



# Climate Change & Insurance

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**DNV UC Berkeley Top Tech Program  
Haas School of Business - UC Berkeley  
April 23, 2009**



# Climate Change is an Emerging Risk to be Managed...

## Insurers are....

- messengers
- integrators
- risk assessors
- risk managers

## but...

- vulnerable
- flying partly blind
- selective

## and....

- part of the solution

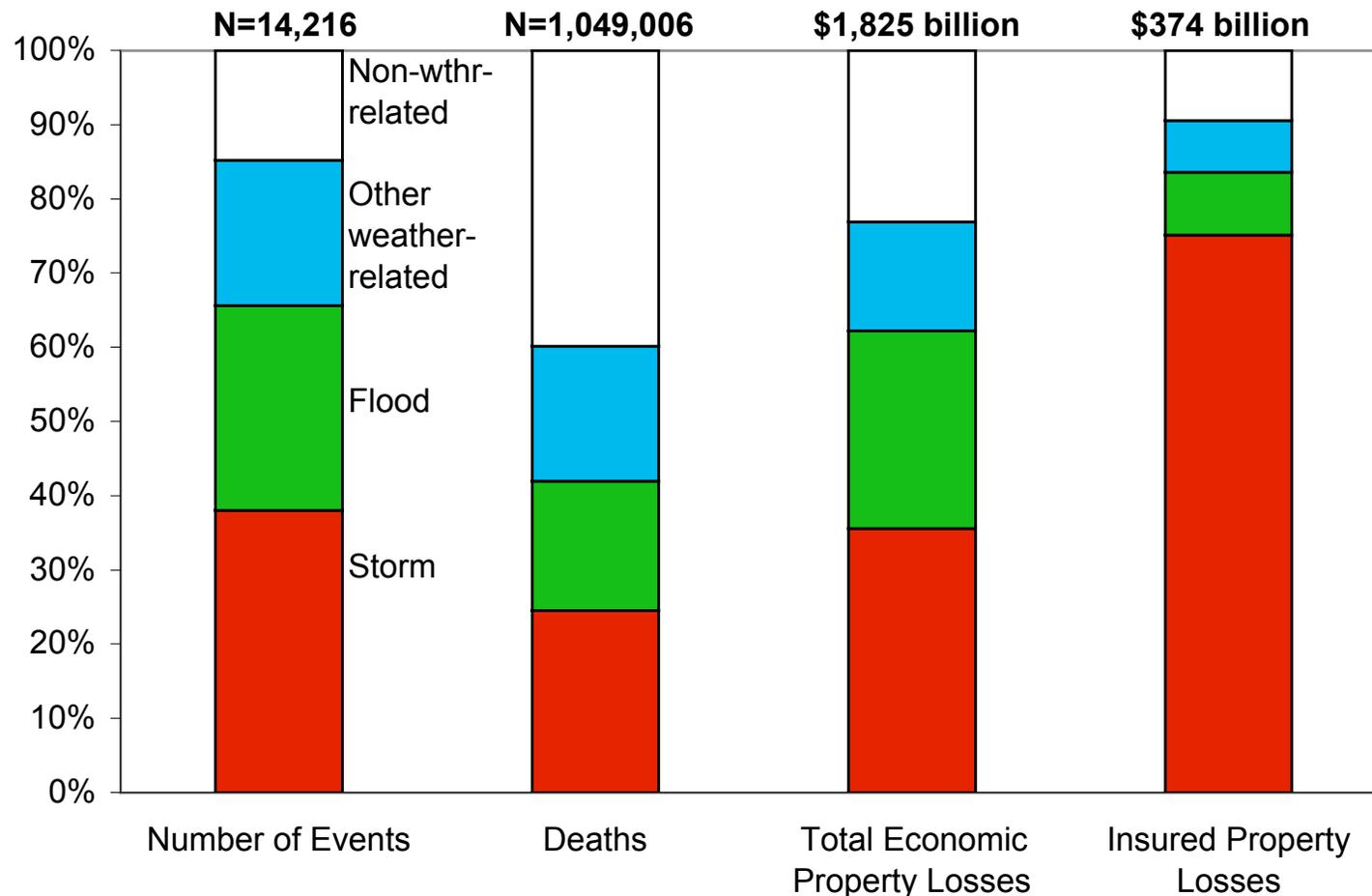


# Roadmap

- **Why insurance & climate change?**
  - vulnerability
  - changing business environment
  - expectations from stakeholders
- **Opportunities for insurers**
  - Underwriting
  - Asset Management
  - In-house / governance
- **Considerations for DNV**

# Disasters Look Different Through an Insurance “Lens”

*Aggregate Global Impacts: 1980-2004*

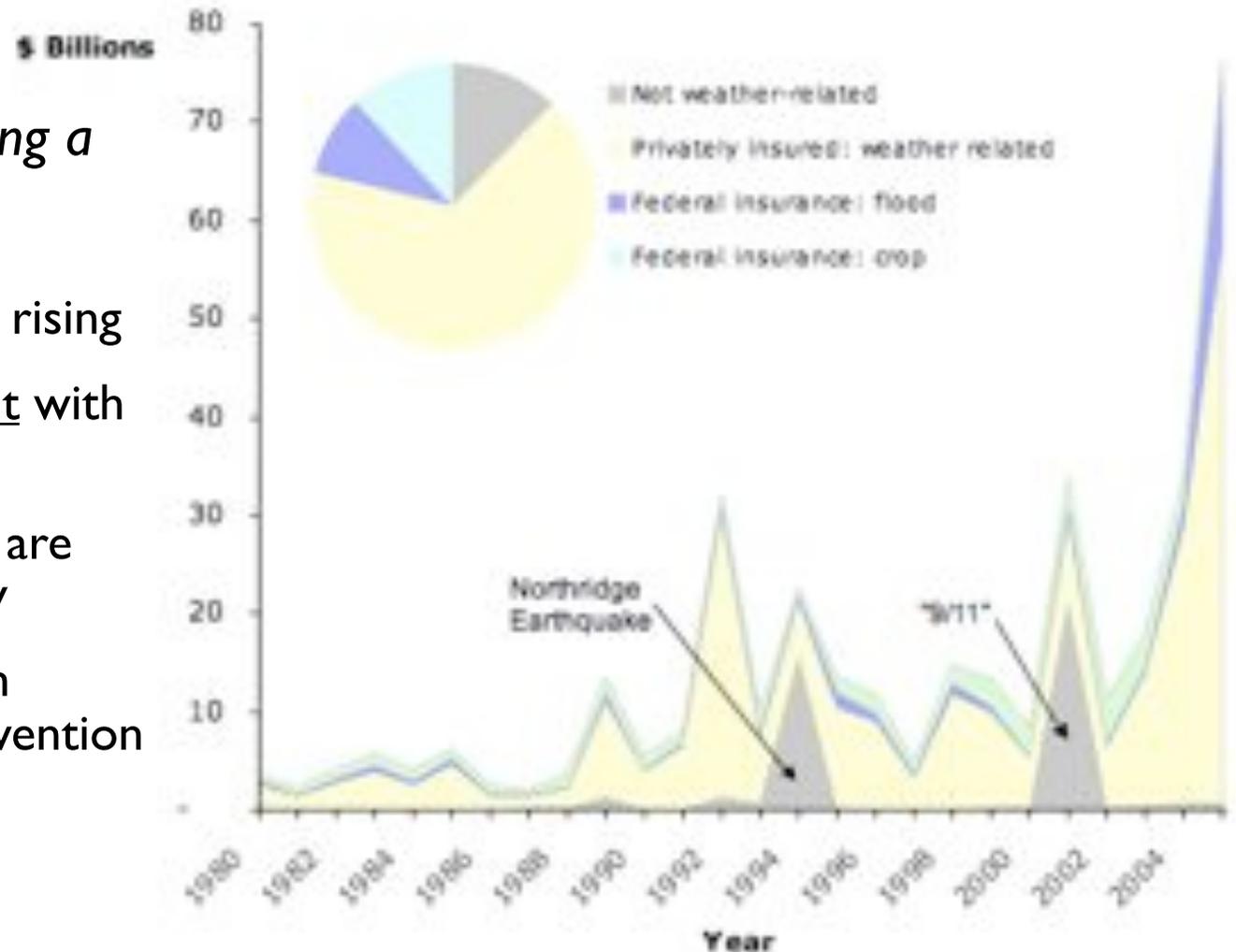


Source: E. Mills Science 309, 1040 -1044 (2005), after Munich Re

# US CAT Losses: 1980-2005

*Demographics playing a strong role, but.....*

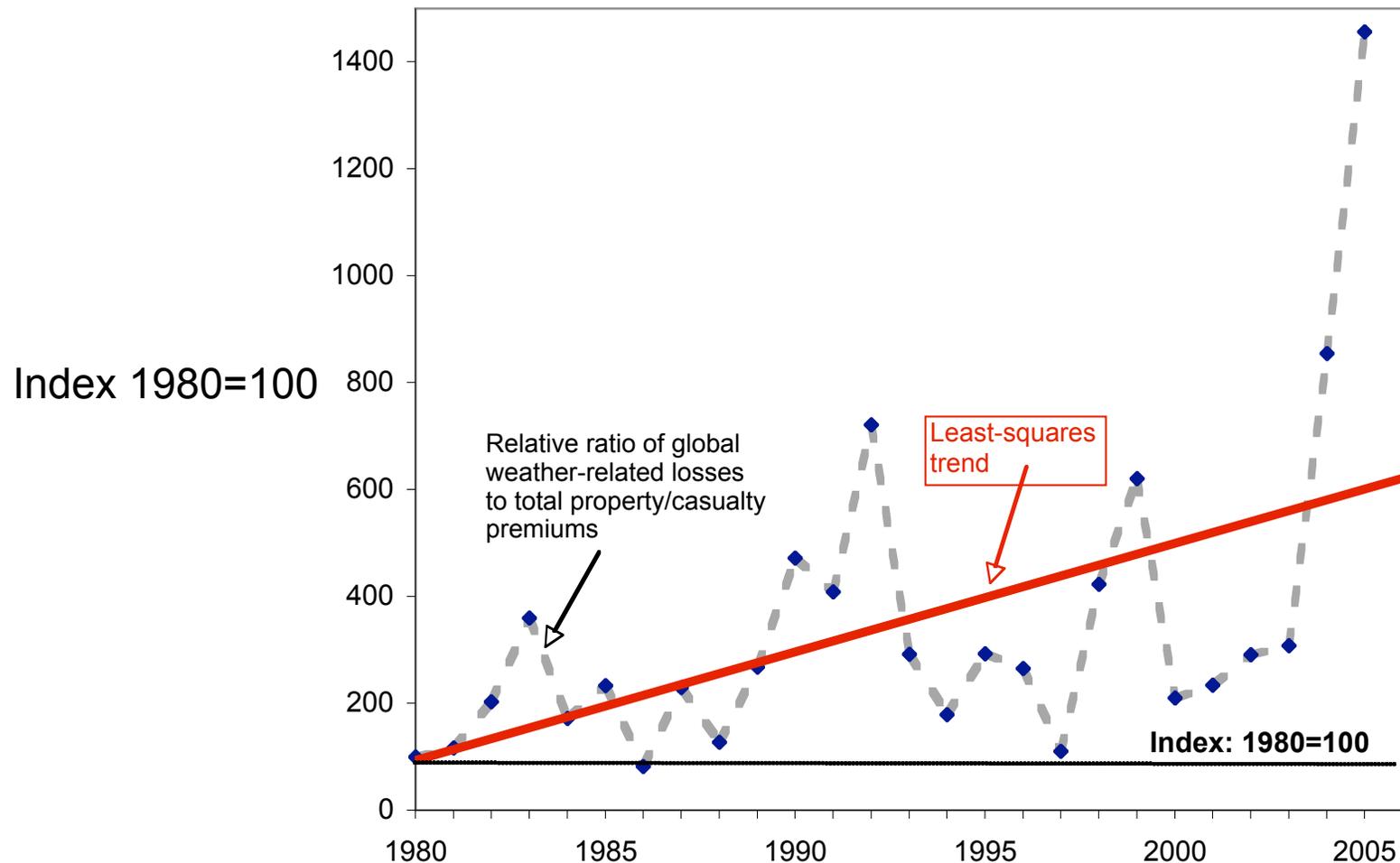
- Number of events is rising
- Trends are consistent with observed change
- Non-weather losses are growing more slowly
- Trend would be even steeper without prevention efforts



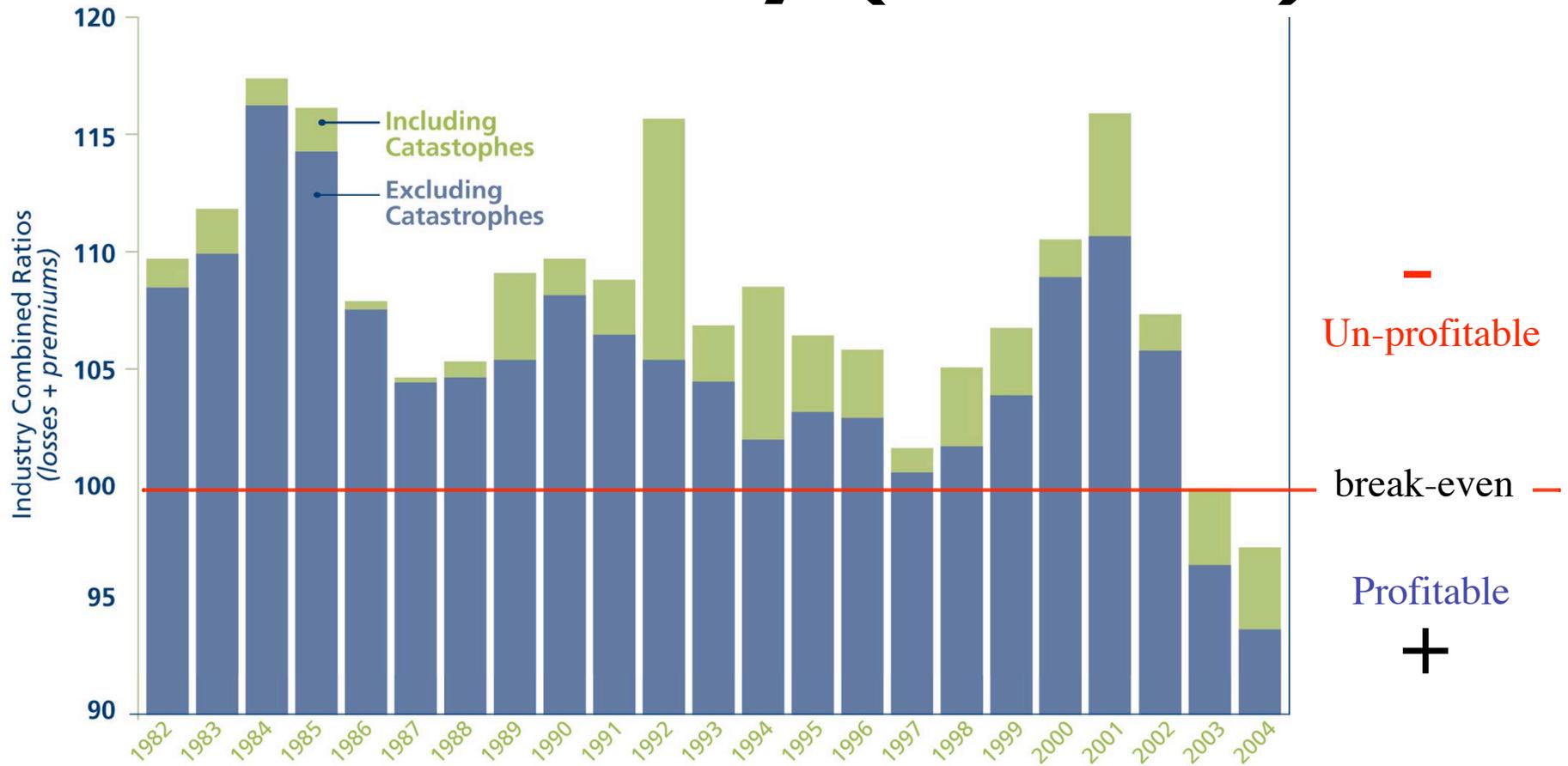
Excludes "small-scale" events & life/health losses

