The Insurance and Risk Management Industries: New Players in the Delivery of Energy-Efficient Products and Services

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Proceedings of the 1999 European Council for an Energy-Efficient Economy

1 – SYNOPSIS

This paper describes ways in which energy-efficient technologies and practices can reduce insurance-related risks, provides case studies, and identifies barriers and opportunities.

2 – ABSTRACT

The insurance industry is rarely thought of as having much concern about energy issues. However, the historical involvement by insurers and allied industries in the development and deployment of familiar technologies such as automobile air bags, fire prevention/suppression systems, and anti-theft devices, shows that this industry has a long history of utilizing technology to improve safety and otherwise reduce the likelihood of losses for which they would otherwise have to pay. We have identified nearly 80 examples of energy-efficient and renewable energy technologies that offer "loss-prevention" benefits, and have mapped these opportunities onto the appropriate segments of the very diverse insurance sector (life, health, property, liability, business interruption, etc.). Some insurers and risk managers are beginning to recognize these previously "hidden" benefits. The paper describes findings of the Lawrence Berkeley National Laboratory insurance industry project, which has helped to develop the business case for insurer involvement in energy efficiency and has documented early examples of insurer efforts along these lines. The identified actions of forward-looking insurers include reduced premiums for architects and engineers who practice building commissioning (reduces risk of liability-related losses), insurer promotion of improved indoor air quality practices (mitigating life, health, and liability risks), and insurer promotion of energy-efficient torchiere light fixtures (eliminates a significant fire hazard). The paper reviews recent proactive steps taken by insurers and risk managers in the energy-efficiency/market-transformation arena.

3 - INTRODUCTION

It is not often that a significant new actor enters the energy efficiency marketplace. We are now witnessing such an occurrence in the case of the insurance and risk management industries. Given that the insurance and risk management sectors are economically more significant than the energy sector--and that they reach almost every homeowner and business--the prospect for their involvement in the development and promotion of energy-efficient technologies stands as an immense opportunity for accelerating the rate of energy-related market transformation.

The fledgling interest in energy efficiency by the insurance and risk management industries is driven by three general factors. The first factor is that a range of loss-prevention benefits of energy efficient technologies and services are coming to light (Mills 1996; Mills 1997; Mills et al. 1998). As a result, these selected efficiency measures take on the appeal of more familiar risk management technologies such as automobile seat belts or air bags, smoke alarms, or preventive medicine. The second factor is that insurers are major players in real estate markets as owners and landlords for commercial buildings. As interest in facility energy management grows, insurers stand to benefit from becoming engaged in it. Lastly, increased competitive pressures motivate companies to develop new products and services (e.g. energy efficiency) that will differentiate firms from their competitors and offer new ways to touch customers.

Our recent inventory of energy-efficiency and renewable energy technologies revealed 78 specific examples of technologies or procedures that offered distinct risk-management benefits (Vine et al. 1998a). We identified eight specify types of "physical perils" that were addressed, and 15 corresponding types of insurance coverages which would benefit from the proper application of these technologies and procedures (Table 1).

Understanding the great diversity of the insurance and risk management industries is essential to developing relevant scenarios for their involvement. Primary insurance itself is bifurcated into two main branches (property/casualty and life/health). Within the property/casualty branch are many specialized types of insurance, such as mechanical equipment breakdown, professional liability, builders risk, and business interruption. Energy strategies must be carefully mapped to the relevant insurance lines.

While the primary focus of this paper is on insurers and risk managers, related industries can also play important roles. Beyond primary insurance is the market of reinsurance (insurance-type contracts through which the primary, front-line insurers reinsure themselves against extraordinary losses), as well as the allied industries such as brokerages, agents, risk managers, self-insurers, and trade organizations.

In addition to the firms who are formally active in the insurance and risk management arenas, are other industries who are stakeholders and potential partners in new initiatives for promoting new energy technologies on the basis of loss prevention. These entities include energy utilities, product manufacturers, law firms, non-governmental organizations, consumer-interest organizations, and government.

For the past several years, the Lawrence Berkeley National Laboratory has operated a program of research focusing on the relevance of energy efficiency to the insurance and risk management communities. The balance of this paper describes findings of the project, which has helped to develop the business case for insurer involvement in energy efficiency and has documented early examples of efforts along these lines.

