



# From Risks to Opportunities: Insurer Exposures and Responses to Climate Change

**Governor Corzine's Summit Confronting Climate Change in New Jersey  
Trenton - September 25, 2006**

Evan Mills, Ph.D.

Staff Scientist

U.S. Department of Energy

Lawrence Berkeley National Laboratory

***“Everybody talks about the weather, but nobody does anything about it.”***

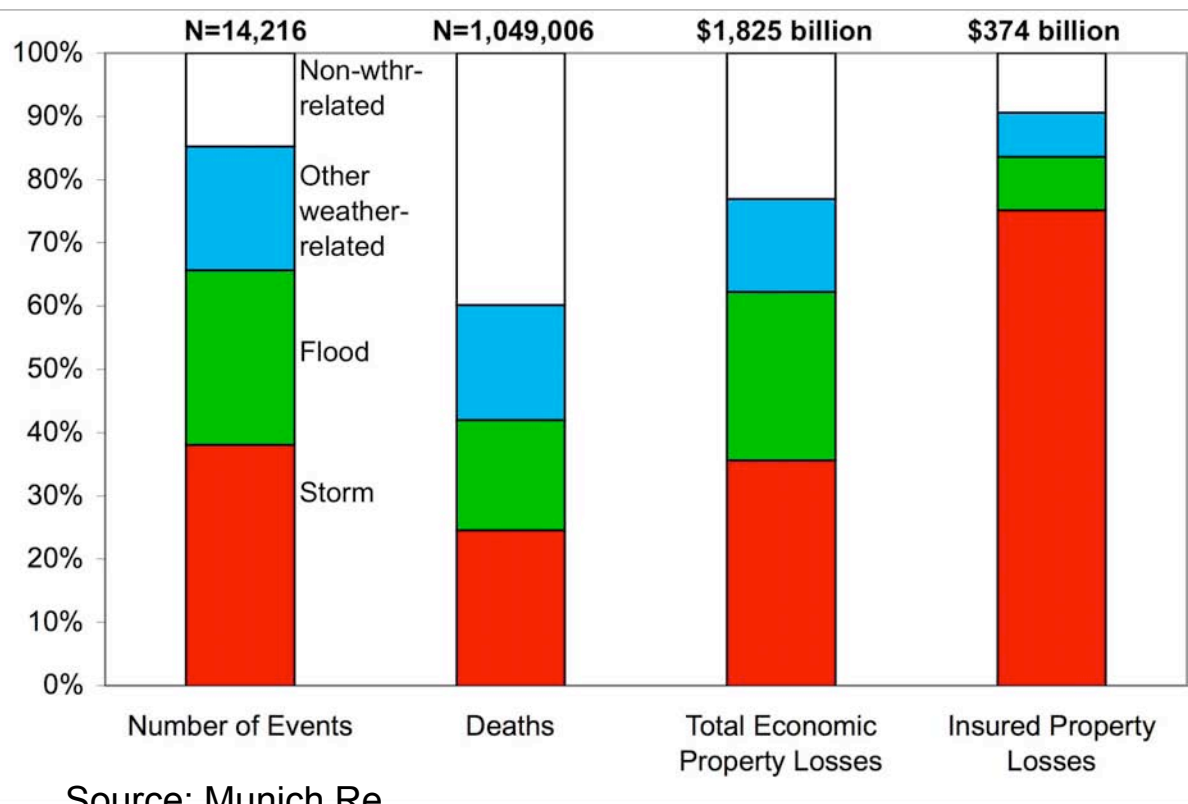
*- Hartford Courant (1897)*

***“After years of silence, the U.S. insurance industry is waking up to climate change.”***

*- Hartford Courant (2006)*

# Disasters Look Different Through an Insurance “Lens”

*Aggregate Global Impacts: 1980-2004*



- Insurance is a form of adaptive capacity
- Insurers are themselves vulnerable
- Insurance is world's largest industry; can play major role in solutions
- Challenge is in the sharing of risk across the public/private spheres

# Uncertainty: Physical Financial

*"We'd be out of our minds if we wrote weather insurance on the opinion global warming would have no effect at all."*

