



INDUSTRY IMPACT AND LESSONS LEARNED FROM HURRICANE SANDY



SUMMARY RESULTS

January 2013

Developed and Compiled by

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A. BACKGROUND

- The Northeast U.S. was devastated by Hurricane Sandy on October 28-30, 2012
- Unlike many prior hurricanes and Nor'easter storms, the Northeast had a lead time to prepare prior to Sandy making landfall on October 30th
- The National Weather Service, National Oceanographic and Atmospheric Administration and NASA all tracked the storm via a number of weather models
- The Futures Industry Association developed a comprehensive survey of futures commission merchants, global clearing firms, key service providers and exchanges, relative to key Business Continuity Management (“BCM”) strategies and tactics.

Background (Cont'd) ...

- The FIA polled a number of its members on the impact and lessons learned from Hurricane Sandy
- Futures commission merchants, global clearing firms, key service providers and exchanges responded
- Respondents were surveyed on their preparedness and experience
- Survey responses were collected and aggregated with no attribution to any individual or firm.

BACKGROUND (Cont'd ...)

- The survey was developed and the responses were analyzed by Tellefsen and Company, L.L.C.
- Some respondents did not answer every question
- The survey encompassed six key BCM metrics:
 - Business Continuity Preparedness
 - Disaster Recovery
 - Supply Chain Disruptions
 - Response
 - Recovery
 - Risk Mitigation

B. EXECUTIVE SUMMARY



Sandy: A Storm of Biblical Proportions ...

EXECUTIVE SUMMARY

- 36 futures commission merchants, global clearing firms, key service providers and exchanges responded to the survey
- Firms were well-prepared, given the advanced notice and media coverage
- Firms enacted their BCP's coming into the weekend and few had to failover to DR
- Those that planned well - generally fared well
- Communication with key staff, decision makers was critical to the incident management process
- Firms regularly communicated status to staff, clients via email, direct phone call, web site postings.

EXECUTIVE SUMMARY (Cont'd) ...

- Metro NYC public transportation was closed, including bridges and tunnels
- Most staff could work remote via terminal server or Citrix server connectivity, however, those that lost power and services were unable to telecommute or collaborate
- Employees were unable to leave home due to storm damage, lack of transportation or unwilling to leave their families
- The FIA and SIFMA industry calls were valuable to firms' preparation and response plans
- Regular and recent BCP awareness training, systems testing and staff training exercises paid off.

EXECUTIVE SUMMARY (Cont'd) ...

- The Lower Manhattan power grid was adversely impacted by tidal surge and was ultimately shut down
- Firms may re-consider the proximity and locations of their primary and back up facilities, going forward
- The biggest problems were caused by supply chain disruptions:
 - Closure of public transportation
 - Closure/inaccessibility of key roads
 - Outages with power and telecomm providers
 - Staff inability to commute into metro NYC due to downed trees, power lines and local street closures

C. INDUSTRY IMPACT

- Hurricane Sandy made landfall in New Jersey on Sunday evening October 30
- Sandy brought with it heavy winds, rain, flooding and caused widespread power outages
- Sandy impacted an area populated by over 50 million people, a greater impact than Hurricane Katrina
- The heavy winds extended over 500 miles from the eye of the storm
- In Chicago, 22' waves pounded the lakefront
- New York City closed public transportation, bridges and tunnels on Sunday evening.

INDUSTRY IMPACT (Cont'd) ...

- Power to lower Manhattan was cut by Con Edison on Monday to protect electrical equipment, as the storm surge threatened underground electrical equipment, including transformers and sub-systems
- Due to the closure of public transit and road closures from downed power lines and trees, employees were unable – or unwilling - to commute
- Firms with regional or international support offices heavily relied on staff in those offices and transferred functions to them
- Due to the timing, month-end processing of operational events was adversely impacted.

INDUSTRY IMPACT (Cont'd) ...

- U.S. equity and equity options markets were closed on Monday and Tuesday:
 - U.S. futures markets opened on Monday, except for equity based futures products
 - The NYSE and NASDAQ market closures impacted companies' reporting of earnings
- Overseas markets were tempered by the closure of the U.S. markets
- Operational events such as fails to deliver, access to cash, money markets and settlements were impacted by the market closings.

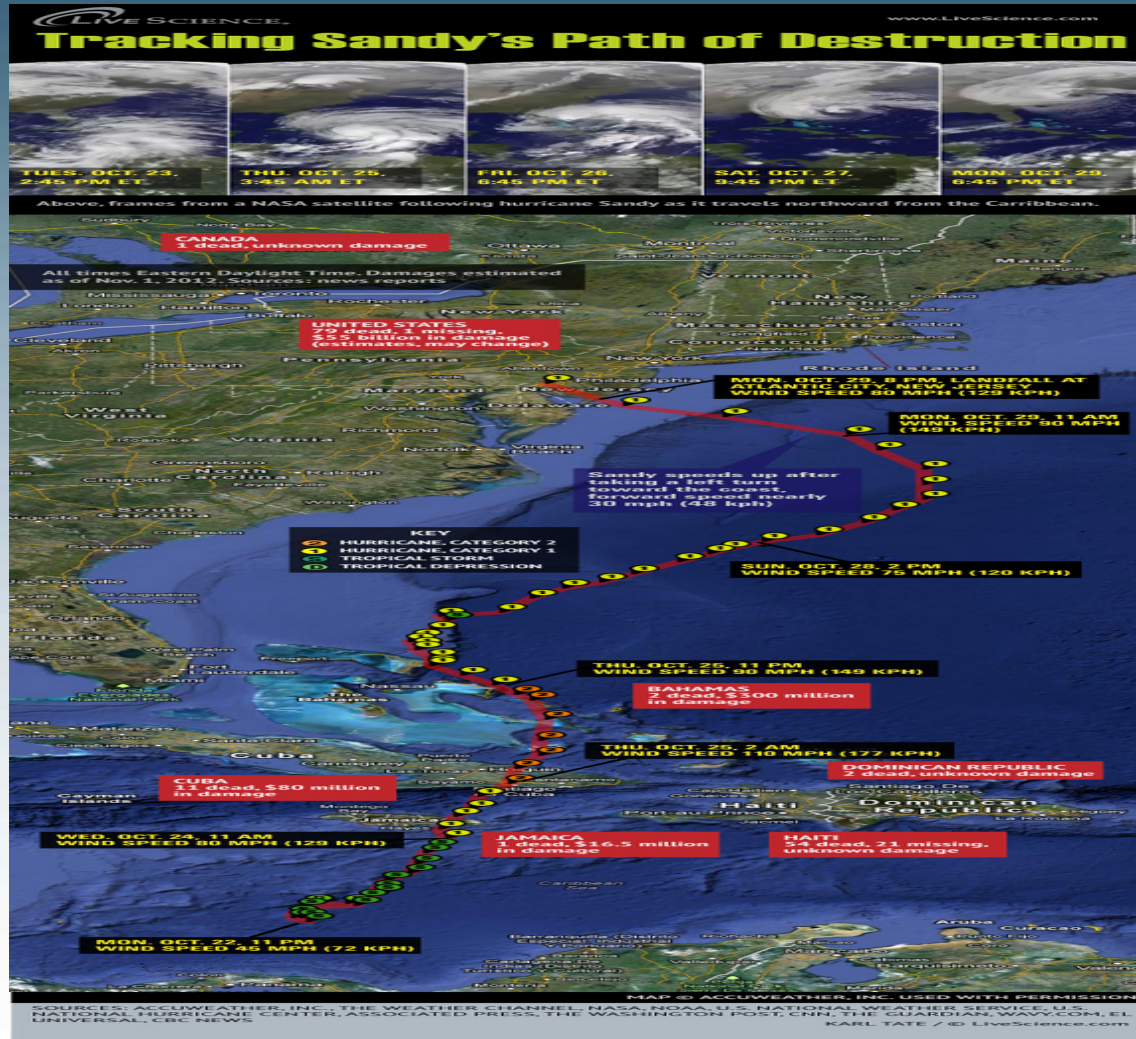
INDUSTRY IMPACT (Cont'd) ...

- Some firms had limited operation functions, as a result of system failover to DR mode
- Firms that lost grid power had to run on generator power for days
- Some firms experienced loss of key service providers, and/or counterparties
- Firms did not consider that the most well-designed and well-tested plans don't expect many things going wrong at the same time.

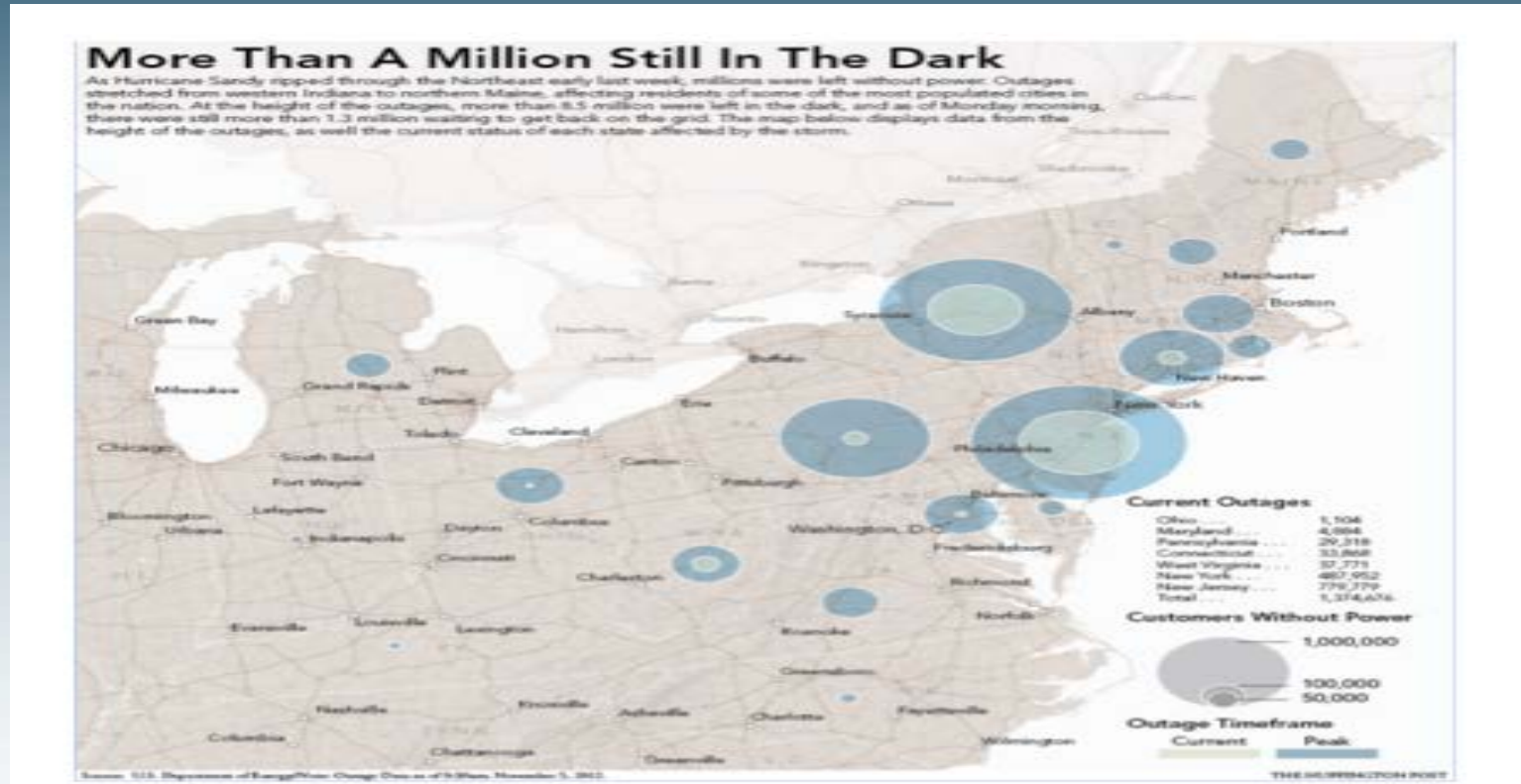
THERE WAS LEAD TIME PRIOR TO SANDY MAKING LANDFALL

- NASA, NOAA and major weather services tracked the genesis of Sandy as a tropical storm in the Caribbean starting on the prior Monday (10/22)
- They utilized a number of weather models showing likely trajectories and impact areas
- Sandy hit Jamaica and Haiti on Wednesday 10/24 as a Category I hurricane with 80-90 MPH winds
- Sandy hit Cuba, the Dominican Republic and the Bahamas on Thursday 10/25 as a Category 2 storm
- Sandy progressed on a NNE track into Sunday 10/28 as a Category I storm and made landfall around Atlantic City NJ on Monday 10/29 with 80-90 MPH winds.

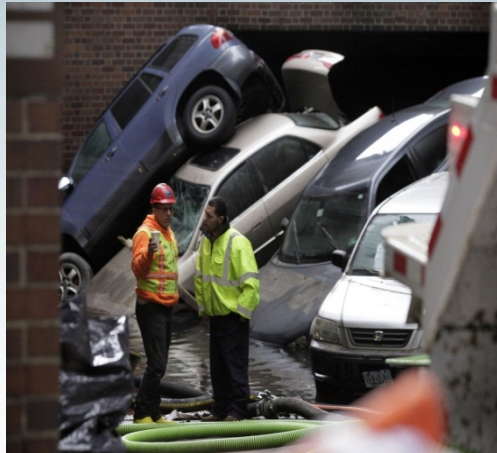
HURRICANE SANDY: PATH AND TIMELINE



ONE WEEK LATER: EXTENSIVE POWER OUTAGES



SOME OF THE DEVASTATION ...



AND SUPPLY CHAIN DISRUPTIONS...