# Risk is OK; Excessive Volatility is Not

The ratio of losses to premium revenues is increasing



# CATs Profoundly Influence Profitability (US P&C)

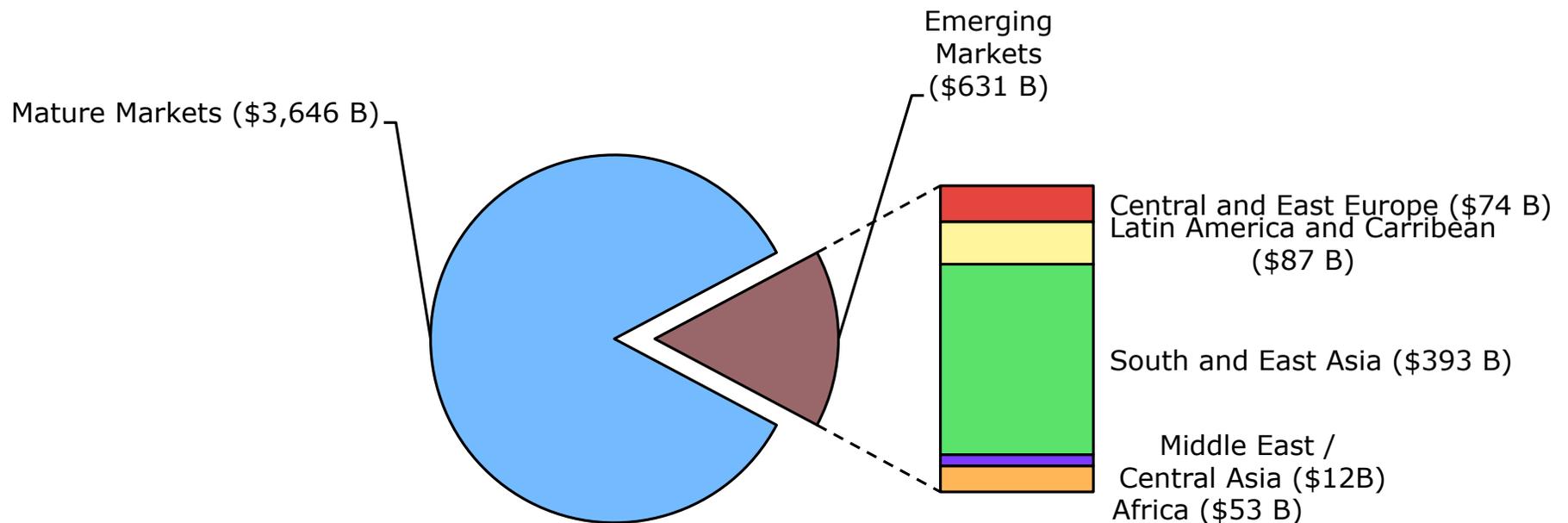


Note: CATs having increased influence on overall profitability

# World Insurance Market

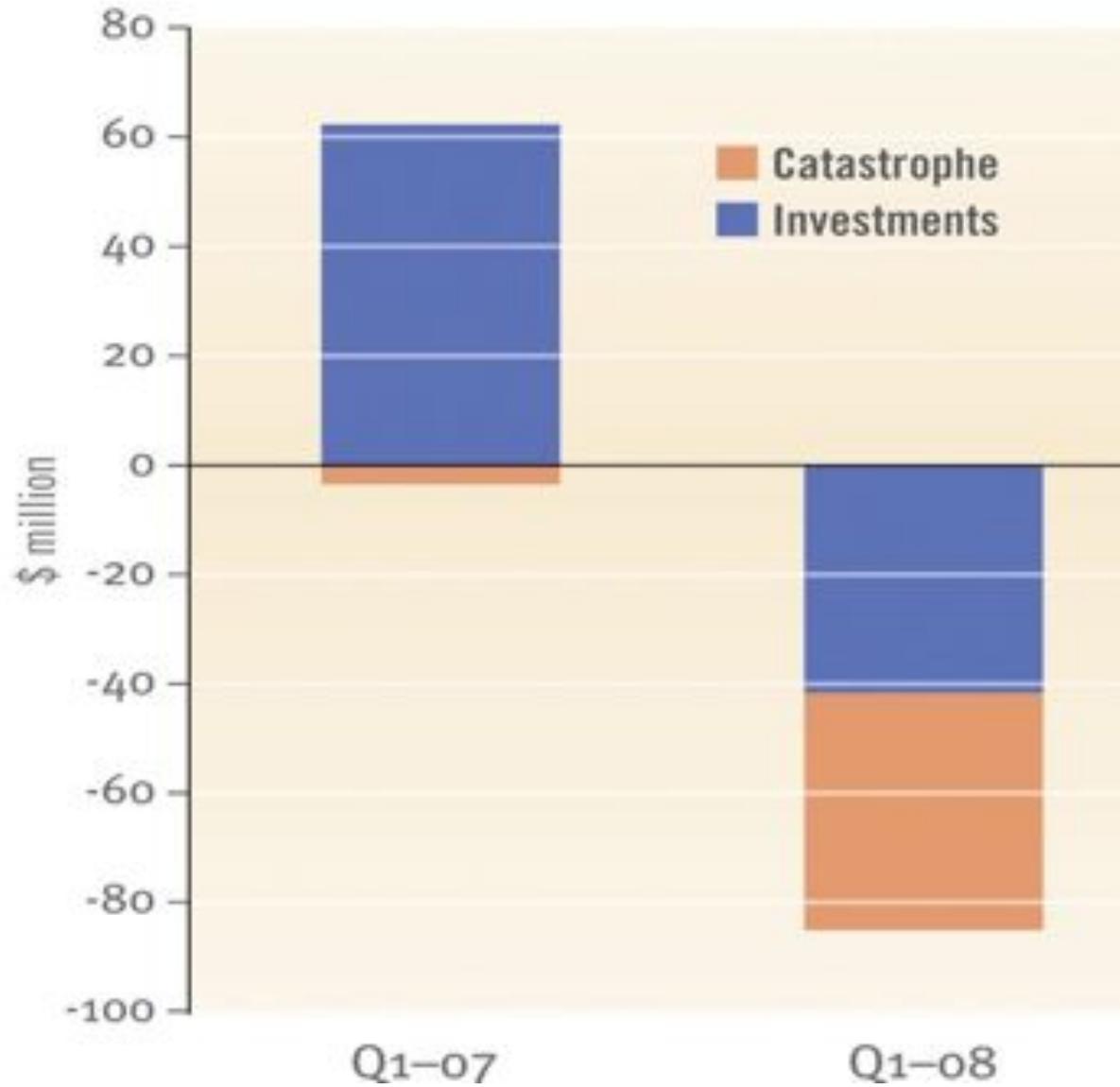
## \$4 Trillion in 2007

(16% in emerging markets)



Source: Swiss Re, Sigma

# Perfect Storm



Source: J. Greenwald. 2008. "Investment, Catastrophe Losses Hit Cincinnati Financial," Business Insurance, July 14, p. 4.

# Small-scale and Indirect Events & Consequences Often Overlooked

*Greater combined impacts than CATs in an average year*

## Events

- Drought
- Hail
- Heat waves
- Ice Storms; float ice
- Insect infestations
- Lightning
- Sea-level rise
- Thunderstorms
- Tornados
- Torrential rains
- Wildfire
- Winterstorms

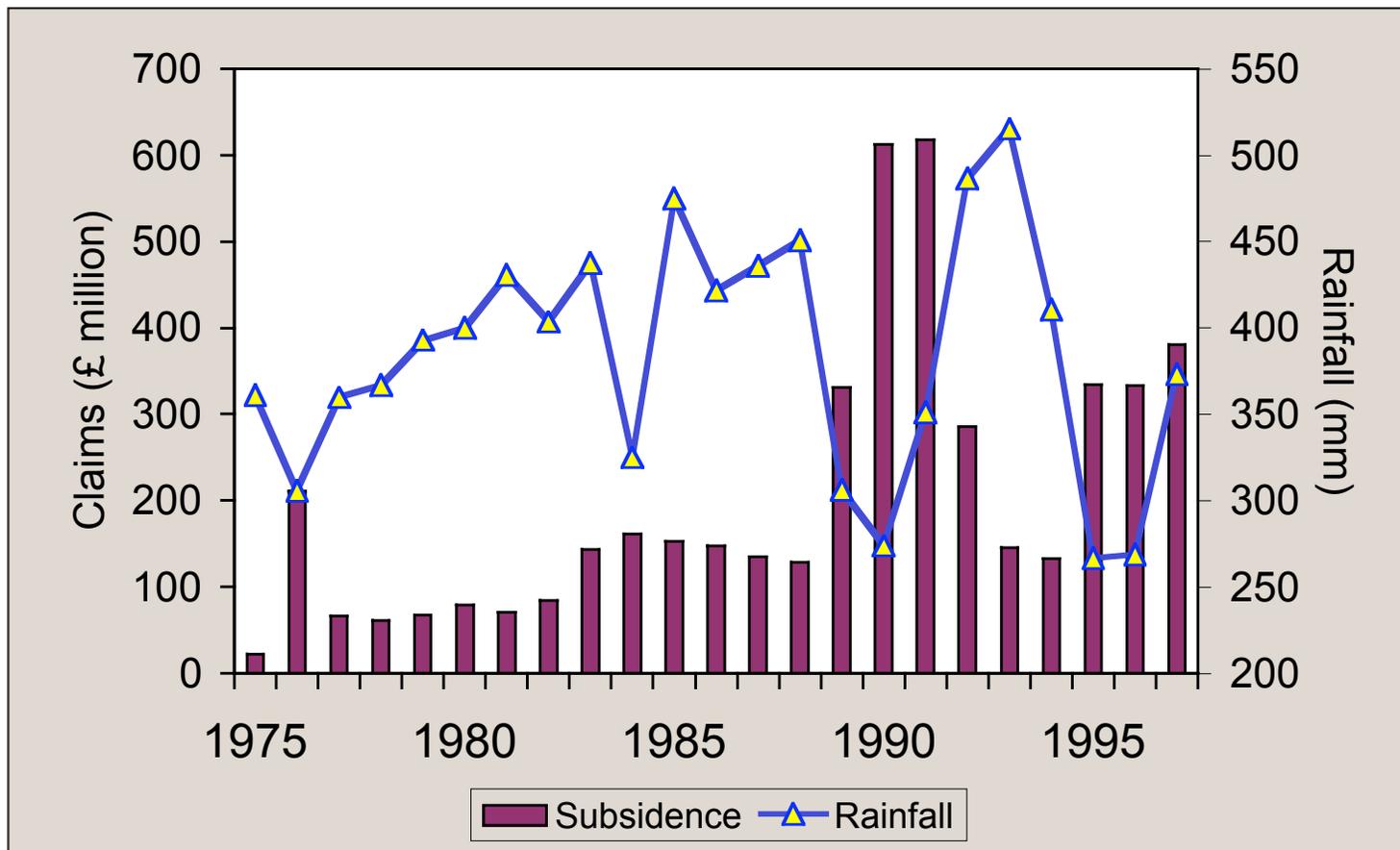
## Consequences

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



# Small-scale Losses: Soil Subsidence

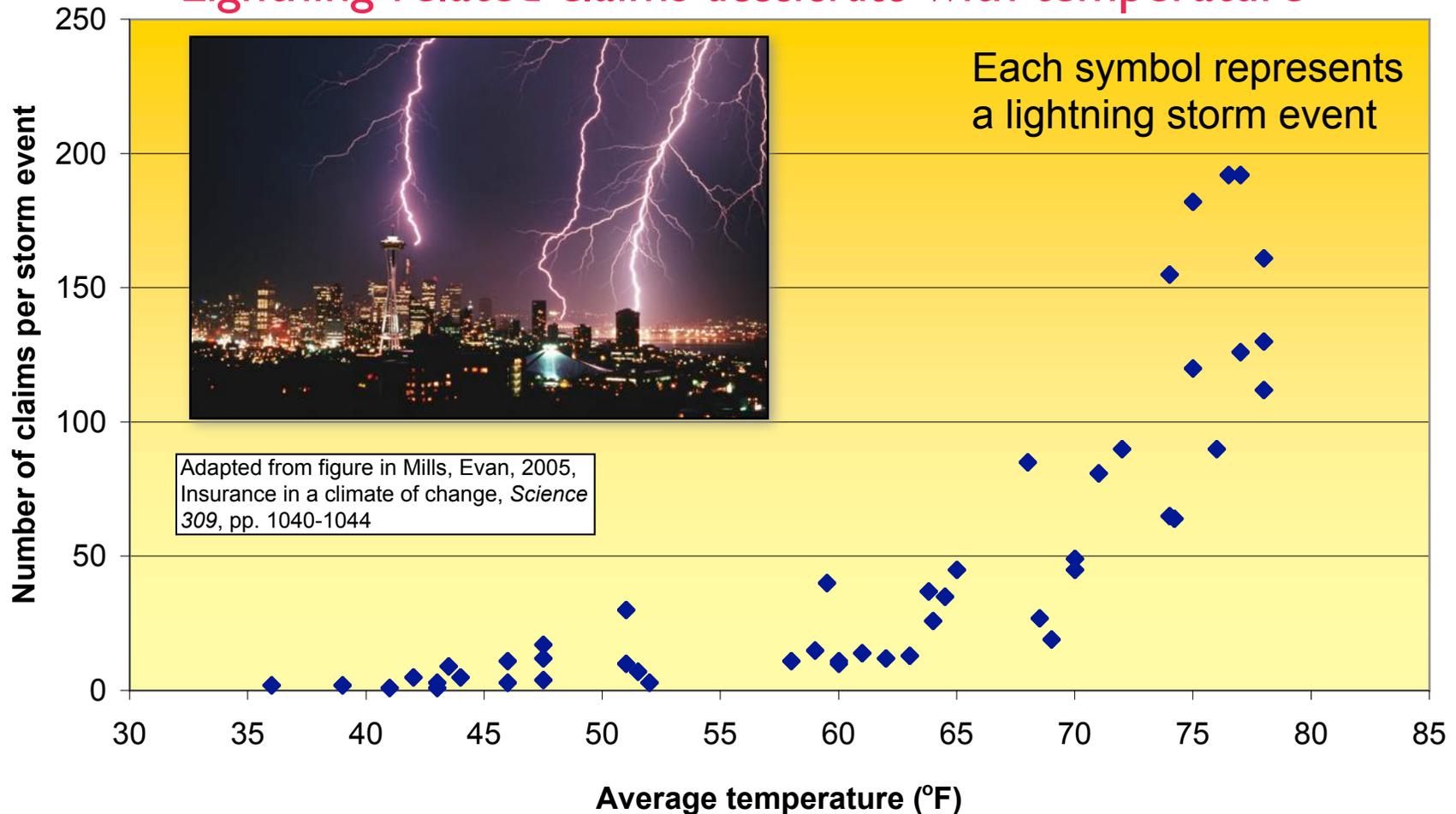
Subsidence claims increase with drought: UK 1975-1999



Source: Association of British Insurers

# Small-scale Losses: Lightning

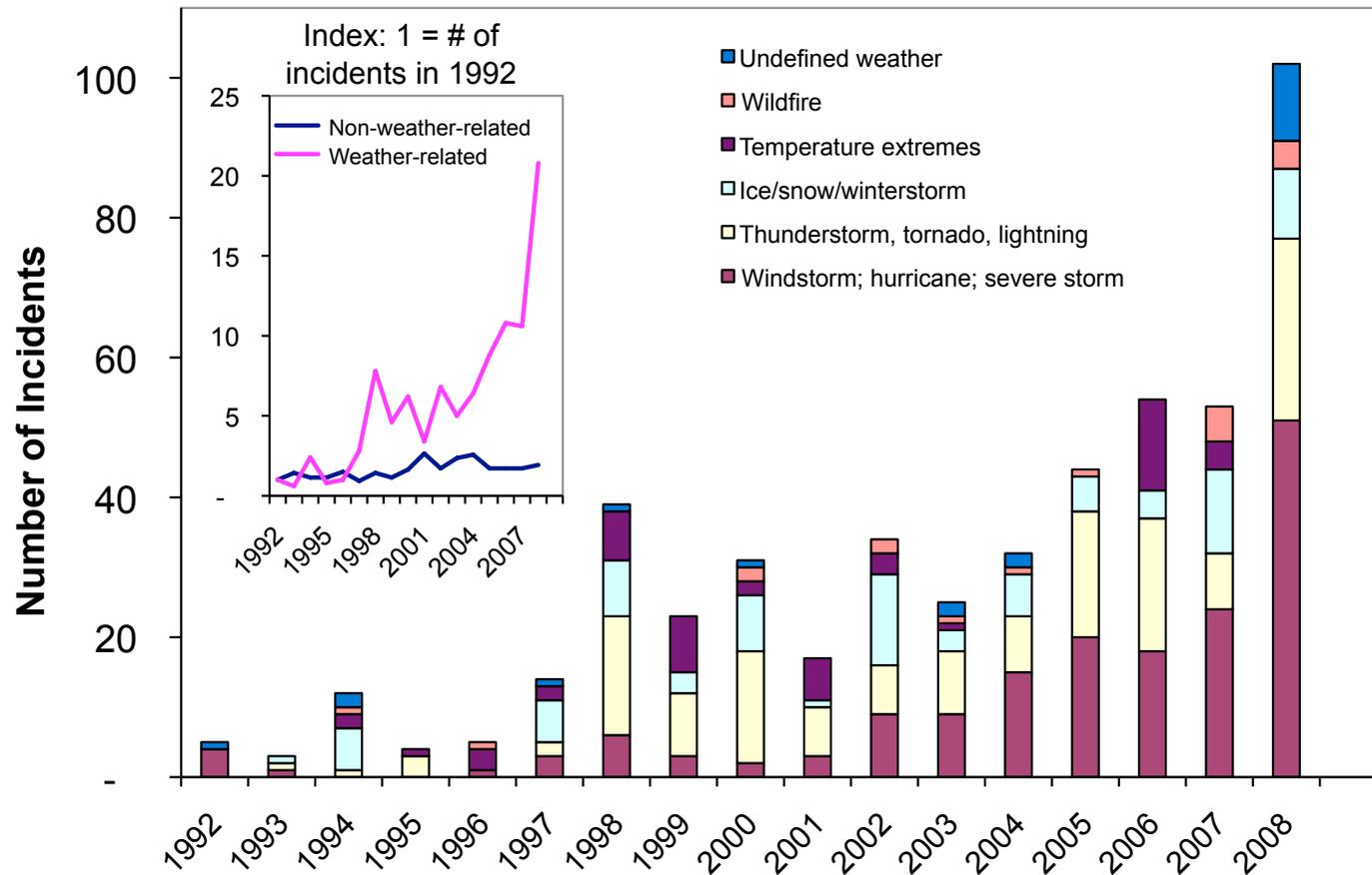
Lightning-related claims *accelerate* with temperature



Source: Hartford Steam Boiler Inspection and Insurance Co.

# Small-scale Losses: Power Outages

Significant US Electric Grid Disturbances (1992-2008)  
499 Weather-Related Incidents



**U.S. economy total cost: ~\$80B/y**  
**Average cost to utilities \$49 million/storm; max. \$890 million (EEI)**  
**RMS Scenario: \$2.7B for NY**

# Anticipated Insurance Losses



## Property

- Property damage
- Marine mishaps
- Mold/moisture
- Forest products
- Agricultural losses
- Fisheries
- Business interruption
- Roadway



## Life/ Health

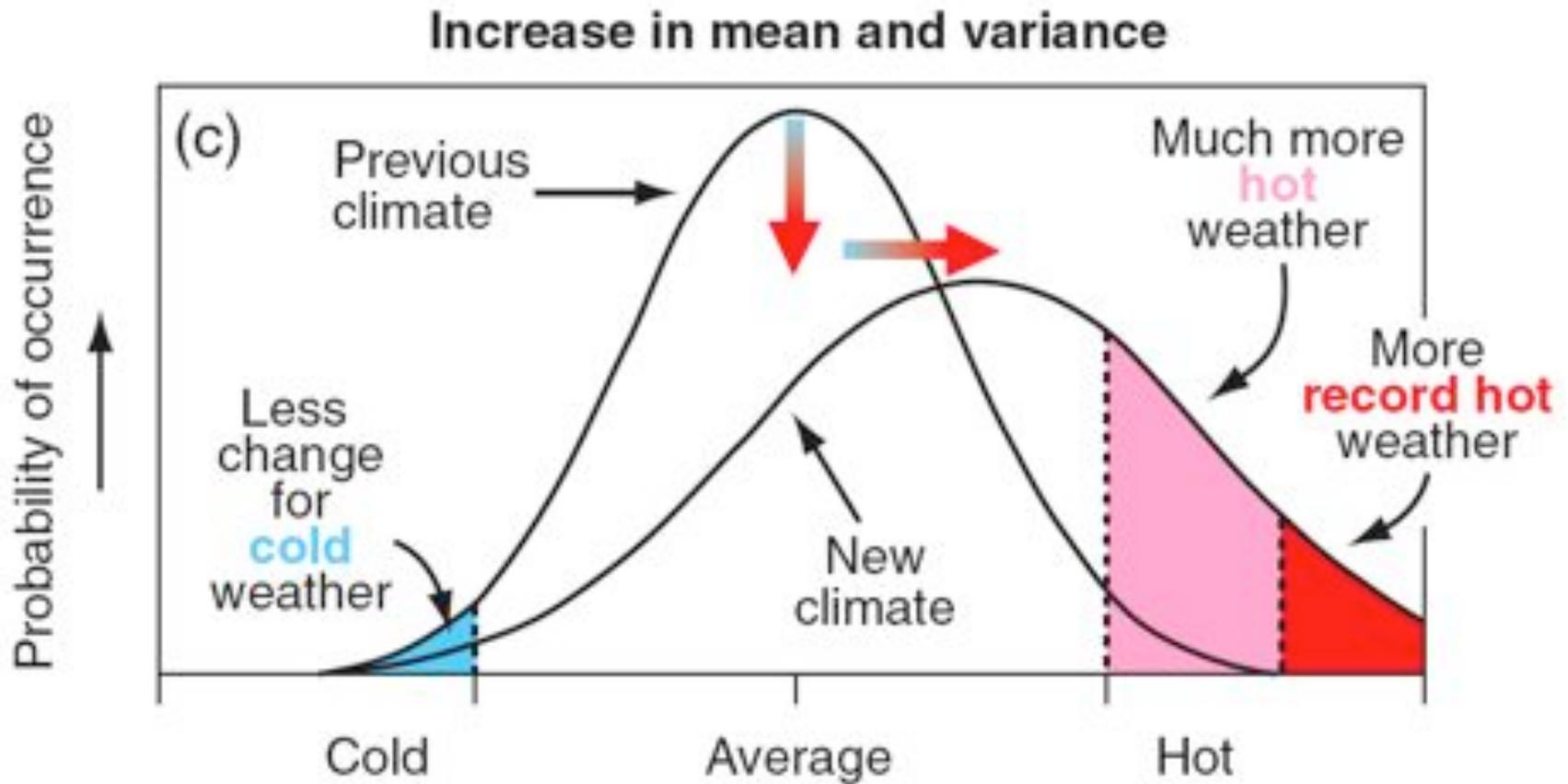
- Injury
- Infectious diseases
- Vector-borne diseases
- Heat stress
- Respiratory
- Pollution release
- Food safety
- Mental health
- Nutrition/water
- Roadway safety



