Expanding the Role of Commercial Insurance in the Electricity Sector to Promote Improved Bulk-Electric System Reliability

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EXECUTIVE SUMMARY

The events of the August 14th, 2003 blackout in the northeast United States and Canada left approximately 50 million people without power and cost billions of dollars in economic losses. The cascading effect of the blackout brought into question the reliability of the nation's electricity sector, the economic impact it had on our country, and the interdependencies on the other critical infrastructure sectors affected.

In response to the rise in hazards both manmade and natural, the Department of Energy's (DoE) Office of Electricity Delivery and Energy Reliability (OE) renewed the intensity of a focus on identifying electricity system vulnerabilities, enhancing system protection and restoration, and speeding disaster recovery. As part of that effort, DoE OE provided a grant to the Critical Infrastructure Protection (CIP) Program at the George Mason University School of Law to investigate the feasibility of creating and/or expanding a robust commercial insurance market for coverage of catastrophic (low probability but high impact) damage to the electricity system.

After nearly a year of research and analysis, the CIP Program presented its results and sought the collective feedback of a significant group of stakeholders in the process at a workshop entitled "Protecting the Electricity Sector's Infrastructure: Building the Business Case for Commercial Insurance." The purpose of the workshop was to identify potential roles for insurance in enhancing infrastructure protection activity in the electricity sector. Attendees at the workshop included participants from the insurance and energy industries, the energy research community, and the federal government. A detailed report on the entire Workshop is included in this document as Appendix A.

Although it was prefaced by months of research, this workshop was the starting point for a new chapter: based on what we know so far, can commercial insurance be used as a mechanism for increasing critical infrastructure protection?

This paper presents analysis and discussion of the three most challenging topics addressed during the two-day workshop. These three topics appear to present the most opportunity for growth and exploration in the months and years to come, and the most pressing in terms of public safety.

The paper is organized into three major sections. The first section discusses the workshop participants' recommendations on the importance of, and need for, mandatory reliability standards in the electricity sector. The second section addresses the role that commercial insurance can and could play in supporting an efficient approach to catastrophic risk

mitigation and recovery. The last section examines the role of the Terrorism Risk Insurance Act (TRIA) which was facing sunset at the time of the Workshop, but which was nominally renewed on December 22, 2005, when a modified version of TRIA, with an extension to December 31, 2007, was signed into law.

A number of recommendations were identified both during the course of the Workshop and as a result of continued investigation of the many facets and factors influencing investment in the electric power infrastructures. These recommendations are discussed throughout the report, but are summarized below to bring into focus potential actions and the numerous questions that remain for investigation and further research.

Recommendations

Reliability Standards Issues

- *Recommendation 1*

  The DoE should initiate a focused meeting with the major stakeholders in the insurance industry to better define linkages between insurance capacity and reliability standards.

- *Recommendation 2*

  The insurance industry should actively participate and comment on future rulemakings concerning reliability standard implementation to be issued by the Federal Energy Regulatory Commission (FERC) [hereinafter referred to as the Commission] in order to promote the development of the insurance market for the electricity sector. The insurance industry has a unique opportunity to both educate the Commission and impact future rules on standard compliance and enforcement which might incentivize insurance products and capacity.

- *Recommendation 3*

  The insurance industry should participate with the North American Electric Reliability Council (NERC) on the development of reliability standards.

- *Recommendation 4*

  NERC and the insurance industry should establish a formalized relationship to ensure that continued design and implementation of the NERC functional model does not unnecessarily inhibit the development of insurance products.

- *Recommendation 5*

  The Commission and NERC should investigate whether future noncompliance with a standard will constitute a potential liability and whether or not functional model designations would have any bearing on such liability. A formal and ongoing dialogue

should be established with the insurance industry to discuss the current functional model and future revisions.

- *Recommendation 6*

  The DoE and NERC should establish an ongoing mechanism with the insurance industry to discuss and promote Readiness Audit findings and examples of excellence to build insurance capacity and promote risk mitigation.

- *Recommendation 7*

  To acquire the needed data, NERC may need to modify or authorize new standards related to data collection consistent with the findings of the EIA report on data needs. The following two standards should be examined for modification:

  - NERC standard TPL-006-0, Assessment Data from Regional Reliability Organizations (NERC, Reliability Standards webpage, 2005); and

  - NERC Standard TPL-005-0, Regional and Interregional Self-Assessment Reliability Reports (NERC, Reliability Standards webpage, 2005).

- *Recommendation 8*

  The DoE, the Commission and NERC should work to implement the data collection changes referenced in the EIA report. More specifically, the EIA recommendations on form changes should be considered in the upcoming Commission rulemaking on reliability standards.

- *Recommendation 9*

  NERC and/or the Commission must ensure that future compliance data for each individual requirement within each standard is collected, stored and managed in a manner to enable statistical comparisons, contrasts and time series analysis between (1) bulk-electric system owners, operators and users, (2) interconnections, (3) regions, (4) Regional Transmission Organizations (RTOs)/ ISOs and (5) control areas. This will be a non-trivial task with approximately 140 control areas and 3,100 utility service areas within North America

- *Recommendation 10*

  NERC, the Commission, DoE and National Association of Regulatory Utility Commissioners (NARUC) should establish a reliability working group with the insurance industry to collect and share industry-specific data on reliability for infrastructure components of the bulk electric and distribution system.

Insurance Market Issues

- *Recommendation 1*

  The DOE, in conjunction with NARUC, should conduct a detailed inventory of State Public Utility Commission statutes, regulations and orders on reserve funds and accounting treatments to assess the applicability of commercial insurance to transfer risk associated with storm restoration costs. These data would provide an accurate determination of the commercial insurance capacity required to replace self insurance or to supplement deficiencies in reserve fund or accounting deferral accruals. This effort should include a detailed breakdown of transmission and distribution restoration costs utilizing FERC Form 1 data or accounting data from State Public Utility Commission proceedings on reserve fund and accounting treatments for capital and/or O&M restoration costs.

- *Recommendation 2*

  The DOE and appropriate insurance industry participants should analyze the potential increase in insured participants, and the resultant impacts to capacity, in a **mandatory** pool for transmission insurance among utility companies and electric sector entities.

- *Recommendation 3*

  The DOE, FERC, NARUC, NERC and the insurance industry should initiate a study to assess any potential impacts of NERC and regional reliability standards on optimal pool geography and the implications on the future success of insurance capacity and products. In particular, research is needed to determine if mandatory pools aligned on either an interconnection-wide basis or regional reliability boundaries could reduce or eliminate adverse selection concerns.

- *Recommendation 4*

  Due to the potential future importance of CAT bonds and other financial instruments in securitizing catastrophic risk, the NARUC, NAIC, FERC and DOE in cooperation with the broader insurance and financial industry should develop and promote an educational program to inform state and federal regulatory commissions about the securitization of insurance risk in the electric sector.

- *Recommendation 5*

  The DOE should investigate the European Federation of National Insurance Associations (CEA) and Florida Hurricane Catastrophe Fund (FHCF) as potential models for reinsurance within the electric sector. In particular, application of such reinsurance funds could be coupled with the mandatory insurance suggested by the workshop participants and applied on a NERC Regional or interconnection-wide basis for asset recovery following a catastrophic event.

- *Recommendation 6*

  The NARUC, NAIC, FERC and DOE should sponsor a workshop or initiate a dialogue on the applicability of commercial insurance in the electric sector to establish common state and federal elements on electricity and insurance regulation.

- *Recommendation 7*

  An ongoing educational program on insurance industry issues (both general and specific) within the electric sector should be developed for State Public Utility Commissioners. Such an effort is especially needed due to the low-average tenure and turnover of State Commissioners and the important role which State Commissioners have in approving cost-recovery of self-insured funds, accounting treatments and commercial insurance premium costs related to system restoration costs.

- *Recommendation 8*

  The DOE, in conjunction with State Public Utility Commissions, should sponsor applied research on the feasibility of implementing reliability insurance in the U.S. electric sector. The research would need to address, at a minimum, the issues discussed above and how reliability insurance could be merged with quality of service standards approved by the respective State Public Utility Commission.

  TRIA

- *Recommendation 1*

  DoE should convene a meeting of the participants at the OECD Paris Conference on Catastrophic Risk Insurance (and any other relevant identified parties) to a follow-on conference specifically devoted to ascertaining the status of efforts related to, and potential for, a global catastrophic risk reinsurance market or agreement.

Conclusions

The role of insurance in mitigating catastrophic risk and in enhancing reliability is actively discussed in academic literature across the Western world. In theory, insurance has a role to play in promoting the adoption and compliance with security and reliability standards. In theory, insurance has a role to play in promoting the adoption and compliance with security and reliability standards. In reality it seems that insurance plays a confined and specific role in the electricity sector, principally as a means of protecting the electricity business (largely in the area of generation) from standard operating risks common to most businesses. From this research, it is apparent that the insurance industry is not yet interested in assuming a role in fostering increased investment in electric utility infrastructure protection without the enforcement of reliability standards and valid data associated with the criteria for assessing reliability. Thus, the role of insurance in managing reliability or in mitigating costs of catastrophe is not an active issue for discussion within the practitioner communities.

It is generally agreed by Workshop participants that any new insurance products should focus exclusively on the transmission components of the bulk-electric system. The majority of the discussion on insurance markets, products and regulatory processes focused on two major areas: 1) how to best approach restoration and cost recovery following a destructive event; and 2) how to best develop insurance capacity or products to enhance electric system reliability.

The workshop participants reached consensus that the adoption of mandatory, enforceable reliability standards in the electricity sector is essential to ensure bulk electric system reliability and to promote the development of competitive insurance markets. Such standards would serve as a metric to improve reliability and as a benchmark for risk analysis and mitigation efforts.

Based on the workshop participants' expert insights and the Energy Information Agency report of 2004, research is clearly needed into the types of data required to assess, with statistical accuracy, improvements to bulk-electric system reliability resulting from the implementation of mandatory standards. In addition, as these data become available, insurance market metrics should also be studied for possible correlation with any measurable improvements in the utilities compliance with reliability standards.

The Workshop participants agreed that separate insurance instruments or products should be developed for terrorism threats versus natural events. The formation of a national captive pool was suggested as a possible mechanism.

Many open-ended questions remain as the implementation of the electricity reliability provisions of the Energy Policy Act of 2005 move forward. Much will depend on the successful creation of the Electric Reliability Organization, the utility and viability of the reliability standards it establishes, the industry's compliance with the standards, the requirements for data collection, storage, and analysis, together with fair, but rigorous enforcement of the penalty scheme.

INTRODUCTION

The image of two of the world's tallest and most iconic buildings tumbling to the ground has imprinted upon the American mind the startling vulnerability of our critical infrastructure. Barely two years later, the events of the August 14th, 2003 blackout in the northeast United States and Canada left approximately 50 million people without power and cost billions of dollars in economic losses. The cascading effect of the blackout brought into question the reliability of the nation's electricity sector, the economic impact it had on our country, and the interdependencies on the other critical infrastructure sectors affected.

In response to the rise in hazards both manmade and nature, the Department of Energy's (DoE) Office of Electricity Delivery and Energy Reliability (OE) renewed the intensity of a focus on identifying electricity system vulnerabilities, enhancing system protection and restoration, and speeding disaster recovery. As part of that effort, DoE OE provided a grant to the Critical Infrastructure Protection (CIP) Program at the George Mason University School of Law to investigate the feasibility of creating and/or expanding a robust commercial insurance market for coverage of catastrophic (low probability but high impact) damage to the electricity system.

