An Analysis of the Consequences of the August 14th 2003 Power Outage and its Potential Impact on Business Strategy and Local Public Policy

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through a joint partnership of:

Gregory M. Stoup Associate
Director, Center for Regional
Economic Issues
Weatherhead School of Management
Cleveland, Ohio 44106
E-mail: gregory.stoup@case.edu

Mark R. Slavik
Risk Practice Leader
Mirifex Systems LLC.
Strongsville, Ohio 44136
E-mail: mslavik@mirifex.com

Molly S. Schnoke
Assistant Research Director
Center for Regional Economic Issues
Weatherhead School of Management
Cleveland, Ohio 44106
E-mail: molly.schoke@case.edu

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Executive Summary

On August 14, 2003, North America experienced the largest blackout in history. It affected eight states in the Midwest and Northeast, and parts of Canada. At its peak over 50 million people were without power; some 260 power plants were immobilized and shut down. The blackout has been estimated to have cost businesses over $6 Billion in direct costs and possibly much more in losses in goodwill and brand equity. With consequences measured in numbers of such magnitude it is not surprising that a rush of investigations and studies have been initiated to analyze the causes of the power failure and pursue answers on how to prevent the occurrence of another power outage of this scale.

This paper reports on the findings of an industry survey conducted of 142 companies during the months immediately following the August 14th blackout. Our purpose for conducting this investigation was to gain a better understanding of the true costs to businesses from the blackout and to stimulate new thinking on what policies and strategies might help business and governments protect themselves from the risk of experiencing a similar disruption in the future.

The survey revealed that the decision-makers at many firms believe that the blackout revealed substantial vulnerabilities to the region's energy infrastructure and that new strategies and policies are needed to protect businesses and communities against future power failures and other sources of risk.

Some of the more salient findings include:

- Over one-third of firms surveyed have no risk management or disaster recovery plans in place.
- Nearly half of the businesses surveyed will invest more in risk management, business continuance and/or disaster recovery in the future.
- More than half the businesses surveyed say that currently the greatest risks to business operations are Cyber-Crime and Utility Outage.
- As a consequence of the blackout, over one-third of businesses surveyed said they'd be somewhat or very likely to invest in alternate energy systems.
- More than a third of the businesses surveyed felt it was somewhat or very likely that the region's image would suffer as a result of the blackout.
- Two-thirds of the businesses surveyed lost at least a full business day due to the blackout.
- A quarter of the businesses surveyed lost more than $50,000 per hour of downtime—meaning at least $400,000 for an 8-hour day.
- Nearly half of the businesses surveyed said lost employee productivity was the largest contributor to losses suffered due to the blackout.

- Production/Manufacturing and Customer Sales/Service were the areas of business hardest hit by the blackout.

Communities, governments, and businesses have already begun to make changes to their energy policies and utility arrangements. The findings of this survey reinforce the belief that even for some events that occur as infrequently as once every few decades, the risk is still substantial enough to warrant the investment of resources to protect against their occurrence.

A copy of the full survey and frequency tabulations for each response are contained in Appendix 1 and 2.

Digital copies of this report are available for free download at:

Mirifex: http://blackoutsurvey.mirifex.com/blackout 2003.cfm

REI: http://www.weatherhead.cwru.edu/rei/inthepress.asp

Background

The survey, analysis and writing of this report, were the products of a partnership between three organizations: Mirifex Systems LLC, The Weatherhead School of Management's Center for Regional Economic Issues, and NE Ohio CrainTech.com. Each organization volunteered time and resources to design and manage the survey, analyze the results, and write the report. Partnerships of this variety are rare and we hope that readers appreciate this contribution to the public dialog.

The partnership was structured to leverage the competitive strengths of each participant. Mirifex and REI developed the survey design and collaborated on the analysis and writing of the report. REI took the lead on framing the report and developing the content. Because of its expertise in risk management consulting, Mirifex drove the analysis and writing of the Risk Management section of this report. CrainTech.com worked with Mirifex to shape a survey delivery strategy and distribute preliminary and final reports.

A brief word on the scope of this report: Given the growing volume of articles and reports on the August 14th blackout and its impact on the economy, it is important that we highlight upfront the limitations of this study. This report does not analyze the causes of the power outage, document the sequence of the events that led to the blackout, or offer scenarios on how the power failure could have been avoided. Federal investigations into the root causes of the power distribution grid and its subsystems are well underway and those reports will help determine what industry and public investments will be necessary to reduce the likelihood of further large scale power outages. We have left treatment of those issues to the efforts of other investigative teams[1].

By contrast, the objective of this investigation is to report the findings of our survey and draw inferences that will help provide business leaders with a better understanding of the strategy options available to individual firms to mitigate external risk; raise public awareness of the energy development and distribution infrastructure and the landscape of energy options available to communities; and provide local and state policy makers with new insights regarding local energy policy and economic development strategies.

[1] As of this writing the U.S. Department of Energy and Canada's Natural Resources Ministry has just released their Interim Report on the causes of the blackout. The report is available at Power Systems Outage Task Force website at https://reports.energy.gov/.

Acknowledgments

It's important that we recognize the individual contributions that made this report possible. First, the authors: Mark Slavik of Mirifex analyzed survey data and wrote the risk mitigation and firm strategy section of the report; Gregory Stoup of REI at Weatherhead authored the chapters on policy and general findings; Molly Schnoke of REI at Weatherhead managed the analysis of the survey data and prepared the methodology section of the report. Tom Merrill of Mirifex supervised much of the research process and edited the final report; Paul McDonald managed the data collection and administration of the survey; Paul McDonald of Mirifex constructed the online survey instrument. Craig Young of REI at Weatherhead assisted in graphic design; Xiaoling Yoo of REI at Weatherhead provided important programming support and industry analysis; Ludwig Atsunyo of REI at Weatherhead also assisted in industry analysis and helped assess the literature on renewable energy policy.

The authors would like to thank Decision Point Marketing Research for assistance in conducting the phone portion of the survey.

I. Survey Methodology

The survey was designed to capture specific and limited information regarding the impact the August 14th power failure had on the decision-making and planning activities of business and other organizations in the affected region. The questionnaire contained a total of 18 questions and was targeted toward business executives and managers. The survey took approximately ten minutes to complete. The survey was launched shortly after the blackout on September 17, 2003, and was in the field for approximately 12 weeks.

The survey program was located and maintained on a network server at Mirifex Systems. The online questionnaire was designed to enable point-and-click responses. The survey itself was separated into three sections. The first section contained three qualifying questions that screened respondents for eligibility. The second section had five questions that captured information related to descriptive information about the company, including firm size and business category. The third section contained ten questions which asked respondents to provide both quantitative and qualitative feedback on the direct costs of the blackout to their firm and the impact the power failure had, or might possibly have, on future business decisions.

Invitations to complete the survey were sent by e-mail to potential respondents, directing them to a web address that housed the survey and the data capture mechanism. Links to the on-line survey were distributed by e-mail to a targeted audience from a CrainTech.com distribution list of executives and managers of companies in CrainTech.com's Ohio, Michigan, and New York delivery areas. Invitations to participate in the survey were also distributed to the general public and promoted by CrainTech.com through its on-line publication and several news releases distributed across the region through PR NewsWire.

The first phase of the web-based survey was conducted for a two-week period allowing for an additional week for potential respondents to participate. At that point, response rates had decreased substantially, prompting the use of phone calls to generate additional responses. About one-third of the responses were initiated by phone calls.

It is worth noting that the greatest number of responses for an e-mail survey are typically received in the first few days and generally electronic survey responses are provided in less than one week[2]. This quick drop off in survey participation is common to online surveys, which as a category, typically have low responses rates[3].

Decision Point Marketing & Research, a professional field research firm, was contracted to conduct phone-based recruitment for four weeks. Contacts were made by phone and directed to the Mirifex website to complete the survey. The sample population was chosen from an online business list purchased by Mirifex and contained more than 700 companies. The geography of the sample population was defined by zip code and derived from public information regarding the geographic scope of the power failure. In total, the survey process produce 142 total responses.

A copy of the survey is included in the appendix of this report.

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[2] The Georgia Institute of Technology conducted a study on using the web as a survey tool. This study, the most comprehensive of its kind, provided an overview of survey methods for the web. Their report is available at the Graphics, Visualization, & Usability Center's website at http://www.cc.gatech.edu/gvu.

[3] Researchers from the Missouri School of Journalism conducted a study exploring online research to determine how best to use online technology to advance knowledge in various disciplines. This report can be found at http://www.empiricom.org.

II. Survey Results

This section provides the response frequencies to each question in our survey. We also provide some analysis in order to set the stage for more detailed discussion in later sections of the report. It is important to precede the survey findings with a brief discussion about the broader environment in which the survey was conducted so that these results can be viewed in the proper context.

The geography of the blackout defined the population from which the survey was sampled. Survey respondents represent an industry distribution that is quite different from the actual industry base of the region affected by the blackout and the broader United States. This resulted in some industries being over-represented in our survey. To the extent that responses vary by industry, some findings will be more industry-specific and less applicable to the broader regional or national economy.

Furthermore, the survey was conducted approximately one month after the blackout had occurred, so respondents in many cases were still managing the negative consequences of the power outage. This environment could impact respondent estimates of the consequences (much of which is subjective) in two different ways. The proximity to the event might have biased respondents toward suggesting more immoderate response strategies than had there been a greater lag between the blackout and the survey. A contrasting argument could be made that those impacted firms might not have had the opportunity to fully assess the mid- and long-term costs, or responses strategies to, the blackout. The survey instrument was not designed to screen either of these potential influences from the analysis.

Finally, the broader economy was in a state of slow growth during August 2003. The national economy was still struggling with job losses and slow sales growth, particularly in the Midwest. Likewise, this environment could have created a pessimistic bias in survey responses relative to a full employment economy. These exogenous forces and influences will, to some degree, limit the applicability of the results and conclusions to the time and place of the blackout.

Question #1: *How many hours was your business without power due to The Blackout which began on August 14, 2003?*

Responses:	#	Pct.	Response
	48	33.8%	Less than 8 hours
	56	39.5%	8 - 24 hours
	25	17.6%	24 - 48 hours
	11	7.7%	48 - 72 hours
	1	.7%	72 - 96 hours
	1	.7%	More than 96 hours
	142	100.0%	

Commentary: Two-thirds of the businesses surveyed (66.2%) lost at least a full business day due to The Blackout. One-quarter (25%) of the businesses surveyed were impacted for two or more business days.

Question #2: *Thinking of your business as a whole, how much do you estimate that each HOUR of downtime cost you?*

Responses:	#	Pct.	Response
	111	78.1%	$50,000 or less
	11	7.8%	$50,000 - $100,000
	11	7.8%	$100,000 - $250,000
	4	2.8%	$250,000 - $500,000
	0	0%	$500,000 - $1 million
	1	.7%	$1 million - $5 million
	4	2.8%	Over $5 million
	142	100.0%	

Commentary: Over one-fifth of the businesses surveyed (21.9%) lost more than $50,000 per hour of downtime—meaning at least $400,000 for an 8-hour day. One business in ten, lost between $100,000 - $500,000 per hour. And 3.5% of businesses surveyed lost more than $1 million for each hour of downtime.

Question #3: *Which of the following, in your opinion, is the largest contributor to the losses you suffered as a result of The Blackout?*

Responses:	#	Pct.	Response
	66	46.5%	Employee productivity losses
	16	11.3%	Plant and/or equipment downtime
	1	.7%	Lack of planning/preparedness
	1	.7%	Reputation damage
	1	.7%	Regulatory and/or legal compliance
	5	3.5%	Service Level (contractual) Agreements
	9	6.3%	Financial performance (revenue generation)
	2	1.4%	Research disruption
	8	5.6%	Delivery disruption
	14	9.9%	Sales disruption
	0	0%	Accounts Payable
	0	0%	Accounts Receivable
	0	0%	e-Business Systems
	7	4.9%	Information Technology Systems
	12	8.5%	Other
	142	100.0%	

Commentary: Nearly half of the businesses surveyed (47%) said lost employee productivity was the largest contributor to losses suffered due to the blackout. Employee productivity is largely impacted by availability of information technology resources and workplace environmental conditions (e.g. drinking water, sanitary systems, HVAC, etc.).

Question #4: *Which area of business would you say was hardest hit due to The Blackout?*

Responses:	#	Pct.	Response
	45	31.7%	Production/Manufacturing
	10	7.0%	Administration
	26	18.3%	Sales and Marketing
	21	14.8%	Information Technology
	0	0%	Legal and Compliance
	18	12.7%	Customer Service
	0	0%	Human Resources
	4	2.8%	Transporting, Shipping, Receiving
	5	3.5%	Research
	13	9.2%	Other
	142	100.0%	

Commentary: Production/Manufacturing was the area of business hardest hit (31.7%) followed by Sales and Marketing (18.3%) and Information Technology (14.8%). Also, Customer Services was identified as being impacted (12.7%) by The Blackout.

Question #5: *Do you think The Blackout will in any way impact your company's future plans with regard to the following?*

Responses:	#	Pct.	Response
	7	4.3%	Growth/expansion
	9	5.5%	Relocation
	4	2.4%	Outsourcing
	5	3.0%	Supplier selection
	14	8.5%	Other operational activities
	44	26.8%	Disaster Recovery & Risk Management
	81	49.5%	No impact
	164	100.0%	

Commentary: Though half say the blackout will have "no impact" on their company's plans for the future, nearly 10% say the blackout will affect their decision-making with regards to either growth or relocation. Nearly 27% say future plans will involve Disaster Recovery & Risk Management initiatives.