## Liability (Casualty)

- Products
- Negligence
- Nuisance
- Fiduciary
- Tort / BI
- Environmental
- Roadway liability insurance

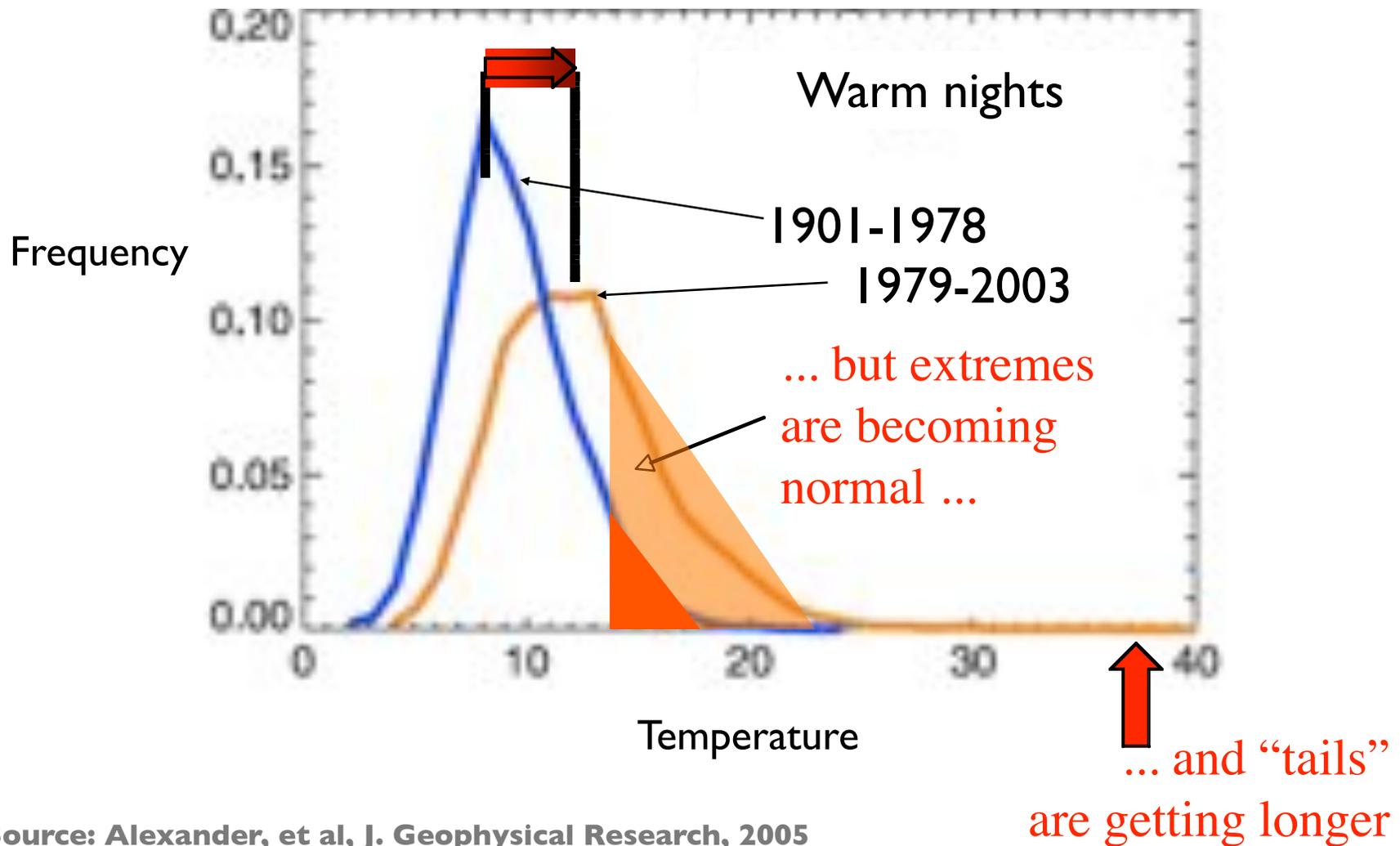
# Changes in Extremes



Source: IPCC, Third Assessment Report

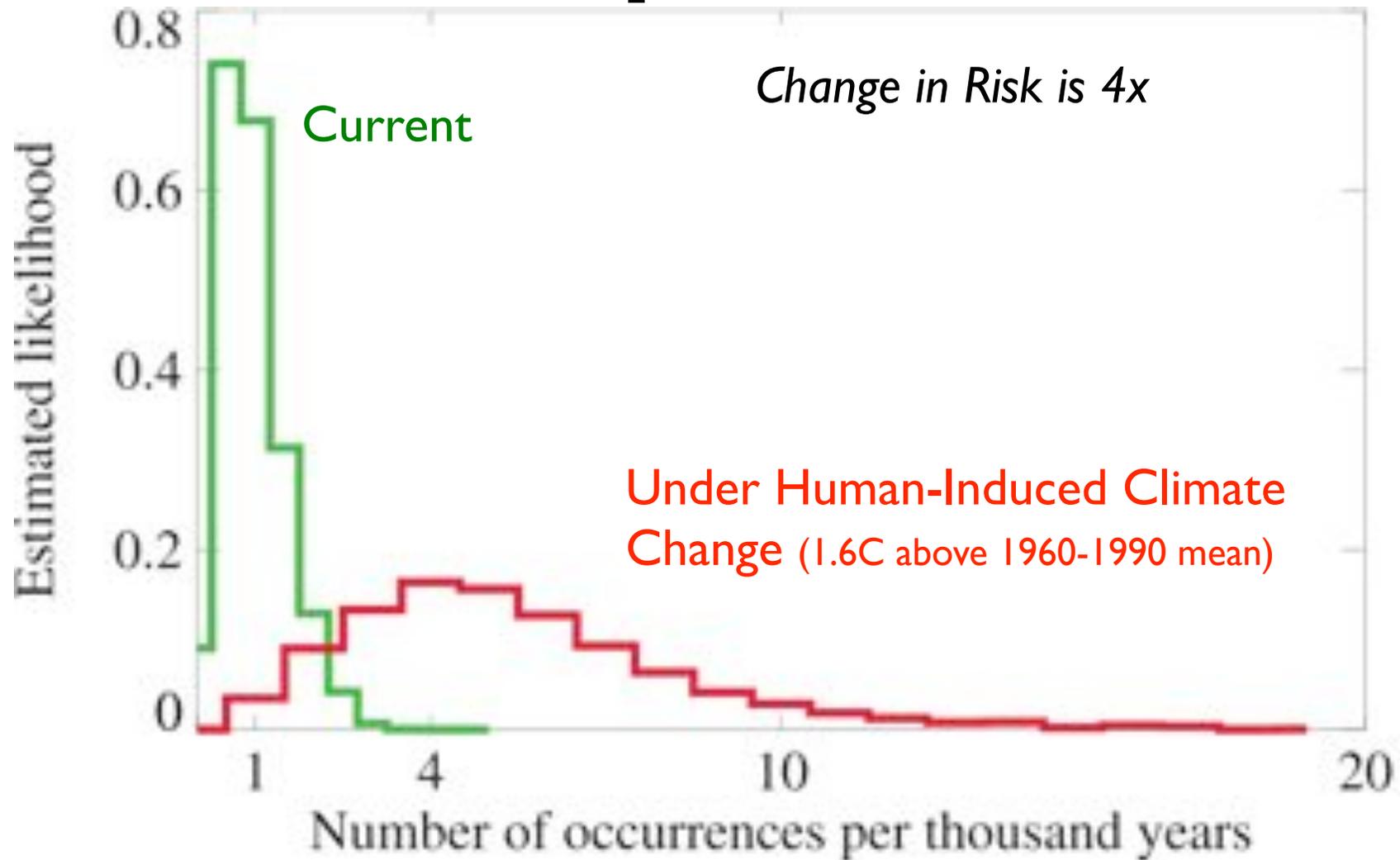
# Extremes Shift More Than Avg

Small changes in averages...



Source: Alexander, et al, J. Geophysical Research, 2005

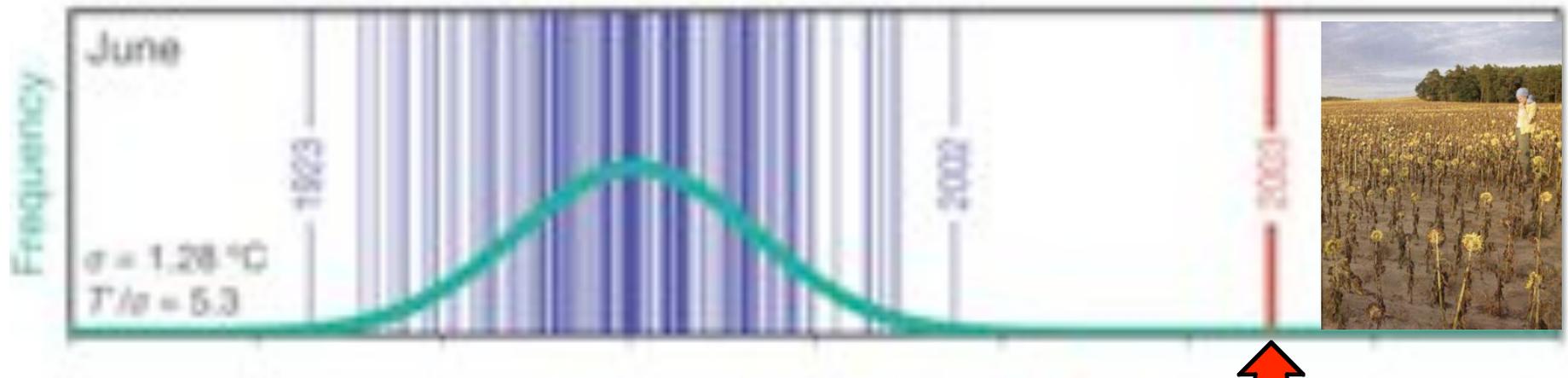
# Change in Frequency of Extreme European Heat Waves



Source: IPCC AR4, Corresponds to 1.6C change in mean

# Rare Extremes Cause Most of the Damages & Insured Losses

## The European heat wave of Summer 2003



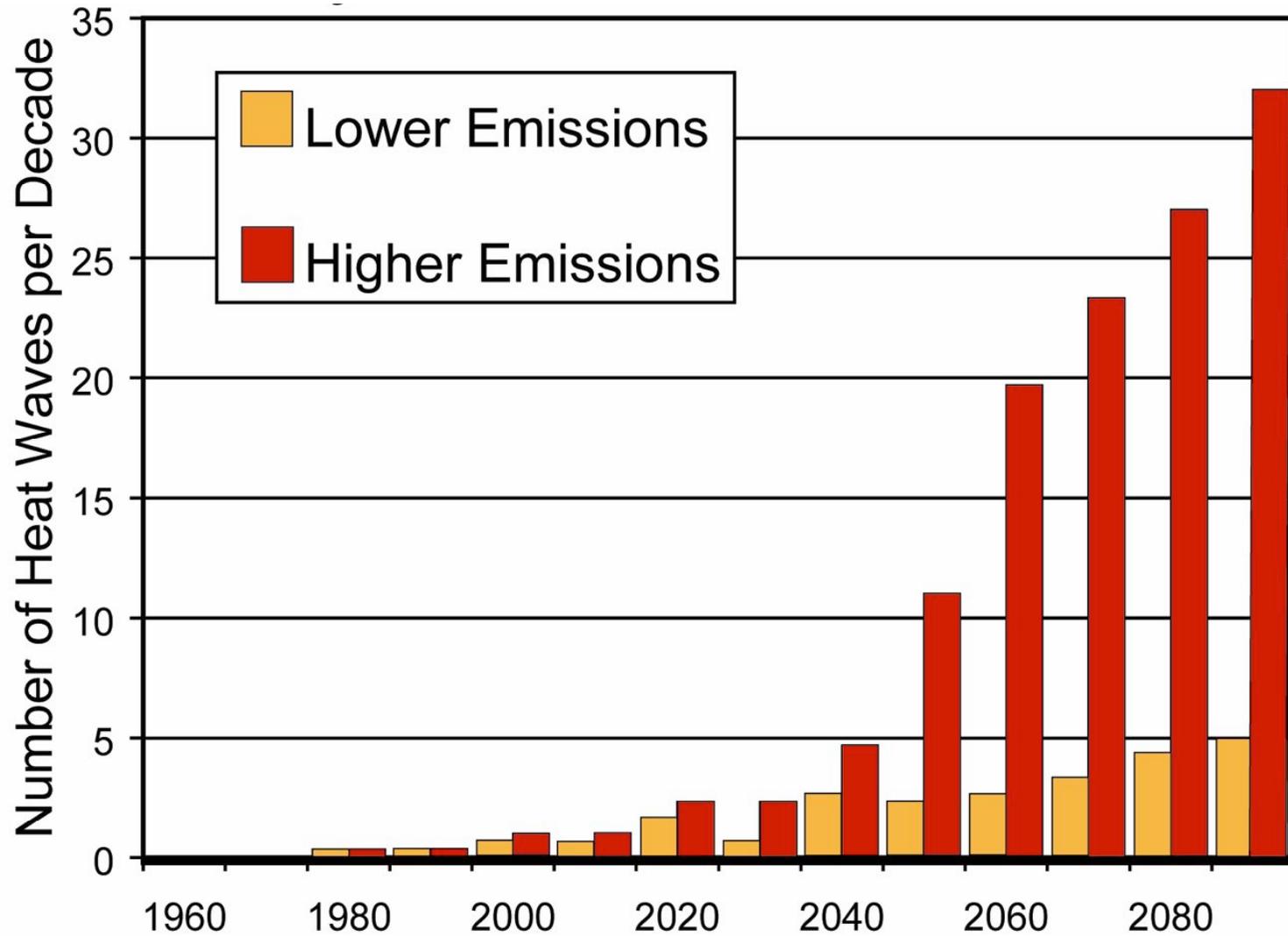
Insurance Losses:

- wildfire/property
- crop
- power sales
- health/mortality

Event was “six-sigmas” outside of norm.  
16°F above average in France and Germany  
was a 1-in-10,000 event to 1-in-46,000 event

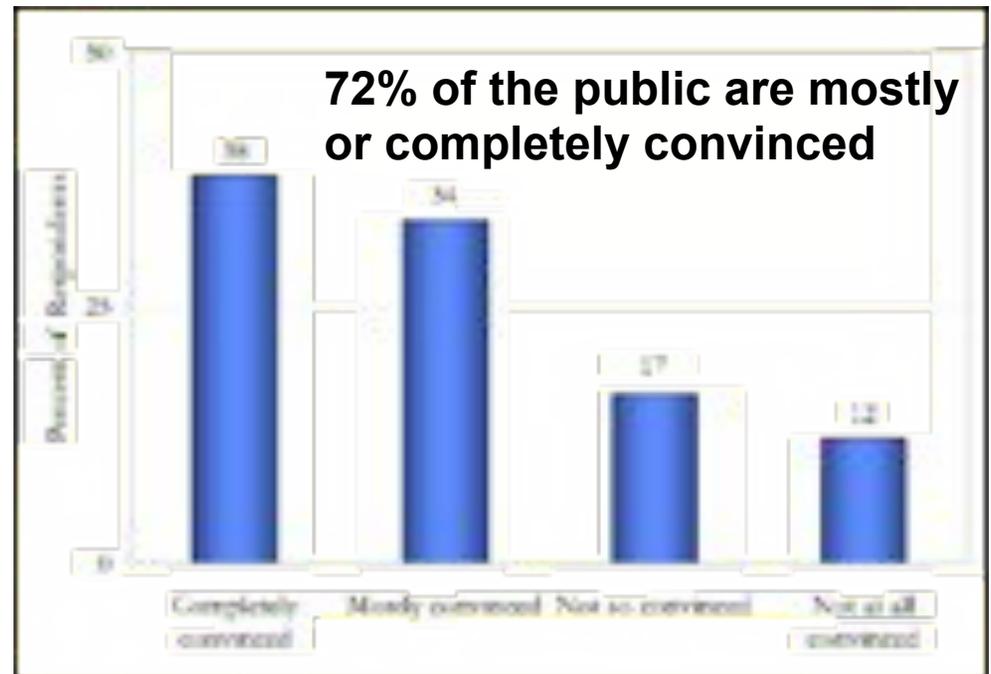
Source: Schar et al, Nature, v. 427, 2004.

# Changes in Severe US Heatwaves



# Temperature of Public Opinion

- In 2007, twice as many people (US) believed climate change is here than did in 2004
- But public opinion lags scientific certainty by a *significant margin*



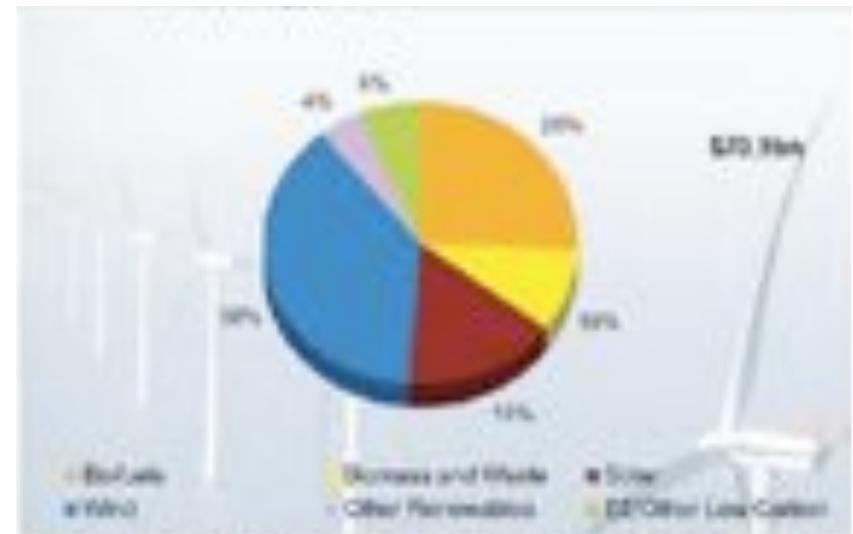
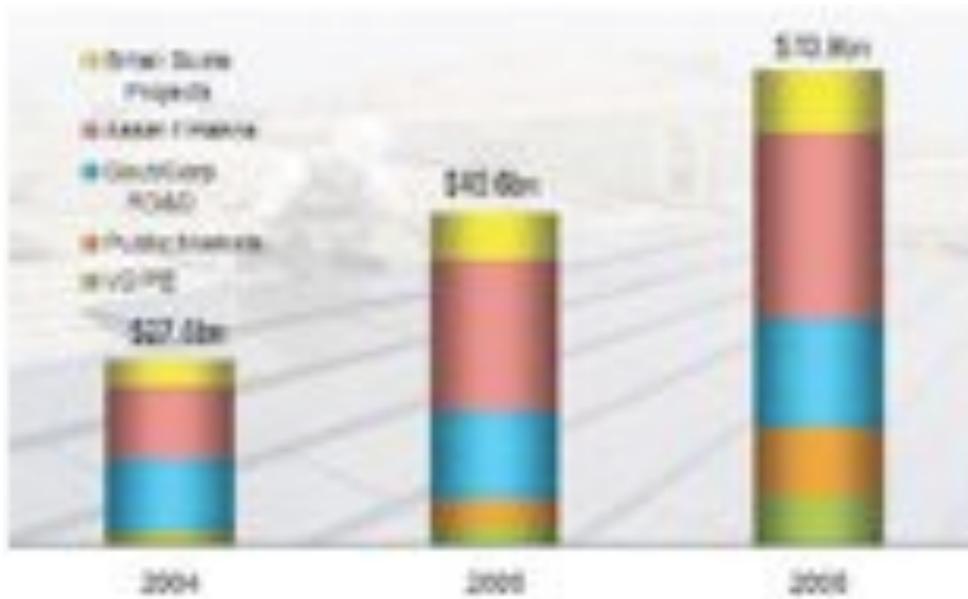
And... diminishing differences by political party affiliation

# The Business Climate is Also Changing

## Global Direct Investment in Sustainable Energy: 2004-2006

Investment by Type

Investment by Technology



\* Sylvie Lemmet, Division of Technology, Industry and Economics, UNEP.  
“Back to the Future: Investing in Clean Energy, Climate Action, p. 138 (2007)

# More Business!

## Global Renewable Energy Investments: \$85 Billion in 2007



The fundamental strength to deliver customized insurance solutions.

