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# PERSPECTIVES

## Energy Consumption Analysis: The Impact on Insurance Claims During Extreme Weather Events

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# THE ROLE OF ENERGY CONSUMPTION ANALYSIS IN EXTREME WEATHER INSURANCE CLAIMS

Water damage to structures is among the most common type of first party property insurance claims. During periods of extreme weather, water damage claims typically increase. Extreme low temperatures in areas of the United States where low temperatures are infrequent combined with higher priced energy or reduced reserves related to ongoing energy transition requirements are affecting operational behaviors of both utilities and consumers. Those behaviors include maintaining lower than normal thermostat settings by consumers to save costs and periodic or rotating outages by utilities when insufficient electrical energy is available to meet demand. These changes can cause an increase in water pipes bursting and, in turn, more property damage claims. The following information may be of particular interest to property insurance providers and their policyholders living in or owning properties within relevant, affected areas of the U.S.

# OPERATIONAL CHANGES IN UTILITIES AND CONSUMER BEHAVIOR

Residential or commercial insurance policies set obligations the insured must comply with which relate to preventing damage. Some obligations include minimum temperature maintenance, temperature alarms, or water sensor systems. Failing to maintain the policy requirements can lead to a gap in coverage.

As discussed in *Rethinking Energy Reliability with Modern Power Systems*, the electrical system grid is less resilient and less reliable than it once was due to a combination of factors. In periods of extreme weather, the electrical system attempts to avoid blackouts and may implement reductions in electrical demand by removing customers from the system, which, in industry terms, is "load shedding" (more commonly discussed in terms of "rolling blackouts" by consumers). Problems arise when these voluntary load shedding events become involuntary events and the power grid suffers a catastrophic failure.

Over time, energy costs have risen. Some markets experience extreme cost swings due to demand which leads consumers to attempt to reduce costs by turning down the thermostat. Short-term rentals such as Air B&B or VRBO as a business have sensitive profit margins, and power can be a significant cost. Personal vacation properties, religious facilities, and vacant properties may be unattended for significant periods of time and are frequently subject to reduced power settings in an effort to control costs. The number of commercial buildings that are vacant is high—208,000 in 2018, for example.[1] Building heat is the single largest energy use in U.S. commercial buildings and accounts for about 32% of energy used in all commercial buildings.[2]

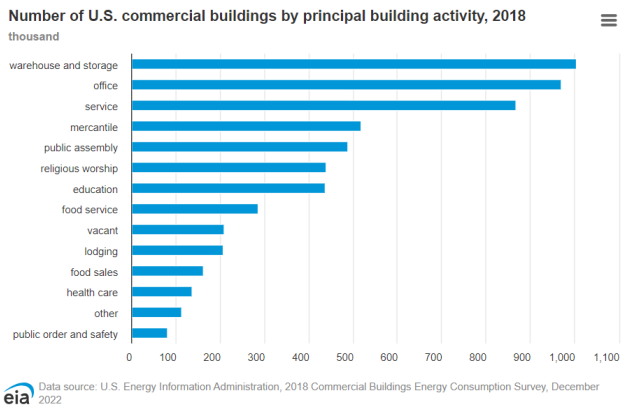


***Figure 1** - Number of U.S. commercial buildings by principal building activity, 2018 (Source: U.S. EIA).*

# THE TEXAS WINTER STORM URI

Named weather events like Texas Winter Storm Uri in February 2021 are well known for the havoc they create across the property insurance market. Unnamed extreme weather events have similar impacts with two significant events in the last year (see Figure 2).[3] Interruptions to the electrical system are common during these events and can increase the property damage as a result (i.e., water leaks or equipment damage due to irregular shutdowns).

[1] https://www.eia.gov/energyexplained/use-of-energy/commercial-buildings.php
[2] Id.
[3] https://www.ncei.noaa.gov/access/billions/events/US/1980-2023?disasters[]=winter-storm

| Event | Begin Date | End Date | Summary | CPI-Adjusted Estimated Cost *(in Billions)* | Deaths |
|---|---|---|---|---|---|
| **Northeastern Winter Storm / Cold Wave** *February 2023* | Feb 2, 2023 | Feb 5, 2023 | A strong winter storm produced snow, high winds and bitter cold across numerous Northeastern states. High winds caused widespread power outages in Massachusetts while Mount Washington, New Hampshire observed a wind chill temperature of -108 degrees Fahrenheit. This was one of the coldest wind chill temperatures ever recorded in the United States. | $1.8 CI | 1 |
| **Central and Eastern Winter Storm and Cold Wave** *December 2022* | Dec 21, 2022 | Dec 26, 2022 | Historic winter storm and powerful arctic front caused significant impact across much of the nation, bringing heavy rains, snow, ice and high winds that sent temperatures plummeting. More than 200 million people were under a winter weather advisory or warning and more than a million customers, from Texas to Maine, were left without power. Buffalo, New York was paralyzed by near hurricane force winds and continuous snow squalls, which contributed to dozens of fatalities in the region. Additional impacts were widespread frozen water pipes that led to extensive water damage in many homes, businesses and to other critical infrastructure. | $8.7 CI | 87 |

