

Stakeholder Engagement Report: Utilities

Climate Change Preparedness in New Jersey

November 2013

*Prepared for the New Jersey Climate Adaptation Alliance by
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This report was prepared for the New Jersey Climate Adaptation Alliance which is facilitated by Rutgers University. The views and insights in this report do not reflect the position of Rutgers University nor the members of the Alliance Advisory Committee.

Introduction

KAlexander Associates was engaged by the New Jersey Climate Adaptation Alliance to solicit input from stakeholders in the investor-owned utility, telecommunications, and cable television sectors as to perceptions of climate change impacts to their businesses and any state and local policy changes they would recommend to allow the sectors to better prepare for and respond to a changing climate. This report summarizes the topline responses of participating respondents and offers insights into respondents' perceptions. The insights included here are based on comments offered during questionnaire interviews conducted via telephone online questionnaire responses and Karen Alexander's understanding of the industry. These insights are intended to help provide a context for understanding the industry and the responses. The comments and recommendations are a compilation and do not represent the views of any one participating company.

Background on the Utility Sectors in New Jersey

Investor-Owned Utilities

The investor-owned utility sector in New Jersey is comprised of businesses that deliver electric, natural gas, water, wastewater and telephone services to residential and business customers. The companies range in size from 10,000 to fewer than 20 New Jersey-based employees. All are "investor-owned." Confusingly, investor-owned utilities are often referred to as public utilities in law and in general usage because they serve the general public. However, none are owned by public/governmental entities.

Investor-ownership can be private, such as a company that is owned by a family or other business entity that is not publicly traded. Investor-ownership can also be public, where stock in the company is bought and sold through the U.S. stock market and is closely monitored both by Wall Street on behalf of individual and institutional investors and by the federal Securities and Exchange Commission on behalf of investors. Except for the electric, water and wastewater sectors, all are comprised of only publicly traded investor-owned utilities. There are ten municipally owned electric utilities and approximately half of New Jersey is served by investor-owned water utilities, with the remainder owned by governmental entities. Only investor-owned utilities are included here. Among the investor-owned utility sector, a company's ownership profile (i.e., publicly traded vs. privately owned) has no bearing on how it is regulated or its service responsibilities.

Investor-owned utilities hold a unique place as "natural monopolies" and differ substantially from other business sectors. A market like the utility market is characterized as a "natural monopoly" if a single firm can serve the market at a lower cost than two or more firms. This

result is due to one provider being able to exploit economies of scale to produce and deliver the range of services likely to be demanded by the market.¹ In the case of utilities, the establishment and continued operation of utility infrastructure requires very large capital investments, the costs of which are more efficiently incurred and defrayed through one rather than multiple companies. New Jerseyans, as is the case for citizens of most jurisdictions, do not have a choice of providers for electric, gas, water or wastewater services.

The provision of utility services is deemed essential to public health and welfare, and as such is a “public good”. In the absence of competition to control prices and service quality for consumers that depend on essential utility services, investor-owned utility rates are regulated, as are service quality and governance. New Jersey investor-owned utilities operate under municipal franchises that authorize the provision of service within the given municipality and are regulated under the rate, governance and service quality authority of the New Jersey Board of Public Utilities (BPU) pursuant to state law.

Telecommunications and Cable Television Sector

The companies in the telecommunications sector which provide landline voice (telephone) and video (cable TV) service are still regulated by the BPU, but because they are now in competitive markets, they are no longer rate regulated as traditional utilities. Limited aspects of their businesses continue to be regulated, for example, basic level rates, service quality, interconnection, inter-carrier compensation and corporate governance. The provision of Internet service and wireless voice service are not regulated at the state level.

With the exception of the lowest service tiers, which are still rate regulated, pricing decisions are market-based. When infrastructure investment decisions are made, they are made with the knowledge that the expenditures may or may not be fully recouped. There is no regulatory “cost recovery” mechanism, so decisions regarding infrastructure investment are impacted by service necessity and market forces. Like utilities, these providers are mindful of, and must balance, the concerns and needs of customers, public officials and shareholders. Performance in their businesses, however, is much more influenced by market factors than regulatory factors, distinctly different from the primary considerations of utilities. Regulation, however, can also have a clear financial impact, especially where it affects the competitive environment.

¹ See e.g. Alfred Kahn: *The Economics of Regulation* Vol. II 119 (1988); see also Daniel Spulber: *Regulation and Markets* 3 (1989)

Approach

The outreach for the investor-owned utilities and cable/telecommunications sector was done via survey. Many participants were unable to participate in focus groups for reasons of scheduling and confidentiality. Questionnaires were developed for the water/wastewater, electric, gas, and telecommunications sectors. Many of the questions were identical on all four questionnaires, though certain questions were tailored individually to each sector. Copies of the questionnaires are provided in Appendices A-D. The questionnaires were sent to employees holding senior management and executive-level positions in targeted companies. Participants had the option of completing the questionnaire online or via telephone. The links to online questionnaires were circulated August 27, with response deadlines of September 11 for electric, gas, cable and telecom; the link to the water and wastewater utilities questionnaire was circulated September 9 with a response deadline of September 20. Any company that had not yet completed the questionnaire by September 20 was contacted and encouraged to do so.

Invitations to participate in the research were sent to 19 companies: 16 are investor-owned utilities that provide water, wastewater, natural gas, telephone or electric service; two are cable television companies; and one is a competitive telecommunications provider. Responses were received from 13 of the 19 companies.

Criteria for selecting these companies were: 1) they serve more than 10,000 customer accounts; 2) they own and operate (as opposed to only operate) the facilities through which service is provided; 3) they are investor-owned utilities regulated by the Board of Public Utilities and 4) they have an accessible contact within the company. Those investor-owned utilities with fewer than 10,000 customer accounts are few and typically serve small individual towns or subdivisions. Their experience would not be substantially different from those included and, if different, not sufficiently representative to impact the results as the electric, gas, cable and telecommunications companies included cover more than 90% of the state, with the exception of the water utilities. The water utilities split the state with about 50% of New Jersey served by investor-owned utilities and 50% served by governmentally-owned utilities. (The water utilities that are owned by governmental entities are covered in the Water Resources sector report).

There are 10 municipally owned electric utilities that distribute electricity exclusively within their geographic boundaries, with the exception of Butler, which provides service inside and outside of its borders. All of these municipal electric utilities depend on the transmission of electricity from the investor-owned utilities included in this project. Only Vineland has independent power generation assets, but even with that depends on interconnected transmission from investor-owned utilities. Therefore, municipally-owned electric utilities were not targeted as part of this outreach.

Profile of Participants

Responses were received from 13 of the 19 targeted companies.² The 13 respondents represent 5 water utilities, 1 wastewater utility, 3 natural gas companies, 3 electric companies, and 1 telephone company. The distribution of respondents of those targeted by sector is as follows: water: 5 of 6; wastewater: 1 of 1; natural gas: 3 of 4; electric: 3 of 4; incumbent telephone: 0 of 2; competitive telecommunications providers³: 1 of 1; cable television 0 of 1.

All respondents work in senior management capacities (director up to president/CEO). Tenure in position ranged from 1 to over 20 years; tenure with the company was in the 10 years or above range, with most tenured more than 20 years. The primary areas of functional responsibility in addition to managerial roles were operations, finance and accounting, and rates and regulatory affairs. All but one of the respondents live in New Jersey.

This analysis synthesizes the responses of the 13 respondents. The largest sector within the sample is the water utilities, which also had the highest response rate. The small sample and response rate limits any statistically significant analysis, but some qualitative insights can be gleaned.

Summary

Perceptions of Climate Change in the Utility Sector

Nearly all respondents agreed or strongly agreed that climate change is occurring, with 12/13 indicating they disagree or strongly disagree with the statement “global climate change is not occurring”. There was no consensus as to whether it is attributable to human activity, with 7/13 agreeing it is, 2/13 disagreeing, and 4/13 indicating that they do not know. Of the six respondents who were explicitly asked to answer from their company’s perspective, most reported that their company’s position is that climate change is occurring. Half (3/6) of respondents’ companies take no position as to the cause of climate change, while the other half attribute climate change mostly to human activities. However, these positions have not necessarily been taken publicly by their companies. All respondents believe that climate change is a risk to New Jersey, and all but two believe it is a risk to their

² One of the utility companies is a provider of both gas and electric service, with two lines of business under one company. Although the businesses are separate, they responded to the questionnaire once for both. Thus their responses are counted as one in the total number of utilities responding.

³ Companies that provide landline telephone service are divided into 2 categories as defined by federal law: incumbent local exchange carriers (e.g., in New Jersey, Verizon and 2 others); and those that compete against the incumbents--competitive local exchange carriers (e.g. AT&T, Comcast, Cablevision, among others).

family and friends. Most (11/13) believe the scientific community understands the underlying science, with some uncertainty expressed by a couple. Similarly, nearly all trust the scientific community to truthfully report findings. However, views are split as to the degree to which state and local officials understand the impacts of climate change on their regions, with seven agreeing that public officials do understand the impacts, five who believe they do not, and one declining to answer.

There is some discrepancy in beliefs as to the honesty of media communication on climate change, with most reflecting trust, and the balance uncertain or reflecting distrust. Most believe that policymakers have the ability to develop mitigation adaptations. All respondents believe that utilities can develop mitigation adaptations, although later questions elicit the view that the support of government, especially with regard to the funding of mitigation measures, is very important.

The phrasing of questions to elicit perceptions regarding the existence and cause(s) of climate change, as well as other “opinion” oriented questions caused reticence in some respondents and, on the part of one company, a decision to decline to participate in the project altogether after reviewing the questionnaire. Additionally, some expressed confusion as to whether respondents were being asked for their personal opinions or their company’s position. When the question was asked, respondents were advised to share their company position only, where one exists. Where a company’s position on climate change has been publicly communicated or is known to be neutral, response on behalf of the company was easily obtained. Where no company position exists, the response was either neutral or reflected the personal view of the respondent.

Climate Change Impacts of Concern

As reflected in the questionnaire responses, the degree of concern about the potential direct and indirect impacts of climate change on their service territories varies by sector with water and wastewater utilities having greatest concern about long-term impacts to water quality or quantity related to discernible climate change-related trends, such as drought. The focus of electric and gas providers is more incident related, reflecting impacts that might be expected from more frequent and/or more intense weather events. Of the three regulated incumbent investor-owned telephone companies operating in New Jersey, a response was obtained from only one. As with the other utilities, the respondent’s focus was more related to recent extreme weather incidents than the possibility of climate change impacts more broadly.

Impacts that registered among those of greatest concern include:

- Extreme weather events that interfere with the ability to deliver service and hinder prompt service restoration (all sectors)*

- Inland and coastal flooding (due to storm surge* and sea level rise) (electric, gas, water)
- Drought (water)
- Quality degradation of drinking water sources (water)
- Interdependence on other utilities, e.g. electricity, communications networks* (water, wastewater, telecommunications)
- Physical damage to infrastructure* (all)
- Risks to worker and public health and safety during extreme weather events* (all)
- Availability of fuel during extreme weather events* (all)
- Lack of resilient emergency communications networks* (water, telecommunications)
- Need to think and revise asset management strategies (all)

Each of the items with an asterisk represents concerns born of real-world experiences during one or more of the recent extreme weather events. With one exception, climate change impacts rank below meeting customer service expectations, achieving revenue/budget targets, and managing rates as priorities for utilities.

The cable/telecommunications sector relies heavily on electricity to provide its wired and wireless voice communications services and its video services. Having an available power sources has a critical impact on the ability to deliver service as the ability to continuously relay the communications signal when power from the grid is lost is limited by the ability to rely on site-specific back up power supplies at signal relay locations as well as at customers' premises. Backup power supply is limited by the availability of fuel supply for backup generators or the capacity of back up batteries. However, even if the telecommunications service provider has back up capability, if end users are without power, they will not be able to receive the signal once their cordless landline or wireless telephone loses battery power.⁴ This is a critical issue, especially for emergency communications.