**PROPERTY**  
General All Risk Property Damage & Business Interruption | Change of Ownership All Risk | Fire All Causes & Theft

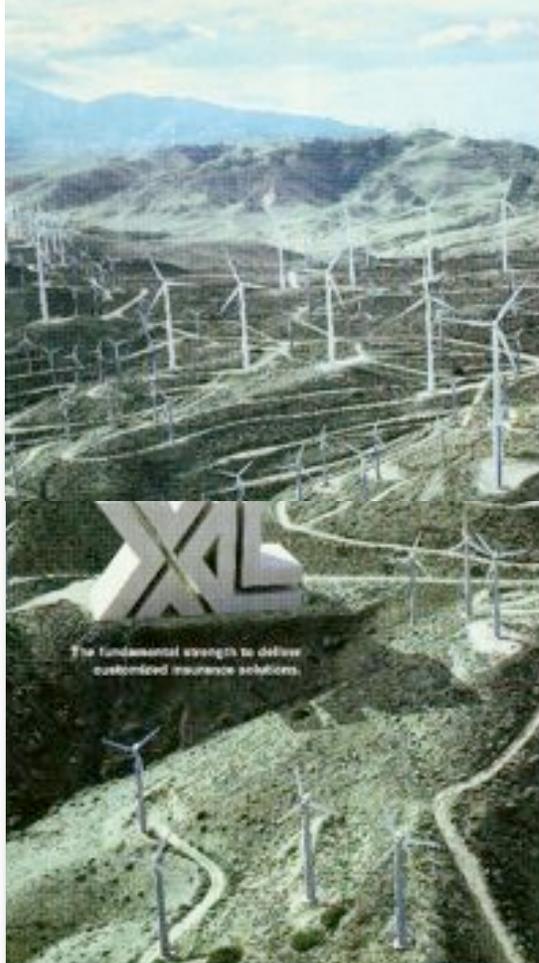
**LIABILITY**  
Professional Liability | Directors & Officers | Employment Practices Liability | Contractual Liability

**COMMODITIES**  
Commodity Price Risk | Energy Storage | Power Generation

**ENVIRONMENT**  
Pollution Liability | Environmental Cleanup | Remediation

**INSURANCE**  
Auto | Marine | Aviation | Construction | Marine | Marine Cargo | Freight

**XL INSURANCE**  
A Division of XL Group, Inc.



The fundamental strength to deliver customized insurance solutions.

**PROPERTY**  
General All Risk Property Damage & Business Interruption | Change of Ownership All Risk | Fire All Causes & Theft

**LIABILITY**  
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Auto | Marine | Aviation | Construction | Marine | Marine Cargo | Freight

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# Changing Risk Profiles



The world is changing. We're changing how we insure it.

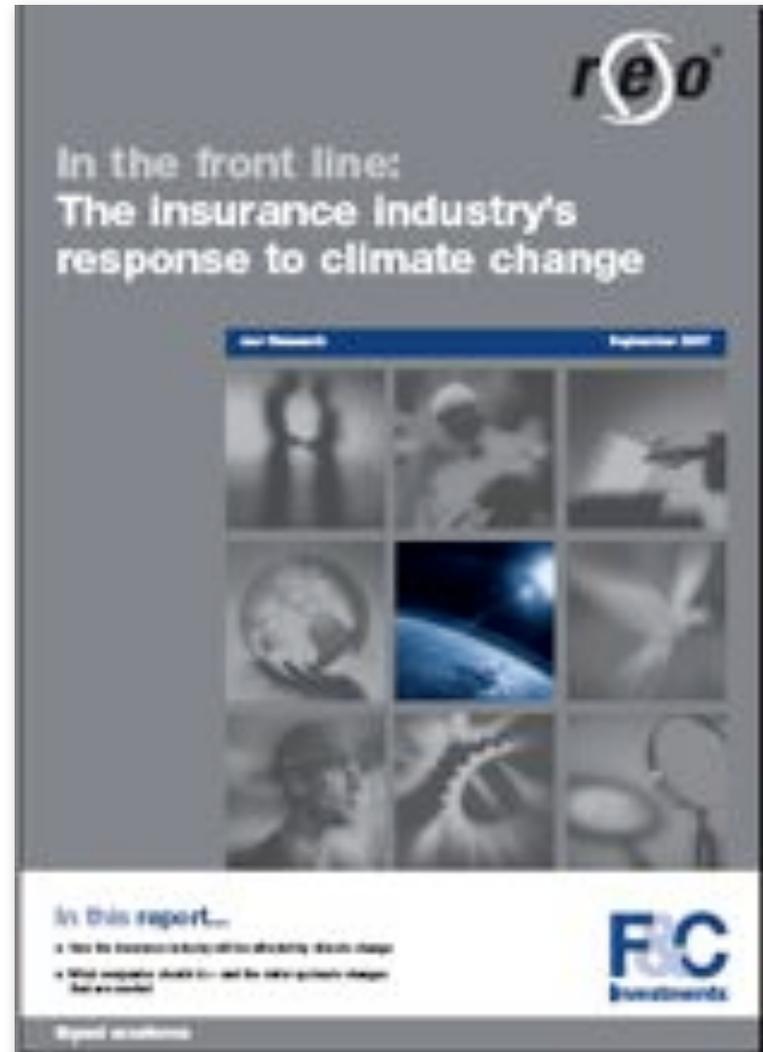
Real estate challenges are changing the world. That's why we created our Upgrade to Green™ coverage and Historic Rehabilitation Tax Credit insurance for commercial risks. These landmark coverages set a new standard and are just two of the 70 products we've developed since 2002 and 15 in 2007 alone. Because when a world changes this fast, you need an insurance company who can change right along with it.

Market Leadership Powered by the Spirit of Innovation™

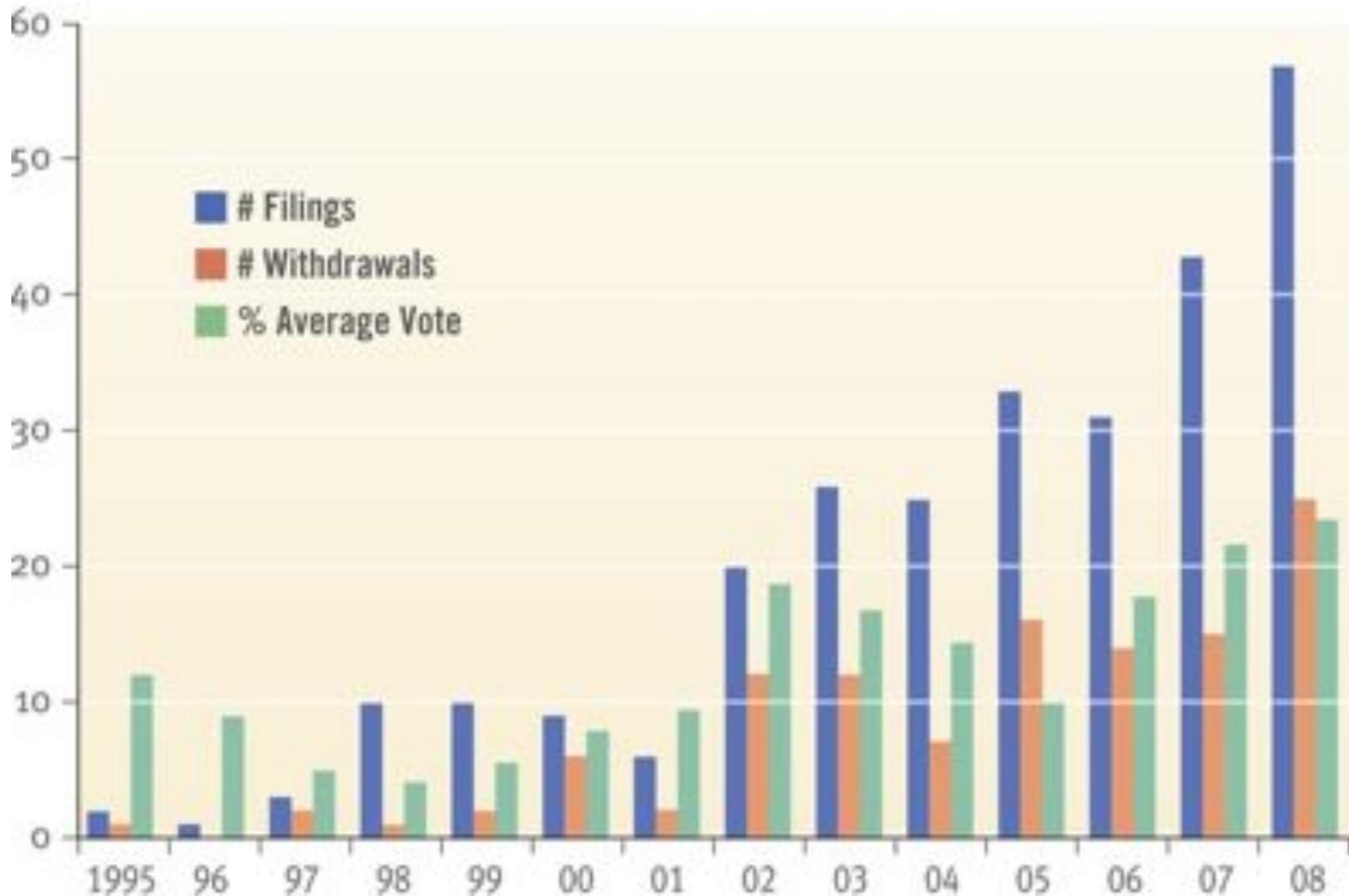
**Lexington Insurance Company**  
An **AIG** Company

# F&C Investments Statement: September 2007

- F&C is an asset manager with \$200 billion under management
- Concerned about climate-sensitivity of their investments in insurers



# Shareholder Climate Resolutions (United States)



# Double-Whammy of troubled economy and high energy prices

fewer boat purchases  
+ more repossessions  
+ more time laid up

= Falling premiums and fewer customers

... but also fewer losses

## E&S/SPECIALTY MARKET REPORT: SPORTS & RECREATION

ALL ASHORE?

### Soaring Gas Prices, Sinking Economy Combine To Leave Boat Insurers At Sea

For all but the biggest yachts, agents and carriers see market stuck in rough waters

BY DANIEL HIRS

**B**ATTERED BY RISING GASOLINE prices and a sinking economy, the insurance market for small recreational boats is facing rough waters, while smooth sailing continues for the mega-yacht sector. Both brokers and insurers in various sectors of this specialty market report.

"Increased gas prices are killing the boat industry," according to Mike Cicco, president of Completely Covered Insurance Agency, a Long Island firm based in Mississippi, N.Y.

Mr. Cicco said he has been receiving requests from boat policyholders who want to increase the time their boats are laid up on shore without coverage, which his agency cannot accommodate.

Some owners, he said, are increasing their deductible and adopting the attitude: "God forbid it goes on fire, I'll take that chance." Boats, he added, are being repossessed "like crazy," and are being auctioned by banks.

He reported a tremendous softening in insurance prices, with double-digit decreases in some cases.

In the case of a 39-foot boat that he handles, Mr. Cicco said, "This year it's a 20 percent decrease for the same exact boat."

The economic problems are impacting his marina business as well. He sees them going out of business or cutting back on insurance as their repair business plummets, as more boaters cut back on usage, and less of them need to be towed in.

Steve Ruchman, a past president of the National Association of Professional Insurance Agents and president of Ruchman Associates Inc. in Rockville Center, N.Y., said he does not see rates decreasing by 20 percent, but acknowledged that insurers are now very competitive for boaters' business. Insurers who shop can easily steer their

way to a good deal, he said, adding that competing companies may not be advertising lower rates, but they "do whatever [it takes] to get the price down" and are very creative in offering deals.

If they are unable to lower the premium, Mr. Ruchman said carriers will negotiate on coverage terms and conditions, with areas of discussion including lay-up periods, permitted navigable waters and towing.

In addition, the more electronic naviga-

tion equipment an owner has, the more

he remarked that "there has been a drastic credit crunch affecting the recreational marine market in a bad way," with loans for boat purchases hard to come by and many who took out loans to buy boats going into default.

All this translates into a smaller marketplace for the insurance industry, according to Mr. Reif.

"Generally speaking, insurers who specialize in boats are seeing a significant drop in business this year," he declared, noting that rates are particularly soft for boats located on inland lakes or rivers.

However, for big boats—these megayachts that measure 100 feet or longer and cost \$5 million or more—it's a very different story.

Sean Blue, yacht director for the AIG Private Line Group in Seattle, said that for such maritime heavyweights, "there is a large demand and a high waiting list at some of the larger yacht shipyards."

The competition is limited among carriers who take on such risks, he said, because "not many can insure a \$100 million yacht."

He said the AIG private line yacht sector is six years old, and retention of clients has been very good, as has growth, noting that the company is adding staff and products.

"We expanded into the European market and have offices in Dubai, Sydney, Hong Kong and London," he said.

One of the risks involved with megayachts is piracy—particularly in Southeast Asia, according to Mr. Blue, who said AIG checks the owners' security precautions for those waters, pointing out that some are shadowed by security boats.

Mr. Ruchman said the boating endorser

+ continued on page 21



**NOT ONLY ARE BOAT INSURANCE PREMIUMS PLUMMETING, BUT THE MARKET IS CONTRACTING AS BOAT SALES ARE WIP-OUT. MANY WHO HAVE BOATS ARE DRY-DOCKING THEM, AND SOME WHO INTENDED TO BUY BOATS ARE GOING INTO DEFAULT.**

tion equipment an owner has, the more premium credits a carrier is generally willing to give, he advised.

Howard Reif, with Sullivan and Strauss Agency in New Hyde Park, N.Y.—which trades as Silkale—said companies that left the market after the extensive boat losses from the hurricanes of 2005 are now back in. "They have a short memory," he quipped. He said he has seen ACE, Allstate, Nationwide, Progressive and Zurich all show a greater appetite for business.

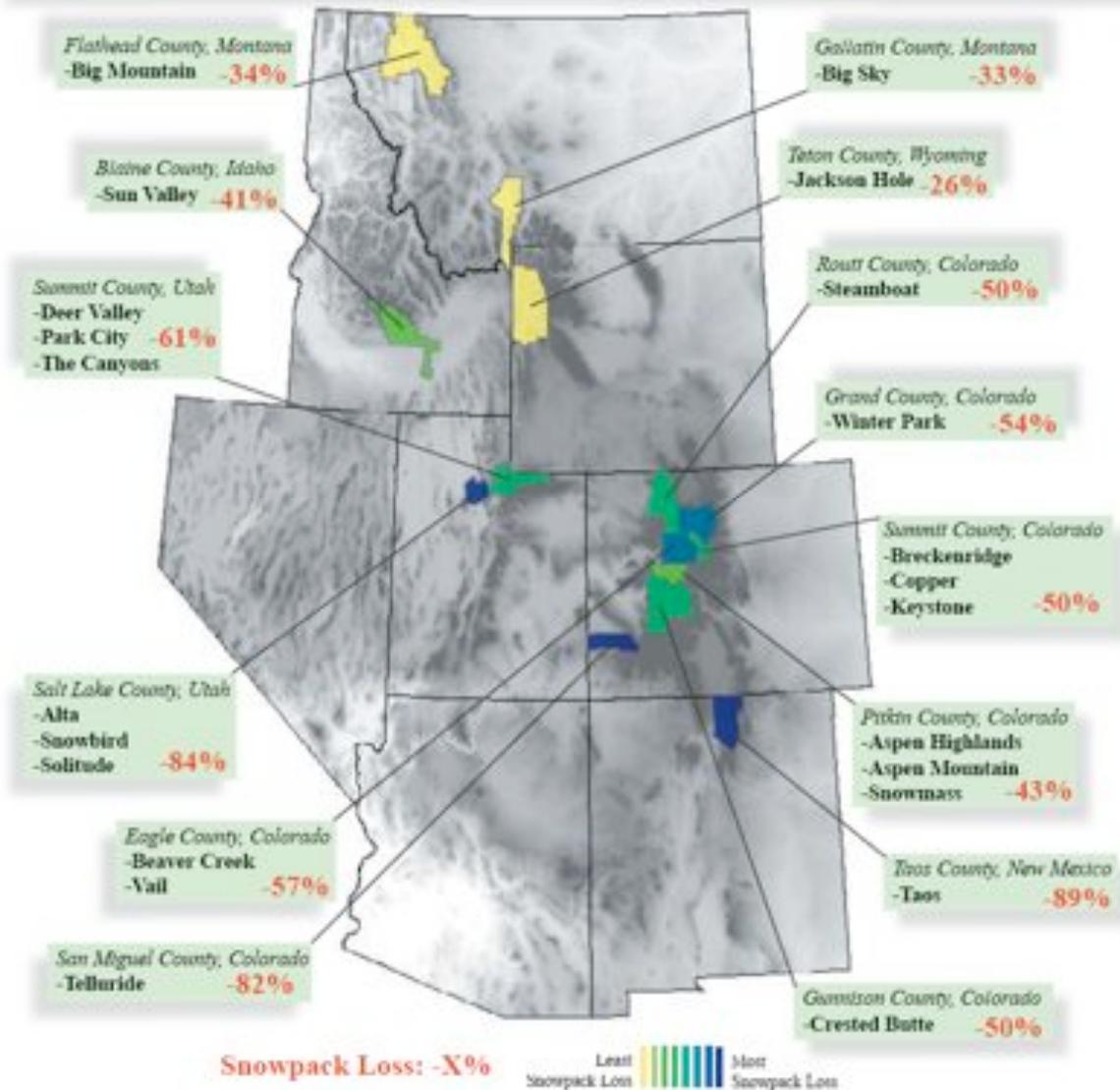
Meanwhile, Mr. Reif said the competitive challenges in the small-boat insurance market are increasing because of plunging boat sales. Purchases are down 20 percent, he said, adding, "I don't see it getting better." Making matters worse, he added, is the fact that "we are at a point with more boats for

# Insurance Customers Impacted

Ski County April 1 Snowpack Loss, 1976 to 2085\*

Figure 16

\*1976 represents the average from 1961 to 1990, and 2085 represents the average from 2070 to 2099.