D. SURVEY FINDINGS

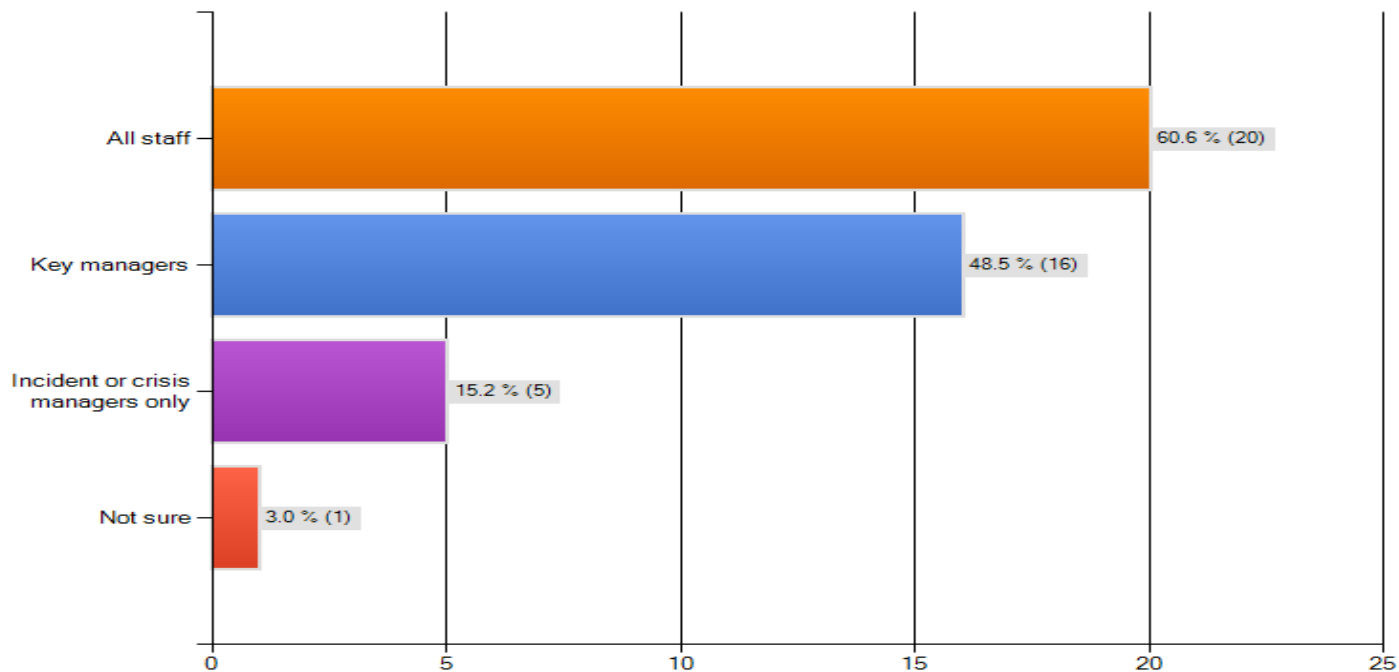
- I. Business Continuity Preparedness
- II. Disaster Recovery
- III. Supply Chain Disruptions
- IV. Response
- V. Recovery
- VI. Risk Mitigation

