insulators, and other components which may get damaged due to high-speed winds or flooding or may be required for post-damage recovery.
8. Take **stock of the agencies available** (along with their contractual manpower) with the departments involved in capital project and operations & maintenance activities. All such agencies may be immediately contracted for restoration works at agreed rates.
9. Contact all certified and/or technically qualified contractors, in advance to provide skilled human resources for assistance in reconstruction.
10. Fix **Financial limits** of field engineers/staff for immediate local procurement, with guidelines specifying the materials that can be procured as per approved rate lists.
11. Power Transmission & Distribution utilities to **check availability of equipment** like Hydra, Pole Master, Tractor, Truck + Bus, emergency lights, Marsh boats, DG sets (with sufficient fuel) which may be vital for restoration activities. These may be strategically pre-positioned across the areas of likely impact to enable restoration to start without delay. If these are not available, the emergency procurement team could immediately contact the suppliers for rent/ lease/purchase of such equipment along with their operators and other human resource.
12. State power departments / utilities may **contact their counterparts in neighbouring states** to make prior arrangements for skilled human resource and material support for restoration activities, if and when required.
13. Request employees to reconsider approved leaves considering the possible emergency situation requiring support of all qualified human resources.

14. **Ensure sufficient availability of masks and sanitizers** and follow COVID 19 safety protocols in offices and war rooms and for field staff required for recovery and reconstruction.
15. Deploy local teams to identify and **clear any trees and vegetation** that may cause damage to power lines or other power infrastructure.
16. Take adequate safety measures to secure solar power panels in solar power generating stations to protect them against high velocity winds and storm water surge.

B. During the cyclone impact

17. During the impact period, the following activities may be undertaken in a coordinated manner **to ensure grid security**: (1) Temporarily switch off 33 kV feeder lines experiencing very high wind speeds, say above 50 kmph; (2) Immediate shutdowns of 11 or 33 feeder lines with reported damage to Over-Head conductors, pole damaged/ uprooted; (3) Coordinate with the Regional Load Dispatch Centres and take corrective measures to ensure overall continuity of the grid.
18. Regularly update on the existing company website on the power outage scenario and consider sending **messages/emails to power users** on their registered contact details regarding power outage.
19. Central war room to be in touch with Meteorological Department for updates on the evolving path of the Cyclone.

C. Near-term restoration and reconstruction activities (if required):

20. Adopt a Two-Phased approach to **assess damage**; first being **quick rough assessment**, this may be carried out by personnel on two-wheelers, or on foot. Communicate with emergency field teams to determine damage to power supply leading to critical institutions like Govt/Pvt Hospitals, water supply, telecommunication, government offices, railway stations, and airports. The second being the **detailed assessment** to assess the detailed impact to carry out extensive reconstruction.
21. After passage of the cyclone, if a larger section of Transmission and Distribution system needs a **black start**, the switching of sub-sections may be done in coordination with the regional Load Dispatch Centre to ensure minimum disturbance to the power grid at large.
22. Assess the **estimated damages** and mobilise immediate **funds** for restoration and reconstruction activities.
23. **Mobilization advances** may be given to contractors/agencies involved in restoration and reconstruction activities, to meet the petty expenses and also to pay the workers involved in restoration activities.
24. Governments or power utilities can consider announcing **incentives for early completion of restoration work** to the contractors involved in restoration activities.
25. **Safety officers** must be designated across the impacted areas (if any), who are to ensure no untoward incidents occur during response and restoration activities, like back feed current in conductors, handling broken conductors, responding to flooded areas. They should also ensure COVID appropriate behaviour is followed by all staff and labour working on restoration and reconstruction activities.
26. In case of any **severe damage to the bulky equipment** like power transformers in switch yards, the concerned power utility should ensure replacement in minimum time. In case the bulky equipment is at a distant place, the utility may seek government support to manage logistics.
27. UHD surveillance camera mounted on Drones (UAVs) with GIS based T&D maps (if available) can be used for aerial survey in support of the first quick damage assessment for the highly impacted areas and hard to reach areas.
28. Local government administration and police may be contacted for help in advance to avoid any law-and-order situation at restoration/ reconstruction activities.