The Impacts of the January 2018 Winter Storm

How the Winter Storm Affected a Segment of the Boston Business Community

INTRODUCTION

January 2018's winter storm was one of the most intense western Atlantic winter storms in decades,[i] hitting the East Coast with blizzard conditions and major coastal flooding. Massachusetts declared a State of Emergency due to the powerful storm, dubbed a historic "bomb cyclone" as a result of the rapid drop in atmospheric pressure in a period of 24 hours.

The storm was a combination of high tide, pounding north- northeast winds, and storm surge producing flooding levels in Boston comparable to the Blizzard of '78. Boston experienced water pouring over Long Wharf and surging into streets in the city's Fort Point neighborhood. Across Massachusetts, cars were floating and stuck in ice, basements were flooded, and boardwalks were submerged.[ii]

In an effort to understand the impact of this storm on Boston's business community, A Better City contacted thirty-seven property owners with assets in close proximity to the Boston waterfront to conduct a survey. The owners surveyed belong to either or both A Better City and the Boston Green Ribbon Commission. The properties include commercial, institutional, residential, hospitality, retail, utilities and charitable organizational use.

Many of the companies surveyed own properties found on the Boston Planning and Development Agency's (BPDA) recently released Sea Level Rise Flood Hazard Area Map which models future coastal flooding conditions due to a 1% annual storm event with 40 inches of sea level rise. Most of those found on the BPDA map, are also identified on the FEMA Flood Maps as Special Flood Hazard Areas that are subject to a 100 year flood (a 1% or greater chance of being equaled or exceeded during any given year).[iii]

Twenty-four responses were collected. Some were submitted anonymously and not all questions were required. The number of responders to each question are identified in brackets e.g. (N=21).The responses have been summarized in aggregate below.

SURVEY FINDINGS

STORM PREPARATION:

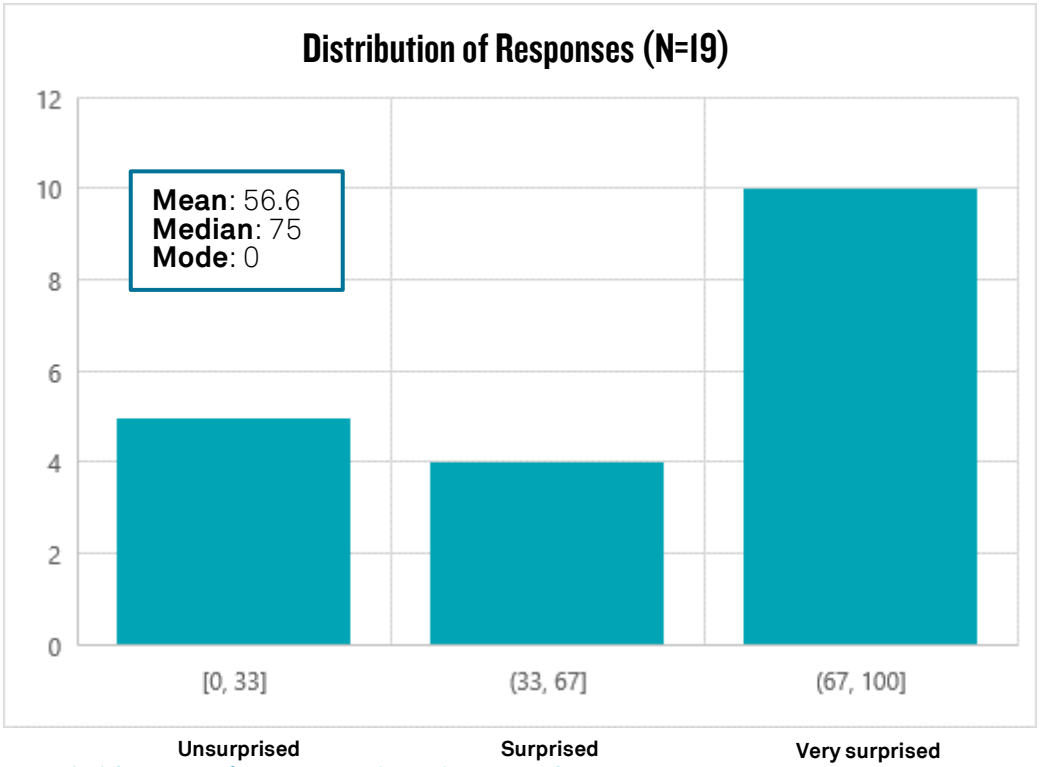
- Based on projected climate impacts, **43% (N=21) had already installed climate protection measures** at their facility(ies); all of those investments were internally funded (and not the result of any grant or external funding). Protection measures included:
    - Raising critical electrical and communications equipment above predicted flood elevations;
    - Installing on-site generation beyond emergency generators;
    - Installing redundant electrical service feeds from different utility substations;
    - Elevating the ground floor during construction;
    - Installing flood barrier systems; and
    - Building management system programming changes.