Sectoral Perceptions of Preparedness

Notwithstanding scientists' claims that single weather events are not necessarily direct indicators of climate change, respondents not surprisingly think of climate change impacts in the context of recent storms. Companies affected by Hurricane Irene reflected that they were moderately prepared for that event, and that there were lessons learned from the storm that improved their preparedness for Superstorm Sandy. Respondents were asked to rate the preparedness of their organization for a major storm event on a scale of 1-4, with

⁴ Telephone service may still be available during a power outage where legacy landline telephone service delivered by self-powered twisted copper pair wiring is in place. This technology is becoming obsolete as fiber optic technology is deployed enabling not only voice service, but also two-way video and high speed Internet services.

one being not at all prepared and 4 being extremely well-prepared. Prior to Hurricane Irene, the average ranking was 2.75; this increased to 3.5 post-Hurricane Sandy, indicating that recent experiences have improved preparedness within the sector.

With respect to perceptions as to their sector's preparedness overall, utilities in these sectors are disinclined to offer their views of the preparedness or performance of others. Because they are all regulated and subject to significant public scrutiny, as a matter of the culture it would be bad form to criticize others in the industry; in this regard there is an unspoken "Golden Rule". Companies individually would gauge their preparedness for major weather events in the context of historical weather norms over time, and against that yardstick they reflected a high level of preparedness and service reliability.

The area of greatest need for the telecommunications sector (again, event related) is reliable electric power supply, and emergency response coordination and communication. The respondent's company was somewhat affected by Hurricane Irene, and it was dramatically affected by Superstorm Sandy. The respondent's perceived level of preparedness was relatively high, and they have put in place most of the mitigation/planning measures listed in the questionnaire.

Leading Practices

Many of the respondents organizations have already put climate-adaptive actions and policies in place, such as emergency preparedness plans that incorporate climate change and local capacities (7), crisis and emergency response risk communication systems (7), capital improvement and maintenance plans which incorporate climate change (5), hazard mitigation plans (5), and public and/or employee awareness programs on climate change impacts (5). Four have conducted vulnerability assessments while two more plan to do so. Four stockpile supplies such as fuel, food, and water, while three more plan to do so. Two have already begun raising, relocating, or flood-proofing capital facilities prone to flooding or storm surges, while six more plan to do so. A few have begun to utilize green infrastructure (such as riparian buffers, living shorelines, tree planting, and wetland restoration) while others indicate this is planned. Not all 13 respondents completed every questionnaire on the survey, and all four questionnaires had slightly different choices, so the denominator of these numbers varies.

Respondents were asked to rate a list of actions/programs needed at the regional, statewide or national to support utility efforts to prepare and respond to climate change impacts as "high need", "some need", or "little or no need". The two most important policies, rated as a high need by nearly all respondents, are regulatory programs to encourage the accelerated replacement of aging infrastructure, and clear policy direction with supporting incentives to expedite hardening and resiliency measures. Resilient emergency communications infrastructure and development of innovative funding strategies

to implement adaptation measures were also identified as important needs. The primary needs identified by organizations include “regulatory approval to enable contemporaneous cost recovery of infrastructure measures to enhance resiliency and mitigation”, “ready access to electric power under any and all conditions”, and “improved coordination surrounding power restoration.”

Utilities generally view asset management programs as beneficial, particularly for improving the safety and security of assets, employees, and the general public, to prolong asset life, and to assist with decision-making and managing risk. However, level of implementation varies among companies. Many companies have undertaken measures to reduce their contributions to climate change, such as installation of solar energy systems, switching to lower-impact fuels (e.g. from oil to natural gas), energy efficiency measures such as building and equipment upgrades, and offering customer-side conservation measures.

Challenges

When asked what the biggest challenges are to achieving preparedness to climate change, respondents’ answers primarily focused on the difficulty of financing infrastructure upgrades due to a perceived unwillingness among customers to accept higher rates. Responses included “impact on customer rates for all required capital improvements”, “acceptance of ability to recover costs through rates”, and “consensus among key stakeholders – elected officials, regulators, shareholders, customers – on funding mechanisms to facilitate grid resiliency.” Other challenges identified include “regulatory support for system hardening program”, “protection of source water”, and “coordination with local municipalities and counties”.

Where respondents reflected as a major concern the costs associated with climate change preparedness, the concern is that the public’s expectations of performance are not likely to be in line with what they are willing to pay to achieve it. The expectation that utilities should have already put in place the measures needed to withstand the onslaught of Superstorm Sandy, for example, reflect a lack of understanding as to what that would take from a cost/benefit standpoint and the economic structure and competing existing service delivery priorities of investor-owned utilities. This tension is not unique to investor-owned utilities. Similar pressures are felt by government-owned utilities, which often must rely on the willingness of local governments to authorize unpopular higher rates or tax increases.

Recommendations

None of the respondents offered specific recommendations for short or long term actions, likely for the reasons described earlier. The author’s observation from the questionnaire responses, interviews and knowledge of the industry, however, is that the “800 pound gorilla in the room” is the need to address the disconnect between the public’s expectations of

utility performance under any and all circumstances, it's willingness to financially support the investments needed to achieve greater resiliency and preparedness and the need to understand that at no level of investment is perfect performance under any and all circumstances possible.

To advance decisions on utility climate change preparedness, it would be helpful to answer three key public policy questions:

- What additional level of utility preparedness and resiliency is truly needed above what is already in place and has been satisfactory for generations?
- If investments are needed to achieve those higher levels, how much financial support are New Jerseyans prepared to give?
- Given that perfection in delivery is not possible in any and all circumstances, to what extent, with the appropriate training and tools, are people willing to take personal responsibility for preparedness efforts that can be accomplished at the individual and family levels?

It has been politically difficult for policymakers to affirmatively support greater investment for more rapid replacement of aging utility infrastructure. It is not yet clear whether greater ratepayer supported investment for climate change adaptations will be more or less politically tenable than investments to replace aging facilities.⁵ The NJCAA may be able to play a role in raising and facilitating a discussion around these issues.

In the cable/telecommunications sector, the respondent identified more resilient emergency communications infrastructure and coordination of emergency communications and service restoration work as key needs. It may be possible to discern more from this sector at the workshop stage. It could be important to further explore what their needs might be for enhanced coordination with utilities and state and local government in emergency communications, preparedness planning and service restoration after major weather events.

Insights from the Author

The storms of the last three years raise the question as to whether a new baseline of performance expectations is being set for what might constitute more extreme and intense

⁵ It is important to note that the BPU in recent years has made modifications to its regulatory treatment of specific types of natural gas and water utility infrastructure investments to achieve more rapid replacement. A more comprehensive approach to encouraging aging utility infrastructure investment across all sectors has been adopted recently by the Pennsylvania Legislature. How and why Pennsylvania undertook those policy changes could offer valuable information to New Jersey if it chooses to look further into mechanisms for accelerating investments for greater climate change preparedness.

weather patterns in the future. It is likely that most would argue that the performance of utility systems have stood up well for decades, in many instances a century or more, and that it would not be appropriate to judge performance of these systems against a new norm that they were never intended to withstand. It is likely that some, if not all, would argue that if policymakers believe recent extraordinary storms represent a new norm and that performance expectations should be judged against that new norm, policy decisions will need to be made as to what level of utility preparedness and resiliency is necessary and what policymakers are prepared to ask ratepayers to pay to achieve it.

At current approved levels and rates of infrastructure investment, utilities will continue to perform well in the context of historical climate norms. Performance above those levels sufficient to mitigate the impacts of climate change could require significant levels of additional capital investment.

Where respondents reflected as a major concern the costs associated with climate change preparedness, the concern is that the public's expectations of performance are not likely to be in line with what they are willing to pay to achieve it. This tension is not unique to investor-owned utilities. Similar pressures are felt by government-owned utilities, which often must rely on the willingness of local governments to authorize unpopular higher rates or additional taxes.

In the author's opinion, public misperception of what they should pay to get the utility service they believe they are entitled to is a challenge for utilities and utility regulators even without considering climate change preparedness. Absent major efforts to change that perception and increase understanding, garnering consensus to provide the financial support needed to achieve high levels of preparedness in the face of climate change could be difficult.

Context for Considering Utility Climate Change Preparedness

The environment in which investor-owned utilities operate places them in the position of having to be mindful simultaneously of the needs of customers, regulators and shareholders, whose interests are not always aligned. The scrutiny of each of these stakeholders can limit the investor-owned utilities' comfort with directly participating in public policy decision-making on issues deemed to be controversial or expensive, including climate change. Utilities take care not to alienate themselves unnecessarily from public officials in the legislative or executive branches of government who have the ability to make decisions that can significantly affect their financial position. There is also the need to manage relationships with customers and local officials, many of whom expect the utility to consistently deliver reliable and high quality service, with little understanding of why the services cost what they do, and little tolerance of service interruptions or the need for rate increases. One company explicitly withdrew from participation after reviewing the

questionnaire for exactly this reason. Others have reflected this view in conversations. Only one of the companies has taken a public position indicating they believe the cause of climate change is human activity, though others will agree that it exists without attributing the cause.

Utility regulators face political pressures to allow only the lowest possible rate increases and demand the highest levels of service, yet must also be mindful of the need to ensure the ongoing financial viability and profitability of the utility so that it can continue to provide service. Investors see utilities as modest but stable sources of income, and seek to invest in utilities that receive approved rates at levels that ensure a reasonable return on shareholders' investment. Credit rating agencies monitor the performance of utilities and their regulatory treatment to signal the degree of creditworthiness. The higher the credit rating of the utility, generally, the lower the interest rate it is able to obtain when it goes to the capital markets to raise funds to invest in new and upgraded infrastructure to enhance service delivery.

Understanding the Role of Rate Regulation in Investor-owned Utilities' Preparedness

Utilities typically are very conservative when making decisions about incurring any expense that is not essential to meeting their service obligations. The rates that utility customers pay, in the main, are reimbursements for dollars already spent to provide continuous service. Rates are decided via a litigated rate case before the Board of Public Utilities. The level of revenues from rates requested by the utility reflects expenses already incurred with some projections of future needs over a short period of time. What the expenses cover are reviewed by the BPU (and other parties to the proceeding) to determine whether the expenditures were prudent. If not deemed essential to meeting the utility's service obligations at the levels spent, recovery of the expenses in rates can be disallowed or allowed at lower levels. Consequently, utilities generally will not undertake large discretionary expenditures if there is uncertainty as to whether the expenditures will be approved after-the-fact.

In the author's opinion, based on knowledge of these sectors, significant financial outlays for climate change adaptations above those already planned, including measures for greater resiliency and mitigation against extraordinary circumstances, like the storms of the last few years, are not likely to be made without some assurance that those costs will be fully recovered when made legitimately and prudently (as judged by regulators). Because the telecommunications and cable companies do not have their rates regulated in the same way as utilities, investments they make will be informed by the demands of the marketplace and their calculation as to their ability to recover their costs through their pricing strategies while remaining competitive.

Because the regulatory structure enables capital outlays to be made with an allowed rate of return, what the allowed rate of return is will also be of importance, because a favorable rate of return will better enable the utility to be more attractive to investors, which in turn builds equity that can be re-invested in the utility. A rate of return considered favorable to the company's financial position can also enhance the utility's credit rating, giving it the ability to borrow at lower carrying costs, which results in lower rates for customers. The BPU's role is to balance the benefits and costs to the utility and its customers.

The public sensitivity around utility rates and utility performance has become increasingly politicized in recent years, making climate change adaptations requiring additional costs low on the hierarchy of needs for most, although not all, utilities. The exceptions are demonstrated by utilities that are able to find alignment of their business interests with climate change related policies, for example, the development and regulatory approval of compressed natural gas fueling stations which can help to achieve the goal of greenhouse gas reduction and which can present a business opportunity for the utility.

