



# **Should Public Utilities Compensate Customers for Service Interruptions?**

**Ken Costello, Principal Researcher  
National Regulatory Research Institute**

**Report No. 12-08  
July 2012**

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## **Acknowledgments**

The author wishes to thank Douglas Elfner, New York State Department of Public Service; Philip Hanser, the Brattle Group; Dr. Larry Kaufmann, Pacific Economics Group Research; Harry Stoller, Illinois Commerce Commission; and NRRI colleagues Dr. Rajnish Barua, Tom Stanton, and Dr. Sherry Lichtenberg. Any errors in the paper remain the responsibility of the author.

## Executive Summary

In the aftermath of prolonged power outages in 2011, state utility commissions, legislatures, and governors have acted to hold utilities more accountable to their customers. Accountability lies at the core of good regulation. The challenge for policymakers is to hold utilities accountable for their actions but, at the same time, be fair to them and their shareholders. Accountability means that the utility suffers financially when it makes imprudent or unreasonable decisions. Such decisions can result in excessive delays in service restoration, an excessive number of interruptions, or poor communications to customers during a service interruption, or all of the above. Poor communications may be a major reason for customer anger at their utilities when they endure an outage.

As this paper stresses, accountability also extends to customers, as they can influence the damage they suffer from an electricity outage. How customers react to an outage and what precautions they took prior to the outage affect the actual harm they endure. Thus, any regulatory policy should recognize that a utility and its customers jointly could mitigate the harm from a service interruption. The policy implication is that compensation based on actual damages can lead to fewer precautionary actions taken by customers and thus excessive costs imposed on utilities.

Accountability comes in different forms. Monitoring, setting standards, establishing a reward/penalty incentive mechanism, and mandating compensation are ways for commissions to hold utilities accountable. Regulators might want to consider seriously the merits of periodically monitoring and evaluating utility performance. Several state commissions take this approach today. Monitoring has four major purposes: (1) to report on and evaluate utility performance in preventing and managing outages; (2) to propose changes to regulatory policies and practices to improve utility performance; (3) to determine utility compliance with rules, guidelines, and expectations; and (4) to apply any mitigating actions when necessary.

*Utility compensation of customers* who have experienced a service interruption has recently received increased attention (and is the focus of this paper). Electric utilities typically do not charge customers for service not received during an outage. One public-policy question is whether customers who experienced an outage should receive compensation that reflects, at least in part, the damages or inconveniences they suffered because of an outage. The paper observes that companies are more inclined to reimburse their customers for service interruptions when they bill service based on a fixed monthly charge.

Electric utilities seldom compensate their customers for outages, regardless of the outages' duration. The utility is typically not liable for causes of interruptions beyond its control (e.g., those that are weather-related). Tariffs frequently hold a utility liable only for willful or gross neglect or other extreme conditions, which commissions seem to determine rarely. Important issues for the industry and regulators include (1) the definition of willful or gross neglect, and (2) the specific utility actions that constitute neglect.

As a comparison with the electric industry, unregulated companies infrequently reimburse customers for service interruptions. More often, they compensate customers for

product defects. Businesses generally do not reimburse customers for the consequential effects of product or service-delivery problems that are beyond their control.

A fundamental economic question related to utility compensation is, who can best minimize outage costs and who can best absorb the risk of outages: the insurance company, the victim, customers as a group, or utility shareholders? The widely recognized Coase theorem tells us that liability should fall on those parties who can eliminate or mitigate a problem most cheaply. A desirable outcome is an efficient allocation of risk. This solution, however, evades the question of who should bear the risk from a fairness perspective. The Coase theorem may also conflict with the legal determination of which party should bear the risk. The topic of this paper, in fact, is whether utilities should be liable for household and business damages caused by power outages.

Strict liability, in which the utility is responsible for all outages irrespective of the cause, might pass an efficiency test, but it might also be unfair to the utility and its shareholders. It presumes that either (1) the utility could prevent and mitigate the outage problem at a lower cost (an efficiency argument) or (2) fairness dictates that the utility absorb all of the costs, since the occurrence and actual consequences of outages are largely under its control. Nevertheless, as the paper discusses, because economic and other losses from outages can be high, compensation based on these losses can place a utility in a difficult financial position.

The merits of compensation come down to its perceived fairness and effect on the behavior of both utilities and customers. Compensation, when funded by utility shareholders, can strengthen a utility's incentive to avoid service interruptions with potentially high costs. It also seems fair, at first sight, for the utility to reimburse customers for damages, especially when attributable to a preventable outage. On the other hand, compensation may be inferior, from both a fairness and efficiency perspective, compared with: (1) *self-protection*, in which the customer spends money to mitigate the effects of a service interruption by buying a surge protector or special insurance, for example; and (2) *higher system reliability* willingly paid for by customers. Even though utility customers have no control over service interruptions, through their actions they can affect the damage they suffer. Compensation might cause customers to take fewer actions that could cheaply mitigate the effects of a service interruption.

A key question relates to the necessary conditions for compensation. The answer depends on the reason for compensation. If compensation is a form of reparation, then customers should receive it only if the utility did something wrong. The utility, for example, may have neglected tree trimming or been lax in restoring service. Viewing, instead, compensation as a warranty payment, the utility would pay it irrespective of what caused an outage lasting beyond a specified time. Compensation would be akin to an "inconvenience" payment that has no correlation with actual customer losses. This type of compensation seems more defensible from a policy perspective, especially in its relative ease of implementation and the fact that it would specify a fixed dollar amount instead of being open-ended. Warranties are common in other industries, as they assist firms in avoiding public-image problems that could lead to customer migration. "Warranty" payments by regulated utilities would improve their goodwill and likely lessen the chances of political retribution from prolonged or frequent outages.

This paper should benefit state commissions by providing insights into whether utility compensation for service interruptions warrants serious consideration as a regulatory policy. Appendix A includes several questions that commissions can ask themselves about compensation and other policies and practices relating to service reliability. This paper recognizes that most commissions do not require or even condone compensation, implying that customers themselves or their insurance companies should assume responsibility for damages. It advises those commissions to revisit their current policies on utility reliability to ensure that: (1) the public knows that they will hold utilities accountable for inferior performance; (2) regulatory incentives for utility service align customer reliability with utility economic interests; (3) efficient outcomes occur; and (4) utility customers and shareholders receive fair treatment.

In the future, conditions may necessitate that commissions consider new policies, including mandatory compensation of customers for service interruptions. This paper should help commissions better prepare themselves for responding to those conditions.

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# Should Public Utilities Compensate Customers for Service Interruptions?

*Regardless of whether the outages are caused by one or several sources...when so many people are out of service at the same time and outage times drag into days, customers and municipalities suffer losses that should be compensated.<sup>1</sup>*

*Stakeholder expectations in general—the public and regulators in particular—have raised the bar for utility handling of outages, an ongoing trend propelled by last fall's hurricanes, tropical storms, and early winter weather, particularly along the Eastern Seaboard and across the Northeast, Accenture executives noted.<sup>2</sup>*

Outage compensation has become a topic of interest for a number of reasons. One is the concern over whether electric utilities have adequate incentives for providing reliable service. Outages are costly to customers and society as a whole, so any inducements to reduce them have a potentially significant benefit.

This paper recognizes that few commissions require or even condone compensation.<sup>3</sup> It advises those commissions to revisit their current policies on utility reliability to ensure that: (1) the public knows that they will utilities accountable for inferior performance; (2) regulatory incentives for utility service align customer reliability with utility economic interests; (3) efficient outcomes occur; and (4) utility customers and shareholders receive fair treatment. Public and political pressures may force commissions to consider new policies, including mandatory compensation of customers for service interruptions.<sup>4</sup> This paper should help commissions better prepare themselves for responding to those pressures in the future. Pressure might derive, for example, from regulatory approval of major expenditures in smart-grid technologies. One alleged benefit of these technologies is less frequent and shorter service

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<sup>1</sup> Quote from Fred Vogt, Director of Public Works for the City of Rolling Meadows, Illinois, after a prolonged electric outage during the summer of 2011. [“State Investigation: ComEd Should Pay for Outages,” *Chicago Tribune*, January 28, 2012.]

<sup>2</sup> Phil Carson, “Managing Expectations on Outages?” *Intelligent Utility Daily*, April 17, 2012, 1.

<sup>3</sup> “Compensation” here means monies distributed to individual customers who experienced a specific outage. State utility commissions in 12 states do penalize electric utilities for performing below some prespecified service-quality level. These penalties generally result in lower revenue requirements that benefit all customers collectively. See Pacific Economics Group Research, *System Reliability Regulation: A Jurisdictional Survey*, May 2010, Table 4.

<sup>4</sup> As an example, the Illinois General Assembly passed legislation in 1997 that required utilities, under specific conditions, to compensate customers for power outages.

interruptions. The public may require commissions to set standards for utility performance and possibly create a mechanism for compensating customers under specified conditions.<sup>5</sup>

The following sections focus on utility compensation from an economic and fairness perspective. Does compensation create perverse incentives? Customers may expend less effort, for example, on precautionary and responsive actions because of the “insurance” provided by utility compensation.<sup>6</sup> Is compensation compatible with the perception of fairness as evident in regulatory policies and practices on other matters?

This paper should benefit state commissions by providing insights into whether utility compensation for service interruptions warrants serious consideration as a regulatory policy. Appendix A includes several questions that commissions can ask themselves about compensation and other policies and practices relating to service reliability.

Legal questions about mandatory compensation are crucial. This paper will touch on the important ones, primarily by asking the relevant questions (*see* Appendix B, for example). Because the author is not a legal expert, the paper will omit an expert analysis of them.

Finally, although this paper’s focus is the electric industry, many of the insights apply to the other utility sectors. The discussion on fairness and the efficiency effects of compensation pertain to topics that a commission would have to address when considering compensation for the natural gas, water, and telecommunications industries.

## **I. Importance of the Topic**

### **A. Holding utilities accountable: a tenet of public utility regulation**

In the aftermath of prolonged power outages in 2011, state utility commissions, legislatures, and governors have acted to hold utilities more accountable.<sup>7</sup> Massive public and government criticism of Connecticut Light and Power’s storm response triggered new legislation in the state.<sup>8</sup> The October 29, 2011 storm knocked out service to more than 800,000 customers

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<sup>5</sup> The author thanks one of the reviewers, Tom Stanton, for this insight.

<sup>6</sup> On its website, Xcel Energy lists the items in what it calls an “Outage Kit” to prepare for an outage, in addition to providing computer tips and actions to take after an outage. *See* [http://www.xcelenergy.com/Outages/About\\_Outages/Preparing\\_for\\_Electricity\\_Outages/Prepare\\_for\\_an\\_Outage](http://www.xcelenergy.com/Outages/About_Outages/Preparing_for_Electricity_Outages/Prepare_for_an_Outage). The Michigan Public Service Commission also has tips for customers in preparing for and responding to an outage. *See* [http://www.michigan.gov/documents/mpsc/mpsc-ca\\_electricoutageservicecredits\\_276711\\_7.pdf](http://www.michigan.gov/documents/mpsc/mpsc-ca_electricoutageservicecredits_276711_7.pdf).

<sup>7</sup> A power outage is one component of service quality. Another is voltage levels, as appliances and other electrical equipment by design operate within a narrow range of voltage levels. Service problems can result from interruptions, as well as voltage spikes, surges, and reductions.

<sup>8</sup> *See*, for example, “Connecticut Utility Faulted by Report on Storm Efforts,” *The New York Times*, December 2, 2011.

over several days. The evidence showed that the utility was unprepared for the storm and conducted a flawed restoration effort.<sup>9</sup> The new law establishes standards for utilities in managing an outage and restoring service. It also gives authority to the Public Utilities Regulatory Authority to fine utilities for falling short of the performance standards.<sup>10</sup>

Proposed legislation in New Jersey would mandate reliability standards for public utilities. The legislation followed two major outages that affected thousands of customers for several days. The purpose of the legislation is “not to impose financial penalties on utilities but rather is a preventive measure to create a best practice plan for utilities to follow.” The bill would allow the Board of Public Utilities to fine utilities for subpar performance in planning for and managing outages.<sup>11</sup> Proposed legislation in Pennsylvania would also make electric utilities more accountable for outages.<sup>12</sup>

Massachusetts has also seen proposed bills and regulatory investigations in the aftermath of prolonged power outages and public anger.<sup>13</sup> Also in the Northeast, outage problems in Pepco’s system in both the District of Columbia and Maryland have led to public outcry and commission actions.<sup>14</sup>

The primary objective of these actions is to hold utilities more accountable. Accountability lies at the core of good regulation. Accountability means that the utility is held responsible and suffers financially when it makes imprudent or unreasonable decisions. Such decisions can result in excessive delays in service restoration, an excessive number of interruptions, or poor communications to customers during service interruptions. Poor communications may be a major reason for customer anger at their utilities when they endure an outage.