- Just over **75% (N=21) of respondents took measures to prepare for the Winter storm** including measures such as:
    - Topping up fuel tanks and generators;
    - Moving equipment above baseline;
    - Tuning up equipment that may be needed during the storm;
    - Putting out sandbags;

- Inspecting areas of the building prone to impact;
- Ensuring adequate staff were available such as a dedicated flood control team;
- Communicating preparation steps to staff and tenants; and
- Ensuring non-critical staff were able to work remotely.

DURING THE STORM:

- The **majority of respondents (N=19) were surprised by the intensity of the storm** and its impacts particularly the speed, intensity, geographic breadth, and depth of the flooding. Respondents were asked to score their level of surprise from 0-100 with a score of 50 indicating surprise at the intensity of the storm; most responses were above 50, with a median of 75. However, as some respondents indicated they were not surprised at all, the mean skewed back to 56.6. All respondents who indicated they were not surprised responded "yes" to taking measures to prepare for the storm.



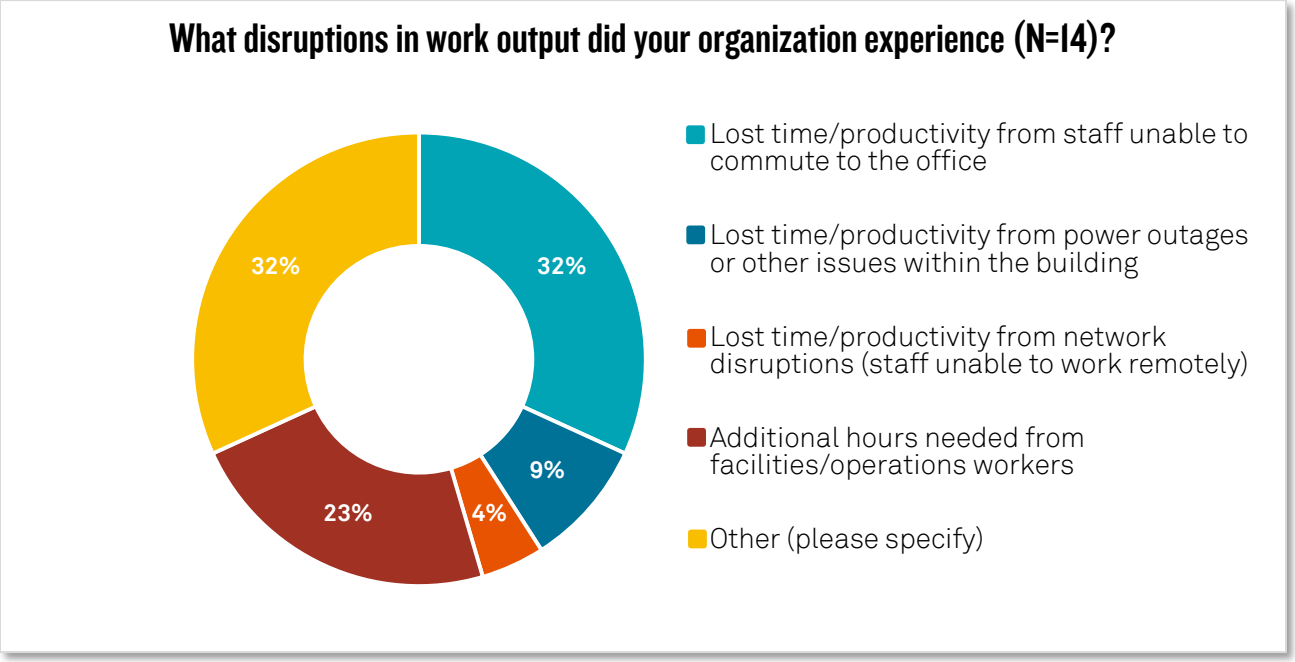
Graph 1- Detailed Overview of Responses about the Winter Storm's Intensity

- As a result of the storm's greater than expected impact, **45% of respondents (N=20) modified their response** during the storm. This included:
  - Bringing in additional staff;
  - Responding to flooding breeches at facilities; and
  - Using equipment to move the sea water back.