# Availability & Affordability

- Exodus of insurers from coasts (*and* elsewhere)
- Quiet “hollowing out” of insurance
- Customers “going Bare”: 9 utilities (10% of membership) left in OIL Mutual Ins. Co. May 2007
  - Paid \$100 million in fees to leave
  - CEO says “It was a stunning blow”
- RAND Report on commercial insurance in FL
  - In 2005: one insured paid \$250k for \$38m coverage
  - In 2006: paid \$940k for \$5m coverage, i.e. a ~29-fold bump in the “cost of risk”

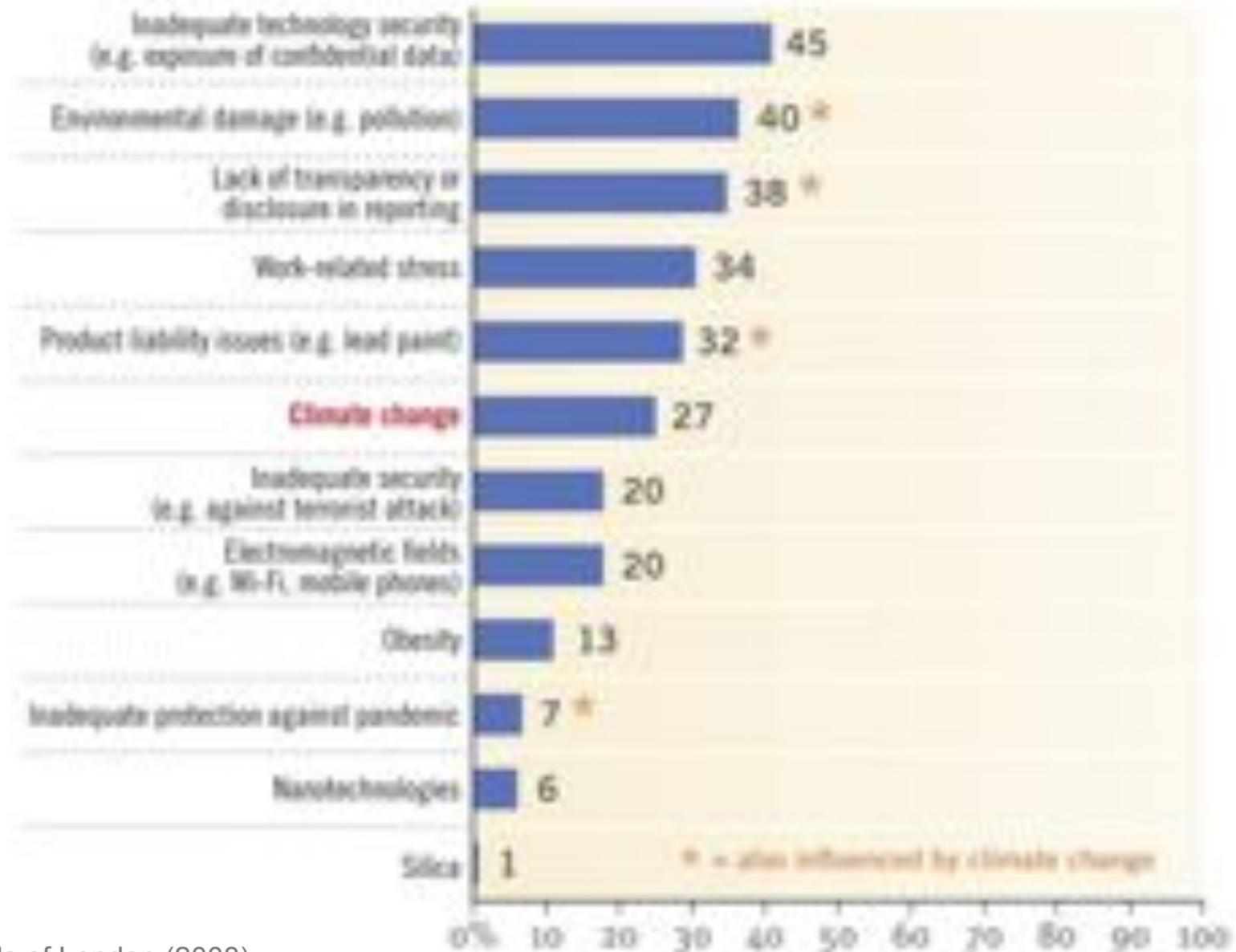
# Customers

***“Most scientists believe that greenhouse gas emissions from human activities are influencing the earth’s climate. .... Duke Energy shares that view.”***

***“... Congress needs to establish a national, economy-wide greenhouse gas mandatory program as soon as possible.”***

**Duke Energy (CEO Jim Rogers)  
Corporate website as of March 2, 2008**

# D&O Perceived Liability Risks: Next 5 years



Source: Lloyds of London (2008)

# Risks Are Also Associated with Responses to Climate Change



- Green buildings
- Nuclear power
- Renewable energy
- Hydrogen
- Carbon capture & storage
- Carbon offsets/trading
- Geo-engineering
- Adaptation projects

*Comparative risk assessments  
needed*

# Comparative Risk Assessment

## VULNERABILITIES TO CHANGING CLIMATE CONDITIONS & RELATED RISKS

X = downside risk      ✓ = upside benefit

	Energy End-Use Efficiency	Fossil	Biofuels	Geothermal	Hydro	Solar	Wind	Nuclear	T&D	Carbon Capture	
										Industrial	Biological
<b>Climate Change Impacts</b>											
Changing meteorology											
Disease/Pests			X								
Drought; water shortage											
Elevated river temperatures											
Increased precipitation			✓								
Lightning											
Soil subsidence											
Storm/flood											
Wildfire											
<b>Other Risks</b>											
Operational			X								
Carbon pricing											
Energy price volatility											
Energy security			✓								
Waste management											
Safety; environmental liability											

Vulnerable to changes in diseases and pests

Increased rainfall could improve productivity

Corrosive ethanol complicates transportation & application

Domestic fuels enhance energy security

# Comparative Risk Assessment

## VULNERABILITIES TO CHANGING CLIMATE CONDITIONS & RELATED RISKS

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	Energy End-Use Efficiency	Fossil	Biofuels	Geothermal	Hydro	Solar	Wind	Nuclear	T&D	Carbon Capture	
										Industrial	Biological
<b>Climate Change Impacts</b>											
Changing meteorology			✓		X	X	X				✓ X
Disease/Pests			X								X
Drought; water shortage		X	X	X	X			X		X	X
Elevated river temperatures		X						X			
Increased precipitation			✓		✓						✓
Lightning		X				X	X	X	X	X	
Soil subsidence		X						X	X		
Storm/flood		X	X	X	X	X	X	X	X	X	X
Wildfire			X						X		X
<b>Other Risks</b>											
Operational	✓	X	X	X	X	X	X	X	X	X	
Carbon pricing	✓	X	✓	✓	✓	✓	✓	✓		✓	✓
Energy price volatility	✓	X	✓ X	✓	✓	✓	✓	✓ X			
Energy security	✓	X	✓	✓	✓	✓	✓	✓ X	X		
Waste management	✓	X	✓		✓	✓	✓	X		X	
Safety; environmental liability	✓	X	✓ X	✓ X	✓	✓	✓	X		X	

# **Climate Change is #1 Risk, According to >70 Insurance Industry Analysts**

**(Ernst & Young Survey, March 2008)**

- 1. *Climate change***
- 2. Demographic shifts in core markets\***
- 3. Catastrophic events\***
- 4. Emerging markets\***
- 5. Regulatory intervention\***
- 6. Channel distribution**
- 7. Integration of technology with operations & strategy**
- 8. Securities markets\***
- 9. Legal risk\***
- 10. Geopolitical or macro-economic shocks\***

\* Also influenced by climate change

# **Insurance Regulators 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 (deceased)  
Nebraska Insurance Commissioner**

# Top Concerns: Survey of 139 Insurance Executives in 21 Countries

1	Too much regulation	12	Managing technology	23	Corporate governance
2	Natural catastrophes	13	Equity markets	24	Demographic trends
3	Management quality	14	Risk-management techniques	25	Contract wording
4	Climate change	15	Back office	26	Capital availability
5	Managing the cycle	16	Political shocks and pressures	27	Security of reinsurance
6	Distribution channels	17	Pricing new risks	28	Availability of reinsurance
7	Long-tail liabilities	18	Terrorism	29	Business continuation
8	Actuarial assumptions	19	Complex instruments	30	Fraud
9	Longevity assumptions	20	Retail-sales practices	31	Merger mania
10	New types of competitors	21	Pollution	32	Too little regulation
11	Investment performance	22	Interest rates	33	Asbestos

Source: Centre for the Study of Financial Information and PricewaterhouseCoopers survey: 2007

***“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 meeting**

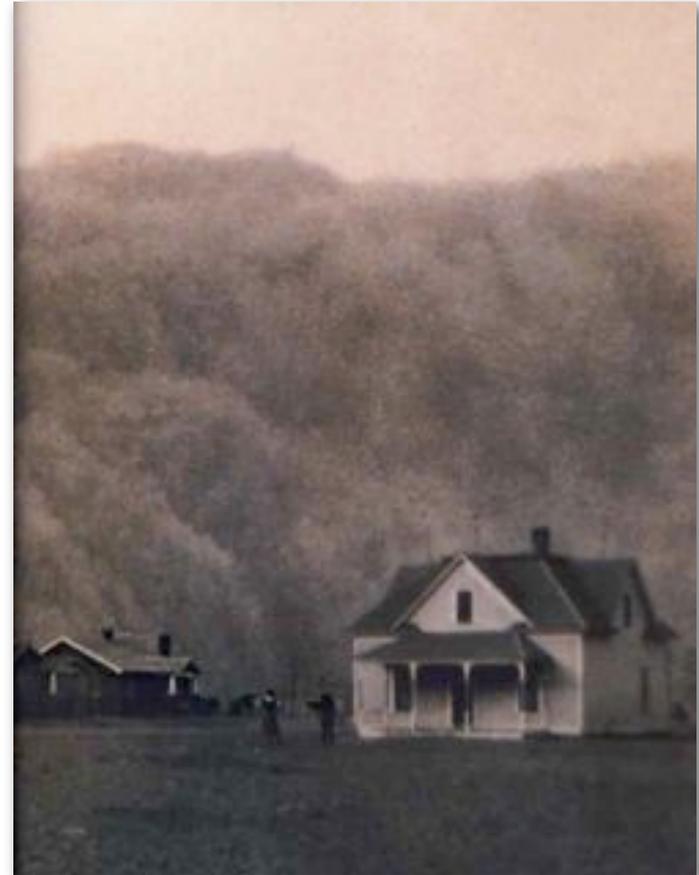
# Keeping The Promise

- *You're in good hands....*
- *Just like a good neighbor ...*
- *We live where you live....*
- *Have you met life today?*
- *Go Ahead.You Can Rely on Us*
- *Insuring Your Future... Today*
- *Taking care of what's important*
- *Ready for tomorrow?*
- *We keep our promises to you*
- *Give your child an advantage for life*
- *Because Change HappenZ*
- *Responsibility.What's your policy?*
- *It's not just how you're covered, it's how you're treated*

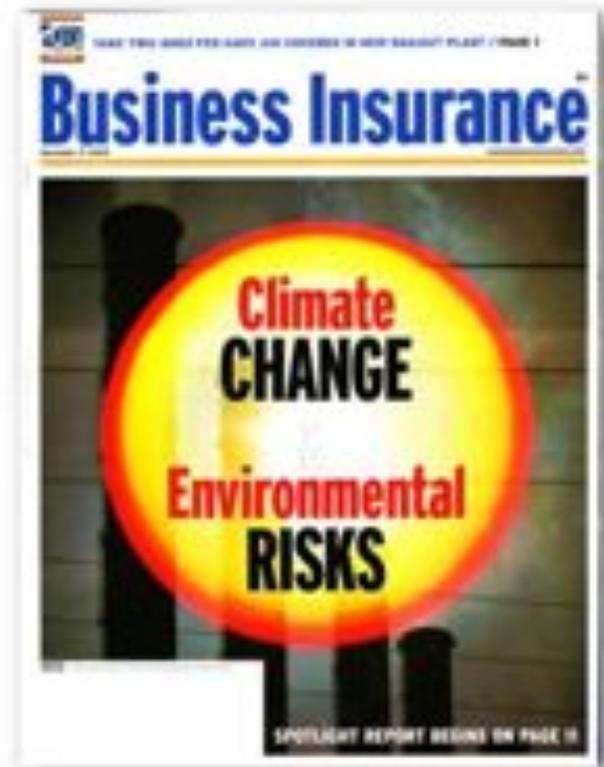


# Enterprise Risk Management

- Actuarial
  - variability
  - return periods
  - correlations
  - non-linearities
  - data “blind-spots”
  - model “blind-spots”
  - demographics
- Competition - Contraction
- Reputation & Trust
- Assets & share prices
- Own liability
- Macro-economy: higher energy prices, conflict ...
- Shareholder relations
- Regulation
- ***Insurability***

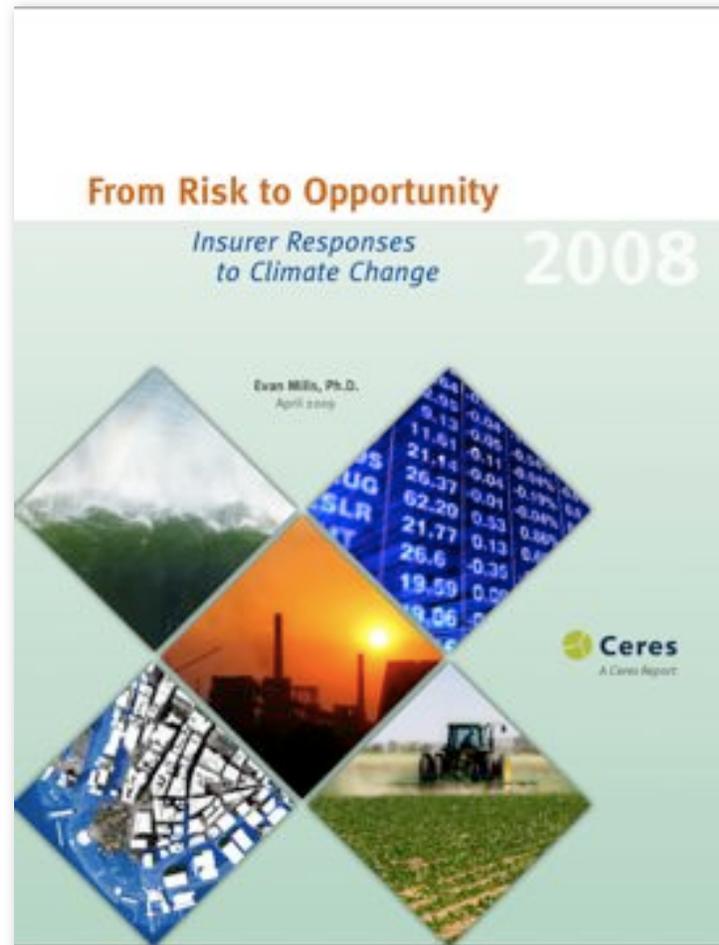


# Insurance Paradigm Shift



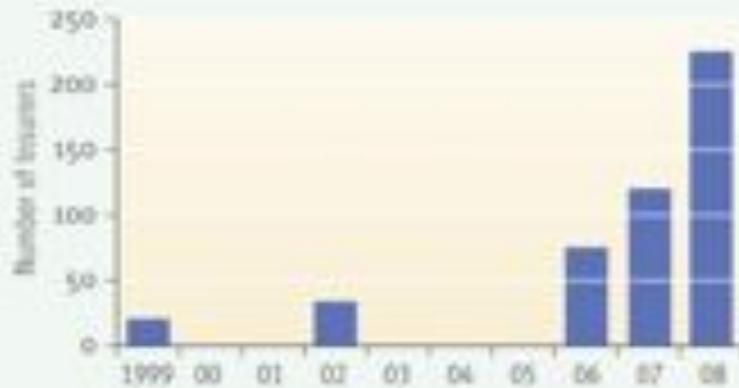
# From Risk ... to Opportunity

**34 strategies; 643 examples**  
**278 entities; 29 countries ... *and counting***



## Offerings

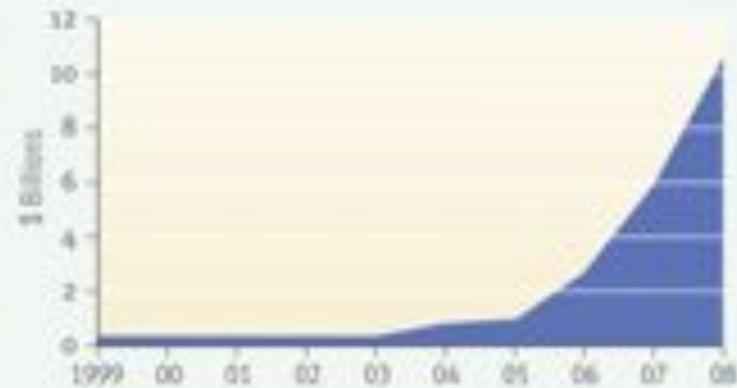
Insurers with Climate-friendly Products & Services (number)



- 43 instances of pay-as-you-drive insurance or credits for low-emission vehicles
- 13 microinsurance programs
- 22 companies offering 39 green-buildings products and services
- 9 companies offering carbon offsets to customers

## Investments

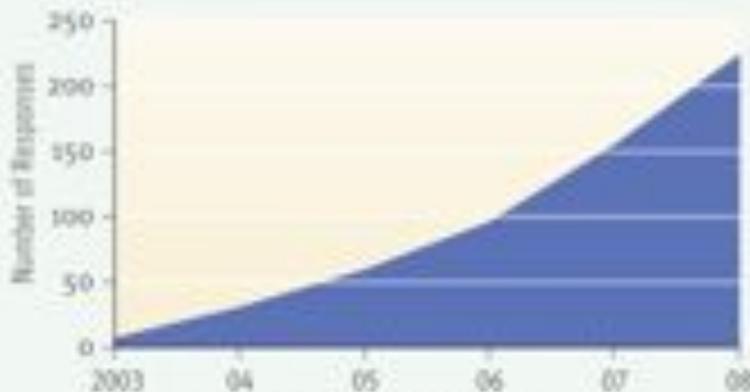
Investment in Climate Solutions (\$Billion)



- 24 companies making direct investments
- 13 instances insurer financing of green projects

## Disclosure

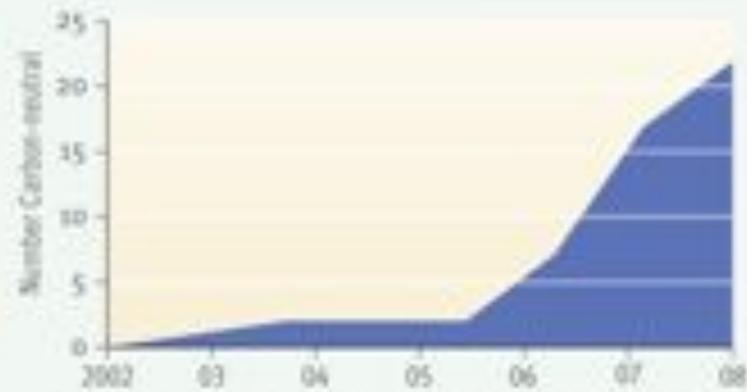
Insurer Responses to Carbon Disclosure Project Survey (number)