Question #6: *As a consequence of The Blackout, do you think your firm will be more likely to consider investments in alternate energy generation, storage and/or distribution systems?*

Responses:	#	Pct.	Response
	23	16.2%	Very likely
	32	22.5%	Somewhat likely
	43	30.3%	No change
	6	4.2%	Somewhat unlikely
	38	26.8%	Very unlikely
	142	100.0%	

Commentary: As a consequence of the blackout, more than one-third of businesses surveyed (38.7%) said they'd be somewhat or very likely to invest in alternate energy systems. That over 30% of the businesses say they do not plan to make additional investments in alternate energy sources identifies an area for further exploration.

Question #7: *Do you feel that the image of your city or region will suffer as a result of The Blackout?*

Responses:	#	Pct.	Response
	17	12.0%	Very likely
	32	22.5%	Somewhat likely
	39	27.5%	No change
	9	6.3%	Somewhat unlikely
	45	31.7%	Very unlikely
	142	100.0%	

Commentary: More than a third of the businesses surveyed (34.5%) felt it was somewhat or very likely that the region's image would suffer as a result of the blackout.

Question #8: *In the area of risk management and disaster recovery, which of the following does your company have in place currently?* (select all that apply)

Responses:	#	Pct.	Response
	36	25.4%	Business resumption plan(s)
	50	35.2%	Business continuity plan(s)
	60	42.3%	Disaster recovery plan(s)
	47	36%	Crisis communications plan(s)
	51	34%	We have no plans

Commentary: Over one-third of firms surveyed (34%) have no risk management or disaster recovery plans in place. The variation in the types of plans in place is discussed in more detail in later chapters.

Question #9: *The Blackout represents one kind of interruption or impact threatening business. Which of the following interruptions/impacts do you feel poses the greatest risk to your company in the near-term future?*

Responses:	#	Pct.	Response
	37	26.1%	Cyber-crime (e.g., viruses, computer hacking, data theft)
	34	23.9%	Utility outage (electrical failure)
	3	2.1%	Fuel curtailment (e.g. natural gas, petroleum-related fuels)
	3	2.1%	Water availability
	4	2.8%	Public relations crisis
	1	.7%	Industrial espionage
	1	.7%	Criminal activity (e.g., theft, workplace violence)
	9	6.3%	Terrorism (e.g. bomb threat, bio-hazard)
	5	3.5%	Natural Disaster (e.g., earthquake, fires)
	10	7.0%	Severe Weather (e.g., flooding, tornado, hurricane)
	19	13.4%	Loss of key staff and employees
	12	8.4%	Regulatory changes
	4	2.8%	Legal actions
	142	100.0%	

Commentary: More than half the businesses surveyed say the top threat of future interruption is either Cyber-Crime (26%) or a Utility Outage (26%), outdistancing other concerns more than 2:1. The loss of key staff (13.4%) and Regulatory Changes (8.4%) were also identified as key areas of concern.

Question #10: *Would you say your company is likely to invest more, less or about the same in risk management, business continuance and/or disaster recovery in the future?*

Responses:	#	Pct.	Response
	12	8.4%	Will invest much more
	53	37.4%	Will invest a little more
	73	51.4%	Continue at current investment levels
	2	1.4%	Will invest a little less
	2	1.4%	Will invest much less
	142	100.0%	

Commentary: Nearly half (46%) of the businesses surveyed will invest more in risk management, business continuance and/or disaster recovery in the future.

III. Profile of Respondents

In this section of the report we look in greater detail at patterns within the region, industries, and firm size (i.e. small and large firms). By examining this information we hope to provide insights into industry-specific and location-specific trends that could help highlight important linkages to shape more effective business strategies and public policies.

Geography:

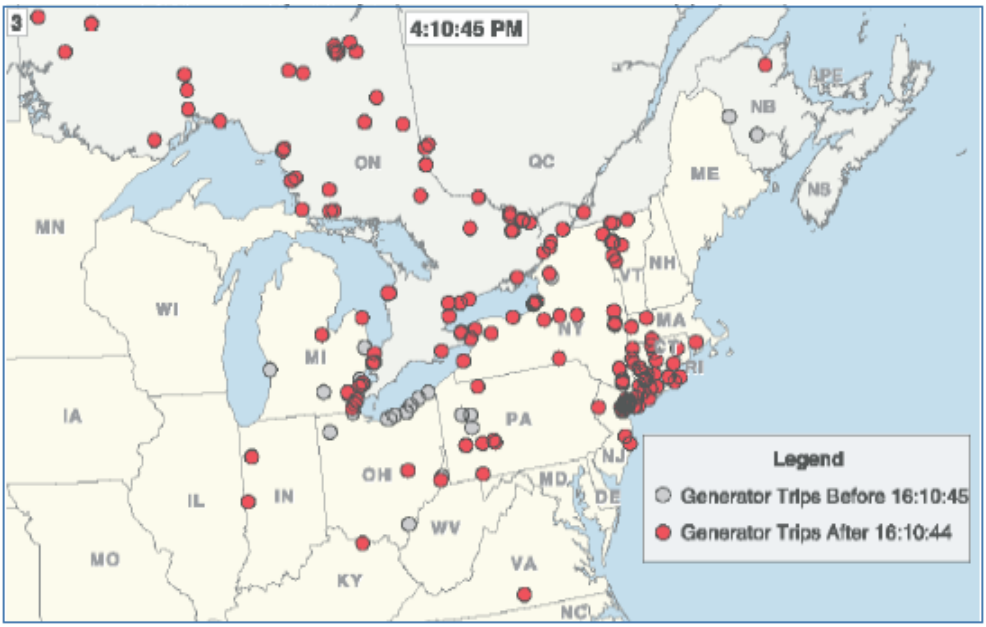
The geography of the blackout included Connecticut, Massachusetts, Michigan, New Jersey, New York, Ohio, Pennsylvania, and Vermont as well as a large swath of Southeastern Canada.

Figure #1: Map of the Region Affected by the Blackout

Source: GAO report: Electricity Restructuring, 2003 Blackout Identifies Crisis & Opportunity for the Electricity Sector, dated November 2003.

The power outage cascade did not encompass the entire geography of each of the affected states but, nonethelessm was contained to a somewhat contiguous grouping of communities within the United States and Canada. In total 531 individual generators tripped and 263 power plants had to shut down.

Figure #2: Map of Generator Trips on August 14th, 2003.



Source: Power Systems Outage Task Force Interim Report, pg 65.

Although, our survey was introduced to a population that included each of the eight states and Ontario, Canada, roughly half the respondents came from Ohio. The remaining responses were distributed somewhat unevenly over the remaining eight regions (Refer to Table #1).

Table #1: Responses by Location

Location	No. of Responses	Percent Response
Ohio	76	53.5%
Pennsylvania	4	2.8%
New York	24	16.9%
Indiana	1	.7%
Illinois	1	.7%
Michigan	15	10.6%
Wisconsin	2	1.4%
South Canada	19	13.4%
Total	**142**	**100%**

Given the sample size of 142 records and this distribution of responses across geography, we are limited in our extended analysis to speak to patterns and conclusions associated with specific states. Therefore, we aggregated our results into several cohorts. In most cases we will restrict our geographic profiles to three groupings: Ohio, Outside Ohio, and the entire Blackout region.[4] Where applicable, we have utilized secondary information to support our results.

In terms of the frequencies of responses, there is a moderate degree of similarity between the Ohio and Outside Ohio groups across most of the survey questions. However, this geographic distinction does create a separation across two important categories.

[4] The copy of survey provided in the appendix of this report includes response frequencies for each geographic cohort.

First, Ohio firms tended to be small establishments. Roughly half of the Ohio respondents were from firms with annual revenues below $10 million. By comparison only a third of firms from outside Ohio had revenues in that range. Likewise, roughly 70% of Ohio firms represented in the sample had fewer than 50 employees; the corresponding figure for non-Ohio firms was 40%. Therefore, conclusions that relate to the particular needs of small firms are more likely to correlate with the demands of Ohio businesses than those outside Ohio.

Second, respondents associated with firms in manufacturing industries were more likely to reside outside Ohio; and firms in the professional, scientific and technology service industries were more likely to have been Ohio companies. Therefore response trends related to manufacturing firms will have a stronger correlation to businesses outside Ohio. This might seem somewhat surprising given the relatively high concentration of manufacturing jobs in Ohio. The likely reason for these disparities is interplay of the small sample size of the database and the distribution method for the survey which is weighted toward technology industries.

Industry:

Another important characteristic of the survey is the distribution of industries represented. Since the power and energy reliability needs of companies vary widely by industry, we need to know the proportion of industry represented in the survey so that we can better identify industry-specific patterns. Furthermore, to the degree that specific industries were under or over sampled, given the actual industry base of the region, we need to know when we are limited in our ability to draw broad conclusions about the region. The distribution of survey respondents will also help define industry groupings; which are necessary to develop inferences from.

Table #2 highlights several features of the survey that warrant some clarification. Note that for this analysis we confine our comments to the United States.

First of all, the industry base of the blackout region is generally similar to the broader United States in terms of the proportion of jobs in each major industry sector[5]. Therefore statements about the blackout region in terms of its underlying economy have applicability to the larger United States.

Comparisons of the distributions of survey respondents with industry employment in the blackout region, however, reveal some strong variations. In particular, survey respondents were more like to represent manufacturing businesses and professional, scientific & technical service firms than had a more representative sample of the population been drawn. There was also a slightly larger representation for food service establishments in the survey.

[5] These percentages were estimated by identifying all the counties that were impacted by the blackout through media releases and interviews with state officials and then calculating industry employment using the U.S. Census Bureau's County Business Patterns database. Although this design will incorporate some portions of counties and regions not affected by the blackout in its calculations, employment percentages based on the entire county will likely correspond strongly to subcounty regions at this broad industry level.

Table #2: Survey Responses and Employment Percentages by Industry Category

Industry Segment	Survey Responses		Employment * Blackout Region	Employment * U.S.
Forestry & Fishing	1%		0.0%	0.5%
Mining	2%		0.1%	0.5%
Utilities	1%		0.2%	0.4%
Construction	1%		4.4%	5.9%
Manufacturing	***13%***		***9.3%***	***10.2%***
Wholesale trade	4%		4.3%	3.8%
Retail Trade	1%		10.0%	11.1%
Transportation & warehousing	4%		2.0%	3.3%
Information	9%		3.1%	2.4%
Finance and insurance	9%		6.8%	4.9%
Real estate & rental & leasing	3%		3.4%	3.3%
Professional, Scientific & Technical services	***21%***		***8.1%***	***6.3%***
Management of companies & enterprises	5%		1.4%	1.1%
Administrative & waste services	0%		5.9%	5.9%
Educational services	8%		2.4%	1.8%
Health care & social assistance	3%		11.3%	9.3%
Arts, entertainment, & recreation	0%		2.2%	2.0%
Accommodation & food services	13%		5.2%	6.6%
Other services, except public administration	1%		4.9%	5.3%
Government & government enterprises	0%		12.2%	13.8%

Source: Bureau of Economics and Statistics, REIS Database (2003).

Given this industry distribution (i.e. over sampling in several industries) we have chosen to group responses into three industry cohorts: (1) Manufacturing, (2) Professional Scientific & Technical Services, and (3) All industries. This grouping has some advantages. Not only are the sample sizes from these industries large enough for some expanded analysis, but they play a fundamentally important role in shaping the long-term economic health of the nation. Information that improves decision making in these industries – one goal of this report - has the potential to have farther reaching impacts on the broader economy.

One interesting industry pattern that emerged from the survey was that manufacturing firms experienced roughly the same degree of immediate financial harm from the blackout as other firms. In fact, there was only modest variation of reported losses (by cost range) for any of the industries we examined.

Table #3: Industry Segments by Hour of Downtime Cost

	Estimated Loss per Hour (in thousands)		
Business Category	Less than $50	$50-$249	$250 or more
Manufacturing	72%	22%	6%
Professional, Scientific, and Technical Services	87%	10%	3%
Total	78%	15%	6%

This similarity across industries at this broad level is most likely a consequence of having small and medium-sized firms dominate the sample (i.e., firms that have less capital intensive operations and lower fixed costs). Roughly half the firms in our sample had less than 50 employees and reported less the $10M in annual revenues, 73% of respondents employed fewer than 250 employees and 75% had less than $100M in annual revenues.

That said, there is some evidence, however, that manufacturing establishments endured larger than average losses. This would be consistent with expectations, particularly for large manufacturing firms that house heavy machinery and capital intensive processes. When sophisticated molding, dyeing, metal fabrication and assembly operations are halted in mid-process, significant resources may be required to bring operations back online.

We can see some evidence of this variation in the source of cost through our survey. Manufacturers reported twice as frequently (22% compared to 11%) that the largest contributor to the cost of the power outage was due to plant and equipment downtime.

Table #4: Industry Segments by Source of Losses

	Largest Contributor of Losses		
Business Category	Employee productivity losses	Plant and/or equipment downtime	Delivery disruption
Manufacturing	39%	22%	0%
Professional, Scientific, and Technical Services	40%	7%	17%
Total	46%	11%	10%

Furthermore, when asked to identify the business area hardest hit by the blackout manufacturing firms were less likely to list sales and marketing, information technology, or customer service; they were twice as likely to pinpoint production processes as the operational area most damaged by the loss of power.

