The Electric Infrastructure Security Council is pleased to work in partnership with Lloyd’s and in coordination with the broader insurance sector to host the E-threat Resilience Roundtables, as a special project of the EIS Summit Series.

May 20-21, 2013
The Capitol Building US Congress, Washington D.C.

E-threat Resilience Strategy Roundtable
The Energy and Insurance Sectors

The EIS Summit Series is an international framework for national and international discussions and review of electric infrastructure security, addressing electromagnetic threats and other hazards to the energy sector. An international government/NGO partnership, the Series is hosted by the Electric Infrastructure Security Council and the Henry Jackson Society.
BACKGROUND

On May 20-21, 2013, delegates from 23 nations participated in ELECTRIC INFRASTRUCTURE SECURITY SUMMIT IV in the United States Capitol Building, Washington D.C. Following the plenary session, energy and insurance sector executives joined together for focused discussions in the E-threat Resilience Strategy Roundtable, sponsored by Lloyd’s, to consider informal approaches for encouraging energy sector resilience to electromagnetic threats – severe space weather and EMP.

Electromagnetic threats have been identified as emerging, serious risks to societal health and continuity in studies by government agencies in the United States, the United Kingdom, Israel and other nations; the projected impact of Severe Space Weather on the global meta-economy has also become a particular focus of the insurance industry, with recent studies by Lloyd’s, and by global insurance and reinsurance corporations.

As the first meeting in what is planned as a continuing Roundtable process, the May 21, 2013 EISS E-threat Resilience Strategy Roundtable focused on setting general goals and plans to help guide the next phase of discussions. At the second meeting of the Roundtable, taking place on October 31, 2013 at Lloyd’s offices in London, these goals and plans will be used to help formulate ideas for development of an informal, multi-sector, Advisory Roadmap, aimed at encouraging improvements in the resilience vs risk balance for electromagnetic threats.
The Lloyd's-sponsored Roundtable was well-attended, with most of the senior energy and insurance sector delegates and a number of senior government representatives participating.

The Roundtable was chaired by Neil Smith, Lloyd's and John Houston, Centerpoint Energy. With the presence of a number of senior government officials from the U.S., the U.K. and Israel, a decision was made to include some of the broader government / corporate discussion, and Dr. Paul Stockton helped facilitate that portion of the interchange.

Tom Bolt, Lloyd's Director of Performance Management, unable to participate in person due to a Board Meeting in London, provided a presentation via video recording. Following a segment of his remarks, the Roundtable continued with a presentation of risks to the North American Electric Grid prepared in co-operation with Atmospheric Environmental Research.

AER Geomagnetic Storm Modeling Presentation: Highlights of discussion

There was considerable interest in the Lloyd's AER report, which summarized modelled estimates of GIC-induced transformer failures from a Carrington-class event affecting the United States. The model predicted substantial power grid problems, estimating long term power losses (from weeks to years) to 20-40 million people from 16 days to 1-2 years.

AER Presentation – Roundtable Discussion

In the interchange during and following the AER presentation, a number of differences between this and previous studies were discussed.

Joseph McClelland, Director of the Office of Energy Infrastructure Security at FERC, commented on the estimated size of the affected population which, while substantial, was less than that forecast by the earlier Oak Ridge National Laboratory Study, commissioned by FERC, DOE and DHS. Much of the difference, he suggested, was likely associated with secondary power grid failures due to voltage instability and related problems caused by the primary transformer failures – considerations included in the Oak Ridge study. Other Roundtable participants had similar observations, commenting that breakdown of significant numbers of transformers, and damage has also been seen at much lower but persistent current levels, citing the extensive damage of EHV transformers in South Africa as an example.

Any global event, he commented, would also have a drastic impact on demand for replacement transformers, further slowing recovery. Given long replacement times, even loss-of-life effects that could take transformers out of service months or years after an event could have catastrophic impacts.

Joseph McClelland indicated that FERC would review the study in more detail, using FERC’s comprehensive models to examine the AER research, to see if inclusion of secondary effects and other factors would result in closer estimates.
A number of comments and suggestions were made during the general discussion, focused on areas of potential synergy between the insurance and energy sectors, and on ideas for government interaction. Many of the comments and recommendations seemed to fit into several broad recommendation categories, summarized below.

Together, these ideas can be laid out as ideas for an informal Roadmap that could guide synergistic relationships among the various stakeholder groups, as they relate to electromagnetic threats.

Summary: Ideas and recommendations
Context of Roadmap recommendations: Clarifying comments made by Roundtable participants

A number of clarifying comments, made by Roundtable participants, were helpful in clarifying the context for an informal “Roadmap” process. These comments, listed here separately, represent important considerations which should inform the ongoing discussion.

1. On Standards

Any imposition of broadly applied standards implies a “public” or regulatory / legislative aspect of resilience efforts. In the discussion, there was general concurrence that something along these lines will be required, and that such standards, ideally, should reflect the international nature of both the problems and the solutions.

Such standards should benefit from wide stakeholder review, not simply by the power industry. For example, an important question that should be asked, from an insurance industry perspective, would be: “What could be recommended as a helpful legislative agenda?” In that regard, it would be important to understand where the energy and insurance sectors could agree that legislation would be helpful.