- **45% of respondents (N=20) had no disruption to their company's work output**. In some cases, this was due to actions taken prior to the storm such as:
  - Closing the building;
  - Having employees work remotely; and
  - Following the storm staffing plan.

- Of the more than half **of respondents (N=20) that had disruptions to their company's work output** during the storm, many were attributed to lost time and productivity because staff couldn't commute to the office. Other disruptions included:
  - Additional hours needed by facilities and operations staff;

- Power outage and network disruptions; and
- Vehicle and flood damage.



Graph 2- Summary of Disruptions to Work Output

- Only **18% of respondents (N=23) experienced damage to their facility during the storm**; 75% of these had prepared for the winter storm. Only two of the respondents had damage sufficient to file an insurance claim.

AFTER THE STORM:

- As a result of the storm, **close to 60% of respondents (N=19) made or will be making adjustments** to their emergency response and/or resilience plans. These adjustments include:
  - Enhancing flood resistance action plans;
  - Looking into long-term climate prevention measures;
  - Developing a tiered response plan;
  - Prioritizing resilience measures;
  - Using physical flood barriers; and
  - Relocating computer hardware.

KEY TAKEAWAYS

The intensity of the winter storm was a surprise to the majority of the property owners A Better City surveyed. Over half of those with assets located in close proximity to the Boston Harbor experienced business disruption either in the form of lost time and productivity and/or facility damage. As a result, 60% of respondents (N=19) will be making changes to their planning.

Survey respondents were asked to provide **key lessons learned from the storm**; the most common responses were:

- The need for more **preparedness/resiliency planning** that can be based on some experience and not solely projections and estimates, **proactive hardening** of facilities; and **acceleration of this protection process**; and

- The understanding that there may be significant deviation between the projections and actual experiences for both storm surge and high tide.

Other lessons learned included:

- The expectation that **there will be more severe weather events** like this one in the future, so facilities will need to pay more attention to flooding risk year-round and extreme cold in winter;
- The understanding that **any delay in addressing known vulnerabilities is at a facility's own risk**;
- The need to make a plan, execute it, and do so with sufficient lead time hours prior to the storm time frame; and
- The need for a regional approach to preparedness that includes a comprehensive public/private approach to respond to the risks associated with extreme weather including health, economic stability, and insurance exposure to property damage and business.

A BETTER CITY RESILIENCE EFFORTS

A Better City's Energy and Environment Unit has been working with its members since 2014 to understand climate impacts that will affect their facilities and portfolios and to provide tools and resources to adapt. Some notable examples include:

- In 2015 we released—and have since updated—a climate resilience toolkit of technologies and services that can be implemented to strengthen facilities adaptive capacity to severe weather events.
- In 2017 we released a report, Voluntary Resilience Standards: An Assessment of Market Options for Boston's Large Commercial Buildings that reviews eight resilience standards relevant to Boston's large commercial facilities. These can be used to assist developers, building owners, property managers, and tenants in preparing for the potential impacts of climate change.
- We have worked closely with the City of Boston as they established Climate Ready Boston, an initiative to develop resilient solutions to prepare Boston for climate change. We currently sit on the Advisory Committee for Climate Ready South Boston, to create neighborhood solutions to coastal flooding from sea level rise and storms.
- We worked closed with the Boston Planning and Development Agency throughout 2017 providing comments to the "Climate Resiliency-Review Policy Update" released in October 2017 that reflects the findings and recommendations of Climate Ready Boston and Mayor Walsh's Carbon Neutral 2050 goal. The update includes a Sea Level Rise—Flood Hazard Area Map, updates to the Climate Resiliency Guidance and Checklist, and an online reporting form.

A Better City will continue to produce new research and share best practices to help property owners increase their preparedness and resilience to climate impacts.

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[i] https://weather.com/storms/winter/news/2018-01-04-winter-storm-grayson-northeast-bombogenesis-snow-forecast

[ii] https://weather.com/storms/winter/news/2018-01-04-winter-storm-grayson-northeast-bombogenesis-snow-forecast

[iii] https://www.fema.gov/media-library-data/20130726-1550-20490-1950/ot_firm.pdf, page 6