I. BUSINESS CONTINUITY PREPAREDNESS

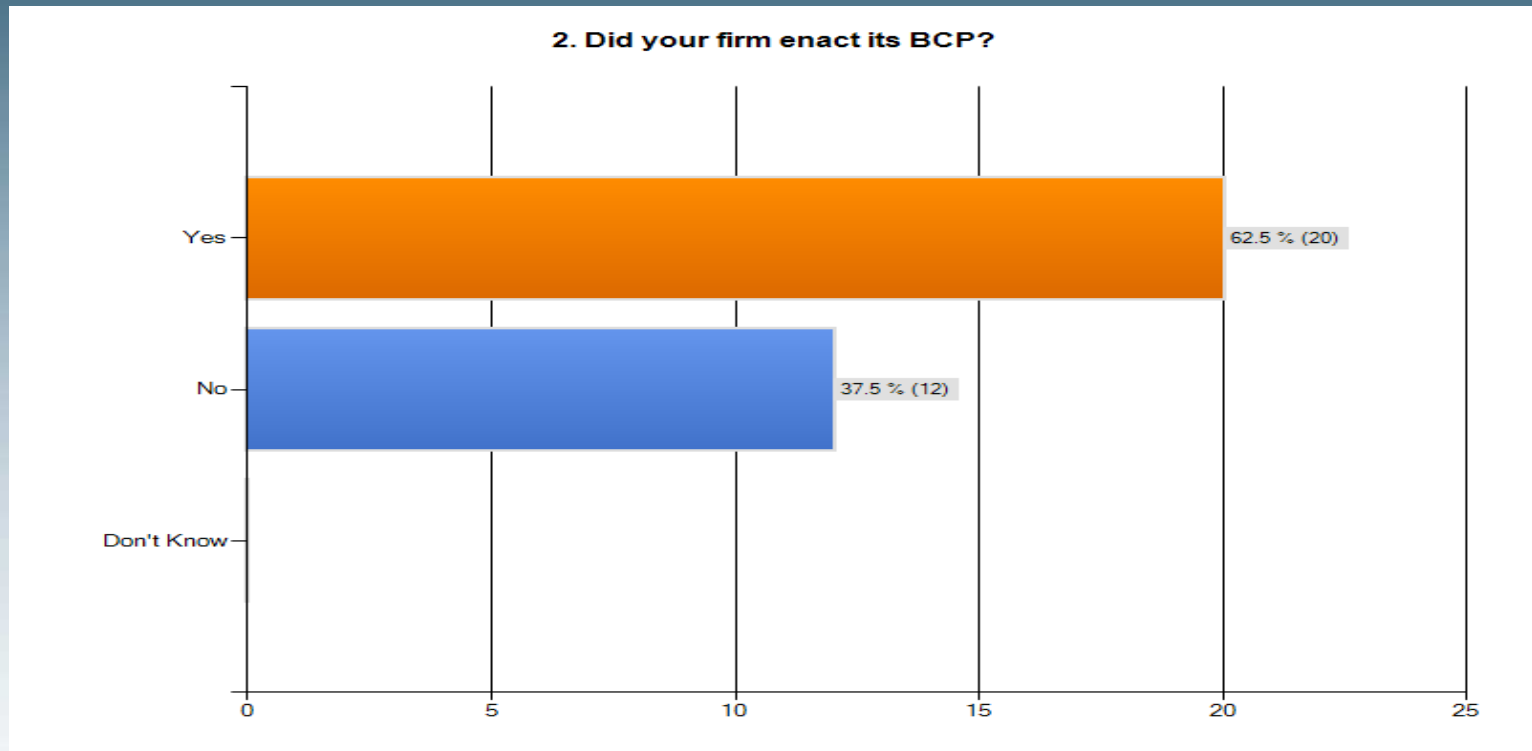


STAFF HAVE ACCESS TO BUSINESS CONTINUITY PLANS, BCP STRATEGIES

1. Does your firm distribute its Business Continuity Plan (BCP) to: (check all that apply)

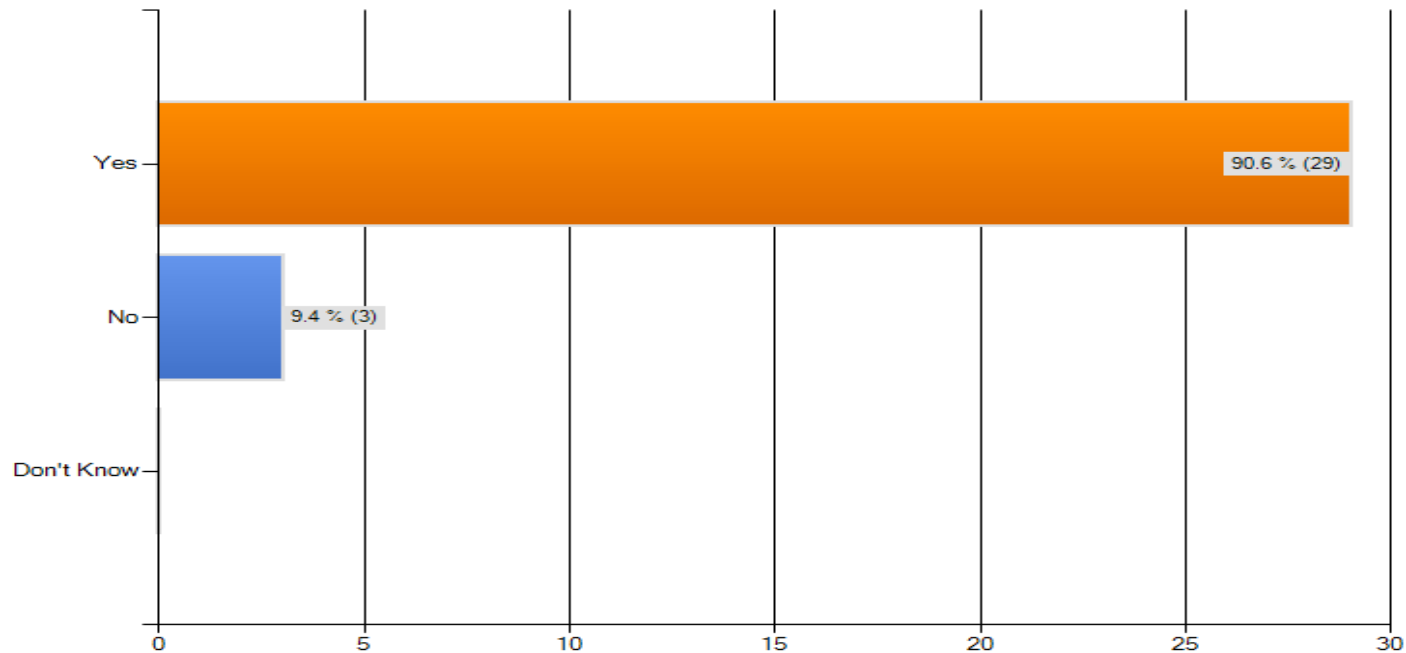


MOST FIRMS ACTIVATED THEIR PLANS COMING INTO THE WEEKEND



THE MAJORITY OF FIRMS HAVE DEDICATED RECOVERY SITES

4. Does your firm have a dedicated recovery site - seats (i.e., the firm's facilities or a contracted DR hosting site)?

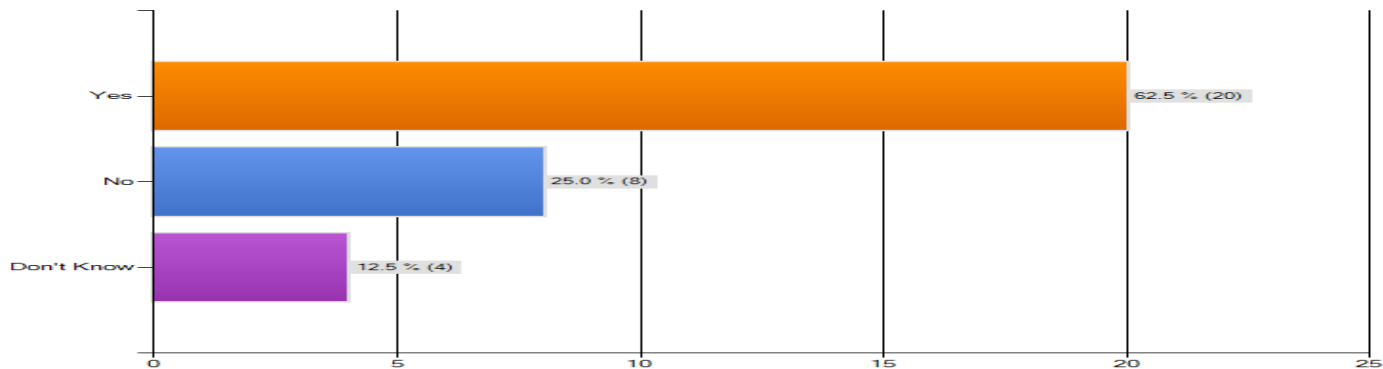


MOST FIRMS EVACUATED STAFF OVER THE WEEKEND; PRE-ARRANGED HOTELS

7. If so, did you get all designated staff in place prior to the storm making landfall?

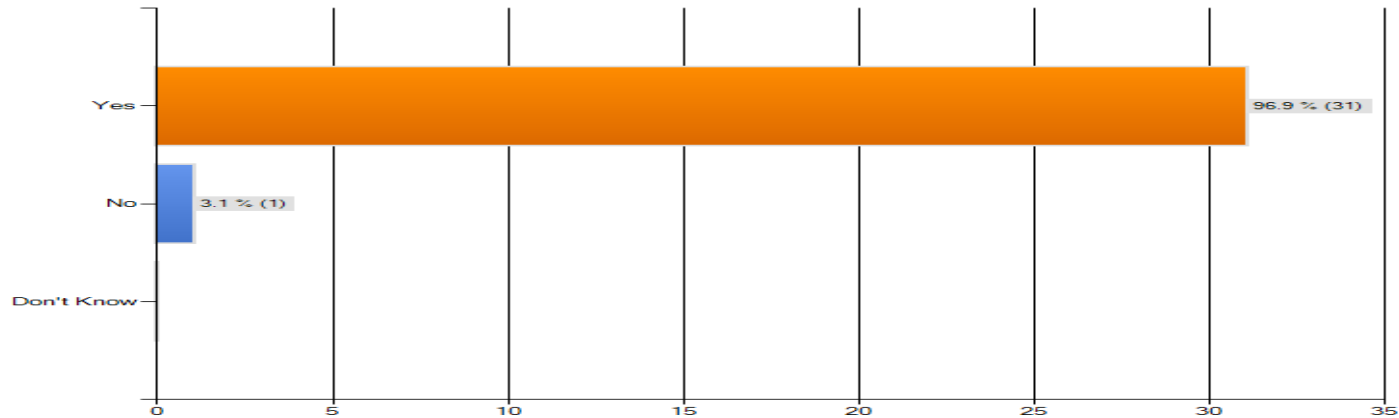


6. Did your firm have pre-arrangements with local hotels or car services to move/lodge key staff?

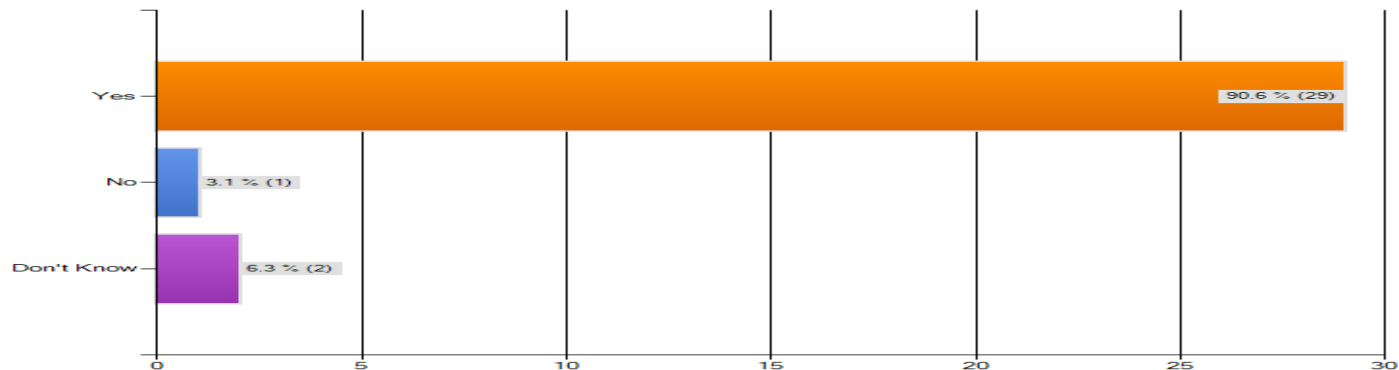


ALMOST ALL FIRMS HAVE AN EMPLOYEE NOTIFICATION SYSTEM

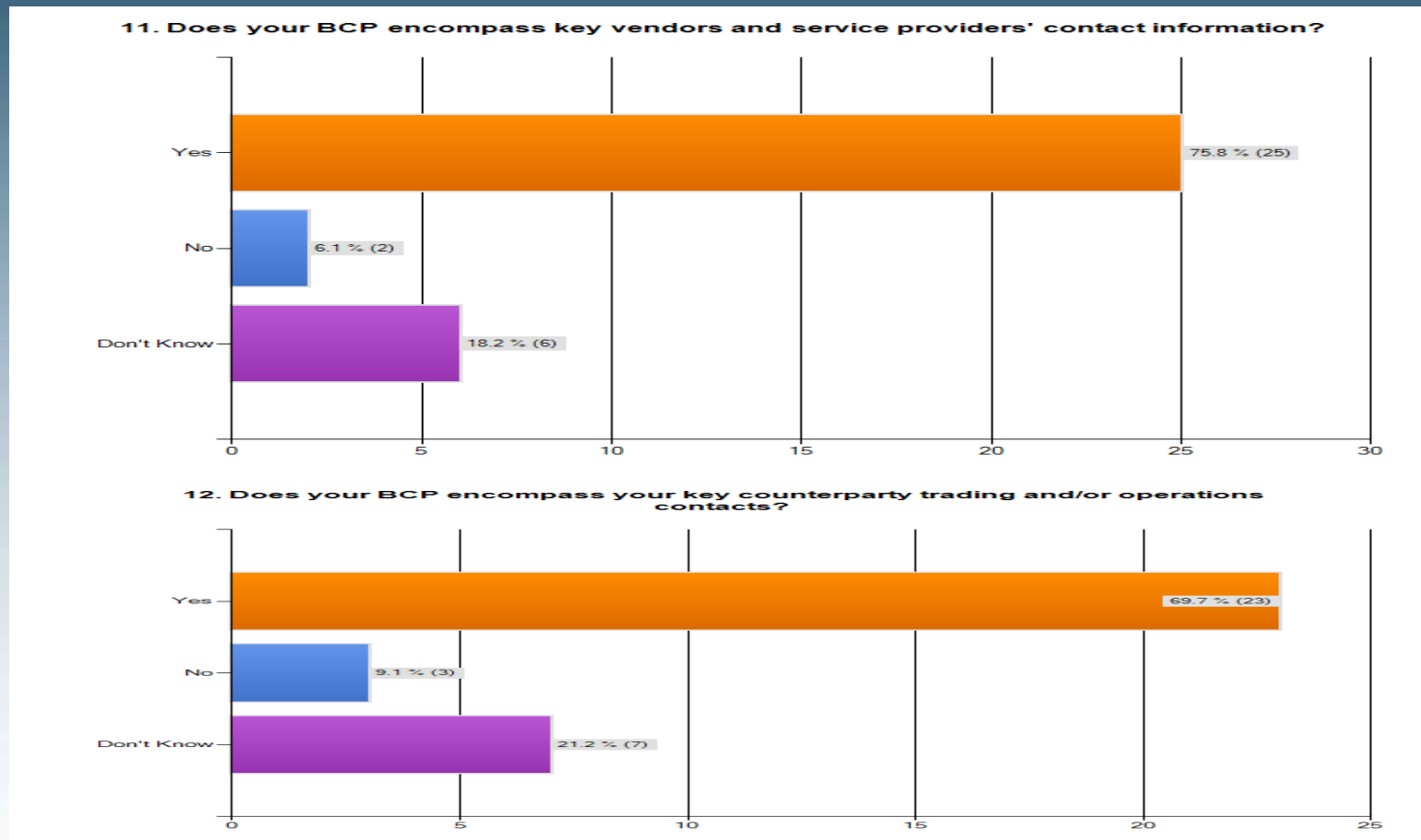