Two additional criteria were suggested as guidance for standards development:

a. View standards as an evolving process

Standards or best practices should not be envisioned as a single, threshold requirement. Decisions on long term goals and standards should not prevent development and implementation of nearer term, interim standards and protective measures. This might include, for example, defining adequate requirements and test criteria for current blockers, which could potentially then be part of near term measures.

In short, the participants agreed, it is important not to lose sight of the fact that we have a limited – and an unknown – amount of time to address this issue. Given this, incremental measures are important.

b. Ensure standards are well-formulated, with insurance sector perspectives “at the table” as standards are developed

However they are implemented, it is crucial that standards be well-formulated. There have been many examples of poorly conceived standards that have had powerful negative impacts.

The insurance industry has a clear self-interest in scrutinizing standards that play could play a role in developing risk transfer solutions, to confirm that such standards do, in fact, enhance resilience.

This could be an important asset in developing effective standards, but it will be important to look for “Roadmap” processes that will not tend to artificially “suppress” such pricing strategies. Attention should also be paid to the possibility that, to the extent such strategies are focused exclusively on transformer failures, it may not always be easy to de-convolve GIC failures from other damage mechanisms.

2. On Public / Private Partnerships

Beyond regulatory or legislative constraints, it was also recognized that public / private partnerships will be necessary in this domain. It will be important to find ways to help empower corporate stakeholders as part of the solution.

In this area, “empowerment” should include a review of how historic regulatory measures have shaped the insurance sector. For example, one important question would be: “Have regulatory measures actually resulted in reducing the kind of hardware redundancy that would be useful for e-threat protection?”

3. Recognize the diversity within the insurance sector

While insurance sector companies, markets and stakeholders will tend to behave in similar ways, they will not act as a single “block,” and it is important to take this into account in laying out recommendations for a path forward.

4. Seek security agency input to clarify malicious e-threat concerns

Part of the Roundtable discussion focused on ideas to help both sectors include malicious threats – EMP and related hazards – within their purview. It was recommended that a structured outreach effort be devised to allow for threat communication to flow from DoD and other security agencies to cleared contractor personnel.

5. Include “Restoration in an Impaired Environment” in the context of e-threat protection efforts

Several participants raised the concern that, while growing attention was being given to ways and means to implement protective measures, there has been little if any focus on the need for restoration in an impaired power grid environment. Given the many implications for high-risk restoration timelines associated with essential public needs, and with critical facilities and capabilities, this must be addressed as an urgent matter.
Recommendations for an informal Roadmap process

1. Sharing modelling information

Consider developing a framework to exchange and share information on modelling approaches, strategies and outputs.
Background

Fairly unique among the corporate domains that sustain modern society, the insurance sector relies significantly on hazard forecasting and modeling to guide its business. At the same time, with limited capability to make resilience investment decisions which could mitigate societal hazards, insurance solutions and specifically premium-setting reflect the unfolding risk environment; resilience decisions are made by other corporate sectors or governments, and may have a limited effect on the insurance industry's performance. This combination—mandatory, optimal forecasting and modeling with no vested interest in resilience investment—positions the sector to act as an effective intermediary: to commission and to exchange a full range of hazard models, facilitating sharing, correlation and peer review among corporate and government stakeholders.

Concept

Developing a framework for sharing modeling / forecasting information: Encouraging peer review and consensus building on scope and characteristics of emerging risk. For space weather, a comprehensive modeling framework for exchanging information could help facilitate review and comparison of different forecasting approaches, and of the scenarios and assumptions on which they are founded. This, in turn, could encourage and accelerate consensus building to address three important considerations:

a. Appropriate risk scenarios / risk levels

b. Assumptions related to hardware impacts – both primary and secondary

c. International guidelines

Recommended action:

Developing a framework for to share modelling information sharing

Consider finding a framework for sharing to develop and share a modeling and forecasting approaches and information, to be available for review and reviewing by international scientists and government and corporate stakeholders. Progress in developing a framework would be assessed in periodic review meetings.
Risk transfer solutions and resilience investments

Explore roles for the role of Insurance sector in encouraging resilience investments
Background

Risk transfer solutions are typically designed so prices reflect the level of risk, and for common, well-known hazards, this strategy has two effects.

The primary function of insurance pricing strategies is to generate adequate capital to cover claims risk, at a reasonable rate of return. But premium setting can also encourage changes to reduce the risk, and this can be reflected in the premiums set. This effect becomes more significant when insurance represents a significant fraction of overall cost. To the extent an insurer’s risk model accurately reflects reality, both of these functions work well: the insurer has a profitable product, and customers are motivated to reduce risk. Insurance can therefore play a significant role in reducing societal risk.

The utility of this approach, however, becomes limited when either of the two embedded assumptions breaks down. For rare hazards where cost impacts are difficult to project, and where insurance represents only a small fraction of total cost there may be little motivation to improve, and price-motivated changes may not properly address the real hazards. Insurance can therefore be sector pricing strategy can, therefore, be a useful tool to address serious societal risks like e-threats. But, like any tool, its use must be planned carefully to fit the task.