Table #5: Industry Segments by Operational Area Hardest Hit

Business Category	Area Hardest Hit by Blackout			
	Production	Sales and Marketing	Information Technology	Customer Service
Manufacturing	61%	11%	6%	0%
Professional, Scientific, and Technical Services	30%	23%	13%	13%
Total	32%	18%	15%	13%

Firm Size:

Perhaps the most salient feature of survey responses was the distribution across firm size. As previously stated, small firms accounted for a seemingly large portion of the total sample. However, when compared to the distribution of the larger population, the survey was quite successful in capturing responses associated with larger establishments. One of the striking characteristics of the United States economy is its abundance of small establishments[6].

Table #6: Firm Size (# of employees) for Survey Respondents.

Number of Employees	Percent of Total Establishments (private industry only)		
	Survey Respondents	Blackout Region*	United States*
Less than 50	51%	95%	94%
50-249	22%	4%	5%
250 or more	27%	1%	1%

Source: United States Bureau of the Census, County Business Patterns (2001).

Over sampling on large firms allows us to examine more closely the impact the power outage had on concentrated sets of specialized activities. It will also provide insight into the attitudes of business that have significant resources to invest in new strategies or have greater influence in shaping public policy.

Not surprisingly the losses suffered by larger firms were greater in degree (i.e. revenue) than those of small and mid-sized businesses. Over half of the firms with more than 250 employees reported hourly losses in excess of $50K.

Table #7: Firm Size (No of employees) by Hour of Downtime Cost

Number of Employees	Estimated Loss per Hour (in thousands)		
	Less than $50	$50-$249	$250 or more
Less than 50	92%	4%	4%
50-249	87%	13%	0%
250 or more	46%	38%	15%

[6] County Business Patterns defines an establishment as a stand alone facility or functional unit typically contained within a single structure. Firms and businesses that have multiple operations housed in separate facilities are treated as distinct establishments in county business patterns database.

Interestingly, our survey revealed that regardless of firm size, the largest contributor to losses was idle workers. Roughly half of all respondents in each size category cited employee productivity as the single largest source of losses. This suggests that, although larger firms will tend to have higher fixed costs and more infrastructures exposed to damage, the disruptions of a power outage take their heaviest toll on employee efficiency. The higher total costs for larger firms are therefore largely a function of having more workers rather than extensive infrastructure or large stocks of factory equipment.

Table #8: Firm Size (No of employees) by Source of Losses

	Largest Contributor of Losses		
Number of Employees	Employee productivity losses	Plant and/or equipment downtime	Delivery disruption
Less than 50	46%	7%	14%
50-249	48%	16%	0%
250 or more	46%	15%	10%

Furthermore, the operational area of larger firms most exposed to losses from a power outage is sales and marketing. Nearly twice as many respondents from large firms identified sales and marketing as the operational area hardest hit by the blackout.

Small and mid-sized firms reported a more evenly distributed loss function for operational areas. This is probably a result of those firms having a lesser degree of specialization across functions.

Table #9: Firm Size (No of employees) by Operational Area Hardest Hit

	Area Hardest Hit by Blackout			
Number of Employees	Production	Sales and Marketing	Information Technology	Customer Service
Less than 50	36%	13%	15%	13%
50-249	35%	16%	13%	10%
250 or more	21%	31%	15%	15%

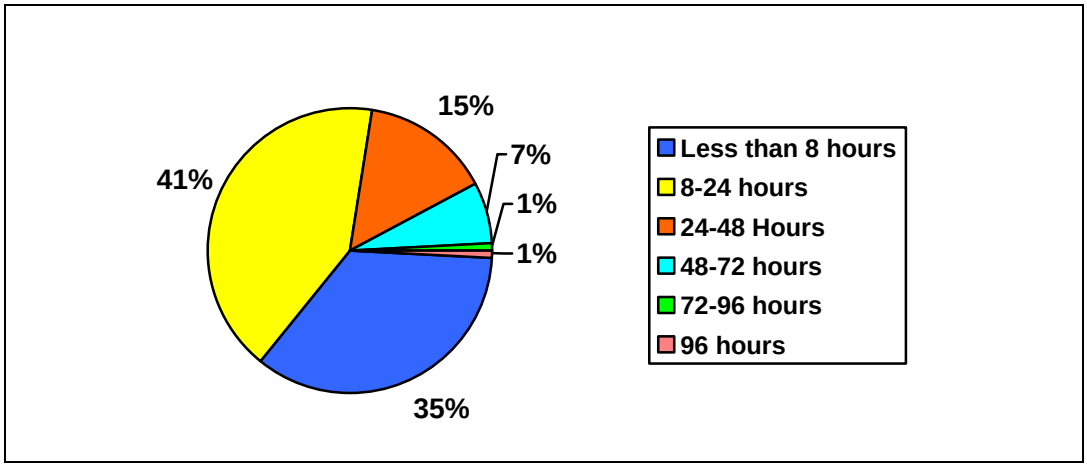
IV. Survey Analysis

On Thursday, August 14, 2003, an electrical disruption caused a loss of electrical service to consumers and industry in eight U.S. states and substantial parts of the Canadian province of Ontario. Depending on the industry and/or company, an interruption to production can quickly reach into the millions of dollars. The actual costs of the August 2003 Blackout will be debated for years to come. U.S. Senator Charles Schumer said, "This is the worst blackout in American history and I think it's safe to say that by the time we finish tallying the cost of responding to this crisis, its expense is going to make the record books."

The initial macro-level economic losses on U.S. workers, consumers and taxpayers from the August 2003 Blackout are estimated at $6.4 billion. Workers and investors lost $4.2 billion in income, due to reductions in wage and salary earnings and profits. Consumers and Industry also lost between $380 million and $.94 billion in goods due to spoilage or waste. The largest portion of this loss was in perishable foods. The impacts could have been far more damaging had the Blackout occurred on a Monday or Tuesday versus late Thursday afternoon.[7]

Nearly two-thirds of the businesses surveyed (66%) lost at least one full business day (8-24 hours) due to the Blackout, while 14.7% of the businesses lost 24-48 hours or two-days. Those companies with annual revenues in excess of $1 billion were hardest hit by the Blackout, with nearly 83% having lost 8-24 hours as compared to 70% of companies with annual revenues less than $10 million.

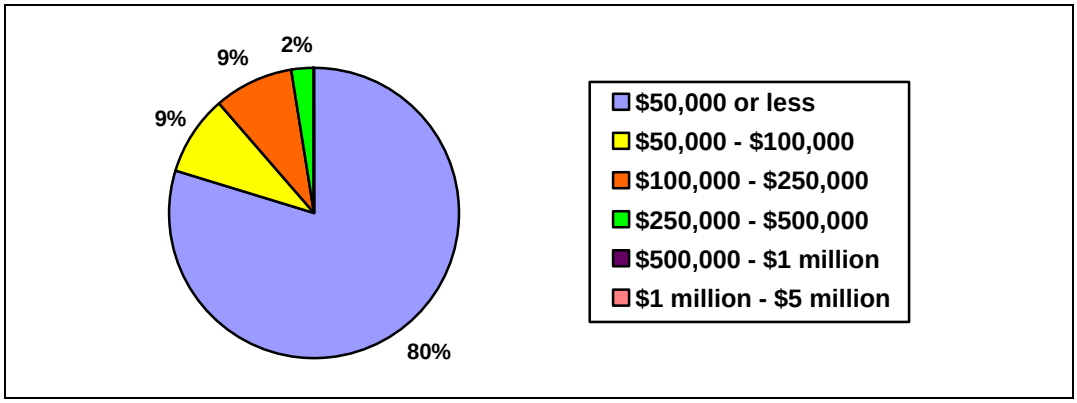
Figure #3: Company Downtime (in Hours) from the Blackout



A quarter of the businesses surveyed (24%) lost more than $50,000 per hour of downtime—meaning at least $400,000 for an 8-hour day, while nearly 15% lost more than a $100,000 per hour. As would be expected, the per-hour loss generally increases with the size of the organization (i.e. annual revenue). Over 96% of those companies with annual revenues less than $10 million estimated hourly losses at less than $50,000 per hour. Whereas over 50% of the companies surveyed with annual revenues in excess of $5 billion estimated hourly losses at $250,000 to $5 million per hour.

[7] Anderson Economic Group: "Northeast Blackout Likely to Reduce US Earnings by $6.4 Billion", August 19, 2003.

Figure #4: Company Loss (in U.S. dollars) from the Blackout



The ability for an organization to quantify their operational losses is a fundamental component to an effective Business Continuity Management program. Normally, costs due to unplanned interruptions are identified during a business impact analysis or BIA. The BIA investigates critical business processes for interruption (operational impact analysis) and financial loss (financial impact analysis). The BIA identifies and analyses key resources that support the organization's critical business processes. The BIA also determines the costs associated with a loss or interruption of those critical processes. The results of the investigation form senior management's prioritization for developing response strategies (e.g. business resumption, disaster recovery plans, etc.).

Figure #5: Downtime in Hours by Firm Size

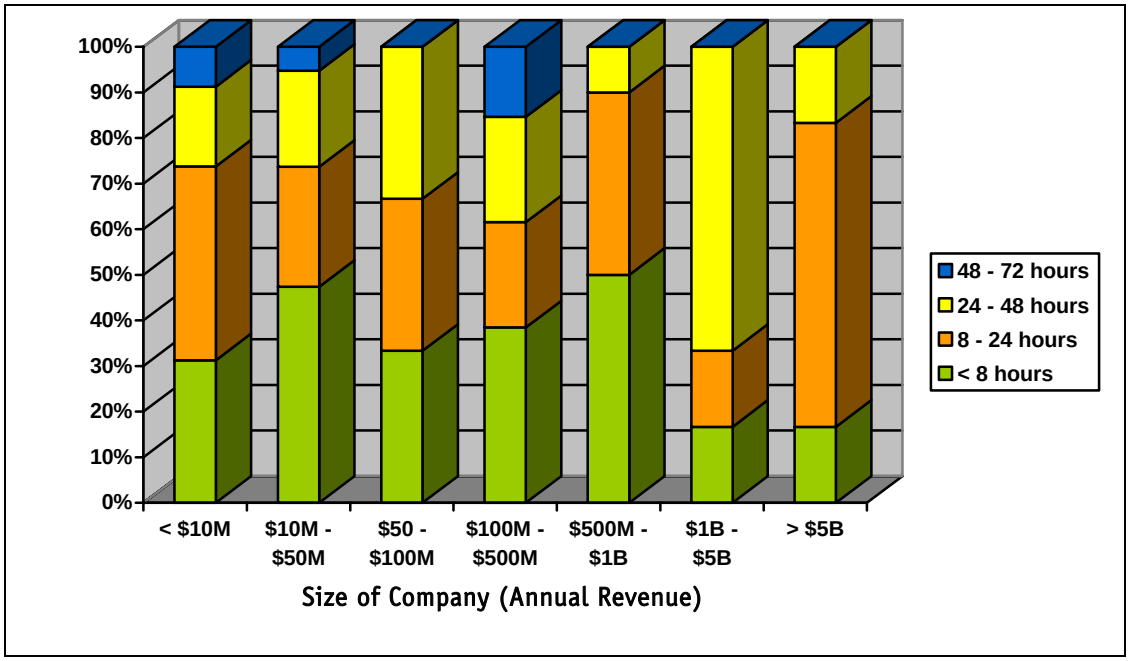
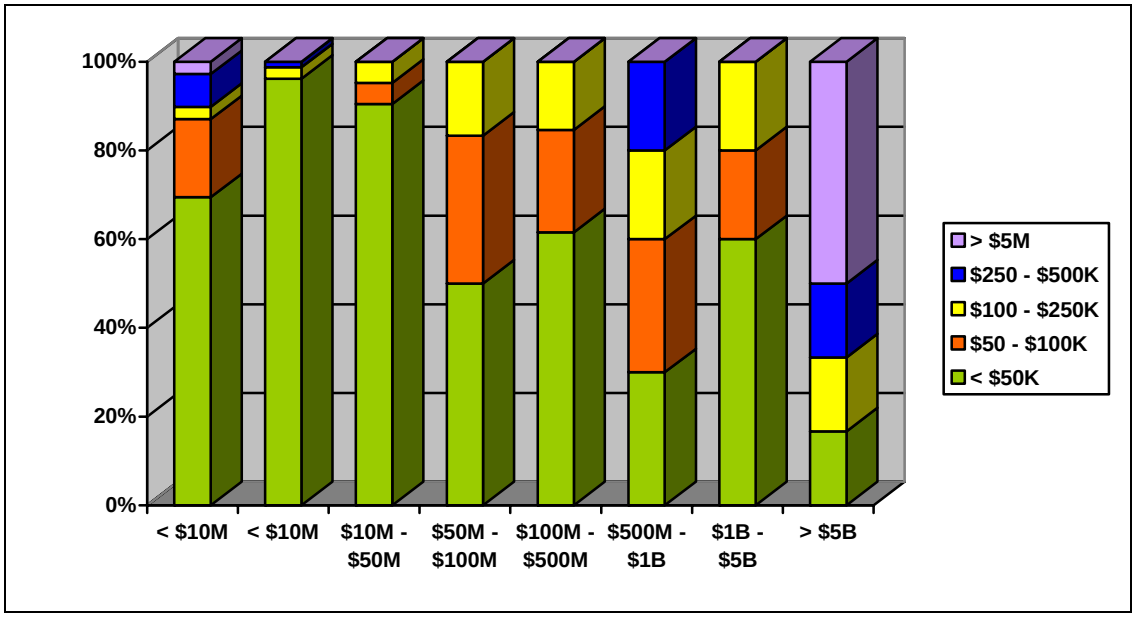


Figure #6: Downtime Cost by Firm Size



These per-hour loss numbers are in line with a 2000 study conducted by Contingency Planning & Management (CPM). CPM determined that companies with annual revenues less than $100 million dollars would experience a $50,000 per hour economic loss from a full interruption. The per hour loss increased substantially with the size (i.e. annual revenue) of the company. For example, companies with annual revenues greater than $3 billion would experience an hourly loss rate of more than $1 million per hour. In addition, the study identified those industries on average, experience different per-hour loss rates. For example, financial and banking institutions experience on average greater hourly loss rates than most other service industries, such as transportation.