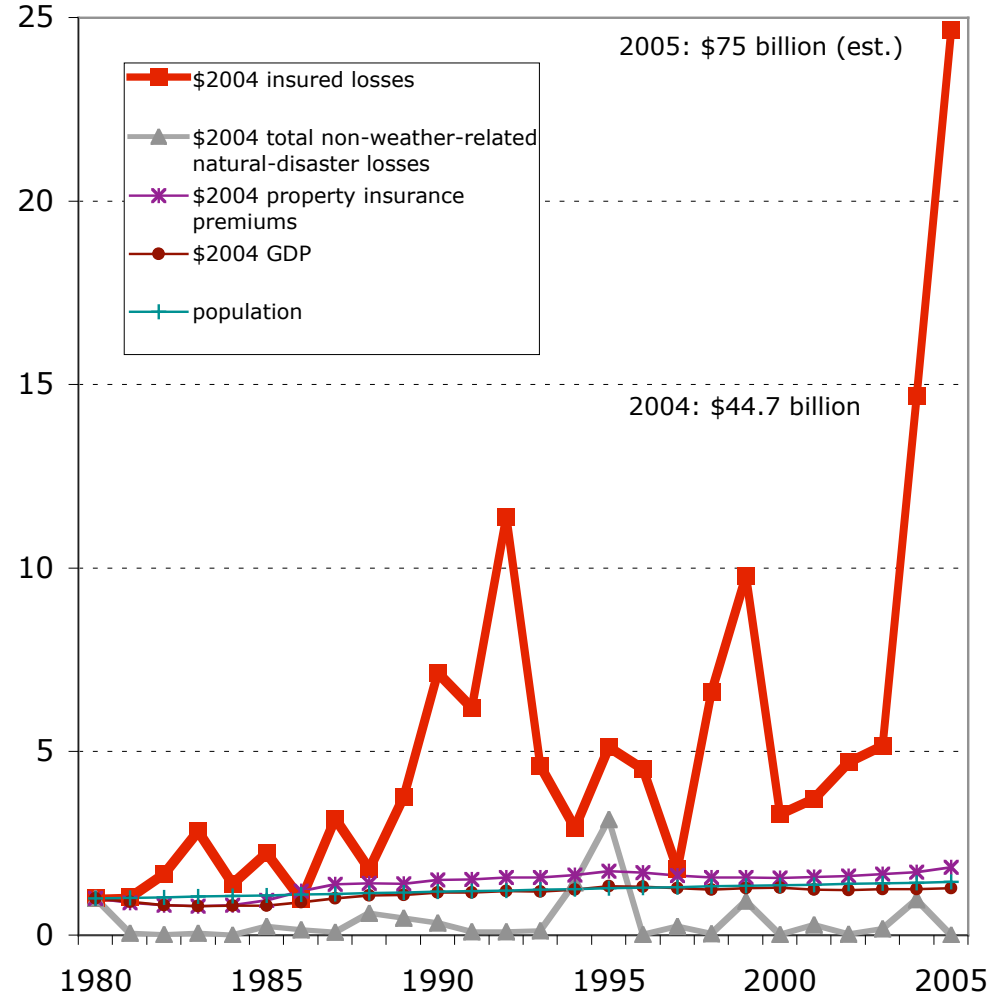
- Warren Buffett

2006 annual shareholder mtg.

Non-climate factors play a role, but...

- Trends consistent w/ clim. Changes
- Why are non-weather losses level?
- Higher losses without prevention
- Excludes "small" loss events
  - offshore; aviation
  - health/life losses
  - small-scale events

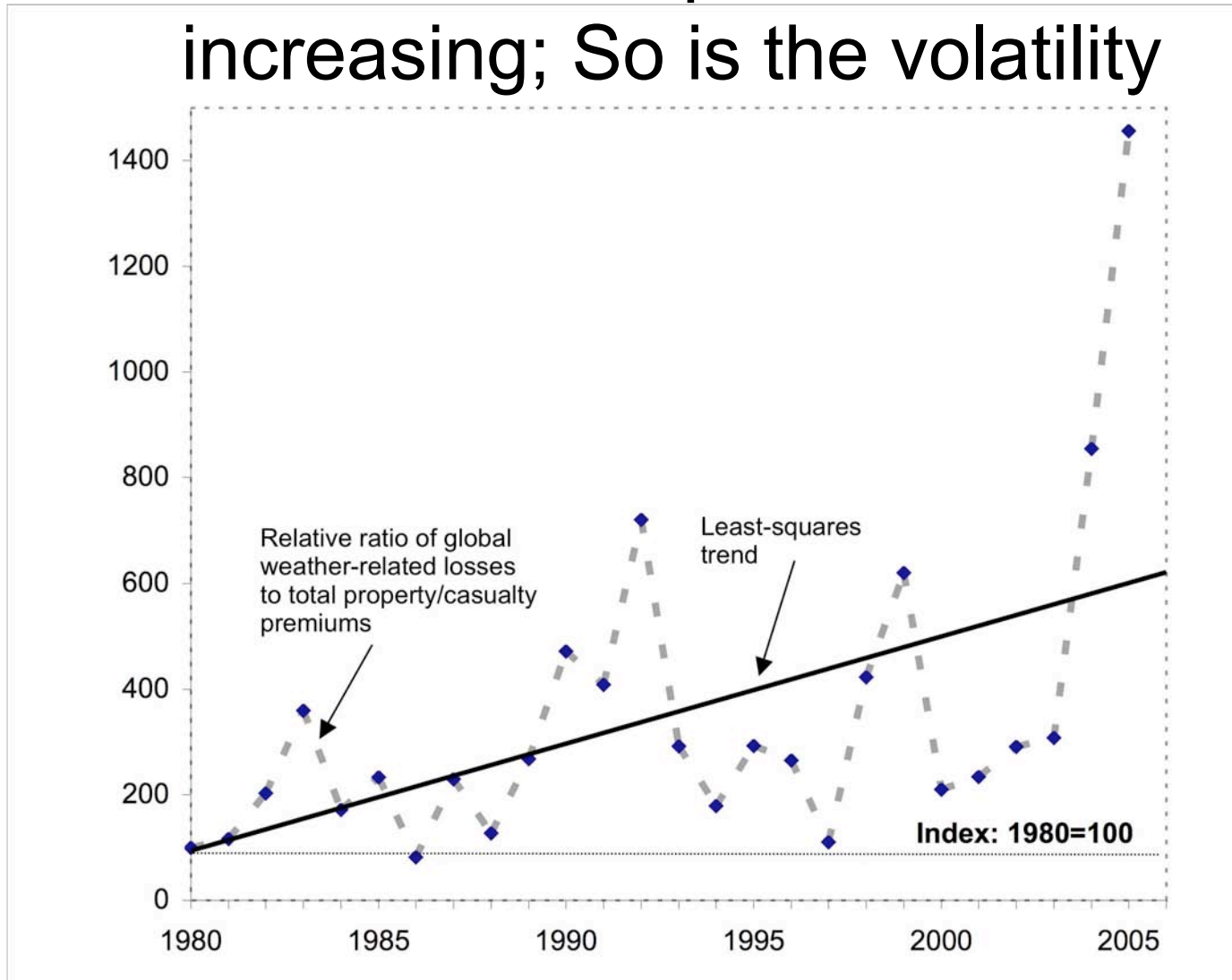
**Global Insured Weather-Related Losses**  
**INDEX: Increasing Faster than Premiums, Population, or GDP**  
**1980 = 1.00**



Notes: All economic values inflation-adjusted to 2004 levels. Losses from Munich Re NatCat Service; premiums from Swiss Re, Sigma. Values for 2005 are LBNL estimates.