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<sup>9</sup> Witt Associates, *Connecticut October 2011 Snowstorm Power Restoration Report*, December 1, 2011 at [http://www.wittassociates.com/assets/860/CTPowerRestorationReport20111201\\_FINAL\\_1\\_.pdf](http://www.wittassociates.com/assets/860/CTPowerRestorationReport20111201_FINAL_1_.pdf)

<sup>10</sup> “Conn. Governor Set to Sign Legislation Allowing Fines for Utilities during Outages,” *SNL Financial*, May 14, 2012, 1.

<sup>11</sup> “NJ Legislator Proposes Bill Mandating Reliability Standards for Utilities,” *SNL Financial*, May 11, 2012, 1.

<sup>12</sup> “Pa. Legislator Wants Utilities to Compensate Customers for Outages,” *Pocono Record*, November 3, 2011. Under the proposed legislation, utilities would compensate customers for outages that extend to at least two or three days. One motivating factor for the legislation was the allegation that some electric utilities had cut their budgets for repair and maintenance while raising the compensation of their top executives. The legislation followed a power outage in 2011 that affected about 3.8 million electric customers.

<sup>13</sup> See [Mass. Senate backs bill on power outages - Boston.com](#).

<sup>14</sup> “Pepco Reliability Plan ‘Cobbled Together’ without Detailed Study, Report Finds,” *The Washington Post*, March 7, 2011.

As this paper emphasizes, accountability also extends to customers, as they can influence the damage they suffer from an electricity outage. How customers react to an outage and what precautions they took prior to the outage affect the actual harm they endure. They can, for example, prepare for an outage by buying extra batteries, flashlights, and blankets, and mitigate losses by purchasing surge protectors and back-up generators. Any regulatory policy should recognize that both a utility and its customers could mitigate the harm from a service interruption. The policy implication is that compensation based on actual damages can lead to fewer precautionary actions by customers and thus excessive costs imposed on utilities.

The challenge for regulators is to hold utilities accountable for their actions but also to be fair to them and their shareholders. In contrast to the situation with most goods and services we purchase, when a customer is dissatisfied with utility service, she is limited in switching to another provider. As a monopolist, the utility has an advantage over customers that regulation can counteract only by holding the utility accountable for poor performance.<sup>15</sup> Accountability comes in different forms. This paper focuses on one of those forms: utility compensation to customers who have experienced an outage.

## **B. Reliable utility service: a primary regulatory goal**

Service reliability is something that both utilities and regulators take seriously.<sup>16</sup> They know that outages are disruptive and potentially extremely costly to customers and society as a whole. (*See* discussion in the next section.) As commented in a study done for the Illinois Commerce Commission:

There are three important dimensions of electric service reliability—the number of customers affected, the frequency with which outages or voltage disturbances occur, and (for service interruptions) their duration. Correspondingly, electric

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<sup>15</sup> Some observers have contended that electric utilities are cutting back on maintenance and repairs. These actions can certainly impair reliability and increase interruptions—for example, from more frequent malfunctioning of low-voltage transformers and breakers. The author could not validate whether and to what extent over the past few years electric utilities have curtailed their maintenance activities. One reviewer remarked that experience in his state showed that growing backlogs of preventive and corrective maintenance are a good predictor of future reliability problems.

<sup>16</sup> The North American Electric Reliability Council (NERC) defines security as “the ability of the electric system to withstand sudden disturbances such as electric short circuits or unanticipated loss of system elements.” Security identifies short-term operational aspects of the system. In comparison, NERC defines the second component of reliability—adequacy—as “the ability of the electric system to supply the aggregate electrical demand and energy requirements of the customers at all times, taking into account scheduled and reasonably expected unscheduled outages of system elements.” For the purposes of this paper, security is more relevant.

service reliability is generally described in terms of how frequently reliability problems occur, how long they last, and how many customers are affected.<sup>17</sup>

Studies have shown that electricity outages, on a kWh basis, have far higher costs than the price of electricity. These costs include spoiled food, lost productivity, lost business revenues, and inconveniences. It is worth assessing how much customers are willing to pay to avoid a service interruption. (See the discussion in the next subsection.)

Even though, in contrast to the situation with some other utility services, electricity customers have lower bills when an interruption occurs, the bill reduction can fall far short of the costs they suffer because of an interruption. On net, then, electricity customers are worse off when they experience an outage, even when their electricity bills decline. A primary question addressed in this paper is whether utilities should compensate customers for this net loss or some portion of it. Paying customers for their actual economic losses from a widespread outage, for example, may jeopardize a utility's financial condition because the losses can be substantial. Another argument is that electric utilities typically charge their customers based on cost of service, not on the much higher value they place on the consumption of electricity. It would ostensibly be discriminatory against the utility for a regulator to require compensation based on actual customer losses (economic or otherwise) from an outage.<sup>18</sup>

State utility commissions, for good reason, demand reliable service. This standard requires utilities to: (1) minimize service interruptions to the extent practicable and economical,<sup>19</sup> (2) manage well any interruptions (e.g., communicate with customers) and (3) restore service after an interruption within the shortest practicable time.

“Reliable service” is a subjective term with different interpretations across electric utilities and periods. One phenomenon, the “electronics” revolution, has placed a premium on reliable service for many customers. Electronics place higher demands on power quality and reliability. Industrial firms can lose entire process lines if even momentary service interruptions occur; outage costs when computers and data processing centers go down, even for short periods, can be significant compared with the costs from food spoilage when refrigerators stop working.

Some states require utilities to “make reasonable efforts to avoid interruptions of service.” Other states demand that utilities “promote adequate, economical, and efficient delivery of utility services in the state.” This objective requires utilities to balance economics and reliability to receive regulatory approval.

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<sup>17</sup> Freeman, Sullivan & Co., *Evaluating Smart Grid Reliability Benefits for Illinois*, report prepared for the Illinois Commerce Commission, January 2011, 4 at [http://www.naruc.org/Publications/SERCAT\\_Illinois\\_2010.pdf](http://www.naruc.org/Publications/SERCAT_Illinois_2010.pdf).

<sup>18</sup> This compensation policy would reflect a value-of-service principle.

<sup>19</sup> Just and reasonable rates require, for example, that the utility not incur costs for improving reliability that exceed the value to customers. Because electric utilities generally do not measure the customer value of higher reliability, the optimal level of reliability is elusive in practice.

The reliability of electricity depends mostly on what utilities do at the distribution level. Over 90 percent of the electricity supply outages experienced by retail electricity customers derive from failures on the local distribution network.<sup>20</sup> Major causes are malfunctioning of overhead and underground equipment.<sup>21</sup>

### **C. Compensating customers for outages as an option**

#### **1. Outages are costly**

One regulatory policy that has received increased attention is utility compensation of customers who have experienced a service interruption. U.S. electric customers are seldom compensated for long outages. Businesses can suffer massive costs from even short blips, let alone long-term service interruptions; cost estimates are about \$50-\$100 billion per year.<sup>22</sup> Households suffer inconveniences and potentially large economic losses from service interruptions.<sup>23</sup> It is important, therefore, for electric utilities to assure reliable service by providing continuous and uninterrupted service and prompt service restoration.<sup>24</sup>

Studies have shown the value of lost load (VOLL) per kilowatt-hour (kWh) for residential customers can be more than two orders of magnitude above the price of electricity; for commercial and industrial customers, the order of magnitude is far greater.<sup>25</sup> VOLL reflects what economists call “compensating variation” or “equivalent variation.” The former measures what customers would be willing to pay to avoid a service interruption, while the latter measures what customers would be willing to accept to have a service interruption. Surveys generally have shown the latter measure to be higher. One explanation is that customers feel they have an entitlement to continuous service; for example, they may feel that they should be paid a

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<sup>20</sup> Electric Power Research Institute, *Estimating the Costs and Benefits of the Smart Grid: A Preliminary Estimate of the Investment Requirements and Resultant Benefits of a Fully Functioning Smart Grid*. Technical Report 1022519, Palo Alto, CA, 2011, page 6.1.

<sup>21</sup> Jay Apt, “Securing the Supply of Electrical Services,” Presentation at the Carnegie Mellon Conference on Crisis Readiness, February 28, 2006, 7.

<sup>22</sup> Kristina Hamachi LaCommare and Joseph H. Eto, *Understanding the Cost of Power Interruptions to U.S. Electricity Consumers*, LBNL-55718, September 2004 at <http://certs.lbl.gov/pdf/55718.pdf>.

<sup>23</sup> According to some analysts, the more frequent momentary power interruptions have a stronger effect on the total cost of interruptions than sustained interruptions.

<sup>24</sup> Some states require utilities to “make reasonable efforts to avoid interruptions of service.” Several states require utilities to “promote adequate, economical, and efficient delivery of utility services in the state.” A later section of this paper will discuss this topic in more detail.

<sup>25</sup> One source of uncertainty in VOLL or outage-cost estimates is the discrepancy between the costs customers report in surveys under hypothetical circumstances and the costs they would actually experience under such circumstances. Analysts have done little work to measure this discrepancy.

handsome sum for agreeing to have their service interrupted because that would violate their basic right to service. Both measures assume that a service interruption is unexpected and happens on short notice.

A recent survey by Build Energy America showed that one-third of customers who were polled would not accept \$1,000 to have a two-day power outage, which is comparable with other studies estimating outage costs. Several respondents said they would pay as much as \$40 per month to avoid an outage of longer than four hours. The survey also showed that one-quarter of Americans believes they should never have to experience a power outage, except when extreme weather conditions occur. Other findings showed that (1) 64 percent said that power outages cause “really significant problems” and (2) the major problems with outages are loss of air conditioning, refrigeration, heat, digital data, mobile devices, and entertainment. Steven Mitnick of Build Energy America remarked, “More and more Americans cannot and will not tolerate outages, especially if they last days or longer.”<sup>26</sup>

What customers are willing to pay to avoid an outage differs from the actual cost of an outage. Just as we pay a premium for insurance that is much less than the expected damage done by a fire or some other accident, the same logic applies to service interruptions. The simple explanation is that the probability of an accident or an outage is much lower than one.

Outage costs are higher when they are more frequent and of longer duration, unexpected, and cover a larger geographical area. An unexpected outage, for example, does not allow customers to cushion the cost of a service interruption by changing their activities. Warning customers of an upcoming outage can help avoid problems that could otherwise exist, for example, interrupting clothes washing or cooking. Prudent utilities notify consumers about planned service interruptions for equipment maintenance.

## **2. Compensation as a warranty**

Looking at other companies in our economy, many of them replace or repair a product (e.g., via warranty) when it performs at a level below what the customer expects, given the age of the product and other factors. The premise is that customers should expect products to be free of defects that would compromise the products’ performance or benefits. For utilities, if their service falls below customer and regulatory expectations or some other threshold—performance fails to meet a predetermined regulatory standard, for example—regulators might require that compensation be offered to customers or hold utilities accountable in some other way.

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<sup>26</sup> “Reliability Demand Survey Finds Many Americans Have Low Tolerance for Power Outages,” Press Release, *The Business Journals*, May 10, 2012 at [http://www.bizjournals.com/prnewswire/press\\_releases/2012/05/10/DC04802](http://www.bizjournals.com/prnewswire/press_releases/2012/05/10/DC04802). One interpretation of the high dollar amount that customers are willing to pay to avoid outages is that regulators can justify rewarding utilities generously—through some incentive mechanism, for instance—for superior reliability. High rewards, in other words, would be comparable to the benefits that customers would receive from superior reliability.

What should customers and regulators expect from utilities in terms of service reliability? It would be unreasonable for them to expect uninterrupted service at all times, but what should they expect?<sup>27</sup> Usually, under a warranty for products, the company does not compensate customers for any harm (i.e., consequential damages) caused by a defective product. What would constitute a utility warranty for electric and other services? Would such a warranty be good regulatory policy? Would it pass a fairness test and not create distorted incentives leading to inefficiencies? Should the warranty payment be some multiple of the electricity rate paid by customers?<sup>28</sup>

## II. Reliability as a Quasi-Public Good

### A. Definition of a quasi-public good

One way to view reliability is that it is a *quasi-public good*: It is shared by more than one party but is subject to a crowding out or congestion effect. Because reliability is a public good, when one customer receives it, other customers on the network receive it as well. The service is susceptible to a “free rider”<sup>29</sup> problem in that it becomes infeasible or highly difficult for the utility to refuse reliability to any customer on the network when it provides it to others.

