From Risk to Opportunity:

Insurer Responses to Climate Change

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FSA Annual Insurance Sector Conference
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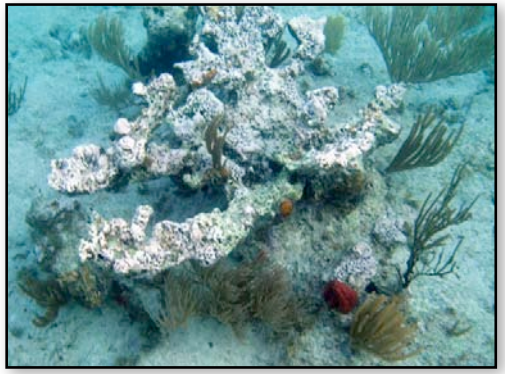
Climate Change is not Separate from “Mainstream” Issues

- Balance sheet strength & solvency
- Competitiveness
- Customer care: availability & affordability
- Need for and adequacy of disclosure
- Emerging markets
- Corporate governance
- Reputation & trust
- Modeling weaknesses;Past vs future
- Regulatory reform

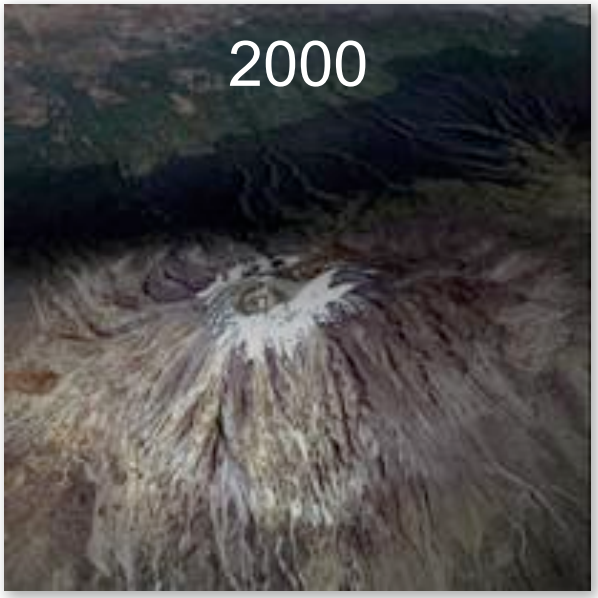
Roadmap

- State of knowledge on climate change
- Relevance for the insurance community
- Perceptions of insurers and related stakeholders
- Business opportunities
- Challenges for insurers & regulators

Caribbean: Coral Die-Off

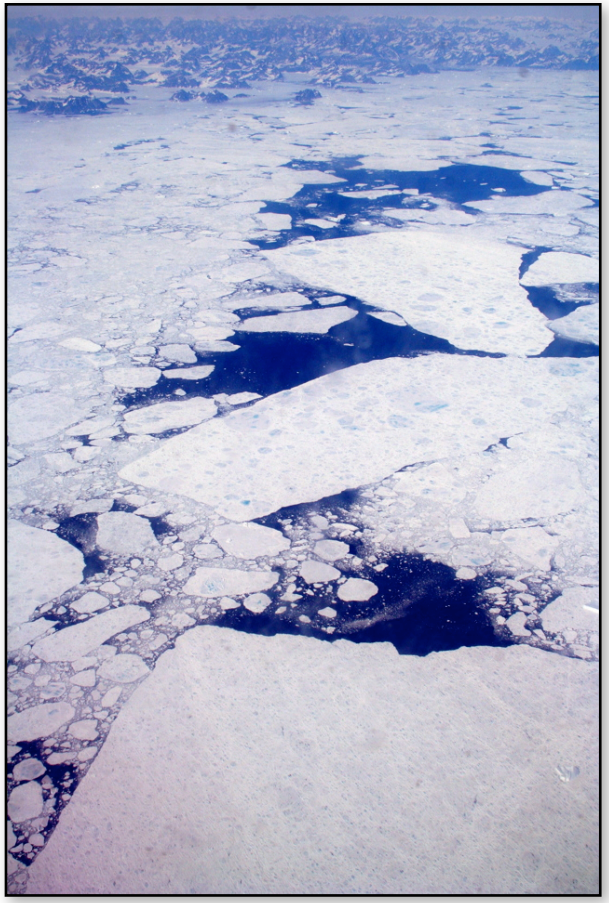


Tanzania: Drought > Blackouts



Iceland: Retreating Glaciers

Greenland: Loss of Sea Ice



California:
Beetle Super-infestation; Wildfire

The Scientific Consensus

Nobel Peace Prize: 2007

Intergovernmental Panel on Climate Change
~1500 Authors;
1000 Reviewers
Unanimously adopted by 100+ nations (including U.S.)

"Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global mean sea level."