# Risk is OK; Uncertainty is Not

The ratio of losses to premium revenues is increasing; So is the volatility



# Insurance Regulators (via NAIC Taskforce) Recognize the Problem

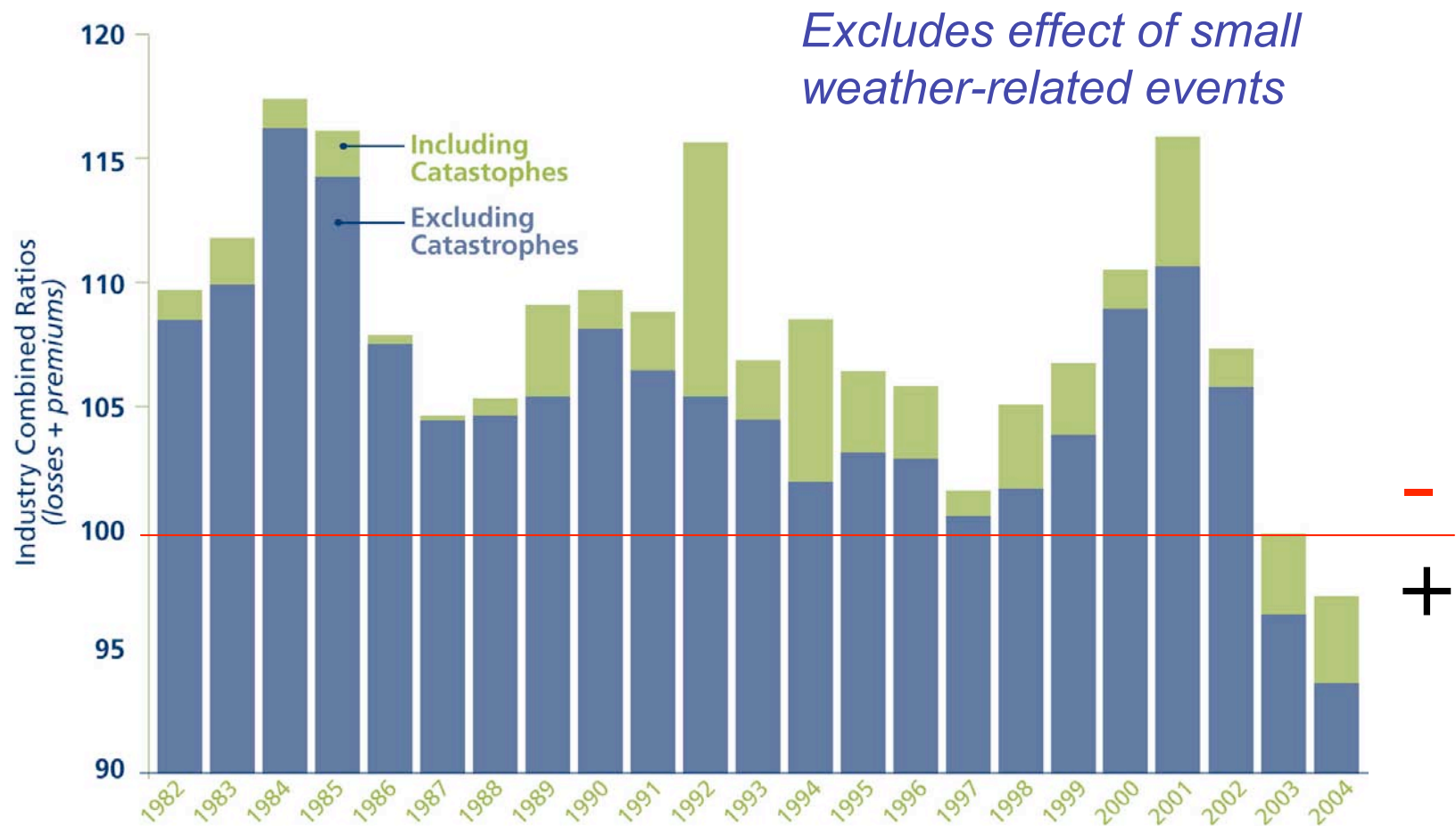
***“Global warming is upon us, and it poses unprecedented new threats to the insurance industry and vast segments of society that rely on insurance for peace of mind and financial security.”***

Michael Kreidler  
Washington Insurance Commissioner

Tim Wagner  
Nebraska Insurance Commissioner

# CATs Play a Key Role in Profitability

## P&C Combined Ratios: 1982-2004



Source: AM Best, Aggregates & Averages

# Small-scale and Indirect Events & Consequences Often Overlooked

*Greater combined impacts than CATs in an average year*

## Events

- Drought
- Hail
- Heat waves
- Ice Storms
- Lightning
- **Sea-level rise**
- Thunderstorms
- Tornados
- Torrential rains
- Wildfire
- Winterstorms