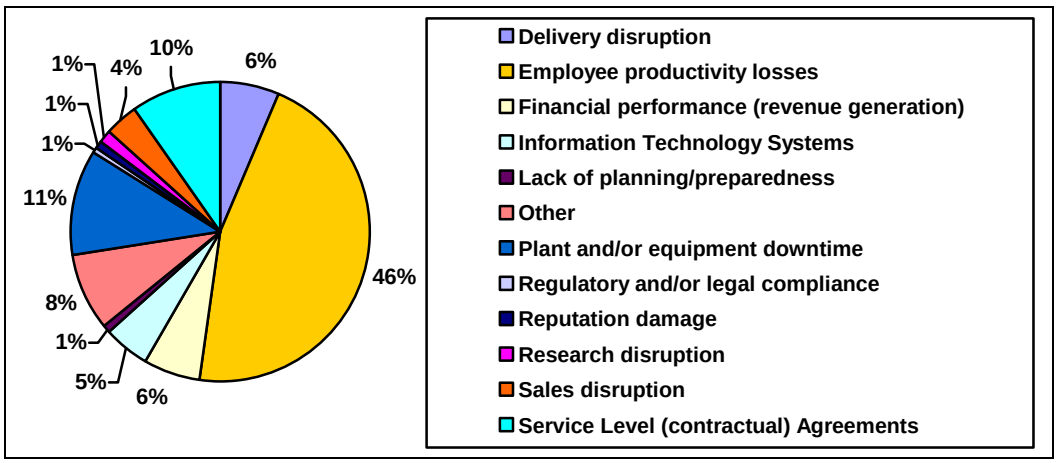
$50K/hour for Companies with Annual Revenues < $100M
$50K and $ 250K/hour for companies with @ $100M - $1B (28%)
$251K and $1M/hour for companies with @ $1B - $3B (18%)
More than $1M/hour for companies with @ $3B - $5B (8%)
Source: Contingency Planning Research, 2001

The Blackout survey identified that approximately 46% of the financial and insurance respondents experienced losses in excess of $50,000 per hour and 23% experienced hourly losses of between $250,000 - $500,000 per hour. In addition, over 27% of the healthcare and 23% of manufacturing responses identified losses in excess of $50,000 per hour. This is in contrast to where only 16% of the responses from the transportation industry reported losses in excess of $50,000 per hour; and only 10% of those responses from the Professional, Scientific, and Technical Services.

Nearly half of the businesses surveyed (46%) said impact to employee productivity was the largest contributor to the losses suffered from the Blackout. The reliance on utilities (i.e. electricity) to support e-Business (information technology and telecommunications) plant equipment, and the facilities support environments (employee and customer support systems) can be inferred as the catalyst for a majority of the financial losses.

The impacts to employee productivity were largely the result of interruptions to IT infrastructure and building support systems (e.g. lighting, HVAC, water, etc). For example, a regional banking operation lost the production of 17,000 employees for one full business day or $3.3 million ($135,844 per hour). Three of their multi-story office building lacked sufficient water pressure to provide a safe and effective work environment to support production.

Figure #7: Contributor to Blackout Cost



Service interruptions can jeopardize contractual service level agreements and permit provisions, as well as damage the significant investments made to brand image. The other significant contributors to economic loss identified in the survey were sales disruption, plant or equipment downtime, delivery disruption, financial performance, and service level agreements. Although not fully assessed in this survey, impacts to brand image and share value have considerable effects on the viability and survivability of an organization. One possible explanation why economic loss regarding brand image and public relations receives less attention is the difficulty in quantifying the soft-dollar impacts to the organization. Bill Nemeth, President and CEO of Mirifex, "The survey results signal a continued shortcoming in the ability of organizations to quantify loss … You can only manage what you can measure."

In many cases, organizations have not fully assessed the financial losses from unplanned interruptions or potential disasters. These risk conditions or threats to organizational survivability and viability are normally captured during the Risk Assessment and Business Impact Analysis aspects of the ERM-BCM program. These risks can be grouped into five main categories, operational, financial, regulatory, legal, and market-media risk. The August 2003 Blackout that affected the eastern United States further demonstrates the importance of assessing the full-spectrum of risk conditions across the organization and its critical processes. Even though many businesses maintained their IT infrastructure via back-up generators, they lacked public water and sanitary services. While the data was available and secured throughout the crisis, the facility could not support either employee and/or customer environmental conditions. Core business processes also require people, facilities, equipment, and most importantly customers. This further demonstrates the important linkage between business resumption and disaster recovery.

For example, a respondent from the finance and insurance industry, with annual revenues of $5 billion and 1000 employees, was without power for 8-24 hours listed their financial losses at less $50,000/hour. The lost wages paid to employees (due to degraded production) could have easily cost the organization $30,000 per hour[8], not to account for lost revenues from the inability to process client transactions, open new accounts, support sales initiatives, etc. Previous studies by CPM indicate that the hourly losses for major financial organizations can be as much as $6,450,000/hour for brokerage activities, $2,600,000 credit card authorizations, and even $14,000/hour for ATM transactions.[9]

The loss to share value from the market's reaction regarding the disaster or negative event is often short-term as long as the company is perceived to be effective in meeting and overcoming adversity, demonstrating the influence of corporate leadership. There have been several studies on the impacts of disasters on a share values. A recent research report by Rory F. Knight and Deborah J. Pretty, "Impact of Catastrophes on Shareholder Value," found that typically the share price of a corporation suffering a disaster falls by around 5% to 8% within the first few days after a disaster. The share value recovery is impacted by the market's perception on the effectiveness of the recovery efforts. Those companies that demonstrated, to the marketplace (e.g. financial analysts), proper leadership and corporate due-diligence rapidly recovered. Their share price not only recovered the initial loss, but in some cases increased 10-15% above the pre-disaster share price within 100 days of the disaster.

First Energy is a holding company whose subsidiaries, Ohio Edison, The Illuminating Company, Pennsylvania Power and Toledo Edison, provide electric utility service to 2.2 million customers in OH and PA.
Source: http://www.grainmarketresearch.com/fe.cfm

On the other hand, those companies where the success of recovery and/or influence of senior leadership were not well received were labeled "losers." The "losers" share price drifted lower, possibly rallying a little around 75 days following the disaster before settling at a price around 15% below the pre-disaster share price.

Akron-based First Energy, which was accused as the utility company primarily responsible for causing the Blackout, experienced impact to their share value during the first few days of the event (i.e. the blackout). First Energy stock which had been trading around $31 per share prior to the Blackout experienced a nearly a 13% or $4 per share loss within a few days of the event. On August 18, 2003, First Energy stock closed at $27.75; experiencing a trade volume of nearly 17 million as compared to the pre-event average trade volume of 1 to 2 million. The impact to market capitalization during this period could have had significant impact to the organization short-term plans.

[8] Using simple calculation on productivity, 1000 employee x .80 capacity x average income/benefits $70,000 x 8 hours

[9] Source. From Internet Week 4/3/2000 and Fiber Channel: A Comprehensive Introduction. P.K. Kembel 2000, p.8…based on survey done by Contingency Planning Research."

Three months following the Blackout, First Energy share value rebounded back to a 52-week high; signifying the investment community's confidence in the long-term viability of the company.

Although the survey did not indicate significant concern with public relations or brand image, the immediate concern for restoration of critical business functions and support systems clearly overshadowed organizational; or strategic concerns. Also, other than the utility industry, because the disaster was regional in nature, organizations lacking effective contingency plans were not held accountable to stock holders, the public and regulators. A more isolated disaster would likely have had far different ramifications for companies without adequate response strategies.

The survey did not evaluate the loss to, nor recovery costs associated with, brand image and market position. Companies spend millions of dollars developing their unique brand image and market positions. A recent report claimed that 80% of most company's value was not reflected in their balance sheet.[10] For example, Coca Cola has invested nearly $84 million in marketing. Their image is a critical asset to both current and future revenues; as well as share value. In the aftermath of a disaster, companies are likely to spend on average, three or more times their normal annual marketing budget to retain customer confidence and regain market share.

Swimming in unknown waters without a life preserver

The need Business Continuity Management (BCM) should have been made painfully clear following the terrorist attacks on the World Trade Center on September 11, 2001. In two short years since that tragic morning, our Nation has experienced a season of damaging tornadoes, Hurricane Isabella estimated at over $1 billion, the largest Blackout in U.S. history, a series of cyber attacks, and a rash of corporate scandals that have rocked both Wall Street and Main Street. In 2001, 257 public companies with more than $256 billion in assets filed for bankruptcy. In addition, nearly 10,000 private companies filed for Chapter 11 protection. This was the highest number of filings recorded between 1980 and 2000; which averaged 113 company filings per year. It is estimated that more than 200 public companies filed for Chapter 11 protection in 2002; and another 10,080 private companies. The list of Chapter 11 victims includes one-time industry leaders such as WorldCom, Inc. (2002), Enron Corp. (2001), Conseco, Inc. (2002), Global Crossing Ltd. (2002), etc.

The survey asked organizations to identify the types of contingency plans they currently had in place. The results identified two important themes. First, over one-third of firms surveyed (34%) indicated that they had no risk management or disaster recovery plans in place. A recent study from Info-Tech Research further supports the findings in the Blackout survey, which indicates that 60 percent of the businesses surveyed did not have formal plans and procedures in place to help IT departments deal with the blackout. Although more than 76% of companies surveyed said that the blackout had an impact on their organization, most of them admitted that they were not sufficiently prepared. One reason for this shortcoming might be that business leaders do not fully understand the risks and associated costs with unplanned interruptions and/or disasters that could potentially effect their organizations.

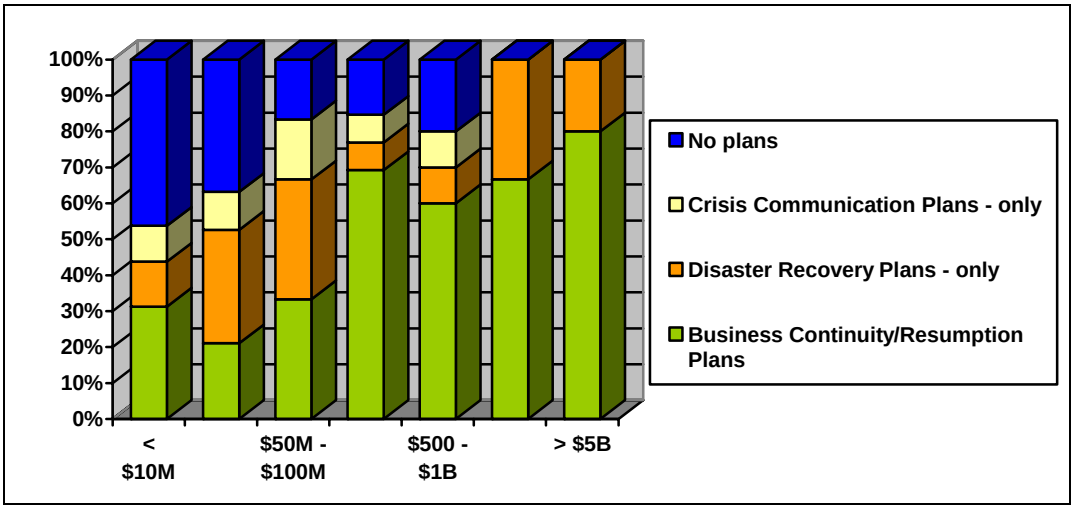
The survey indicated that only 17% of respondents currently had the full-spectrum of contingency plans in place. These include: Business continuity plans (BCP), Business resumption plans (BRP), Disaster recovery plans (DRP) and Crisis communications plans (CCP).

[10] Interbrand in association with Citibank

Each type of contingency plan serves a specific purpose in protecting the organization. Successful organizations can no longer view Enterprise-wide Risk Management and Business Continuity Management programs as afterthoughts, or programs relegated four to five organizational levels below the Chief Executive. Many of the risks that could potentially jeopardize the organization's viability and survivability can only be assessed by the senior management. In addition, like most effective value-based programs, ERM and BCM are at best marginally effective unless driven and championed by the senior leadership team. Although difficult at times to quantify, there are costs for either responding to, or not responding to risk. Senior management is expected to have made their decisions based on credible analysis and evaluation, or "understanding." Subordinate managers and program/project staffs, whether internal or outsourced, have the responsibility for obtaining, organizing and synthesizing data and information into "knowledge," so that senior management can make effective decisions.