- ***IPCC Fourth Assessment Report (2007)***

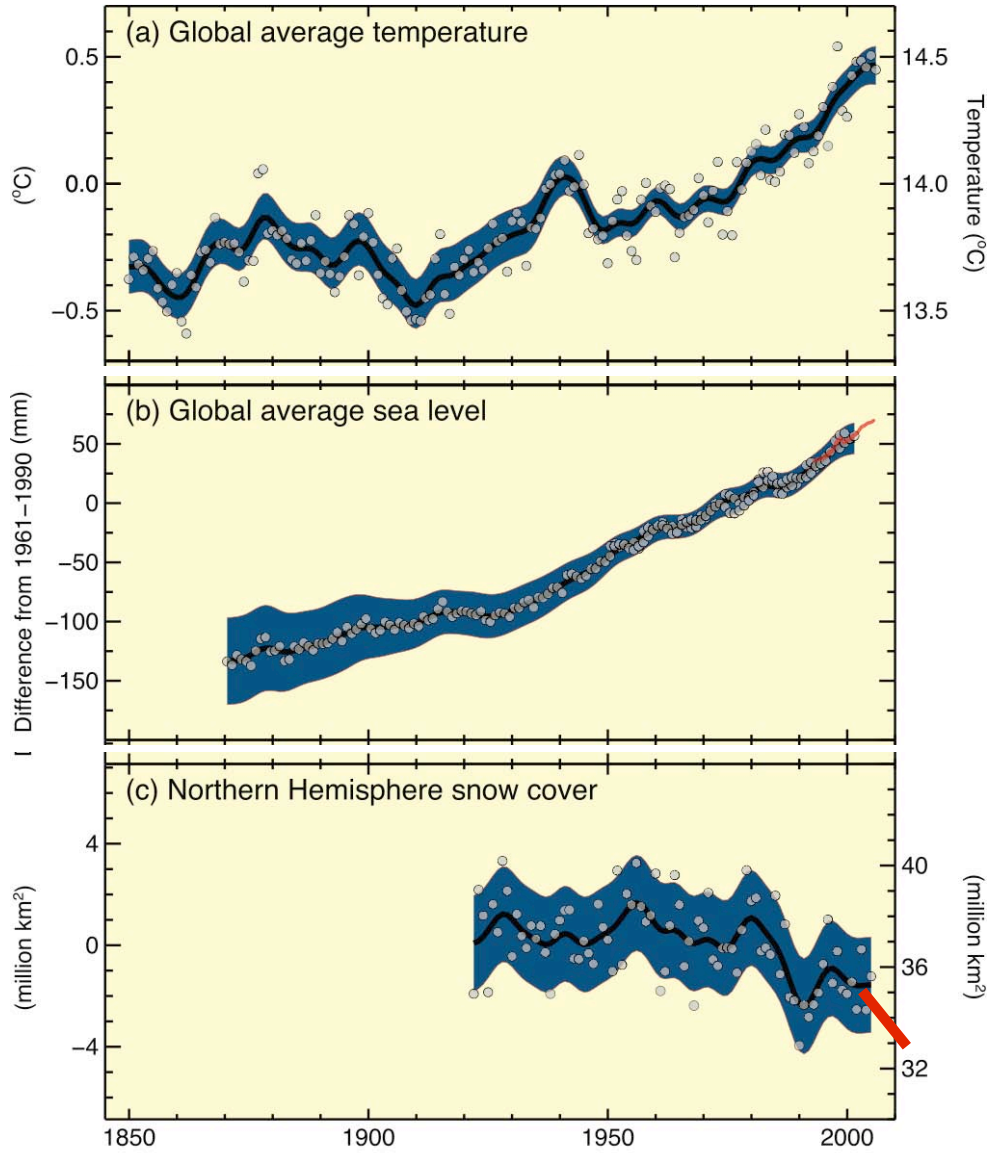
http://www.ipcc.ch

Direct Observations of Recent Climate Change: IPCC

Global average temperature (*accelerating*)

Global average sea level

Northern hemisphere snow cover (*accelerating*)



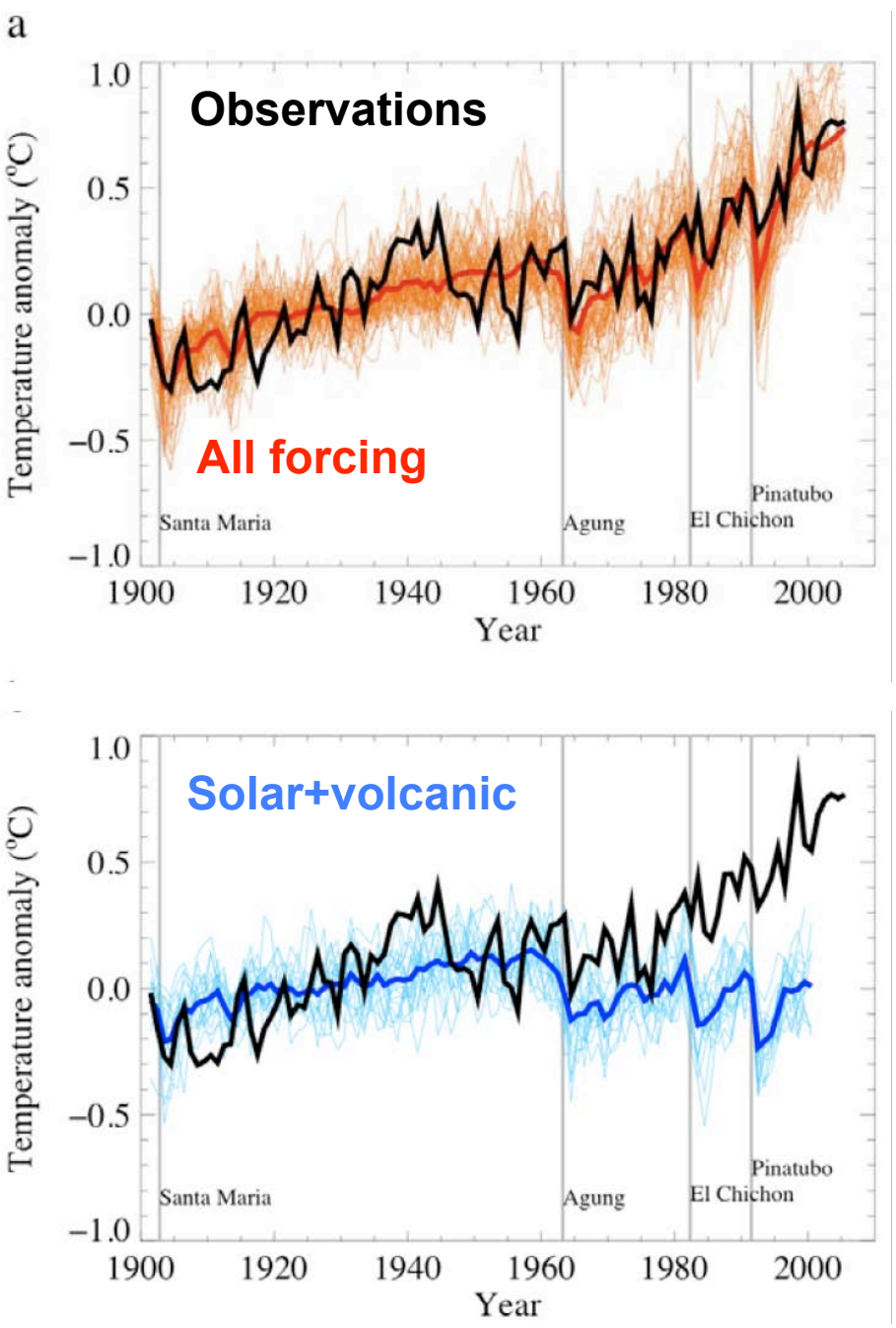
Source: IPCC 4th Assessment (2007)