***Figure 2** - Significant winter weather events from 2022-2023, their costs, and related deaths (Source: NOAA).*

# THE DANGERS OF LOW TEMPERATURES AND POWER LOSS IN BUILDINGS

The combination of extreme low temperature and loss of power can damage water systems within buildings. In areas of the country without a history of low temperatures, building contractors and building owners may elect to avoid costs associated with heat tracing or insulating piping. Similarly, some building systems, such as fire suppression systems, may be located above the temperature-controlled environment in a plenum space that does not provide temperature protections to the piping. When buildings are temporarily out of service, such as schools during winter break, or vacation or second homes, owners may elect to reduce the temperature in the building during periods of unoccupancy to reduce power consumption and resulting costs. Many owners may be unfamiliar with the details of their insurance policies regarding the temperature maintenance or sensor requirements. The combination of these factors can result in pipe ruptures that can cause substantial economic loss.

# ENERGY CONSUMPTION ANALYSIS: A TOOL FOR DETERMINING COMPLIANCE

On many occasions, pipe failures caused by freeze events are only discovered after significant water damage has occurred. In determining compliance with insurance policy requirements, the parties must evaluate whether the appropriate systems were in place, whether the temperature was maintained, and other factors. In some instances, the available information is, for the most part, determined by an after-the-fact physical inspection of the damaged property. Energy consumption analysis is another useful tool available to determine whether compliance with temperature requirements was maintained.

By evaluating energy consumption, the proper experts can provide guidance to the parties as to whether an energy consumption response occurred due to extreme temperature. In combination with the after-the-fact physical inspection of the damaged property, the energy consumption analysis, which provides details around the function of the heating, ventilation, and air conditioning (HVAC) system during the time period in question, can inform the parties whether a building and its systems adhered to temperature requirements of the policy.

# THE RISE OF SMART METERS: INFORMING INSURANCE POLICY COMPLIANCE

As electric utilities increase their use of smart meters and other data collection devices, the ability to utilize that data to inform insurance policy compliance grows. The most basic form of smart meter measures and records electricity usage at a minimum of hourly intervals and provides that data to the utility at least once a day. There are approximately 111 million (electric) utility smart meters in the U.S. today.[4]

| Number and percentage share of AMI installations by sector, 2021 | | | | |
|---|---|---|---|---|
| Residential | Commercial | Industrial | Transportation | Total |
| 97,708,824 (69%) | 12,930,423 (66%) | 535,725 (63%) | 1,786 (52%) | 111,176,758 (69%) |

***Figure 3** - Advance metering infrastructure (AMI) smart meter installation data, 2021 (Source: U.S. EIA).*

The European Union also has significant numbers of smart meters with almost 200 million. The International Energy Agency (IEA) gives an idea of the scale of the resources that are available.

> *"The number of smart power meters worldwide exceeded 1 billion last year, a 10-fold increase since 2010. Meanwhile, connected devices with automated controls and sensors are expected to reach 13 billion in 2023, up from less than a billion a decade ago. This number could reach more than 25 billion in 2030. And there are similar trends in power grids, with around 320 million distribution sensors deployed globally."*[5]

# THE FUTURE: LEVERAGING DATA FOR ENHANCED INSURANCE CLAIM ANALYSIS

As more data becomes available and claims related to extreme weather events continue to rise, the ability of both insurance companies and policy holders to analyze the relevant data becomes more important. Smart meter data, which helps calculate demand response and consumption rates, is just one of the many tools available to parties as they navigate the water-related freeze damages. When it comes to avoiding unnecessary property damage due to factors such as those discussed in this article, it is important to speak with the right experts who can apply energy consumption analyses to aid in determining policy compliance.

[4] https://www.eia.gov/tools/faqs/faq.php?id=108&t=
[5] https://www.iea.org/commentaries/unleashing-the-benefits-of-data-for-energy-systems

# ACKNOWLEDGMENTS

We would like to thank our colleagues John Peiserich and John Dulude for providing insight and expertise that greatly assisted this research.

John F. Peiserich is an Executive Vice President and Practice Lead in J.S. Held's Environmental, Health & Safety practice. With over 30 years of experience, John provides consulting and expert services for heavy industry and law firms throughout the country with a focus on Oil & Gas, Energy, and Public Utilities. He has extensive experience evaluating risk associated with potential and ongoing compliance obligations, developing strategies around those obligations, and working to implement a client-focused compliance strategy. Mr. Peiserich has appointments as an Independent Monitor through EPA's Suspension and Debarment Program. John routinely supports clients in a forward-facing role for rulemaking and legislative issues involving energy, environmental, Oil & Gas, and related issues.

John can be reached at john.peiserich@jsheld.com or +1 504 360 8373.

John Dulude is a Senior Vice President and leads Energy Transition Services in J.S. Held's Environmental, Health & Safety practice. With over 40 years of domestic and international industry experience, John has spent much of his career in the power sector, with expertise ranging from hydroelectric, fossil, nuclear, wind, and solar generation as well as transmission facilities, system reliability, capital investment assessment, generation mix analysis, finance, equipment selection, and load profiles. His project management experience spans North America, Africa, China, Vietnam, and Kazakhstan.

John can be reached at jdulude@jsheld.com or +1 843 977 1441.