The survey identified that nearly 74% of those organizations with no contingency plans had annual revenues less than $10 million and only 6 organizations with revenues greater than $50 million lacked contingency plans. These results from this survey mirror several studies conducted by Gartner, "Gartner analysts said the majority of small and medium size businesses have traditionally under invested in business continuity planning. One reason why is that the disaster recovery and business continuity markets historically have been centered around robust and expensive solutions that can be cost prohibitive for SMBs. Gartner estimates that only 35 percent of small and medium size businesses have a comprehensive disaster recovery plan in place and fewer than 10 percent have crisis management, contingency, business recovery and business resumption plans. The number of organizations without contingency plans was highest amongst small and medium size businesses.

Figure #8: Types of Contingency Plans



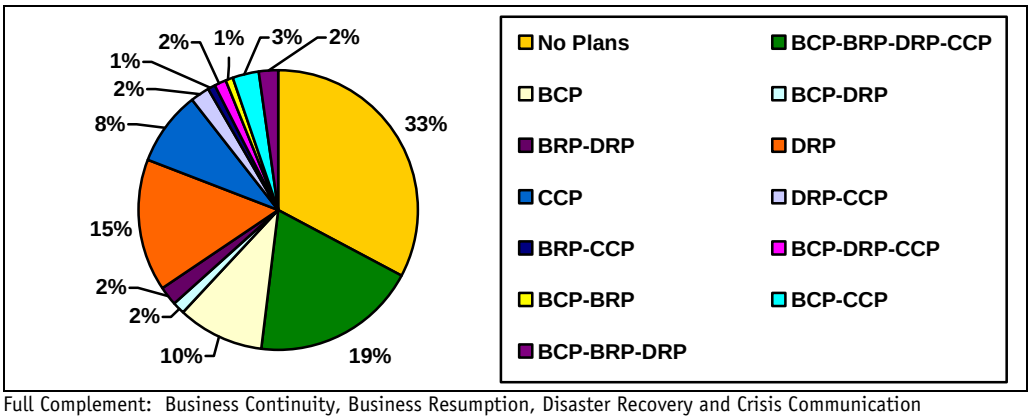
A second, yet less discernable, theme drawn from the survey is the apparent lack of standardization or understanding of what contingency plans an organization should have in place. Nearly three-quarters of the respondents lacked the full umbrella of contingency plans, which includes business resumption plans, disaster recovery plans, emergency response plans/procedures and crisis communication plans.[11]

[11] The survey did not ask firms if they had emergency response/preparedness plans which are focused on protecting life and property in the event of an emergency (e.g. fire, tornado, etc.)

Respondents indicated that either they didn't have contingency plans (34%) or did not have the full compliment of contingency plans for protecting their organization (53%). 8% indicated that they only had crisis communication plans. Organizations which maintained only disaster recovery plans represented 13%; and an additional four organizations maintain both Disaster Recovery and Crisis Communication plans.

The survey indicates wide dispersion of opinions regarding contingency plans. It's easy to understand the confusion regarding continuity planning. The challenge for today's business leader is how to bring clarity to the blurred landscape of various continuity and disaster recovery concepts and acronyms, such as BCP, BCM, RM, DRP, DR, BRP, ERP, etc. Figure #9 illustrates the variation in the types of plans the respondents indicated they currently had in place.

Figure #9: Types of Contingency Plans



Full Complement: Business Continuity, Business Resumption, Disaster Recovery and Crisis Communication
BCP – Business Continuity Plan; BRP – Business Resumption Plan; DRP – Disaster Recovery Plan
CCP – Crisis Communication Plan

The attention of business leaders over the past several years has been primarily focused on disaster recovery under the technological banner of the CIO. Disaster recovery, which is largely synominous with data recovery, is focused primarily on the IT environment that supports the organization; including operating systems, applications, data and associated hardware. This has broadened in recent years to include telecommunications. The importance of e-Business within today's corporate environment cannot be understated, it is essential for both viability and survivability. Information Technology is interwoven into the fabric of almost every facet of today's organization, from production, inventory and shipping to accounting, sales and customer relations. However, for most organizations, there is a significant lack of synchronization and coordination between the continuity of their critical business processes and the supporting IT infrastructure.

The Info-Tech Research survey drew similar conclusions, while 76% of IT managers said that the blackout had an impact on their company, 67 percent of them said that it had no financial impact whatsoever. This suggests that IT and business still have not bridged the gap.[12] During the 2003 Blackout, many organizations had electricity, and data was on-line and available, but there was no one there to use them. It was similar a Broadway play were the props, lights and stage are all set, but the actors never showed up.

[12] SmallBusinessComputing.com

Although a common framework for contingency planning is still evolving from professional organizations such as the Disaster Recovery Institute – International or DRII, a common theme is emerging amongst the profession that defines the various contingency strategies under the umbrella of Business Continuity Planning (BCP) or Business Continuity Management (BCM). BCP is a methodology that is used to develop, test, and maintain contingency plans. BRP, DRP, ERP and CCP are contingency strategies organized, and managed, under this programmatic umbrella.

The ideal business continuity management program synchronizes the various response strategies designed to protect the organization's critical resources (people, facilities, equipment, IT/Telecom infrastructure), so that key business processes can continue to function within acceptable tolerances. A short definition of these response strategies will help to provide clarity to the discussion.

- Business resumption plans (BRP) are advanced arrangements for reestablishing critical business processes following an interruption or event. For example, a BRP provides the blueprint for reestablishing company operations at a different location following a disaster such as a tornado or hurricane.

- Disaster recovery plans (DRP) are advanced arrangements used to recover critical data, operating systems, applications, and associated hardware following an interruption or impact (e.g. power failure). DR planning also includes telecommunication systems and networks.

- Emergency response (or preparedness) procedures (ERP) are procedures for protecting people and property during an emergency such as a fire or tornado. These emergency response procedures are normally a component, along with communications plans, of the crisis management program.

- Crisis communications plans are the scripts for how the company will communicate to employees (and their families), customers, suppliers or vendors, shareholders, regulators and the general public following a disaster or negative incident.

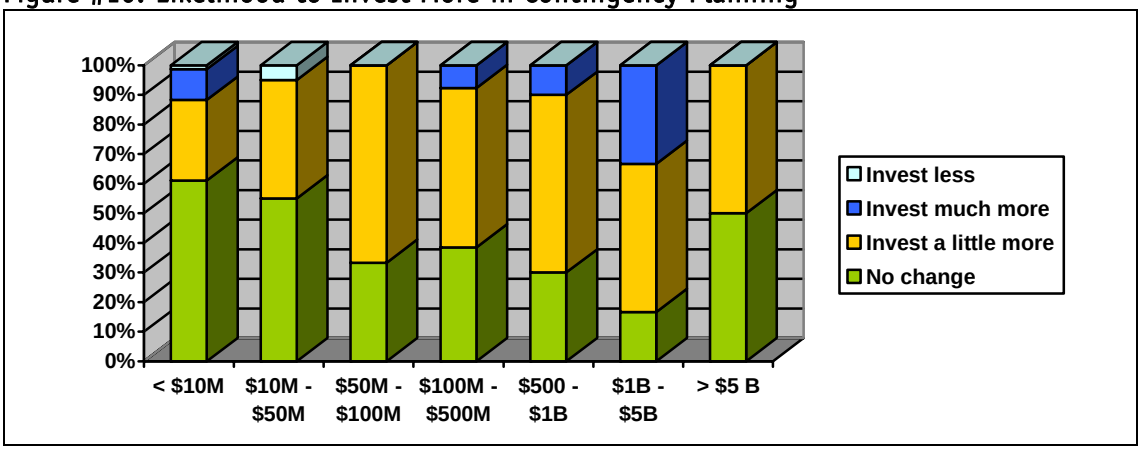
Another important finding that can be inferred from the survey is the lack of understanding regarding true organizational loss (financial, operational, legal, regulatory, market and media) from the Blackout interruption. For example, several large financial, healthcare and professional firms with more than 1,000 employees indicated losses at less than $50,000 per hour. The firms also indicated that they were interrupted or down for at least one full business day. The employee salary expenses alone, would equate to losses in the range between $33,653 per hour and $38,461 per hour. This does not take into account lost sales opportunities, transactions fees, interest on accounts receivables, overtime paid to recover systems, backlogs, etc.; nor a host of other metrics that should be accounted for in the downtime calculus.

Where to go from here?

The survey indicated that close to 45% of the companies intend to invest more in their risk management (BCP and DR) programs. Over 59% of those who intend to increase investments viewed cyber-crime or utility outage as their greatest risk. This further supports the growing reliance on e-Business in both small and large businesses; and the understanding that increased investments will be necessary to support continuance and recovery.

As a consequence of the Blackout, over one-third of businesses surveyed (38%) said they'd be somewhat or very likely to invest in alternate energy systems. The study did not assess how these interruptions might potentially jeopardize their organization's survival. However, a recent Gartner study highlights the importance of contingency planning in company survivability. Gartner estimates that two out of five enterprises that experience a disaster will go out of business in five years.[13] According to survey results released by Gartner and the Society for Information Management (SIM), most companies are unprepared for terrorist attacks or natural disasters, and would be unable to quickly and smoothly execute basic business continuity measures."[14] The survey supports Gartner's findings that nearly half of SMBs do not currently have adequate contingency plans, nor do they intend to increase investments to mitigate the risks they identified.

Figure #10: Likelihood to Invest More in Contingency Planning



The greatest vulnerability appears to be those organizations with annual revenues less than $10 million. Only 25% of those companies plan to increase investment in their risk management or contingency plans; and only 30% of those companies currently without contingency plans, intend to invest more in the future. So nearly 32% of the companies with annual revenues less than $10 million will continue to operate without contingency plans. This echoes the concerns discussed in several Gartner reports, "Small and medium-size businesses (SMB) need to evaluate their business processes and protect what is critical," said Donna Scott, vice president and research director for Gartner. Business leaders must anticipate how they would conduct business in the event of natural disasters, system outages, facility fires, or other risks to their operations. Failure to do so can jeopardize company viability and survivability. Business leaders must ensure that risks are assesses and develop response strategies for risk mitigation and contingency plans for resumption/recovery.

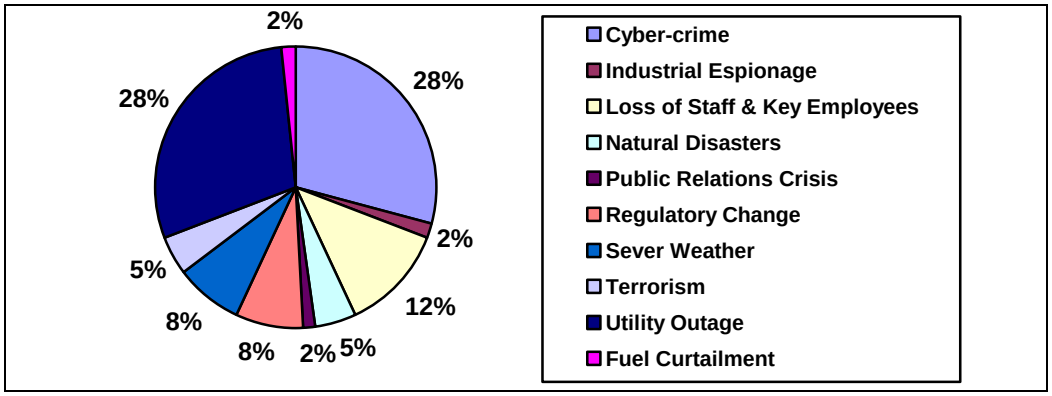
[13] Gartner "Aftermath: Disaster Recovery," V. Wheatman, September 29, 2001.

[14] Source: "Gartner Says Most Small and Midsize Businesses Are Not Prepared for a Crisis," March 25, 2002

These findings from SMB's are in sharp contrast to companies with higher annual revenues. For example, whereas 50% of the companies with annual revenues of $10 - $50 million plan to increase investments in their risk management programs, companies with annual revenues between $50 million and $100 million will increase by nearly 67%; and companies with annual revenues between $100 million and $500 million by 62%. Nearly three-quarters of the companies with annual revenues between $500 million and $1 billion indicated they planned to increase investments in their risk management programs. Even though the majority companies with annual revenues in excess of $5 billion had the full-compliment of contingency plans in place, more than 50% indicated they intended to increase their investments.

Companies identified a host of different types of interruptions/impacts that posed the greatest risk to their companies. However, more than half the businesses surveyed said their top concern was the threat of Cyber-Crime (26%) or a Utility Outage (26%), outdistancing other concerns by more than 2:1. The dependencies between technology and utilities make these two difficult to separate. The integration and reliance on technology continues to represent both an incredible resource to be leveraged, and a vulnerability to be guarded against. "For many Real-time enterprises, a four- to 24-hour site outage would cause irreparable damage to the enterprise,'" says Donna Scott, VP and Research Director for Gartner.

Figure #11: Future Threats to Business



V. Conclusion

As communities, governments, and businesses continue to address their energy policies and utility arrangements, the need for more comprehensive response strategies will be required to ensure business continuance and effective resumption. Today's business leaders will play an increasingly important role in ensuring that the risks facing their organizations are fully explored, quantified, and prepared for. The concerns regarding cyber-crime and utility outage demonstrate the interdependence between technology, available energy (i.e. electrical utilities) and employee productivity. The continued reliance on technology in all facets of today's business will continue to require attention and resources to ensure continuance and/or successful recovery.