Key Messages from the IPCC

1. The climate is changing (*faster* than previously expected) & uncertainties are shrinking - underestimating future impacts
2. Humans are primary cause; no validated alternate theory
3. The climate will continue to change (ocean lags)
4. Multiple impacts are *already* observable
5. Disruptive impacts are expected at 2 - 3 degrees of warming (450 ppm); postponing reductions increases cost & difficulty
6. Impacts vary materially across range of plausible warming
7. There is (considerable) hope for curbing climate change
   - Costs ~ 0.1% per year in GDP, *excl. avoided damages*
8. Solution requires emissions reductions <u>and</u> adaptation

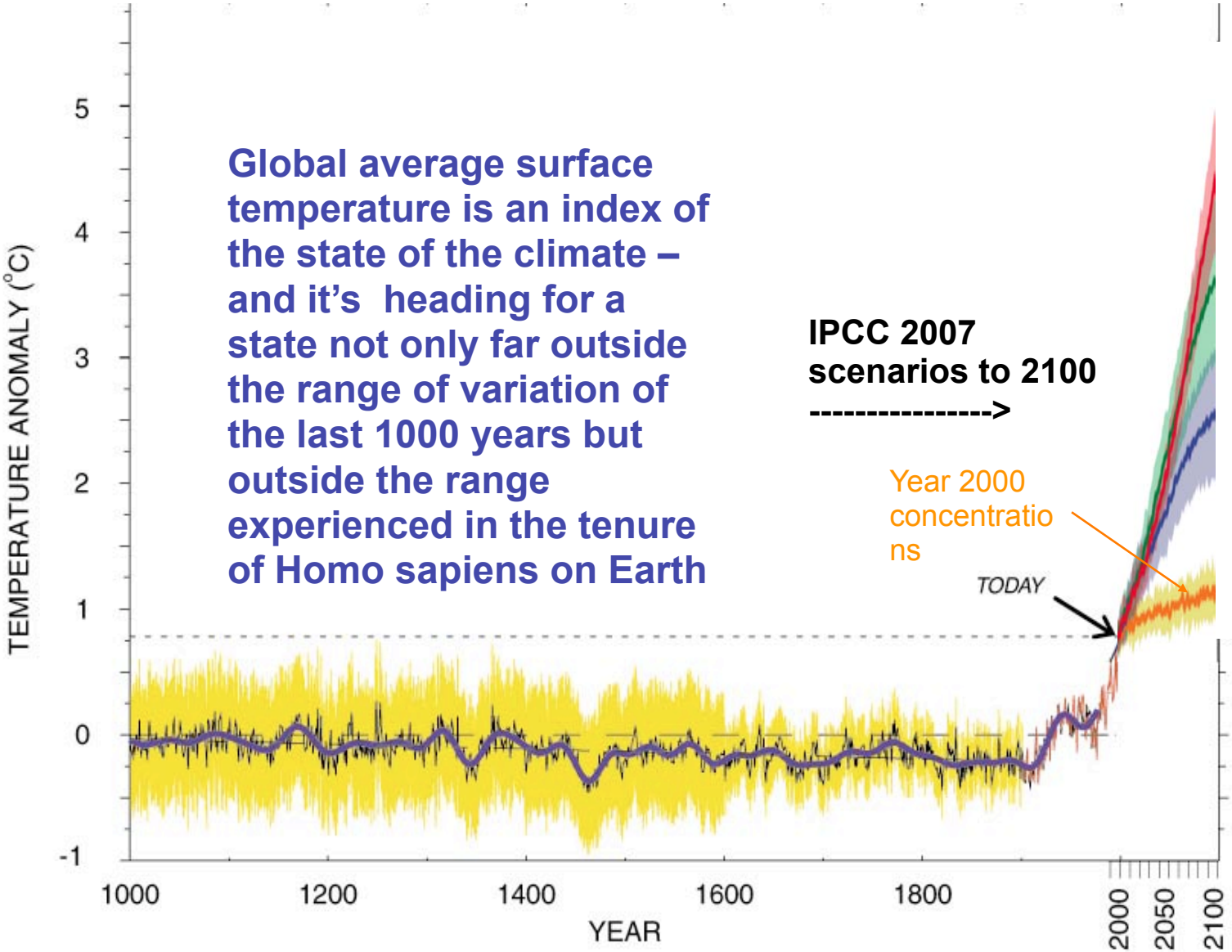
Attribution

Our models predict history very well, so we are confident in their ability to project future impacts