- Carbon disclosure project: 66% reporting
- SEC Disclosures: 15% reporting in 2006
- See Appendix B for details: 2003-2008

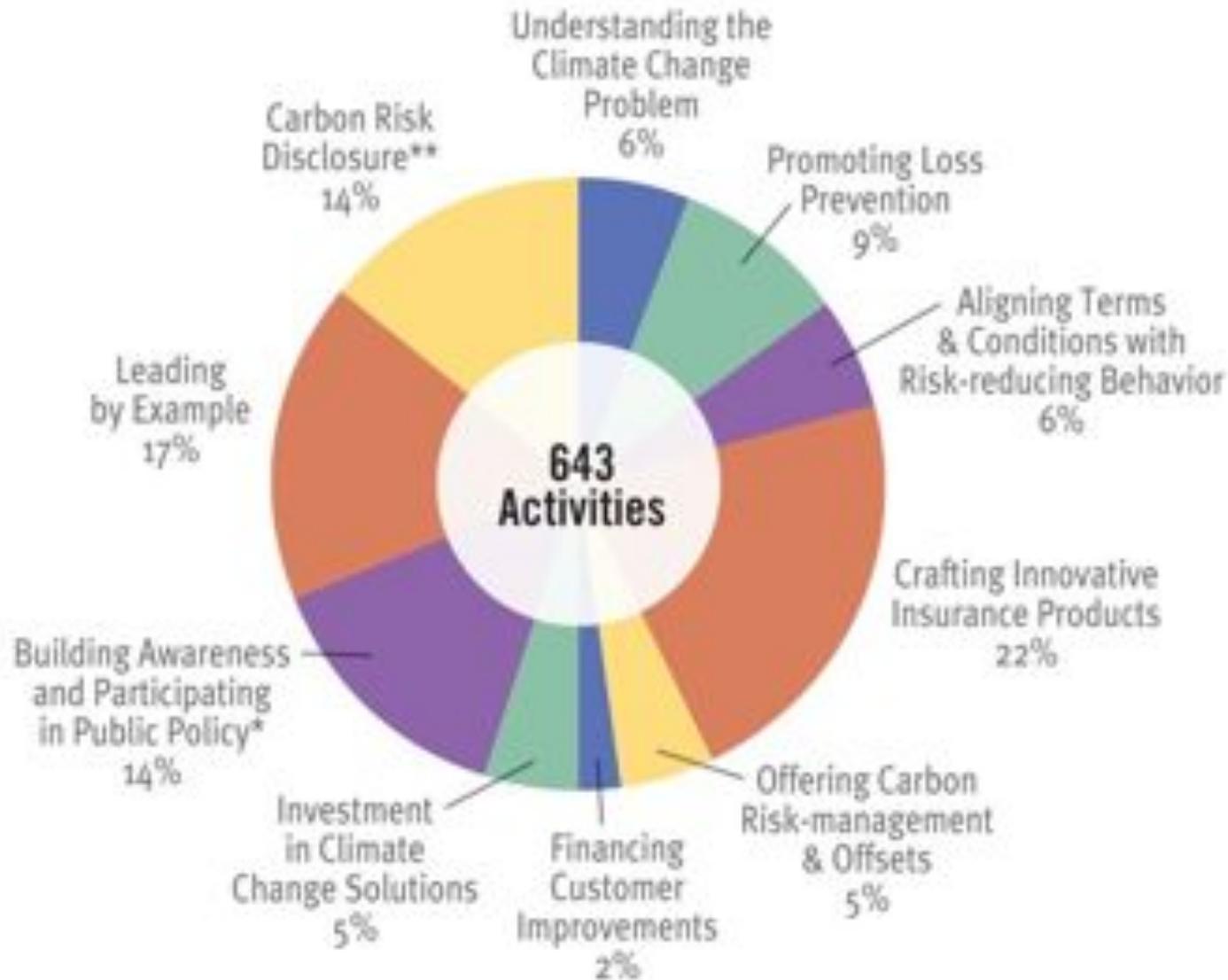
## Leadership

Carbon-Neutral Insurers and Intermediaries (number)

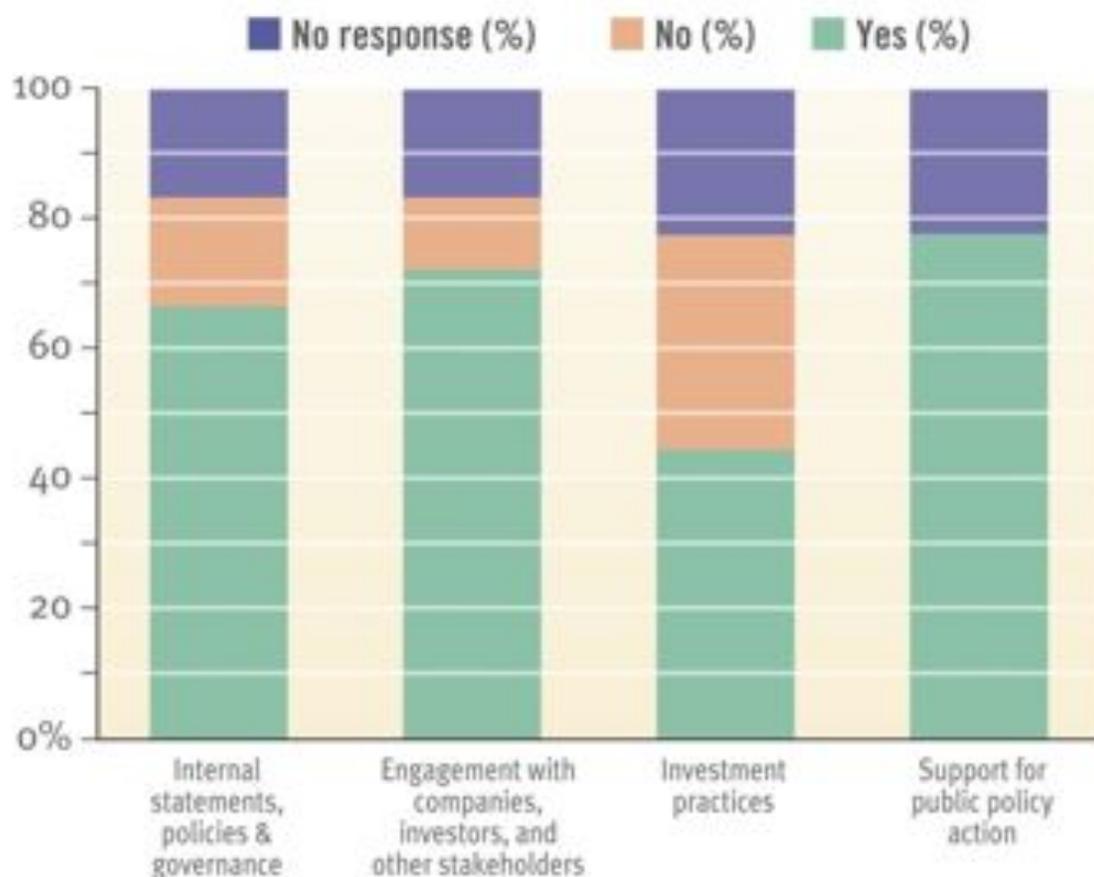


- 25 companies publishing corporate responsibility reports
- 23 companies with carbon-neutral commitments
- Date is year carbon neutrality achieved

# Major Categories of Activity



# Internal Responses: 18 companies\*



\* AIG (U.S.), Allianz SE, (DE) Allstate (U.S.), Association of British Insurers (UK), AXA Group (FR), ClimateWise, The Co-operators (CA), MAPFRE (ES), McGriff, Seibels & Williams, Inc (U.S.), Munich Re (DE), Risk Management Solutions (U.S.), RSA Insurance Group (UK), Swiss Re (CH), Tokio Marine & Nichido Fire Insurance (J), The Travelers Companies, Inc. (U.S.), Willis (U.S.), XL Capital (U.S.), Zurich Financial Services (CH).

# New Insurer Business Units



“Office of Environment & Climate Change”;  
“Advanced Energy Solutions”



“Climate Solutions”



“Agri-Fuels Group”



“Green Energy Team”



“Core Business Climate Change Project”



“Climate Change Taskforce”



“Climate Change Advisory Council”

# Understanding the Problem: CAT+Climate Modeling

## – Trade Associations

- III [CAT Modeling Forum], with Ceres and others

## – Insurers

- **AIG**
- **Travelers**
- **Lloyds**

## – Reinsurers

- **Swiss Re**
- **Munich Re**

## – Brokers

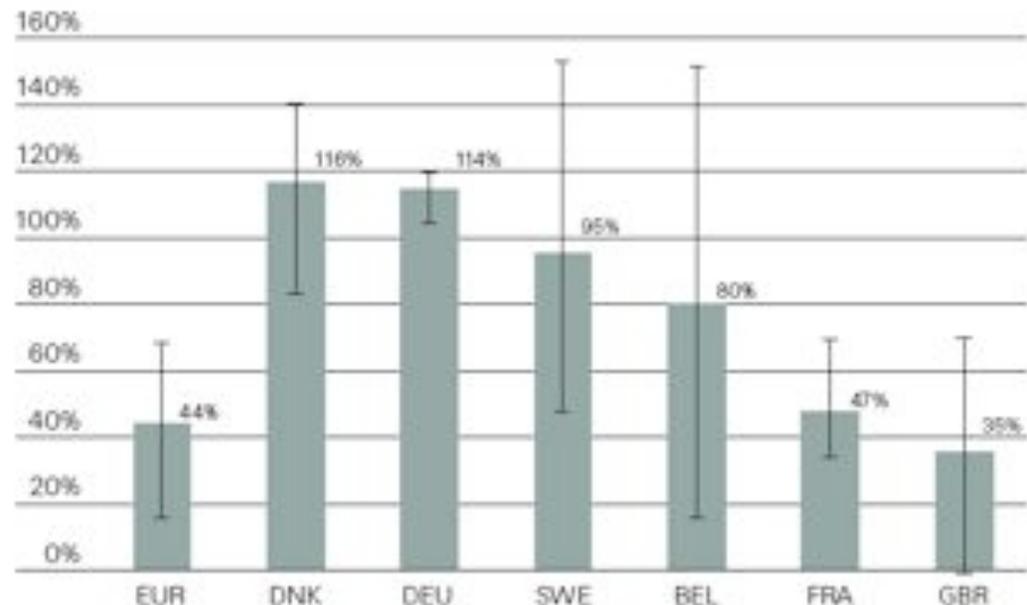
- **Willis**

## – CAT Modelers

- **RMS**
- **AIR**

Expected increase in annual loss in Europe

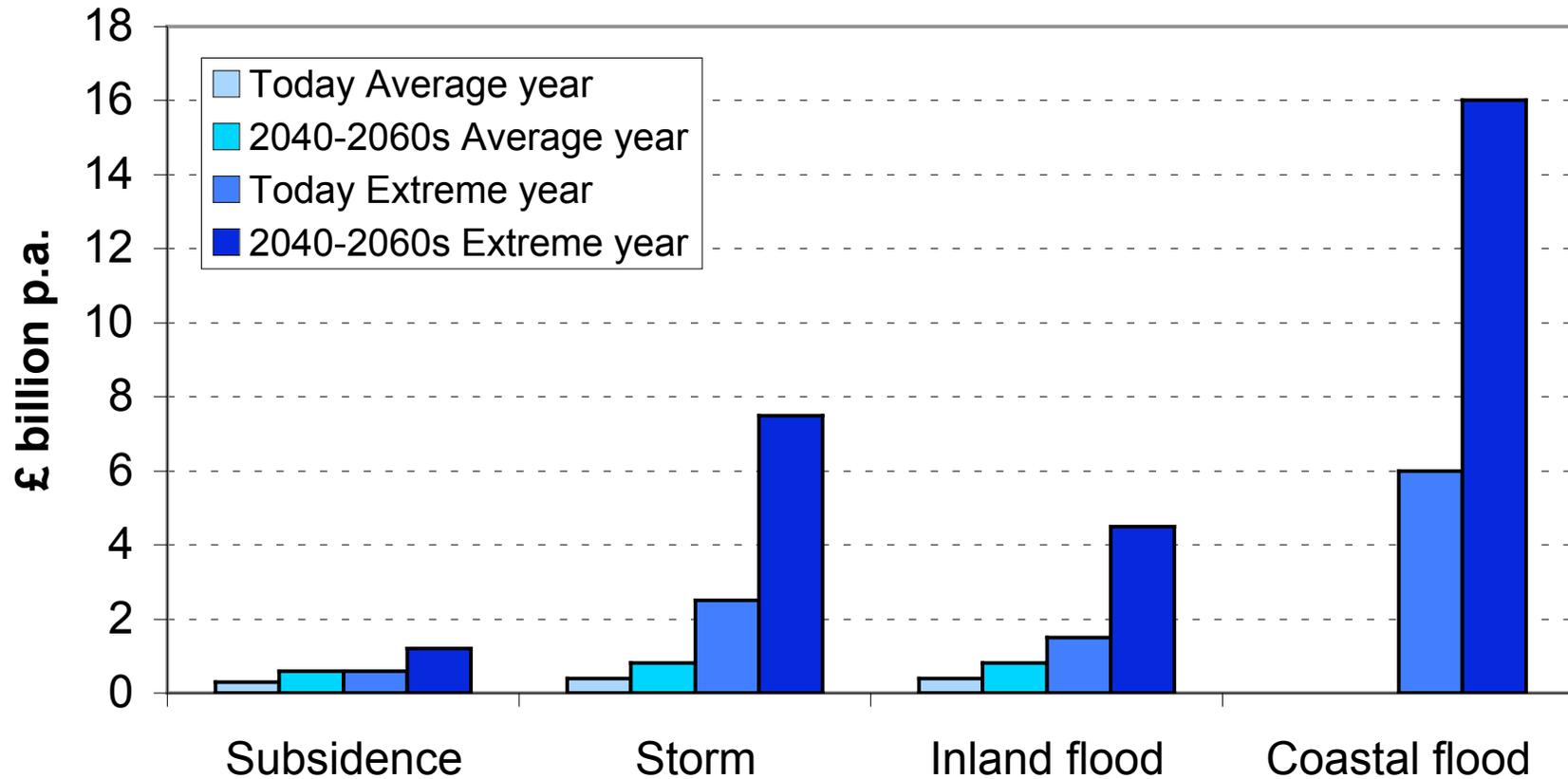
Swiss Re



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



# Projections of UK Insured Losses



Source: Association of British Insurers, "Adapting to Our Changing Climate: A Manifesto For Business, Government, and the Public"

# Improved Building Practices

- **FM Global** - hurricane-resistant building guidelines
- **Institute for Business and Home Safety's** “Fortified... for safer living” stds.
  - Wind-resistant rigid foam panel walls and multi-glazed windows
  - Ice-dam resistant
  - Mold resistant
  - Water-resistant insulation
- **Some insurers giving premium credits for compliant homes**



BASF Home - Patterson NJ

# Win-Win Solutions

***Arkwright Mutual (now part of FM Global):***

replaced fire-hazardous halogen “torchieres” with compact fluorescent alternatives at

Northeastern University student housing + seminars for risk managers

Collaboration with Boston Edison and LBNL

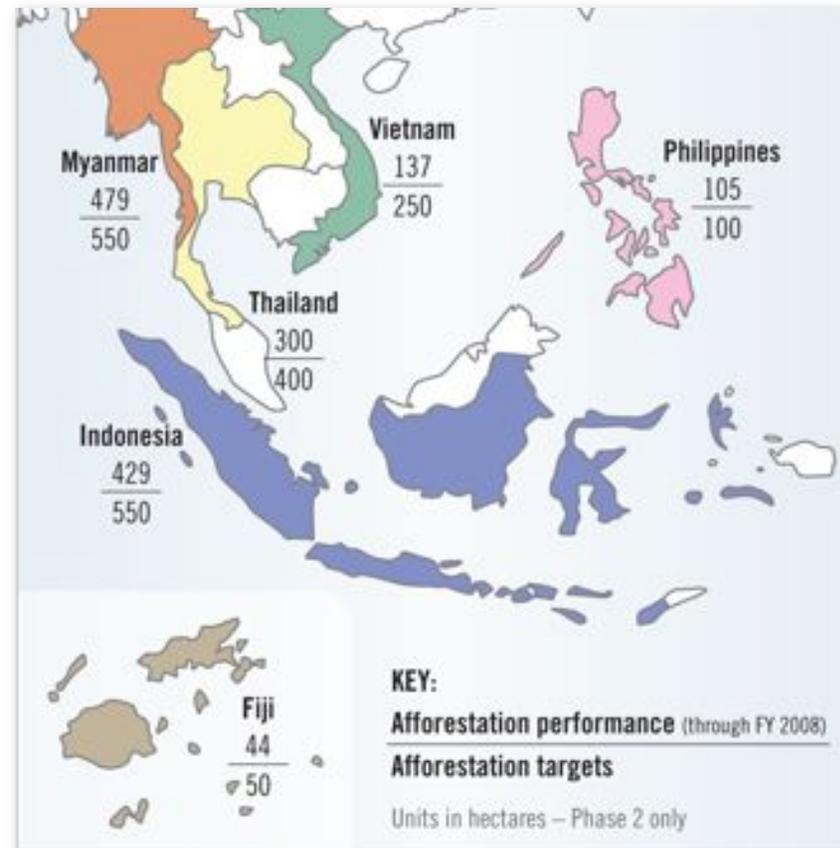


# Promoting Loss Prevention: Wetlands Restoration

## Tokio Marine Holdings



*Company states that  
2005 Tsunami did less  
damage in these areas*



Source: <http://www.tokiomarine-nichido.co.jp/english/index.html>

# Insurable Green Building Risks

- Builders risk during construction
- Incremental costs for green replacement materials
- Upgrading after loss
- Fees for green consultants
- Additional removal/disposal/recycling of damaged property
- Business interruption for delays in obtaining green materials; certification
- Professional liability for specialized trades
- Mis-representation
- Crisis management



**22 companies  
offering 39  
products &  
services**

# Low-emission Vehicle Discounts

5-50% premium discounts to hybrid drivers

- **AXA**
- **Berkshire/GEICO**
- **Cooperative**
- **Desjardins General**
- **Farmers**
- **Hybernia**
- **SECURA**
- **St. Paul-Travelers**



**18 companies  
offering  
improved  
terms**

# Mileage-based Auto Insurance

- 26 companies offering insurance discounts of up to 40%:

- **Aioi**
- **Axa**
- **GMAC**
- **Hollard**
- **Milemeter**
- **Norwich Union**
- **Polis Direct**
- **Progressive**
- **Rheinland**
- **Sompo**
- **Tokio Marine Nichido**
- **Unigard**
- **Versicherungen**

250,000 policies  
in Europe as of  
2007;  
\$700M revenues  
projected by  
2010



General Motors Acceptance Corporation  
(GMAC) PAYD discount schedule.