These findings further support other studies that suggest that a large percentage of businesses lack the necessary risk and business continuance programs to ensure organizational survivability and viability. The lack of contingency plans for small- and medium-size businesses (SMB), most vulnerable to business failure from an interruption, represents a significant challenge in today's complex landscape of risk. Many SMB business leaders recognize the conceptual dangers associated with an interruption, yet either do plan to take action (i.e. develop response plans) or believe the efforts cannot are cost prohibited. In either case, the loss experienced from the 2003 Blackout will most likely, be replaced by other events and disasters in the future. The also suggests that companies need to improve their ability to project hard (quantitative costs), as well as soft (qualitative), costs from an unplanned interruption or adverse impact to their organization. The ability to forecast operational and financial impacts provides senior management with the knowledge to make informed decisions, and properly exercise their risk due-diligence role in protecting corporate assets. For publicly traded corporations, this role is quickly expanding amid the regulatory backdrop of the Sarbanes-Oxley Act or 2002.

Lastly, the survey highlights the confusion surrounding the contingency planning process. Business continuity, resumption, disaster recovery, and crisis communication mean different things to different people. As the Business Continuity profession builds a common language, it will become easier to assess the progress made following the next major disaster. A good blueprint for success begins with using the Business Continuity Planning/Management (BCP/BCM) methodology as the umbrella for constructing and managing the organization's response strategies. The core response strategies include: business resumption plans (BRP) to support the restoration of critical business processes; disaster recovery plans (DRP) to restore key databases, applications, operating systems and associated assets and system; emergency response procedures to protect people and property during an emergency; and, crisis communication plans (CCP) to ensure the right message is conveyed by the right person to the right audience. Today's business leaders cannot predict where the next outage will come from, but do have the opportunity, and responsibility, to prepare for their occurrence.

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About the Authors

Mark R. Slavik

Mark is the Practice Leader for Risk and Business Continuity Management at Mirifex Systems. He has more than 15 years experience helping organizations assess their vulnerabilities and develop effective response strategies; Mark has led some of the most extensive risk/disaster programs in the nation. Following the "9-11" terrorist attacks, Mark managed a 5-state protection operation as part of Operation Noble Eagle, the nation's first major initiative of the Homeland Security program. In 1996-97, he was responsible for coordinating Ohio National Guard (ONG) personnel, equipment and resources for two federally-declared disasters. He has a Master's Degree from Miami University – Ohio, and holds numerous certifications to include Series 7, 63, 66, Certified Financial Manager, etc. In addition, Mark is a trustee on the Strongsville Chamber of Commerce and the Ledgewood Association. In addition, he serves as the Training Branch Chief for the 10,600 soldiers in the Ohio Army National Guard.

Gregory M. Stoup

Gregory is the Associate Director and the Director of Research at REI. Gregory supervises REI's research portfolio and develops programs in collaboration with other institutions designed to advance economic development activities throughout Ohio. He works closely with policy makers and community leaders in Northeast Ohio to develop programs and strategies to create a foundation for sustainable regional economic growth. Gregory's work in the Ohio fuel cell, manufacturing and biomedical industries led to the commitment of new resources to those industries and the development of initiatives to help position those sectors for sustained growth. He has developed research programs and consulting projects in collaborated with the Progressive Policy Institute, the Ewing Marion Kauffman Foundation, the federal Economic Development Agency and the Battelle Memorial Institute. He contributes to the community dialog on economic development policy through regular appearances on local public television, contributions to the electronic and print media and through journal publications. Gregory sits on the boards of several Northeast Ohio organizations and serves as judge on several local business plan competitions. Gregory holds a BA from Northwestern University and an MS from Case Western Reserve University.

Molly S. Schnoke

Ms. Molly Schnoke is the Assistant Research Director at the Center for Regional Economic Issues (REI) within Case Western Reserve University's Weatherhead School of Management. She manages the daily operations of Center's research, project oversight, and consulting activities as well as the team of research assistants. She has contributed to several policy presentations for the Center. She is regularly involved in project planning and design. She has managed a variety of projects for the REI including Making Change, a joint public education programming effort with Ideastream; Building a Regional Entrepreneurial Environment; an Industry Cluster Analysis; and Critical Relationships in a Manufacturing Industry. Her work at REI has included projects in the areas of community and urban development, entrepreneurship, technology-based economic development, manufacturing, and policy & strategy. Molly holds a BA from The Ohio State University and a MA from The University of Akron. Molly has been involved in the design & development and the implementation & execution of multiple survey research projects for REI including the Northeast Ohio Barometer Poll.

Mirifex Systems

Established in 1999, Mirifex has rapidly become one of Ohio's largest and most diverse business management and technology consulting firms by delivering "brilliant returns" to clients in a range of high-growth industries. The firm offers a full complement of management and consulting specialties— including Business Process Optimization, Risk Management, Information Technology, Project Management and Strategic Marketing—to businesses and organizations in banking and insurance, government and institutions, manufacturing, healthcare and professional services. Home to nearly 150 technology and business systems professionals, Mirifex was recently named among the nation's "Hot 100" firms to watch by Entrepreneur Magazine and Dun & Bradstreet (July 2003). Mirifex is headquartered at 8370 Dow Circle in Strongsville, Ohio.

The Center for Regional Economic Issues (REI) @ Case Western Reserve University's Weatherhead School of Management

REI develops high quality economic research and analytic tools. We produce transformational ideas and outstanding leaders for regional economic development. With the support of our investors and partners, we have developed a national reputation as a leader in producing actionable information, insights and initiatives for regional economic development. REI's mission is achieved through four program areas:

Research and Powertools: REI integrates economic research with management consulting. Economic research provides a theory base in regional economic development. Management consulting disciplines provide the analytic tools and techniques to identify and develop regional economic opportunities.

Strategy and Policy Development: REI identifies emerging trends within a regional economy and analyzes their implications for different organizations and communities within the region. In the course of this work, REI conducts a range of activities to build organizational networks within a region and consensus on a set of initiatives.

Cluster Development: REI initiatives in cluster development support on-going efforts to improve regional economic performance by increasing productivity. REI promotes change on three levels. First, REI undertakes a series of initiatives to enhance the leadership skills of business managers and economic development professionals.

Second, REI undertakes initiatives to improve the effectiveness of cluster development organizations. Finally, REI provides Internet-based infrastructures to facilitate collaboration and communication.

Public Education: REI brings together experts on critical issues of regional economic development to produce high quality educational material. REI's public education initiatives are designed to stimulate informed debate, constructive decision-making and effective public policies.

Appendix 1: Screener & Profile Responses

1. Do you, or does anyone in your immediate family work for a market research firm, a sponsor of this survey, a public utility company, or a regulator of the utilities industry?

	ALL RESP		OH ONLY		NON-OH	
Yes	0	0%	0	0%	0	0%
No	142	100%	76	100%	66	100%

2. Have you participated in a market research survey within the past 3 months?

	ALL RESP		OH ONLY		NON-OH	
Yes	14	10%	10	7%	4	3%
No	128	90%	132	93%	138	97%

3. Given your position with the company you represent, do you feel comfortable in answering questions about the impact of The Blackout on your business?

	ALL RESP		OH ONLY		NON-OH	
Yes	142	100%	76	100%	66	100%
No	0	0%	0	0%	0	0%

4. Please select the category that most clearly reflects the type of business you operate.

	ALL RESP		OH ONLY		NON-OH	
Agriculture, Forestry, Fishing and Hunting	2	1%	2	3%	0	0%
Mining	3	2%	0	0%	3	4%
Utilities	1	1%	0	0%	1	2%
Construction	2	1%	0	0%	2	3%
Manufacturing	18	13%	6	8%	12	18%
Wholesale Trade	5	4%	4	5%	1	2%
Retail Trade	1	1%	1	1%	0	0%
Transportation & Warehousing	6	4%	4	5%	2	3%
Information	13	9%	8	11%	5	8%
Finance & Insurance	14	9%	9	11%	5	8%
Real Estate and Rental and Leasing	4	3%	2	3%	2	3%
Professional, Scientific, and Tech Services	30	21%	22	28%	8	12%
Management of Companies and Enterprises	7	5%	3	4%	4	7%
Administrative and Support and Waste	0	0%	0	0%	0	0%
Management and Remediation Services	1	1%	1	1%	0	0%
Educational Services	11	8%	3	4%	8	12%
Health Care and Social Assistance	4	3%	2	3%	2	3%
Arts, Entertainment, and Recreation	0	0%	0	0%	0	0%
Accommodation and Food Services	18	13%	8	10%	10	15%
Other Services	2	1%	2	3%	0	0%
Public Administration & Government	0	0%	0	0%	0	0%

5. Please select the STATE or REGION where you are located, and type in your POSTAL/ZIP CODE.

ALL RESP

	Frequency	Percent
Ohio	76	53.5
Pennsylvania	4	2.8
New York	24	16.9
Indiana	1	.7
Illinois	1	.7
Michigan	15	10.6
Wisconsin	2	1.4
South Canada	19	13.4
Total	142	100.0

6. How would you classify your position in the company or institution?

	ALL RESP		OH ONLY		NON-OH	
Executive Management	68	48%	40	52%	28	42%
Director or Department-level Management	36	26%	19	25%	17	27%
Functional Management	19	13%	8	11%	11	17%
Other	19	13%	9	12%	9	14%

7. What are your company's annual revenues?

	ALL RESP		OH ONLY		NON-OH	
Under $10 million	81	57%	49	64%	32	48%
$10 million to $50 million	20	14%	7	9%	13	20%
$50 million to $100 million	6	4%	3	4%	3	5%
$100 million to $500 million	13	10%	4	5%	9	14%
$500 million to $1 billion	10	7%	5	7%	5	7%
$1 billion to $5 billion	6	4%	5	7%	1	1%
Over $5 billion	6	4%	3	4%	3	5%

8. How many employees does your company currently have?

	ALL RESP		OH ONLY		NON-OH	
1 – 4	22	15%	15	20%	7	11%
5 – 9	15	11%	9	12%	6	9%
10 – 19	14	10%	10	13%	4	6%
20 – 49	21	15%	12	16%	9	14%
50 – 99	15	11%	6	8%	8	12%
100 – 249	16	11%	4	5%	12	18%
250 – 499	9	6%	2	3%	7	11%
500 – 999	3	2%	2	3%	1	1%
1000 or more	27	19%	15	20%	12	18%

Appendix 2: Survey Responses

1. How many hours was your business without power due to The Blackout which began on August 14, 2003?

	ALL RESP		OH ONLY		NON-OH	
Less than 8 hours	48	34%	24	31%	24	36%
8 - 24 hours	56	39%	41	55%	15	23%
24 - 48 hours	25	17%	9	12%	16	24%
48 - 72 hours	11	8%	1	1%	10	15%
72 - 96 hours	1	1%	0	0%	1	2%
More than 96 hours	1	1%	1	1%	0	0%

2. Thinking of your business as a whole, how much do you estimate that each HOUR of downtime cost you?

	ALL RESP		OH ONLY		NON-OH	
$50,000 or less	111	77%	63	82%	48	73%
$50,000 - $100,000	11	8%	4	5%	7	10%
$100,000 - $250,000	11	8%	6	8%	5	8%
$250,000 - $500,000	4	3%	1	2%	3	4%
$500,000 - $1 million	0	0%	0	0%	0	0%
$1 million - $5 million	1	1%	0	0%	1	2%
Over $5 million	4	3%	2	3%	2	3%

3. Which of the following, in your opinion, is the largest contributor to the losses you suffered as a result of The Blackout?

	ALL RESP		OH ONLY		NON-OH	
Employee productivity losses	66	46%	37	49%	29	44%
Plant and/or equipment downtime	16	11%	2	3%	14	21%
Lack of planning/preparedness	1	1%	1	1%	0	0%
Reputation damage	1	1%	1	1%	0	0%
Regulatory and/or legal compliance	1	1%	1	1%	0	0%
Service Level Agreements	5	4%	1	1%	4	6%
Financial performance	9	6%	5	7%	4	6%
Research disruption	8	6%	4	5%	4	6%
Delivery disruption	14	10	10	13%	4	6%
Sales disruption	0	0%	0	0%	0	5%
Accounts Payable	0	0%	0	0%	0	0%
Accounts Receivable	0	0%	0	0%	0	0%
e-Business Systems	7	5%	7	9%	0	0%
Information Technology Systems	2	1%	2	3%	0	0%
Other	12	8%	5	7%	7	11%

4. Which area of business would you say was hardest hit due to The Blackout?

	ALL RESP		OH ONLY		NON-OH	
Production/Manufacturing	45	32%	24	32%	21	32%
Administration	10	7%	3	7%	7	11%
Sales and Marketing	26	18%	17	18%	9	14%
Information Technology	21	15%	10	15%	11	17%
Legal and Compliance	0	0%	0	0%	0	0%
Customer Service	18	13%	14	13%	4	6%
Human Resources	0	0%	0	0%	0	0%
Trans., Shipping, Receiving	4	3%	1	1%	3	5%
Research	5	4%	2	3%	3	5%
Other	13	9%	5	7%	8	112%

5. Do you think The Blackout will in any way impact your company's future plans with regard to the following? (Select all that apply)

	ALL RESP		OH ONLY		NON-OH	
Growth/expansion	7	4%	6	7%	1	1%
Relocation	5	3%	3	3%	2	3%
Outsourcing	5	3%	3	3%	2	3%
Supplier selection	5	3%	2	2%	3	4%
Other operational activities	16	10%	9	10%	7	9%
Disaster Recovery & Risk Management	43	27%	24	28%	19	25%
No impact	81	50%	40	46%	41	55%

6. As a consequence of The Blackout, do you think your firm will be more likely to consider investments in alternate energy generation, storage and/or distribution systems?