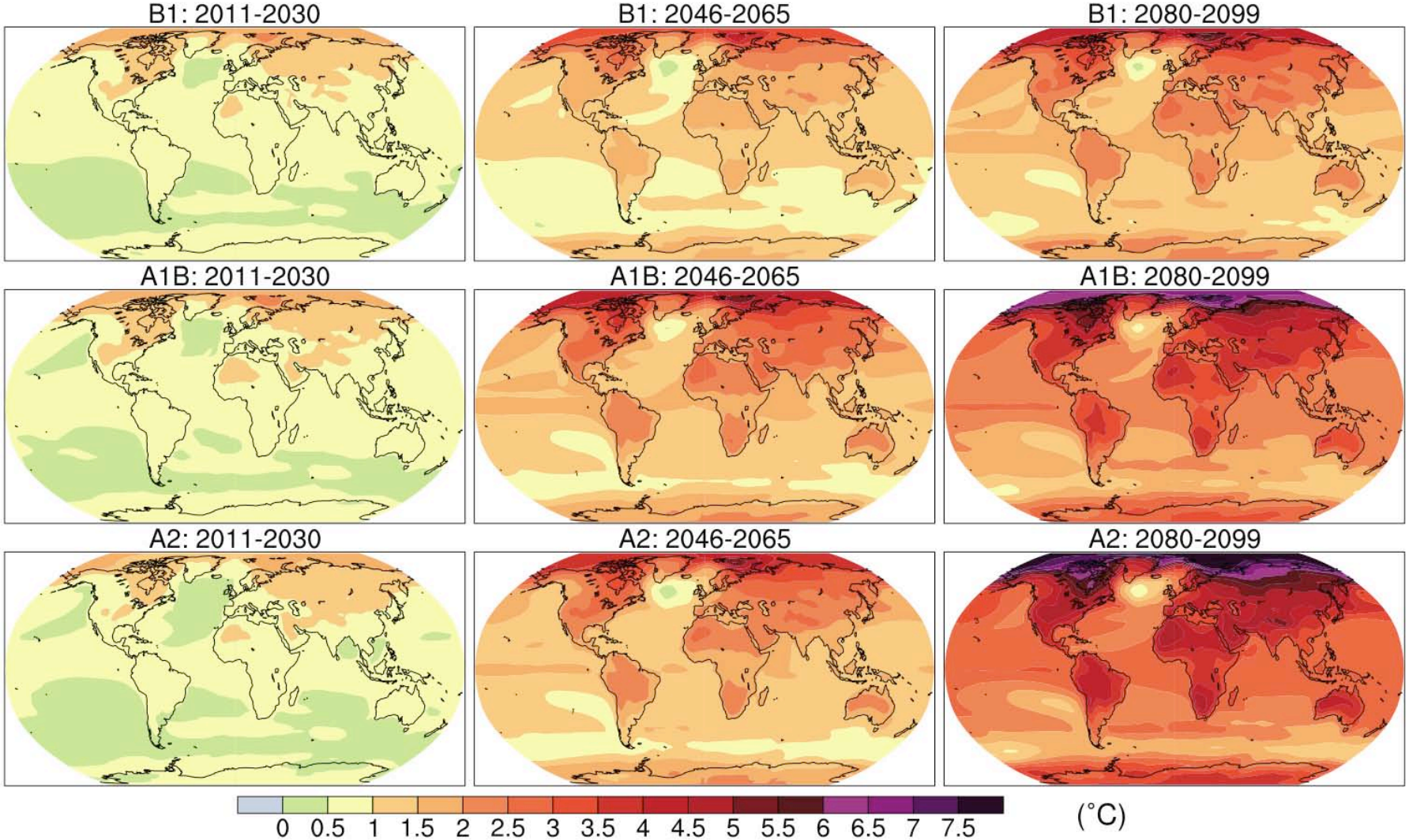
Source: IPCC 4th Assessment (2007)