After close to a year of research and analysis, the CIP Program presented its results and sought the collective feedback of a significant group of stakeholders in the process at a workshop entitled "Protecting the Electricity Sector's Infrastructure: Building the Business Case for Commercial Insurance." The purpose of the workshop was to identify potential role(s) for insurance in enhancing infrastructure protection activity in the electricity sector. Attendees at the workshop included participants from the insurance and energy industries, the energy research community, and the federal government. A detailed report on the entire Workshop is included in this document as Appendix A.

Although it was prefaced by months of research, this workshop was the starting point for a new chapter: based on what we know so far, can commercial insurance be used as a mechanism for increasing critical infrastructure protection? To achieve the purpose and outcomes, the two-day workshop was organized into five distinct portions:

- The Status Quo - Where Are We In Assuring a Reliable Flow of Electric Energy?
- Mind Meld: Where Is the Electricity Sector Most Vulnerable?
- A Primer on the Economics of Classical Insurance
- Where Do We Want to Go?
- Possible New Role(s) for Insurance-Breakout Sessions
    1. Support Expanded Insurance Markets and Products Group
    2. Non-Supportive of Insurance Markets and Products Group
    3. Legal and Regulatory Issues Group

To start the participants thinking about the workshop's purpose, **The Status Quo** portion of the first day involved three basic briefings including an introduction of the role of electricity in the insurance sector and the general findings of the project to date; an overview

of regulated and deregulated electricity models, including regional transmission organizations (RTOs); and an overview of the interface between electricity reliability issues and insurance.

The **"Mind Meld"** portion of the workshop was a facilitated session with the goal of linking insurance-sector perspectives on risk management to known or perceived electricity sector vulnerabilities.

The participants were given a **Primer on the Economics of Classical Insurance** by a long-time insurance industry practitioner.

The **Where Do We Want to Go?** Part of the first day included a briefing on the Energy Policy Act of 2005 (which, as seen in the discussion and reflected by later sections of this paper, has significant impact on risk management practices for the electricity sector). This segment also allowed participants to gain a common understanding of relevant, available insurance products currently on the market and why such products are not highly sought after.

For the last exercise of the first day, workshop participants split into three groups. One group, the so-called Believers, was charged with developing a set of possible solutions or outcomes to promote the development of additional insurance markets and products in the electricity sector. The second group, or Non-Believers, was charged with generating alternatives to insurance for mitigating catastrophic risk in the electricity sector. The third group was given the responsibility of identifying any clear legal, regulatory, or policy barriers to an expanded role for the commercial insurance market in mitigating catastrophic risk to the electricity sector.[1]

The second day of the workshop began with a summary of the first day's events, a presentation of the three breakout groups' findings, and a discussion of the main points of consensus and contention among the group as a whole. The participants concluded the workshop by identifying and clarifying each observation about current or potential roles for insurance (and closely related issues) that the group had generated during the workshop.

This paper presents analysis and discussion of the three most challenging topics addressed during the two-day workshop. These three topics appear to present the most opportunity for growth and exploration in the months and years to come, and pressing in terms of public safety.

The paper is organized into three major sections. The first section discusses the workshop participants' recommendations on the importance of, and need for, mandatory reliability standards in the electricity sector. The second section addresses the role that commercial insurance can and could play in supporting an efficient approach to catastrophic risk mitigation and recovery. The last section examines the impending sunset of TRIA, and that in light of global discussion on the topic of structuring catastrophic risk management, is undesirable.

[1] Detailed reports on the entire day, including all three breakout sessions are included in this document as Appendix A.

I. The Need for Mandatory Reliability Standards

Workshop Summary

The workshop participants reached consensus that the adoption of mandatory, enforceable reliability standards in the electricity sector is essential to ensure bulk electric system reliability and to promote the development of competitive insurance markets. Such standards would serve as a metric to improve reliability and as a benchmark for risk analysis and mitigation efforts. It was suggested that mandatory standards could catalyze the incremental improvement and expansion of existing insurance markets and products. Meaningful compliance and enforcement of such standards was also viewed as critical to ensure that transmission-owning companies conduct proper planning, operation and system maintenance. However, concern was expressed that mandatory reliability standards and penalties for non-compliance could result in rate increases. Balancing insurance premiums and deductibles versus the post-event use of "self-insured" reserves would need to be assessed.

It was also suggested that insurance products benchmarked to reliability standards could improve the ability of transmission-owning companies to obtain lower cost capital to construct additional transmission facilities. In particular, independent transmission-owning companies could benefit most from improved access to lower cost capital. However, the group consensus was that an adequate market or capacity[2] for transmission insurance would not develop in the near term. The workshop participants concluded that should the insurance market develop, it alone would be inadequate to incent additional transmission investment, resulting in limited improvements to reliability directly attributable to insurance.

The workshop participants also indicated that additional research is needed to selectively improve data collection in the electricity sector in order to improve risk analytics. Areas of data grouping might include system construction and reliability of components, operation and maintenance costs, and system restoration costs to the insurance capacity that is needed. Given that data and information about the physical characteristics of the energy infrastructure and various cost components is highly sensitive from both the market and national security perspectives, adherence to protected critical infrastructure information sharing protocols and rules for these data is a priority issue.

[2] The term capacity is a measure of the supply of insurance available to meet demand and is dependent on the industry's financial standing to accept risk.

Discussion

Energy Policy Act of 2005

Subsequent to the workshop, the Energy Policy Act of 2005 was signed into law by President George W. Bush on August 8, 2005. Under Section 1211, Subtitle A of the Electricity Title (also known as the Electricity Modernization Act of 2005) the Federal Energy Regulatory Commission (Commission) was granted "jurisdiction within the United States over an Electric Reliability Organization (ERO), regional entities, and all users, owners and operators of the bulk-power system" with regard to the approval and enforcement of reliability standards (Energy Policy Act of 2005). The Commission was required to issue a final rule to implement the reliability standards no later than 180 days after the date of enactment of the Act, February 8, 2006. The Commission met the deadline.

Passage of Section 1201 addresses one of the principal issues brought forward by the workshop participants on how to improve reliability by incenting the development of competitive insurance markets in the electricity sector. Because of the importance of reliability to the general economic and financial viability of the electricity sector, the requirement for mandatory reliability standards may also improve investor confidence in the electricity sector. A recent report by PriceWaterhouseCoopers (2005) found that "inconsistent regulation and continuing regulatory uncertainty were damaging investor confidence. . . .[despite] unambiguous demand and growth prospects" in the energy utility sector. Mandatory standards will balance regulatory inconsistencies by requiring all users, owners and operators of the bulk-power system to comply with one clear set of rules. Moreover, the mandatory standards should also minimize or eliminate varying levels of reliability and compliance between Regional Reliability Councils (Regions) and inconsistent State Public Utility Commission (PUC) regulatory oversight for cost recovery of reliability-associated facilities.

However, whether or not a linkage exists between mandatory reliability standards and improved insurance markets and products remains an open-ended question. One important consideration will be the effectiveness of the Commission and the ERO regarding standards development, compliance and enforcement. Rigorous standards to promote risk mitigation coupled with penalties designed to improve reliability could bring needed capital and investment to create the desired insurance markets. The Commission will need to carefully design the penalties for noncompliance to enable transparent and unambiguous regulatory and market signals.

- *Recommendation 1*

  The DoE should initiate a focused meeting with the major stakeholders in the insurance industry to better define linkages between insurance capacity and reliability standards.

- *Recommendation 2*

  To promote insurance market development in the electricity sector, the authors strongly recommend that the insurance industry actively participate and comment on future

rulemakings concerning reliability standard implementation to be issued by the Commission. The insurance industry has a unique opportunity to both educate the Commission and impact future rules on standard compliance and enforcement which might incentivize insurance products and capacity.

NERC Reliability Standards

NERC initiated a number of actions to facilitate the process of ERO implementation prior to the passage of the Energy Policy Act of 2005. These changes included creating an independent Board of Trustees, establishing independent and adequate source(s) of funding for NERC, and the conversion of existing standards to ensure unambiguous compliance and enforcement (NERC, Reliability Legislation webpage, 2005). The legislation makes compliance with NERC and regional reliability rules mandatory and enforceable. NERC has also formed a Post-Legislation Steering Committee to oversee NERC's application to the Commission for certification as the ERO. NERC is now working to implement the reliability provisions of the energy bill and gain recognition as the ERO in the United States and Canada. Approval of NERC's application will result in the formation of an independent, international electric reliability organization with the authority to develop and enforce reliability standards for the entire North American bulk electric system. NERC's goal is to become certified and begin operation as the ERO by January 1, 2007 (NERC PLSC webpage, 2005).

NERC recently approved Version 0 of its electric reliability standards which became effective April 1, 2005. Version 0 standards are a direct translation from the prior NERC standards, but have been modified to ensure consistency with NERC's functional model. Standards are updated through an ANSI-approved process. Currently, a total of 91 separate standards have been approved for 14 separate technical categories including the following:

Resource and Demand Balancing	Protection and Control
Modeling, Data, and Analysis	Facilities Design, Connections and Maintenance
Critical Infrastructure Protection	Transmission Operations
Organization Certification	Interchange Scheduling and Coordination
Communications	Transmission Planning
Personnel Performance, Training, and Qualifications	Interconnection Reliability Operations and Coordination
Emergency Preparedness and Operations	Voltage and Reactive

In addition, more than 60 new standards are in various stages of the development process at NERC including cyber security and Phase III/IV planning standards.

One of the important outcomes of improved compliance with the reliability standards could be to reduce the likelihood of extreme or catastrophic events such as the August 2003 Blackout. Such events are addressed in Category D of NERC Standard TPL-004-0-System Performance Following Extreme BES Events (NERC, Reliability Standards webpage, 2005). If insurance products for the transmission system were developed, the insurance industry may be able to incent improved reliability and risk mitigation by requiring improved

statistical or risk analysis of the occurrence of extreme events and other lesser category contingencies. Improved risk mitigation could both increase the capacity of companies providing new insurance products in the electricity sector and potentially lower insurance costs.

- *Recommendation 3*

  The insurance industry should participate with NERC on reliability standard development. Participation could take on a number of forms including insurance industry comments on proposed reliability standards or future participation in NERC stakeholder meetings or the NERC Registered Ballot Body.[3] It should be noted that the current configuration of the Ballot Body would need to be potentially amended to accommodate insurance industry participation.

NERC Functional Model

The NERC Functional Model was developed to provide a flexible framework for developing standards for reliability and requirements for organization certification. The Model was also intended to improve the assignment of responsibilities for reliability in the restructured bulk-electric system where vertically-integrated utility functions (generation, transmission and distribution) have been unbundled (NERC Reliability Functional Model webpage, 2005). NERC included the functional model in the Version 0 standards to clarify and better define the specific entities responsible for compliance. In its original form, 15 various functional entities were proposed to address the operation and planning of the bulk-electric system. To effectively monitor compliance, each NERC region has identified entities responsible for compliance with the standards (NERC Regional Entity List webpage, 2005).

However, ambiguity in the functional model groupings has resulted in questions as to whether responsible entities were accountable for only a subset of requirements of a certain standard or accountable for all the requirements associated with some function (NERC Functional Model – Reliability Standards Coordination Task Force, 2005). Inconsistencies in the applicability of the functional model in the Version 0 and draft standards resulted in the formation of the NERC Functional Model – Reliability Standards Coordination Task Force (FMRSCTF). In March 2005, the FMRSCTF made a number of recommendations to improve implementation of the functional model and future compliance with standards. Among other things, the FMRSCTF recommended that (1) responsible entities should be held accountable for compliance with reliability standards, and (2) accountability for operating and planning tasks should be clearly linked to bulk electric system assets and each bulk electric system asset should be addressed by a single responsible entity for each function (NERC, Functional Model – Reliability Standards Coordination Task Force, 2005).