Mathematically,  $R = R(u, k)$ , where reliability ( $R$ ) on a distribution network is a decreasing function of use ( $u$ ) and an increasing function of capacity ( $k$ ). That is, the derivative of  $R$  with respect to  $u$  is less than zero, and the derivative of  $R$  with respect to  $k$  is greater than zero. In the context of this paper, higher reliability means that the chances of having inadequate distribution capability to meet demand diminish. Thus, the expected costs from outages would decline.

Because outages increase with usage, reliability takes on the form of a quasi-public good with rivalry in consumption. Quasi-public goods can be defined as goods characterized by either partial rivalry or excludability of benefits. A good is *partially rival* in consumption when one individual’s consumption of a unit of the good detracts from the consumption possibilities of another individual.

Individual electricity customers generally cannot choose the level of reliability they desire. The utility, in other words, does not provide differentiated service reliability. One exception is interruptible service for customers who are willing to accept less reliable service for lower rates. As one noted economist has remarked:

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<sup>27</sup> Some customers may actually expect perfect reliability. They would tend to rely on non-utility service providers to deliver the necessary capabilities, such as storage and emergency backup systems, to avoid any service interruptions.

<sup>28</sup> The rationale would be that the value of lost load per kWh to a customer is likely much greater than the electricity rate.

<sup>29</sup> A “free rider” is someone who consumes a good or service without paying for it.



Physical attributes of the networks which characterize industries that have been subject to price and entry regulation, may limit the array of product qualities that can be offered economically to customers. For example, on a typical electric distribution network, individual customers cannot be offered different levels of network reliability because the physical control of the distribution network is at the “neighborhood” rather than the individual levels.<sup>30</sup>

## **B. Potential problems raised**

As a quasi-public good, reliability poses challenges for both utilities and regulators. First, in an ideal world, some customers would pay more for reliability than they do today; other customers would pay less. Although adequate for customers collectively, the existing level of reliability might hide some distortions when viewed from a more micro or individual-customer perspective. It also means that outages affect customers differently, so offering, for example, the same compensation to customers with interrupted service could overpay some customers while underpaying others. The assumption is that compensation corresponds to the actual damages inflicted on customers.<sup>31</sup>

Second, individual customers ignore the effects of their consumption on other customers, unless the price they pay reflects those effects. As a rule, utility prices do not, so customers tend to overuse the system during the peak period, when congestion and service interruptions would be more common. The outcome is that we should see more service interruptions than if utility pricing were to differentiate between periods of surplus capacity and tight capacity.<sup>32</sup>

Third, because declining reliability for a network can affect a large number of customers, the benefits from avoiding this condition can be substantial. The regulatory goal of reliable service would therefore seem to have sound economic justification. A regulatory policy of requiring utilities to compensate customers for actual damages from a service interruption could place the utilities in a difficult financial situation.

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<sup>30</sup> Paul L. Joskow, “Regulation of Natural Monopolies,” 05-008 WP, April 2005, 54-5.

<sup>31</sup> Actual damages might include both economic and noneconomic components. An example of the latter is the inconvenience and discomfort caused by an outage. Imputing a dollar value on the noneconomic effects is difficult.

<sup>32</sup> Congestion occurs when the value of the power network to individual users decreases as total usage on the network increases. The power network is a shared resource for which, in the short run, capacity is fixed and any increased usage would make power less reliable for everyone. Economists refer to congestion as a “negative network externality.” An efficient solution would be to internalize the externality—for example, by correct pricing that accounts for the social costs (e.g., congestion costs) of increased usage by individual utility customers. Average-cost pricing would violate this condition and lead to excessive congestion or, in the context of this paper, to more power outages or a higher probability of occurrence.

### III. What States Do Today

#### A. Regulatory requirements for utilities

Commissions typically limit utility liability. The main question addressed in this paper is whether commissions should expand this liability by placing financial burden for outages on utilities. One extreme condition is strict liability (“no-fault” compensation) that makes the utility fully liable for any damage, irrespective of cause. Most electric utilities are responsible for subpar performance when they demonstrate imprudent or grossly negligent,<sup>33</sup> or when they fail to meet a prespecified target. Utilities usually are not responsible for compensating individual customers for outages that caused economic or other types of damages. Limitations on compensation protect utilities from potentially substantial financial liability.

NRRI sent a survey containing the questions in Appendix A to the members of the NARUC Staff Subcommittees on Electricity and Electric Reliability. Although we received only seven responses,<sup>34</sup> they reveal actions consistent with the information we acquired and observed elsewhere.<sup>35</sup> These actions are as follows:

- Utilities are rarely penalized for gross or willful negligence; one commission responded by saying that “willful negligence” is akin to inaction.<sup>36</sup> As a side note, the author reviewed several electric utility tariffs and discovered that a large percentage mentioned “willful negligence” or “gross negligence” as the sole source of utility liability for a service interruption. The tariffs never define the term, leaving it to the commission or courts to do so.
- One commission reported that one of its electric utilities provides compensation as part of a merger agreement.
- Most commissions said they lack the authority to mandate utilities to compensate customers.
- A few commissions indicated that any compensation would likely have to come from a court ruling.

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<sup>33</sup> Some legal experts find “grossly” a useless term that is subjective depending on the circumstance and outcome. Thus, it lacks meaning until an event has occurred.

<sup>34</sup> Alabama, Arizona, Delaware, Illinois, Iowa, Maine, and New York.

<sup>35</sup> NRRI also sent out an informal inquiry to selected states that asked general questions, including “Does your commission require or have a policy on utility compensation for service interruptions?” Maryland, Michigan, Minnesota, New York, Ohio, and Pennsylvania responded to the inquiry.

<sup>36</sup> Some legal experts contend that negligence refers primarily to actions that a reasonable person would have taken but did not, causing harm to individuals and society as a whole.

- One commission said that minimum customer rights involve the utility’s providing “reasonably adequate service at just and reasonable rates.” The author has observed that most state commissions hold this perception of customer rights.
- One commission reported that it has authority to impose fines on utilities for willful violation of a commission rule or order, or state statute.<sup>37</sup> The commission also has authority to reduce an investor-owned utility’s return on equity for imprudence or mismanagement.
- One commission indicated that courts would have to determine “willful neglect” or “gross negligence.”
- Another commission recently chose to tighten reliability performance standards and fine utilities for subpar performance rather than mandate utilities to compensate customers for power outages.<sup>38</sup>
- The most comprehensive responses came from the New York State Department of Public Service. One response was that the public service law has no provisions about compensation; the commission has, however, approved settlements that provide such compensation; the utility, ConEd, agreed to compensation to avoid a penalty. Another response was that Public Service Law §65(1) requires that electric utilities “shall furnish and provide such service, instrumentalities, and facilities as shall be safe and adequate and in all respects just and reasonable.”

Although not focusing directly on utility compensation, a recent NARUC survey asked state utility commissions whether they fine electric utilities for failing to restore service in a timely manner. Eleven state commissions responded.<sup>39</sup> One commission requires compensation if a utility fails to meet restoration targets. A few others said that they could penalize a utility in a rate case—for example, by adjusting downward the authorized rate of return on equity (ROE) or not allowing full cost recovery if service is below expectations. A number of states said that they could fine a utility for violating rules or a commission order.

Based on all the information gathered for this paper, compensation is a topic to which state commissions have not so far devoted a great deal of attention. Yet, if long power outages become a more frequent event in the future, consumer complaints and associated political pressure may compel state utility commissions to consider compensation as an option.

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<sup>37</sup> Revenues from fines imposed by this commission go directly to the state’s general revenue.

<sup>38</sup> See also “Md. Regulators Adopt Reliability Standards for Electric Utilities, *SNL Financial*, April 18, 2012.

<sup>39</sup> They are Alabama, Arkansas, Florida, Georgia, Iowa, Kentucky, Michigan, Nebraska, New Hampshire, Oregon, and Virginia.

## 1. Utility obligation to provide reliable service

The typical obligations of electric utilities in different states are as follows:

- *Minimize service interruptions:* This outcome requires utilities to exercise reasonable diligence in providing reliable service.
- *Mitigate losses from service interruptions:* This outcome requires utilities to re-establish power within a reasonable time and communicate with customers during an interruption.<sup>40</sup>
- *Require a reasonable effort or diligence to provide regular and uninterrupted electric supply:* This obligation combines the previous two. In practice, this reliability standard reflects the goal that the power network should have enough redundancy to avoid service interruptions even in the face of contingencies.
- *Provide reliable service at least or reasonable costs:* This balancing of reliability and cost is a universal tenet of regulation.<sup>41</sup> Overspending on reliability means that a utility's rates violate the "just and reasonable" criterion.
- *Exclude a guarantee of uninterrupted service:* The rationale is that such a guarantee would be unreasonable no matter the capability of utility management and the amount the utility spends on reliability.<sup>42</sup>

Utility tariffs frequently spell out utility obligations and liability as they pertain to service reliability. The utility has an obligation, for example, to provide electricity on demand and restore service when interrupted, using reasonable care. Many tariffs greatly limit a utility's liability for failure to provide electricity or for interruptions. One interpretation is that the intent is to keep rates reasonable or to prevent the utility from suffering serious financial difficulties.

Utilities do have definite obligations. They include: (a) preventing outages, (b) developing an emergency strategy (or an action plan) in the event of an outage, (c)

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<sup>40</sup> Utilities can inform the public, for example, about the expected duration of an outage, in addition to its geographic scope.

<sup>41</sup> As an example, section 411.100(a) of the Illinois Commerce Commission rules for "Electric Reliability" [83 Ill. Adm. Code 411.100, et seq.] requires that electric utilities provide reliable service. The section states that:

Each jurisdictional entity shall provide services and facilities that, in accordance with the Act and other applicable statutes, provide an adequate, efficient, and reasonable level of reliability giving appropriate consideration to the costs and benefits of changing or maintaining the level of reliability.

<sup>42</sup> "Less than 100 percent guaranteed service" means that occasional service interruptions are acceptable without inferring that utility service is less than adequately reliable.

communicating with customers during an outage, and (d) minimizing the time for, or managing well, service restoration.<sup>43</sup> A commission may judge that, in failing to meet these obligations, the utility was imprudent.

Regulators can assess in advance, although not without difficulty, whether a utility's proposed level of reliability is adequate or cost-beneficial.<sup>44</sup> They can judge, after the fact, whether the utility's actual reliability is satisfactory or requires additional review to determine whether the utility complied with the regulator's standard. Regulators could periodically monitor utility performance. They might establish reliability targets to compare periodically with the utility's actual performance. Regulators might resort to an incentive mechanism that would reward a utility for surpassing a target and penalize it for performing below the target.<sup>45</sup> Another option is for regulators to penalize a utility for failing to meet prespecified standards, but not reward it for superior performance. This option presumes that a utility should not earn a reward for fulfilling a primary obligation, such as providing reliable service.<sup>46</sup> In many real-world instances, the penalty paid by a utility takes the form of negative revenue adjustments, which benefit all customers. Less likely are direct payments to individual customers who suffered an outage of long duration.

Actual performance itself cannot determine whether a utility acted prudently. If regulators use actual performance in this way, the utility becomes highly susceptible to a whimsical evaluation based on outcomes rather than the prudence of the decisions themselves. Regulators who penalize a utility for a large number of outages over a specific period are an example. An unusually large number of storms may have hit the area. It is legitimate for regulators to ask whether some of the outages resulted from imprudent behavior, such as inadequate tree trimming or poor maintenance of its equipment. Regulators really would not know unless they do a thorough investigation.

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<sup>43</sup> See Robert Burns, *Regulatory Policies for Electricity Outages: A Systems Approach*, NRRI 07-07, August 2007.

<sup>44</sup> As mentioned elsewhere in this paper, the difficulty comes from measuring with a reasonable degree of accuracy the values that customers place on different levels of reliability.

<sup>45</sup> Rewards and penalties can depend on different factors, including the incremental or decremental value that customers place on reliability levels above or below the benchmark. Incentive mechanisms in the U.S. generally do not relate rewards and penalties to customer valuations of reliability, unlike (for example) mechanisms in Australia and New Zealand.

<sup>46</sup> For an excellent review of different regulatory options, see Pacific Economics Group, *Service Quality Regulation for Detroit Edison: A Critical Assessment*, March 2007. The study found that monitoring and evaluating utility performance is the most common approach used by state utility commissions. See also John G. Kassakian and Richard Schmalensee, *The Future of the Electric Grid: An Interdisciplinary MIT Study* (Cambridge, MA: Massachusetts Institute of Technology, 2011), 185-8 at <http://web.mit.edu/mitei/research/studies/the-electric-grid-2011.shtml>.

## 2. Limited utility liability

Causes of service interruptions include: (a) weather or other acts of God, (b) internal utility actions and decisions that were reasonable at the time they were made, (c) imprudent management (prudent management would have involved something else), and (d) willful neglect (conscious or intentional failure to perform a duty due to negligence or lack of diligence, for instance).