Concept

a. Developing risk transfer solutions: Motivating effective resilience investments through insurance pricing.

The projected impact of severe space weather on EHV transformers is difficult to predict with high confidence, and for other electromagnetic threats models are widely considered to have limited utility. Nevertheless, modeling and available data have led to consensus that these and similar hazards could have – at best – a serious negative impact on the power grid, with severe consequences for national and international economies. In fact, most studies have suggested that this class of threats must be considered a serious threat to societal stability, on a continental or even global scale.

For a risk of this magnitude, it makes sense to begin looking for opportunities for cost-effective protection, without insisting on highly detailed, thoroughly validated models, which are impossible to develop for rare hazard scenarios.

For severe space weather, this could mean aggressive development, validation and implementation of approaches for procedural and automated protection. For EMP, planning and procedure development for post-event restoration / black start that meets critical asset timelines, while ensuring adequate inventories of basic – and generally inexpensive – spares, may address most of the resilience needs.

Exploring effective use of insurance industry pricing structures to help motivate e-threat resilience could thus, look at the viability of motivating investment in these resilience approaches.

While ways need to be found to develop effective risk transfer solutions (when, for example, the pool of insured transformers may represent a relatively small market), this approach is likely still one of the best areas to focus. For example, insurance strategies will almost certainly call for standards that can be used to help guide rate-setting, and these standards can assist in defining industry norms.

b. Developing Leveraging risk reduction strategies: future impact of insurance: Looking for opportunities to leverage broader corporate and government involvement insurance structures to help motivate resilience investments.

• Severe space weather – Resilience-friendly EHV transformer insurance pricing structures may, in many cases, have a direct and positive impact. In fact, however, the risk associated with transformer damage is likely to go far beyond the transformers themselves, putting at risk successful operation of a corporation’s complete grid and electricity delivery, with corresponding direct or indirect financial risks to insurance providers. This suggests it may be possible and, in the long term, profitable for insurance providers to consider developing a broader set of energy sector insurance solutions products, by potentially including space-weather coverage options.

• Malicious e-threats – Given the wide range of impacts anticipated for electromagnetic pulse effects, motivating protection through risk transfer solutions would likely require setting rates that reflect a broad range of coverage categories, dependent on implementation of basic protection measures. In those cases where policies include exclusions for "acts of war" or "terrorism," such measures may require government "backstopping" to enhance the cost-effectiveness – and thus availability – of such insurance cover (see next section).

Recommended action:
Encourage resilience investments through risk transfer solutions

Explore use of insurance industry approaches pricing strategy to help motivate e-threat resilience, potentially including developing a broader set of energy sector insurance solutions. Evaluate the impact of government "backstopping" as an enabling factor.
Insurance sector, energy sector and government dialogue

Focusing the dialogue to find ways to leverage insurance sector expertise and sector’s tools to encourage e-threat expertise and resilience.
Background

In our modern society, insurance has become an essential business and societal tool, making possible business planning and investment and growth which would otherwise be heavily encumbered. While market forces are normally preferred, and sufficient to make a wide range of insurance products available, there are unique areas where governments have judged that unknown – and potentially high – risks mean that insurers are not always able to provide cover. Thus, in some situations, Governments must get involved for insurance to be provided would, if uninsured, stifle normal business operation, with unacceptable economic impact.

As an example, following the Balkan Exchange Bomb in 1992, the U.K. created the Pool Re insurance act, to provide a government-backed mechanism to allow businesses to purchase terrorism insurance. Following the 9/11 attacks, the U.S. Congress passed the Terrorism Risk Insurance Act, providing a similar government-backed mechanism to allow businesses to purchase such insurance.

Recommended action

Initiate a government, energy sector and insurance sector e-threat dialogue

Begin an ongoing dialogue designed to discuss and evaluate different strategies for public / private partnerships in encouraging e-threat resilience.

Concept


With U.S. and international government agencies unanimous in expressing concerns for the range of serious, potential impacts of severe space weather and other electromagnetic threats, this may be an area where insurance sector / energy sector / government dialogues would be particularly useful.

Government backstopping could potentially make possible new risk transfer solutions insurance products and new pricing strategies that could help motivate resilience investment against e-threats. And by creating nation-wide mechanisms to implement such products and strategies, this might also encourage development of common risk mitigation approaches.
4

Broadening participation in energy sector/NGO e-threat protection initiatives. Strengthen new initiatives by calling for insurance sector participation.
Background

From NERC’s GMD Taskforce to the DOE / EIS Council International E-Pro Report (and the upcoming E-Pro Handbook), there is a growing set of energy industry initiatives to help build a “bottom up” approach to addressing e-threat concerns. By participating in these initiatives, insurance markets and corporations could help ensure that their unique, global risk-based perspectives play a significant role in this new and important dimension of e-threat protection.

Recommended action

**Recommend insurance markets and organizations participate in new energy sector protection initiatives**

Encourage insurance sector stakeholder organizations to participate in energy sector e-threat protection initiatives, to help an effective balance between initiating protective measures and additional analysis.
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