While, as this paper will demonstrate, much of the work conducted by "the energy efficiency community" has synergistic relevance to insurance issues, we are aware of no other published effort to comprehensively organize this thinking and transfer it to the insurance and risk management communities.

4 - CASE STUDIES

A number of early activities demonstrate the largely untapped value of energy efficiency and renewable energy to the insurance and risk management communities. The approaches can be grouped into the categories of: information and education, financial incentives, specialized insurance policies and products, direct insurer investment to promote energy efficiency, value-added customer services, efficient codes and standards, research and development, and in-house energy management (Table 2).

4.1. Information and Education

Insurers' well-established channels of communication with most property and business owners present a unique opportunity to disseminate information about risk management.

The USAA Insurance Company published a detailed and extensive guide to energy conservation for homeowners, providing basic information on energy saving measures, a simple home energy audit procedure, and a tool for computing cost-effectiveness. (USAA 1992). A more general USAA publication on home remodeling also includes energy savings advice (USAA 1996).

Arkwright Mutual Insurance Company has promoted the risk-prevention benefits of compact fluorescent torchiere light fixtures, which replace high-temperature halogen versions known to be associated with hundreds of structural fires across the United States (Avery et al. 1998). The activity involved a technology demonstration in student housing at Northeastern University, a follow-up training workshop for risk managers, and several publications distributed to their customers nationally. In a prime example of cross marketing between government and insurance activities, Arkwright included prominent mention of the ENERGY STAR labeling program for efficient (and fire-safe) torchiere fixtures, operated by the U.S. Environmental Protection Agency and the U.S. Department of Energy.

In a few instances, energy utilities have collaborated with insurers. Boston Edison participated in the Arkwright torchiere project, and the Pacific Gas and Electric Company created an umbrella under which efficiency-related collaborations with insurers are hoped to take place.

The United Nations Environment Programme hosts an international Insurance Industry Initiative for the Environment, which has approximately 80 member companies from 25 countries.. Information on energy efficiency has on occasion been circulated among the participants.

4.2. Financial Incentives

The highly competitive, "soft" insurance market of today makes it extremely difficult for insurers to grant premium reductions as an incentive for customers that implement risk management. There are, however, some notable exceptions.

In the first instance of an insurer financial incentive we are aware of, the Hanover Insurance Company (c.1980) gave a 10% reduction in homeowner property insurance premiums to energy efficient/solar homes, with the justification that the heating systems fired less often, resulting in a reduced fire hazard.

Insurers can also promote strategic education programs for their customers, be they building owners or building professionals (Mills and Knoepfel 1997). Some insurers in Massachusetts offer 10% discounts to people who take a free six-hour course in weatherization, home repair and other subjects.

Another highly notable example, pertaining to professional liability insurance for building professionals, is a one-time credit of 10% offered to architects and engineers who receive training in commissioning. The credit applies to the Professional Liability policies for architects and engineers, and reflects research done by the insurance company (DPIC) into the role that building commissioning can play in pre-empting physical problems—often related to HVAC systems--that could lead to insurance claims (Brady and Dasher 1998).

4.3. Specialized Policies and Products

Another tool available to insurers is to design new types of insurance policies and products that promote risk-reducing energy efficiency improvements.

As an example, the Zurich-American Insurance Group offers specialized insurance policies for third party energy service companies that implement energy efficiency technologies in exchange for a share of the savings. The policies protect the installer or building owner against under-achievement of contracted energy savings targets, and thus help reduce business risks for this emerging service industry.

Other examples involve new products to help address indoor air quality problems, an issue integrally related to energy performance. While most such claims are settled out of court, three U.S. examples that we have identified resulted in payouts totaling $50 million (Chen and Vine 1998; Chen and Vine 1999).

- The Building Air Quality Alliance (BAQA) has developed a "due diligence IAQ screen" to help building managers reduce their potential liability by completing a checklist protocol to ensure that a building has good indoor air quality practices. BAQA has developed an IAQ risk assessment protocol and an IAQ insurance policy for building owners with the Clair Odell Group, an insurance brokerage firm, and an insurance provider.

- Environmental Resource Process Management (Atlanta) and an unnamed insurance underwriter are working together to develop a way of assessing IAQ risks in buildings, and to offer a form of liability coverage that would pay for correcting the IAQ problem.