	ALL RESP		OH ONLY		NON-OH	
Very likely	23	16%	13	17%	10	15%
Somewhat likely	32	23%	18	24%	14	21%
No change	43	30%	14	18%	29	44%
Somewhat unlikely	6	4%	5	7%	1	2%
Very unlikely	38	27%	26	34%	12	18%

7. Do you feel that the image of your city or region will suffer as a result of The Blackout?

	ALL RESP		OH ONLY		NON-OH	
Very likely	17	12%	14	18%	3	5%
Somewhat likely	32	23%	23	30%	9	14%
No change	39	27%	12	16%	27	41%
Somewhat unlikely	9	6%	5	7%	4	6%
Very unlikely	45	32%	22	29%	23	35%

8. In the area of risk management and disaster recovery, which of the following does your company have in place currently? (select all that apply)

	ALL RESP		OH ONLY		NON-OH	
Business resumption plan(s)	36	12%	22	16%	14	13%
Business continuity plan(s)	50	20%	28	20%	22	20%
Disaster recovery plan(s)	57	23%	34	25%	23	21%
Crisis communications plan(s)	51	21%	30	22%	21	19%
We have no plans	51	21%	23	17%	28	26%

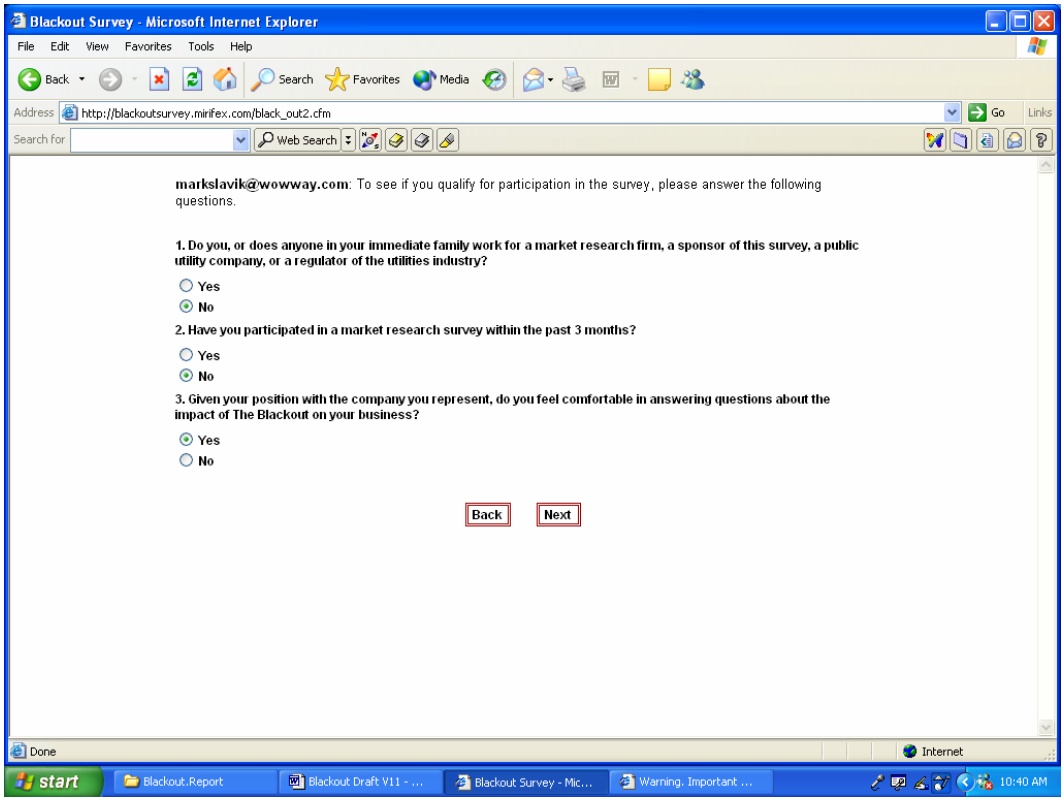
9. The Blackout represents one kind of interruption or impact threatening business. Which of the following interruptions/impacts do you feel poses the greatest risk to your company in the near-term future?

	ALL RESP		OH ONLY		NON-OH	
Cyber-crime (e.g., viruses, hacking, data theft)	37	26%	27	36%	10	15%
Utility outage (electrical failure)	34	24%	17	21%	18	27%
Fuel curtailment (e.g. natural gas, petroleum)	3	2%	1	1%	2	3%
Water availability	3	2%	1	1%	2	3%
Public relations crisis	4	3%	1	1%	3	5%
Industrial espionage	1	1%	1	1%	0	0%
Criminal activity (e.g., theft, workplace violence)	1	1%	0	0%	1	2%
Terrorism (e.g. bomb threat, bio-hazard)	9	6%	5	7%	4	6%
Natural Disaster (e.g., earthquake, fires)	5	4%	2	3%	3	5%
Severe Weather (e.g., flooding, tornado, hurricane)	10	7%	6	8%	4	6%
Loss of key staff and employees	19	13	11	14%	8	12%
Regulatory changes	12	8%	3	4%	9	14%
Legal actions	4	3%	2	3%	2	3%

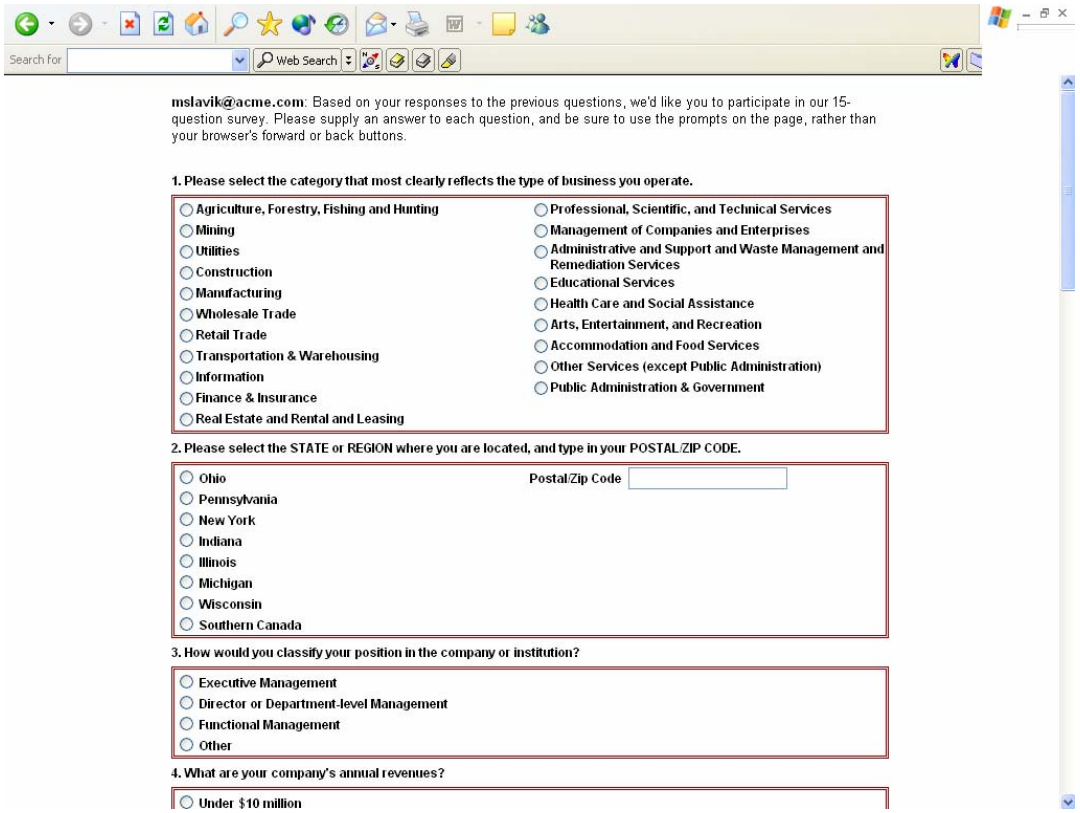
10. Would you say your company is likely to invest more, less or about the same in risk management, business continuance and/or disaster recovery in the future?

		ALL RESP		OH ONLY		NON-OH	
Will invest much more		12	8%	7	9%	5	8%
Will invest a little more		53	37%	35	46%	18	27%
Continue at current investment levels	73	5	1%	32	42%	41	62%
Will invest a little less		2	1%	1	1%	1	2%
Will invest much less		2	1%	1	1%	1	2%

Appendix 3: Survey Instrument



Appendix 2: Survey Instrument



mslavik@acme.com: Based on your responses to the previous questions, we'd like you to participate in our 15-question survey. Please supply an answer to each question, and be sure to use the prompts on the page, rather than your browser's forward or back buttons.

1. Please select the category that most clearly reflects the type of business you operate.

- Agriculture, Forestry, Fishing and Hunting
- Mining
- Utilities
- Construction
- Manufacturing
- Wholesale Trade
- Retail Trade
- Transportation & Warehousing
- Information
- Finance & Insurance
- Real Estate and Rental and Leasing
- Professional, Scientific, and Technical Services
- Management of Companies and Enterprises
- Administrative and Support and Waste Management and Remediation Services
- Educational Services
- Health Care and Social Assistance
- Arts, Entertainment, and Recreation
- Accommodation and Food Services
- Other Services (except Public Administration)
- Public Administration & Government

2. Please select the STATE or REGION where you are located, and type in your POSTAL/ZIP CODE.

- Ohio
- Pennsylvania
- New York
- Indiana
- Illinois
- Michigan
- Wisconsin
- Southern Canada

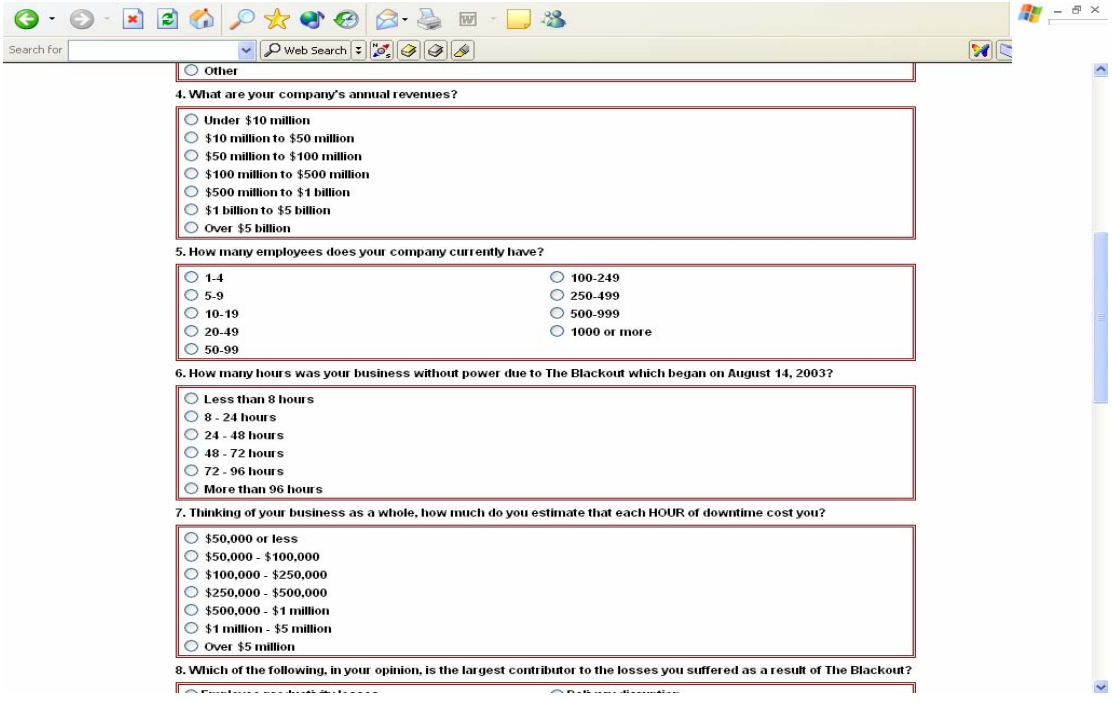
Postal/Zip Code

3. How would you classify your position in the company or institution?

- Executive Management
- Director or Department-level Management
- Functional Management
- Other

4. What are your company's annual revenues?

- Under $10 million



- Other

4. What are your company's annual revenues?

- Under $10 million
- $10 million to $50 million
- $50 million to $100 million
- $100 million to $500 million
- $500 million to $1 billion
- $1 billion to $5 billion
- Over $5 billion

5. How many employees does your company currently have?

- 1-4
- 5-9
- 10-19
- 20-49
- 50-99
- 100-249
- 250-499
- 500-999
- 1000 or more

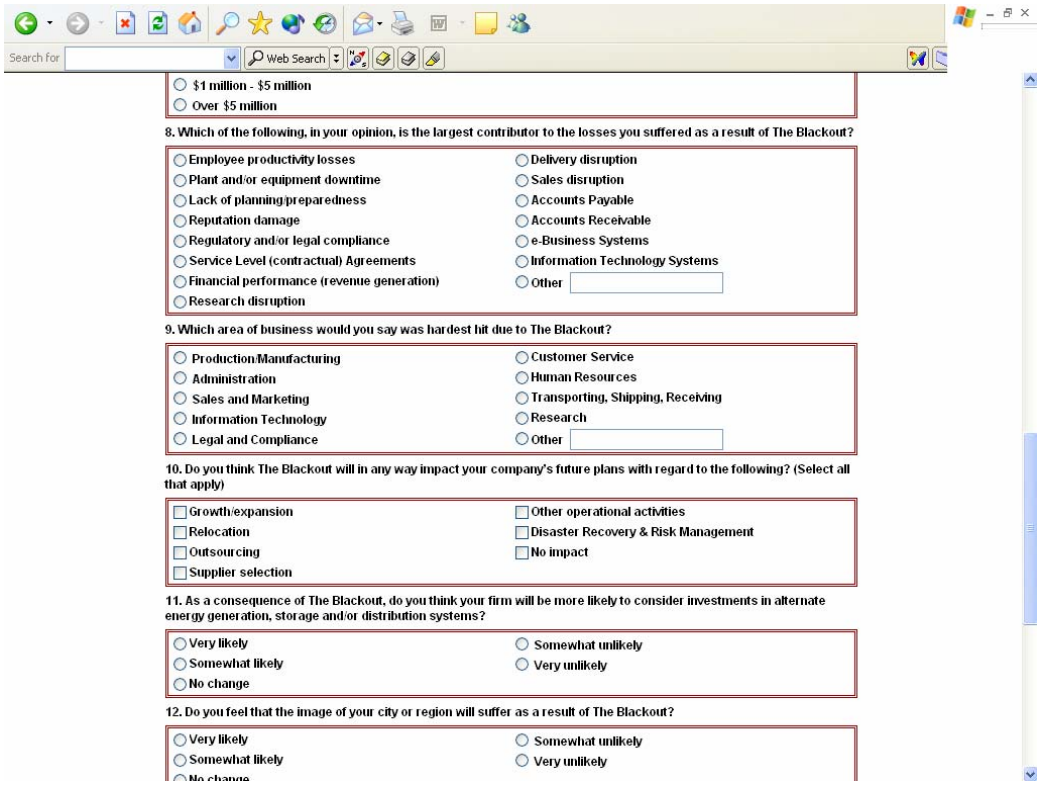
6. How many hours was your business without power due to The Blackout which began on August 14, 2003?