If we don't alter course, we'll end up where we're headed



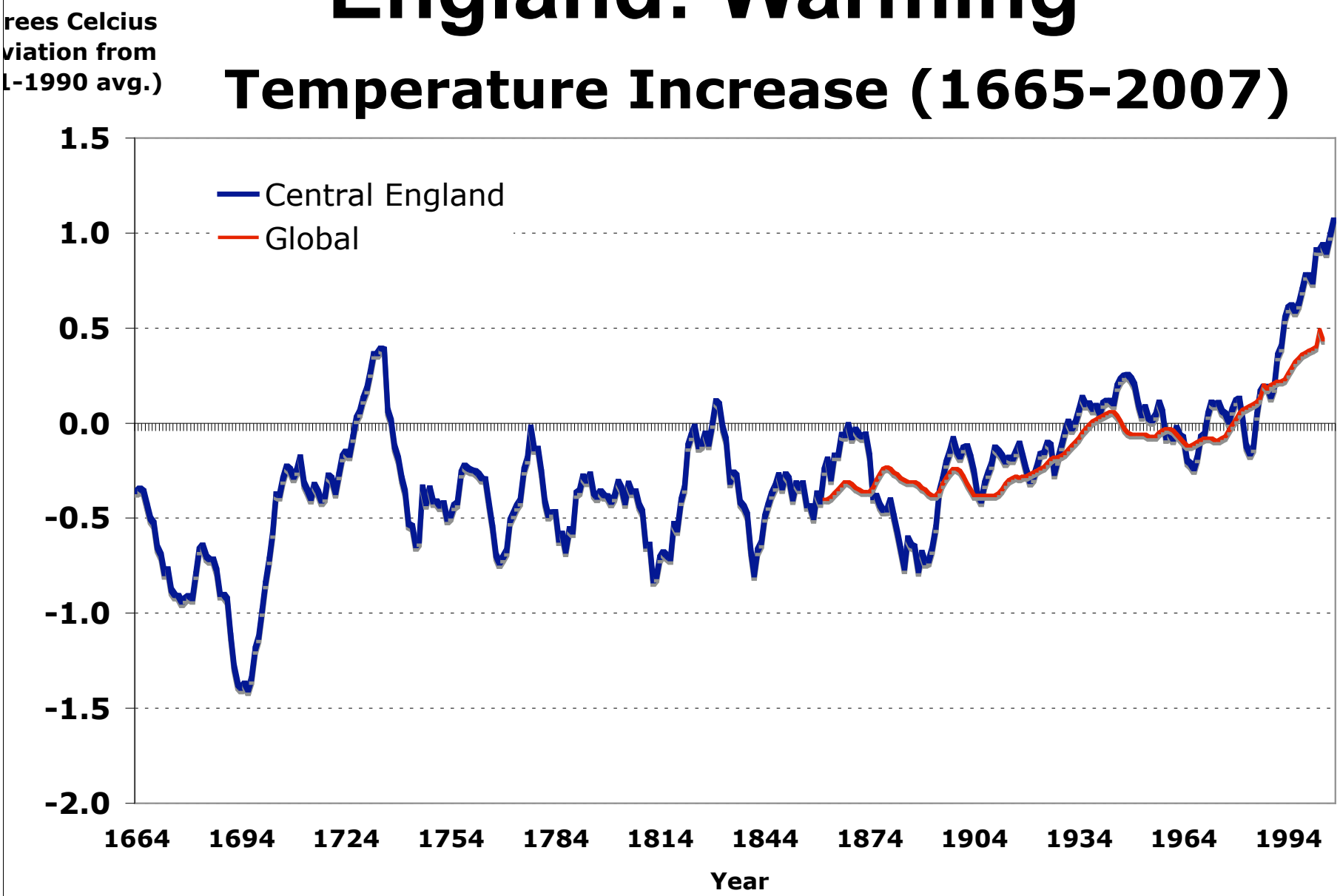
Source: John Holdren, after IPCC

Looking Forward: Range of Predicted Warming



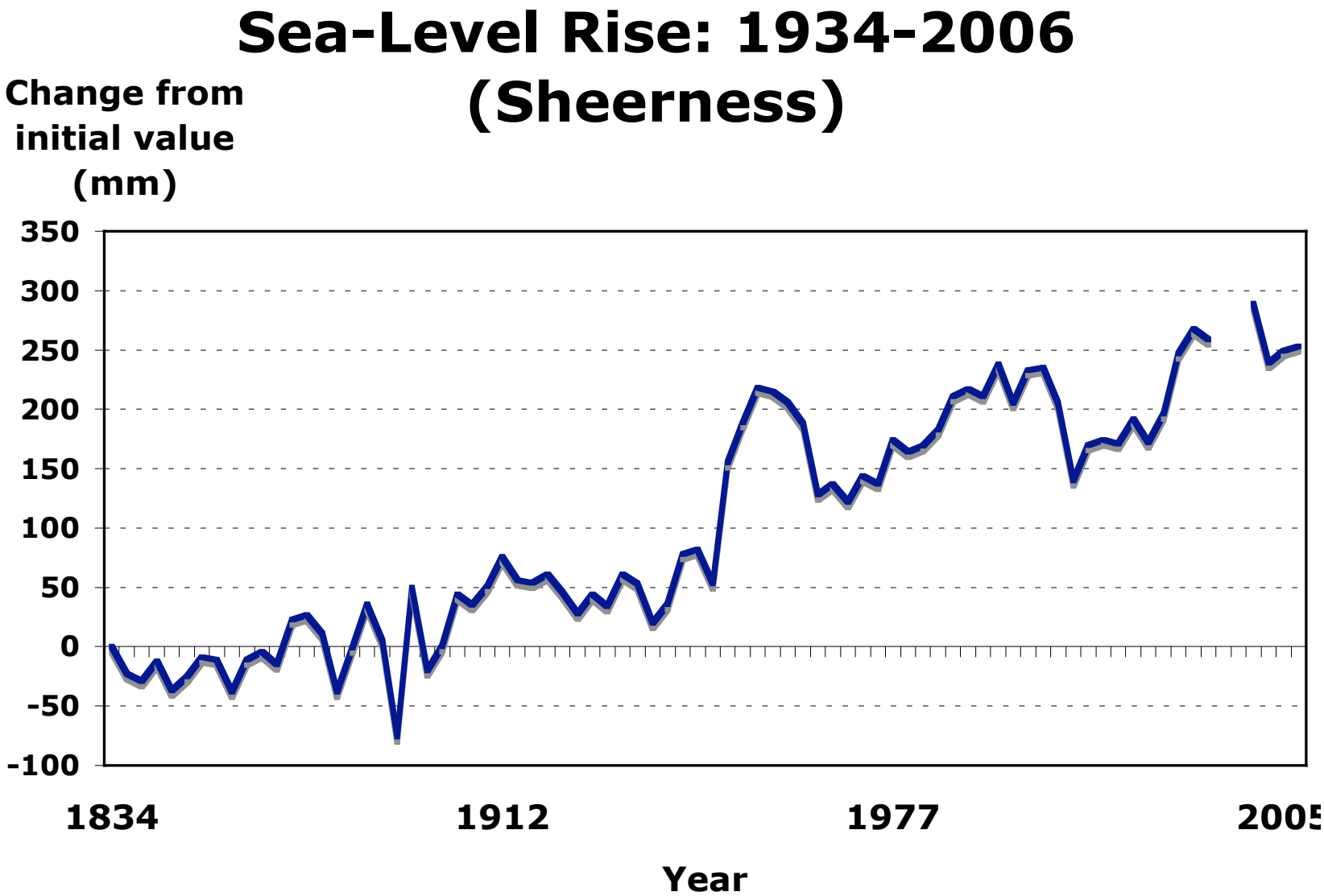
England: Warming

Temperature Increase (1665-2007)