The utility is typically not liable for causes of interruptions beyond its control (e.g., weather-related). The utility is more frequently liable, at least on paper, for willful or gross neglect or other extreme conditions, which commissions seem rarely to determine.<sup>47</sup> It is important to consider the definition of willful or gross neglect, as well as what utility actions would constitute such behavior. Would a commission have the authority and capability to make this determination, or would the authority lie solely with the courts?

Recently, some states have contemplated requiring electric utilities to compensate their customers for service interruptions. A small number of utilities currently do because of a commission ruling, legislative mandate, or voluntary utility action. Two examples of voluntary actions by utilities are:

- *New Mexico Gas*: The utility curtailed over 40,000 homes and businesses for several days in February 2011.<sup>48</sup> It subsequently created a \$1 million fund to pay for claims made by customers. It first asked customers to find out whether they could receive any compensation from their insurance companies. The utility said the money would come from shareholders.<sup>49</sup>
- *Connecticut Light & Power*: The utility established a \$10 million fund to compensate residential customers for a 2011 October snowstorm that led to a lengthy outage. The utility said the fund was intended to help customers who suffered hardship during the outage. The governor's office administered the fund.<sup>50</sup>

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<sup>47</sup> See the earlier discussion on the NRRI survey.

<sup>48</sup> New Mexico Gas experienced declines in gas pressure on its systems because of extreme winter weather. To prevent pressures from falling so low as to force curtailment of all retail service, the utility had to cut supply to some customers. Restoring gas service was not immediate, as it is more complicated than restoring electric service: Gas utility personnel had to manually shut off gas meters and then relight pilot lights on site. See Federal Energy Regulatory Commission, *Outages and Curtailments during the Southwest Cold Weather Event on February 1-5, 2011*, August 2011 at <http://www.ferc.gov/legal/staff-reports/08-16-11-report.pdf>.

<sup>49</sup> See [https://www.nmgco.com/pdf/PR02092011\\_ClaimsUpdate.pdf](https://www.nmgco.com/pdf/PR02092011_ClaimsUpdate.pdf).

<sup>50</sup> See [http://www.masslive.com/news/index.ssf/2011/11/northeast\\_utilities\\_establishi.html](http://www.masslive.com/news/index.ssf/2011/11/northeast_utilities_establishi.html). Incidentally, the cable, telecommunications, and satellite companies in Connecticut volunteered to offer credits to their customers because of service interruptions caused by the same snowstorm. This gesture is

## **B. Customer rights and obligations**

Electricity utility customers possess the basic right to receive a service for which they pay. When they receive no service, they do not pay the utility during that time, except possibly for the monthly customer or service charge. But, as discussed later, one could argue that the utility should pro-rate the customer or service charge based on the duration of a service interruption.

State commissions set prices that they consider just and reasonable; that is, customers should not pay for costs that the utility could have avoided with efficient or prudent management. The price should allow an efficient or prudent utility a reasonable opportunity to earn a return sufficient to attract new capital. The last two statements infer that customers should pay for all prudent utility expenditures associated with reliability, but no more.

Customers should also have the right to receive reliable service that minimizes service interruptions and their durations within reason. This right requires customers to pay a price that allows a prudent utility to achieve the level of reliability that customers expect.

Customers have no legal obligation to mitigate the damage from an outage. However, as this paper discusses, the utility should not reimburse customers for damages they could have avoided with reasonable care. Doing so would reward customers for carelessness that either customers as a group or the utility shareholders would have to fund.<sup>51</sup> Compensation in this situation would be both unfair and inefficient. A major problem is quantifying the damages that customers could have avoided. This next-to-impossible calculation relegates the ideal policy to a theoretical exercise.

## **C. Utilities with compensation schemes**

Below are examples of electric utilities that compensate their customers for service interruptions. The author did not conduct a comprehensive survey, so other electric utilities may also offer their customers compensation. It is, however, safe to say that only a small percentage of U.S. electric utilities have any compensation scheme.<sup>52</sup>

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not surprising, given the fact that these companies charge customers a fixed monthly fee for service regardless of their usage. See <http://www.ct.gov/ag/cwp/view.asp?A=2341&Q=491402>.

<sup>51</sup> Two examples are a customer: (a) opening the refrigerator during an outage, which causes food spoilage; or (b) failing to buy surge protectors for his electronic equipment.

<sup>52</sup> Compensation schemes seem more common in other countries. Countries that require compensation include Australia, United Kingdom, Netherlands, and Italy. See Serena Hesmondhalgh et al., *Approaches to Setting Electric Distribution Reliability Standards and Outcomes*, The Brattle Group, January 2012, Table 37 at <http://www.brattle.com/documents/UploadLibrary/Upload1014.pdf>.

## 1. Illinois

Customers of two Illinois electric utilities, Ameren and Commonwealth Edison, are eligible for compensation for damages caused by power outages. Section 16-125(e) of the Illinois Public Utilities Act<sup>53</sup> provides that when more than 30,000 customers of a utility are subject to an interruption of service equal to or exceeding four hours in duration:

... the [electric] utility shall be responsible for compensating customers affected by that interruption for four hours or more for all actual damages, which shall not include consequential damages, suffered as a result of the power interruption. The utility shall also reimburse the affected municipality, county, or other unit of local government in which the power interruption has taken place for all emergency and contingency expenses incurred by the unit of local government as a result of the interruption.

The section also enumerates circumstances in which a utility can seek a waiver of these requirements from the Illinois Commerce Commission.<sup>54</sup> The circumstances include unpreventable damage due to weather events (e.g., lightning) or other conditions (e.g., uprooted trees); customer tampering; unpreventable damage due to civil or international unrest or animals; and damage to utility equipment or other actions by a party other than the utility, its employees, or its contractors. It can hold the utilities liable without a finding of fault. The legislation prohibits the utility from recovering any compensation, regardless of whether it was prudence.

In Illinois, a customer can file a claim with the utility. If the utility denies it, the customer can then go to the commission or small claims court. The commission cannot force a utility to compensate a customer, but it can verify whether the outage meets all the criteria for compensation. This lack of commission authority also exists in most other states, in which the courts have sole authority, for example, to rule on allegations of willful neglect by the utility.<sup>55</sup>

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<sup>53</sup> In most other instances, the utility's tariff stipulates conditions for compensation.

<sup>54</sup> At the time of this writing, the commission has two dockets (11-0588 and 11-0662) investigating the applicability of Section 16-125(e) to two major storms in 2011 that caused prolonged outages on Commonwealth Edison's system. *See* <http://www.icc.illinois.gov/docket/casedetails.aspx?no=11-0588> and <http://www.icc.illinois.gov/docket/casedetails.aspx?no=11-0662>

<sup>55</sup> *See*, for example, the Southern California Edison website on how customers can file claims for damages from power outages at <http://www.sce.com/CustomerService/request/claims/faq.html>. A response from a staff member of the Ohio Public Utilities Commission said that if a customer believes he deserves some compensation from the utility for an outage, the customer could file a complaint with the commission requesting a ruling that the utility provided "inadequate service." If the commission agrees, the customer can then use that ruling in court to seek financial damages.



## 2. Michigan

In Michigan, electricity customers are entitled to \$25 in compensation if the utility: (a) fails to restore service within 120 hours of an outage during a catastrophic condition (i.e., when 10 percent or more customers face service interruption or a state of emergency occurs); (b) fails to restore service within 16 hours of an outage during normal conditions (e.g., less than catastrophic conditions, or when not more than 10 percent of customers are without service); or (c) has seven or more interruptions in a 12-month period.<sup>56</sup> In each instance, a utility will lower a customer's bill by the greater of \$25 or the monthly customer charge.<sup>57</sup>

The compensation aims to punish utilities that were slow to restore service and who provided less-than-reasonable service. It reimburses customers for a service they were not receiving but were being billed for in their monthly customer charge. One problem noted by commission staff persons is that customers receive compensation only if they request it.<sup>58</sup>

## 3. New York

A response to an e-mail question sent out by NRRI to the New York State Department of Public Service (DPS) remarked that:

New York and some other states have established performance-based standards, with associated financial consequences, regarding the reliability of electric service (CAIDI and SAIFI).<sup>59</sup> In New York, failure to meet those standards results in "negative revenue adjustments" which are used for the benefit of the general body of customers. This "compensation" is not directed only to the benefit of customers who experienced prolonged or frequent outages. The New York DPS believes that this mechanism provides utilities an incentive to maintain and improve their electric reliability.<sup>60</sup>

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<sup>56</sup> [http://www.michigan.gov/documents/mpsc/mpsc-ca\\_electricoutageservicecredits\\_276711\\_7.pdf](http://www.michigan.gov/documents/mpsc/mpsc-ca_electricoutageservicecredits_276711_7.pdf)

<sup>57</sup> Assume that the average residential customer uses 25 kWhs of electricity per day and that an outage lasts 24 hours. In other words, customers would receive compensation of \$25 or \$1 per kWh of lost power. The one dollar translates into \$1,000 per mWh, which is on the low side of outage-cost estimates from surveys and other empirical studies. Based on this rough calculation, the \$25 compensation resembles the value of lost power estimated in studies, whether intended or not.

<sup>58</sup> The last points came from commission-staff responses of April 17, 2012.

<sup>59</sup> CAIDI refers to the Customer Average Interruption Duration Index or the average time required to restore service. SAIFI refers to the System Average Interruption Duration Index or the total duration of interruption for the average customer during a predefined period.

<sup>60</sup> Email response of the New York State Department of Public Service, dated March 27, 2012.

The public utility statutes and commission rules contain no particular provision on compensation. Utilities generally are only liable for damages caused by gross negligence or willful misconduct. As quoted above, the electric utilities have reliability performance mechanisms in which the commission imposes a penalty when a utility fails to meet specific electric-reliability targets. These penalties generally translate into refunds to customers. One of the responses to NRRI's survey indicated that, in 2008, both Con Edison and Orange & Rockland failed to meet the duration target in their reliability-performance mechanism. Together, they received penalties of about \$5.4 million that benefited customers in the form of lower rates.

One unique requirement in New York is that electric utilities must make dry ice available at centralized locations to customers when utilities anticipate a widespread outage lasting longer than 48 hours.<sup>61</sup> This mandate makes it easier for customers to acquire dry ice that would mitigate food and medicine spoilage. The effect is lower outage costs to customers and a reduced chance of legal suits against utilities. Besides, utility actions like these (even though mandatory) probably help improve customer relations. If nothing else, they show that the utility is thinking about customers by helping them to cope better with an event with potentially severe consequences. From an economic perspective, the dry-ice mandate seems efficient in reducing the social costs from an outage; that is, the cost to utilities in providing dry ice is less than the avoided cost of food and medicine spoilage in addition to the cost for customers of acquiring dry ice on their own.<sup>62</sup>

The Public Service Commission has authorized compensation on those occasions in which a utility agreed to avoid a penalty. One example of utility compensation involves Consolidated Edison's Reimbursement Tariff:

Con Edison provides reimbursement to residential customers for loss of refrigeration of up to \$450 per customer (\$200 without proof of loss) for spoiled food, and for actual losses for perishable prescription medications. Non-residential customers may be reimbursed for loss of perishable merchandise up to \$9,000 per customer. Total liability is limited to \$15 million per incident, and claims are pro-rated if this amount is exceeded. Liability is limited to outages on distribution circuits (33 kV or less) exceeding 12 hours, when not due to deficiencies in generation or transmission, NYISO directives, customer-owned meters, or conditions beyond the Company's control, such as storms, floods, vandalism, strikes, or fires or accidents.<sup>63</sup>

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<sup>61</sup> The author thanks one of the reviewers, Douglas Elfner, for this information.

<sup>62</sup> One reviewer noted other instances in which a utility would assist customers in preparing for an imminent weather-related outage. In one example, a utility handed out to customers assembled kits with a flashlight, water containers, instructions on coping with an outage, and other items. Another example is a utility delivering portable generators on a flatbed truck to chicken farmers during a power outage. Such actions by the utility definitely help to defuse customer anger and possible lawsuits.

<sup>63</sup> Email response of the New York State Department of Public Service, dated March 27, 2012.