[3] The Registered Ballot Body (RBB) comprises all entities that qualify and register for one of the nine industry segments as defined in the Reliability Standards Process Manual. Members of the RBB are eligible to vote on proposed reliability standards, https://standards.nerc.net/.

- *Recommendation 4*

  NERC and the insurance industry should establish a formalized relationship to ensure that continued design and implementation of the NERC functional model does not unnecessarily inhibit the development of insurance products. Such discussions would be especially relevant given the current restructuring in the electricity sector and the continued growth of wholesale electric markets and an increase in the number of independent transmission-owning companies.

An improved understanding of the implications of NERC's functional areas to the development of new transmission-related insurance products, is needed. In particular, an understanding is needed regarding the area of operational compliance. Consistent with the second FMRSCTF recommendation above, only the transmission owner, generator owner and potentially the distribution provider and load serving entity would require property coverage to replace infrastructure or assets following some loss. However, the actions of certain other entities could also impact the loss of facilities. For example, an "independent transmission operator" could cause property damage or asset loss to either transmission or generation assets resulting from noncompliance with certain operational standards.

- *Recommendation 5*

  The Commission and NERC should investigate whether future noncompliance with a standard will constitute a potential liability and whether or not functional model designations would have any bearing on such liability. In addition, a formal and ongoing dialogue should be established with the insurance industry to discuss the current functional model and future revisions.

NERC Compliance Enforcement Program

NERC has an ongoing Compliance Enforcement Program (CEP) to ensure compliance with both NERC and Regional standards. NERC annually reviews the compliance enforcement program for each Region to assess the level of compliance with NERC reliability standards (NERC, Regional Compliance Enforcement Programs webpage, 2005). Currently, NERC actively monitors compliance with 96 requirements contained in 44 reliability standards (NERC, Annual Compliance Programs and Reports webpage, 2005). Each Region currently reviews and enforces compliance with regional utility members (NERC, Compliance Enforcement Program webpage, 2005) This regional model is expected to continue since Section 1201 of the Energy Policy Act of 2005 authorizes the ERO, upon Commission approval, to enter into an agreement delegating authority to a regional entity to both propose reliability standards to the ERO and enforce reliability standards.

Since spring 2004, as a direct result of the August 2003 Blackout, each Region has issued quarterly compliance reports to NERC.. These reports document all violations of NERC and Regional standards. However, these reports will no longer be issued according to the previous Operating Policy and Planning Standard requirements. Future compliance reports will use the new Version 0, or subsequent reliability standards, and must be consistent with the Commission's final rules on reliability standards (NERC, Compliance Enforcement

Program Report, 2005). As a result, there will be no consistent long-term data on compliance with Version 0 standards.

Because compliance with the standards has been only voluntary to date, NERC has implemented simulated penalties for varying levels for non-compliance (NERC, Sanctions and Penalties webpage, 2005). Looking forward, implementation of Section 1211 of the Energy Policy Act of 2005 enables the ERO to "impose a penalty on a user or owner or operator of the bulk-power system for a violation of a reliability standard approved by the Commission … after notice and an opportunity for a hearing" before the Commission. As opposed to NERC's simulated penalties, ERO-imposed penalties shall "bear a reasonable relation to the seriousness of the violation …[and] take into consideration the efforts of the user, owner, or operator to remedy the violation in a timely manner" (Energy Policy Act, 2005, pp.767-768). In the National Transmission Grid Study, the DoE recommended that reliability-focused penalties for noncompliance should reflect "the cost of replacing the reliability services that are not provided by the violator" (DoE, 2002, p.47).

Commission approval of a rigorous compliance and penalty scheme will serve as a significant "regulatory signal" to the users, owners, and operators of the bulk-electric system on the importance of compliance. An argument can be made that regulatory-imposed penalties could impact future insurance capacity and products in the electricity sector. Consistent with the concept in the National Transmission Grid Study referenced above, will rigorous enforcement create demand for liability coverage related to noncompliance with a reliability standard? Conversely, will effective penalties increase compliance and reduce or eliminate the need for liability coverage? Assuming that the imposition of penalties will improve future system reliability, will there be a corresponding improvement in insurance-related risk mitigation leading to increased insurance capacity and products? These open-ended questions need further investigation.

NERC Readiness Audit Program

NERC recognizes that compliance with standards represents a baseline for reliability and operational excellence. Therefore, in addition to the compliance program, NERC currently conducts a Readiness Audit Program to ensure that "operators of the bulk electric system have the tools, processes, and procedures to operate reliably" (NERC, Readiness Audit webpage, 2005). Reliability standards, various reference documents and audit criteria are utilized to identify operational areas needing improvement as well as examples of exemplary system operation. Currently, all balancing authorities, transmission operators, and reliability coordinators in North America are audited on a three-year cycle.

In 2004, NERC also initiated an Examples of Excellence program highlighting system operations which enhance electric system reliability. These examples are derived from NERC's Readiness Audit Program and encourage "critical thinking and analysis of operational reliability" (NERC, Examples of Excellence webpage, 2005).

- *Recommendation 6*

  The Readiness Audit Program, including the Examples of Excellence component, could provide valuable information to the insurance industry on the status of risk mitigation in the electricity sector. The DoE and NERC should establish an ongoing mechanism with the insurance industry to discuss and promote Readiness Audit findings and examples of excellence to build insurance capacity and promote risk mitigation.

Reliability and Compliance Data Issues

The need for improvements to data collection, sharing and analysis to enhance risk analytics was a principle issue discussed by the workshop participants. Despite the consensus that mandatory reliability standards would improve reliability and potentially incent greater insurance capacity and new or innovative products, little, if any, empirical evidence exits to support such a hypothesis. In 2004, the DoE Energy Information Agency (EIA) conducted an extensive review of the data needed to assess reliability (DoE EIA, 2004). The report found that the Federal Government collection of data needed to monitor reliability of the transmission system had not kept pace with restructuring (DoE EIA, 2004, p. 4). A major conclusion of the report was that "changing and consolidating existing data collections could greatly enhance the data available to Federal and State policymakers. . . . [but] would require long-term, coordinated effort across the Commission, EIA, DoE, Office of Management and Budget, Independent System Operators (ISOs), and perhaps NERC" (DoE EIA, 2004, p. 7).

Based on the workshop participants' expert insights and the EIA report, research is clearly needed into the types of data required to assess, with statistical accuracy, improvements to bulk-electric system reliability resulting from the implementation of mandatory standards. In addition, as these data become available, insurance market metrics should also be studied for possible correlation with any measurable improvements in the utilities compliance with reliability standard.

Two inter-related categories of reliability data deserve additional focus in this regard. The first is compliance with reliability standards. As referenced earlier, the quarterly NERC compliance reports did not contain an adequate sample of compliance data from which to "draw meaningful conclusions, identify trends, and focus on emerging problem areas" (NERC, Compliance Enforcement Program webpage, 2005).

The second category of reliability data is the occurrence of contingencies and disturbances. The EIA currently collects and stores these data from bulk-electric system and distribution entities. Every electric utility or other entity subject to the provisions of Section 311 of the Federal Power Act, engaged in the generation, transmission, or distribution of electric energy for delivery and/or sale to the public is required to use the Emergency Incident and Disturbance Report (Form EIA-417) to report disturbances. NERC requires reporting of disturbances under NERC Operating Policy 5F (NERC, Disturbance Analysis Working Group, 2004). More specifically, the NERC Disturbance Analysis Working Group (DAWG) "reviews and publishes summary reports on disturbances that occur on the bulk electric systems in North America, including electric service interruptions, voltage reductions, acts of

sabotage, unusual occurrences that can affect the reliability of the bulk electric systems, and fuel problems" (NERC, Systems Disturbances Reports webpage, 2005). The DAWG categorizes disturbances as being associated with an excursion of an operating policy or a planning standard (NERC, Disturbance Analysis Working Group, 2004). The sub-categories are shown in Table 1.

Disturbance data provide one direct measure of reliability and in some instances compliance with reliability standards. NERC disturbance data for calendar years 1992 through 2004 is shown in Figure 1 (NERC, Systems Disturbances Reports webpage, 2005). During the period, voltage and/or demand reductions have remained at or below five occurrences per year with the exception of 1998. Unusual occurrences have also remained constant with the exception of a two to three fold increase in 2001. In contrast, interruptions have shown an upward trend since 1997, but exhibiting a large annual variability since 1998.

A closer examination of 2002 data provides insight into the potential use of these data as a metric for reliability and compliance. For example, approximately 8.5 million customers were interrupted during 38 occurrences reported by NERC and the Regions in 2002. The vast majority (7.3 million) of the interruptions were weather related with the majority of the interruptions occurring in only six major weather events across the U.S and Canada. Equipment failure or human error comprised only 11 of the occurrences during 2002 impacting 1.2 million customers. However, it should be noted that these 11 events may not have been attributable to non-compliance with a NERC or Regional standard. The specifics of each disturbance, including whether or not the disturbance resulted from noncompliance, are not reported in the annual report of the DAWG.

Operating Policies	**Planning Standards**
Generation Control and Performance	System Adequacy and Security
Transmission	System Modeling Data Requirements
Interchange	System Protection and Control
System Coordination	System Restoration
Emergency Operations	
Operations Planning	
Telecommunications	
Operating Personnel and Training	
Security Coordinator Procedures	

Table 1. Categories and associated sub-categories of bulk-electric system disturbances monitored by the North American Electric Reliability Council.

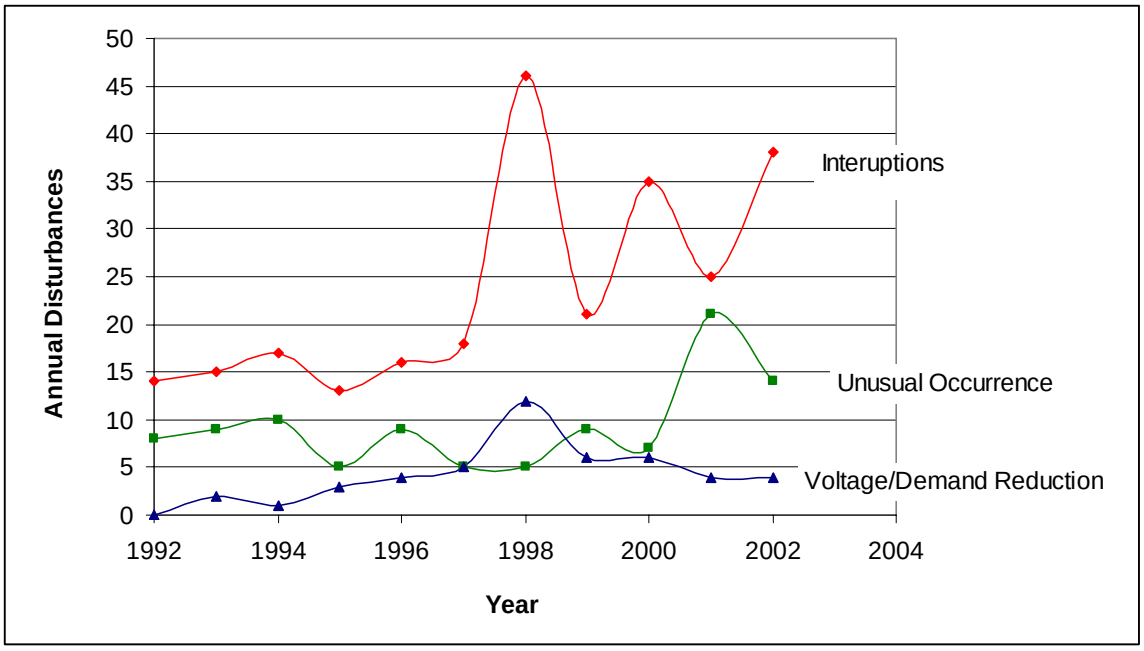

Figure 1. Annual variability in disturbance data from 1992 through 2002 reported to the North American Electric Reliability Council.