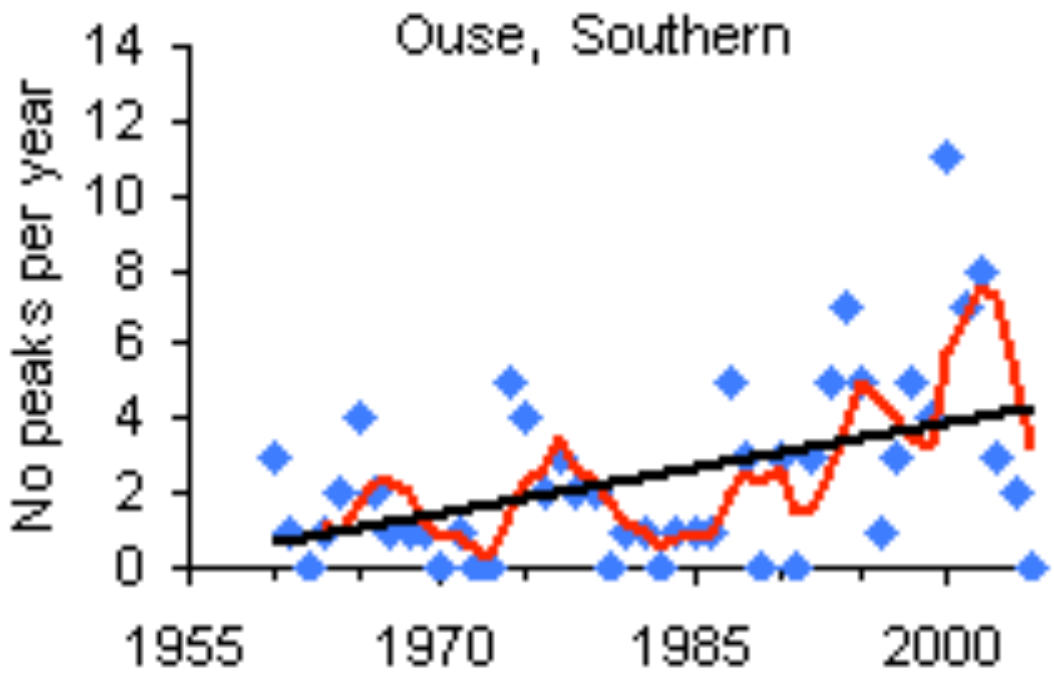
Source: Hadley Center - via UK Environment Agency

