ICE STORM AND BACKUP GENERATOR FAILURES COMBINE FOR UNPARALLELED CHALLENGES

Thirty-nine hours without a live electricity grid and multiple backup generator failures reinforced the importance of resiliency planning for Toronto's Sunnybrook Health Sciences Centre.

INTRODUCTION

When ice enveloped the City of Toronto on December 21, 2013, one of Canada's largest hospitals, Sunnybrook Health Sciences Centre was challenged with continuing to deliver uninterrupted care to hundreds of acute care patients in the Toronto area. With hard work and tremendous effort from the staff, the hospital successfully managed to keep their critical services open throughout the aftermath of one of the province's worst storms.

The powerful ice storm deposited the equivalent of two year's worth of freezing rain on the city in the span of only two days and nights. Utility poles, power lines and tree branches were no match for the incredible power of the ice as they collapsed and twisted under its weight. Much of Toronto's transit system was paralyzed as the city became a giant skating rink.

Overall, power outages impacted some 400,000 electricity customers across Ontario and many in the local community came to the hospital looking for warmth.

IMPACTS

At the height of the storm, over 300,000 Toronto Hydro customers were without electricity and heat. Sunnybrook's main campus was also without power from the electricity grid and would remain that way for 39 hours; the longest power outage at the hospital in recent memory. Even during the black-out of 2003, the grid was only down for 12 hours.

During the outage, Sunnybrook relied completely on its emergency power generator plant to produce electricity to keep the campus's critical components online. As the existing campus generator plant had a capacity of 4.3 MW, relative to the winter electrical load of approximately 8 MW, available emergency power for hospital operations was quite limited. This resulted in the hospital being unable to function at normal capacity.

Early in the morning of December 22, Sunnybrook experienced multiple generator failures and lost all but one generator for two hours, thereby reducing the power available to the hospital even further. Despite having to address these additional challenges in the middle of the night, the front line team at Sunnybrook responded excellently, trouble shooting and effectively resolving the issue in only two hours.

KEY VULNERABILITIES

During those 39 very long hours spent on emergency power, the trauma bays, emergency rooms and intensive care units were kept open, however, some less critical services to patients had to be scaled back. As a result, hundreds of patients and visitors were impacted.

Medical imaging appointments were cancelled, lab tests were delayed, as was food delivery to inpatients, retail food operations were without power and computer networks and e-mail systems were disrupted. In addition, lighting, elevators and air handling units were functioning at a diminished capacity.

Of particular concern to staff when much of the emergency generator plant went offline were six infants in the Neonatal Intensive Care Unit who were relocated to other hospitals as a precautionary measure.

Overall, the electricity outage was extremely disruptive to hospital patients, staff and visitors.

RECOVERY

With power restored and health care delivery back at pre-event levels, members of the Sunnybrook Plant Operations & Maintenance Department met with representatives from Toronto Hydro. The debriefing session included discussion on how the power outage had been handled by both the hospital and the power distribution company, and how future prolonged outages could be prevented.

Additionally, an internal investigation was conducted to determine the root cause of the emergency power generator failure which, in large part, was related to the power plant's aging infrastructure.

Sunnybrook Health Sciences Centre was in the process of implementing a replacement plan for the emergency generator plant when a massive ice storm resulted in electricity outages that left the hospital and over 300,000 Toronto Hydro customers without grid electricity for 39 hours.

PLANNING FOR RESILIENCY

Since the ice storm, Sunnybrook has completed a major infrastructure renewal project which included replacement of the existing, aged back-up electricity generators in its power plant and a doubling of its generating capacity. Furthermore, this new generator plant equipment has been standarized to provide for improved reliability and operational efficiencies. The ice storm struck days after this project was awarded, reinforcing the hospital's decision to make a major investment in renewing their aged infrastructure.

The renewal of the emergency generator plant has helped to ensure Sunnybrook is better prepared to handle a prolonged electricity grid outage with minimal impacts to patient care and program delivery.

The hospital has also been in discussions with Toronto Hydro regarding the possibility of relocating the hospital's main incoming power feeder lines away from trees to improve reliability during future major weather events.

Coalition contact information:
Kent Waddington, Communications Director
Canadian Coalition for Green Health Care
kent@greenhealthcare.ca

Thank you to Laura Berndt for images and technical input in developing this profile.

This project made possible by financial support from Health Canada.

http://greenhealthcare.ca/climate-change/resiliency

CCGHC-RP-07E, March 24, 2017