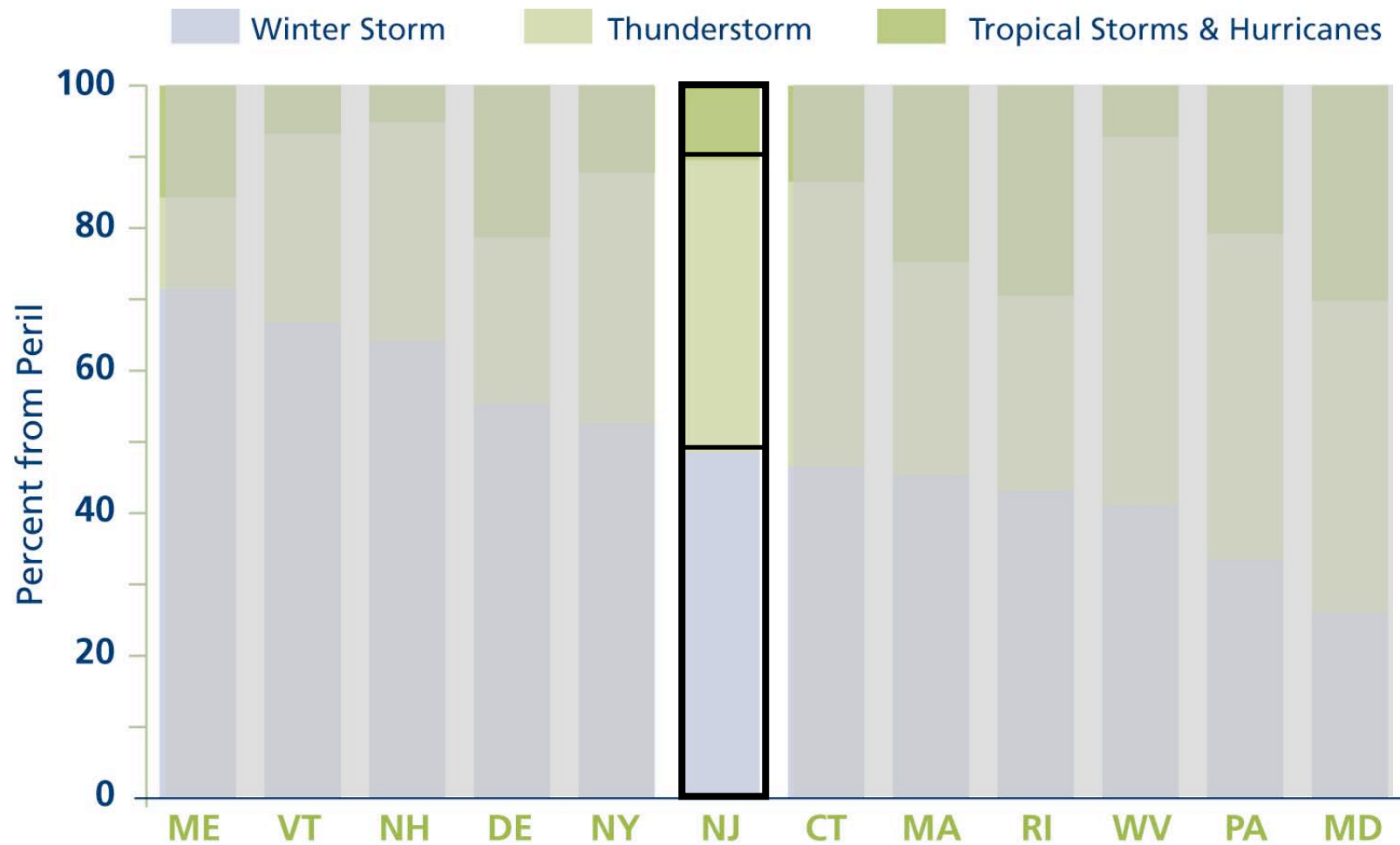
## Consequences

- Blackouts
- **Coastal erosion**
- Crop/fishery damages
- Equipment breakdown
- Eroded air quality
- Eroded water quality
- **Flooding**
- Health impacts
- Mudslides
- Property loss
- Sinkholes/Subsidence
- Weather-related vehicle accidents