9. Does your firm have an employee notification system?



10. Does your BCP encompass staff members' name, address, home phone/cell phone, home email address, family emergency contacts, etc.?

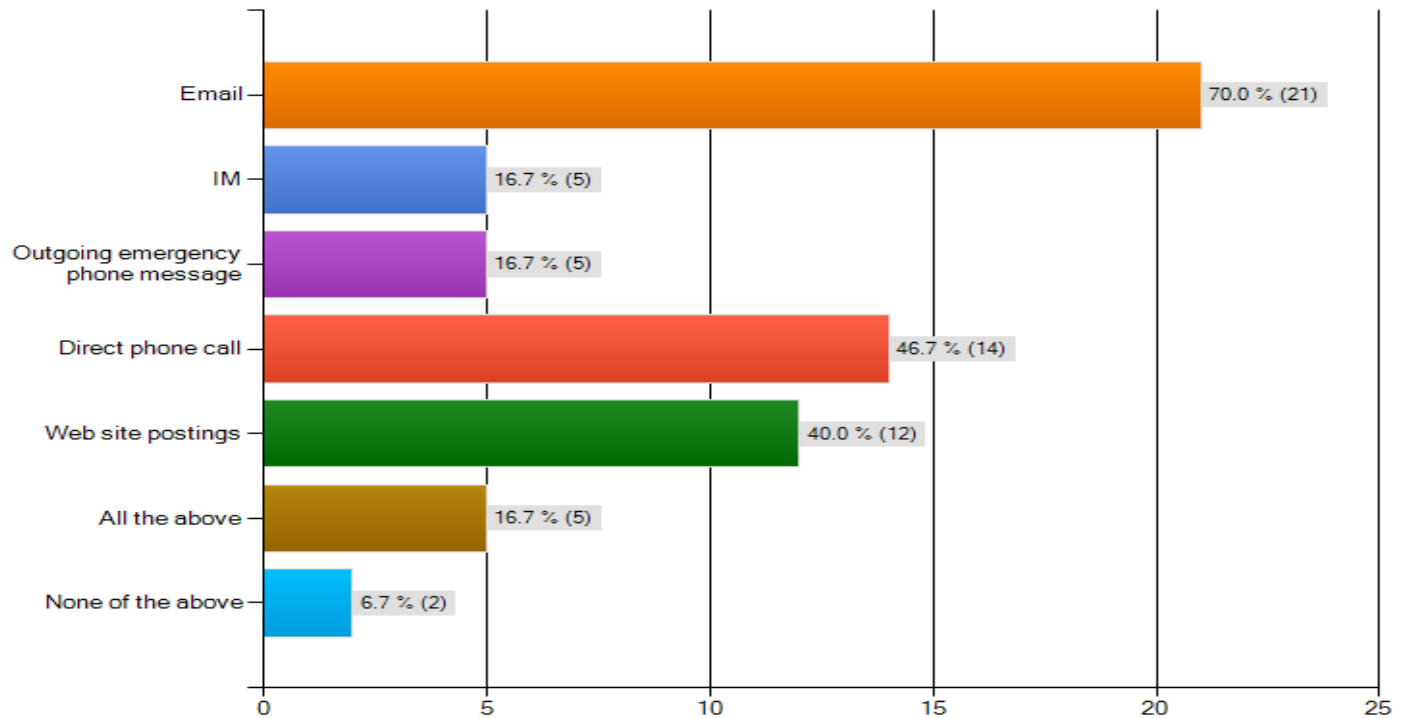


BCP'S CONTAIN KEY CONTACT INFORMATION



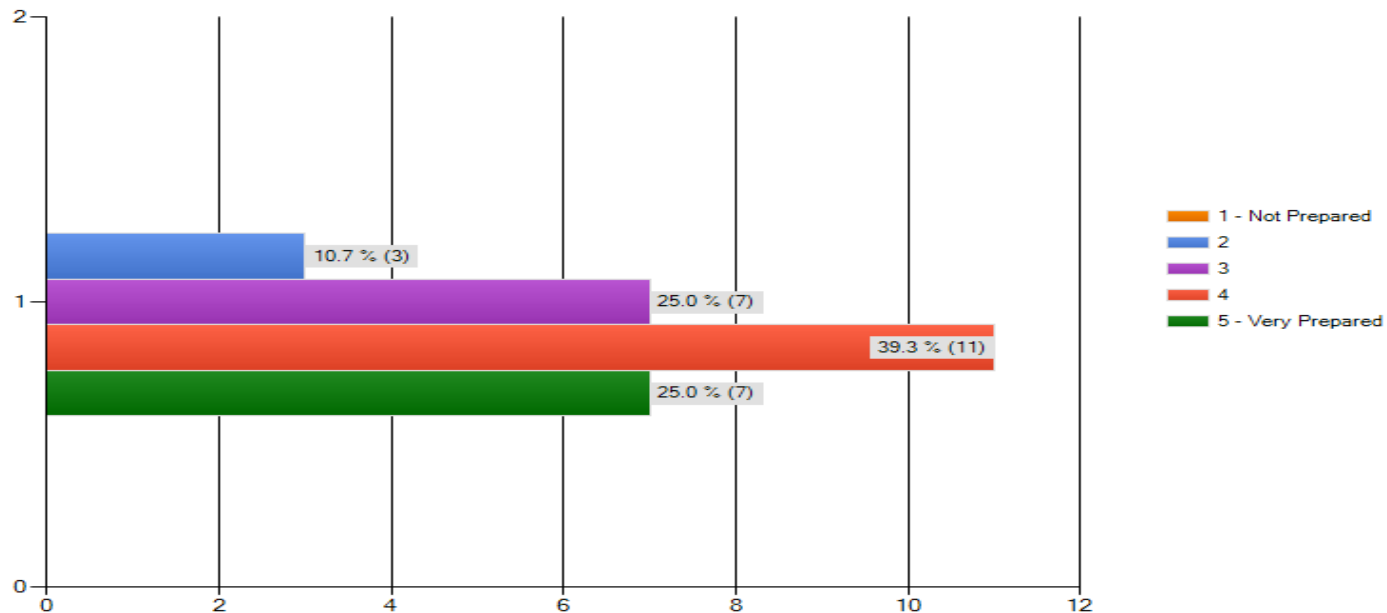
FIRMS USED EMAIL, OTHER TOOLS TO CONTACT CLIENTS

13. How did your firm reach out to its clients? (check all that apply)



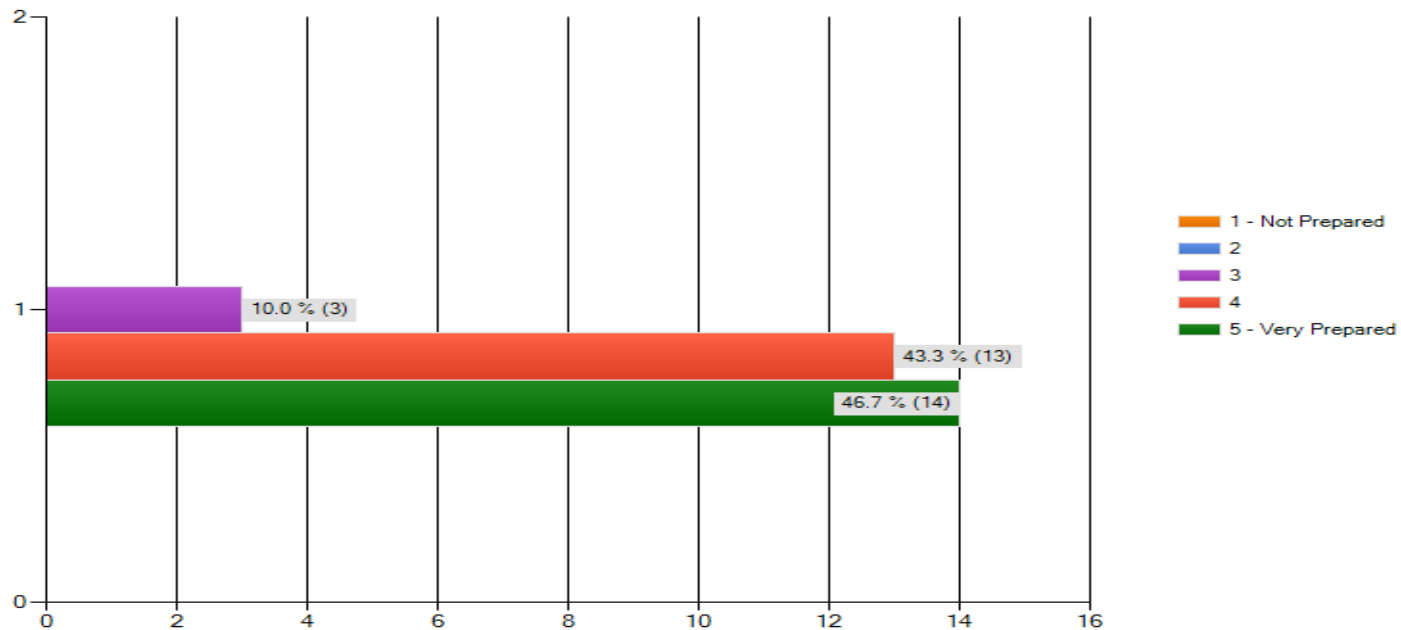
KEY SERVICE PROVIDERS' PREPARATION AND SUPPORT WAS HIGHLY RANKED

14. How would you grade the overall preparation and support from your key service providers? (Rank from 1-5 where 1= Not Prepared and 5 = Very Prepared):

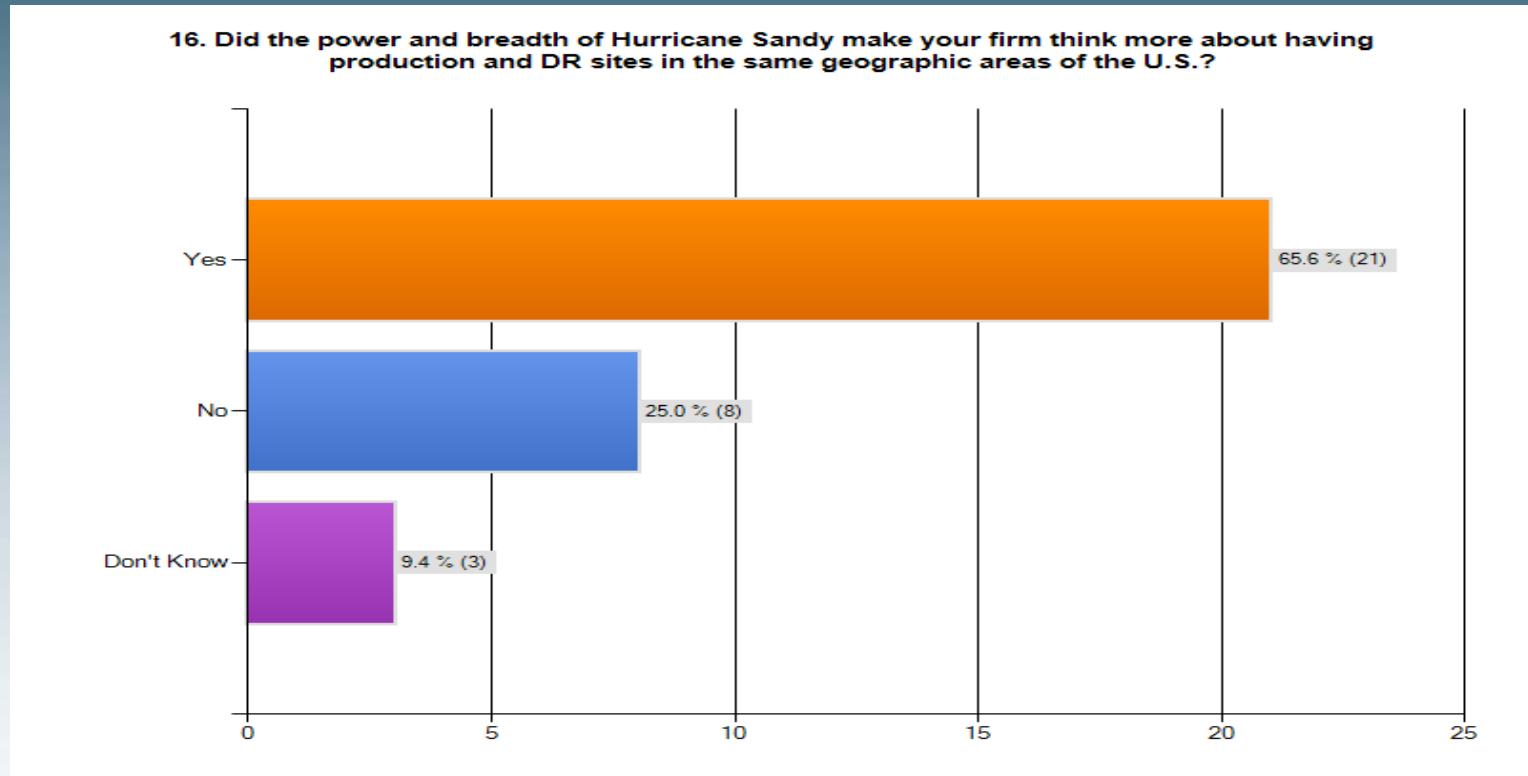


THE MAJORITY OF FIRMS CONSIDERED THEMSELVES WELL-PREPARED

15. How would you rank your firm's overall state of preparedness to respond to Sandy? (Rank from 1-5 where 1= Not Prepared and 5= Very Prepared):