Future use of disturbance data as a measure of system reliability and compliance with reliability standards will require careful examination. This brief examination exemplifies the difficulty in using such data as a measure of reliability, let alone compliance. The EIA also reported on similar concerns over inaccuracies in estimating outage probabilities in North America and also problems over the accuracy of estimating outage probabilities within and between Regions (DoE EIA, 2004, p. 21).

The cost of disturbances associated with either weather-related damage or inadequate reliability is critical to the discussion of increased insurance in the electricity sector. A recent estimate on storm-related damage to electric utility systems by the Edison Electric Institute found that 81 major storms resulted in approximately $2.7 billion (in constant 2003 dollars) in utility restoration costs between 1994 and 2004 (Johnson, 2005). The weather-related costs during the interruptions referenced above in the NERC report totaled in the $100s of millions. In contrast, the EIA reported that the "Electric Power Research Institute, the insurance industry, and other researchers attempted to compute annual costs resulting from power incidents" using both EIA and other data sources(DoE EIA, 2004, p. 22). In a similar manner to the lack of compliance data, cost data on the impacts of disturbances are not adequate, making it "impossible to balance the costs of reliability investments against cost savings" (DoE EIA, 2004, p. 22).

The inability to accurately assess future insurance costs related to both storm damage and inadequate reliability and noncompliance with standards is a major impediment to promoting insurance capacity and products.

- *Recommendation 7*

  To acquire the needed data, NERC may need to modify or authorize new standards related to data collection consistent with the findings of the EIA report on data needs. The following two standards, among others, should be examined for modification:

  - NERC standard TPL-006-0, Assessment Data from Regional Reliability Organizations, requires each Region to provide "system data, including past, existing, and future facility and Bulk Electric System data, reports, and system performance information, necessary to assess reliability and compliance with the NERC Reliability Standards and the respective Regional planning criteria" (NERC, Reliability Standards webpage, 2005).

  - NERC Standard TPL-005-0, Regional and Interregional Self-Assessment Reliability Reports, requires each Region to "assess the overall reliability (adequacy and security) of the interconnected bulk electric systems, both existing and as planned" (NERC, Reliability Standards webpage, 2005).

- *Recommendation 8*

  The DoE, the Commission and NERC should work to implement the data collection changes referenced in the EIA report. More specifically, the EIA recommendations on form changes should be considered in the upcoming Commission rulemaking on reliability standards.

- *Recommendation 9*

  NERC and/or the Commission must ensure that future compliance data for each individual requirement within each standard is collected, stored and managed in a manner to enable statistical comparisons, contrasts and time series analysis between (1) bulk-electric system owners, operators and users, (2) interconnections, (3) regions, (4) Regional Transmission Organizations (RTOs)/ ISOs and (5) control areas. This will be a non-trivial task with approximately 140 control areas and 3,100 utility service areas within North America.

  Because compliance and enforcement of the reliability standards will be on a regional basis, the analysis of regional reliability data (i.e. noncompliance, outages and disturbances) should receive priority. In particular, an analysis of the regional data would determine if statistically significant differences in reliability exist between Regions for various categories of contingencies or individual standards. In other words, reliability may not be homogeneous from Region to Region. If the recurrence probabilities of various category contingencies or compliance metrics are different across NERC Regions, varying insurance premiums and deductibles based on regional performance could be utilized to promote reliability through insurance market signals. This fact is important since NERC Standard TPL-004-0 does not allow, as do many other NERC standards, for regional differences in standards. These statistical outcomes could be

utilized for a number of purposes including the design of penalties for noncompliance, the establishment of regional premiums and deductibles, and to address certain basic concerns of the workshop participants such as adverse selection[4] and captive pooling.[5]

- *Recommendation 10*

  NERC, the Commission, DoE and NARUC should establish a reliability working group with the insurance industry to collect and share industry-specific data on reliability for infrastructure components of the bulk electric and distribution system. One of the discussion points during the workshop was the lack of data sharing between insurance companies on reliability, risk mitigation and asset repair costs. Such data could provide significant information to better understand the role of commercial insurance in the energy sector, whether property or liability related. Protecting the confidentiality of these data for critical infrastructure protection or anti-competitive concerns would need to be addressed.

[4] Adverse selection occurs when entities exposed to higher risk seek more insurance coverage than those with lower risk. In the case of weather disasters, such as hurricanes, adverse selection concentrates risk as opposed to spreading the risk among a large numbers of policyholders.

[5] Captive pooling is a form of self insurance where an insurer is created and wholly-owned by more than one non-insurer. The ability to pool assets enables increased coverage compared to that of an individual company. Pools may be formed voluntarily or mandated by the state to cover large or catastrophic risks that are not covered in the commercial insurance market.

II. Insurance Market Issues and Regulatory Processes

Workshop Summary

The majority of the discussion on insurance markets, products and regulatory processes during the workshop focused on two major areas. The first issue was how to best approach restoration and cost recovery in the electric sector following a destructive event. Such an event could range from small to catastrophic in extent and result from either natural events or terror-related threats. The second major issue of discussion was how to best develop insurance capacity or products to enhance electric system reliability. Workshop participants suggested a number of solutions ranging from mandatory insurance coverage regulated by federal or state agencies to participation by electric-sector entities in voluntary, market-based insurance products addressing both bulk and distribution reliability.

Throughout the workshop, the need for mandatory, enforceable reliability standards was a constant theme. Standards would primarily improve reliability, thus serving to reduce risk and uncertainty in the bulk-electric system. A discussion of this issue is found in the section entitled "The Need for Mandatory Reliability Standards" earlier in this paper. With the exception of placing distribution lines under ground, no construction or other design standards were suggested that would mitigate the need for restoration to the distribution or bulk-electric system caused by damage from destructive events.

It was generally agreed that any new insurance products should focus exclusively on the transmission components of the bulk-electric system. Distribution systems would not be covered since a cost-recovery mechanism for load serving entities or distribution companies currently exists through the rate approval process of State Public Utility Commissions. In terms of asset replacement following an event, the workshop participants reported that a limited market currently exists covering property damage to transmission systems. It was suggested that existing coverage(s) could be expanded by establishing a mandatory pool for transmission insurance among energy companies, similar to that offered by Associated Electric & Gas Insurance Services Limited (AEGIS).[6] However, this has been attempted before, on a limited state basis with regional balancing, and failed. Therefore, additional analysis would be required to determine the geographic extent of any pool, coverage limits and deductibles to make such a captive pool workable.

A critical infrastructure protection fee, established and approved *ex ante* by the State Public Utility Commissions, was also suggested. The fee would be escrowed by the Commissions and used for either distribution and transmission system restoration and repair costs incurred by the utility following an event or used to purchase commercially-available insurance, or both. A pre-approved program would avoid State Public Utility Commissions post event prudency reviews of utility repair and restoration costs. This would make the process more

[6] AEGIS is a non-assessable mutual insurance company offering a full range of insurance and risk management products and services. See discussion in later section, "*Commercial Property and Casualty Insurance Issues.*"

efficient and remove the risk and uncertainty that exists in most states today. Such a program could be modeled on State Public Utility Commission jurisdictional models currently used in pre-approved fuel purchase practices and hedging programs for natural gas. In contrast, concern was expressed by a number of the workshop participants that a state-managed effort focused on any form of self-insurance by utilities was contrary to the development of commercial insurance markets. It was argued that State Public Utility Commission jurisdiction over quality of service and cost recovery is an impediment to the development of broader insurance products for the transmission system. Additional research is needed on the development and implementation of the strategies for an *ex ante* fee and for coupling such an effort with new insurance offerings. The development of either national or regional standards for service quality or cost recovery were suggested as alternative jurisdictional models needing investigation.

It was agreed that insurance products covering consequential loss or outage are generally not available for, or needed by utilities. In the event of both short and long-term disturbances in power quality and outages, customers already mitigate these losses through alternative power supplies and surge protection. The consensus was that such a product would not be viable in the utility sector, and that electric customers would continue to be the insured for such indirect losses. Furthermore, electric utility customers should be encouraged or incentivized to carry additional economic loss coverage or power interruption insurance in response to vulnerabilities and threats.

In terms of reliability, it was suggested that the establishment of cost-based best practices used in a voluntary approach could be utilized to build a more robust business case for insurance in contrast to the more traditional (rate-of-return) regulatory approach referenced above. A number of the workshop participants argued that both distribution and bulk-electric system reliability could be improved through market-based approaches through incremental improvement and expansion of existing insurance markets and products. Concerns over adverse selection and the inability to adequately spread the risk of natural threats were viewed as a major obstacle to the development of such new insurance capacity or products.

One model receiving much discussion was to utilize customer funded insurance in retail choice markets to move beyond minimal reliability standards or practices. Such insurance would allow a customer on the distribution system to select or contract for a level of reliability (or quality of service) to be provided by the load-serving entity. Failure of the load-serving entity to provide the contracted level would result in payments to the customer for the service disruption. Payments made by the load-serving entity would originate from insurance products purchased in a competitive market. The French Guaranteed Service Agreement was discussed as an example of the use of insurance to promote increased utility reliability and/or quality of service. Under the program, large customers agree to a specified level of service. If the service is not provided per the contract, the utility pays the customer liquidated damages. The utility maintains insurance to cover any claims. It was suggested that such a model could be used in the U.S. to promote and incent greater grid reliability, but additional research is needed.

Lastly, the workshop participants agreed that separate insurance instruments or products should be developed for terrorism threats versus natural events. The formation of a national,

captive pool was suggested as a possible mechanism to promote terrorism risk insurance. A discussion on the Terrorism Risk Insurance Act of 2002 (TRIA) can be found in the TRIA section of this paper.

Discussion

Uncertainty in Asset Restoration Costs

As a direct result of the terrorist attack of September 11, 2001, the August 2003 Blackout in North America and more recently the 2004 hurricanes in Florida and Hurricane Katrina in 2005, unparalleled attention has been focused on protecting the Nation's infrastructure. Damages from Katrina are estimated to be in the ten's to hundred's of billions of dollars, while data from the Insurance Information Institute indicates that the 2004 hurricanes resulted in estimated insured losses of $22.8 billion (Hurricane Insurance Information Center). Focusing on the electric sector, a study from the Edison Electric Institute found that the 2004 hurricanes resulted in approximately $1.4 billion in asset repair and recovery costs by investor-owned utilities in Florida (Johnson, 2005).