The Reimbursement Tariff began in 1973 in response to distribution-system outages during the previous year. It was designed to compensate customers for certain losses, including food spoilage and loss of perishable items, resulting from power failures caused by malfunctions in the utility's local distribution system. The commission saw reimbursement as appropriate because:

... the rates paid by customers in Con Edison's service territory reflect, in part, the costs associated with maintaining an expensive network distribution system of supposedly high reliability. Since the rates paid by Con Edison's customers include the higher costs associated with this system, we believe it reasonable to provide these customers with additional protection in the event the system fails.<sup>64</sup>

Finally, the commission requires electric utilities to file emergency plans. The plans help to ensure adequate utility response for electric emergencies, such as outages. The utilities are responsible for complying with the plans.<sup>65</sup>

#### **4. California**

One utility, Southern California Edison, has a Service Guarantee Program:

On November 8, 2004, Southern California Edison (SCE) launched a four-point Service Guarantee Program...SCE guarantees that your electrical service will be restored within 24 hours of a power outage...SCE guarantees to notify you of a planned outage at least three (3) calendar days prior to the event. Notification may be made by mail, phone, door-to-door, in person, or by e-mail.<sup>66</sup>

The Public Utilities Commission sets general rules but does not decide on the merits of individual claims for reimbursement. Southern California Edison reviews all claims; if it denies a claim, it will explain why. If the customer is not satisfied, she can file a civil action, including a small-claims action.

Another utility, Pacific Gas and Electric (PG&E), has a Safety Net Program:

We understand how inconvenient it is for customers who go without power for 48 hours or longer due to severe events, such as a storm...If you are a residential customer and have gone without power for at least 48 hours due to severe storm conditions, you may qualify for a payment under PG&E's Safety Net Program.

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<sup>64</sup> New York State Public Service Commission, *Opinion and Order Directing the Filing of Tariff Provisions by Consolidated Edison Company of New York, Inc. to Provide Compensation For Losses Due to Distribution System Interruptions*, Case 3729, July 10, 1973.

<sup>65</sup> The information for New York is derived mostly from the survey responses and a separate email response of the New York State Department of Public Service.

<sup>66</sup> See <http://www.sce.com/CustomerService/request/service-guarantee-program.htm>.

This program provides for the automatic payment of \$25-\$100, which is paid about 60 days following the storm outage...Payment levels are based on the length of the customer's outage: 48 to 72 hours \$25, 72 to 96 hours \$50, 96 to 120 hours \$75, 120 hours or more \$100...In some cases, processing may take 90-120 days (heavy storm season).<sup>67</sup>

To be eligible for payment, the outage must be weather-related and cause substantial damage to PG&E's electric distribution system. Customers who experience an outage of 24 hours or longer that is not related to a storm or severe event may be eligible for a payment under a different program, the Service Guarantee Program.<sup>68</sup>

## 5. Minnesota

Xcel Energy tariffs contain provisions that require compensation to customers who receive service quality below some predetermined standard.<sup>69</sup> Specifically, individual customers receive (a) \$50 in annual compensation for individual customers experiencing at least six interruptions, (b) \$50 in compensation for individual customers per interruption lasting 24 hours or more,<sup>70</sup> and (c) \$200 in compensation to municipal pumping customers per interruption of any duration.

## IV. How Other Industries Handle Compensation: Relevance for Electric Utilities

Some non-electric utilities, such as cable companies, offer compensation to customers. The city of Seattle, for example, has a customer bill of rights for cable customers when the company performs less than satisfactorily. One provision calls for customers to receive free service when service outages extend beyond a specified level.<sup>71</sup> Proposed legislation in Connecticut would require bill credits or refunds to cable customers when service interruptions extend beyond 24 consecutive hours.<sup>72</sup>

Those firms who charge a fixed monthly fee for service, such as Internet-service and cell-phone companies, are more likely to compensate customers by pro-rating their bills based on the

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<sup>67</sup> <http://www.pge.com/myhome/customerservice/energystatus/extendedoutages/>

<sup>68</sup> Ibid.

<sup>69</sup> Customers do not receive compensation if interruptions occur because of Public Damage and Storm Days.

<sup>70</sup> The \$50, assuming 25 kWhs of average daily use of electricity, corresponds to compensation of \$2 per kWh or \$2,000 per mWh, which is within the range of outage-cost estimates from studies.

<sup>71</sup> See [http://www.seattle.gov/cable/CCBOR/Credits\\_to\\_Customers.htm](http://www.seattle.gov/cable/CCBOR/Credits_to_Customers.htm).

<sup>72</sup> See <http://www.cga.ct.gov/2011/rpt/2011-R-0398.htm>.

duration of a service interruption.<sup>73</sup> The rationale is that the fixed bill allows customers not only to access a service but also to use the service.<sup>74</sup>

Unregulated companies infrequently reimburse customers for service interruptions. More often, they compensate customers for product defects. Businesses in general do not reimburse customers for the consequential effects of product- or service-delivery problems that are beyond their control.

Airline compensation to passengers for inferior service has become a topic of national interest. The U.S. Transportation (DOT) Secretary issued final rules in April 2011 on new airline-passenger protections that require airlines to: (1) reimburse passengers for bag fees if their bags are lost, (2) provide consumers involuntarily bumped from flights with greater compensation, and (3) expand the current ban on lengthy tarmac delays. The new rules build on previous DOT protections issued in December 2009, which prohibited U.S. airlines operating domestic flights from permitting an aircraft to remain on the tarmac for more than three hours with exceptions for safety-, security-, and air-traffic-control-related reasons.<sup>75</sup> The new rules also require U.S. airlines to provide basic services such as access to lavatories and water in the event of extended tarmac delays. As remarked by Secretary Ray LaHood:

Airline passengers have a right to be treated fairly. It's just common sense that if an airline loses your bag or you get bumped from a flight because it was oversold, you should be reimbursed. The additional passenger protections we're announcing today will help make sure air travelers are treated with the respect they deserve.<sup>76</sup>

The Obama Administration is touting these rules as the Passenger Bill of Rights.<sup>77</sup> One parallel idea is for state utility commissions to issue a customer bill of rights that would outline customers' basic rights to reliable utility service at just and reasonable rates, with the addition of compensation to customers under specific conditions, such as proof of utility imprudence.

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<sup>73</sup> See, for example, "Utility Customers Expect Compensation for Lost Service," myrecordjournal.com, November 10, 2011 at [http://www.myrecordjournal.com/state/article\\_01cb0764-0c1a-11e1-a942-001cc4c002e0.html](http://www.myrecordjournal.com/state/article_01cb0764-0c1a-11e1-a942-001cc4c002e0.html).

<sup>74</sup> As discussed later, the same rationale can apply to electric utilities, which have both a usage charge and a fixed monthly customer/service charge. The latter charge pays for customer access to the use of electricity; but since an outage precludes access, the utility arguably should reduce the fixed monthly charge.

<sup>75</sup> Violations will result in a fine of \$27,500 per passenger.

<sup>76</sup> U.S. Department of Transportation, "U.S. Department of Transportation Expands Airline Passenger Protections," DOT 51-11, April 20, 2011 at <http://www.dot.gov/affairs/2011/dot5111.html>.

<sup>77</sup> See, for example, Kelly Chen, "New 'Passenger Bill of Rights' Limits Tarmac Time, Reimburses Lost Bags," Public Broadcasting Service, *The Rundown*, April 20, 2011 at <http://www.pbs.org/newshour/rundown/2011/04/passenger-bill-of-rights.html>.

Sometimes when customers experience a service outage of long duration, companies will apologize for the inconvenience and show goodwill by providing compensation. One example is BlackBerry maker Research in Motion's compensation of BlackBerry users in October 2011 for a three-day outage that affected millions of people.<sup>78</sup> As this example shows, compensation in the form of a warranty intends to prevent an exodus of customers switching to competitors (e.g., rival smart phones and Google gadgets) because of a product defect or service interruption.

## V. Designing a Compensation Policy

A fundamental economic question related to utility compensation is, "Who can best minimize outage costs, and who can best absorb the risk of outages: the insurance company, the victim, customers as a group, or utility shareholders?" The widely recognized Coase theorem would say that liability should fall on those parties that can eliminate or mitigate a problem most cheaply.<sup>79</sup> The outcome would be an efficient allocation of risk. This solution, however, evades the question of who should bear the risk from a fairness perspective. The Coase theorem may also conflict with the legal determination of which party should bear the risk. The topic of this paper, in fact, is whether utilities should be liable for household and business damages caused by power outages.

Strict liability (in which the utility is responsible for all outages, irrespective of the cause) might pass an efficiency test, but it might also be unfair to the utility and its shareholders. It presumes that either:

- The utility could prevent and mitigate the outage problem at a lower cost (an efficiency argument) or
- Fairness dictates that the utility absorb all of the costs, because the occurrence and actual consequences of outages are largely under its control.

At the other extreme, if customers and their insurance companies bear the full costs of outages, the utility may have inadequate incentive to minimize outages and their consequences. In a world in which the utility is able to charge a higher price for more reliable service, this problem might not exist. But can regulated utilities charge more? The answer is "yes," to the extent that they can recover the additional costs for more reliable service. Utilities would find it profitable when these costs are rate based, allowing them to earn a compensatory return. In an unregulated market, the firm would tend to take similar action whether it or the customer were fully liable for the damage. The reason is that customers would tend to pay a higher price for

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<sup>78</sup> See [http://money.cnn.com/2011/10/13/technology/blackberry\\_outage/index.htm](http://money.cnn.com/2011/10/13/technology/blackberry_outage/index.htm) and <http://www.rawstory.com/rs/2011/10/13/blackberry-may-be-forced-to-compensate-customers-over-outage/>. The outage stemmed from a core switch failure that cascaded when a back-up system failed to work. The outage primarily affected text messaging and Internet access.

<sup>79</sup> See Ronald Coase, "The Problem of Social Cost," *Journal of Law and Economics*, 3 (October 1960): 1-44.

service comparable to the expected decline in damage resulting from service that is more reliable.

### **A. Expanding customer rights through compensation**

Customer rights typically include receiving reliable service and not paying for service not received. This requirement demands a minimum number of outages and service restoration in a reasonable time. Compensation expands these rights by offsetting, fully or partially, the costs from outages. In other words, compensation shifts rights to customers by holding utilities fully or partially responsible for an outage's inconvenience and costs. From a legal perspective, the utility becomes liable for outage costs.

Some commissions are asking whether utilities should compensate customers for service interruptions. Do customers not have a right to compensation, especially for prolonged service interruptions that have large adverse consequences? Is compensation not fair to customers? The economic losses and inconveniences suffered by customers greatly exceed their bill savings from consuming less electricity.<sup>80</sup>

Would not compensation also give utilities greater motivation to reduce the frequency, duration, and scope of service interruptions? Utilities might find adequate incentive, for example, in lost revenues and additional costs incurred from service interruptions. Further, new ratemaking mechanisms, such as revenue decoupling, may weaken the utility's incentive to avert an interruption or promptly restore service when it can quickly recover lost revenues through an automatic rate adjustment.

### **B. General description of a compensation policy**

Compensation represents a form of punishment for the utility, reparations for actual harm, or just an "inconvenience" payment. In some ways, compensation has features akin to an insurance payout:

1. *Deductibles*: Customers would receive compensation only if outages are beyond a certain duration or threshold level of damage. Customers would be responsible for small damages.
2. *Caps on coverage*: The maximum compensation per household would be \$50, for instance. The rationale is that less-than-full coverage for outage costs might cause customers to feel partially responsible for covering outage costs. That is, partial coverage or a coverage cap provides incentive for customers to devote some effort toward protecting their property and well-being during an outage.
3. *Tightly circumscribed rules*: The utility may require customers to show receipts for damages. Especially if compensation reimburses customers for actual damages, the

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<sup>80</sup> Studies show this phenomenon, defining the value of unserved electricity as the "value of customer reliability," "value of lost load," "customer cost of service interruption," or "outage cost."

utility would want proof to avoid paying out an excessive amount that unduly burdens either its shareholders or its customers as a group.

4. *Denied coverage*: The utility would not reimburse those customers who did something unreasonable that inflated the damage.

### **C. Criteria for evaluation**

Would the world be a better place if utilities compensated customers for service interruptions? Although this question borders on moral philosophy, economics can assist in answering this question by identifying—and, to the extent possible, quantifying—the benefits and costs. Fairness becomes a factor because of inevitable gains and losses to different people. Whether compensation is in the public interest requires regulators to make subjective judgments, if only because of the elusiveness of fairness.

The merits of compensation depend on its perceived fairness and its effect on the behavior of both utilities and customers. Compensation, when funded by utility shareholders, can strengthen a utility’s incentive to avoid service interruptions with potentially high costs. It also seems fair, at first sight, for the utility to reimburse customers for damages caused by a preventable outage. On the other hand, compensation may be inferior from both a fairness and efficiency perspective compared with: (1) *self-protection*, in which the customer spends money to mitigate the effects of a service interruption by buying a surge protector or special insurance, for example; and (2) *higher system reliability* willingly paid for by customers. Even though utility customers have no control over service interruptions, through their actions they can affect the scale of the damage they suffer. Compensation might cause customers to take fewer actions that could cheaply mitigate the effects of a service interruption.

Overall, as a policy matter, compensation involves both fairness and efficiency questions. The following discussion elaborates on them in addition to comparing the effects of compensation with other regulatory options.