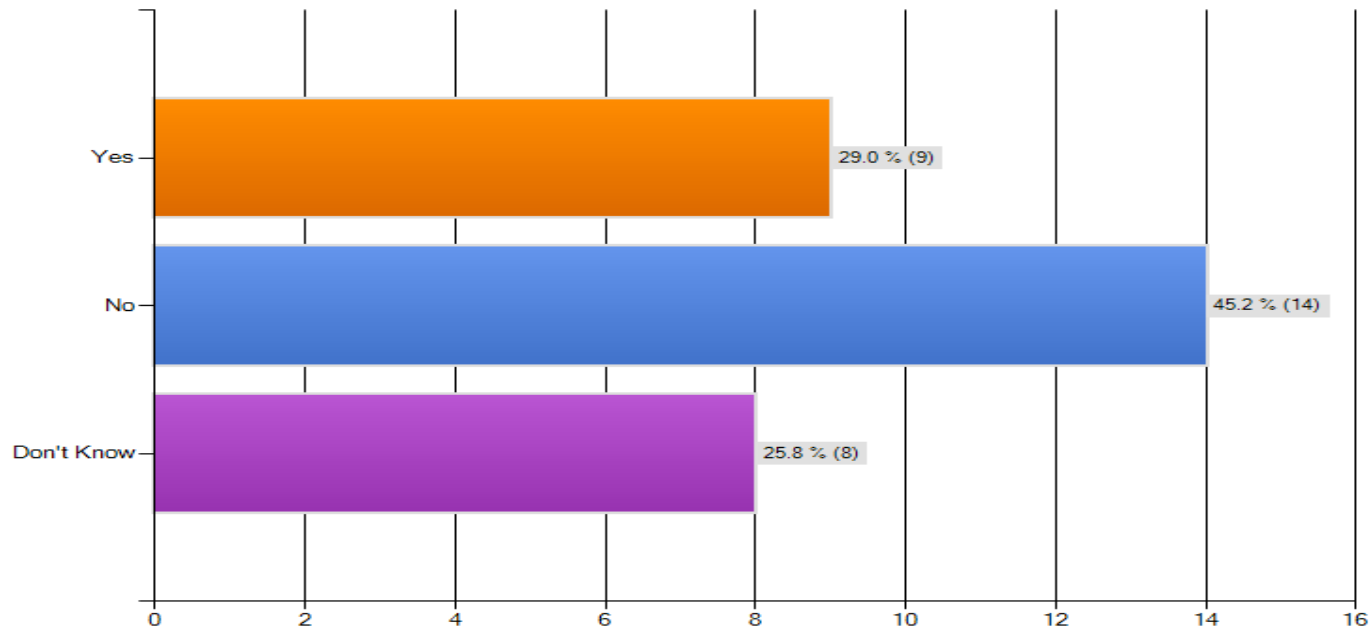


FIRMS MAY RE-CONSIDER PROXIMITY, LOCATIONS OF PRODUCTION AND DR SITES



HOWEVER, FIRMS ARE NOT YET CONSIDERING RE-LOCATIONS

17. If so, are you considering changing the location based on experience with Hurricane Sandy?

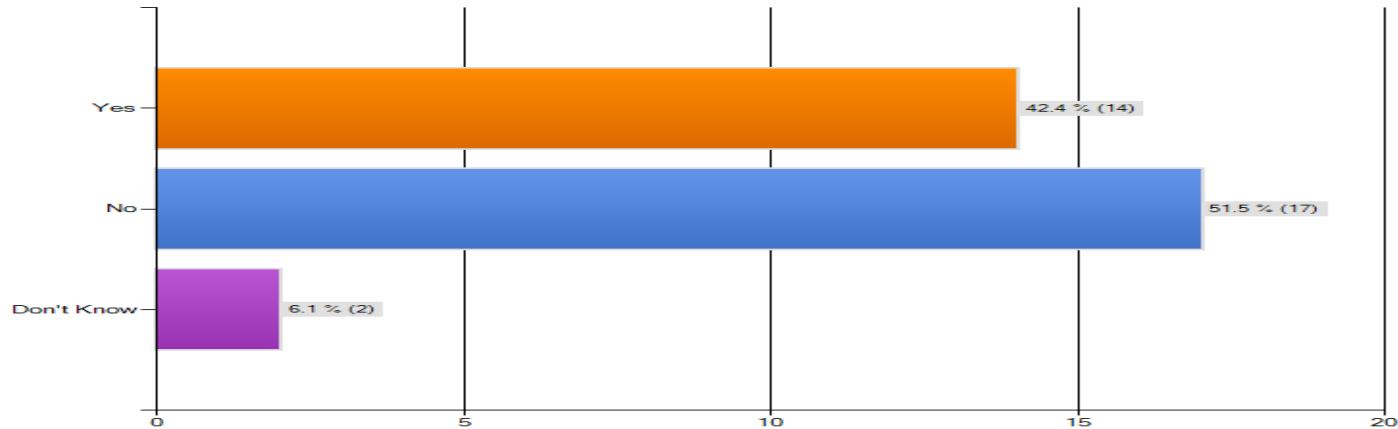


II. DISASTER RECOVERY

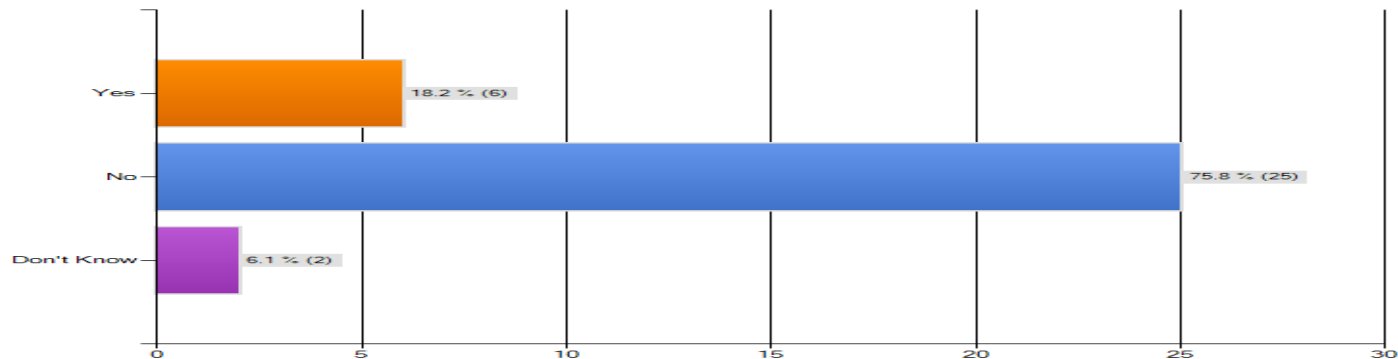


OVER 40% OF FIRMS FAILED OVER TO BACK UP SYSTEMS / SITES

18. Did your firm fail-over to its back up systems/back up sites?

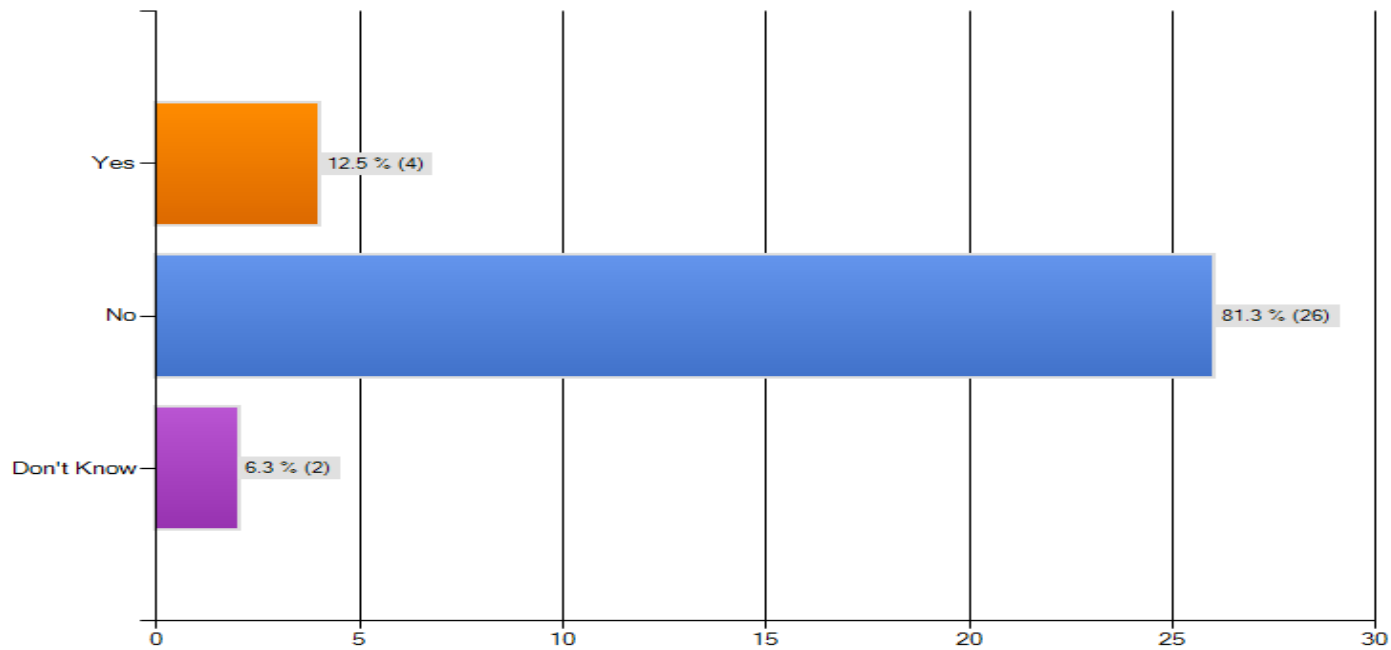


22. Did your firm stay failed over as a result of participation in the October 27th industry DR test?



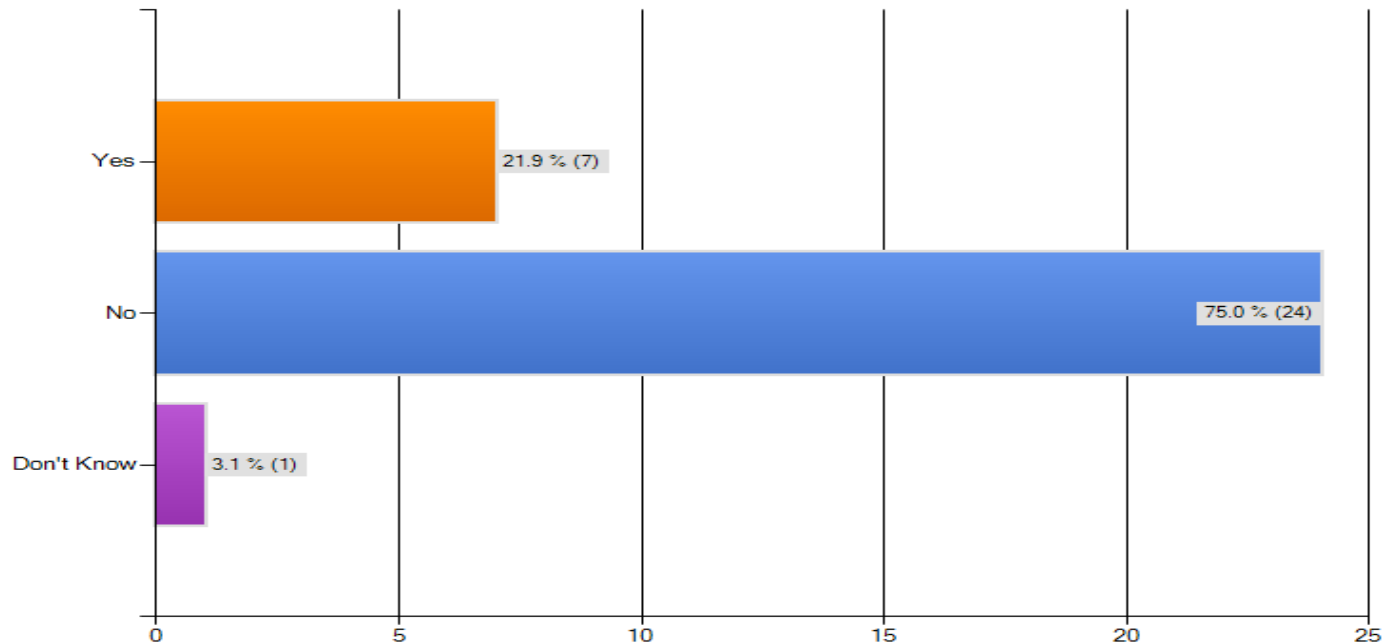
BUT THERE WAS NO SIGNIFICANT IMPACT TO MISSION-CRITICAL SYSTEMS, INFRASTRUCTURE

24. Was there any significant impact to key mission-critical systems/infrastructure?

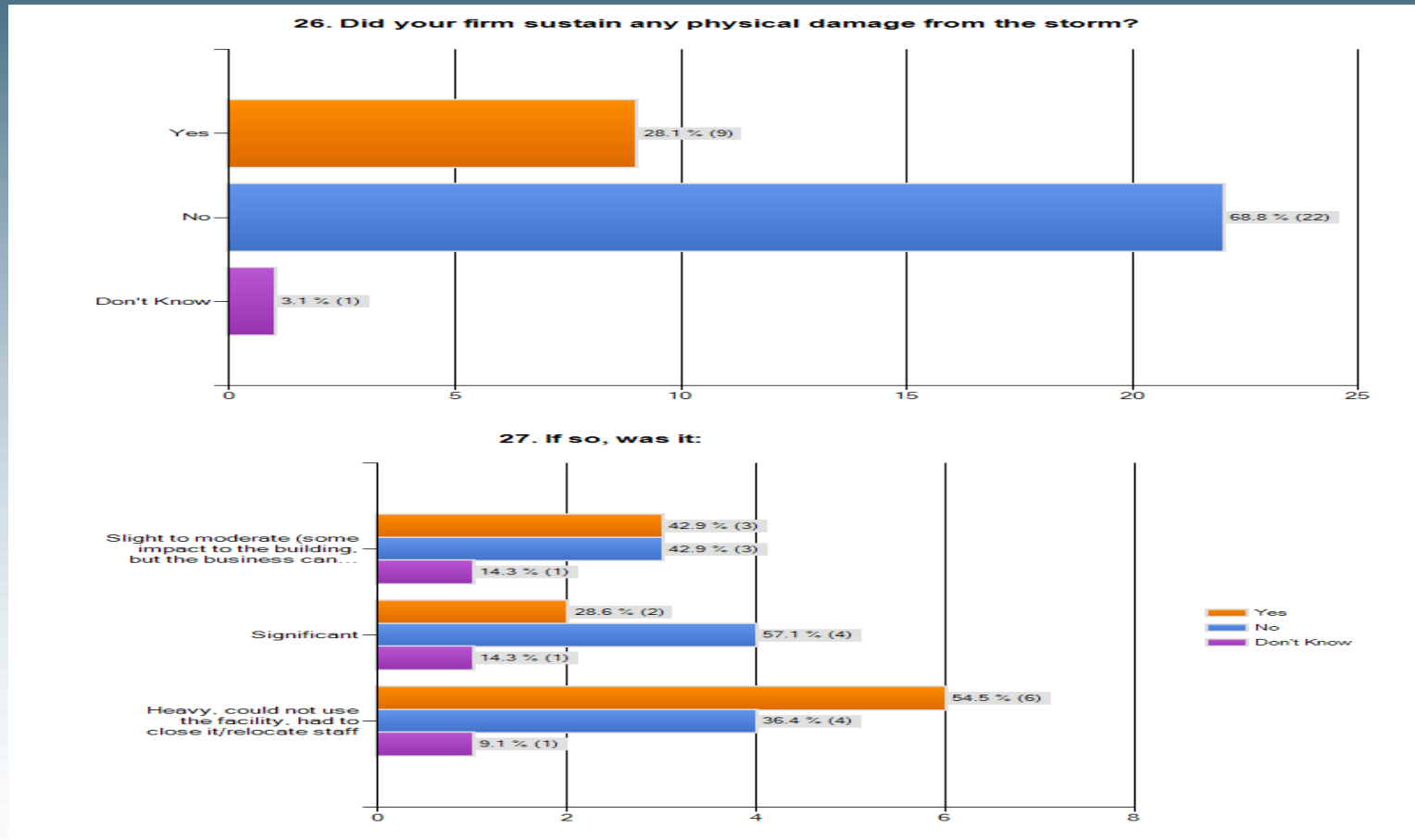


MOST STAFF COULD TELECOMMUTE VIA TERMINAL SERVERS OR CITRIX SERVERS

25. Did your staff have problems with remote access via terminal servers or Citrix servers?



ONE-THIRD OF RESPONDANTS HAD SIGNIFICANT/HEAVY STORM DAMAGE

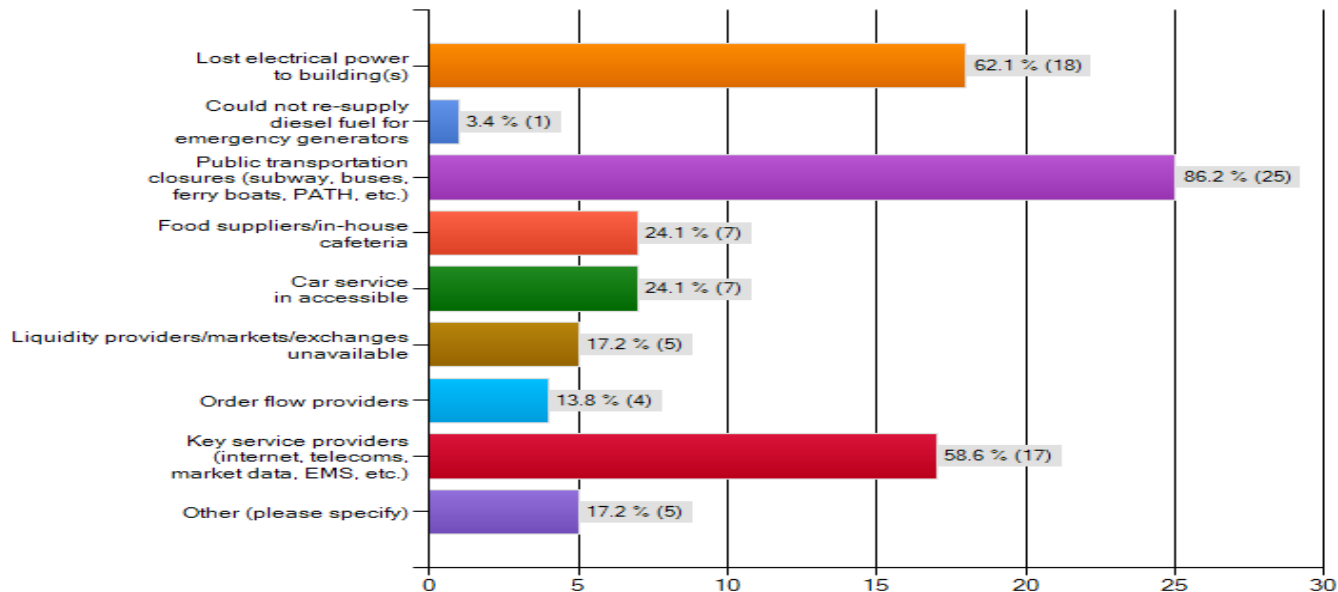


III. SUPPLY CHAIN DISRUPTIONS



THE BIGGEST DISRUPTIONS: PUBLIC TRANSPORTATION, ROAD CLOSURES, POWER AND TELCO PROVIDERS

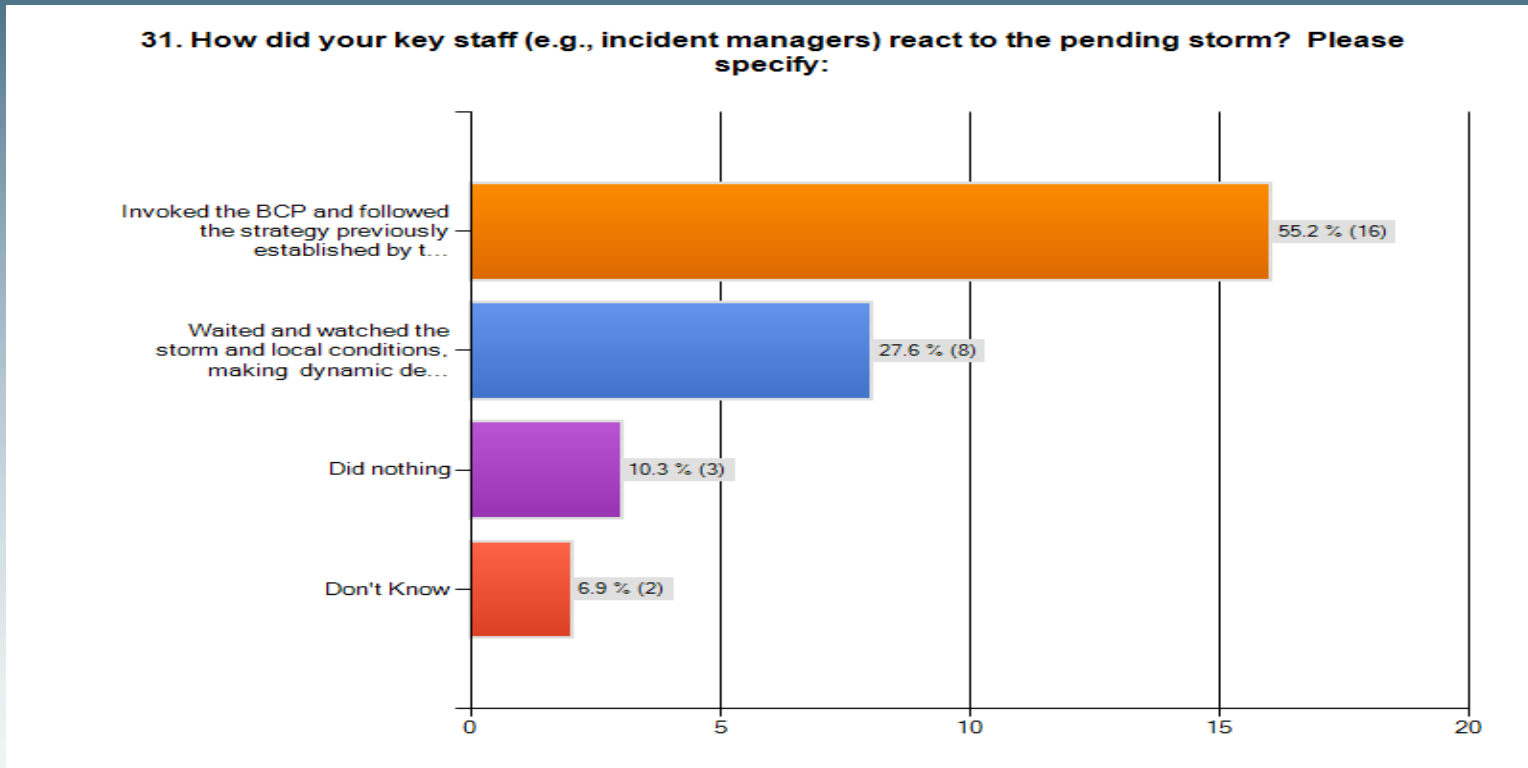
29. What types of supply chain disruptions did your firm encounter? (check all that are applicable):



IV. RESPONSE

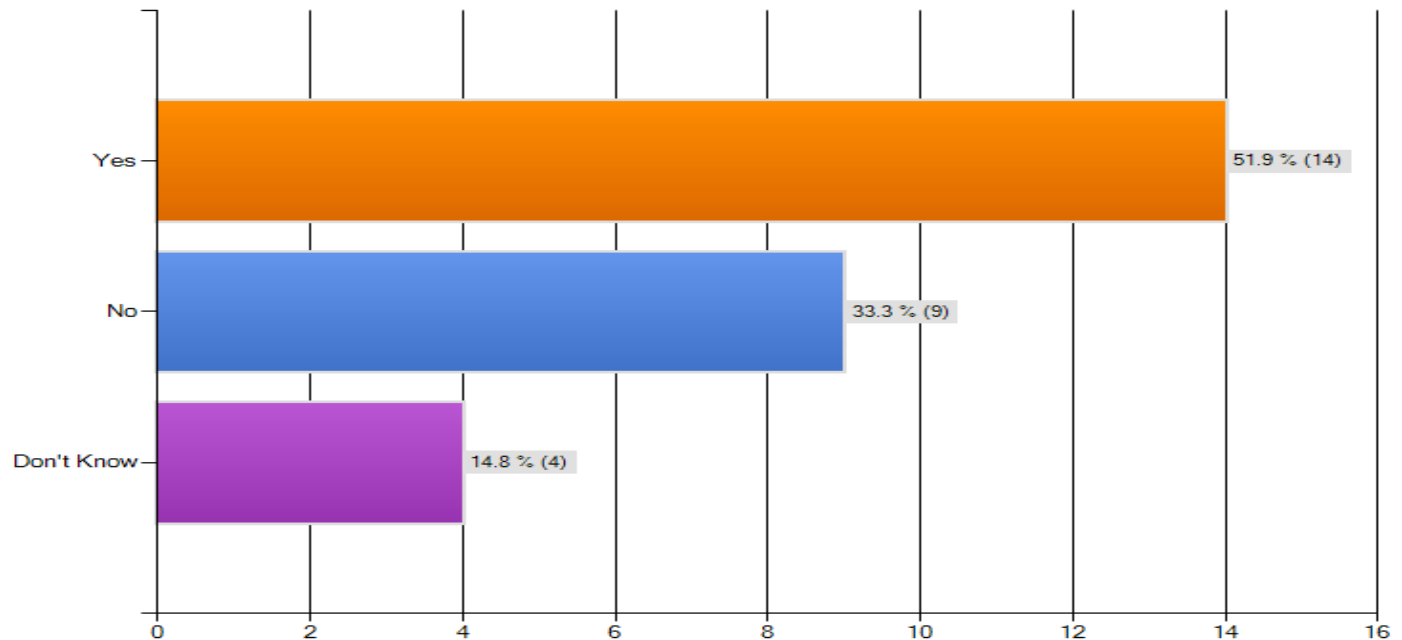


INCIDENT MANAGERS WERE ACTIVATED, COMMUNICATED, FOLLOWED THE PLAN



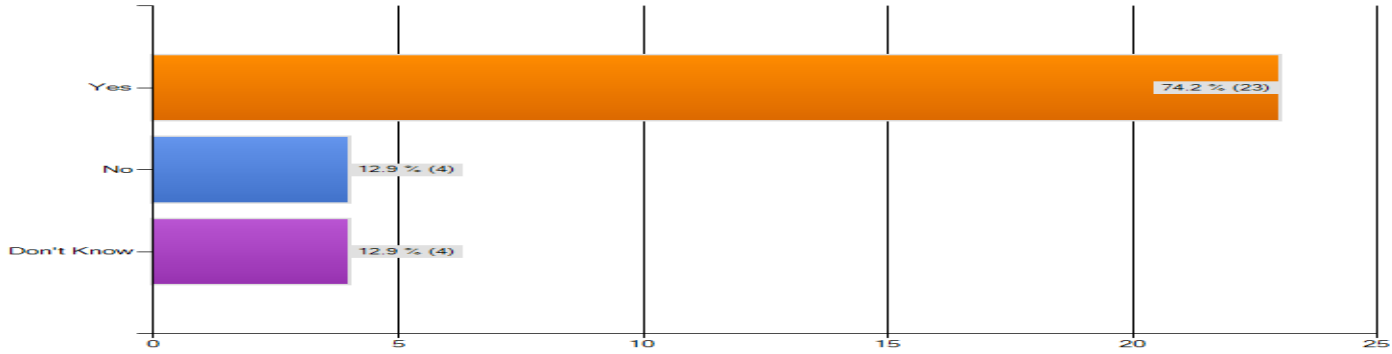
MOST FIRMS COORDINATED THEIR RESPONSES WITH KEY SUPPORT PLAYERS

32. Did your firm coordinate its response with NYC, police, public utilities, building management company, first responders, etc.?