The occurrence of tropical storms in the Atlantic basin appears to be increasing based on data from the National Oceanic and Atmospheric Administration (NOAA). Warmer ocean temperatures coupled with optimal and atmosphere conditions are expected to increase tropical storm activity over the next decade. The increased activity is part of a multi-decadal (approximately 20-30 year) cycle which was observed to begin in 1995 (NOAA August 2, 2005). Not surprisingly, four out of the five largest and most expensive natural events causing damage to electric systems in the U.S. during 1994 through 2004 were hurricanes which accounted for 60 percent of the estimated average storm restoration costs incurred by investor-owned electric utilities

Based on the NOAA analysis, a basic principle of insurability that "losses will be definite as to cause, time, place and amount" may no longer be applicable to future hurricane related damages in the Atlantic basin (Williams et al., 1981). Establishing the premiums will be an increasingly complex and dynamic exercise in commercial insurance markets because of the uncertainty caused by changes in the underlying environmental conditions and the resultant increase in expected losses to electric sector facilities. In addition, the increasing irregularity of the recurrence of hard and soft market conditions in the property and casualty insurance sector may very well exacerbate the further development of insurance products in the electric sector. This same uncertainty also makes the calculation and approval mechanisms of forward-looking self-insured reserve funds difficult for both investor-owned utilities and State Public Utility Commissions.

The uncertainty over premiums and increasing insurance costs was reported by Johnson (2005) stating that

> "Until Hurricane Andrew in 1992, commercial insurance was widely available at affordable rates to protect against catastrophic storms. Florida Power and Light, for example had a transmission and distribution system policy with a

> limit of $350 million per occurrence. The 1992 premium for this policy was $3.5 million. After Hurricane Andrew, commercial insurance carriers stopped writing such policies altogether or made them so expensive that they could not be justified. For example, the quote Florida Power and Light received in 1993, the year after Hurricane Andrew, was for $23 million for a transmission and distribution system policy with an aggregate annual loss of $100 million."

In response to the events of 2004 and the impending electric system restoration costs associated with the hurricanes of 2005, capacity in the U.S. insurance industry may decrease further causing insurers to raise rates and tighten conditions and limits in an effort to increase profitability. In a broader setting, the Organisation for Economic Co-operation and Development (OECD) has also stated that the increasing frequency and severity of future expected losses (natural or terrorist related) could adversely impact the ability of the international insurance and reinsurance industries to absorb costs of similar large scale disasters (OECD, 2005).

Self-Insurance Approaches for Asset Restoration

Because of increasing premiums and restrictive coverage limits and offerings, the workshop participants suggested that State Public Utility Commissions should establish and approve *ex ante* a critical infrastructure protection fee to be escrowed by the Commissions. Johnson (2005) also recommended that utilities develop self-insurance mechanisms, either individually or industry wide, via a storm reserve with monthly reserve accruals or direct cash deposits. An open-ended question which needs additional investigation is "How should fees or reserve funds be structured and what, if any, changes may be needed in State Public Utility Commissions statutes, regulations or accounting practices to address this issue?

Currently, a mix of reserve funds and accounting treatments are used by State Public Utility Commissions for storm cost recovery. Reserve funds may be used to recover either capital or O&M costs and vary depending upon specific State Public Utility Commission regulations and orders. The report by Johnson (2005) provides some important insights into the use of reserve funds or *ex post* approval of accounting treatments as a self-insurance mechanism. It should be noted that the report was based on a survey and is a not a comprehensive analysis of all electric utilities. According to the report, few investor-owned utilities maintain reserve funds, and in the case of one utility, the fund provided contained no cash to pay for restoration. Regarding the significant losses in Florida during 2004, these reserve funds were inadequate to cover the entire operation and maintenance (O&M) restoration costs. In lieu of reserve funds, many State Public Utility Commissions conduct *ex post* evidentiary hearings to allow investor-owned utilities to defer storm restoration O&M costs. The deferral allows the utility to amortize the costs over some period of time (typically less than five years) to mitigate utility expenses during the year in which the restoration occurred.

Within the insurance industry, insurers periodically readjust their estimated liability to pay potential claims known as loss reserves. The increased loss ratio by the insurance industry following Hurricane Andrew led to the increased premiums referenced above. In response, Florida Power and Light elected to self-insure rather than pay higher insurance premiums for

transmission and distribution system coverage. About $20 million a year is placed in a storm reserve account equating to approximately 20 cents per month for a typical residential customer (Johnson, 2005). Based on the data presented, average storm cost from 1994 to 2004 was equal to approximately $87 per peak customer. This amount includes both capital and O&M costs. Using this figure, the "average" utility customer would need to contribute approximately 66 cents per month to fund the "average" expected restoration cost. Removing the largest storms which accounted for 60 percent of the restoration costs from 1994 through 2004, as discussed by Johnson, would equate to an average storm restoration cost of about $33 or 25 cents per peak customer per month. Therefore, a significant likelihood exists that reserve fund contributions less than 66 cents per month per customer would be inadequate to meet capital and O&M restoration costs for the recurrence of an "average event" let alone a recurrence of the extreme events of 2004 and 2005.[7]

Florida Power and Light's restoration costs during 2004 totaled $890 million. Assuming the reserve fund would not be invested, a period of 44 years would be required to fund the 2004 repair costs at a contribution rate of $20 million per year. If invested and assuming a 10 percent annual return on investment, it would take 17 years to earn $890 million. With the expectation of increasing tropical storm activity reported by NOAA, the above storm reserve account appears extremely inadequate. In support of this general observation, the Florida Public Service Commission granted approval to Florida Power and Light and Progress Energy to amortize (over two years) negative balances in their storm reserve accounts resulting in monthly surcharges of $2.09 and $3.81 for Florida Power and Light and Progress Energy customers, respectively (Johnson, 2005).

Despite these negative account balances, Johnson (2005) reported that both Florida Power and Light and Progress Energy had "sufficient access to commercial paper and bank lines to pay the cash costs of the 2004 storms." Based on the data from Johnson (2005), deferred accounting treatments may offer a better approach than "non-cash" reserve funds. This would be especially relevant in repaying notes and bank lines used by utilities to cover storm restoration costs. Whichever self-insurance mechanism is utilized, additional focus is needed

[7] The above calculations are for illustrative purposes only. The authors do not believe the lower computed average of $33 to be representative of the average expected value of the underlying data or an accurate approach to assess the adequacy of self insurance mechanisms and cost restoration requirements. Our calculations attempt to [simplistically] demonstrate the inadequacy of such approaches in determining required reserves in self-insured mechanisms. Computer modeling and simulation would be required to accurately develop estimated loss costs associated with the range of natural events including catastrophic events such as those experienced by Florida's electric utilities during 2004.

by State Public Utility Commissions on self insurance mechanisms to prevent negative financial impacts to utilities.

This discussion raises a number of important issues and questions applicable to the general use of reserve funds or other accounting treatments as a self-insurance mechanism.

- Should ratepayer contributions be deposited directly into a designated reserve fund as opposed to an accounting treatment of "reserve fund accruals" simply to smooth annual utility earnings? Should reserve funds be escrowed in non-interest bearing accounts or invested in various financial instruments? If invested, what risk level is appropriate and how will investment earnings from the account be treated? To what extent, if any, should the treatment of reserve funds be uniform across states or regions?

- What contribution rate is required to ensure that reserve funds provide meaningful and adequate self insurance protection? What catastrophic modeling evidence should State Public Utility Commissions require of utilities to determine the estimated cost of natural disasters and other catastrophic losses?

- How should contributions to the reserve fund be structured under a utility's cost of service plan? More specifically, in what ratios should the different customer classes contribute to ensure fair and equitable participation in funding restoration costs? In many states, rate rebalancing has been occurring which has reduced subsidies for residential rates. The report by Johnson (2005) did not break-out restoration costs as transmission or distribution system related. If distribution system repair costs comprised the majority of these costs, substantial surcharges or potential rate increases could be borne by the residential or small business classes.

- A logical sequence of restoration is utilized by utilities following an outage which brings the bulk-electric and/or three-phase system components online prior to single-phase components of the distribution system. Should contributions to a reserve fund be based on multiple restoration criteria including, but not limited to, restoration priority or average restoration costs per class? Additional research may be warranted to determine if the use of multiple restoration criteria could mimic commercial insurance products and offerings with the restoration contribution serving as an analog to variable premiums and deductibles.

- Are regulatory or accounting models currently utilized by State Public Service Commissions transferable to *ex ante* approval of reserve funds? The majority of State Public Utility Commissions have established *ex ante* approval procedures for fuel adjustment and/or natural gas hedging programs which could well serve as guidance.

- At what frequency and under what circumstances will State Public Utility Commissions need to review and reassess established *ex ante* approval practices? Current insurance industry practices related to loss revenue analysis may provide a model to address this question.

- *Recommendation 1*

  The DOE, in conjunction with the National Association of Regulatory Utility Commissioners (NARUC), should conduct a detailed inventory of State Public Utility Commission statutes, regulations and orders on reserve funds and accounting treatments to assess the applicability of commercial insurance to transfer risk associated with storm restoration costs. These data would provide an accurate determination of the commercial insurance capacity required to replace self insurance or to supplement deficiencies in reserve fund or accounting deferral accruals. This effort should include a detailed breakdown of transmission and distribution restoration costs utilizing FERC Form 1 data or accounting data from State Public Utility Commission proceedings on reserve fund and accounting treatments for capital and/or O&M restoration costs.

Commercial Property and Casualty Insurance Issues

The workshop participants concluded that adequate commercial insurance capacity and products are not currently available in the electric sector. As stated earlier in this section, concerns over adverse selection and the inability to adequately spread the risk of threats to the electric system were perceived as major obstacles to the development of new insurance capacity or products.

Gollier (2005) argues that competitive insurance markets can not efficiently insure catastrophic events due to uncertainty. This inefficiency results from "the inability to smooth catastrophic shocks over time due to solvency issues and liquidity constraints, the absence of objective probabilities, the large transaction costs of auditing large waves of claims simultaneously and the Samaritan Syndrome". The events following Hurricane Katrina in 2005 demonstrated a number of these inefficiencies firsthand including the multi-billion dollar relief offered to storm victims by the U.S. government. Recent catastrophic events have also "reinforced the need for reinsurance demonstrating that insurance and reinsurance are inextricably linked enabling the insurer to spread their local exposures around the global market through reinsurance" (O'Conner, 2005). During the workshop, there was little discussion of the importance of reinsurance despite the fact that the limited availability and selection in the catastrophe reinsurance market increases overall property insurance prices (O'Conner, 2005). As referenced in the self insurance discussion, such price increases have retarded the uptake of commercial insurance for transmission and distribution systems by electric companies.

The U.S. property and casualty industry currently maintains a surplus of approximately $390 billion and holds assets in excess of $1.3 trillion (NAIC, 2005). The 2004 financial position found that the industry's surplus (statutory net worth) represented a record high and "net income after taxes and rate of return on net worth both increased for the third consecutive year" (ISO, 2004). However, the Insurance Services Office (ISO) estimated that the industry's rate of return on average net worth ranged from 9.4 percent to 10.1 percent in 2004 or approximately 5 percent less than the Fortune 500 companies. In addition, net investment income continued to slow in 2004 to an annual rate of 2.4 percent (ISO, 2004). This compares with annual growth in investment income of 18.7 percent in the 1970s, 12.8 percent in the 1980s, 2.2 percent in the 1990s, and 0.6 percent since 2000. Declines will

"mean that insurers can no longer count on having ever-increasing amounts of investment income to offset losses on underwriting" (ISO, 2004). Lastly, the ISO reports that slowing premium growth could negatively impact the sustainability of forward-looking improvements in property and casualty insurance industry financials (ISO, 2004).