Conclusion

As the author spoke with some of the utility respondents, insight was gained regarding sensitivity on the part of some to the use of the statutorily derived terms "safe, adequate and proper service" against which BPU-regulated utilities' performance is judged. Two of the survey questions asked respondents if they believe a number of elements impacted their ability to provide "safe, adequate and proper service." This language has specific meaning under state utility law that creates the regulatory structure under which investor-owned utilities operate and which establishes the performance standards utilities are to achieve as judged by BPU.

There is the view by some that this standard has been and can continue to be met at the level of incremental investment that utilities have historically made under normal operating circumstances—that is, what was considered normal before recent extraordinary weather events now raises the possibility that what has been normal may be changing. Those expressing the concern would argue that performance above what they have provided consistently over the years and which has met the legal standard constitutes a significant change in expectations. To ensure that service is maintained or that customers experience outages of only short duration (less than 8 hours) even in the face of storms like Sandy would be a new and significantly higher standard, one that would require significantly increased levels of investment than has ever been needed in the past. That level of investment cannot be supported by current levels of approved rates.

Of concern is that some in the public, and by extension legislators, may have an expectation that the utilities' systems should already have been built to withstand storms like Irene, Sandy, etc. even though there was no way anyone could have predicted the impacts nor

would BPU likely ever have approved the expenditures for something that “might” happen. Companies that experienced significant damage in one or both of the most recent storms are more sensitive to the use of the “safe, adequate and proper” language and are very careful to distinguish performance under what used to be the norm versus performance in the face of an extraordinary event that is outside of the norm. If the “safe, adequate and proper” language had not been included as a qualifier in the questions, it is likely that all would have consistently noted that many of the issues are of some or great concern with respect to the ability to meet customer expectations of (as opposed to regulatory obligations for) future reliability. However, it is highly unlikely, absent societal support to pay for measures needed to increase the resilience of utility infrastructure that any of the utilities would believe it appropriate to utilize the “safe, adequate and proper” standard developed a century ago to judge performance under the new extraordinary circumstances that may be the result of climate change. This disconnect between the levels of reliability that are possible with current supported levels of investment (levels which have been adequate heretofore) and performance that might be expected in the future but for which it is as yet uncertain whether ratepayers are willing to pay more to receive it, will be the issue that will permeate all discussions with investor-owned utilities about climate change preparedness.

Appendix A: Water/Wastewater Utilities Questionnaire

Preparing for Climate Change Impacts in New Jersey: Water Utilities - KA

Q1 Please read the following information and sign electronically in the box below, indicating your informed consent. Thank you for agreeing to participate in this online survey. This research is being conducted by Rutgers University in conjunction with the New Jersey Climate Adaptation Alliance. All members of the Association of Environmental Authorities, the NJ Section of the American Water Works Association, the water utility members of the NJ Utilities Association, and the NJ Water Environmental Association are being asked to participate. The purpose of the survey is to obtain data to assess New Jersey's most pressing concerns resulting from climate change, and to help to prioritize a set of program, planning and policy adaptations that are necessary to prepare for and mitigate these impacts. There are no reasonable or discernible risks to your participation in this study. We are not asking for your name on the survey, and will only utilize information collected in summary form to categorize or further explain important differences. If we are able to deduce your identity, the research will be confidential. Confidential means that the research records will include some information about you and this information will be stored in such a manner that there is some linkage between your identity (as deduced but not specified) and the response in the research. The information collected about you includes your opinions about climate change risks, ratings of concern about climate change impacts and your assessment of the needs for various climate adaptation programs. Please note that we will keep this information confidential by not including your name in the data records, limiting individual access to the research data and keeping it in a secure location. The research team and the Institutional Review Board (a committee that reviews research studies in order to protect research participants) at Rutgers are the only parties that will be allowed to see the data, except as may be required by law. If a report of this study is published, or the results are presented at a professional conference, only group results will be stated. All study data will be kept for three years. The benefits of completing the survey are that you will contribute to further knowledge and insight about impacts to New Jersey from climate change and help to inform the development and prioritization of resources needed to support new or expanded programs or policies to address these impacts. The survey should take about 10-15 minutes to complete. Participation is completely voluntary and refusal to participate will result in no penalties. You may opt out of completion of the survey at any time while taking it. If you have questions related to the research, please contact Jeanne Herb, Associate Director of the Environmental Analysis and Communication group, 33 Livingston Ave., New Brunswick, NJ 08901, 848-932-2725, jherb@ejb.rutgers.edu. If you have questions about your rights as a research subject, you may contact the IRB Administrator at Rutgers University

at: Rutgers University Institutional Review Board for the Protection of Human
Subjects Office of Research and Sponsored Programs 3 Rutgers

Plaza
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New Brunswick, NJ08901-8559
Email: humansubjects@orsp.rutgers.edu

Tel: 838 932

- I have read and understand the risks and benefits of this research and agree to participate by typing my initials in this box. _____

Q32 Note: Where the term “water utility” is used in this survey, it refers to both water supply and wastewater utilities. Please indicate the organization that emailed you the link to this survey.

- American Water Works Association - NJ Chapter
- Association of Environmental Authorities
- Karen Alexander at KAlexander Associates, LLC
- NJ Water Environment Association

Q2 Please indicate the primary sector in which you work:

- Public Community Water Supply System (publicly-owned)
- Public Non-Community or Non-Public Water Supply System (all ownership categories)
- Public/Domestic Wastewater Utility (publicly owned)
- Investor-owned Public Community Water Supply System
- Investor-owned Public/Domestic Wastewater Utility
- Other Private Sector (e.g. Industry) Water Supply/Wastewater
- Municipal Government
- County Government
- State Government
- Federal Government
- Consultant
- Contractor
- Equipment Manufacturer or Supplier
- Nonprofit
- Academic
- Other _____

Q3 In what aspects of water utility functions do you typically work? Select all that apply:

- Elected Official and/or Non-Executive Board Member
- Executive Management
- Operations Management
- Treatment Operations
- Pipelines and Pumping Station Operations
- Administrative Support
- Rates / Regulatory Affairs
- Legal
- Engineering
- Planning
- Finance / Accounting
- Construction Management
- Public Policy / Government Affairs
- Emergency Preparedness
- Construction, Equipment Supply
- Other _____
- Not Applicable (don't work for or with water utilities)

Q26 What is your position?

- Non-Executive Board Member
- Elected Official
- Executive
- Director or Manager
- Supervisor
- Technical Staff
- Non-technical Staff
- Consultant or Attorney (not on utility staff)
- Researcher and/or Academia
- Other _____

Q5 How long have you been in this position?

- 1 - 5 years
- 6 - 10 years
- 11 - 20 years
- More than 20 years

Q34 How long has your organization (or its predecessor) provided service in New Jersey?

- More than 100 years
- 50 - 100 years
- 25 - 50 years
- Less than 25 years

Q33 What is the primary type of community served by your water supply or wastewater utility?

- Rural
- Suburban
- Urban
- Mixed (two or more of the above)
- Not Applicable (not associated with a water utility)

Q6 Do you live in New Jersey?

- Yes
- No

Q5 Do you Strongly Agree, Agree, Disagree or Strongly Disagree (or Don't Know) with the following statements?

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know
Global climate change is not occurring.	<input type="radio"/>				
Global climate change is mostly caused by human activity.	<input type="radio"/>				
Global climate change is a risk to New Jersey.	<input type="radio"/>				
Global climate change is a risk to me, my family, and my friends.	<input type="radio"/>				
The international scientific community understands the science behind global climate change.	<input type="radio"/>				
I trust the scientific community to truthfully report their findings related to climate	<input type="radio"/>				

change.					
Our state and local officials understand the implications of global climate change for my region.	<input type="radio"/>				
The media I rely on communicate honestly with us about global climate change.	<input type="radio"/>				
It is possible for public policymakers to develop adaptations to climate change to minimize adverse effects.	<input type="radio"/>				
It is possible for water and wastewater utilities to develop adaptations to climate change to minimize adverse effects.	<input type="radio"/>				

Q6 Please rate how concerned you are about the following potential direct and indirect climate change related impacts to the ability of your water utility (if you are associated with a water utility) in or related to your service area or to water utilities in general (if you are not associated with a water utility) to provide service:

	Great Concern	Some Concern	Little Concern	No Concern	Not applicable
Higher average ambient air temperature	<input type="radio"/>				
Higher water temperature	<input type="radio"/>				
Increased algal blooms / eutrophication	<input type="radio"/>				
Increased concentration of water pollutants	<input type="radio"/>				
Reduced water flows in streams and lakes	<input type="radio"/>				
Reduced recharge of aquifers	<input type="radio"/>				
Reduced water supply availability	<input type="radio"/>				
More severe droughts	<input type="radio"/>				
Salinity changes in water resources	<input type="radio"/>				
Increased annual water	<input type="radio"/>				

demand					
Increased summer season water demand	<input type="radio"/>				
Decreased annual water demand	<input type="radio"/>				
Increased frequency of severe storms	<input type="radio"/>				
Increased severity of storms	<input type="radio"/>				
Unpredictability of weather patterns	<input type="radio"/>				
Increased stormwater flows	<input type="radio"/>				
Increased occurrence / severity of coastal floods	<input type="radio"/>				
Increased coastal erosion	<input type="radio"/>				
Increased severity of coastal storm surges	<input type="radio"/>				
Increased tidal wetland erosion/loss	<input type="radio"/>				

Increased occurrence / severity of non-tidal river floods	<input type="radio"/>				
Reduced flood attenuation	<input type="radio"/>				
Increased inundation of low-lying infrastructure (roads, substations, etc.)	<input type="radio"/>				
Release of toxic materials from flooding of hazardous or contaminated sites	<input type="radio"/>				
Increased spread of invasive species	<input type="radio"/>				
Increased heat stress/stroke (for field workers)	<input type="radio"/>				
Worker health and safety during major events	<input type="radio"/>				
Public health and safety during major events	<input type="radio"/>				

Increased sanitary sewer overflows (SSOs)	<input type="radio"/>				
Increased combined sewer overflows (CSOs)	<input type="radio"/>				
Increased infiltration and inflow (I&I)	<input type="radio"/>				
Physical damage to critical utility infrastructure (energy, water, wastewater)	<input type="radio"/>				
Decrease in effectiveness of water supply and sewage treatment systems	<input type="radio"/>				
Greater impacts on asset viability	<input type="radio"/>				
Increased frequency of replacement for critical facilities and equipment	<input type="radio"/>				
Loss of assets due to permanent damage	<input type="radio"/>				

Increase in severity and length of unplanned service interruptions	<input type="radio"/>				
Difficulty with contingency planning due to lack of experience	<input type="radio"/>				
Other	<input type="radio"/>				

Q24 Was the service area of your water utility (if you are associated with a water utility) or of the local water utility/utilities (if you are not associated with a water utility) harmed by Hurricane Irene (2011)?

- Yes
- No

Q11 If yes, in what ways? Select all that apply:

- Deaths (Customer/General Public)
- Deaths (Employee/Contractor)
- Injuries caused by event or response
- Short-term power loss (48 hours or less)
- Longer-term power loss (more than 48 hours)
- Short-term water supply loss (48 hours or less)
- Longer-term water supply loss (more than 48 hours)
- Short-term sewer service loss (48 hours or less)
- Longer-term sewer service loss (more than 48 hours)
- Severe flooding
- Minor flooding
- Major property damage (customers/community)
- Minor property damage (customers/community)
- Major property damage (my organization)
- Minor property damage (my organization)
- Road closures
- Resident evacuation
- Business closures
- Other _____

Q12 Was the service area of your water utility (if you are associated with a water utility) or of the local water utility/utilities (if you are not associated with a water utility) harmed by Hurricane Sandy (2012)?