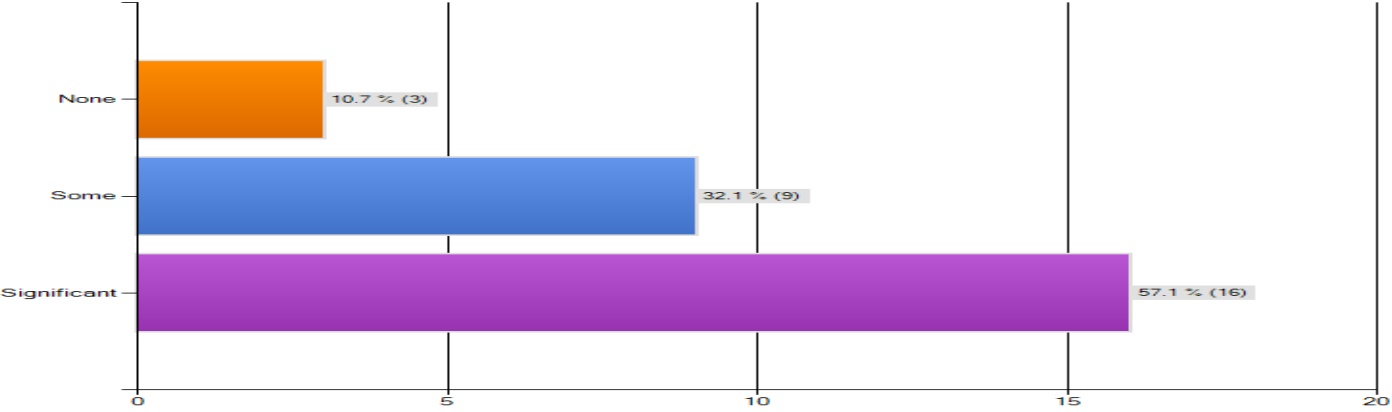


INDUSTRY CONFERENCE CALLS WERE VALUABLE PREPARATION TOOLS

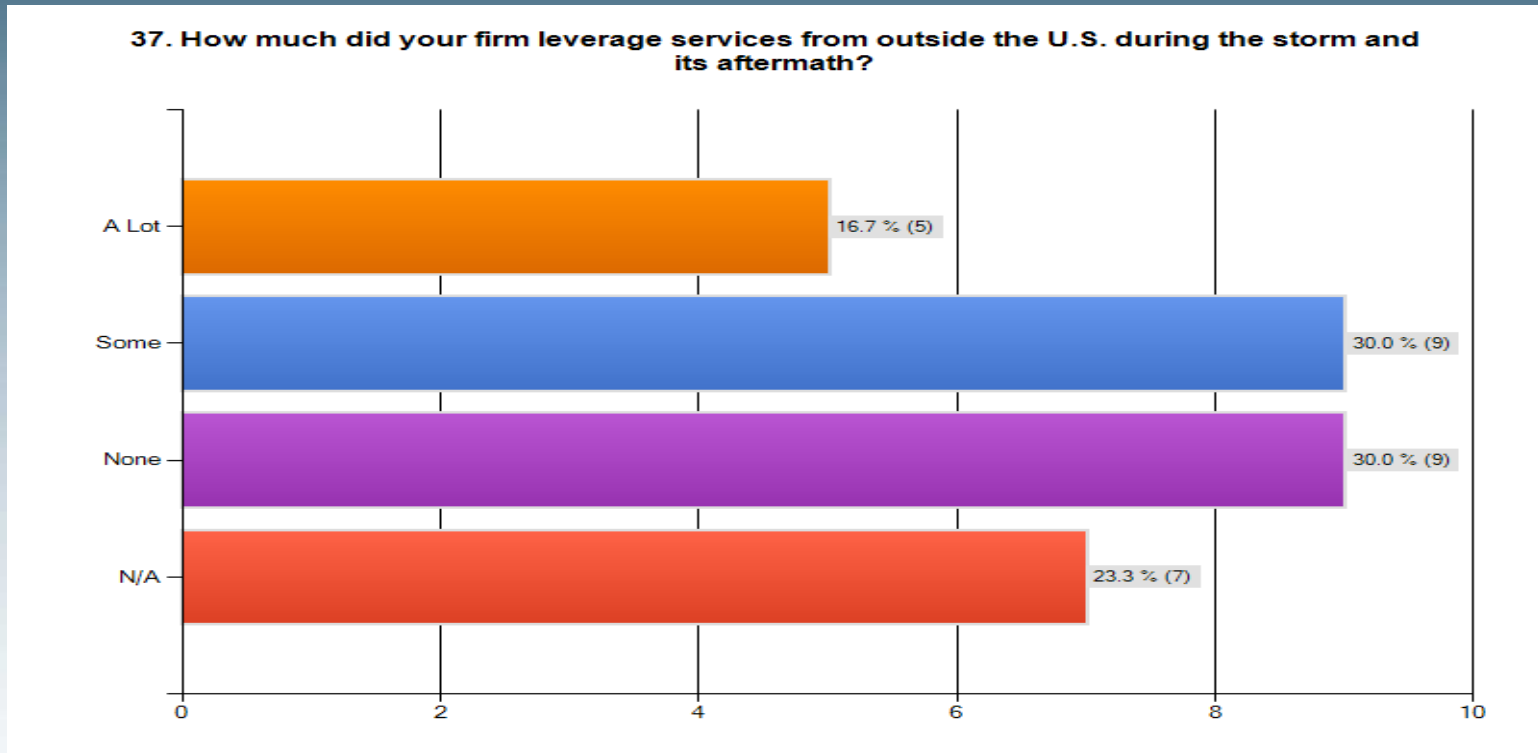
33. Did your firm participate on any of the FIA calls during the weekend of October 27-28?



35. If so, how valuable were they to your preparation and planning?

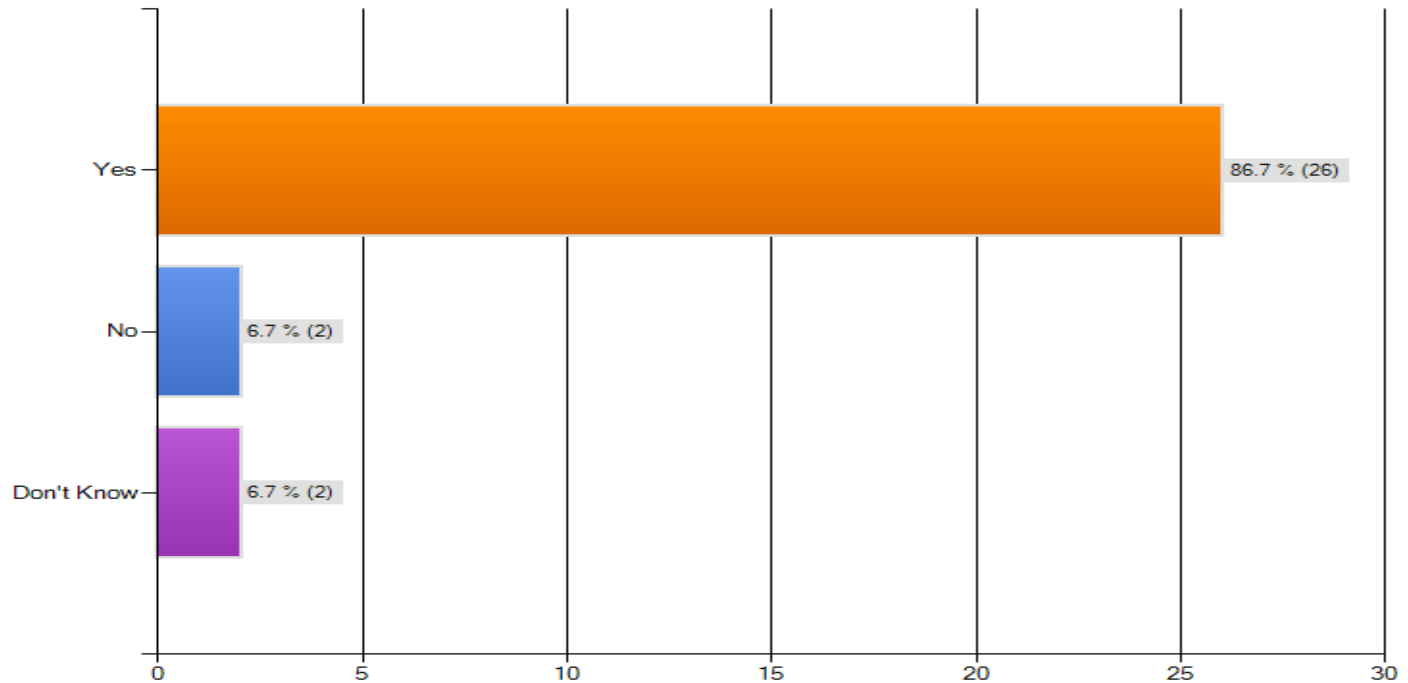


FOLLOWING THE STORM, FIRMS LEVERAGED GLOBAL/NATIONAL SUPPORT TEAMS



ALMOST ALL FIRMS HAVE DEDICATED EMERGENCY REPOSENSE TEAMS

38. Does your firm have designated recovery response teams?

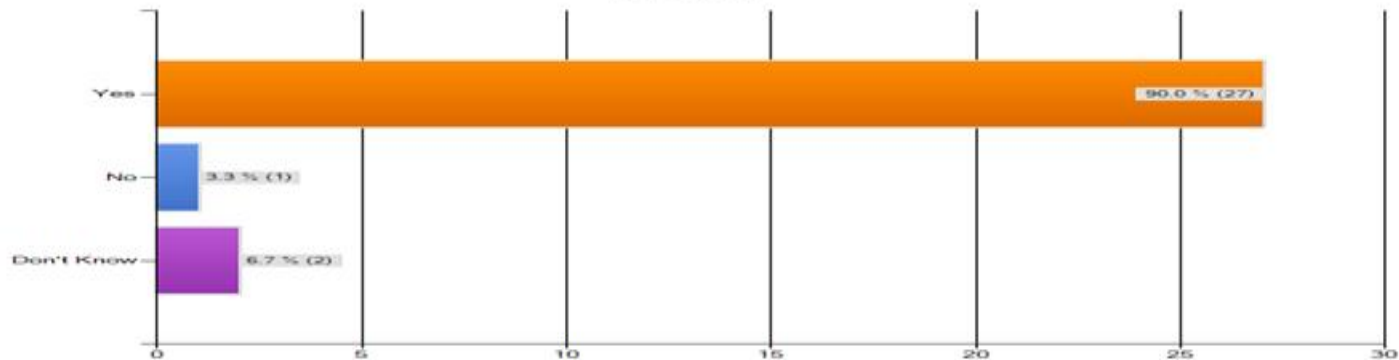


V. RECOVERY

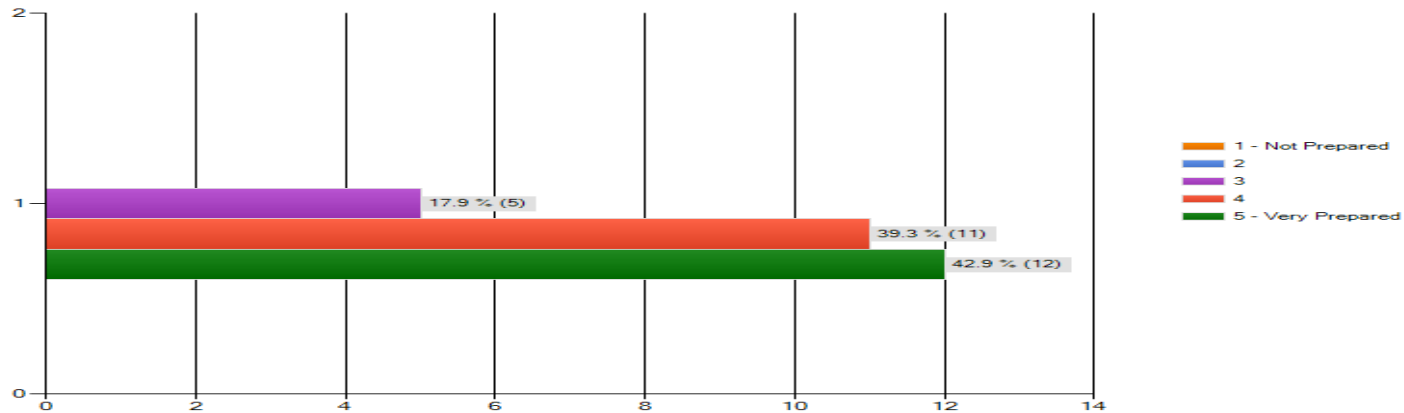


FIRMS WERE WELL PREPARED FOR RECOVERY ACTIVITIES

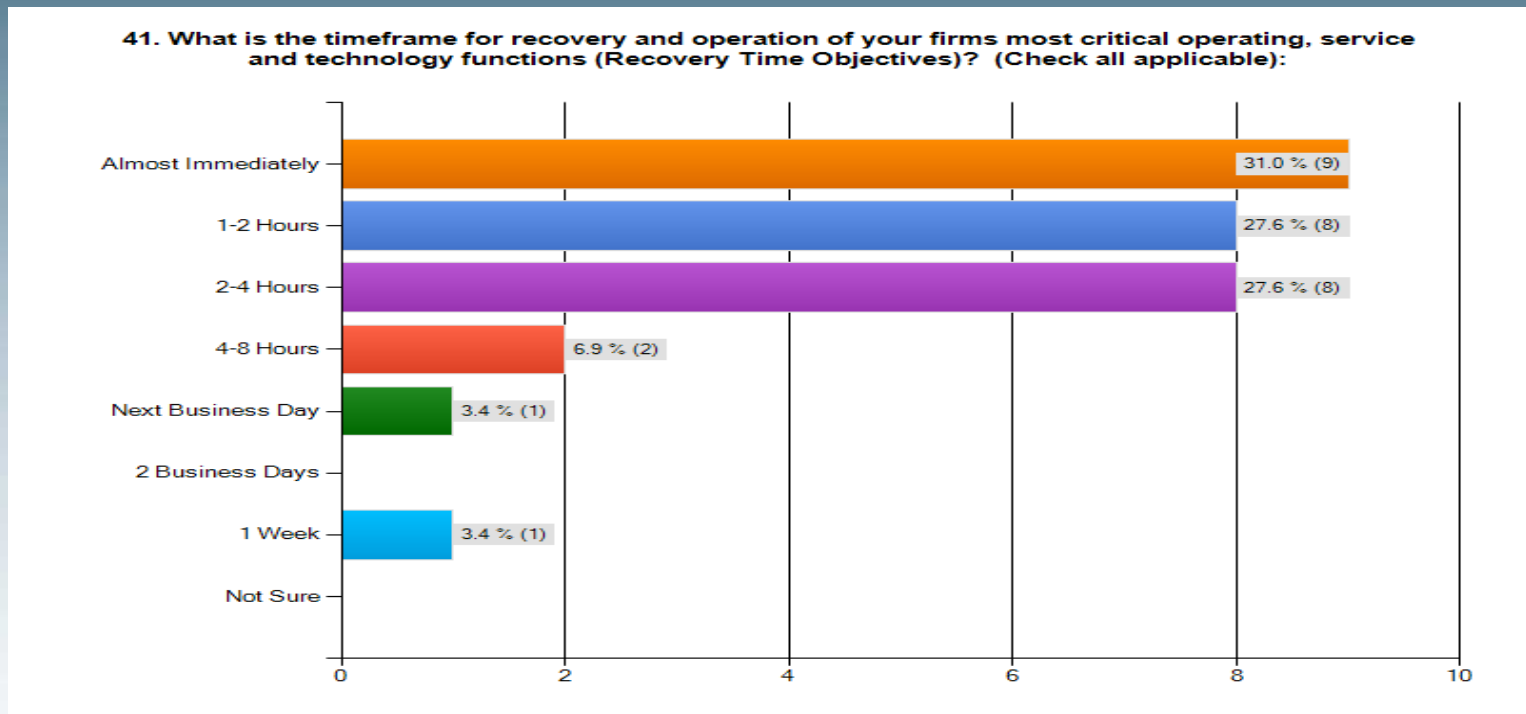
39. Does your BCP encompass the strategy, teams and procedures to conduct recovery activities?