In response to the potential for $10s of billions in claims resulting from Hurricane Katrina, the National Association of State Insurance Commissioners (NAIC) has stated that adequate capacity and reserves exist for insurers to meet their obligations(NAIC, 2005). This is a direct result of the risk modeling procedures utilized by the property and casualty industry which already include estimated catastrophe costs. Because rates already include catastrophic loss factors and are spread across the U.S., the NAIC "does not expect property insurance rates to be significantly affected" due to Hurricane Katrina (NAIC, 2005). As discussed in the above section concerning "Self-Insurance Approaches for Asset Restoration", the data presented by Johnson (2005) would indicate that electric utilities and State Public Utility Commissions do not utilize similar risk modeling procedures under current self-insurance schemes. One could conclude that the development of adequate commercial insurance in the electric sector or the requirement for a mandatory pool (as discussed below) would require realistic premiums and reserves, similar to those currently found in the broader property insurance market, to provide for robust asset restoration in the electric sector.

One alternative proposed by the workshop participants was to promote the expansion of transmission system coverage by establishing a mandatory pool for transmission insurance among utility companies. Increasing premiums and the instability in the current reinsurance market has, in part, contributed to the formation of mutual insurers and government supported catastrophic pools. Currently, AEGIS offers a full range of insurance and risk management products and services (AEGIS, 2005). AEGIS's membership is comprised of 283 traditional utilities, 18 transmission and distribution companies, 15 water utilities, four telecommunications companies, 71 exploration and production companies, and 78 related energy companies. At the end of 2004, AEGIS's surplus totaled $971 million with total premiums of $1,038 million (AEGIS, 2005).

According to AEGIS (2005), commercial insurance carriers reentered the energy sector during 2004, offering "attractive coverages and pricing in areas they had de-emphasized for the past few years." Therefore, how can adverse selection and the uncertainty of catastrophic events be overcome to further the growth of new products in the electric sector? With the requirement for mandatory participation as suggested by the workshop participants, the total premiums collected and capacity of any pool could increase, although such increases would be contrary to the data reported by the ISO for the broader property and casualty industry. However, without additional research, capacity increases can not be determined at this time.

The other unknown from the workshop discussion was the percentage of non-traditional utility members including independent power producers, independent transmission owning companies and load serving entities not participating in AEGIS. AEGIS reports that its retention ratio is [virtually] 100 percent for traditional utility classes and that "no large, traditional utility has left AEGIS in the past five years" (AEGIS, 2005). Thus, it is unclear how much additional financial capacity or increase in the number of insured would be gained by AEGIS or another similar mandatory pool.

- *Recommendation 2*

  The DOE and appropriate insurance industry participants should analyze the potential increase in insured participants, and the resultant impacts to capacity, in a **mandatory** pool for transmission insurance among utility companies and electric sector entities.

One of the major issues discussed at the workshop was the need to determine the geographic extent of a mandatory insurance pool. As a nationwide mutual insurance company, AEGIS spreads risk broadly geographically and across utility sectors in a similar manner as the general property and casualty industry. This is in contrast to utility specific self insurance mechanisms confined to the service territory of the investor-owned utility or load-serving entity. As discussed in the reliability section of this paper, compliance and enforcement of the electric reliability standards mandated in the Energy Act of 2005 will be on a regional basis. This will result in the collection of data on noncompliance, outages and disturbances within the regions. And as recommended in the "Need for Mandatory Reliability Standards" section of this report, these data could be utilized to establish regional or interconnection-wide premiums and deductibles addressing certain basic concerns of the workshop participants such as adverse selection. Although the estimated increases to AEGIS's capacity resulting from mandatory participation are unknown, combining multiple perils across utility sectors could reduce the problem of adverse selection.

- *Recommendation 3*

  The DOE, FERC, NARUC, NERC and the insurance industry should initiate a study to assess any potential impacts of NERC and regional reliability standards on optimal pool geography and the implications on the future success of insurance capacity and products. In particular, research is needed to determine if mandatory pools aligned on either an interconnection-wide basis or regional reliability boundaries could reduce or eliminate adverse selection concerns.

Risk Securitization and Catastrophic Bonds

Another option to insure or secure risk within the electric sector is catastrophic bonds. The use of catastrophic bonds (cat bonds) has grown in recent years due to the inability or unwillingness of insurers to cover catastrophic events and the shortage of reinsurance capacity. According to the Government Accountability Office (GAO, 2005), the issuance of cat bonds increased by 50 percent from 2002 to 2004, to a total of $4.3 billion in bonds outstanding worldwide.

Cat bonds are an alternative risk transfer instrument for insurance and reinsurance companies that bring "increased coverage capacity and more predictable prices since the capital markets have considerably larger capacity and scope for economic diversification than insurance or reinsurance companies" (Araya, 2005). Cat bonds are issued to third-party investors directly or indirectly by insurance or reinsurance companies or a pooling entity. As reported by Moodys, these securities have never been downgraded and no Moody-rated cat bond has resulted in a loss to investors since being rated (Araya, 2005). Kunreuther (2002)

provides a specific analysis into the use of cat bonds in managing extreme risk, in particular for terror-related events. AEGIS also currently offers various financial products, including cat bonds to fund losses for risks that are subject to wide pricing swings and/or are difficult to insure. Transmission and distribution system assets are included in this category (AEGIS website, 2005).

The electric sector could potentially benefit in the future from the expansion of the cat bond market since recovery costs from natural (or terror-related events) could be spread more broadly. Cat bonds have already been used in the U.S. market to cover damages from natural events. For example, from 1977 through 2003, catastrophic losses attributable to U.S. hurricanes comprised 37 percent of the distribution of catastrophic losses (unadjusted for inflation) in the cat bond market (Araya, 2005).

However, the viability of the cat bond market is a concern. Despite the growth reported above by the GAO (2005), the transfer of catastrophe risks to capital markets is extremely low compared to international reinsurance capacity, and **"**cat bonds and insurance-linked securities are negatively affected by the same predictability and uncertainty problems that challenge catastrophic risks insurability" (OECD, 2005). Similar open-ended questions on the future use of cat bonds are also raised by Kunreuther (2002) and in the last three years, the GAO has issued three separate reports on the role and status of risk-linked securities and securitization of catastrophic risks (GAO 2002, GAO 2003 and GAO 2005). Transaction costs and legal fees also increase the cost of cat bonds compared to traditional reinsurance (GAO, 2005).

- *Recommendation 4*

  Due to the potential future importance of cat bonds and other financial instruments in securitizing catastrophic risk, the NARUC, NAIC, FERC and DOE in cooperation with the broader insurance and financial industry should develop and promote an educational program to inform state and federal regulatory commissions about the securitization of insurance risk in the electric sector. This would promote a consistent regulatory approach between state and federal commissions on cost-recovery, rates, tariff provisions and general policies concerning the future utilization of risk securitization.

Government Supported Catastrophic Pools

Government supported catastrophic pools are another mechanism which has potential application to the electric sector. The States of California and Florida have developed public-private partnerships to enhance capacity in the insurance industry to respond to catastrophic risk. O'Conner (2005) and the GAO (2005) discuss the establishment of the California Earthquake Authority (CEA) and the Florida Hurricane Catastrophe Fund (FHCF). The CEA is a "privately financed, publicly managed organization that offers basic earthquake insurance" for California property owners and renters (CEA, 2005). "Premiums, contributions from and assessments on member insurance companies, borrowed funds, reinsurance, and the return on invested funds" are used to pay claims and no public monies or funds are pledged to cover policyholder losses (CEA, 2005). According to its website, the CEA has access to over $7.2 billion to pay claims. The GAO (2005) reports that only 15

percent of eligible customers purchase earthquake insurance due [in part] to perceived high premiums and deductibles.

The FHCF was created in response to Hurricane Andrew to provide a stable and affordable market for reinsurance. Mandatory participation is required by all residential insurance companies and premiums are based on each company's hurricane exposure in the residential market. Most commercial property is exempt (FCHC, 2005). According to the GAO (2005), the FHCF

> enhances industry capacity by (1) offering reinsurance at lower rates than private reinsurers for catastrophic risk, thereby increasing the number of primary companies willing to write policies in the state; (2) ensuring that primary companies will be compensated up to specified levels when a catastrophic hurricane occurs; and (3) continuing to offer reinsurance at relatively stable rates in the immediate aftermath of hurricanes. (2005, p. 14)

In 2004, Florida's Legislature expanded the claims-paying capacity of the FHCF from $11 billion to $15 billion which is estimated to be adequate to cover claims from a hurricane recurring once every 50 years (Hurricane Insurance Information Center,2005).

- *Recommendation 5*

  The DOE should investigate the CEA and FHCF as potential models for reinsurance within the electric sector. In particular, application of such reinsurance funds could be coupled with the mandatory insurance suggested by the workshop participants and applied on a NERC Regional or interconnection-wide basis for asset recovery following a catastrophic event.

State Regulatory Insurance Issues

In exercising their authority, State Public Utility Commissions operate under broad statutes established by their respective legislatures. For example, rates must be "just and reasonable" and without "undue preference or prejudice." Franchises, licenses and/or permits are issued by State Commissions upon determining the "public convenience and necessity," and/or "public interest." In other words, State Public Utility Commissions have "wide discretion."

Like State Public Utility Commissions, utilities and, particularly, investor-owned utilities, have wide discretion in their business affairs. The U.S. Supreme Court held over 80 years ago that:

> The Commission is not the financial manager of the corporation and is not empowered to substitute its judgment for that of the directors of the corporation; nor can it ignore items charged by the utility as operating

> expenses unless there is an abuse of discretion in that regard by the corporate office.[8]

Given the right of utilities to manage their business affairs, and given the wide discretion by State Public Utility Commissions to evaluate what is "reasonable," it is unlikely that any two utilities or any two commissions evaluate the need for commercial insurance or self insurance in similar fashion and, particularly, in setting "just and reasonable rates."

In follow-up to the workshop, a survey on the use of insurance as a cost-recovery mechanism was sent to fifty State Public Utility Commissions. A total of 21 Commissions responded (42% response rate) to the survey as follows:

1) Does your jurisdiction allow investor-owned utilities (IOU) to recover the costs of insurance premiums for policies covering critical electric infrastructure (assuming such premiums are reasonable)?

YES: 18
NO: 2

2) Is there any requirement in your jurisdiction that IOUs compare the costs and benefits of commercial insurance and self-insurance in order to seek recovery of insurance premiums for critical electric infrastructure?

YES: 3
NO: 18

3) If an IOU self-insures its critical electric infrastructure, is there any requirement that the IOU demonstrate that self-insurance is more beneficial than commercial insurance?

YES: 6
NO: 15

The responses are not surprising, given the "wide discretion" State Public Utility Commissions have in deciding what is "reasonable and unreasonable" and the wide discretion utilities have in deciding how to manage their corporate affairs. And while this discretion is good for many purposes, it does not necessarily follow that the preparation for catastrophic events should be analyzed and considered on an ad hoc basis. Indeed, given the complexity of the electric grid, it seems intuitive that uniform guidelines should be adopted with respect to analyzing the costs and benefits of commercial insurance versus self insurance and the appropriate level of commercial insurance and/or self insurance.