- Less than 8 hours
- 8 - 24 hours
- 24 - 48 hours
- 48 - 72 hours
- 72 - 96 hours
- More than 96 hours

7. Thinking of your business as a whole, how much do you estimate that each HOUR of downtime cost you?

- $50,000 or less
- $50,000 - $100,000
- $100,000 - $250,000
- $250,000 - $500,000
- $500,000 - $1 million
- $1 million - $5 million
- Over $5 million

8. Which of the following, in your opinion, is the largest contributor to the losses you suffered as a result of The Blackout?



- $1 million - $5 million
- Over $5 million

8. Which of the following, in your opinion, is the largest contributor to the losses you suffered as a result of The Blackout?

- Employee productivity losses
- Plant and/or equipment downtime
- Lack of planning/preparedness
- Reputation damage
- Regulatory and/or legal compliance
- Service Level (contractual) Agreements
- Financial performance (revenue generation)
- Research disruption
- Delivery disruption
- Sales disruption
- Accounts Payable
- Accounts Receivable
- e-Business Systems
- Information Technology Systems
- Other

9. Which area of business would you say was hardest hit due to The Blackout?

- Production/Manufacturing
- Administration
- Sales and Marketing
- Information Technology
- Legal and Compliance
- Customer Service
- Human Resources
- Transporting, Shipping, Receiving
- Research
- Other

10. Do you think The Blackout will in any way impact your company's future plans with regard to the following? (Select all that apply)

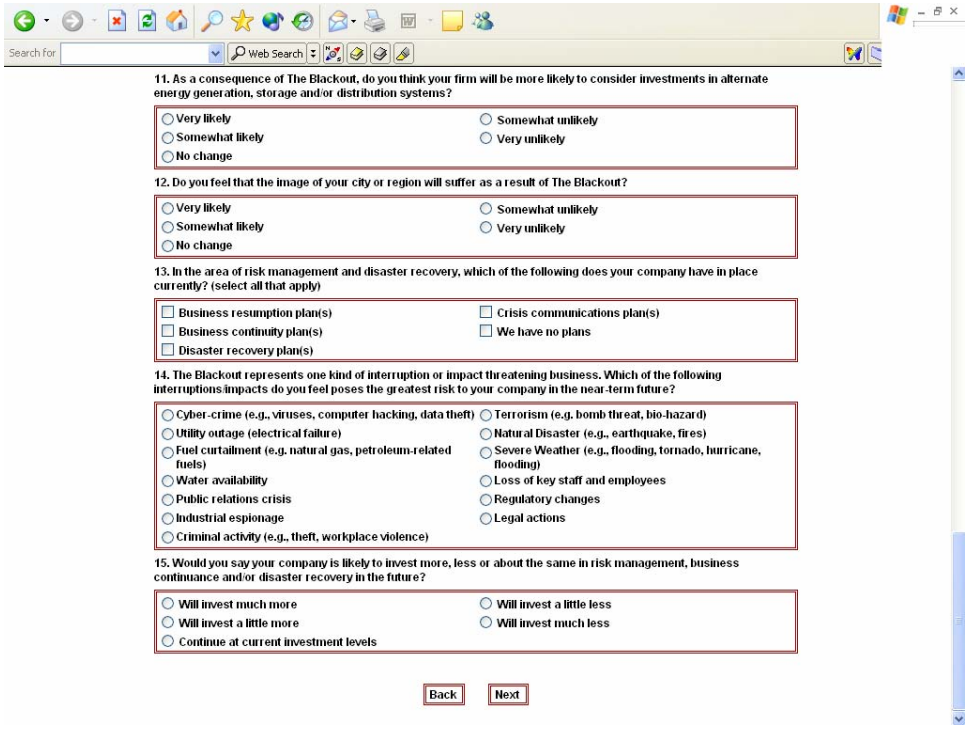
- Growth/expansion
- Relocation
- Outsourcing
- Supplier selection
- Other operational activities
- Disaster Recovery & Risk Management
- No impact

11. As a consequence of The Blackout, do you think your firm will be more likely to consider investments in alternate energy generation, storage and/or distribution systems?

- Very likely
- Somewhat likely
- No change
- Somewhat unlikely
- Very unlikely

12. Do you feel that the image of your city or region will suffer as a result of The Blackout?

- Very likely
- Somewhat likely
- No change
- Somewhat unlikely
- Very unlikely



11. As a consequence of The Blackout, do you think your firm will be more likely to consider investments in alternate energy generation, storage and/or distribution systems?

- Very likely
- Somewhat likely
- No change
- Somewhat unlikely
- Very unlikely

12. Do you feel that the image of your city or region will suffer as a result of The Blackout?

- Very likely
- Somewhat likely
- No change
- Somewhat unlikely
- Very unlikely

13. In the area of risk management and disaster recovery, which of the following does your company have in place currently? (select all that apply)

- Business resumption plan(s)
- Business continuity plan(s)
- Disaster recovery plan(s)
- Crisis communications plan(s)
- We have no plans

14. The Blackout represents one kind of interruption or impact threatening business. Which of the following interruptions/impacts do you feel poses the greatest risk to your company in the near-term future?

- Cyber-crime (e.g., viruses, computer hacking, data theft)
- Utility outage (electrical failure)
- Fuel curtailment (e.g. natural gas, petroleum-related fuels)
- Water availability
- Public relations crisis
- Industrial espionage
- Criminal activity (e.g., theft, workplace violence)
- Terrorism (e.g. bomb threat, bio-hazard)
- Natural Disaster (e.g., earthquake, fires)
- Severe Weather (e.g., flooding, tornado, hurricane, flooding)
- Loss of Key staff and employees
- Regulatory changes
- Legal actions

15. Would you say your company is likely to invest more, less or about the same in risk management, business continuance and/or disaster recovery in the future?

- Will invest much more
- Will invest a little more
- Continue at current investment levels
- Will invest a little less
- Will invest much less

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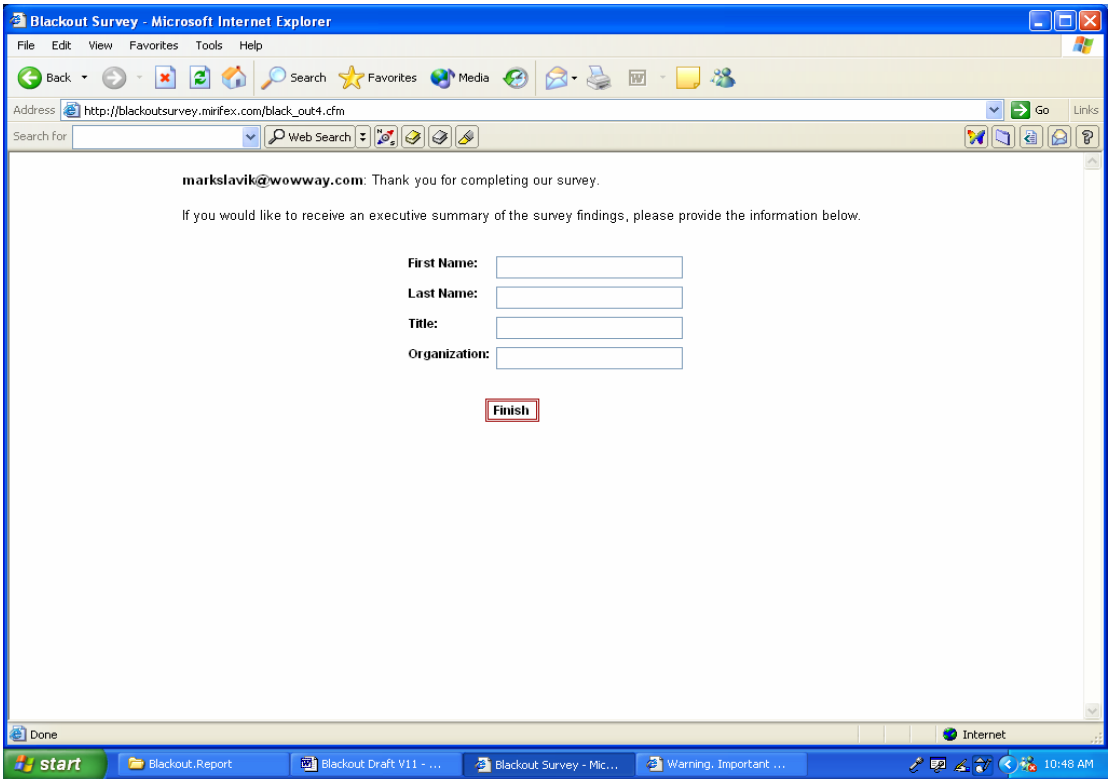
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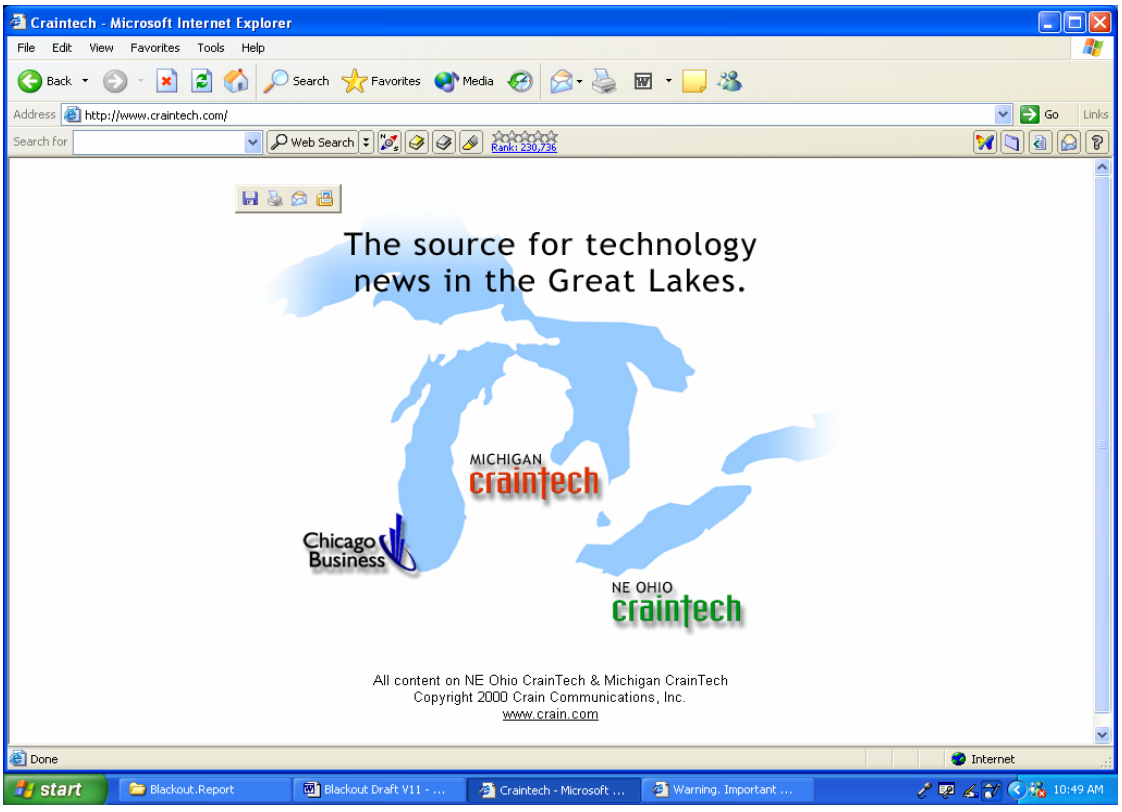
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