#### **1. Fairness to customers and the utility**

In the U.S., balancing the rights of consumers and utilities entails consideration of at least three factors: (1) *legal constraints*—for example, utilities have a right to be given a reasonable opportunity to be financially viable, and consumers have a right to just and reasonable prices; (2) *the regulator’s perception of fairness*; and (3) *compatibility with the public interest*. In the U.S., regulators attempt to balance the interests of different stakeholders with the overall objective of promoting the general good; at least, that is the premise behind the public-interest theory of regulation. Terms like “fairness” and “just and reasonable prices” have subjective connotations that challenge regulators to balance the dual objectives of fairness and economic efficiency.

Defining the basic rights of utility customers helps to drive regulatory decisions. Almost everyone would agree that consumers should have a right to receive a service for which they pay. Conversely, customers should not pay for service they did not receive. Customers should also have the right to adequate service quality, however regulators define it.



From the utility side, what level of profits do utilities have a right to attain? Most observers would contend that a utility should have a reasonable opportunity to recover all of its prudent costs, including the cost of debt and equity, so that it can finance new investments to meet the future demands of its customers. Assume that the regulator and utility customers expect reliable service. It is then fair to allow utility recovery of the costs required to achieve this goal, as long as the utility behaved prudently.

Fairness refers to the relative distribution of the well-being among stakeholders to the regulatory process. Is it fair, for example, to take \$10 from person 1 and give it to person 2? Certainly, person 2 would be better off, but person 1 would be worse off. From a societal perspective, is this redistribution good or bad? The answer partially depends on the additional “utils” to person 2 relative to the decreased “utils” to person 1. If person 1 were wealthy, the decline in his well-being would be unnoticeable. On the other hand, if person 2 were poor, the \$10 could be greatly appreciated. Overall, society would seem to benefit.

But, the more difficult question is, would this redistribution be fair? Reasonable people may disagree: For some, taking money from those who are wealthy to give it to those who are poor is always fair; others would argue that if the wealthy work hard for their money and are deserving of it, it would be unfair just to “tax” them and give the money to someone with less money. Who is right requires the wisdom of a moral philosopher. Economists and other analysts can only identify the trade-offs and quantify them when feasible. Is it good policy to have utility shareholders pay for the damages to customers from a power outage? Many observers would argue that it is always fair but might lead to distorted behavior. Others would contend that the answer depends on who or what caused the outage.

The term “fairness” and its derivative, “fair,” appear commonly in the regulatory arena. We often hear of a “fair rate of return,” “fair and reasonable rates,” “fair value,” and a “fair process.”<sup>81</sup> Because fairness is elusive and enters the domain of philosophy, it becomes difficult to know what is fair and to say that one policy is fairer than another is. Stakeholders’ perceptions of fairness differ; therefore, regulators must balance them to decide what is in the public interest.

What would fairness, as it relates to utility compensation, consist of in the abstract? Certainly, it would differ from the perspectives of the victims, utility shareholders, and customers as groups. The victim may feel that fairness involves full compensation for the losses from an outage. Utility shareholders may argue that as long as the utility was prudent, customers should receive no compensation, or that if they do, the utility should be able to recover the costs. Customers as a group may contend that the utility should be responsible for funding any compensation: It most directly affects the occurrence and management of outages.

Instead of ranking policies based on fairness, regulators might prefer to eliminate those policies that are clearly unfair before determining whether a particular policy passes a “fairness”

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<sup>81</sup> Doug N. Jones and Patrick C. Mann, “The Fairness Criterion in Public Utility Regulation: Does Fairness Still Matter?” *Journal of Economic Issues*, 35(1) (March 2001): 153-72.

test. Regulators may find it easier to say, “I can detect unfairness when I see it” than to say, “I know when something is fair.” The latter usually requires determining that an outcome is fair even though it hurts some people while benefiting others, relative to an alternate outcome. Regulators would then have to make a subjective judgment that a particular redistribution of wealth passes some “fairness” threshold.

One notion of unfairness is that it violates an explicit or implicit social contract. The social contract may include minimum customer rights to utility service or the constitutional rights of utilities for compensatory rates. Below are examples of apparently unfair outcomes that can result from specific regulatory policies on compensation:

1. *Utilities are not able to recover their prudent costs.* One of the tenets of regulation is that utilities should have a reasonable opportunity to recover their prudent costs. Compensation funded by utility shareholders for outages beyond a utility’s control would violate this condition. A utility could surpass a stringent reliability benchmark, for example, and still be “penalized” if it were forced to pay compensation without recovery from customers. One reviewer mentioned the situation in which utilities spend money in preparing for an imminent storm or other severe-weather event that turns out to be less destructive than anticipated. The problem is that, in some instances, a utility has difficulties in recovering its costs. Unless one argues that these utilities were overly cautious, it seems unfair to disallow any of the costs. Any disallowance would strictly reflect second-guessing and create unnecessary additional risk for the utility.
2. *The utility is unable to present its case that an outage was not preventable.* A presumption that a prolonged outage was the utility’s fault might conflict with the evidence. Bad outcomes do not necessarily signify an imprudent utility. Penalizing the utility without conducting a retrospective review presumes imprudence when other reasons may explain an unexpectedly bad outcome. Many people would conclude that, besides giving utilities incentives for distorted behavior,<sup>82</sup> this regulatory practice is also unfair.
3. *Basing electricity prices on cost of service (which most utilities do) but compensation on value of service is discriminatory against utilities.* It seems unfair to require utilities to compensate customers for the full value of their losses when utilities cannot charge customers their full value from consuming electricity.<sup>83</sup>

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<sup>82</sup> A utility, for example, could be motivated to overspend on reliability to avoid outages. “Overspending” means that at an existing level of reliability the marginal benefits from reduced outages are less than the marginal costs.

<sup>83</sup> The latter pricing scheme reflects what economists call “perfect price discrimination.” Under this extreme form of discrimination, the utility would extract all the value that customers receive from electricity consumption. Although economically efficient, most people would consider this outcome to violate a “fairness” test.

4. *Utilities should provide 100 percent reliable service at all times and under all conditions.* Most people would find this condition overly stringent and unfair to utilities if they were forced to compensate customers for all outages. Fairness would then seem to limit compensation to unusually long outages or situations in which the utility performed imprudently in preventing or managing an outage or restoring service.
5. *Commissions do not hold utilities accountable for subpar performance.* Customers bear all of the risks when a utility performs poorly. Many observers would find this outcome unfair to customers, in addition to giving the utility only a weak incentive for reliable service. One alternative is for regulators to monitor and evaluate utility performance, and then to penalize the utility when it could have avoided an outage or restore service more promptly.
6. *Utilities charge higher rates to low-income households to benefit other customers with higher incomes.* Some people might find it unfair to raise rates to all customers, including low-income households, for reimbursing financially well-off customers who suffered damages from an outage.
7. *Customers collect twice on damages suffered.* The customer collects from his insurance company, as well as compensation from the utility. Double payment for the same damage comes at the expense of either utility shareholders or customers as a group. Few people would find this just. Besides, customers would tend to take little action to mitigate damages, in addition to being motivated to inflate damages to the extent possible.
8. *Utilities recover “compensation” costs from customers for damages that prudent utility management would have prevented.* The problem here is that the utility is using ratepayer money to compensate customers for damages that the utility could have avoided with reasonable actions.
9. *Customers bear no responsibility for the damages they suffered from an outage.* It seems unfair for a utility to compensate customers for damages that they could have avoided with reasonable care.<sup>84</sup> Damages suffered by customers depend on their actions, as well as those of the utility. Both parties should share in the responsibility because each has some control over the outcome. It seems unfair, then, to compensate customers for all of the damages.<sup>85</sup> But, as discussed earlier, measuring the harm that a customer could have avoided with reasonable care is next to impossible.

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<sup>84</sup> One interpretation of “reasonable care” is that the customer should use the same degree of care that a person of ordinary prudence would exercise in the same or a similar situation.

<sup>85</sup> As pointed out elsewhere in this paper, it could also be inefficient in the sense that customers would tend to be more careless in controlling the damages from a service interruption.

## 2. Utility incentive for mitigating damages from service interruptions

Assume a stylized model in which customers benefit from electricity usage at the amount  $U$ . Assume also that outages occur at the probability  $p$  with an average damage of  $d$  (i.e., damage per unit of kWh interruption). Consistent with empirical research,  $d$  is much greater than the price of electricity  $p_e$ . On net, a customer's benefit from electricity equals  $U - p \cdot d$ . Because the average U.S. customer relies heavily on electricity, outages can impose a potentially high cost on households and businesses. Overall, customers would be willing to pay up to this  $U - p \cdot d$  for electricity.

Our first question relates to the utility's incentive to mitigate  $p \cdot d$ . The general answer is that it depends on the benefits and costs to the utility. The benefits might include a higher rate base, goodwill, and less liability exposure from compensation funded by shareholders, cost disallowances, insurance deductibles, and fines.<sup>86</sup> On the cost side, mitigating outages requires additional managerial effort, and the inevitable rise in price could reduce the utility's sales.

Existing regulatory policies and requirements may fall short in motivating utilities to provide highly reliable service. What incentives do utilities have? Several come to mind: consumer wrath, legislative/gubernatorial wrath, lost revenues exceeding avoided costs,<sup>87</sup> bad publicity, a commission investigation (e.g., a retrospective audit that evaluates past utility actions), additional costs not recoverable,<sup>88</sup> a fine or other financial penalty.<sup>89</sup>

Whether the utility would provide reliability at the socially optimal level turns partially on its legal liability. When the utility assumes full responsibility for the damages from an outage, it would seem to have maximum incentive to prevent outages and restore service in the shortest possible time. Presumably, in the absence of mandatory compensation, the utility becomes more indifferent about the reliability of its service. This outcome assumes that the utility cannot charge a higher price for more reliable service.

Suppose instead that customers are willing to pay a higher price for electricity that is more reliable. They implicitly calculate that with higher reliability they suffer less damage from

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<sup>86</sup> Legally, fines are civil penalties for violating a commission mandate. Fines can be a fixed dollar amount per day, a dollar amount that relates to the harm from a violation, or an amount that the commission considers "fair" and adequate to deter future violations.

<sup>87</sup> Under typical electric-utility rate structures, when sales decrease or decline to zero, the utility recovers less of its fixed costs, thereby suffering profit losses.

<sup>88</sup> In restoring service, a utility incurs costs that it might never recover. Exceptions include a special rider that allows a utility to recover its costs from a major storm and deferred recovery of the costs during the next rate case.

<sup>89</sup> Penalties for substandard reliability should exceed in dollars the higher costs for a utility to improve its reliability. Otherwise, the utility would prefer to pay the penalty and continue to have substandard reliability.

outages.<sup>90</sup> Able to charge a higher price, the utility would have an incentive to improve its reliability. It would incur additional costs, but it would also receive more revenues, as customers would be willing to pay a higher price. To the extent that customers place a higher value on more reliable electricity than it costs the utility to provide it, the utility stands to profit.<sup>91</sup> In this scenario, compensating customers would not be necessary to motivate the utility to provide reliable service.

### **3. Incentive for customer-mitigative actions**

Compensation to customers for service interruptions may violate what economists call Pareto optimality.<sup>92</sup> The reason is that it could less motivate customers to self-protect against the damage caused by a service interruption. This is analogous to insurance inducing carelessness on the part of property owners when it comes to protecting their possessions from theft (i.e., the “moral hazard” problem). Self-protection on the part of individual customers can cost less than the utility spending additional dollars to improve its reliability or compensate customers after the fact for outage costs.

Many customers pay large sums of money for self-protection. They have purchased services from non-utility providers who deliver such options as on-site generation, energy storage, uninterruptible power supplies, and power-conditioning equipment. Some observers have contended that, in addition to electronics and other new technologies placing a premium on highly reliable service, the reliability of utility service has diminished.<sup>93</sup> These two factors together may explain why self-protection has become more prevalent.

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<sup>90</sup> Customers would differ as to the additional amount they would be willing to pay because of the varying effect of outages on individual customers.

<sup>91</sup> The outcome is also economically efficient in that the increased value of electricity to customers is greater than the additional costs to the utility. The assumption is that customers understand the decrease in the value of lost load from more reliable service.

<sup>92</sup> “Pareto optimality” is an economically efficient world in which no person becomes better off without making another person worse off.

<sup>93</sup> See, for example, American Society of Civil Engineers, *Failure to Act: The Economic Impact of Current Investment Trends in Electricity Infrastructure* (Reston, VA: American Society of Civil Engineers, April 2012). The report warns that if the country fails to make the necessary investments (which involves hundreds of billions of dollars) to upgrade its generation, transmission, and distribution systems, businesses and other power consumers will suffer more frequent blackouts and brownouts, motivating them to develop secondary or backup sources of power. The report estimated that power interruptions could cost an industrial firm between \$2,000 and \$5,000 and a commercial business between \$700 and \$1,300.