- Yes
- No

Q13 If yes, in what ways? Select all that apply:

- Deaths (Customer/General Public)
- Deaths (Employee/Contractor)
- Injuries caused by event or response
- Short-term power loss (48 hours or less)
- Longer-term power loss (more than 48 hours)
- Short-term water supply loss (48 hours or less)
- Longer-term water supply loss (more than 48 hours)
- Short-term sewer service loss (48 hours or less)
- Longer-term sewer service loss (more than 48 hours)
- Severe flooding
- Minor flooding
- Major property damage (customers/community)
- Minor property damage (customers/community)
- Major property damage (my organization)
- Minor property damage (my organization)
- Road closures
- Resident evacuation
- Business closures
- Other _____

Q28 Of the following climate change adaptations, which are in place, planned, or needed for communities within the service area of your water utility (if you are associated with a water utility) or of the local water utility/utilities (if you are not associated with a water utility)?

	In Place	Planned	Not Planned but Needed	Not Needed	Don't Know	Not Applicable
Local climate adaptation plans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hazard mitigation plans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vulnerability assessments/census of vulnerable sub-populations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emergency preparedness plans that incorporate climate changes and local capacities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Risk maps (e.g. inundation)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alternate service distribution routes (e.g. interconnections)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public and employee awareness campaign on emergency preparedness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inclusion of vulnerable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

populations in emergency preparedness plans						
Heat warning system	<input type="radio"/>					
Local electric utility communication plan for outages	<input type="radio"/>					
Local water utility communication plan for outages	<input type="radio"/>					
Crisis and emergency response risk communication system	<input type="radio"/>					
Public awareness program on climate change impacts	<input type="radio"/>					
Stockpiling of supplies (fuel, food, water, medicine)	<input type="radio"/>					
Green infrastructure (e.g. riparian buffers, living shorelines, native landscaping, tree planting, wetland restoration, etc.)	<input type="radio"/>					
Capital improvement and	<input type="radio"/>					

<p>maintenance plans which incorporate climate change</p> <p>Buyout of properties in high hazard floodplains</p> <p>Raising, relocating, or flood-proofing capital facilities prone to flooding or storm surges</p> <p>Other</p>	<input type="radio"/>					
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Q15 What are the most important actions/programs needed at the regional, statewide or national level (both governmental and non-governmental) to support water utility efforts to prepare and respond to climate change impacts?

	Very Important	Important	Somewhat Important	Not Important	Don't Know
Incentive programs to relocate development away from vulnerable areas	<input type="radio"/>				
Socioeconomic vulnerability assessments	<input type="radio"/>				
Regulatory programs to encourage the accelerated replacement of aging infrastructure	<input type="radio"/>				
Clear policy direction with supporting incentives to expedite hardening and resiliency measures	<input type="radio"/>				
Clearly established emergency response lines of communication	<input type="radio"/>				
Improved planning,	<input type="radio"/>				

coordination, and communication across affected entities					
Enhanced weather forecasting	<input type="radio"/>				
Improved climate and weather modeling capacity for local scale assessments	<input type="radio"/>				
Critical infrastructure assessments	<input type="radio"/>				
Improved coordination between water utilities (mutual aid) and state resources	<input type="radio"/>				
Improved coordination between water utilities and other sectors (health, planning, transportation, emergency planning)	<input type="radio"/>				
Strengthened employee training and	<input type="radio"/>				

retention for water utilities					
Rapid response system for extreme weather events	<input type="radio"/>				
Strengthened training for governing bodies of water utilities	<input type="radio"/>				
Training of local government officials as to the constraints affecting restoration	<input type="radio"/>				
Resilient emergency communications infrastructure	<input type="radio"/>				
Enhanced GIS and LiDAR data	<input type="radio"/>				
Development of innovative funding strategies to implement adaptation measures	<input type="radio"/>				
Water supply planning and conservation programs	<input type="radio"/>				

Updated regulations or guidelines addressing design and construction standards	<input type="radio"/>				
Shoreline change data and projections	<input type="radio"/>				
Inland waterways flood hazard delineation data and projections	<input type="radio"/>				
Assistance with stockpiling of supplies	<input type="radio"/>				
Updated or new regulations addressing emergency planning	<input type="radio"/>				
Updated or new regulations addressing infrastructure upgrades	<input type="radio"/>				
Updated or new regulations addressing floodplain delineation	<input type="radio"/>				
Updated or new regulations addressing	<input type="radio"/>				

floodplain construction					
Updated or new regulations addressing hazard mitigation planning	<input type="radio"/>				
Other	<input type="radio"/>				

Q29 What does your organization most need to prepare for and be ready to respond to climate change impacts over the coming decades?

Q17 What are the biggest challenges to achieving water utility preparedness for climate change?

Q18 Please rank climate change impacts in importance relative to these other water utility challenges. (Drag and drop to rank 1 to 6 with 1 being most important and 6 being least important):

- _____ Regulatory Compliance
- _____ Achieving Revenue/Budget Targets
- _____ Asset Management
- _____ Meeting Customer Price/Rate Expectations
- _____ Employee Capabilities and Retention
- _____ Climate Change Impacts

Q35 In your opinion, on a scale of 1 to 5 (1 being “not at all prepared” and 5 being “extremely well prepared”), please rate the following:

	Not at all prepared	Somewhat prepared	Adequately prepared	Extremely well-prepared	Don't know
The preparedness of your organization for a major storm event prior to Hurricane Irene	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The preparedness of your organization for a major storm event post Hurricane Sandy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q36 ASSET MANAGEMENT FOR WATER UTILITIES USEPA and others have recommended that water utilities (water supply and wastewater) prepare and implement long-term asset management plans. Which choice below represents your opinion of the long-term sustainability of an asset management program for water utilities?

- Only a buzz word or temporary fad, unlikely to be a sustainable program
- Likely to be implemented voluntarily by most systems as a standard business practice
- Likely to be implemented ad hoc rather than system-wide
- Likely to be mandated through State funding requirements or regulations
- Don't know/No opinion

Q37 Should public assistance to water utilities (e.g., NJ Environmental Infrastructure Financing Program loans) be dependent upon a demonstration that the water utility has effective system

management such as asset management, with sufficient user rates? Which of the choices below best describes your opinion of this approach?

- Not necessary and will not guarantee efficient use of funding
- Necessary, but stringency should vary with size of utility
- Asset management is necessary for all systems and distributes funding efficiently
- Don't know/No opinion

Q38 Should NJPDES permits for sewer utilities be dependent upon a demonstration that the utility has effective system management such as asset management, with sufficient user rates? Which of the choices below best describes your opinion of this approach?

- Not necessary and will not guarantee proper asset management
- Necessary, but stringency should vary with size of utility
- Asset management is necessary for all systems
- Don't know/No opinion

Q39 Should water allocation permits for public water supply utilities be dependent upon a demonstration that the utility has effective system management such as asset management, with sufficient user rates? Which of the choices below best describes your opinion of this approach?

- Not necessary and will not guarantee proper asset management
- Necessary, but stringency should vary with size of utility
- Asset management is necessary for all systems
- Don't know/No opinion

Q40 Which choice below best represents the current level of asset management implementation in the water utility which with you are most closely associated?

- None
- Minimal (some implementation regarding tracking and assessing assets)
- Partial (implemented some specific asset management tools for managing risk and reducing lifecycle costs, and are developing an asset management plan)
- Significant (developed an asset management plan and initiated substantive implementation)
- Full (fully implemented a long-term asset management plan)
- Don't Know/No opinion

Q41 Which of the following software packages are being used to track assets by the water utility which with you are most closely associated? Select all that apply:

- Database or spreadsheet
- CMMS (Computerized Maintenance Management System)
- GIS (Geographic Information System: digital mapping associated with system information)
- FMS (Financial Management System)
- USEPA CUPPS (Check Up Program for Small Systems)
- Custom-designed Asset Management Program
- Other _____
- Don't Know

Q42 Rate the value of asset management programs for the following purposes on a scale from 1 to 5 (1 being “Adversely,” 3 being “Neutral” and 5 being “Dramatically Beneficial”), for the water utility which with you are most closely associated:

	Adversely	Somewhat adversely	Neutral	Somewhat beneficial	Dramatically Beneficial	Don't know
Improve coordination, communications and operation of the utility	<input type="radio"/>	<input type="radio"/>				
Assist with knowledge retention and information transfer within the utility	<input type="radio"/>	<input type="radio"/>				
Prolong asset life and value	<input type="radio"/>	<input type="radio"/>				
Assist with managing risk	<input type="radio"/>	<input type="radio"/>				
Improve regulatory compliance	<input type="radio"/>	<input type="radio"/>				
Improve security and safety of assets, employees and the general public	<input type="radio"/>	<input type="radio"/>				
Reduce disruptions to service and protect against business risk exposure	<input type="radio"/>	<input type="radio"/>				

Assist with decision making approaches for capital improvements	<input type="radio"/>					
Reduce operating and maintenance costs and long-term capital expenditures	<input type="radio"/>					
Assist with public confidence and developing justifiable rates	<input type="radio"/>					
Improve the utility's bond rating, lower interest rates and lower insurance premiums	<input type="radio"/>					
To improve rankings for funding for grants and low interest loans	<input type="radio"/>					

Q43 Electricity costs constitute the following percentage of total operations costs for the water utility with which you are most closely associated:

- Less than 5%
- 5 - 10%
- 10 - 15%
- 15 - 20%
- 20% or greater
- Don't know

Q44 Rate the extent to which the reliability of electrical supply has a major influence on capital project decisions for the water utility with which you are most closely associated (1 being little to no effect and 5 being very significant effect).

	1	2	3	4	5	Don't know
Importance of electrical supply on capital project decisions	<input type="radio"/>					

Q45 Which of the following actions or techniques are being used to manage electricity demand by the water utility with which you are most closely associated? Select all that apply:

- Energy audits for buildings
- Building upgrades for energy conservation
- Energy audits for pumping facilities not associated with treatment works
- Energy audits for treatment works
- Replacement of capital equipment with energy-efficient equipment
- Installation of solar energy systems
- Installation of wind energy systems
- Installation of energy production systems using sludge or biosolids
- Third-party contracts for installation of energy conservation or production systems
- Installation or expansion of auxiliary generators
- Installation or expansion of fuel storage
- Agreements or contracts for emergency generators
- Agreements or contracts for emergency fuel
- Other _____
- None
- Don't know

Q46 Which, if any, of the following measures has your organization employed to reduce its contribution to greenhouse gas emissions:

- Installation of solar energy systems
- Energy conservation measures
- Water conservation measures
- Fuel switching (e.g., oil or propane to natural gas)
- Building modifications for energy efficiency
- Use of electric fleet vehicles
- Use of natural gas/CNG powered fleet vehicles
- Water leak measurement and prevention
- Offering of customer-oriented conservation measures
- None
- Don't know

Q47 FINANCIAL IMPACTS OF CLIMATE CHANGE Please respond to the following two statements:

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know
My organization quantifies and separately identifies expenses related to climate change impacts and/or adaptations	<input type="radio"/>				
If it does not now do so, in the future my organization should quantify and separately identify expenses related to climate change impacts and/or adaptations	<input type="radio"/>				

Q48 Considering all of the major storm events that affected its operations in the past three years including Hurricane Irene, the Halloween snow storm, and Superstorm Sandy, and irrespective of whether your company attributes these events to climate change, in the aggregate, the water utility with which you are most closely associated spent approximately how much to restore service (include all costs):

- More than \$100 million
- \$50 - 100 million
- \$25 - 50 million
- \$10 - 25 million
- \$1 - 10 million
- Less than \$1 million
- Don't know