England: Sea-Level Rise



Source: UK Environment Agency

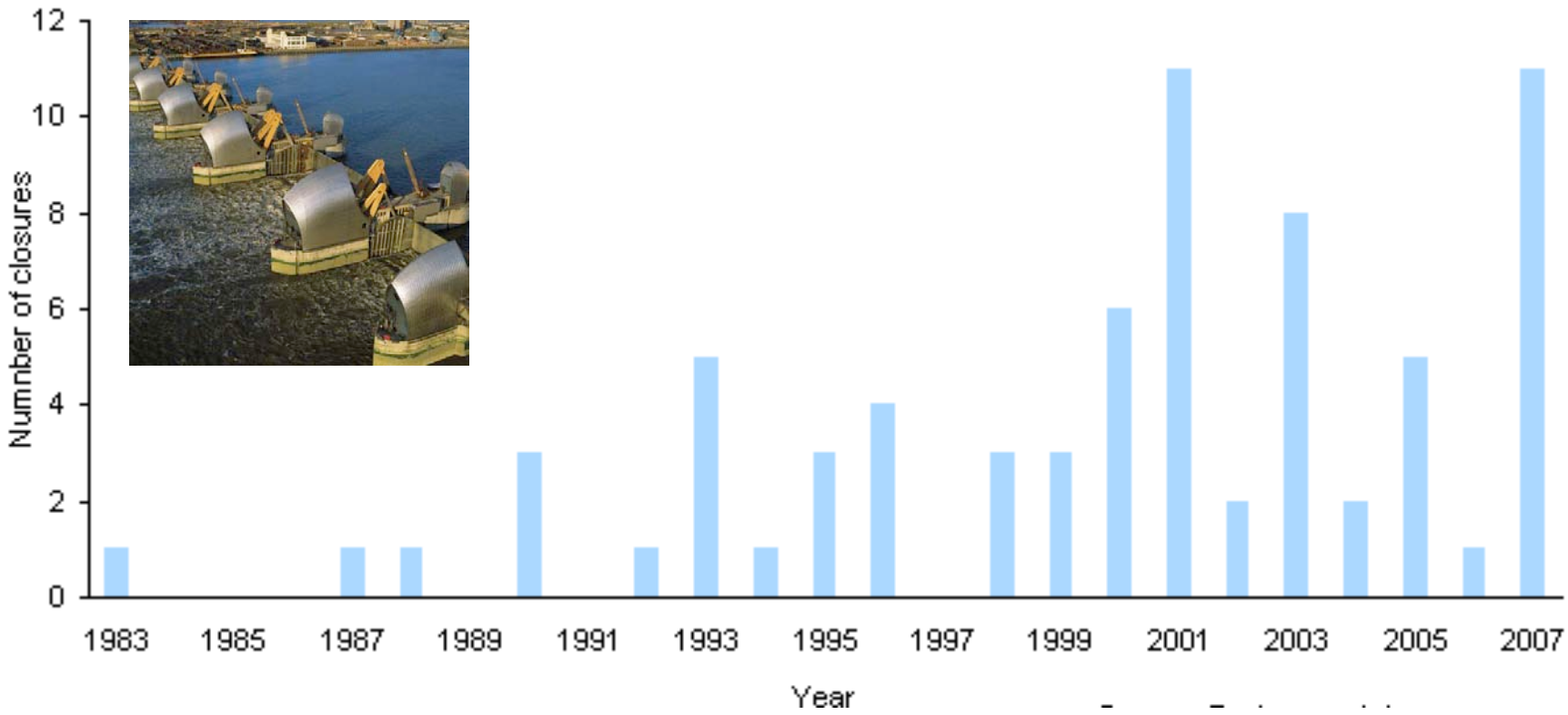
England: Flooding



Data show number of peaks compared to that exceed at least three times each year from 1981-2000 average

Source: UK Environment Agency

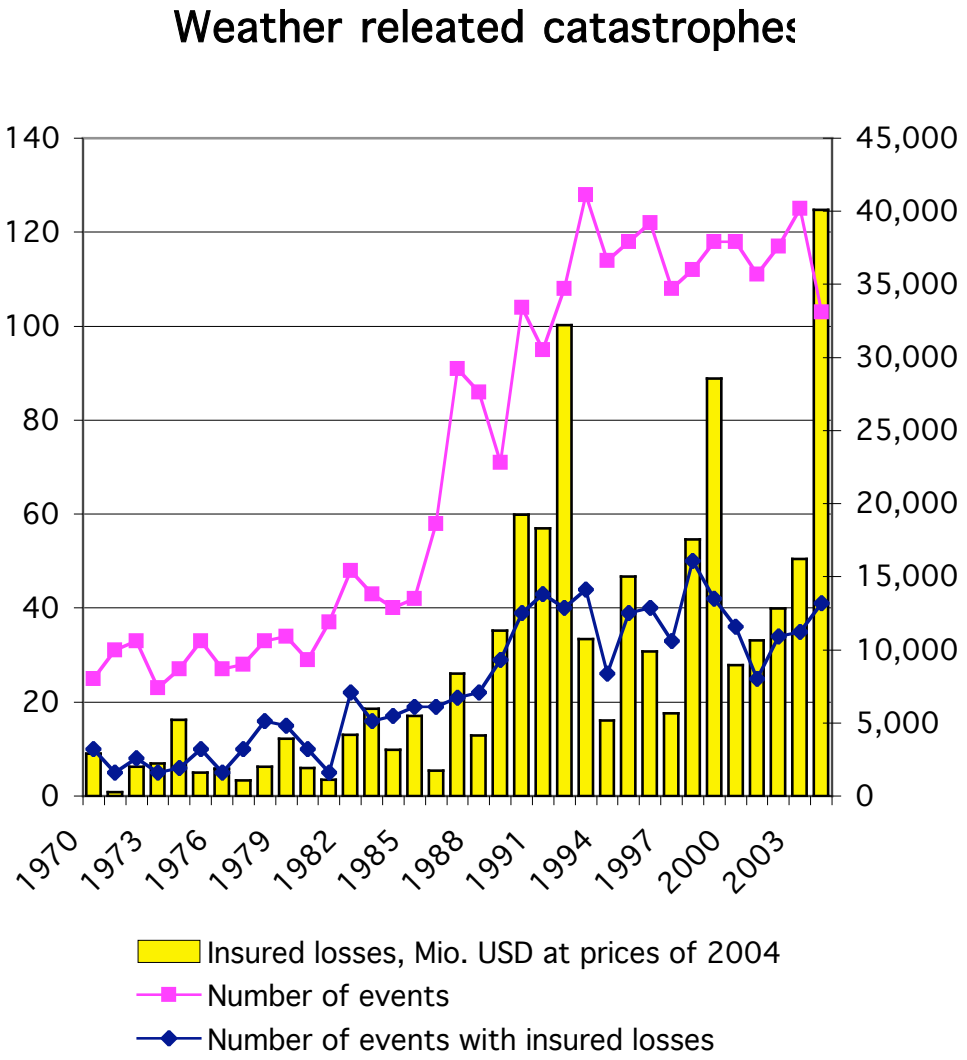
Thames Barrier Closures against Tidal Surges: 1983-2007



Source: UK Environment Agency

FINGERPRINTS ... Costs

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



Source: Swiss Re, Sigma Catastrophe Database

For Insurers, 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

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 and strategy**
8. **Securities markets**
9. **Legal risk**
10. **Geopolitical or macro-economic shocks**

