The winds and water have subsided, the power is back on in most places, but relief efforts still face logistical challenges.

Originally published week of Nov 12

When the formation of tropical storm Sandy was announced on October 22 it was difficult to foresee the devastating impact it would have on the United States: more than 90 casualties, 10 million people without electricity and an expected cost of over US$50 billion. On Tuesday, October 30, President Obama, informed the country about the state of affairs regarding the disaster response. The president mentioned concepts such as preparation, coordination, initial response and recovery, which are part of the disaster management cycle.

The disaster management cycle is the subject of extensive research in social sciences and operations management. It is composed of four stages: preparedness, response, recovery and mitigation. As part of the disaster management cycle, coordination, collaboration and information management are critical activities to mitigate the impact of disasters. In the case of storm Sandy, the preparedness stage of the cycle began with early alerts released by the National Centers for Environmental Prediction. Early alerts allowed the disaster response system, composed of federal, state and local governments as well as humanitarian organisations, and military forces to execute their strategies aimed at mitigating the impact of the storm on human life. These strategies included prepositioning supplies such as water, medicines and food, as well as equipment such as power generators and water pumps in the areas with the highest probability of disaster. In an unprecedented effort to respond to the emergency, military planes transported equipment provided by the private sector to the disaster areas in hours. As mentioned by the president during his intervention on October 30, this initial response was followed by the recovery stage. Although the immediate danger has passed, the recovery stage has its own challenges.

Some of the logistics challenges include supplying water, food and fuel to the affected areas, restoring electricity, drying out buildings and public
infrastructure, and cleaning streets from fallen trees and debris. Information management is at the top of the logistics efforts. Considering that the affected population faces huge stress and uncertainty over the duration of this emergency, added to the fact that temperatures are dropping, time is still a factor.

**Shortages & Rationing**

To date, the media has not reported major problems regarding food shortages in the New York City (NYC) area and New Jersey. Foreseeing that food shortages may increase in certain areas due to the lack of electricity, the NYC government has established water and food distribution points in Brooklyn, Staten Island, Queens and Manhattan. The electricity company Con Edison has implemented the distribution of dry ice to help those affected people that have no electricity to keep food fresh. This initiative has been combined with instructions provided by the Department of Health about the use of dry ice and other recommendations to keep food safe.

The media has reported fuel shortages and some security problems due to the impatience and frustration of customers waiting in line in service stations in New York and New Jersey. The New York Times has reported fistfights and arrests in service stations. Fuel supply appears to be a complex challenge at the moment. Fuel shortages can be caused by the interruption of flow in the refineries’ distribution networks that supply service stations. Fuel shortages can also be caused by the lack of electricity at service stations. Without electricity, service stations cannot distribute fuel to their customers—and without fuel, power generators cannot produce electricity (figure 1). To respond to the crisis, fuel companies are sending trucks to replenish service stations.

Adding to the challenge, demand for fuel has increased for both citizens and disaster response vehicles. The increase in the use of particular vehicles has caused an increase in demand for fuel from citizens. This is mainly explained by the decrease in public transportation, which is used by citizens to go to work as well as the uncertainty about the duration of the emergency. By allowing employees who have the conditions to work from home during the duration of fuel shortages, employers can contribute to mitigate the emergency. By giving honest and frequent updates about the duration of the emergency, the government and the media can reduce uncertainty. Keep in mind that in disaster conditions uncertainty produces stress and fear. Additionally, the government and the media can create awareness about the use of fuel. It has been reported that citizens having almost full fuel tanks are driving around looking for fuel “just in case” because they do not know how long the shortage will take. By doing so, drivers are consuming their fuel without the guarantee of finding supply. A fuel tank is usually enough to drive normal commuting distances during more than one week but the uncertainty of the planning horizon is pushing people to take potentially counterproductive decisions.

**Portable Power & Water**

The need for portable water pumps and electric generators added to the increase in the use of disaster response vehicles, which explains the remaining increase in the demand for fuel. Water pumps are the main tools to dry out the millions of gallons of water that flooded house basements, tunnels and train stations in the affected areas. Power generators are important to provide electricity to hospitals, nursing homes and government offices while electricity is re-established. According to the Financial Times, the Federal Emergency Management Agency (FEMA) said they had 400 industrial-size power generators ready to help the East Coast. Nevertheless, the deployment of generators has been a challenge. Despite the need for matching the right generator with the right need, FEMA officers must balance the urgency of providing electricity with the efforts to restore energy, managed by electric companies. According to utilities, efforts focus first on restoring power to high voltage lines. Second, essential services like hospitals, police stations and traffic lights are restored. Third, distribution lines serving large neighbourhoods follow.

Restoring electricity is a monumental effort carried out by more than 64,000 workers from 82 utility
companies across the U.S. (Financial Times). Reconnecting the grid is risky for utility employees considering that it involves removing downed trees and accessing homes with standing water. Additionally, priorities in reconnection as well as the differences in time to repair underground and overhead lines result in asymmetric restoration, which creates a perception of inequity in the affected population. Experience in previous disasters like the Haiti earthquake has shown that the perception of inequity increases the risk of security problems. Once again, to anticipate security issues the government and the media should keep the population informed about the situation while the disaster response system focuses all their effort and resources on restoring basic services as soon as possible, building on the response they have delivered until now.

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