Appendix B: Electric Utilities Questionnaire

Preparing for Climate Change Impacts in New Jersey: Electric Utilities - Aug 27

Q1 Please read the following information and sign electronically in the box below, indicating your informed consent. Thank you for agreeing to participate in this online survey. This research is being conducted by Rutgers University in conjunction with the New Jersey Climate Adaptation Alliance. Representatives from New Jersey's electricity providers are being asked to participate. The purpose of the survey is to obtain data to assess New Jersey's most pressing concerns resulting from climate change, and to help to prioritize a set of program, planning and policy adaptations that are necessary to prepare for and mitigate these impacts. There are no reasonable or discernible risks to your participation in this study. We are not asking for your name on the survey, and will only utilize information collected in summary form to categorize or further explain important differences. If we are able to deduce your identity, the research will be confidential. Confidential means that the research records will include some information about you and this information will be stored in such a manner that there is some linkage between your identity (as deduced but not specified) and the response in the research. The information collected about you includes your opinions about climate change risks, ratings of concern about climate change impacts and your assessment of the needs for various climate adaptation programs. Please note that we will keep this information confidential by not including your name in the data records, limiting individual access to the research data and keeping it in a secure location. The research team and the Institutional Review Board (a committee that reviews research studies in order to protect research participants) at Rutgers are the only parties that will be allowed to see the data, except as may be required by law. If a report of this study is published, or the results are presented at a professional conference, only group results will be stated. All study data will be kept for three years. The benefits of completing the survey are that you will contribute to further knowledge and insight about impacts to New Jersey from climate change and help to inform the development and prioritization of resources needed to support new or expanded programs or policies to address these impacts. The survey should take about 10-15 minutes to complete. Participation is completely voluntary and refusal to participate will result in no penalties. You may opt out of completion of the survey at any time while taking it. If you have questions related to the research, please contact Jeanne Herb, Associate Director of the Environmental Analysis and Communication group, 33 Livingston Ave., New Brunswick, NJ 08901, 848-932-2725, jherb@ejb.rutgers.edu. If you have questions about your rights as a research subject, you may contact the IRB Administrator at Rutgers University at:

Subjects	Rutgers University Institutional Review Board for the Protection of Human	
Plaza	Office of Research and Sponsored Programs	3 Rutgers
0150	New Brunswick, NJ 08901-8559	Tel: 838 932
	Email: humansubjects@orsp.rutgers.edu	

- I have read and understand the risks and benefits of this research and agree to participate by typing my initials in this box. _____

Q36 This questionnaire is designed to: Elicit the views of your company regarding the state of its preparedness and resiliency and that of your industry sector in the face of changing climate patterns; Identify any specific needs you foresee to enable better adaptation to climate changes and Ascertain what public policy recommendations you believe the State of New Jersey should consider to enhance the ability of your company and sector to fulfill your service obligations and adapt to climate changes. Companies in the water, wastewater, telecommunications, cable television, electric and natural gas sectors have agreed to participate, with separate surveys being circulated tailored to each sector. Participation is voluntary and the survey responses will be held confidential, i.e., neither individuals nor companies will be identified. To help us achieve confidentiality, we ask that you not include in your responses any information that would identify you or your company affiliation. Thank you in advance for your participation!

Q32 Please identify the level of your position within your company:

- Senior Executive (president, CEO, General Manager, COO)
- Senior Manager (vice president, administrator, director)
- Manager
- Other

Q2 Within which of these functional areas do you work?

- Senior Executive / Management
- Operations
- Rates / Regulatory Affairs
- Customer Service
- Government Affairs
- Construction Management
- Emergency Preparedness
- Public Policy
- Environmental Affairs
- Finance / Accounting
- Planning
- Engineering
- Research & Development
- Marketing
- Legal
- Other _____

Q5 How long have you been in your current position?

- 1 - 5 years
- 6 - 10 years
- 11 - 20 years
- More than 20 years

Q37 How long have you been with your current employer?

- 1 - 5 years
- 6 - 10 years
- 11 - 20 years
- More than 20 years

Q34 How long has your company (or its predecessor) provided service in New Jersey?

- More than 100 years
- 50 - 100 years
- 25 - 50 years
- Less than 25 years

Q33 What is the primary type of community served by your company?

- Rural
- Suburban
- Urban
- Coastal
- Mixed (two or more of the above)

Q6 Do you live in New Jersey?

- Yes
- No

Q5 Do you Strongly Agree, Agree, Disagree or Strongly Disagree (or Don't Know) with the following statements?

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know
Global climate change is not occurring.	<input type="radio"/>				
Global climate change is mostly caused by human activity.	<input type="radio"/>				
Global climate change is a risk to New Jersey.	<input type="radio"/>				
Global climate change is a risk to me, my family, and my friends.	<input type="radio"/>				
The international scientific community understands the science behind global climate change.	<input type="radio"/>				
I trust the scientific community to truthfully report their findings related to climate	<input type="radio"/>				

change.					
Our state and local officials understand the implications of global climate change for my region.	<input type="radio"/>				
The media I rely on communicate honestly with us about global climate change.	<input type="radio"/>				
State and local officials understand the implications of global climate change for my company's geographic service territory.	<input type="radio"/>				
State and local officials understand the implications of global climate change for my industry sector.	<input type="radio"/>				
It is possible for public policymakers to develop adaptations to climate change	<input type="radio"/>				

<p>to minimize adverse effects.</p> <p>It is possible for companies to develop adaptations to climate change to minimize adverse effects.</p>	<input type="radio"/>				
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Q38 Do you Strongly Agree, Agree, Disagree, or Strongly Disagree with the following statements?

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know
My company has taken a public position regarding climate change.	<input type="radio"/>				
My company's position regarding climate change is that it is occurring and is mostly caused by human activity.	<input type="radio"/>				
My company's position regarding climate change is that it is not occurring.	<input type="radio"/>				
My company's position regarding climate change is that it is occurring and is primarily a natural phenomenon that occurs cyclically.	<input type="radio"/>				
My company's	<input type="radio"/>				

Q6 Please rate how concerned your company is about the following potential climate change related impacts on its ability to provide safe, reliable and adequate service:

	Great Concern	Some Concern	Little Concern	No Concern	Not applicable	Don't Know
Higher average ambient air temperature	<input type="radio"/>					
Increased frequency and intensity of severe storms	<input type="radio"/>					
Decreased annual water demand	<input type="radio"/>					
Increased occurrence and severity of coastal flooding	<input type="radio"/>					
Increased occurrence and severity of inland flooding	<input type="radio"/>					
Increased coastal erosion	<input type="radio"/>					
Increased tidal wetland erosion/loss	<input type="radio"/>					
Increased presence of saltwater due to storm surge	<input type="radio"/>					
Increased inundation of low-lying	<input type="radio"/>					

infrastructure						
Physical damage to critical utility infrastructure	<input type="radio"/>					
Need to rethink and revise asset management plans/strategies	<input type="radio"/>					
Difficulty with contingency planning due to lack of experience	<input type="radio"/>					
Unpredictability of weather patterns	<input type="radio"/>					
Increase in severity and length of unplanned service interruptions	<input type="radio"/>					
Integrity of distribution assets (gas leaks/fire hazard)	<input type="radio"/>					
Loss of distribution assets due to permanent damage	<input type="radio"/>					
Integrity of manufactured	<input type="radio"/>					

gas plant remediation sites						
Increased corrosion of critical facilities and equipment	<input type="radio"/>					
Increased replacement cycles for critical facilities and equipment	<input type="radio"/>					
Increased heat stress/stroke (for field workers)	<input type="radio"/>					
Other	<input type="radio"/>					

Q24 Was your service area harmed by Hurricane Irene (2011)?

- Yes
- No

Q11 If yes, in what ways? Select all that apply:

- Deaths (Customer/General Public)
- Deaths (Employee/Contractor)
- Injuries caused by event or response
- Short-term power loss (48 hours or less)
- Longer-term power loss (more than 48 hours)
- Short-term water supply loss (48 hours or less)
- Longer-term water supply loss (more than 48 hours)
- Short-term sewer service loss (48 hours or less)
- Longer-term sewer service loss (more than 48 hours)
- Severe flooding
- Minor flooding
- Major property damage (customers/community)
- Minor property damage (customers/community)
- Major property damage (my organization)
- Minor property damage (my organization)
- Road closures
- Resident evacuation
- Business closures
- Other _____

Q12 Was your service area harmed by Hurricane Sandy (2012)?

- Yes
- No

Q13 If yes, in what ways? Select all that apply:

- Deaths (Customer/General Public)
- Deaths (Employee/Contractor)
- Injuries caused by event or response
- Short-term power loss (48 hours or less)
- Longer-term power loss (more than 48 hours)
- Short-term water supply loss (48 hours or less)
- Longer-term water supply loss (more than 48 hours)
- Short-term sewer service loss (48 hours or less)
- Longer-term sewer service loss (more than 48 hours)
- Severe flooding
- Minor flooding
- Major property damage (customers/community)
- Minor property damage (customers/community)
- Major property damage (my organization)
- Minor property damage (my organization)
- Road closures
- Resident evacuation
- Business closures
- Other _____

Q28 Of the following climate change adaptations, which have your company put in place, planned, or are needed for your service territory?

	In Place	Planned	Not Planned but Needed	Not Needed	Don't Know	Not Applicable
Local climate adaptation plans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hazard mitigation plans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vulnerability assessments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emergency preparedness plans that incorporate climate changes and local capacities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contingency plans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Heat warning system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Customer communication plan for outages	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Crisis and emergency response risk communication system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public and	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

employee awareness campaign on emergency preparedness						
Stockpiling of supplies (fuel, food, water, medicine)	<input type="radio"/>					
Green infrastructure (e.g. riparian buffers, living shorelines, native landscaping, tree planting, wetland restoration, etc.)	<input type="radio"/>					
Capital improvement and maintenance plans which incorporate climate change	<input type="radio"/>					
Raising, relocating, or flood-proofing capital facilities prone to flooding or storm surges	<input type="radio"/>					
Other	<input type="radio"/>					

Q15 What are the most important actions/programs needed at the regional, state or national level to support your company's efforts to prepare and respond to climate change impacts?

	High Need	Some Need	Little or No Need	Don't Know
Regulatory programs to encourage the accelerated replacement of aging infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clear policy direction with supporting incentives to expedite hardening and resiliency measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enhanced weather forecasting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved climate and weather modeling capacity for local scale assessments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Critical infrastructure assessments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved coordination between utilities (mutual aid) and state resources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clearly established emergency response lines of	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

communication				
Improved planning, coordination, and communication across and between utilities and state and local governments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rapid response system for extreme weather events	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Training of local government officials as to the constraints affecting restoration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Resilient emergency communications infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enhanced GIS and LiDAR data	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Development of innovative funding strategies to implement adaptation measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Updated regulations or guidelines addressing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

floodplains				
Shoreline change data and projections	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inland waterways change data and projections	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Assistance with pre-positioning of equipment and stockpiling of supplies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Updated or new regulations addressing emergency planning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Updated or new regulations addressing infrastructure upgrades	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Updated or new regulations addressing floodplain delineation revision	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Updated or new regulations addressing hazard mitigation planning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q29 What does your company most need to prepare for and be ready to respond to climate change impacts over the coming decades?

Q17 What are the biggest challenges for your company to achieving greater preparedness for climate change?

Q18 Please rank climate change adaptation needs in importance among these other challenges. (Drag and drop to rank 1 to 5 with 1 being most important and 5 being least important):

- _____ Achieving Revenue Targets
- _____ Asset Management
- _____ Meeting Customer Service Expectations
- _____ Managing Rates / Rate Cases
- _____ Climate Change Adaptation Needs

Q35 In your opinion, on a scale of 1 to 4 (1 being “not at all prepared” and 4 being “extremely well prepared”), please rate the following:

	Not at all prepared	Somewhat prepared	Adequately prepared	Extremely well prepared	Don't Know
The preparedness of your company for a major storm event prior to Hurricane Irene	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The preparedness of your company for a major storm event post Hurricane Sandy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q39 Which choice below best represents the current level of asset management implementation in your company?