40. If so, how would you rank your firm's strategy, readiness and procedures to support recovery activities? (Rank from 1-5 where 1= Not Prepared and 5= Very Prepared):

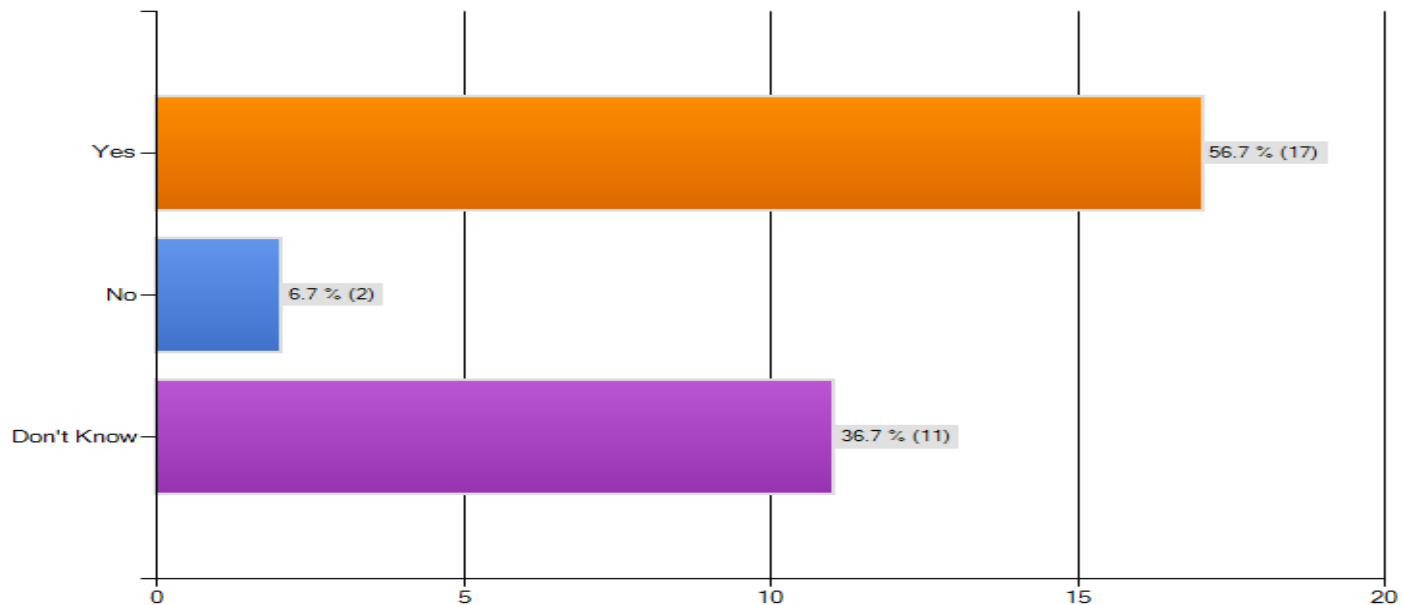


MOST MISSION-CRITICAL FUNCTIONS COULD BE RECOVERED ALMOST IMMEDIATELY OTHERS WITHIN 2-4 HOURS

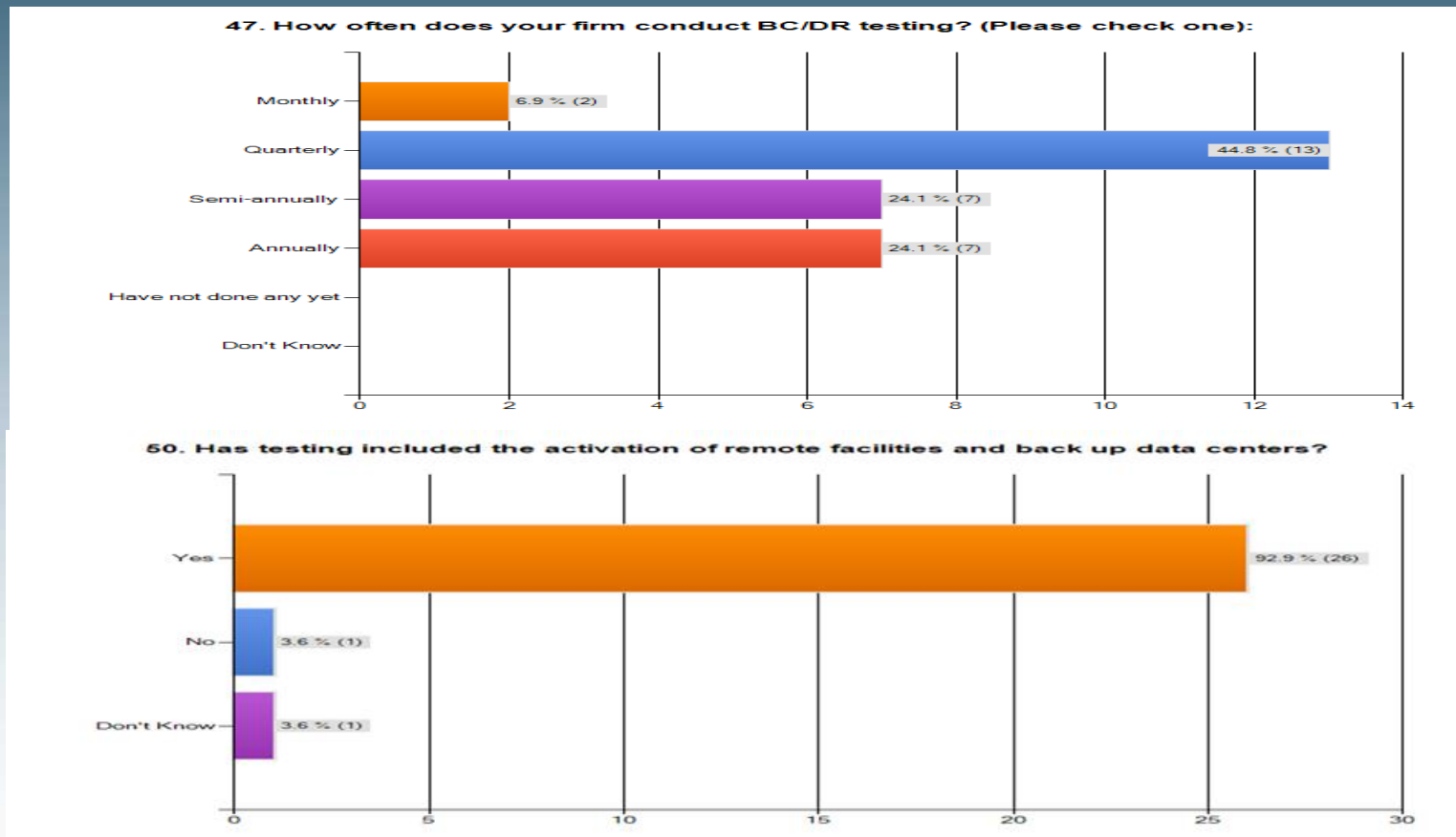


MANY FIRMS ARE COVERED BY CATASTROPHIC RISK INSURANCE

43. Does your firm have catastrophic risk insurance as well as other forms of coverage (e.g., business interruption, property/casualty, employer's liability and general liability and life insurance coverage)?

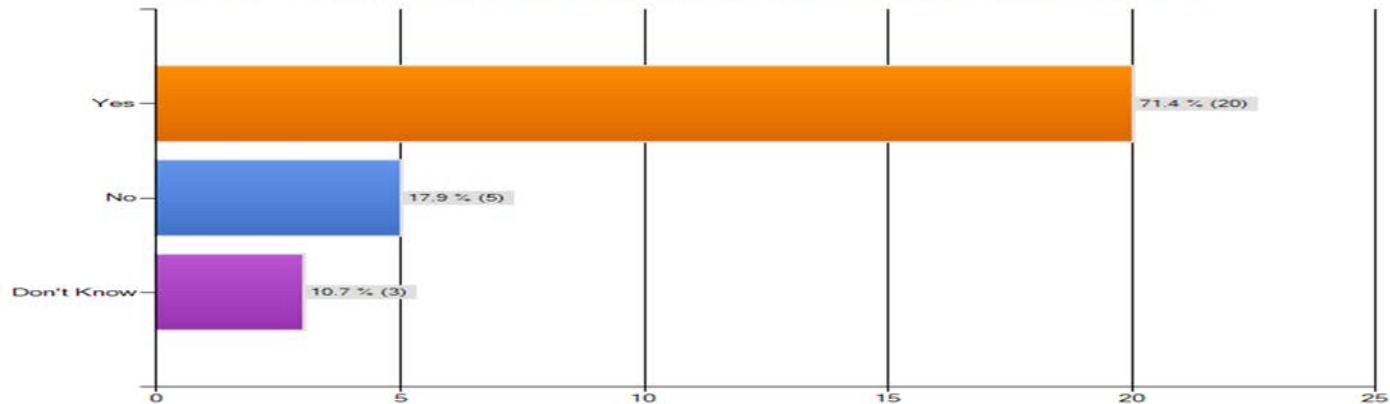


FIRMS FREQUENTLY CONDUCT BC/DR TESTING ACROSS MULTIPLE LOCATIONS

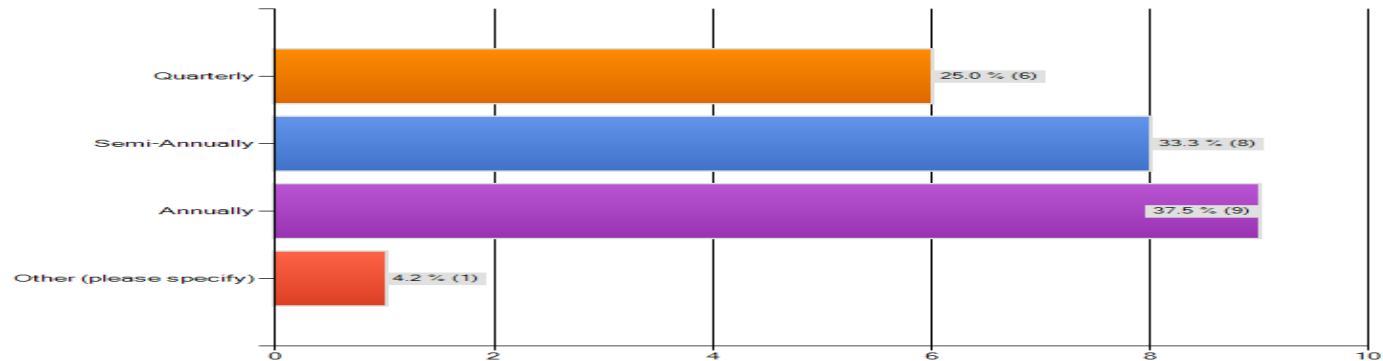


STAFF REGULARLY PARTICIPATE IN BC/DR TEST EXERCISES

48. Has your firm conducted staff BC/DR training drills for all locations?



49. If yes, how frequently have drills been conducted?



E. LESSONS LEARNED



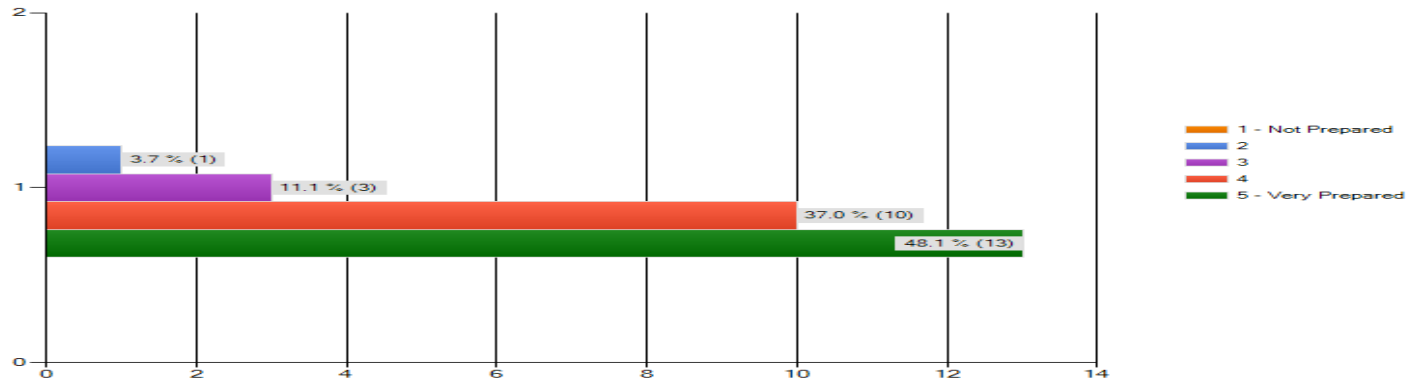
(Incident Managers Must Continue to be Vigilant ...)

LESSONS LEARNED (Cont'd) ...

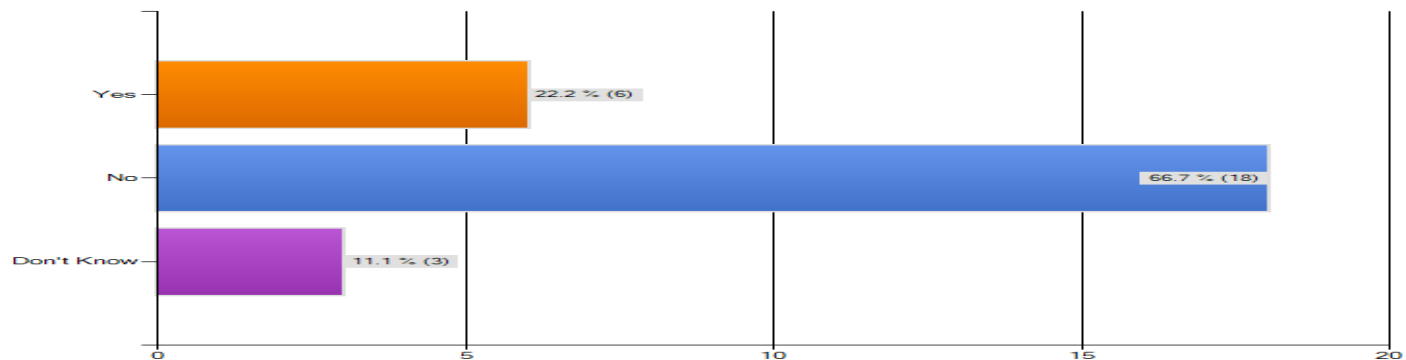
- Firms that heeded the storm warnings, communicated early and often, were better prepared and fared well
- Regular BC/DR testing of systems, infrastructure and staff paid off
- Actions from the authorities to close down mass transit, highways, bridges and tunnels impacted service providers, impeded the movement of key staff, support services
- The late decision to close the U.S. equity markets caused confusion, impacted liquidity and operations functions - but was the right thing to do
- Firms are re-evaluating their overall BC/DR preparedness, including the performance of service providers, what worked well, what did not, etc.