Miles/year	Discount offered
1 – 2,500 miles	40%
2,501 – 5,000	33%
5,001 – 7,500	28%
7,501 – 10,000	20%
10,001 – 12,500	11%
12,501 – 15,000	5%
15,001 – 99,999	0%

Some use GPS → stolen-vehicle  
recovery; avoids reporting fraud

# Innovative Products for Energy Performance

- **Energy Production:**  
*Munich Re -  
geothermal, Sompo -  
wind, others....*



- **Demand reduction:**  
*AIIG, Zurich and  
others...*



# Carbon Offsets

- **Allianz, AXA, Cooperative, others...**
- **Insurance Australia Group:**  
Car and travel insurance bundled with offsets

The screenshot shows the CIS Cooperative Insurance website. The header includes the CIS logo and the tagline "For insurance, savings, investments and pensions". A navigation bar contains "My Portfolio", "Get A Quote", and "Motor Insurance". The main content area features a sidebar with menu items: Homepage, Motor & Home, Saving & Investing, Pensions, Life & Health, Banking, Mortgages, About Us, Ethics in Action, and Contact Us. The central content area is titled "ecoinsurance" and features a graphic of a car made of green plants. Below the graphic, it states: "Offset 20% of your car's CO<sub>2</sub> emissions\*" and "ecoinsurance is the UK's first car insurance policy to help offset some of the damage your car's CO<sub>2</sub> emissions cause to the environment."

The screenshot shows the Climatesure website. The header includes the Climatesure logo and the tagline "insuring a brighter future". A navigation bar contains "great insurance", "great price", "how it works", "our partners", "news", and "home". The main content area is titled "great insurance cover" and includes a section for "Travel Insurance Cover". The text states: "We all want cheap insurance and the best cover. In partnership with AXA, Climatesure offers its customers total confidence that they can have both by offering eco-friendly insurance to the green consumer at the best possible price." The "Travel Insurance Cover" section lists the following benefits: "Full CO<sub>2</sub> offset of all estimated carbon dioxide based on the air travel involved in the insured trip up to a maximum of 40 flight hours per policy", "A choice of single trip cover, annual multi-trip cover and backpacker cover", "Up to £7,500,000 medical coverage including a 24 hour emergency assistance helpline", "Up to £3,000 cancellation and curtailment", and "Up to £2,000 baggage coverage". The text also mentions "Free coverage for a range of leisure activities (and an option to upgrade cover for more dangerous ones)". The footer includes "we work with..." and the AXA logo.

The badge is for the Allianz CO<sub>2</sub>-neutral und effizient award. It features the Allianz logo at the top, followed by the text "CO<sub>2</sub>-neutral und effizient" and "Ausstoß unter 140 g CO<sub>2</sub>/km". The year "2008" is prominently displayed in large blue numbers. At the bottom, it says "In Kooperation mit dem WWF" and includes the WWF logo.

# Emerging Risk: Liability



Oil spill following Hurricane Katrina - *LIFE*



# Directors & Officers Insurance

**Swiss Re:** “The Letter”

**Zurich:** D&O Side A coverage extension

**Liberty Mutual:** D&O Side A coverage extension

- Pollution defense-cost coverage
- Defense-cost coverage for global warming-related misrepresentations; and
- Defense-cost coverage associated with formal administrative or regulatory investigative proceedings



E.g. Native Village of Kivalina v. ExxonMobil Corp.

# ***Political risk insurance for carbon credits***

**Zurich:** coverage extension for carbon-credit projects, covering:

- Political risks and, in certain cases, the credit risks associated with operating in emerging markets
- Risk of a host government's actions that prevent an investor from receiving benefits associated with emission credits
- Political violence events, incl. war and terrorism, that disrupt operations



# ***Carbon offset delivery securitization***

- **Zurich:** CER/VER delivery securitization - Target buyer is a multi-lateral or multi-national bank
- **Swiss Re:** Kyoto-CDM risk insurance
- **Munich Re:** similar

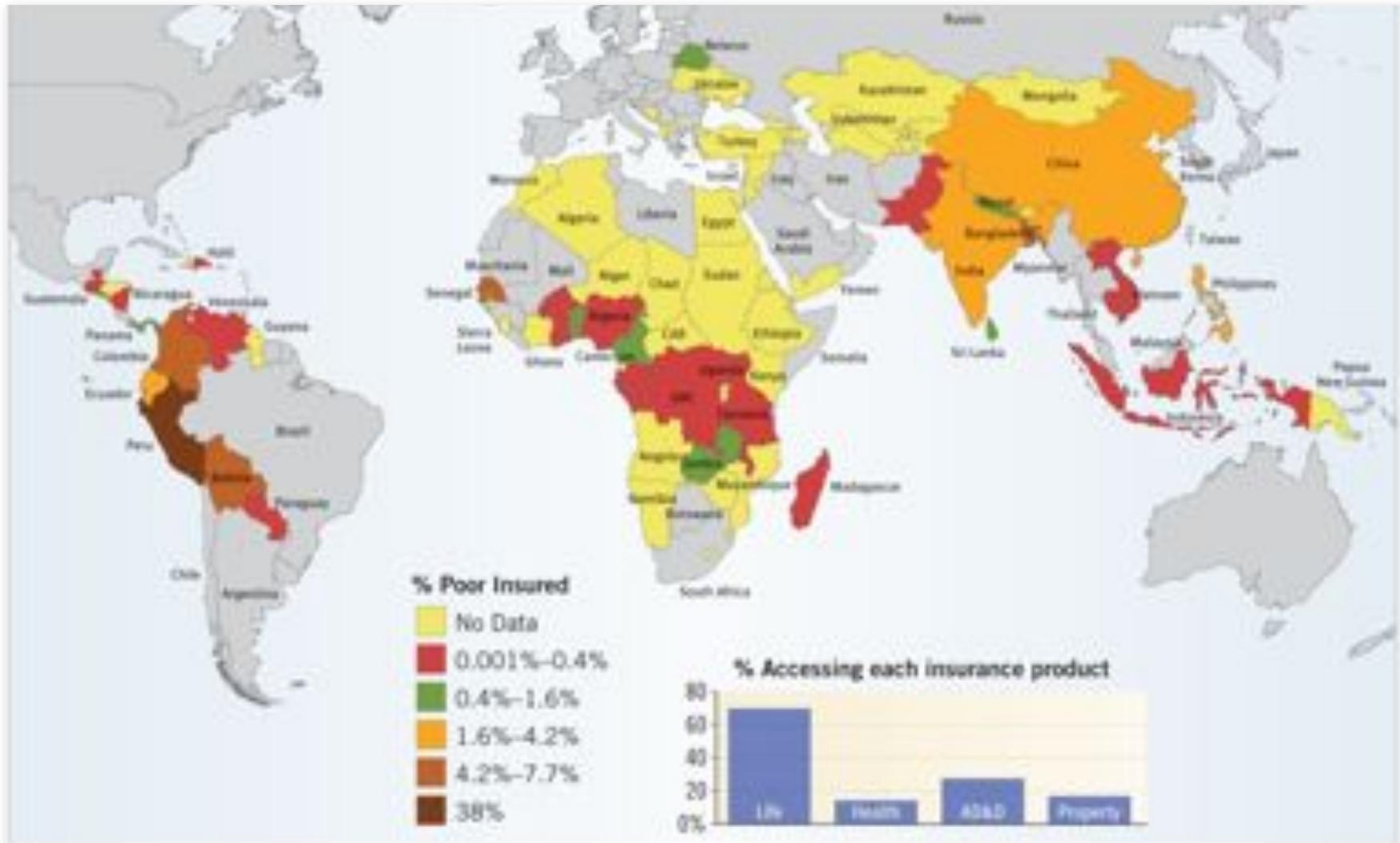


# ***Industrial Energy Efficiency Incentives***

**Allianz/FFIC** Premium reductions of up to 5% via pricing credits or dividends on Workers Compensation, Property and General Liability coverages for manufacturers with sustainable processes or products, e.g.:

- Lean manufacturing - reducing material use and energy costs while also improving housekeeping reduces slips and fall injuries.
- Reductions in the use of flammable liquids - reduces carbon footprint since most flammables are petroleum based - also improves property safety and public/employee safety
- Newer, more energy efficient machinery - runs cooler (fewer fires) and has superior machine guarding (fewer injuries)

# Microinsurance



Source: Microinsurance Centre, 2008

- **Swiss Re:** Drought/Crop micro-insurance for 400,000 farmers in Ethiopia, Ghana, Kenya, Malawi, Mali, Nigeria, Rwanda, Senegal, Tanzania and Uganda.



# Carbon Risk-Management Services: Offsets

- **Insurance Australia Group:** offering on-line automobile carbon-offset service for customers



The screenshot shows the landing page for Climate Help. At the top, there are four navigation buttons: 'Calculate your CO<sub>2</sub>', 'Offset your emissions', 'Take our survey', and 'Play the game'. The main content area is split into two columns. The left column has a green header 'Climate Help' and a list of links: 'Climate change', 'Going carbon neutral', 'What we're doing', 'How you can help', 'FAQ', and 'Contact'. The right column has a headline 'Don't underestimate the effects of climate change.' followed by a paragraph about climate change events and a paragraph about the Climate Help program. Below the text is a 3D illustration of a road with a car emitting CO<sub>2</sub> and a forest of trees. A 'Next >' button is at the bottom right. The NRMA Insurance logo is at the bottom left.

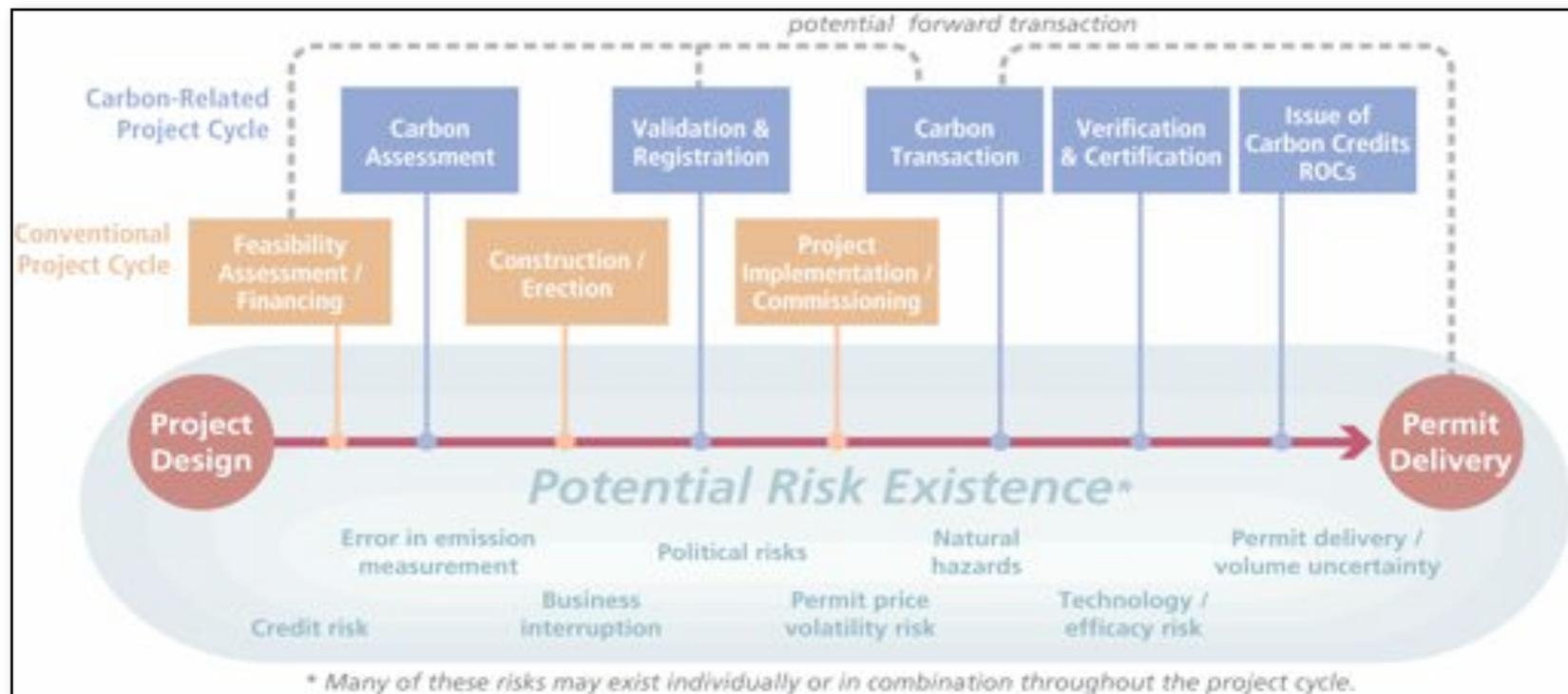


The screenshot shows the payment page for Climate Help. The header is green with the NRMA Insurance logo and 'Climate Help Pay for your emissions'. A 'Back to Climate Help' link is in the top right. The main text explains that paying for emissions is simple and that a certificate will be sent. Below this is a 'Calculate your CO<sub>2</sub>' section with a dropdown for car type (set to 'Small'), a dropdown for annual driving distance (set to 'Between 10,000 kms and 15,000 kms per year'), and a result: 'Your car emits 2.1 tonnes of CO<sub>2</sub> emissions annually'. It shows that to offset for 12 months, the user needs to pay \$32.93. A note states it costs \$15.68 to offset one tonne of CO<sub>2</sub>. The 'Pay for your emissions' section has a form with fields for Title (Mr), First name, Surname, Email, and Age (18-24 years). It also has checkboxes for 'Are you an NRMA Insurance customer?' and 'Are you an IAG staff member?'. Below that are fields for Name on credit card, Credit card number, Expiry Date (01 / 00), and Credit Card Type (Please select). A note says 'We do not accept AMEX or Diners Club'. At the bottom, it says 'You are paying \$32.93' and has a 'Next >' button. The footer contains copyright information and a disclaimer.

Source: <http://www.climatehelp.com.au/>

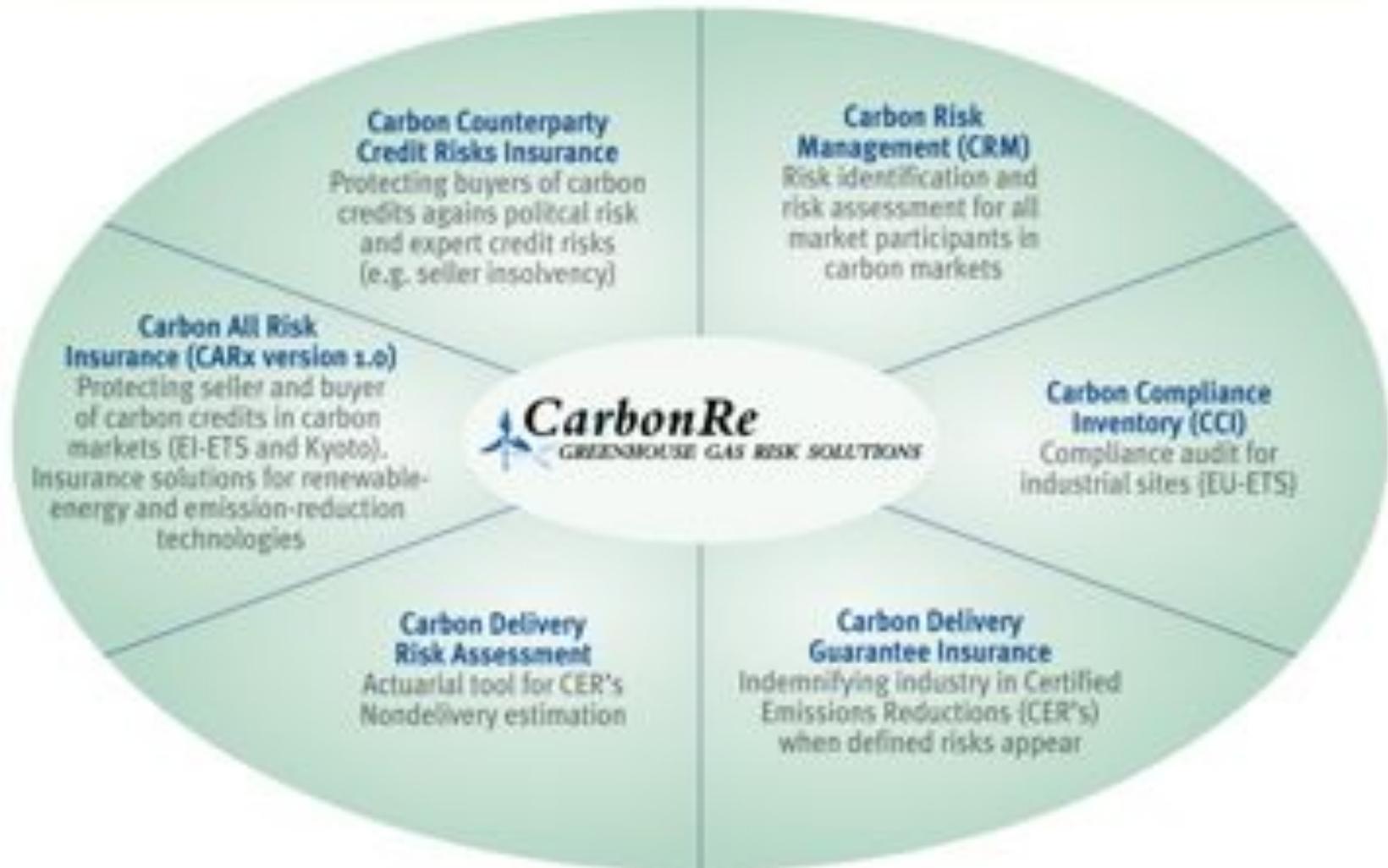
# Carbon Risk-Management Services: Project Risk

- **AIG, Marsh, Zurich, others:** offering carbon project risk-management consulting services; benchmarking, and insurance



Source: Marsh. 2004. "Responding to Climate Change Risks and Opportunities"

# Example of Insurer Carbon Risk Management Offerings



# Building Awareness & Participating in Public Policy

- ***American Insurance Association:*** endorses public transportation; reduced speed limits; telecommuting based on win-win benefits to insurers
- ***Insurance Institute for Highway Safety:*** supports tightened CAFE standards
- ***Firemen's Fund, IBHS, ICLR:*** have endorsed energy-efficient building codes



# Building Awareness & Participating in Public Policy

- ClimateWise announced Sept 17, 2007 -- 41 insurers and trade allies pledged to lead the way in:
  - “Analysing and reducing risks
  - Support climate awareness amongst our customers;
  - Incorporate climate change into our investment strategies
  - Inform and engage in public policy debate
  - And reduce the environmental impact of our businesses.”