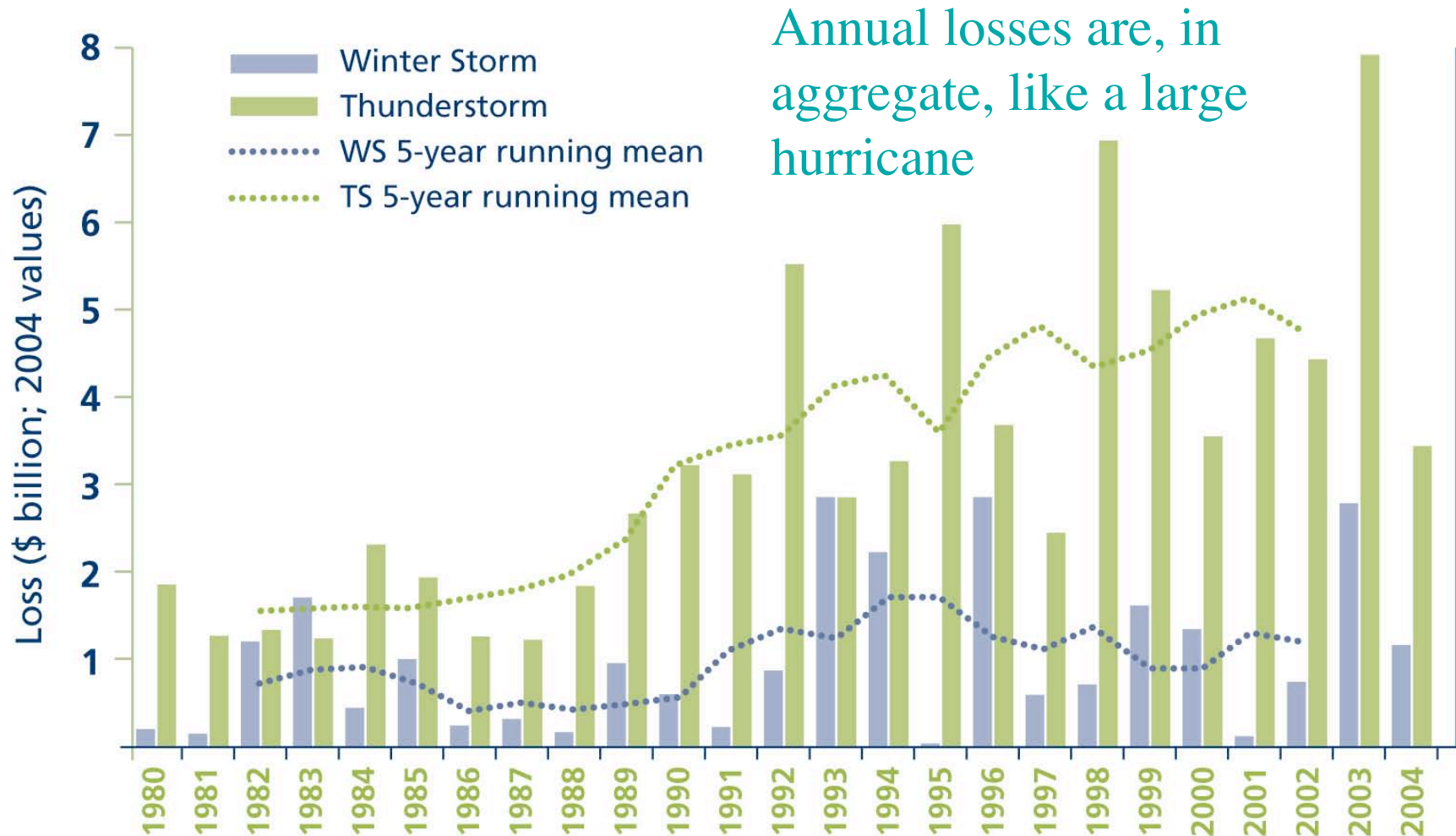


# Importance of “Small-Scale” Events



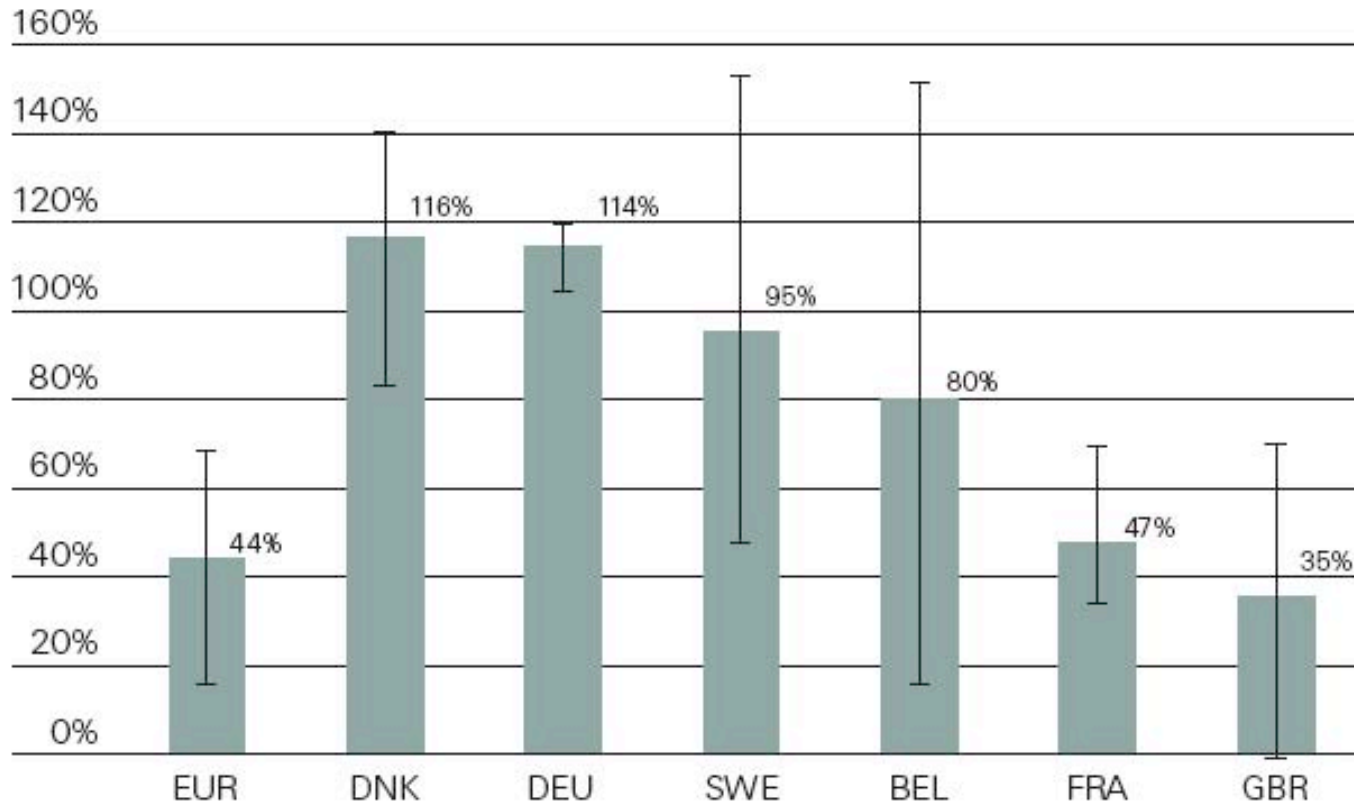
Cumulative insured losses 1980-2004 (Source: American Re)

# Inflation-Corrected U.S. Loss Trends: Examples of Small-scale Events



Cumulative insured losses 1980-2004 (Source: American Re)