- Willis Corroon, a major insurance broker, is also developing a new breed of IAQ policy for property owners, managers, and developers. The product will bundle insurance with audits and guidelines on design, construction, and maintenance practices that minimize the risk of IAQ problems. Coverage will include payments for the correction of problems and loss of use.

4.4. Direct Insurer Investment to Promote Energy Efficiency

Insurers are among the most significant players in world financial markets, and these involvements often touch on the energy sector. As an illustration, insurers were responsible for about 15% of all contributions to US money and capital markets in 1996 (American Council of Life Insurance 1997).

The Storebrand Scudder Environmental Value fund is an early example of environmental investing, to which insurance companies (Swiss Re, Gerling, Trygg-Hansa) have already contributed $110 million. Energy efficiency is one of the criteria used to evaluate securities as they are considered for inclusion in this fund.

4.5. Value-Added Customer Services

The risk-management benefits of energy efficiency suggest possibilities for entirely new profit centers within firms.

Chubb has avoided claims thanks to the use of infrared cameras in detecting electrical and other risks. Some of the risks identified also correlate with energy inefficiencies, e.g. refrigerant leakage, water damage to roofs, eroded insulation in steelmaking furnaces, and ruptured underground district heating lines. Munich Re has recommended the use of IR cameras as a loss-prevention tool, citing the prompt detection of broken hot water pipes as an example of how to minimize water damage losses and save energy. Hartford Steam Boiler has been the leader in mechanical equipment inspections, as evidenced by its eye-opening analysis of fire hazards in 200 New York City buildings. Infrared inspections might also prove useful in other areas, such as identifying heat losses (and associated energy waste) in roofs that invite costly ice dam formation or poorly insulated pipes exposed to freeze damage.

Storebrand has conducted customer-focused activities in which they provide building inspections (commercial and residential) and provide advice on improving indoor air quality and energy efficiency.

4.6. Efficiency Codes and Standards

Insurers have long been involved in the development and support of building standards, as integral to the disaster-resilience of the properties they insure. To the extent that energy-efficient technologies can offer risk management benefits (e.g. reduction of ice damming risks or elimination of pilot lights), insurers could expand their involvement to this dimension of codes and standards.

While the insurance industry's Institute for Business and Home Safety (IBHS) has endorsed the improved enforcement of building energy codes, there are as yet no examples of individual insurers involvement in the energy code arena.

4.7. Research & Development

Insurance-related technical organizations such as the Factory Mutual Research Corporation and Underwriters Laboratory evidence insurers' historic role in technology assessment and R&D. With a few modest exceptions, the resources of these organizations have yet to be focused squarely on the opportunities for combined energy and risk management. We have previously discussed at some length the role that insurers can play in energy R&D (Mills and Knoepfel 1997).

An early example of such a partnership is a Cooperative Research and Development Agreement (CRADA) between various elements of the U.S. insurance and roofing industries and the U.S. Department of Energy's Oak Ridge National Laboratory. The private partner is the Roofing Industry Committee on Wind Issues (RICOWI), which includes all major roofing trade associations in North America and various insurance partners (the Institute for Business and Home Safety, State Farm, and Chubb) (Vine et al. 1998b). One aim of this cost-shared project is to analyze mechanisms of roof failure during severe windstorms and to identify specific ways in which energy-efficiency detailing can also enhance roof structural integrity in the face of such storms.

More recently, IBHS, focusing on natural disaster preparedness and recovery, is partnering with the U.S. Department of Energy in developing and deploying an extremely low-energy ultraviolet water disinfection system. The design is based on UV Waterworks, which utilizes small ultraviolet lamps to disinfect the water. The device will be manufactured by WaterHealth International, and can be operated with solar photovoltaic cells when grid-based power is unavailable. IBHS has also explored topics such as frozen water pipes and rooftop ice damming, for which some risk management solutions also yield energy savings.

4.8. In-House Energy Management

The insurance industry is one of the world's most significant owners of real estate. Our survey of ten largest insurance companies globally identified assets in real estate (buildings, land, movables) amounting to $US 105 billion (Mills and Knoepfel 1997). The exact figure for the floor area of these buildings is not known, but we estimate it at about one billion square feet, corresponding to an annual energy cost of $1.6 billion. U.S. life insurer real estate holdings are valued at nearly $60 billion. Many insurers operate in-house energy management programs, with varying degrees of effort.