In 2005, the OECD published a comprehensive report on catastrophic risks and insurance. Contrary to the self insurance mechanism proposed in the GMU/DoE (OE) workshop and

[8] *Missouri ex rel. Southwestern Bell Teleph. Co. v. Missouri Pub. Service Comm.*, 262 U.S. 276, 289 (1923) (quoting *Illinois Pub. Utilities Comm. ex rel. Springfield v. Springfield Gas & Elec. Co.*, 291 Ill. 209, 234 (1920)).

the current ad hoc approach discussed above, the OECD stated that "the role of governments should be encouraging and supporting the development of private sector initiatives, by limiting exposures and by providing a favorable legal, fiscal and regulatory environment" (OECD, 2005). The report went on to state that disasters should be properly assessed and managed *ex ante* via proactive governmental action. However, governmental intervention should not displace "private market solutions, such as insurance, reinsurance and alternative risk transfer tools such as cat bonds discussed above" (OECD, 2005) In a similar fashion, a number of workshop participants argued for the development of either national or regional standards for service quality or cost recovery as an alternative to the current regulation of utilities and insurance companies by state commissions. Some participants indicated that State Public Utility Commission jurisdiction over cost recovery is an impediment to the development of broader insurance products for the transmission system. While an extensive examination of this issue is beyond the scope of this paper, empirical evidence previously discussed supports the concerns of the workshop participants. More specifically, the work by Johnson (2005) demonstrates that investor-owned utilities under the jurisdiction of State Public Utility Commissions lacked adequate self insurance reserves to respond to extreme natural weather events.

In contrast, surpluses in the broader property and casualty industry are regulated by State Insurance Commissions which "require insurers to maintain minimum levels of surplus to absorb the volatility inherent in property and liability policy coverages" (NAIC, 2005).What is also evident is the lack of coordination or communication between State Public Utility Commissions and State Insurance Commissions on insurance matters in the utility sector. Coordination between these sister agencies could lead to a common framework for the expansion of, or development of new commercial insurance lines in the electric sector based on long-established State Insurance Commission principles and information available through the ISO.

- *Recommendation 6*

  The NARUC, NAIC, FERC and DOE should sponsor a workshop or initiate a dialogue on the applicability of commercial insurance in the electric sector to establish common state and federal elements on electricity and insurance regulation.

- *Recommendation 7*

  An ongoing educational program on insurance industry issues (both general and specific) within the electric sector should be developed for State Public Utility Commissioners. Such an effort is especially needed due to the low-average tenure and turnover of State Commissioners [9] (Beecher, 2005) and the import role which State Commissioners have in approving cost-recovery of self-insured funds, accounting treatments and commercial insurance premium costs related to system restoration costs.

[9] As of February 2005, the median tenure for a State Public Utility Commissioner was 3.4 years. Given the fact that the majority of Commissions are comprised of three members, significant turnover is the norm within individual Commissions and across NARUC.

Reliability Insurance Issues

The utilization of reliability insurance in the U.S. to promote greater grid reliability received considerable attention during the workshop. Reliability insurance has been described as:

> Reliability insurance contracts consist of two components: a premium paid by consumers, and a corresponding level of coverage provided by the distribution company. Consumers determine their level of coverage according to their value for reliable electricity service, and pay a corresponding premium to the distribution company. The distribution company is then required to reimburse consumers for outages according to their levels of coverage. The distribution company may use the premiums it collects to improve reliability or to pay reimbursements. (Fumagalli et al., 2004, p.1287)

In deregulated markets, one of the benefits of such a scheme is that the risk of outages is transferred away "from consumers, who have no ability to control the outages, to the distribution company, which influences reliability through its investment and operational decisions" (Fumagalli et al., 2001, p. 266). Another potential benefit of reliability insurance discussed by Kiesling and Giberson (2004) concerns the "information about values for energy and service reliability" obtained directly from consumers' choices thus enabling distribution companies to prioritize grid investment. More specifically, the authors concluded that reliability insurance would provide a "dynamic and constructive policy approach to network reliability" by utilizing "the heterogeneous and locational characteristics of reliability to bolster system and grid security and stability" (Kiesling and Giberson, 2004, p. 6).

The use of guaranteed service agreements as a means to improve reliability and service quality is not a new concept in other parts of the world. The French Guaranteed Service Agreement is an example of a compensation scheme to promote increased utility reliability and/or quality of service. Better known as the Emerald Contract, the program was implemented in 1995 to incent the government-owned electric provider, Electricité de France (EDF), to improve the poor quality of electric power supplies in France (EDF, 2005). Normal operating conditions including the quantity (outages) and quality (voltage characteristics) of electricity are defined in the contract as is the relationship between EDF and the customer regarding customer induced voltage disturbances associated with "fluctuating" loads (Kueck et al., 2004). Operational disturbances are defined as those affecting more than 100,000 customers and are included under the *force majeure* section of the contract. The customer is compensated if EDF fails to provide the contracted reliability (EDF, 2005). As one of the world's largest electric utilities, and as one of the last major state-owned energy monopolies in Europe, EDF has expanded into global deregulated markets. EDF provides power to 27 million French customers and 15 million other customers in Europe, Africa, the Americas, Asia, and the Middle East (E7, 2005). Because of EDF's global presence, the precedents set by the Emerald Contract could have far-reaching impacts internationally, and eventually in the U.S., on the adoption of compensation schemes and reliability insurance.

Incentive programs designed to enhance distribution service quality have also been adopted in Great Britain, Jamaica, the Kyrgyz Republic, Hungary, Norway, Spain and Romania (Gábor, 2000). In general these programs establish minimal performance standards to be meet by service providers including, but not limited to, the frequency of supply outages, the time required to restore supply after an outage, measurement accuracy limits, time required to respond to various customer inquiries and the number of billing and metering complaints. In general, these programs involve compensation payment to customers, but whether these efforts could be classified as "insurance" as proposed by Fumagalli et al. (2004) and Kiesling and Giberson (2004) is questionable.

A number of fundamental issues will need to be addressed if a reliability insurance scheme is to be implemented in U.S. electric markets. These issues were reviewed at the Annual Regional Energy Regulatory Conference for Central/Eastern Europe & Eurasia in 2000, and also in a report prepared by the Oak Ridge National Laboratory in 2004 on the practices used to measure power reliability (Kueck et al., 2004) and include:

- The level of distribution service quality will need to be established, and in particular, the customers' preference for a desired level of service quality if a traditional regulatory model is utilized to implement the reliability insurance scheme. In the traditional regulatory model such an undertaking will be difficult, but is a more straight-forward market proposition in the models proposed by Fumagalli et al. (2004) and Kiesling and Giberson (2004).

- A determination will be needed whether distribution quality of service metrics should be limited to "normal" operating conditions as specified in the Emerald Contract, or include all disturbances and interruptions, including major natural events. If all disturbances and interruptions are included, the insurance and electric sectors will need to determine if a common statistical treatment is needed to address the variability of large, catastrophic events. Fumagalli et al. (2004) also suggest that additional research is needed to model the temporal aspects of service quality or reliability and the implications to reliability insurance. Currently, risk analysis procedures are handled on an ad hoc basis and vary among insurance and reinsurance companies and their insured. This issue is not inconsistent with the earlier discussion on catastrophic risk analysis under commercial property and casualty insurance issues.

- Due to the existence of regional power markets and interstate distribution systems, an assessment will be needed to determine whether reliability metrics can be compared between distribution companies, load serving entities or between states and regions. Common definitions and data analysis of distribution quality of service metrics will be required if interstate and intraregional comparisons are desired.

- Monitoring of distribution service quality will require investments by the distribution company or load serving entity to enable accurate and timely quality of service data and the implementation of a fair and accurate compensation program. Local and regional assessments will be required to determine the implementation costs of reliability insurance including costs for advanced metering and monitoring systems, contract administration and regulatory programs (Fumagalli et al., 2004).

- Additional research and analysis will be required to determine what comprises "fair and reasonable" compensation to avoid creating disincentives. In terms of future research, Kiesling and Giberson (2004) also recognized the need for "empirical studies of power systems reliability that focus on the underlying economic incentives governing contributions to system reliability".

A number of other issues were also discussed by the workshop participants regarding the practicality of a reliability insurance scheme. As discussed, reliability insurance would be difficult to implement under traditional cost of service regulation and would only be workable in states with retail choice. However, in most retail choice states, only 5 percent of residential customers typically elect to switch suppliers. It was reported that the State of Texas has the largest percentage of customers exercising retail choice at 20 percent. With such a low uptake rate, a question was raised as to whether such a program could be adequately funded unless customers of the provider of last resort also participated. Participating customers would need to be able to understand and have knowledge of the retail choice market prior to selecting a "contracted level of reliability".

- *Recommendation 8*

  The DOE in conjunction with State Public Utility Commissions should sponsor applied research on the feasibility of implementing reliability insurance in the U.S. electric sector. The research would need to address, at a minimum, the issues discussed above and how reliability insurance could be merged with quality of service standards approved by the respective State Public Utility Commission.

III. Renewal and Expansion of the Terrorism Risk Insurance Act

Workshop Summary

At the time of the Workshop, the Terrorism Risk Insurance Act (TRIA) was scheduled to sunset in December 2005. In light of what appeared to be the imminent demise of the protective insurance program, the group discussed TRIA and its relevance to private insurance viability in the energy sector. While some workshop participants felt more strongly than others about the renewal of TRIA, all the participants agreed that TRIA has not finished serving its purpose and has not completed the task for which it was created.[10]

Several of the participants felt that TRIA, as originally drafted, contained fundamental weaknesses that prevented it from addressing the need for risk-management related to low-probability, high-consequence events. Not all of the participants were equally familiar with the specific terms of TRIA, but when the narrow range of TRIA coverage was explained to them, they agreed that the coverage provided fails to address a significant amount of the

[10] Nb: Federal employees did not voice opinions during this discussion.

terrorism risk currently faced by the United States. In other words, even the first version of TRIA was not crafted to address the actual terrorist threats to infrastructure.

Discussion

On December 22, 2005, President Bush signed a limited version of a TRIA extension into effect. For an additional two-year period, TRIA will remain nominally operable. Prior to the final enactment there had been considerable, and somewhat heated, debate about its continuation, alteration, or cessation. At the time of the workshop, the debate had only begun to take shape, with the commencement in mid-June of an insurance-industry-based effort by the Coalition to Insure Against Terrorism (CIAT) to push for renewal (http://www.insureagainstterrorism.org/). A few days prior to this workshop, on June 20, 2005, the University of Southern California held a symposium to discuss a report issued simultaneously by RAND on TRIA, which also recommended averting sunset. (http://www.usc.edu/dept/create/news.php?id=102)

In early August, the Wharton Risk Management and Decision Process Center (of the Wharton School of Business at the University of Pennsylvania) issued what may well be the definitive report on, and analysis of, TRIA in its original form. Broadly speaking, Wharton's report also favors renewing and expanding TRIA.

By contrast, the Department of Treasury on June 30 issued a report to Congress regarding TRIA. Treasury Secretary John Snow prefaced the report with a letter to Rep. Michael Oxley, Chairman of the House Financial Services Committee, in which he put forth two key concepts. First, he summarized the report by saying that "TRIA has achieved its goals of supporting the industry during a transitional period and stabilizing the private insurance market." Second, he noted that "the Administration opposes extension of TRIA in its current form." The Administration does not oppose TRIA in its current form because it supports expanding TRIA; unlike the RAND and Wharton authors, the Treasury TRIA report writers support ending TRIA altogether, or, at the very least, amending it to include "a significant increase" in the size of event triggering TRIA coverage.