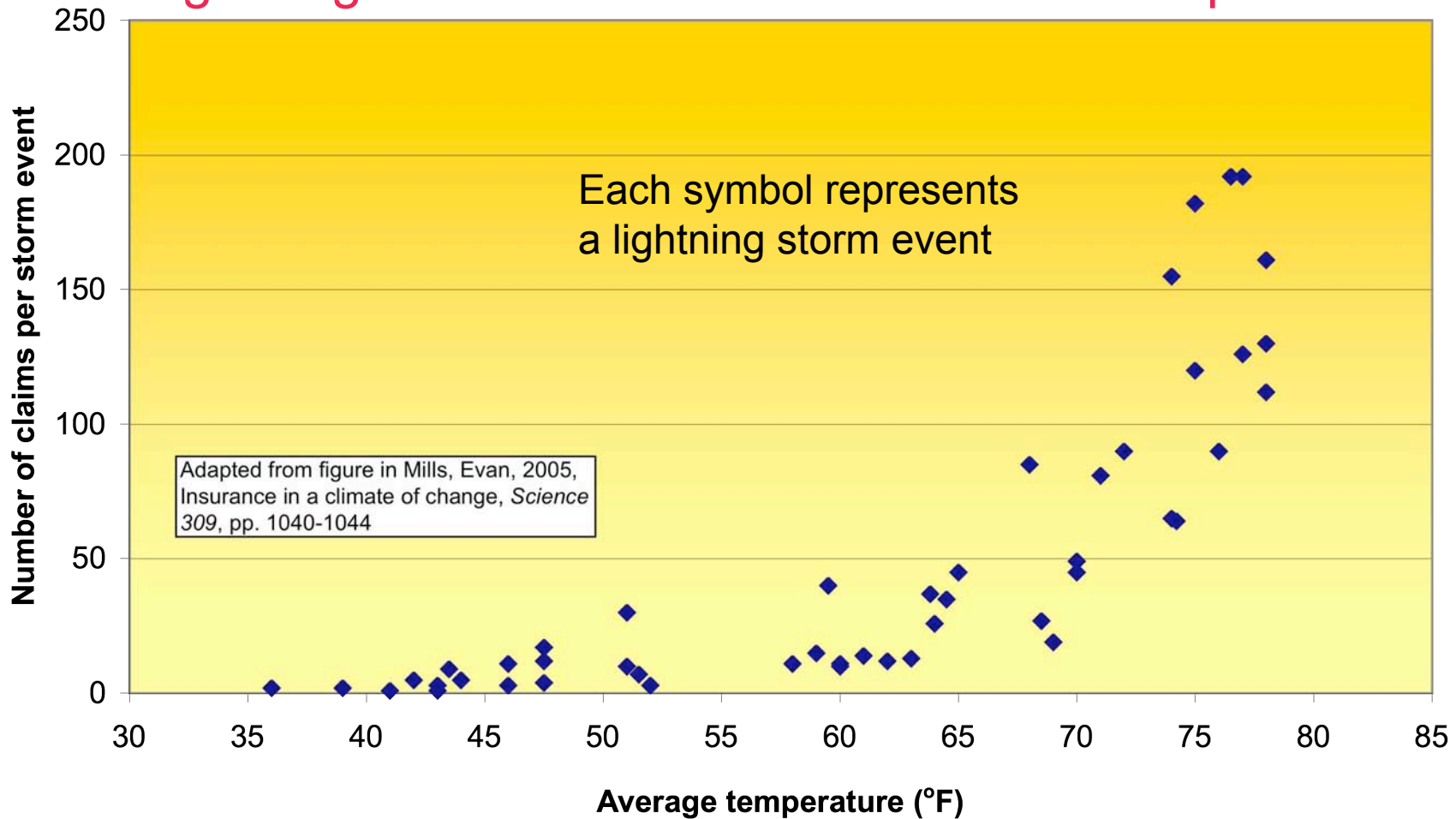
# Swiss Re Outlook for Winter Storms under Climate Change



*Increase in annual expected loss for Europe (EUR), Denmark (DNK), Germany (DEU), Sweden (SWE), Belgium (BEL), France (FRA) and the UK (GBR) over the period 1975 to 2085 (in %). The broad bars represent the mean value of the climatic models, and the error bars show the spread of the results from all models*

# Temperature-Related Insurance Loss Experience

Lightning-related claims *accelerate* with temperature



Source: Hartford Steam Boiler Inspection and Insurance Co.

# Effectuated Insurance Business Segments

- Most direct lines + Reinsurance [P/C & L/H]
  - Homeowners
  - Commercial
  - Business interruption
  - Auto (personal/commercial)
  - Marine/inland marine
  - Aviation
  - Crop
  - Offshore energy
  - Equipment breakdown
  - Liability (D&O, environmental, product, political risk...)
  - Life/health
- Surplus lines; Guaranty Funds; Residual Markets; Risk Retention Groups; ART; *and*... public-sector insurance programs (flood, crop)

*Emerging Markets are a major “hotspot”; insurers domiciled in New Jersey are impacted by catastrophes almost anywhere in the world*

# Why Worry? - Underwriting

- Climate change compounds existing insurance problems
  - Mold
  - Respiratory disease
  - Corporate governance/liability
- Complicates underwriting
  - Shorter return periods
  - Increasing variability
  - New types of (unanticipated) losses; shifting locations
  - “CAT-following-CAT” (e.g., windstorm > flood > pollution > mold)
  - Unexpected correlation (e.g., power outage + flood)
  - Increases not necessarily linear, predictable, or gradual
- Incomplete Data: Flying (partly) blind
  - Seriously incomplete, and increasingly proprietary loss data
  - CAT models capture only a subset of the impacts of concern