Given the importance of computer-related tasks in insurance operations, worker productivity can also be of particular importance. In a carefully controlled research study, West Bend Mutual Insurance company reported a 7% increase in productivity (numbers of files processed pertaining to applications, endorsements, renewals, and quotes) following the implementation of a variety of energy- and non-energy related worker environment improvement measures. Energy savings were 38% and were statistically associated with one-third of the total productivity gain.

As large real estate owners, insurers also tend to purchase enormous volumes of energy-using equipment. Several European insurance companies (Delta Lloyd Verzekeringsgroup NV, General Accident, Independent Assurance, and Prudential Assurance) are now collaborating with the International Energy

Agency to harnass the purchasing power of large building owners to create new markets for energy-efficient photocopiers.

Lastly, U.S. insurers are beginning to look at the benefits of participating in the government's voluntary energy savings programs, such as Rebuild America and ENERGY STAR. Given the scale of insurer real estate ownership, the industry has an unparalleled opportunity to display leadership by example in the field of energy management.

5 - BARRIERS TO INSURER INVOLVEMENT IN ENERGY EFFICIENCY

5.1. Technical

While there is a growing literature and documentation of the risk management benefits of energy-efficient technologies, there remains a need for more specific quantitative documentation. In some cases, actuarial quality statistical analyses may be required; in other cases, engineering-type documentation of the benefits may suffice.

Surprisingly, insurers are rarely involved in technology R&D. Although there are some notable exceptions, most insurance research is focused on the financial issues.

Another real barrier is that energy-efficient technologies can at times work against the goals of risk management (Vine, et al. 1998). Improperly applied energy management can compromise indoor air quality, cause water damage, pose fire hazards, etc. These problems are generally resolvable, but energy R&D organizations (public as well as private) are driven largely if not exclusively by energy-related objectives and do not necessarily consider risk management issues.

5.2. Nature of Insurance Industry and the Insurance Marketplace

The insurance industry is highly competitive and there are numerous disincentives to take risks on new products and concepts. Fragmentation among the types of insurers, plus the allied industries of reinsurance, brokerages, agents, self insurance, can also impede innovation and the diffusion of new business concepts. While many perceive the insurance industry as a monolith, the reality is quite different. In the U.S. alone, there were 3,316 property- casualty companies and 1,969 life and health companies in operation as of 1996. Added to this are thousands of firms who provide allied services.

Especially in the United States, insurers have had a difficult history with issues pertaining to environment and pollution prevention. Many years of litigation over "Superfund" toxic waste cleanup has translated into billions of dollars in unanticipated costs and headaches for insurers. While the types of energy initiatives outlined in this paper are a far cry from waste cleanup, the association with "environment" can dampen insurer enthusiasm.

There are also a variety of regulatory hurdles. Insurers must seek approvals for rate changes, included those designed as incentives for energy efficiency. Diversification into subsidiary industries (such as Energy Services) may also invoke regulatory review. In the U.S., insurer R&D costs cannot ordinarily be placed into the insurance premiums.

5.3. Energy/Environment Community Perceptions of Insurance Industry

Another set of barriers are created by the energy and environmental community's perception of insurers. While the insurance industry has enormous revenues, the allocation of monies to new and high-risk

ventures outside of the core business is highly limited. Moreover, the industry has become increasingly competitive, which has translated into premium and profit reductions. The current "soft market" conditions make it particularly difficult to implement new premium credits to promote efficiency.

The energy/environmental community also has a very vague understanding of the insurance business. This makes it difficult to craft propositions that make real business sense for insurers.

There is also a growing perception that insurers will in some sense "automatically" promote energy efficiency because it will reduce greenhouse gas emissions and thereby lower the risk of weather-related natural disasters. While there are several well-documented connections between extreme weather events and global climate change, the science is in fact inconclusive about many issues. Moreover, the prospective benefits would manifest well into the future, far ahead of the financial planning horizon of most insurance interests. Few insurers take a sufficiently long-term view.

5.4. Insurance Industry Perceptions of Energy/Environment Community

There are also barriers in the nature of insurance community perceptions of the energy/environmental community. History has often evidenced an adversarial relationship between non-governmental organizations and insurers. In the case of energy, it is far more likely that the non-governmental organizations would prefer to operate as allies of the insurers, but the historical perception must be overcome.

Lastly, energy efficiency may come to be viewed as a "Trojan Horse" for politicizing insurers around the climate change issue. This perception can conflict with insurer focus on the direct relationship between certain efficiency measures and risk management, such as property protection, or indoor air quality enhancement.