- None
- Minimal (some implementation regarding tracking and assessing assets)
- Partial (implemented some specific asset management tools for managing risk and reducing lifecycle costs, and are developing an asset management plan)
- Significant (developed an asset management plan and initiated substantive implementation)
- Full (fully implemented a long-term asset management plan)
- Don't Know

Q40 Which of the following software packages are being used to track assets by the utility which with you are most closely associated? Choose all that apply:

- Database or spreadsheet
- CMMS (Computerized Maintenance Management System)
- GIS (Geographic Information System: digital mapping associated with system information)
- FMS (Financial Management System)
- USEPA CUPPS (Check Up Program for Small Systems)
- Custom-designed Asset Management Program
- Other _____
- None of the above
- Don't Know

Q41 Rate the value of asset management programs for the following purposes on a scale from 1 to 5 (1 being “Adversely” and 5 being “Dramatically Beneficial”) for your company:

	Adversely	Somewhat Adversely	No Effect	Somewhat Beneficial	Dramatically Beneficial	Don't Know
Improve coordination, communications and operation of the utility	<input type="radio"/>	<input type="radio"/>				
Assist with knowledge retention and information transfer within the utility	<input type="radio"/>	<input type="radio"/>				
Prolong asset life and value	<input type="radio"/>	<input type="radio"/>				
Assist with managing risk	<input type="radio"/>	<input type="radio"/>				
Improve regulatory compliance	<input type="radio"/>	<input type="radio"/>				
Improve security and safety of assets, employees and the general public	<input type="radio"/>	<input type="radio"/>				
Reduce disruptions to service and protect against business risk exposure	<input type="radio"/>	<input type="radio"/>				
Assist with	<input type="radio"/>	<input type="radio"/>				

<p>decision making approaches for capital improvements</p> <p>Reduce operating and maintenance costs and long-term capital expenditures</p> <p>Assist with public confidence and developing justifiable rates</p> <p>Improve the utility's bond rating, lower interest rates and lower insurance premiums</p>	○	○	○	○	○	○
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Q42 Which of the following actions or techniques are being used by your company to reduce energy demand, provide alternative energy sources and/or provide for back up supply in the event of a service interruption? Choose all that apply:

- Energy audits for buildings
- Building upgrades for energy conservation
- Replacement of capital equipment with energy-efficient equipment
- Contracts for third-party installation of energy conservation measures
- Installation of solar energy systems
- Installation of wind energy systems
- Installation or expansion of auxiliary generators
- Installation or expansion of fuel storage
- Agreements or contracts for emergency generators
- Agreements or contracts for emergency fuel
- Other _____
- Don't Know

Q43 Which, if any, of the following measures has your company employed to reduce its contribution to climate change? Select all that apply:

- Installation of solar energy systems
- Energy conservation measures
- Fuel switching (e.g. oil or propane to natural gas)
- Building modifications for energy efficiency
- Use of electric fleet vehicles
- Use of natural gas/CNG powered fleet vehicles
- Gas leak measurement and prevention
- Offering of customer side conservation measures
- Don't Know

Q44 Please respond to the following statements related to the financial impacts of climate change.

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know
My company quantifies and separately identifies expenses related to climate change impacts and/or adaptations.	<input type="radio"/>				
I believe that for the future my company should quantify and separately identify expenses related to climate change impacts and/or adaptations (if it does not currently do so).	<input type="radio"/>				

Q45 Considering all of the major storm events that affected its operations in the past 3 years including including Hurricane Irene, the Halloween snow storm, and Superstorm Sandy, and irrespective of whether your company attributes these events to climate change or not, in the aggregate, your company has spent approximately how much to restore service (include all costs)?

- More than \$100 million
- \$50 - 100 million
- \$25 - 50 million
- \$10 - 25 million
- \$1 - 10 million
- Less than \$1 million
- Don't Know

Appendix C: Gas Utilities Questionnaire

Preparing for Climate Change Impacts in New Jersey: Natural Gas Utilities - Aug 27

Q1 Please read the following information and sign electronically in the box below, indicating your informed consent. Thank you for agreeing to participate in this online survey. This research is being conducted by Rutgers University in conjunction with the New Jersey Climate Adaptation Alliance. Representatives from New Jersey's natural gas providers are being asked to participate. The purpose of the survey is to obtain data to assess New Jersey's most pressing concerns resulting from climate change, and to help to prioritize a set of program, planning and policy adaptations that are necessary to prepare for and mitigate these impacts. There are no reasonable or discernible risks to your participation in this study. We are not asking for your name on the survey, and will only utilize information collected in summary form to categorize or further explain important differences. If we are able to deduce your identity, the research will be confidential. Confidential means that the research records will include some information about you and this information will be stored in such a manner that there is some linkage between your identity (as deduced but not specified) and the response in the research. The information collected about you includes your opinions about climate change risks, ratings of concern about climate change impacts and your assessment of the needs for various climate adaptation programs. Please note that we will keep this information confidential by not including your name in the data records, limiting individual access to the research data and keeping it in a secure location. The research team and the Institutional Review Board (a committee that reviews research studies in order to protect research participants) at Rutgers are the only parties that will be allowed to see the data, except as may be required by law. If a report of this study is published, or the results are presented at a professional conference, only group results will be stated. All study data will be kept for three years. The benefits of completing the survey are that you will contribute to further knowledge and insight about impacts to New Jersey from climate change and help to inform the development and prioritization of resources needed to support new or expanded programs or policies to address these impacts. The survey should take about 10-15 minutes to complete. Participation is completely voluntary and refusal to participate will result in no penalties. You may opt out of completion of the survey at any time while taking it. If you have questions related to the research, please contact Jeanne Herb, Associate Director of the Environmental Analysis and Communication group, 33 Livingston Ave., New Brunswick, NJ 08901, 848-932-2725, jherb@ejb.rutgers.edu. If you have questions about your rights as a research subject, you may contact the IRB Administrator at Rutgers University at:

Subjects	Rutgers University Institutional Review Board for the Protection of Human	
Plaza	Office of Research and Sponsored Programs	3 Rutgers
0150	New Brunswick, NJ 08901-8559	Tel: 838 932
	Email: humansubjects@orsp.rutgers.edu	

- I have read and understand the risks and benefits of this research and agree to participate by typing my initials in this box. _____

Q36 This questionnaire is designed to: Elicit the views of your company regarding the state of its preparedness and resiliency and that of your industry sector in the face of changing climate patterns; Identify any specific needs you foresee to enable better adaptation to climate changes and Ascertain what public policy recommendations you believe the State of New Jersey should consider to enhance the ability of your company and sector to fulfill your service obligations and adapt to climate changes. Companies in the water, wastewater, telecommunications, cable television, electric and natural gas sectors have agreed to participate, with separate surveys being circulated tailored to each sector. Participation is voluntary and the survey responses will be held confidential, i.e., neither individuals nor companies will be identified. To help us achieve confidentiality, we ask that you not include in your responses any information that would identify you or your company affiliation. Thank you in advance for your participation!

Q32 Please identify the level of your position within your company:

- Senior Executive (president, CEO, General Manager, COO)
- Senior Manager (vice president, administrator, director)
- Manager
- Other

Q2 Within which of these functional areas do you work?

- Senior Executive / Management
- Operations
- Rates / Regulatory Affairs
- Customer Service
- Government Affairs
- Construction Management
- Emergency Preparedness
- Public Policy
- Environmental Affairs
- Finance / Accounting
- Planning
- Engineering
- Research & Development
- Marketing
- Legal
- Other _____

Q5 How long have you been in your current position?

- 1 - 5 years
- 6 - 10 years
- 11 - 20 years
- More than 20 years

Q37 How long have you been with your current employer?

- 1 - 5 years
- 6 - 10 years
- 11 - 20 years
- More than 20 years

Q34 How long has your company (or its predecessor) provided service in New Jersey?

- More than 100 years
- 50 - 100 years
- 25 - 50 years
- Less than 25 years

Q33 What is the primary type of community served by your company?

- Rural
- Suburban
- Urban
- Coastal
- Mixed (two or more of the above)

Q6 Do you live in New Jersey?

- Yes
- No

Q5 Do you Strongly Agree, Agree, Disagree or Strongly Disagree (or Don't Know) with the following statements?

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know
Global climate change is not occurring.	<input type="radio"/>				
Global climate change is mostly caused by human activity.	<input type="radio"/>				
Global climate change is a risk to New Jersey.	<input type="radio"/>				
Global climate change is a risk to me, my family, and my friends.	<input type="radio"/>				
The international scientific community understands the science behind global climate change.	<input type="radio"/>				
I trust the scientific community to truthfully report their findings related to climate	<input type="radio"/>				

change.					
Our state and local officials understand the implications of global climate change for my region.	<input type="radio"/>				
The media I rely on communicate honestly with us about global climate change.	<input type="radio"/>				
State and local officials understand the implications of global climate change for my company's geographic service territory.	<input type="radio"/>				
State and local officials understand the implications of global climate change for my industry sector.	<input type="radio"/>				
It is possible for public policymakers to develop adaptations to climate change	<input type="radio"/>				

<p>to minimize adverse effects.</p> <p>It is possible for companies to develop adaptations to climate change to minimize adverse effects.</p>	<input type="radio"/>				
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Q38 Do you Strongly Agree, Agree, Disagree, or Strongly Disagree with the following statements?

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know
My company has taken a public position regarding climate change.	<input type="radio"/>				
My company's position regarding climate change is that it is occurring and is mostly caused by human activity.	<input type="radio"/>				
My company's position regarding climate change is that it is not occurring.	<input type="radio"/>				
My company's position regarding climate change is that it is occurring and is primarily a natural phenomenon that occurs cyclically.	<input type="radio"/>				
My company's	<input type="radio"/>				

Q6 OPERATIONAL IMPACTS Please rate how concerned your company is about the following potential climate change related impacts on its ability to provide safe, reliable and adequate service:

	Great Concern	Some Concern	Little Concern	No Concern	Not applicable	Don't Know
Higher average ambient air temperature	<input type="radio"/>					
Increased frequency and intensity of severe storms	<input type="radio"/>					
Increased occurrence and severity of coastal flooding	<input type="radio"/>					
Increased occurrence and severity of inland flooding	<input type="radio"/>					
Increased coastal erosion	<input type="radio"/>					
Increased tidal wetland erosion/loss	<input type="radio"/>					
Increased presence of saltwater due to storm surge	<input type="radio"/>					
Increased inundation of low-lying infrastructure	<input type="radio"/>					
Physical	<input type="radio"/>					

damage to critical infrastructure						
Need to rethink and revise asset management plans/strategies	<input type="radio"/>					
Difficulty with contingency planning due to lack of experience	<input type="radio"/>					
Unpredictability of weather patterns	<input type="radio"/>					
Increase in severity and length of unplanned service interruptions	<input type="radio"/>					
Integrity of distribution assets (gas leaks/fire hazard)	<input type="radio"/>					
Loss of distribution assets due to permanent damage	<input type="radio"/>					
Increased corrosion of critical facilities and equipment	<input type="radio"/>					

Increased replacement cycles for critical facilities and equipment	<input type="radio"/>					
Increased heat stress/stroke (for field workers)	<input type="radio"/>					
Other	<input type="radio"/>					

Q24 Was your service area harmed by Hurricane Irene (2011)?

- Yes
- No

Q11 If yes, in what ways? Select all that apply:

- Deaths (Customer/General Public)
- Deaths (Employee/Contractor)
- Injuries caused by event or response
- Short-term power loss (48 hours or less)
- Longer-term power loss (more than 48 hours)
- Severe flooding
- Minor flooding
- Major property damage (customers/community)
- Minor property damage (customers/community)
- Major property damage (my company)
- Minor property damage (my company)
- Road closures
- Resident evacuation
- Business closures
- Other _____

Q12 Was your service area harmed by Hurricane Sandy (2012)?

- Yes
- No

Q13 If yes, in what ways? Select all that apply:

- Deaths (Customer/General Public)
- Deaths (Employee/Contractor)
- Injuries caused by event or response
- Short-term power loss (48 hours or less)
- Longer-term power loss (more than 48 hours)
- Severe flooding
- Minor flooding
- Major property damage (customers/community)
- Minor property damage (customers/community)
- Major property damage (my company)
- Minor property damage (my company)
- Road closures
- Resident evacuation
- Business closures
- Other _____

Q28 ADAPTATION AND PREPAREDNESS STRATEGIES Of the following climate change adaptations, which have your company put in place, planned, or are needed for your service territory?