*The future will not mirror the past*

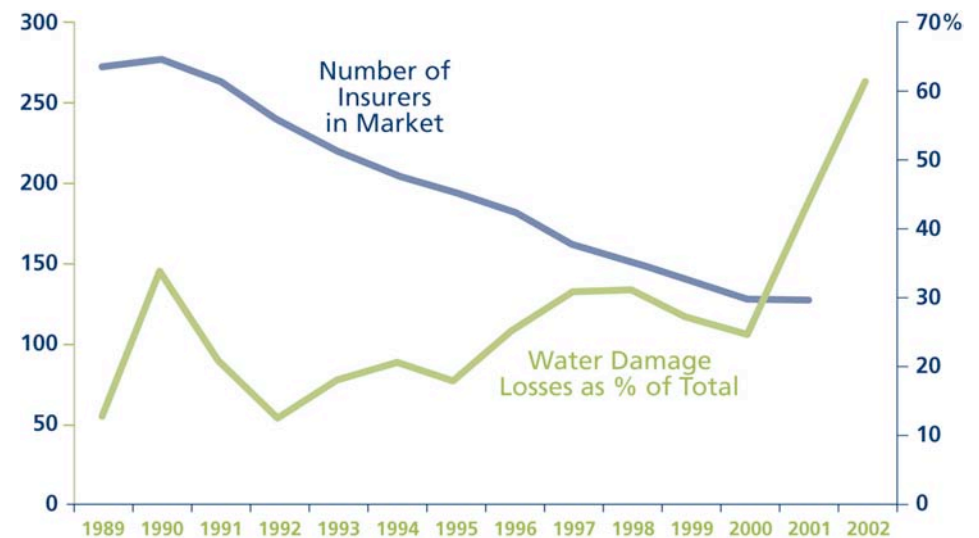
# Why Worry? - Beyond Underwriting

- Asset Management
  - Weather-sensitivity of investments
  - Real estate holdings
- Operations
  - Ability to function in post-disaster settings
- Market Power
  - Slowed or shrinking market
    - voluntary - withdrawal
    - involuntary - knock-on effects
    - shift from U.S. to Europe/Asia -- where foresight is greater?
  - Reputation risk [and rising shareholder concern]
- Broader Economy
  - “Dust-bowl-plus-Depression” syndrome
  - Escalating energy prices & inflation bad for insurance market
  - Impacts of climate change on insurance customers (especially homeowners and small businesses - see new AXA study)

# Crisis of Availability & Affordability

- 200-500% increases in premiums; *plus* reduced coverage
  - HCA Hospitals: Prices up 167%, coverage down 75%, leaving \$750 million “hole”
- Making homeownership unaffordable for some
- Loss of insurance makes properties un-bankable
- Even unregulated surplus lines providers, commercial insurers, and reinsurers are avoiding certain areas

*Texas Homeowners Market in Face of Rising Mold/Moisture Claims*





# Structural Market Changes

- CAT models indicating higher loss outlook
  - 30% increase in category 3-5 hurricanes
  - Shift from max single event to annual aggregate loss
- Rating agencies tightening risk-based capital formulas --> \$120 billion “capital hole”
- Federal flood insurance program insolvent (rates not actuarial; taxpayers pick up the difference)
- State government-mandated “Residual Markets” are the insurers of last resort (and, increasingly, “only” resort).
  - About 3,000,000 policyholders, and rising (= \$3B/year foregone revenue)
  - Citizens has become the largest insurer in Florida
  - Liquidation of Poe Financial --> 350,000 policyholders into Citizens

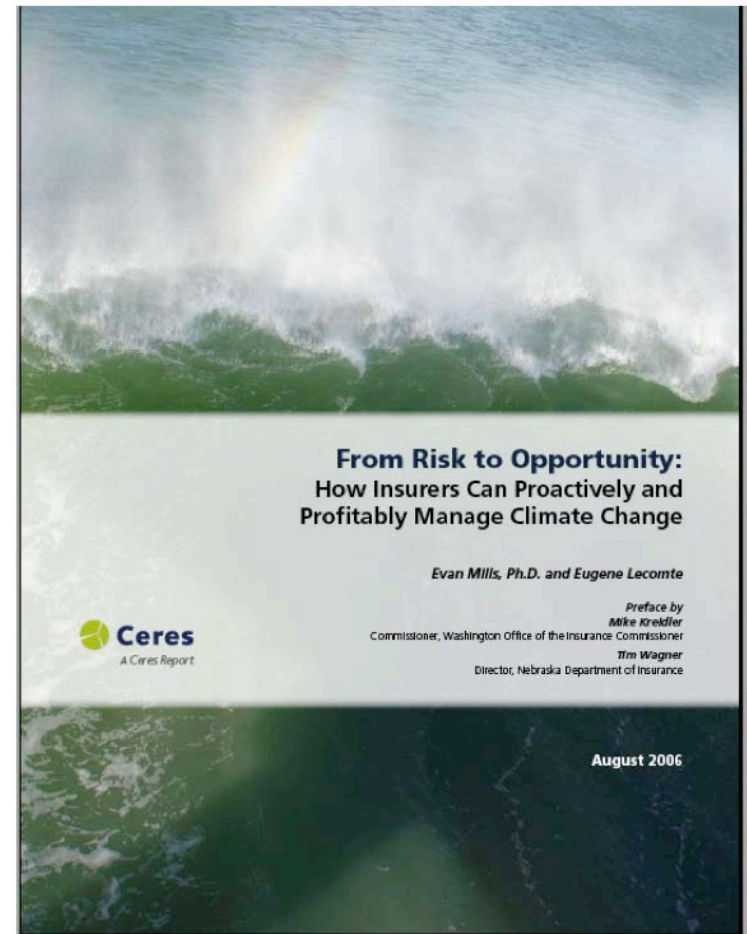
*Not cyclical changes; Eroding insurability*

# From Risk ... to Opportunity

*The insurance sector has a key role to play in helping to mitigate the effects of climate change ... and by developing new products and solutions that can support emerging greenhouse-gas and renewable energy markets.*