Source: <http://www.climatewise.org.uk/>



Additional signatories as of 11 June 2008: ACE, Amlin, ARK, Beazley, BIBA, Caitlin, Chaucer, Diagonal Underwriting, Equity Group, Hardy's Underwriting, Heritage, Hiscox, Legal & General, Marketform, Navigators, NFU Mutual, Prudential, QBE European Operations, RJ Kiln, RMS, Spectrum, Standard Life, UNUM, XL



"We are committed to a pathway that will slow, stop and reverse the growth of U.S. emissions while expanding the U.S. economy"

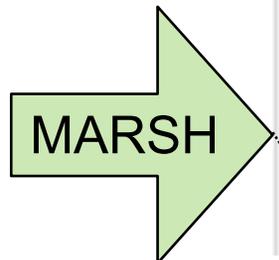
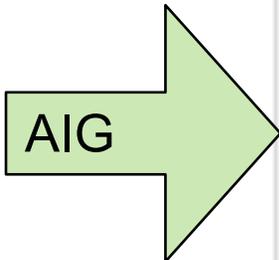
- Home
- About Us
- Policy Statements
- FAQs
- Newsroom
- Background Materials

### Welcome to the U.S. Climate Action Partnership (USCAP) Web Site

United States Climate Action Partnership (USCAP) is a group of businesses and leading environmental organizations that have come together to call on the federal government to quickly enact strong national legislation to require significant reductions of greenhouse gas emissions. USCAP has issued a landmark set of principles and recommendations to underscore the urgent need for a policy framework on climate change. [More...](#)

#### USCAP Members Include:

- Alcan Inc.
- Alcoa
- American International Group, Inc. (AIG)
- Boston Scientific Corporation
- BP America Inc.
- Caterpillar Inc.
- Chrysler LLC
- ConocoPhillips
- Deere & Company
- The Dow Chemical Company
- Duke Energy
- DuPont
- Environmental Defense
- Exelon Corporation
- Ford Motor Company
- FPL Group, Inc.
- General Electric
- General Motors Corp.
- Johnson & Johnson
- Marsh, Inc.



### Our Report: A Call for Action

Our solutions-based report, titled *A Call for Action* (PDF - 1.18 MB), is the result of a year-long collaboration. It lays out a blueprint for a mandatory economy-wide, market-driven approach to climate protection.



### Our Six Principles

- 1 Account for the global dimensions of climate change;
- 2 Create incentives for technology innovation;
- 3 Be environmentally effective;
- 4 Create economic opportunity and advantage;
- 5 Be fair to sectors disproportionately impacted; and
- 6 Reward early action.

### What's New

January 8, 2008 - Top Five Socially Responsible Investing News Stories of 2007 - Socialw@sh.com reports that USCAP was a key catalyst in the business community in pushing climate change to the forefront in 2007.

January 2, 2008 - Top Corporate Social Responsibility News of 2007 - CSRWire reports about USCAP's role as a leader in the business community on this issue.

December 10, 2007 - USCAP Event at UN Climate Change Conference in Bali (PDF - 943 KB)

October 23, 2007 - U.S. Climate Action Partnership

# Funding Innovation

- **Progressive** \$10-million “X-Prize” for Ultra-fuel-efficient cars

The image shows a screenshot of the Progressive Automotive X-Prize website. At the top, the logo reads "PROGRESSIVE AUTOMOTIVE X-PRIZE" with "X-PRIZE" in a large, stylized font. To the right, it says "sponsored by PROGRESSIVE" and includes a search bar. Below the logo is a navigation menu with links for "Prize Details", "Blog", "Community", "Take Action", "News & Events", and "About". A main banner features the text: "Imagine a world where super-efficient cars are desirable, affordable and everywhere... where gasoline no longer makes history, but is history...". The banner image shows a timeline of cars from 1890 to 2010, with a modern car in the foreground. Below the banner is a blue bar with the text "Revolution Through Competition." and a "TAKE ACTION" button. The main content area is divided into three columns. The left column contains a quote from Glenn Renwick, CEO of Progressive, and "RSS Feeds" for "Press Releases" and "Blog Posts". The middle column has a "WELCOME" section with a paragraph about the prize announcement and a "NEXT" section with a paragraph about the partnership with Progressive Insurance. The right column has a "TOP STORIES" section with three news items: "We're Hiring", "Tata Motors Limited Intends to Compete in Multimillion Dollar Progressive Automotive X-PRIZE" (dated May 15, 2008), and "New York City Announced as First Stage of the \$10 Million Progressive Insurance Automotive X-PRIZE Competition" (dated March 24, 2008).

PROGRESSIVE AUTOMOTIVE X-PRIZE

sponsored by PROGRESSIVE

Prize Details | Blog | Community | Take Action | News & Events | About

Imagine a world where super-efficient cars are desirable, affordable and everywhere... where gasoline no longer makes history, but is history...

1890 | 1900 | 1910 | 1920 | 1930 | 1940 | 1950 | 1960 | 1970 | 1980 | 1990 | 2000 | 2010

Revolution Through Competition. TAKE ACTION

"This competition will result in more choices of more fuel-efficient vehicles for drivers and will be a catalyst for moving this technology forward, faster."  
- Glenn Renwick  
CEO, Progressive

RSS Feeds  
Press Releases  
Blog Posts

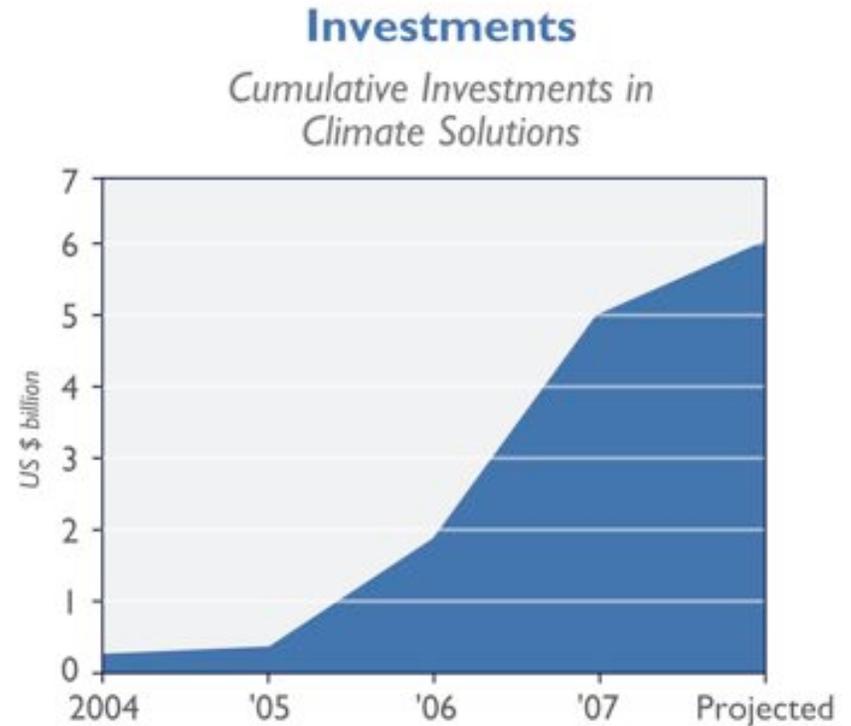
NEXT

**WELCOME**  
On March 20th at the New York International Auto Show, the X-PRIZE Foundation and Progressive Insurance jointly announced the \$10 million dollar Progressive Insurance Automotive X-PRIZE. "Let the race begin!" said X-PRIZE Chairman and CEO Dr. Peter Diamandis. Complete details [here](#).  
People love their cars. They are vital links to our jobs, our community, ourselves. For everything we love about them, cars are chained to the most severe global crises of our time: oil dependence and climate change.  
Through an exciting partnership with Progressive Insurance, the newly renamed Progressive Insurance Automotive X-PRIZE invites teams from around the world to focus on a single goal: design viable, clean and super-efficient cars that people want to buy.

**TOP STORIES**  
We're Hiring  
Tata Motors Limited Intends to Compete in Multimillion Dollar Progressive Automotive X-PRIZE  
May 15, 2008  
New York City Announced as First Stage of the \$10 Million Progressive Insurance Automotive X-PRIZE Competition  
March 24, 2008  
X-PRIZE Foundation & Progressive Insurance .join

# Direct Investment

- **Allianz:** \$15 million in the European Carbon Fund; plans to invest between \$400 and \$650 million in renewable energy
- **Gerling:** Sustainable Development Project operates a \$100 million venture capital fund
- **ING:** Green finance - \$1.16 billion
- **Sompo Japan:** \$100 million green fund
- **Swiss Re:** \$429 million “clean energy” venture fund; \$320 million in individual investments



2008 CERA study predicts \$7 trillion investment in “clean-energy technologies”.

# Direct Investment

## Prudential

### Powered by wind

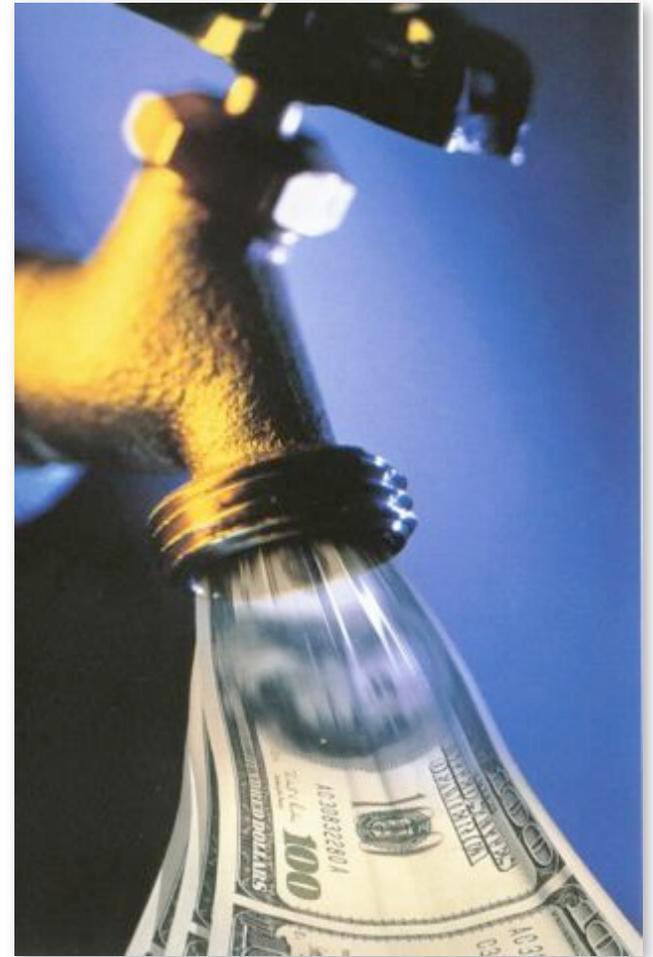
A state-by-state look at Prudential's wind-energy investments and how many homes can be powered by each

State	Capacity (Megawatts)	Households Powered*
Texas	619	185,580
Colorado	301	90,150
Washington	205	61,410
California	150	45,000
Kansas	150	45,000
New York	116	34,650
Minnesota	101	30,150
<b>TOTAL</b>	<b>1,642</b>	<b>491,940</b>

Source: Prudential website

# Financing Emissions-reduction Projects

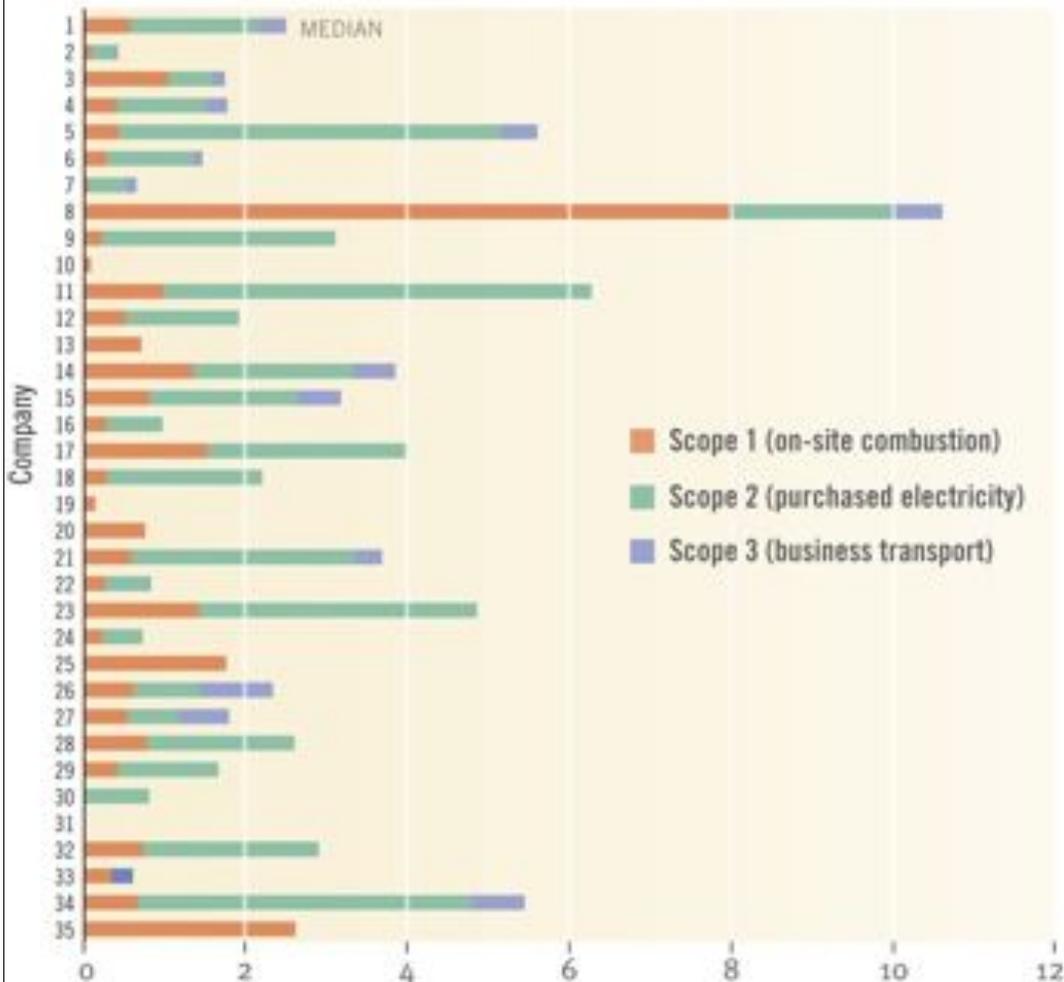
- **AIG:** \$300 million lending facility for efficiency and clean energy
- **Fortis:**
  - Preferential lending rate for energy-efficiency upgrades +10% premium discount
  - \$106 million “Green Bank” loans
- **HSBC:** \$45 million for wind projects in India
- **Mitsui Sumitomo:** Loans for building-integrated solar systems
- **TrygVesta:** \$10k financing for “climate-friendly home energy upgrades” after loss.



# Improved Governance

## *Leading by Example*

Tonnes CO2e-year / \$ million revenues



Source: Truecost and LBNL Analysis



**Carbon footprint of the world's insurers equals:**

- 12 million tons CO<sub>2</sub>/year
- 2.4 million US cars
- 4 large electric plants
- 57k train cars of coal

# Improved Governance

## Carbon-neutrality (23 companies)

- **AIG\***
- **Aviva**
- **Bradford & Bingley**
- **Folksam**
- **Fortis**
- **FP Marine**
- **HSBC**
- **Independent Insurance Services**
- **ING**
- **Insurance Australia Group**
- **Munich Re**
- **Royal & Sun Alliance**
- **Rutherford**
- **Solar Group**
- **Specialized Broking**
- **Storebrand**
- **Swiss Re**
- **Tokio Marine Nichido**
- **Xelector**



\*Conversion of marginal farmlands back to grasslands (North Dakota)



\*Improved forest management (California)



\*Reduced Agricultural fossil fuel inputs (China)



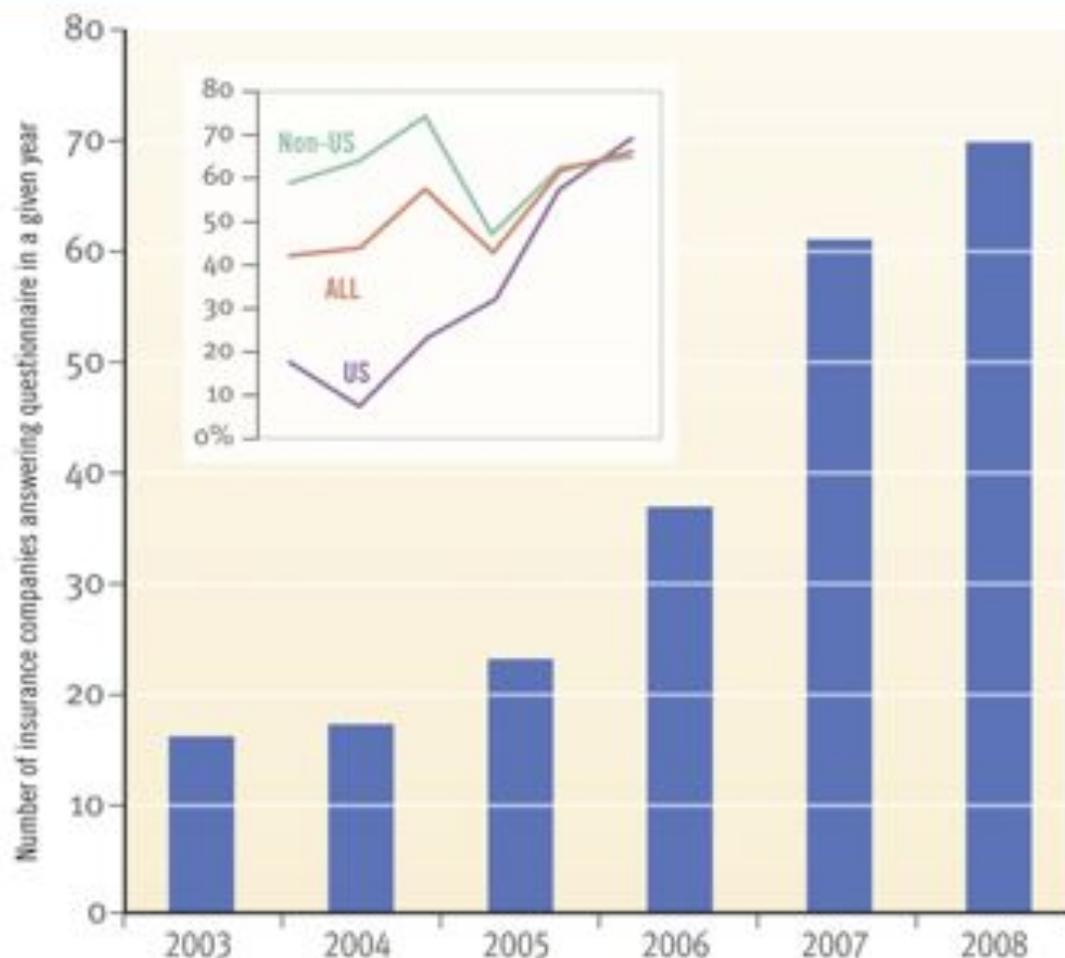
\*Biogas from waste for cooking and lighting (China)

# Improved Governance

## *Carbon-risk disclosure*

**Carbon Disclosure Project:** Annual Global Survey by Institutional Investors (\$57 Trillion under management)

**110** Insurers surveyed: 2003-2008:  
**AIG, Allstate, Aon, Chubb, Marsh, MBIA, Safeco, St. Paul Travelers, Unum Provident, Munich Re, many others...**



Source: <http://www.cdproject.net/>

# Risks & Opportunities for DNV

- **Internally Focused**

- Dynamics with emitting customers
- Emerging risks & performance of climate solutions
- Own risk retention / limits

- **Customer Focused**

- Help understand climate risks
- Provide new services for managing carbon risk
  - benchmarking or carbon-footprinting
  - climate risk modeling
  - training: operations, loss control, board coaching; disclosure
  - commissioning
- Help aggregate demand for “green” insurance

“When the winds of change blow, some  
build walls ... others build windmills.”

- *Chinese Proverb*



<http://insurance.lbl.gov>  
[emills@lbl.gov](mailto:emills@lbl.gov)