	In Place	Planned	Not Planned but Needed	Not Needed	Don't Know	Not Applicable
Local climate adaptation plans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hazard mitigation plans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vulnerability assessments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Emergency preparedness plans that anticipate climate change impacts and local capacities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contingency plans	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Heat warning system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Customer communication plan for outages	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Crisis and emergency response risk communication system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Public and employee awareness campaign on emergency preparedness	<input type="radio"/>					
Stockpiling of supplies (fuel, food, water, medicine)	<input type="radio"/>					
Green infrastructure (e.g. riparian buffers, living shorelines, native landscaping, tree planting, wetland restoration, etc.)	<input type="radio"/>					
Capital improvement and maintenance plans which incorporate climate change	<input type="radio"/>					
Raising, relocating, or flood-proofing capital facilities prone to flooding or storm surges	<input type="radio"/>					
Other	<input type="radio"/>					

Q15 What are the most important actions/programs needed at the regional, state or national level to support your company's efforts to prepare and respond to climate change impacts?

	High Need	Some Need	Little or No Need	Don't Know
Regulatory programs to encourage the accelerated replacement of aging infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clear policy direction with supporting incentives to expedite hardening and resiliency measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enhanced weather forecasting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved climate and weather modeling capacity for local scale assessments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Critical infrastructure assessments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved coordination between utilities (mutual aid) and state resources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clearly established emergency response lines of	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

communication				
Improved planning, coordination, and communication across and between utilities and state and local governments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rapid response system for extreme weather events	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Training of local government officials as to the constraints affecting restoration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Resilient emergency communications infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enhanced GIS and LiDAR data	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Development of innovative funding strategies to implement adaptation measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Coastal change data and projections	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inland waterways	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

change data and projections				
Assistance with pre-positioning of equipment and stockpiling of supplies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Updated or new regulations addressing emergency planning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Updated or new regulations addressing infrastructure upgrades	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Updated regulations or guidelines addressing floodplain delineation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Updated or new regulations addressing floodplain construction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Updated or new regulations addressing hazard mitigation planning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q29 What does your company most need to prepare for and be ready to respond to climate change impacts over the coming decades?

Q17 What are the biggest challenges for your company to achieving greater preparedness for climate change?

Q18 Please rank climate change adaptation needs in importance among these other challenges. (Drag and drop to rank 1 to 5 with 1 being most important and 5 being least important):

- _____ Achieving Revenue Targets
- _____ Asset Management
- _____ Meeting Customer Service Expectations
- _____ Managing Rates / Rate Cases
- _____ Climate Change Adaptation Needs

Q35 In your opinion, on a scale of 1 to 4 (1 being “not at all prepared” and 4 being “extremely well prepared”), please rate the following:

	Not at all prepared	Somewhat prepared	Adequately prepared	Extremely well prepared	Don't Know
The preparedness of your company for a major storm event prior to Hurricane Irene	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The preparedness of your company for a major storm event post Hurricane Sandy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q39 ASSET MANAGEMENT STRATEGIES Which choice below best represents the current level of asset management implementation in your company?

- None
- Minimal (some implementation regarding tracking and assessing assets)
- Partial (implemented some specific asset management tools for managing risk and reducing lifecycle costs, and are developing an asset management plan)
- Significant (developed an asset management plan and initiated substantive implementation)
- Full (fully implemented a long-term asset management plan)
- Don't Know

Q40 Which of the following software packages are being used to track assets by the utility which with you are most closely associated? Choose all that apply:

- Database or spreadsheet
- CMMS (Computerized Maintenance Management System)
- GIS (Geographic Information System: digital mapping associated with system information)
- FMS (Financial Management System)
- USEPA CUPPS (Check Up Program for Small Systems)
- Custom-designed Asset Management Program
- Other _____
- None of the above
- Don't Know

Q41 Rate the value of asset management programs for the following purposes on a scale from 1 to 5 (1 being “Adversely” and 5 being “Dramatically Beneficial”) for your company:

	Adversely	Somewhat Adversely	No Effect	Somewhat Beneficial	Dramatically Beneficial	Don't Know
Improve coordination, communications and operation of the company	<input type="radio"/>	<input type="radio"/>				
Assist with knowledge retention and information transfer within the company	<input type="radio"/>	<input type="radio"/>				
Prolong asset life and value	<input type="radio"/>	<input type="radio"/>				
Assist with managing risk	<input type="radio"/>	<input type="radio"/>				
Improve regulatory compliance	<input type="radio"/>	<input type="radio"/>				
Improve security and safety of assets, employees and the general public	<input type="radio"/>	<input type="radio"/>				
Reduce disruptions to service and protect against business risk exposure	<input type="radio"/>	<input type="radio"/>				
Assist with	<input type="radio"/>	<input type="radio"/>				

<p>decision making approaches for capital improvements</p> <p>Reduce operating and maintenance costs and long-term capital expenditures</p> <p>Assist with public confidence and developing justifiable rates</p> <p>Improve the company's credit rating, lower interest rates and lower insurance premiums</p>	○	○	○	○	○	○
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Q42 Which of the following actions or techniques are being used by your company to reduce energy demand, provide alternative energy sources and/or provide for back up electric supply in the event of a service interruption? Choose all that apply:

- Energy audits for buildings
- Building upgrades for energy conservation
- Replacement of capital equipment with energy-efficient equipment
- Contracts for third-party installation of energy conservation measures
- Installation of solar energy systems
- Installation of wind energy systems
- Installation or expansion of auxiliary generators
- Installation or expansion of fuel storage
- Agreements or contracts for emergency generators
- Agreements or contracts for emergency fuel
- Other _____
- Don't Know

Q43 Which, if any, of the following measures has your company employed to reduce its contribution to climate change? Select all that apply:

- Installation of solar energy systems
- Energy conservation measures
- Fuel switching (e.g. oil or propane to natural gas)
- Building modifications for energy efficiency
- Use of electric fleet vehicles
- Use of natural gas/CNG powered fleet vehicles
- Gas leak measurement and prevention
- Offering of customer side conservation measures
- Don't Know

Q44 FINANCIAL IMPACTS OF CLIMATE CHANGE Please respond to the following statements related to the financial impacts of climate change.

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know
My company quantifies and separately identifies expenses related to climate change impacts and/or adaptations.	<input type="radio"/>				
I believe that for the future my company should quantify and separately identify expenses related to climate change impacts and/or adaptations (if it does not currently do so).	<input type="radio"/>				

Q45 Considering all of the major storm events that affected its operations in the past 3 years including including Hurricane Irene, the Halloween snow storm, and Superstorm Sandy, and irrespective of whether your company attributes these events to climate change or not, in the aggregate, your company has spent approximately how much to restore service (include all costs)?

- More than \$100 million
- \$50 - 100 million
- \$25 - 50 million
- \$10 - 25 million
- \$1 - 10 million
- Less than \$1 million

Appendix D: Cable/Telecommunications Questionnaire

Preparing for Climate Change Impacts in New Jersey: Cable & Telecommunications – Copy

Q1 Please read the following information and sign electronically in the box below, indicating your informed consent. Thank you for agreeing to participate in this online survey. This research is being conducted by Rutgers University in conjunction with the New Jersey Climate Adaptation Alliance. Representatives from New Jersey's cable and telecommunication providers are being asked to participate. The purpose of the survey is to obtain data to assess New Jersey's most pressing concerns resulting from climate change, and to help to prioritize a set of program, planning and policy adaptations that are necessary to prepare for and mitigate these impacts. There are no reasonable or discernible risks to your participation in this study. We are not asking for your name on the survey, and will only utilize information collected in summary form to categorize or further explain important differences. If we are able to deduce your identity, the research will be confidential. Confidential means that the research records will include some information about you and this information will be stored in such a manner that there is some linkage between your identity (as deduced but not specified) and the response in the research. The information collected about you includes your opinions about climate change risks, ratings of concern about climate change impacts and your assessment of the needs for various climate adaptation programs. Please note that we will keep this information confidential by not including your name in the data records, limiting individual access to the research data and keeping it in a secure location. The research team and the Institutional Review Board (a committee that reviews research studies in order to protect research participants) at Rutgers are the only parties that will be allowed to see the data, except as may be required by law. If a report of this study is published, or the results are presented at a professional conference, only group results will be stated. All study data will be kept for three years. The benefits of completing the survey are that you will contribute to further knowledge and insight about impacts to New Jersey from climate change and help to inform the development and prioritization of resources needed to support new or expanded programs or policies to address these impacts. The survey should take about 10-15 minutes to complete. Participation is completely voluntary and refusal to participate will result in no penalties. You may opt out of completion of the survey at any time while taking it. If you have questions related to the research, please contact Jeanne Herb, Associate Director of the Environmental Analysis and Communication group, 33 Livingston Ave., New Brunswick, NJ 08901, 848-932-2725, jherb@ejb.rutgers.edu. If you have questions about your rights as a research subject, you may contact the IRB Administrator at Rutgers University at:

Human Subjects	Rutgers University Institutional Review Board for the Protection of	
Rutgers Plaza	Office of Research and Sponsored Programs	3
0150	New Brunswick, NJ 08901-8559	Tel: 838 932
	Email: humansubjects@orsp.rutgers.edu	

- I have read and understand the risks and benefits of this research and agree to participate by typing my initials in this box. _____

Q36 This questionnaire is designed to: Elicit the views of your company regarding the state of its preparedness and resiliency and that of your industry sector in the face of changing climate patterns; Identify any specific needs you foresee to enable better adaptation to climate changes and Ascertain what public policy recommendations you believe the State of New Jersey should consider to enhance the ability of your company and sector to fulfill your service obligations and adapt to climate changes. Companies in the water, wastewater, telecommunications, cable television, electric and natural gas sectors have agreed to participate, with separate surveys being circulated tailored to each sector. Participation is voluntary and the survey responses will be held confidential, i.e., neither individuals nor companies will be identified. To help us achieve confidentiality, we ask that you not include in your responses any information that would identify you or your company affiliation. Thank you in advance for your participation!

Q46 Please identify the primary sector in which you work:

- Cable television company (multi-channel video is legacy/primary business)
 Telephone company (wireline telephone service is legacy/primary business)

Q32 Please identify the level of your position within your company:

- Senior Executive (president, CEO, General Manager, COO)
 Senior Manager (vice president, administrator, director)
 Manager
 Other

Q2 Within which of these functional areas do you work?

- Senior Executive / Management
- Operations
- Rates / Regulatory Affairs
- Customer Service
- Government Affairs
- Construction Management
- Emergency Preparedness
- Public Policy
- Environmental Affairs
- Finance / Accounting
- Planning
- Engineering
- Research & Development
- Marketing
- Legal
- Other _____

Q5 How long have you been in your current position?

- 1 - 5 years
- 6 - 10 years
- 11 - 20 years
- More than 20 years

Q37 How long have you been with your current employer?

- 1 - 5 years
- 6 - 10 years
- 11 - 20 years
- More than 20 years

Q34 How long has your company (or its predecessor) provided service in New Jersey?

- More than 100 years
- 50 - 100 years
- 25 - 50 years
- Less than 25 years

Q33 What is the primary type of community served by your company?

- Rural
- Suburban
- Urban
- Coastal
- Mixed (two or more of the above)

Q6 Do you live in New Jersey?

- Yes
- No

Q5 Do you Strongly Agree, Agree, Disagree or Strongly Disagree (or Don't Know) with the following statements?