- Marsh & McLennan Companies

New Report:  
~200 examples; ~100 insurers



*Published by Ceres*

# Proactive Insurer Responses

Type of Activity	Insurance Industry Examples
<p><b>Promoting Loss Prevention</b></p> <ul style="list-style-type: none"> <li>Traditional risk management</li> <li>Integrating energy management and risk management</li> <li>Forestry, agriculture, and wetlands</li> <li>"Rebuilding Right" following losses</li> </ul>	<ul style="list-style-type: none"> <li>Institute for Business and Home Safety</li> <li>FM Global</li> <li>Tokio Marine</li> <li>Fireman's Fund</li> </ul>
<p><b>Crafting Innovative Insurance Products and Services</b></p> <ul style="list-style-type: none"> <li>New products for energy service providers</li> <li>Energy savings insurance</li> <li>Renewable energy project insurance</li> <li>Green-buildings insurance</li> <li>Pay-as-You-Drive insurance</li> <li>Climate risk management services</li> </ul>	<ul style="list-style-type: none"> <li>Locton Risk Services</li> <li>Lloyds of London</li> <li>Munich Re</li> <li>Fireman's Fund</li> <li>GMAC</li> <li>AIG/Solomon Associates</li> </ul>
<p><b>Participating in Carbon Markets</b></p> <ul style="list-style-type: none"> <li>Facilitating carbon trading</li> <li>Managing risk for Clean-Development Mechanism (CDM) projects</li> <li>Enabling customers to purchase carbon offsets</li> </ul>	<ul style="list-style-type: none"> <li>Aon</li> <li>Swiss Re</li> <li>Insurance Australia Group</li> </ul>
<p><b>Aligning Terms and Conditions with Risk-Reducing Behavior and Capitalizing on the "Halo Effect"</b></p> <ul style="list-style-type: none"> <li>Assigning Directors &amp; Officers liability</li> <li>The "Halo Effect"</li> </ul>	<ul style="list-style-type: none"> <li>Swiss Re</li> <li>Travelers</li> </ul>
<p><b>R&amp;D and Direct investment in Climate Change Solutions</b></p> <ul style="list-style-type: none"> <li>Research &amp; Development</li> <li>Investments</li> <li>Climate-responsive funds</li> </ul>	<ul style="list-style-type: none"> <li>Allstate</li> <li>Swiss Re</li> <li>Gerling</li> </ul>
<p><b>Building Awareness and Participating in the Formulation of Public Policy</b></p> <ul style="list-style-type: none"> <li>Consumer information and education</li> <li>Having a voice in public policy discussions on climate change</li> <li>Endorsing voluntary energy-saving policies</li> <li>Energy-efficiency codes and standards</li> </ul>	<ul style="list-style-type: none"> <li>USAA Insurance Company</li> <li>UNEP Finance Initiative</li> <li>American Insurance Association</li> <li>Insurance Institute for Highway Safety</li> </ul>
<p><b>Leading by Example</b></p> <ul style="list-style-type: none"> <li>In-house energy management</li> <li>Reducing insurers's carbon footprint through improved operations</li> <li>Disclosing climate vulnerabilities and liabilities</li> </ul>	<ul style="list-style-type: none"> <li>AIG/Hartford Steam Boiler</li> <li>American Modern Insurance Group</li> <li>Saint Paul Travelers</li> </ul>

# Examples

- **FM Global** - Promoting hurricane-resistant construction among its customers
- **Fireman's Fund** - green-buildings insurance
- **Tokio Marine** - replanting 7500 acres of mangroves
- **American Insurance Association** - Endorsing public transportation; reduced speed limits
- **IBHS** - "*Fortified....for safer living*" program

# BASF Home - Patterson NJ

- Meets Institute for Business and Home Safety's "Fortified...for safer living" standards [going beyond code]
  - Wind-resistant rigid foam panel walls and multi-glazed windows
  - Ice-dam resistant
  - Mold resistant
  - Insulation not damaged by flood



*Some insurers giving premium credits....*

# Synergisms between Disaster Resilience & Reduced GHG Emissions

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## BASF chemistry helps build better homes

Welcome to the BASF Better Home, Better Planet Initiative: Near Zero Energy Home-Paterson, N.J. A home that is 80% more energy efficient. A home that is fortified against natural disaster. A home that has a lower environmental impact. A home that costs less to own. And a home that you can build faster.

Take a tour and find out how BASF chemistry can help you build a better home for a better planet.

Efficiency	Affordability	Environmental	Strength	Speed
 <p>Get superior insulating performance and air barrier continuity so you can downsize HVAC equipment. Use the sun to power electricity and hot water. Back it up with low-e windows, ENERGY STAR® appliances, high-efficiency air conditioning, boilers and radiant flooring. ▶</p>	 <p>Most homeowners pay about \$1,300 a year on utility bills. This can be reduced by as much as 80 percent in the BASF Near-Zero Energy Home-Paterson, N.J. Add structural stability for reduced insurance costs, along with a lower lifecycle cost with minimal maintenance requirements. ▶</p>	 <p>Think chemistry when you think about the environment. Develop materials that target ecological efficiency. Provide outstanding in-place energy efficiency. Go formaldehyde-free. Emit no volatile organic compounds. Cause zero ozone depletion. Create water-based formulations. Use significant recycled content. Be responsible. ▶</p>	 <p>Go beyond Code for added resistance to natural hazards like high wind, hail and earthquakes. Reduce insurance costs. Get peace of mind. The BASF Near-Zero Energy Home-Paterson, N.J., is designated <b>Fortified...for safer living</b>® ▶</p>	 <p>Build it faster. Build it better. Materials arrive at the job site ready to install without extra fuss. Reduce site labor. Faster on-site assembly so framing crews are more productive. Get the project dried-in sooner and give subcontractors a head start on the jobs they need to do. ▶</p>

Source: <http://www.betterhomebetterplanet.com/>

# Policy Recommendations

## Assessment

- Fill data holes!
- Tap insurers' knowledge of risk assessment/management
- Incorporate climate risks in assessing insurer solvency and consumer-impacts - climate change not priced into market
- Improve catastrophe modeling to capture climate change
- Assess exposures of insurer investments; capital adequacy
- Understand State's *own* vulnerability as self-insurer

## Application

- Upgrade building codes for resiliency and energy efficiency; couple with incentives to go *beyond* code
- Foster public-private partnerships with insurers: e.g. flood protection can make uninsurable risks insurable
- Identify and remedy undue regulatory barriers to constructive insurer responses (risk-based pricing, premium differentiation/incentives)
- Prioritize solutions that have win-win combinations of enhanced disaster resilience and climate protection

**<http://eetd.lbl.gov/insurance>**

Evan Mills, Ph.D.

MS 90-4000

Lawrence Berkeley National Laboratory

Berkeley, CA 94720 USA

510-486-6784

EMills@lbl.gov