With the issuance of these three reports, the battle lines were drawn. A fair number of academics had joined with both the insurance industry and private industry more broadly to promote not only the continuation, but also the expansion, of TRIA; the current Administration had taken a stance against the coverage provided to private industry through TRIA.

Several underlying factors were surely at work in this situation. Two may be of particular importance. One is that the takeup rate for TRIA-type coverage has been lower than expected. The other is that the current Administration has generally sought to lower the citizen tax burden, and the implications for taxpayer exposure from a continuation of TRIA are large.

The final bill omits the expansion of coverage provided by the version passed in the House of Representatives. Since a primary concern of insurance companies and citizens has been

that TRIA provides no coverage for domestically based terrorists, the House language broadened TRIA so as to provide insurance for attacks generated domestically.

In addition, the bill further expands the coverage obligations of the insurance providers themselves. This measure is designed to limit the impact on the American taxpayer of covered incidents.

As enacted, however, the TRIA extension takes no steps toward mitigating the active concerns of stakeholders in the debate over terrorism insurance. The unresolved issues of scope, overall allocation of responsibility, and consumer expectation remain just as real today as they have been in the past four years. They will intensify once more as the end of the two-year extension approaches.

Some insight into the continuing tension may be afforded by examining the current thinking and priorities regarding catastrophic risk insurance in the broader global insurance market. In November 2004, the Organization for Economic Cooperation and Development hosted a conference on Catastrophic Risk Insurance in Paris. From the presentations made and papers presented at that conference, several points of reference emerge.

- Terrorism risk coverage and catastrophic-risk coverage are not synonymous.
- There is a low takeup rate in all of the environments where catastrophic risk insurance is offered.
- Several European countries offer TRIA-like protection. All of the schemes are too young to have been truly tested or fully understood, in terms of consequence to private industry and national economies.
- One major barrier to effectively mitigating economic loss as a result of catastrophe is the absence of widespread backing, or pooling of risk, through reinsurance.
- One potential approach to mitigating catastrophic damage is a global reinsurance market, probably based upon coalitions of the targeted (i.e., Western nations).

Terrorism Risk Coverage and Catastrophic Risk Coverage are not Synonymous

TRIA was enacted quickly after September 11, 2001, and the key goal at the time was protection against "terrorism." In the four years since the World Trade towers were felled, a slightly more sophisticated understanding has evolved: it is not so much terrorism, per se, that threatens the U.S. economy (or most other economies, for that matter); it is events with catastrophic impact. September 11, 2001, was one event that embodied both terrorism and catastrophic impact. Not all terrorist events, however, qualify as both.[11]

While the national interest is served both by deterring terrorism and by averting or reducing catastrophic impact, the potential role of insurance is only at issue in the discussion of catastrophic risk management. Unfortunately, the experience of many Middle Eastern and

[11] From a national standpoint. Obviously, from the perspective of persons who are directly affected by loss of a loved one or loss of property, each terrorist event is catastrophic.

Latin American countries indicates that a robust and profitable market exists when terrorism, generally speaking, is prevalent.[12]

Understanding the difference between terrorism coverage and catastrophic-event coverage has already helped clarify the debate about the role of insurance. It may also help clarify the debate about a revised role for TRIA.

Catastrophic Risk Insurance Takeup Rate

Catastrophic risk insurance – in this country labeled TRIA coverage – has not been widely adopted. Many who are examining the issue infer that the low takeup rate is related to an unstated assumption that the federal government is likely to help damaged parties in a truly disastrous situation, regardless of coverage.

There may be other reasons for low takeup. Perhaps rates, regardless of federal subsidy, are still perceived as too high. Perhaps the perceived threat of another event is too low to justify mitigation planning.

The authors of this paper sense, quite frankly, that takeup is low because the limitations on coverage provided by TRIA effectively eviscerate its protective value. Purchasing coverage offered under TRIA provides specific and limited protection from terrorism sponsored by foreign governments, so long as it is not chemical, biological, or nuclear. In other words – non-state-sponsored terrorism, which may well be the bulk of terrorism, is not covered. Chemical, biological, or nuclear attacks are not covered, yet these are all likely types of attack, given what we know about weapons availability and radiological trafficking on the world market.

European TRIA-Like Protection

Several European countries offer TRIA-like protection. All of the schemes are too young to have been truly tested or fully understood, in terms of consequence to private industry and to national economies.

[12] There has been for many years a market in kidnapping and ransom insurance, as well as loss insurance for events like suicide bombings, which have occurred frequently enough in the Middle East that they are actuarially manageable.

It is important, in this discussion, to distinguish between TRIA-type protection and enhanced-service offerings.[13] There is a scattering of each across Europe. Moving forward, the analysis of each must be distinct. Coverage of catastrophic loss, both through insurance and through reinsurance, is not the same as enhanced service, but they may look the same during a given outage. For purposes of global economic-loss mitigation, compiling and analyzing catastrophic loss is more relevant than enhanced service offerings.

It is entirely plausible, however, that the preventive or security measures taken to provide for *both* enhanced service and catastrophic risk mitigation will overlap. Understanding how to properly account for these type of preventive expenditures is, much like TRIA coverage itself, poorly understood at present.

One major barrier to effectively mitigating economic loss as a result of catastrophe is the absence of widespread backing, or pooling of risk, through reinsurance.

Global reinsurance to effectively distribute terrorism-related cost is not mature or fully available at this time. One possible reason for this may be a limitation on reinsurance treaties imposed by TRIA.[14] TRIA imposes no specific limitations on an insurer's or party's ability to reinsure. TRIA contains language that could potentially be interpreted as dampening the reinsurance market's interest in providing coverage, however, because it provides that windfalls are returned to the U.S. government. This is logical from the U.S. government's point of view, but reinsurance providers are unlikely to be inclined toward filling the U.S. treasury. Perhaps this perceived problem could be defused by stipulating that windfalls were returned to the reinsurer, although this problem requires further study to ascertain the precise nature of the difficulty and to define paths around it.[15]

Global Reinsurance Market Approach

A few of the participants appeared to believe that a global reinsurance market for catastrophic risk is already being built. To the authors' knowledge, however, no such market

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[13] Marija Ilic is a leading promoter of these types of systems in the United States. The notion is based on the idea that citizens or high-dependency industrial users of the electricity system will pay a premium for higher quality of service. In European and other non-US areas, where electricity has a higher unreliability quotient than in the United States, this type of pricing differential may work more effectively than in the United States. It is the authors' observation that U.S. electricity is sufficiently reliable that – in contrast to a nation where people are pleased to pay a premium for additional reliability – it is more likely that U.S. citizens view service as an entitlement, and any reduction in reliability (which probably would be necessary in order to generate a meaningful service differential) would result in public outcry.

[14] There are no limitations on obtaining reinsurance coverage. Also, nothing in the TRIA alters, amends, or expands the terms of reinsurance agreements. However, Section 103(g)(2) outlines the circumstances under which an insurer would be required to return a windfall.

[15] This discussion is derived through extrapolating from the insurance industry's input at the June 2005 workshop. One participant, in particular, was extremely vocal about TRIA's limitations on reinsurance. Since TRIA imposes no direct limitations on reinsurance, the most likely interpretation is that there is a perceived limitation on reinsurance, which may well be made up of subtle factors such as the "windfall" clause, in the footnote above.

exists at present and discussions are extremely preliminary. An international conference exploring the subject with relevant insurance identified stakeholders is a logical next step. It could be framed as a follow-on to the OECD Conference on Catastrophic Risk Insurance held in Paris in November 2004.

- *Recommendation 1*

  DoE should convene a meeting of the participants at the OECD Paris Conference on Catastrophic Risk Insurance (and any other relevant identified parties) to a follow-on conference specifically devoted to, ascertaining the status of efforts related to, and potential for, a global catastrophic risk reinsurance market or agreement.

IV. Conclusions

The role of insurance in mitigating catastrophic risk and in enhancing reliability is actively discussed in academic literature across the Western world. In theory, insurance has a role to play in promoting the adoption and compliance with security and reliability standards. In theory, insurance has a role to play in promoting the adoption and compliance with security and reliability standards. In reality it seems that insurance plays a confined and specific role in the electricity sector, principally as a means of protecting the electricity business (largely in the area of generation) from standard operating risks common to most businesses. Additional roles for insurance are unsubstantiated by actuarial data, so private-market offerors are reluctant to expand offerings into the increasingly costly arena of catastrophic risk. However, the role of insurance in managing reliability or in mitigating costs of catastrophe is not an active issue for discussion within the practitioner communities.

It is generally agreed by Workshop participants that any new insurance products should focus exclusively on the transmission components of the bulk-electric system. Concerns over adverse selection and the inability to adequately spread the risk of threats to the electric system were perceived as major obstacles to the development of new insurance capacity or products. The majority of the discussion on insurance markets, products and regulatory processes focused on two major areas: 1) how to best approach restoration and cost recovery following a destructive event; and 2) how to best develop insurance capacity or products to enhance electric system reliability. On the first area workshop participants suggested the use of mandatory pools among energy companies, similar to that offered by Associated Electric & Gas Insurance Services Limited (AEGIS) might be a viable option within certain geographic areas. Some type of *ex* ante fee escrowed by State Utility Commissions was also mentioned, but was also seen as an impediment to the development of broader insurance products. On the second area, the French Guaranteed Service Agreement was cited as an example of the use of insurance to promote increased reliability. Under this program, large customers contract for a level of service, the utility maintains insurance to cover any claims by the customer if the utility falls below the contract standards.

Another option to insure or secure risk is catastrophic bonds (cat bonds) The Government Accountability Office has made several studies of the instruments that are issued to third-party investors and are already in use in the U.S. However the transfer of risks to capital markets has been extremely low compared to the international reinsurance capacity.

Government supported catastrophic pools have been established in both California and Florida as public-private partnerships to enhance capacity in the insurance industry to respond to catastrophic risks. These two states were likely markets for these instruments given the high incidence of hurricanes and earthquakes.

The Workshop participants agreed that separate insurance instruments or products should be developed for terrorism threats versus natural events. The formation of a national captive pool was suggested as a possible mechanism.

As a result of the research conducted prior to the Workshop, the discussions during the Workshop, and subsequent literature research, it is apparent that the insurance industry is not yet interested in assuming a role in fostering increased investment in electric utility infrastructure protection without the enforcement of reliability standards and valid data associated with the criteria for assessing reliability.

The workshop participants reached consensus that the adoption of mandatory, enforceable reliability standards in the electricity sector is essential to ensure bulk electric system reliability and to promote the development of competitive insurance markets. Such standards would serve as a metric to improve reliability and as a benchmark for risk analysis and mitigation efforts.

Based on the workshop participants' expert insights and the Energy Information Agency report of 2004, research is clearly needed into the types of data required to assess, with statistical accuracy, improvements to bulk-electric system reliability resulting from the implementation of mandatory standards. In addition, as these data become available, insurance market metrics should also be studied for possible correlation with any measurable improvements in the utilities compliance with reliability standards. The correlation between the costs of reliability investments and the savings in repair and maintenance expenses must be made in order to build the business case for investing in reliability. The inability to accurately assess future insurance costs related to both storm damage and inadequate reliability and noncompliance with standards is a major impediment to promoting insurance capacity and products.

Many open-ended questions remain as the implementation of the electricity reliability provisions of the Energy Policy Act of 2005 move forward. Much will depend on the successful creation of the Electric Reliability Organization, the utility and viability of the reliability standards it establishes, the industry's compliance with the standards, the requirements for data reporting, storage, and analysis, together with fair, but rigorous enforcement of the penalty scheme.

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