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know
Global climate change is not occurring.	<input type="checkbox"/>				
Global climate change is mostly caused by human activity.	<input type="checkbox"/>				
Global climate change is a risk to New Jersey.	<input type="checkbox"/>				
Global climate change is a risk to me, my family, and my friends.	<input type="checkbox"/>				
The international scientific community understands the science behind global climate change.	<input type="checkbox"/>				
I trust the scientific community to truthfully report their findings related to climate	<input type="checkbox"/>				

change.					
Our state and local officials understand the implications of global climate change for my region.	<input type="checkbox"/>				
The media I rely on communicate honestly with us about global climate change.	<input type="checkbox"/>				
State and local officials understand the implications of global climate change for my company's geographic service territory.	<input type="checkbox"/>				
State and local officials understand the implications of global climate change for my industry sector.	<input type="checkbox"/>				
It is possible for public policymakers to develop adaptations to climate change	<input type="checkbox"/>				

<p>to minimize adverse effects.</p> <p>It is possible for companies to develop adaptations to climate change to minimize adverse effects.</p>	<input type="checkbox"/>				
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Q38 Do you Strongly Agree, Agree, Disagree, or Strongly Disagree with the following statements?

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know
My company has taken a public position regarding climate change.	<input type="checkbox"/>				
My company's position regarding climate change is that it is occurring and is mostly caused by human activity.	<input type="checkbox"/>				
My company's position regarding climate change is that it is not occurring.	<input type="checkbox"/>				
My company's position regarding climate change is that it is occurring and is primarily a natural phenomenon that occurs cyclically.	<input type="checkbox"/>				

<p>My company's position regarding climate change is that it is occurring but it takes no position as to the cause.</p>	<input type="checkbox"/>				
<p>My company has the knowledge and ability to identify and adopt climate change adaptations to minimize adverse impacts on its operations.</p>	<input type="checkbox"/>				
<p>My company needs the support of state government to identify and adopt climate change adaptations to minimize adverse impacts on its operations.</p>	<input type="checkbox"/>				

Q6 OPERATIONAL IMPACTS Please rate how concerned your company is about the following potential climate change related impacts on its ability to provide safe, reliable and adequate service:

	Great Concern	Some Concern	Little Concern	No Concern	Not applicable	Don't know
Higher average ambient air temperature	<input type="checkbox"/>					
Increased frequency and intensity of severe storms	<input type="checkbox"/>					
Decreased annual water demand	<input type="checkbox"/>					
Increased occurrence and severity of coastal flooding	<input type="checkbox"/>					
Increased occurrence and severity of inland flooding	<input type="checkbox"/>					
Increased coastal erosion	<input type="checkbox"/>					
Increased tidal wetland erosion/loss	<input type="checkbox"/>					
Increased presence of saltwater due to storm surge	<input type="checkbox"/>					
Increased inundation of	<input type="checkbox"/>					

low-lying infrastructure						
Physical damage to critical infrastructure	<input type="checkbox"/>					
Need to rethink and revise asset management plans/strategies	<input type="checkbox"/>					
Difficulty with contingency planning due to lack of experience	<input type="checkbox"/>					
Unpredictability of weather patterns	<input type="checkbox"/>					
Increase in severity and length of unplanned service interruptions	<input type="checkbox"/>					
Integrity of service delivery assets	<input type="checkbox"/>					
Loss of service delivery assets due to permanent damage	<input type="checkbox"/>					
Increased corrosion of critical facilities	<input type="checkbox"/>					

and equipment						
Increased replacement cycles for critical facilities and equipment	<input type="checkbox"/>					
Increased heat stress/stroke (for field workers)	<input type="checkbox"/>					
Other	<input type="checkbox"/>					

Q24 Was your service area harmed by Hurricane Irene (2011)?

- Yes
- No

Q11 If yes, in what ways? Select all that apply:

- Deaths (Customer/General Public)
- Deaths (Employee/Contractor)
- Injuries caused by event or response
- Short-term power loss (48 hours or less)
- Longer-term power loss (more than 48 hours)
- Severe flooding
- Minor flooding
- Major property damage (customers/community)
- Minor property damage (customers/community)
- Major property damage (my company)
- Minor property damage (my company)
- Road closures
- Resident evacuation
- Business closures
- Other _____

Q12 Was your service area harmed by Hurricane Sandy (2012)?

- Yes
- No

Q13 If yes, in what ways? Select all that apply:

- Deaths (Customer/General Public)
- Deaths (Employee/Contractor)
- Injuries caused by event or response
- Short-term power loss (48 hours or less)
- Longer-term power loss (more than 48 hours)
- Severe flooding
- Minor flooding
- Major property damage (customers/community)
- Minor property damage (customers/community)
- Major property damage (my company)
- Minor property damage (my company)
- Road closures
- Resident evacuation
- Business closures
- Other _____

Q28 ADAPTATION AND PREPAREDNESS STRATEGIES Of the following climate change adaptations, which have your company put in place, planned, or are needed for your service territory?

	In Place	Planned	Not Planned but Needed	Not Needed	Don't Know	Not Applicable
Local climate adaptation plans	<input type="checkbox"/>					
Hazard mitigation plans	<input type="checkbox"/>					
Vulnerability assessments	<input type="checkbox"/>					
Emergency preparedness plans that anticipate climate change impacts and local capacities	<input type="checkbox"/>					
Contingency plans	<input type="checkbox"/>					
Heat warning system	<input type="checkbox"/>					
Customer communication plan for outages	<input type="checkbox"/>					
Crisis and emergency response risk communication system	<input type="checkbox"/>					

Public and employee awareness campaign on emergency preparedness	<input type="checkbox"/>					
Stockpiling of supplies (fuel, food, water, medicine)	<input type="checkbox"/>					
Green infrastructure (e.g. riparian buffers, living shorelines, native landscaping, tree planting, wetland restoration, etc.)	<input type="checkbox"/>					
Capital improvement and maintenance plans which incorporate climate change	<input type="checkbox"/>					
Raising, relocating, or flood-proofing capital facilities prone to flooding or storm surges	<input type="checkbox"/>					
Backup power supplies	<input type="checkbox"/>					

Self-healing, redundant networks	<input type="checkbox"/>					
Other	<input type="checkbox"/>					

Q15 What are the most important actions/programs needed at the regional, state or national level to support your company's efforts to prepare and respond to climate change impacts?

	High Need	Some Need	Little or No Need	Don't Know
Clear policy direction with supporting incentives to expedite hardening and resiliency measures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enhanced weather forecasting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improved climate and weather modeling capacity for local scale assessments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Critical infrastructure assessments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improved coordination and communication with utilities and state and local governments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clearly established emergency response lines of communication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rapid response system for extreme weather events	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Training of local government officials as to the constraints affecting restoration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Resilient emergency communications infrastructure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enhanced GIS and LiDAR data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Development of innovative funding strategies to implement adaptation measures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coastal change data and projections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inland waterways change data and projections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Assistance with pre-positioning of equipment and stockpiling of supplies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Updated or new regulations to allow greater flexibility in how service is delivered	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Updated or new regulations addressing emergency planning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Updated or new regulations addressing infrastructure upgrades	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Updated regulations or guidelines addressing floodplain delineation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Updated or new regulations addressing floodplain construction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Updated or new regulations addressing hazard mitigation planning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q29 What does your company most need to prepare for and be ready to respond to climate change impacts over the coming decades?

Q17 What are the biggest challenges for your company to achieving greater preparedness for climate change?

Q18 Please rank climate change adaptation needs in importance among these other challenges. (Drag and drop to rank 1 to 6 with 1 being most important and 6 being least important):

- _____ Climate Adaptation Needs
- _____ Need for Reduced State Regulation
- _____ Competition
- _____ Achieving Revenue Targets
- _____ Asset Management
- _____ Meeting Customer Price and Service Expectations

Q35 In your opinion, on a scale of 1 to 4 (1 being “not at all prepared” and 4 being “extremely well prepared”), please rate the following:

	Not at all prepared	Somewhat prepared	Adequately prepared	Extremely well prepared	Don't know
The preparedness of your company for a major storm event prior to Hurricane Irene	<input type="checkbox"/>				
The preparedness of your company for a major storm event post Hurricane Sandy	<input type="checkbox"/>				

Q39 ASSET MANAGEMENT STRATEGIES Which choice below best represents the current level of asset management implementation in your company?

- None
- Minimal (some implementation regarding tracking and assessing assets)
- Partial (implemented some specific asset management tools for managing risk and reducing lifecycle costs, and are developing an asset management plan)
- Significant (developed an asset management plan and initiated substantive implementation)
- Full (fully implemented a long-term asset management plan)
- Don't Know

Q40 Which of the following software packages are being used to track assets by the utility which with you are most closely associated? Choose all that apply:

- Database or spreadsheet
- CMMS (Computerized Maintenance Management System)
- GIS (Geographic Information System: digital mapping associated with system information)
- FMS (Financial Management System)
- USEPA CUPPS (Check Up Program for Small Systems)
- Custom-designed Asset Management Program
- Other _____
- None of the above
- Don't Know

Q41 Rate the value of asset management programs for the following purposes on a scale from 1 to 5 (1 being “Adversely” and 5 being “Dramatically Beneficial”) for your company:

	Adversely	Somewhat Adversely	No Effect	Somewhat Beneficial	Dramatically Beneficial	Don't know
Improve coordination, communications and operation of the company	<input type="checkbox"/>					
Assist with knowledge retention and information transfer within the company	<input type="checkbox"/>					
Prolong asset life and value	<input type="checkbox"/>					
Assist with managing risk	<input type="checkbox"/>					
Improve regulatory compliance	<input type="checkbox"/>					
Improve security and safety of assets, employees and the general public	<input type="checkbox"/>					
Reduce disruptions to service and protect against business risk exposure	<input type="checkbox"/>					

Assist with decision making approaches for capital improvements	<input type="checkbox"/>					
Reduce operating and maintenance costs and long-term capital expenditures	<input type="checkbox"/>					
Assist with public confidence and developing justifiable rates	<input type="checkbox"/>					
Improve the company's credit rating, lower interest rates and lower insurance premiums	<input type="checkbox"/>					

Q47 Electricity costs constitute the following percentage of total operational costs for your company's New Jersey operations:

- Less than 5%
- 5 - 10%
- 10 - 15%
- 15 - 20%
- 20% or greater
- Don't know

Q42 Which of the following actions or techniques are being used by your company to reduce energy demand, provide alternative energy sources and/or provide for back up electric supply in the event of a service interruption? Choose all that apply:

- Energy audits for buildings
- Building upgrades for energy conservation
- Replacement of capital equipment with energy-efficient equipment
- Contracts for third-party installation of energy conservation measures
- Installation of solar energy systems
- Installation of wind energy systems
- Installation or expansion of auxiliary generators
- Installation or expansion of fuel storage
- Agreements or contracts for emergency generators
- Agreements or contracts for emergency fuel
- Other _____
- Don't Know

Q43 Which, if any, of the following measures has your company employed to reduce its contribution to climate change? Select all that apply:

- Installation of solar energy systems
- Energy conservation measures
- Fuel switching (e.g. oil or propane to natural gas)
- Building modifications for energy efficiency
- Use of electric fleet vehicles
- Use of natural gas/CNG powered fleet vehicles
- Gas leak measurement and prevention
- Offering of customer side conservation measures
- Don't Know

Q44 FINANCIAL IMPACTS OF CLIMATE CHANGE Please respond to the following statements related to the financial impacts of climate change.

	Strongly Agree	Agree	Disagree	Strongly Disagree	Don't Know
My company quantifies and separately identifies expenses related to climate change impacts and/or adaptations.	<input type="checkbox"/>				
I believe that for the future my company should quantify and separately identify expenses related to climate change impacts and/or adaptations (if it does not currently do so).	<input type="checkbox"/>				

Q45 Considering all of the major storm events that affected its operations in the past 3 years including including Hurricane Irene, the Halloween snow storm, and Superstorm Sandy, and irrespective of whether your company attributes these events to climate change or not, in the aggregate, your company has spent approximately how much to restore service (include all costs)?

- More than \$100 million
- \$50 - 100 million
- \$25 - 50 million
- \$10 - 25 million
- \$1 - 10 million
- Less than \$1 million
- Don't know