#### 4. Comparison with other options for regulators

Monitoring, setting standards, establishing a reward/penalty incentive mechanism, and mandating compensation are ways for commissions to hold utilities accountable.<sup>94</sup> As an example, regulators can measure “reliability” performance as the first step toward a preliminary evaluation of a utility’s performance. The next step involves developing a standard, which can include selecting peer utilities and measuring their average performance. Regulators can then compare this average performance with that of the utility under review. A statistically significant difference can attract the regulator’s attention and lead to further action.

Relatively few utilities compensate customers for outages. Most of those that do not base compensation directly on customer costs. Compensation is more a form of “inconvenience” payment for customers suffering the discomforts of an outage:

We apologize for the outage, as we fell short of meeting our expectations. To compensate you, we will reduce your bill by \$x.<sup>95</sup>

The utility would normally not assign blame to itself. Compensation may represent a “warranty” payment suggesting, “You expect better service from us, so we are going to reduce your bill.” A warranty does not typically provide payment for consequential economic or other losses from a defective product or subpar service. Warranties are usually limited to the replacement of a product or reimbursement for the cost of a product within a limited period. They are essentially an “added value” component of a product by which the firm commits to a given level of responsibility (usually over a specific time) for the performance of the product it sells.

#### D. The negatives of compensation

Mandatory compensation has several debatable negative aspects that make it an undesirable regulatory policy. The word “debatable” implies that not all of the negatives are equally valid. The reader may find a number of them to be dubious. Some of these negatives are conceptual in nature, while others reflect implementation problems. Thus, not all of the

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<sup>94</sup> See Pacific Economics Group, *Service Quality Regulation for Detroit Edison: A Critical Assessment*, March 2007; and Pacific Economics Group Research, *System Reliability Regulation: A Jurisdictional Survey*. The latter study identified several states where regulators require utilities to report on their service-reliability metrics and monitor the utilities’ performance for the metrics:

In the US, eight States and the District of Columbia have system reliability targets for some of the utilities in the State, while 12 States have penalty/reward mechanisms for at least some utilities in the State. Seventeen US States have system reliability monitoring regimes (at 52).

See also Serena Hesmondhalgh et al., *Approaches to Setting Electric Distribution Reliability Standards and Outcomes*.

<sup>95</sup> From the author’s observation, more often electric utilities apologized for a prolonged outage but then defended it as an uncontrollable event and refused to offer any compensation to customers.

negatives preclude compensation—some only convey what features a compensation scheme should avoid. The negatives are as follows:

1. *Proper balancing of customer rights and utility obligations precludes compensation.* A utility's only obligation is to minimize outages, within reason, and to minimize the consequences of an outage, also within reason. Requiring the utility, in addition, to compensate customers for outages after the fact would assign an inappropriate obligation to a utility, especially because customers can affect the damage suffered and some outages are outside the utility's control.
2. *Compensation distorts incentives for customer actions.* Analysts call this problem a "moral hazard," with customers forgoing efficient behavior.<sup>96</sup> Customers can take various actions to avoid or mitigate damages from an outage. Although customers have no legal responsibility to mitigate damages, it seems both unfair and inefficient to reimburse customers for damages that they could have reasonably avoided or mitigated more cheaply than the utility.<sup>97</sup> Just as utilities should be accountable in their actions, customers should also have a duty to take reasonable actions in mitigating the consequences of an outage. If they fail to do so, they should suffer the consequences.<sup>98</sup>
3. *Customers already receive a discount on their bills when the meter stops turning.* It would be inappropriate for the utility to compensate them for any damages.<sup>99</sup>
4. *If compensation is based on actual damage, it becomes difficult to measure and verify the damage.* False claims could become a serious problem. Customers would tend to overestimate damages. It becomes impracticable for utilities to verify the damages, especially for an outage that involves a large number of customers.<sup>100</sup>

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<sup>96</sup> This argument assumes that a utility compensates customers based on their actual losses. It is not applicable when a utility pays customers a fixed amount for outages no matter what the effect is on an individual customer.

<sup>97</sup> As already discussed, avoidance of this situation would be extremely difficult to put into practice. The reader can easily imagine the difficulties, for example, of establishing the threshold for adequate customer mitigation "behavior" that would determine which customers receive compensation and which do not. Although the "moral hazard" problem is a theoretical possibility, its seriousness requires an empirical analysis. The author is unaware of any such analysis.

<sup>98</sup> Without utility compensation or with partial compensation for damages, for example, customers do bear a portion of the costs from their failure to take precautionary actions.

<sup>99</sup> This argument is dubious because, as pointed out elsewhere in this paper, studies have shown that customers' losses from power outages are much greater than any reduction they may receive on their bills.

<sup>100</sup> The author is aware of only four utilities that pay compensation based on actual damages, subject to a cap and other specified conditions. They are Ameren and Commonwealth Edison in Illinois,

5. *Utilities could more effectively allocate the money to upgrade their system and improve their reliability.* Instead of paying compensation, a utility might use that money to upgrade its system, reducing the frequency and duration of future outages. Monies spent on compensation might preclude utility investments that would benefit all customers rather than just those who have experienced past service interruptions.<sup>101</sup>
6. *Everyone's rates could increase, potentially by a nontrivial amount, when compensation has no cap.* The higher rates would hurt those customers who are not receiving compensation. The result is a distributional effect among customers that conceivably could make wealthy households better off and poor households worse off.
7. *When utility shareholders fund the compensation, the financial condition of a utility could deteriorate.* This condition is more likely when compensation has no cap and relates to the actual damages suffered by customers. As discussed earlier, electric utilities typically charge their customers based on cost of service, not on the much higher value customers place on the consumption of electricity. It would be discriminatory against the utility for a regulator to require compensation based on actual customer losses from an outage. Such losses could jeopardize the financial condition of a utility.
8. *It is unfair for the utility to compensate customers when an outage is unpreventable.* Holding a utility strictly liable places it in the inappropriate position of an insurer. Utilities should not be in the insurance business. They lack the expertise and resources to perform this function. A preferred form of utility insurance would come from charging a "premium" price to those customers who want service that is more reliable. (See number 12 below.)
9. *If electricity users want protection against consequential losses from an outage, they should purchase home insurance from companies whose expertise lies in providing that protection.* This approach is more efficient, as insurance companies are experts at pooling and absorbing risks.
10. *Customers might be in the better position to take actions to mitigate outage costs; if so, in theory they, rather than the utility, should be liable for outage costs.* The Coase

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Southern California Edison, and Consolidated Edison in New York. See Parts III.C.1, 2, and 3 of this paper for references to these compensation schemes.

<sup>101</sup> A counterargument is that compensation by itself could motivate a utility to upgrade its system. The motivation depends on the size of the compensation (assuming that the utility is unable to recover it from ratepayers) relative to the incremental cost of upgrades. If, for example, compensation were greater than the incremental cost, the utility would tend to upgrade its system. Whether this outcome is efficient requires that customers value the increased reliability more than the additional costs for upgrading.



theorem (as discussed earlier) says that in promoting efficient risk allocation, liability or any loss should fall on those who can eliminate or mitigate a problem most cheaply. Because the vast majority of U.S. electric utilities are not liable for actual customer damages, the implicit presumption is that customers are better able to mitigate them. Customers can buy insurance, as well as take precautionary and other actions to lessen the financial harm and inconveniences from an outage.

11. *A preferred regulatory policy is to hold the utility accountable by establishing performance standards, imposing a fine or other financial penalty, or mandating an investigation following a high number of customer complaints for service interruptions.* Some of these other options “compensate” all ratepayers (e.g., through downward adjustment of the ROE or less-than-full cost recovery) when the utility performs below a prespecified standard. A financial penalty could go to the state’s general fund, toward dedicated utility activities to improve reliability, directly to those customers harmed by an outage, or directly to all customers in the form of a bill credit.
12. *Other utility options, such as priority or “insurance” pricing, might more efficiently provide insurance to customers for interruptions.* Under this pricing scheme, those customers who pay a higher premium up front would receive more compensation for an outage.<sup>102</sup> Evidence shows that customers suffer widely varying costs from an outage. Some retail customers, for example, are very tolerant of variations in power quality and power interruptions, while other customers are less accepting of power problems. Consequently, customers would be willing to pay different amounts for protection against outages. One common example is interruptible rates for customers who are willing to accept less reliable service in return for a lower rate.<sup>103</sup> As discussed in Part II of this paper, reliability is a quasi-public good in which use of the network by one customer affects available service to other customers. Individual customers ignore the effects of their consumption on other customers, unless the price they pay reflects those effects.
13. *Outages are inevitable, so customers should not be entitled to perfectly reliable service.* A utility, no matter how much money it spends, is unable to prevent outages caused by random and unexpected events. If compensation is defensible, the utility

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<sup>102</sup> Priority service is a form of product differentiation in which the market segments into different priority classes. Those customers willing to pay higher prices gain higher priority in receiving the product or service. Priority service is a rationing scheme for curtailing excess demand in the event of deficient supply, where both efficiency and equity are factors. The theory of efficient rationing suggests that allocation should be according to customers’ valuations of service. *See, for example, Hung-Po Chao and Robert Wilson, “Priority Service: Pricing, Investment, and Market Organization,” The American Economic Review, 77(5) (December 1987): 899-916.*

<sup>103</sup> The rationale for the lower rate is that the utility can spend less on future capacity when a customer chooses interruptible service over firm service.

should only provide it under specific conditions (for example, a prolonged outage or unsatisfactory utility performance in preventing an outage or restoring service).

14. *Customers' insurance policies may cover some of the losses from an outage.* Customers would be overcollecting if the utility compensates them for the same damage covered by an insurance policy.<sup>104</sup>
15. *If utilities cannot recover compensation from customers, they can suffer financially even when they act prudently.* This outcome may violate a fairness standard that this paper discussed earlier.
16. *The regulator might struggle to articulate a specific policy goal for compensation.* Goals can include compensation for: (a) tangible customer losses, (b) an inconvenience payment even when an outage was unpreventable, and (c) reparations or amends for utility wrongdoing. The appropriate size of compensation and the conditions required for compensation depend on the goal. A goal of paying customers only for large losses, for example, would require higher, but less frequent, compensation than “inconvenience” payments.

#### **E. The positives of compensation**

Similar to the negative features of compensation, the positive features may not all be equally valid, and some may be highly questionable. They include the following:

1. *Fairness requires utilities to compensate customers who suffer large losses from an outage.* Why should customers bear the full brunt of a long outage even if the utility is not at fault? Should the utility not guarantee against long outages? We often observe, across different industries, compensation of customers when companies perform below expectations. One good example is a “100 percent customer satisfaction guarantee,” which allows consumers to return a product for any reason and get their money back. Expectations might derive from regulatory standards for the frequency and duration of outages, in addition to other actions that a reasonable utility would undertake (e.g., communicating with customers during an outage).
2. *Compensation strengthens utility incentives to prevent outages and minimize service restoration.* Otherwise, a utility would be weakly motivated to minimize the outage damage.
3. *Compensation in the form of a rebate to electricity customers for lost service is appropriate, given the typical rate design.* Most electric customers pay their utility a monthly service or customer charge. This charge usually includes the direct cost of serving a customer, including the cost for meters, meter reading, billing and collection, servicing an account, call centers, and other costs independent of gas

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<sup>104</sup> This problem would arise if customers file a false claim or if the compensation scheme does not account for the payments made by insurance companies.

usage. These services have no value to customers during a service interruption. It seems reasonable, therefore, for the utility to discount the customer charge. Some analysts refer to customer charges as “access fees.” Service interruptions prevent customers from accessing the network to consume the electricity or other public utility service that benefits them.

4. *Compensation can provide “guaranteed service” to customers based on some prespecified standard.* It can help protect customers against outages that reflect inferior utility performance. Regulators should expect the utility to provide minimum threshold service; the rationale for compensation would be to account for customer inconvenience, not actual financial loss.<sup>105</sup> Compensation, in this sense, is simply fair compensation from the utility for failing to meet the expectations of both customers and the regulator.
5. *Bill reductions from consuming fewer units of electricity fall short of compensating customers.* Reduction of utility bills because of an outage falls far short of the harm from an outage. Studies have shown that customer benefits from consuming electricity are much greater than their electric bills. In the jargon of economists, customers realize large consumer surplus when they consume electricity.<sup>106</sup>
6. *Compensation holds the utility accountable.* Accountability is essential to good regulation. Anything less than compensation would be inadequate. The utility shareholders would absorb the cost of compensation.
7. *Customers are entitled to compensation when utility service falls below some prespecified standard.* A utility should suffer the consequences of subpar performance. It should pay a fine or penalty that goes directly to those customers who suffered interruptible service.
8. *Utilities should be liable for outages because they can mitigate them more cheaply than can customers.* The utility is presumably able to mitigate the damages from an

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<sup>105</sup> In the United Kingdom, for example, the regulator, the Office of the Gas and Electricity Markets (OFGEM), has what it calls Guaranteed Standards in place that require distribution companies to compensate customers, subject to certain exemptions, if the companies fail to restore service within a specified time period. The standards cover 12 areas, including service restoration, connections, and voltage quality. As expressed by OFGEM, the objective is to *compensate customers for the inconvenience caused by an outage, and not for subsequent financial losses*. The mechanism also gives distribution companies incentives to restore service as soon as practicable within a specified time period to avoid paying compensation. See <http://www.ofgem.gov.uk/Networks/ElecDist/QualofServ/GuarStanddds/Pages/GuarStanddds.aspx>.