FIRMS HAD ADVANCE WARNINGS, WERE WELL PREPARED

51. Unlike 9/11 and other sudden-onset disasters, the approach of Sandy dominated news for days prior to its effect reaching shore. How do you rate your firm's preparedness and actions, given the lead time? (Based on the lead time for warnings please rank from 1-5 where 1= Not Prepared and 5= Very Prepared):

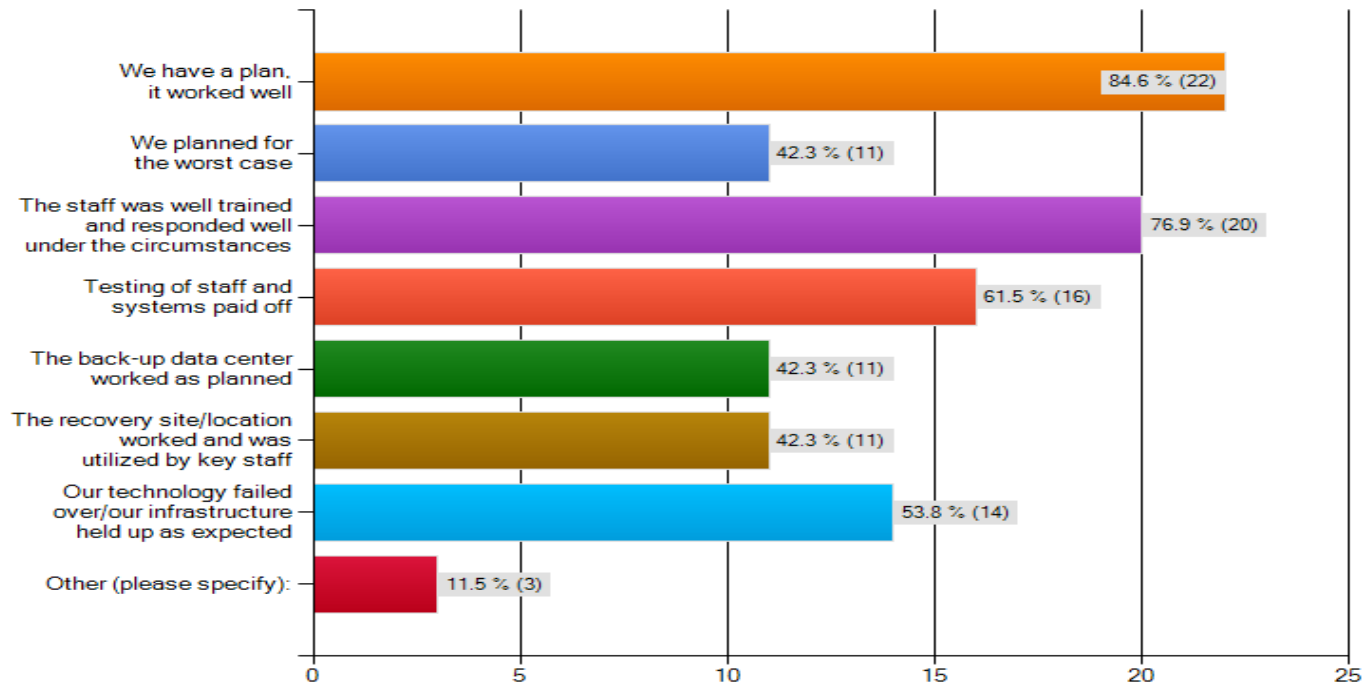


52. Did your firm make any adjustments to its DR plan between the time Sandy was forecast and the time the plan was invoked?

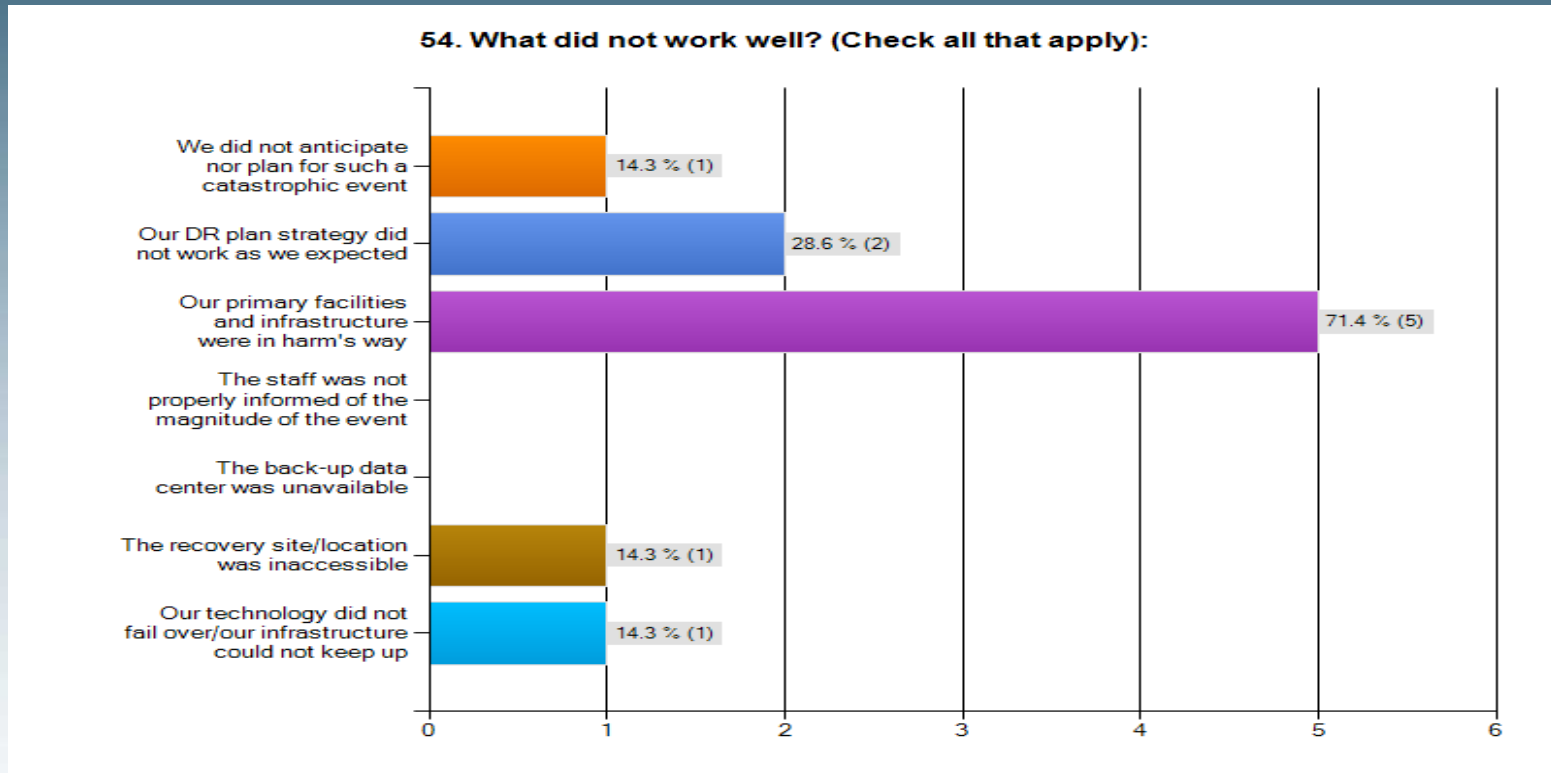


WE HAVE A PLAN, IT WORKED !

53. In retrospect, what worked well for your firm? (Check all that apply):

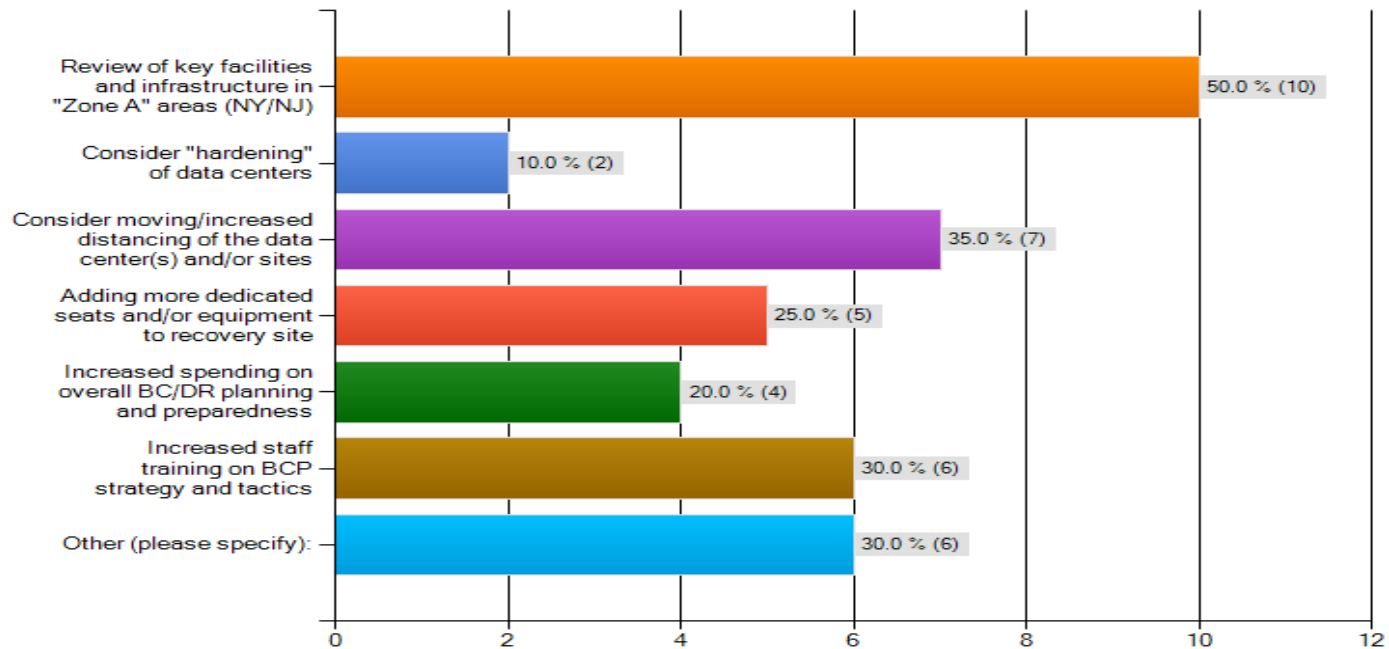


THOSE IN HARM'S WAY, DID NOT ANTICIPATE SUCH A WIDESPREAD, CATASTROPHIC EVENT



FIRMS ARE CONTEMPLATING CHANGES...

58. What areas does your firm plan to make changes to going forward? (Check all applicable):



F. ANECDOTAL FEEDBACK

- “The FIA/SIFMA committees made a significant impact on helping firms with their strategies”
- “Our plan worked very well, and we feel very good about how we executed it”
- “So many people have replaced their analog phone service with VoIP or broadband packages. After 3-4 hours of the power outage, these people lost phone service. Those who had old copper, analog phone service were hardly affected at all. We will probably have more people keep old-style phone service in the future”
- “The fact that we can operate in New York as well as we can in London and Paris makes our BC/DR plan close to fool-proof. We have staff in London that can run our business for us. We just need to make our clients aware of our situation, and we are good to go”.

ANECDOTAL FEEDBACK (Cont'd) ...

- “We did not anticipate the extent of mass transit outages”
- “Staff’s loss of power at home impacted remote access / remote working abilities”
- “The extent of power outages and inaccessible roads greatly impeded recovery”
- “Staff did not make it to hotel rooms, due to hotels are located in Zone A, not because of timing issues”
- “Given the concentration in the lower Manhattan area and what appears to be a power grid in lower Manhattan vulnerable to flooding, these events are probably something that should be expected again in the future. Hopefully brighter minds are thinking about this”.

G. CONCLUSIONS



CONCLUSIONS (Cont'd) ...

- The decision to close the equity markets was the right thing to do
- Even the most well-constructed and well-tested plans do not address multiple events all happening at the same time!
- Firms were well-prepared, given the advanced warnings and extensive media coverage
- Firms enacted their BCP's coming into the weekend, and few needed to failover to DR mode
- Those that planned well - generally fared well.

CONCLUSIONS (Cont'd) ...

- Communication with critical staff and decision makers was key to the incident management process.
- Most staff could work remote, however, widespread power outages impeded employees' telecommuting and collaboration abilities
- Employees were unable to leave home due to local storm damage, lack of transportation or unwillingness/inability to leave families.

CONCLUSIONS (Cont'd) ...

- Some firms had significant damage to mission-critical systems or infrastructure and facilities
- As a result, firms may re-consider the proximity and locations of their primary and back up facilities, going forward
- The biggest problems were caused by supply chain disruptions:
 - Closure of public transportation
 - Closure/inaccessibility of key roads
 - Outages with power and telecomm providers
 - Inability of staff to commute, telecommute

CONCLUSIONS (Cont'd) ...

- Firms are contemplating changes to key locations, further hardening of data centers and sites, and increased BCP training going forward
- The FIA and SIFMA industry calls were valuable to firms' preparation and response plans
- Regular and recent BCP awareness, systems testing and staff training exercises paid off.

H. DISCUSSION AND NEXT STEPS

- What would your firm have done differently if you only had one day's notice from the national weather services and the authorities? Would your firm's outcome have been the same?
- What if Manhattan lost power for a week?
- What if Sandy came further inland, up the Hudson River?
- How concerned are you about the proximity and location of your production and DR sites?
- Are there areas where firms can collaborate for services or to procure equipment to save money and/or to evaluate best options?
- What changes to your firm's BCP are you contemplating?

DISCUSSION AND NEXT STEPS (Cont'd) ...

- Firms should conduct post-mortem evaluations to learn from the experience:
 - What worked well, what didn't
 - Identify gaps, update plans, processes and technology accordingly
- Post-mortem reviews should consider:
 - Potential vulnerabilities of key service providers, especially cloud service providers DR failover capabilities
 - Insurance policies for loss of use, flood coverage, etc.
 - Hardening of key staff home set ups
 - Diversity of telecoms providers, as those relying on 3G/4G networks as a back-up were unsuccessful.

DISCUSSION AND NEXT STEPS Cont'd) ...

- Production and DR data center engineering and design should be revisited for:
 - Redundancy of voice and data infrastructures
 - Portability of phone systems
 - The locations of generators and fuel pumps
 - Review of fuel supply contracts with multiple suppliers from diverse locations
 - The number and location of recovery site seats for key staff.

*Be Prepared for Unexpected Things
That Can Jump Out and Bite You...*