6 - CONCLUSIONS

There is tremendous promise for insurers to become more involved in energy efficiency and market transformation. The early precedents cited above illustrate the wide array of ways in which insurers have already participated, but barriers also remain.

It is somewhat curious that the European insurance community--which is generally considered to be more advanced in efforts related to global environmental issues--appears to be less active in the practical promotion of energy efficiency.

The challenge is to continue to identify and articulate the ways in which energy efficiency can moderate or prevent insurance losses, and to improve the competitive advantage of insurance firms. To be successful, energy efficiency must address acute strategic issues. A good example is the rapid growth in construction defects litigation haunting many U.S. insurers; many of the claims trace back to bad design and application of energy-related systems. Constructive roles for insurance regulators must also be identified. Industry market leaders, and trade associations can serve as key agents of innovation.

7 - ACKNOWLEDGMENTS

This work was funded by the Assistant Secretary for Energy Efficiency and Renewable Energy, Office of Building Technologies and State and Community Programs, of the U.S. Department of Energy under Contract No. DE-AC03-76SF00098 and by the U.S. Environmental Protection Agency, Atmospheric Pollution Prevention Division.

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Table 1. Physical perils and insurance coverage addressed by energy-efficiency and renewable energy technologies & strategies (Vine et al. 1998a).

	Number of measures offering benefit[1]
Physical Perils	
Extreme Temperature Episodes	**16**
Fire & Wind Damage	**38**
Home or Workplace Indoor Air Quality Hazards	**38**
Home or Workplace Safety Hazards	**21**
Ice & Water Damage	**17**
Outdoor Pollution or Other Environmental Hazard	**17**[2]
Power Failures	**35**
Theft and Burglary	**6**
Insurance Coverage — Commercial Lines	
Boiler & Machinery	**15**
Builder's Risk	**4**
Business Interruption	**21**
Commercial Property Insurance	**36**
Completed Operations Liability	**14**
Comprehensive General Liability	**45**
Contractors Liability	**14**
Environmental Liability	**12**
Health/Life Insurance	**39**
Product Liability	**5**
Professional Liability	**19**
Service Interruption	**21**
Workers' Compensation	**35**
Insurance Coverage — Personal Lines	
Health/Life Insurance	**35**
Homeowners Insurance	**26**

[1]*The numbers in this column refer to unique technologies and covers all (i.e., including non-national laboratory) technologies in Table 4. For example, if two national laboratories are conducting research on fuel cells, this is "counted" only once under Service Interruption in Table ES-1.*

[2]*The environmental benefits of improving the outdoor air and reducing greenhouse gases by renewable energy resources (e.g., solar, wind, etc.) are not included in this table.*

Table 2. Summary of insurance-related activities in the energy efficiency sector.

	Country	Information & Education	Financial Incentives	New Insurance Products	Direct Investment via Markets	Technology Demon-strations	Customer Services & Inspections	Codes & Standards	Research & Development	In-House Energy Management
INSURANCE & REINSURANCE COMPANIES										
Arkwright Mutual	US	•				•				
CGU (formerly General Accident)	UK									•
Chubb	US						•		•	
Delta Lloyd Verzekeringsgroup NV	NL									•
Developers Professional Insurance Company (DPIC)	US		•							
Hanover	US		•							
Hartford Steam Boiler (HSB)	US									•
Independent Insurance	UK									•
Munich Re	D	•								
Prudential Assurance	UK									•
State Farm	US								•	
Storebrand	N				•		•			
Swiss Re	CH									•
USAA	US	•								
Westbend Mutual	US								•	
Zurich American Insurance Group	US			•						
INSURANCE BROKERS & AGENTS										
J.H. Marsh & McLennan	US									
Willis Corroon	US			•			•			
Clair Odell Group	US			•			•			
INSURANCE ORGANIZATIONS										
Institute for Business and Home Safety (IBHS)	US	•						•	•	
United Nations Environment Programme Insurance Initiative		•								
OTHERS										
U.S. Department of Energy	US	•	•	•		•			•	
U.S. Environmental Protection Agency	US	•	•	•		•				•
Boston Edison Company	US	•				•				
Pacific Gas & Electric Company	US	•								
Waterhealth International	US								•	
Building Air Quality Alliance (BAQA)	US			•			•			
International Energy Agency										•