<sup>106</sup> “Consumer surplus” measures the difference between the value of consumed electricity and the outlays required by a customer to pay for the electricity.

outage at a lower cost than that at which customers can.<sup>107</sup> Thus, as a matter of efficiency, it should be liable for the costs.

9. *Most electric tariffs restrict utility liability to willful or gross negligence.* Commissions have rarely penalized utilities for negligence. Most tariffs are, therefore, ineffective in offering customers compensation or even adequate protections against inferior utility performance. The *status quo* fails to protect customers.
10. *Customers have no control over the occurrence of an outage.* The utility should incur the risk of an outage because its actions influence how often outages happen and how much damage they cause.<sup>108</sup>
11. *The lawsuit option for individual customers is too costly and risky.* Customers find it extremely difficult to go up against a utility and prove negligence.<sup>109</sup> Besides, for many customers the expected gain from filing a claim in civil court is just not worth the time and money. Therefore, regulators should take a proactive role by: (1) mandating compensation from utilities or, at the minimum, (2) ruling on disputes between a utility and an individual customer or a group of customers.
12. *Consumer choice is rarely possible for power distribution.* Customers are unable to switch providers when utility service is poor. Regulation should play a crucial role in ensuring to utility customers that they receive adequate service quality or compensation if service is below expectations.

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<sup>107</sup> Empirical evidence is lacking as to whether utilities are the lowest-cost damage litigator. This evidence would be important in identifying which party, from an efficiency perspective based on the Coase theorem, should be liable for outage damages.

<sup>108</sup> As stated elsewhere in this paper, however, customers do have some control over the damages they suffer from an outage.

<sup>109</sup> A customer would have to show that the utility was negligent, causing it to suffer damages, for example, in the form of spoiled food, water damage to a home, equipment failure, and repair costs.

## **VI. Recommendations for State Utility Commissions**

Three basic questions relating to compensation are as follows: Should the utility compensate customers for outages? If so, under what conditions should it pay and how much? Utility accountability means that when a utility performs poorly it should pay a price. The price could be a fine or other financial penalty or compensation to its customers. The vast majority of state commissions do not require compensation, while several hold utilities accountable in other ways.

This paper enumerates the reasons why state utility commissions seldom require compensation. Compensation raises both theoretical and practical questions for regulators. Paying individual customers for actual losses from outages has more negatives than positives. It places utilities in the role of insurance companies, which expands the responsibility of a utility in a dubious direction. Implementation problems arise from the difficulty of measuring and verifying the damage. False claims could become a problem. Customers would tend to overestimate the damage caused by outages. It becomes impracticable for utilities to validate customer claims, especially for an outage that covers a large number of customers. Customers also might receive duplicative payments—from both their insurance companies and the utility.

Rarely discussed is the “moral hazard” problem that could weaken incentives for customers to mitigate the damages from an outage. Customers and their utilities both affect the damages from an outage. Although individual customers have no control over the occurrence of an outage, they can take precautionary actions that would reduce the damage they suffer. Thus, compensation may be excessive in reimbursing customers for damages that they could have reasonably avoided.

A key question relates to the necessary conditions for compensation. The answer depends on the reason for compensation. If compensation is a form of reparation, then customers should receive it only if the utility did something wrong. The utility, for example, may have neglected tree trimming or been lax in restoring service.

Alternatively, viewing compensation as a warranty payment would require the utility to pay it irrespective of the cause of an outage lasting (for example) beyond 24 hours. Compensation would be akin to an “inconvenience” payment unrelated to actual customer losses. This type of compensation seems more defensible from a policy perspective in its relative ease of implementation and the fact that it specifies beforehand the dollar amount paid to each customer. Warranties are common in other industries, as they assist firms in avoiding public-image problems that could lead customers to migrate. “Warranty” payments by regulated utilities would improve their goodwill and likely lessen the chances of political retribution from prolonged or frequent outages.

One approach that regulators might want to consider seriously is monitoring and evaluating utility performance on a periodic basis.<sup>110</sup> Several state commissions take this approach today. Monitoring has four major purposes: (1) to report and evaluate utility performance in preventing and managing outages; (2) to propose changes to regulatory policies and practices to improve utility performance; (3) to determine utility compliance with rules, guidelines, and expectations; and (4) to apply any mitigating actions when necessary.<sup>111</sup>

As an illustration, regulators can assess the utility's performance by comparing actual performance with a prespecified standard. Any substantial deviation can reflect exceptionally good or bad performance. The utility would then have the opportunity to respond to the evidence of bad performance, with subsequent evaluation by the regulator. Based on its review, the regulator can then choose among various actions. These actions include disallowing utility recovery of some costs, conducting a more detailed investigation (such as a retrospective management audit), and creating stronger incentive by rewarding or penalizing the utility for exceptionally good or poor performance. If a utility performs less than satisfactorily, for example, the regulator can impose a financial penalty.<sup>112</sup> If not prohibited by statute, the utility can distribute the penalty to customers experiencing an outage, or the utility can use the money to upgrade its service.

Although the vast majority of commissions do not mandate compensation, many would likely have that authority if they desire to exercise it. Unless statutes prohibit compensation, commissions might want to pursue the idea. After all, legally speaking, commissions, rather than the courts, seem to have authority to determine what constitutes adequate service and whether the utility fulfilled its responsibility of providing adequate service.

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<sup>110</sup> One commission, the Florida Public Service Commission, has reporting requirements on service quality and monitors service quality through its annual service-reliability reports. The commission also reviews a utility's quality of service during a rate case. The commission handles any service-quality concerns raised through these venues on a case-by-case basis.

<sup>111</sup> One reviewer raised the relevant question of whether the "data" from monitoring should come from the utilities themselves or from regulatory personnel doing fieldwork and observing utility activities and facilities. The former is lower cost to the regulator, but it might provide incomplete and even misleading information.

<sup>112</sup> The assumption is that the regulator has legal authority to impose a penalty.

## Appendix A: Questions Commissions Can Ask Themselves

1. Has your commission studied its legal authority to require electric utilities to compensate customers for service interruptions?
2. What standards or obligations—e.g., reasonable effort or diligence to provide regular and uninterrupted electric service—does your commission impose on electric utilities for service reliability? Do the electric tariffs in your state contain provisions, for example, on:
  - a. When a utility is liable for service interruptions (e.g., willful neglect)?
  - b. When a utility is not liable (e.g., causes beyond the reasonable control of a utility)?
  - c. If you answer “yes” to either (a) or (b), what is the exact language in the tariffs?
3. If electric utilities have previously failed to meet those standards or obligations, what action has your commission taken? For example, has your commission conducted an investigation, imposed a fine, required compensation to customers, or lowered the authorized rate of return?
4. Have customers taken electric utilities to court asking for utility compensation following a service interruption? If so, what were the courts’ decisions?
5. If electric tariffs contain the term “willful neglect” or “gross negligence,” how does your commission define it?<sup>113</sup>
  - a. Does your commission distinguish between the terms “willful neglect” and “imprudence”?
  - b. Does your commission have authority over determining whether electric utilities are guilty of “willful neglect” or “gross negligence,” or do courts have to make this determination?
  - c. Has your commission ever charged electric utilities with willful neglect for substandard service or reliability? If so, were the utilities fined or held accountable in some other way?
6. Does your state statute or constitution contain any reference to electric utility compensation for service interruptions? If so, what does the statute or constitution say?
7. Is your commission legally prohibited from imposing fines on electric utilities for subpar reliability (e.g., unusually high frequency of service interruptions, poor management of service restoration)?

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<sup>113</sup> One response from the Illinois Commerce Commission to NRRI’s survey remarked that:

Illinois courts have defined “gross negligence” as an omission of that degree of care which “men of common sense and common prudence, however inattentive, ordinarily take of their own affairs[.]” *Nicte-Ha v. Teichert*, 119 Ill. App. 2d 336, 256 N.E. 2d 140 (1st Dist. 1970).

8. Is your commission legally prohibited from requiring electric utilities to compensate their customers for service interruptions?
9. Are fines that electric utilities pay for subpar reliability directly refunded to customers? If not, how are they disposed of? How often and in what amounts has your commission fined electric utilities for subpar reliability?
10. What does your commission consider a “reasonable effort” by the electric utility to: (a) avoid service interruptions and (b) manage an outage and restore service in the shortest possible time?
11. Does your commission require electric utilities, pursuant to statutes or rules, to compensate customers for service interruptions? If so, what are the conditions and amounts?
12. If your commission does not require compensation, do electric customers have the right to seek compensation from a utility? If so,
  - a. What is the procedure they need to follow?
  - b. What obligation does a utility have to a customer who petitions for compensation?
  - c. What is the role of your commission in adjudicating the matter?
13. Have your electric utilities ever voluntarily compensated their customers for service interruptions?<sup>114</sup> If “yes,”
  - a. What caused the interruptions?
  - b. How long were the interruptions?
  - c. How did the utilities determine the level of compensation?
14. Has your commission ever considered compensation to electric customers for service interruptions without actually making the decision to mandate it?
15. What incentives do electric utilities have under your jurisdiction to: (a) avoid service interruptions and (b) minimize the adverse consequences to customers from service interruptions?
16. Has your commission ever attempted to estimate the costs of electric service interruptions to customers? If so, has it used these estimates in reaching a decision or in some other capacity?
17. What would your commission consider imprudent behavior or willful neglect by an electric utility in preventing and managing service interruptions?

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<sup>114</sup> One response from the Illinois Commerce Commission to NRRI’s survey mentioned that in 2000 Commonwealth Edison offered compensation to customers with service interrupted for eight hours or more because of summer heat (\$60 for residential customers; \$100 for businesses). The response noted that the utility offered compensation following substandard reliability during the summer of 1999.



18. What does your commission consider the minimum rights that customers should have with regard to reliable electric service?
19. What does your commission regard as the responsibility of an electric utility to customers following a prolonged service interruption (e.g., beyond 24 hours)?
  - a. Does that responsibility rest on whether the utility was at fault or the situation was beyond its control?
  - b. Would responsibility ever include compensating customers?

## Appendix B: Legal Issues

1. Commission authority to mandate compensation
  - a. Legal constraints
  - b. Commission discretion
2. Legal standing of tariffs in the court of law
3. Utility legal obligation to provide reliable service
4. Customer legal rights to reliable service
  - a. Appeal to the commission
  - b. Appeal to the courts
5. Meaning of “willful neglect”<sup>115</sup> or “gross negligence” (from regulatory and judicial perspectives) versus “imprudence” (from regulatory perspective): <sup>116</sup> any difference?
6. Strict liability versus limited liability
7. Definition of prudent utility behavior relating to outage prevention and management
8. Why relatively few electric utilities have tariffs that provide compensation to customers for outages other than under extreme conditions
9. Authority of the courts versus commissions in determining:
  - a. The adequacy of a utility’s reliability
  - b. Any compensation that customers should receive for inadequate reliability
10. Meaning of “reasonable effort” or “diligence”
11. Meaning of “beyond reasonable control of a utility”
12. Evidence required in court for successful litigation by a complaining customer
13. Compensation versus fines (from regulatory and legal perspectives)
14. Legal recourse of customers when a commission does not mandate compensation
15. Legal responsibility of a utility following a prolonged outage

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<sup>115</sup> Does “willful,” for example, depend on the context of a situation? Some legal experts refer to it as intentional, as opposed to the inadvertent, the deliberate, and the voluntary. A “willful violation” may mean a deliberate intent to violate a regulation or law—for example, performing an act that regulations prohibit, intending to refrain from performing an act that regulations require, or acting indifferently regarding whether or not an action or inaction violates regulations. For example, willful misconduct might be a utility not undertaking additional tree trimming when the commission mandated it.

<sup>116</sup> Imprudent behavior might result in longer-than-necessary service interruptions, an excessive number of interruptions, or poor communications with customers during a service interruption.