Anticipated Losses

Property

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

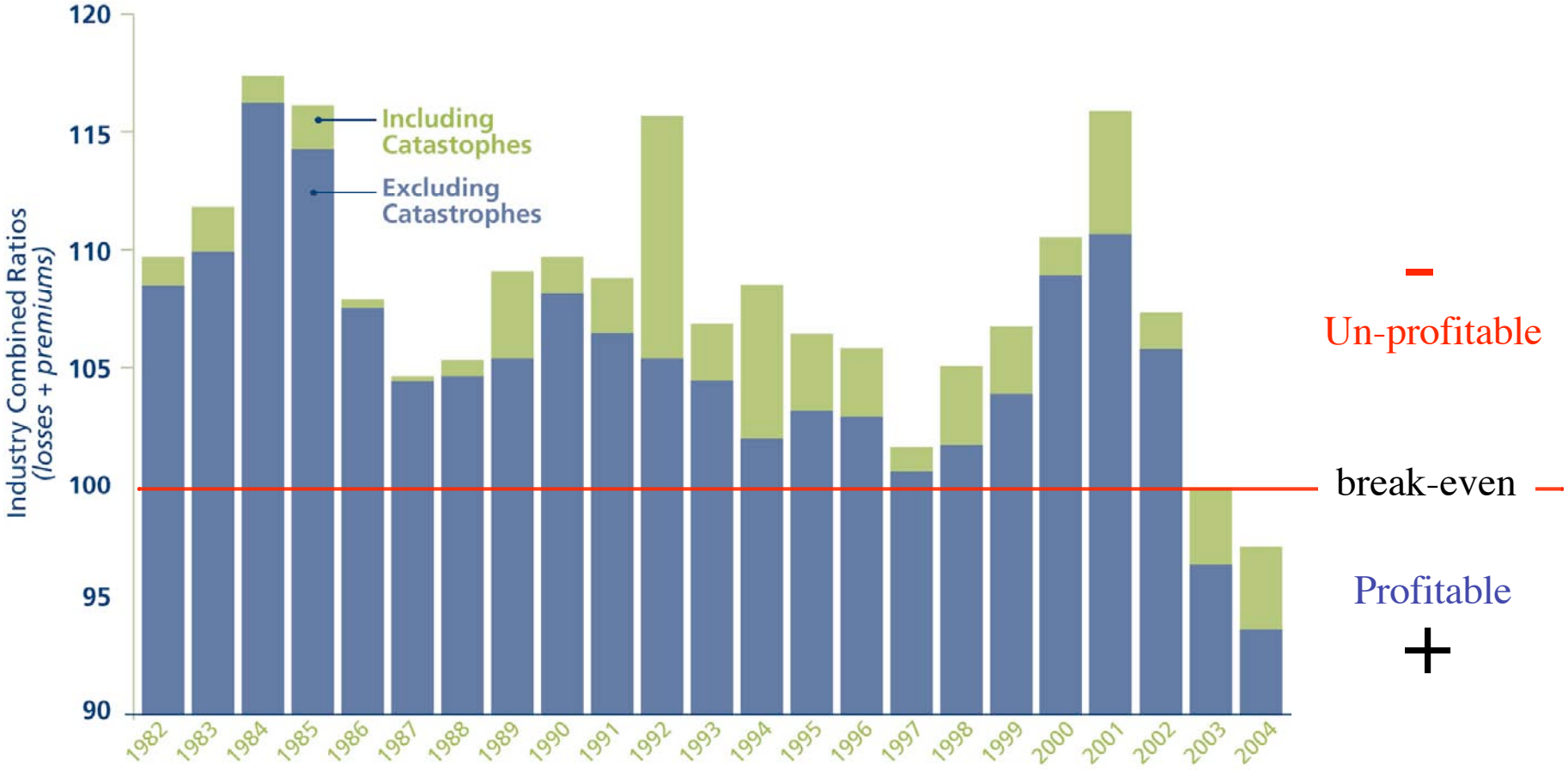
Life/Health

- Injury
- Infectious diseases
- Heat stress
- Respiratory
- Pollution release
- Food poisoning
- Mental health
- Nutrition/water

Liability (Casualty)

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

CATs Profoundly Influence Profitability (US P&C)

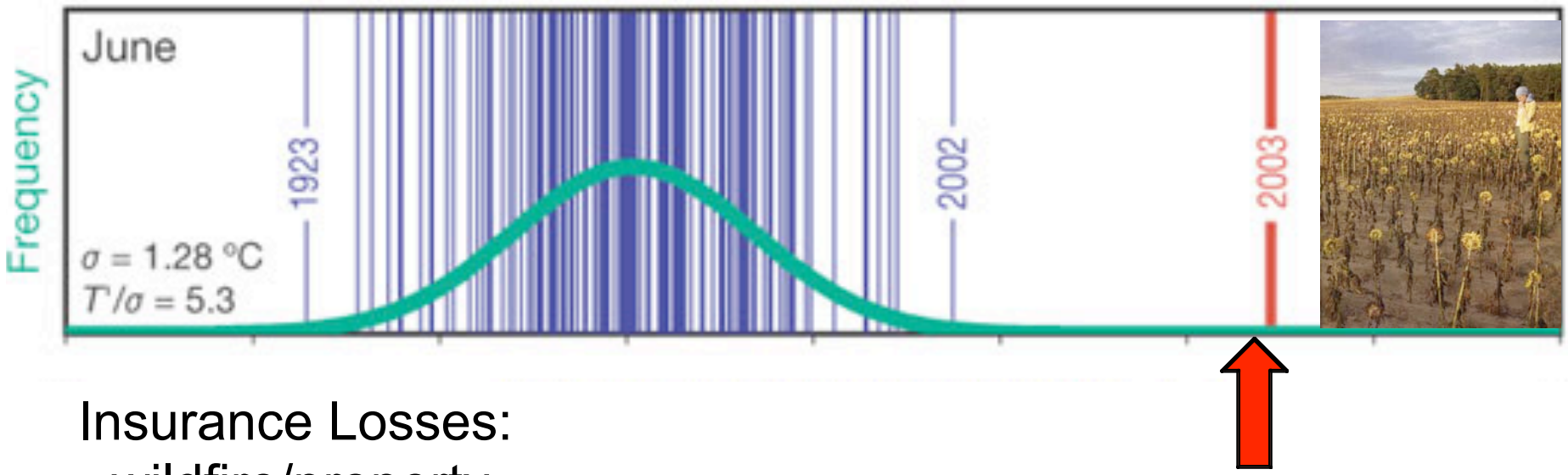


Note: CATs having increased influence on overall profitability

Source: A.M. Best & Co.

Rare Extremes Cause Most of the

The European heat wave of Summer 2003



Insurance Losses:

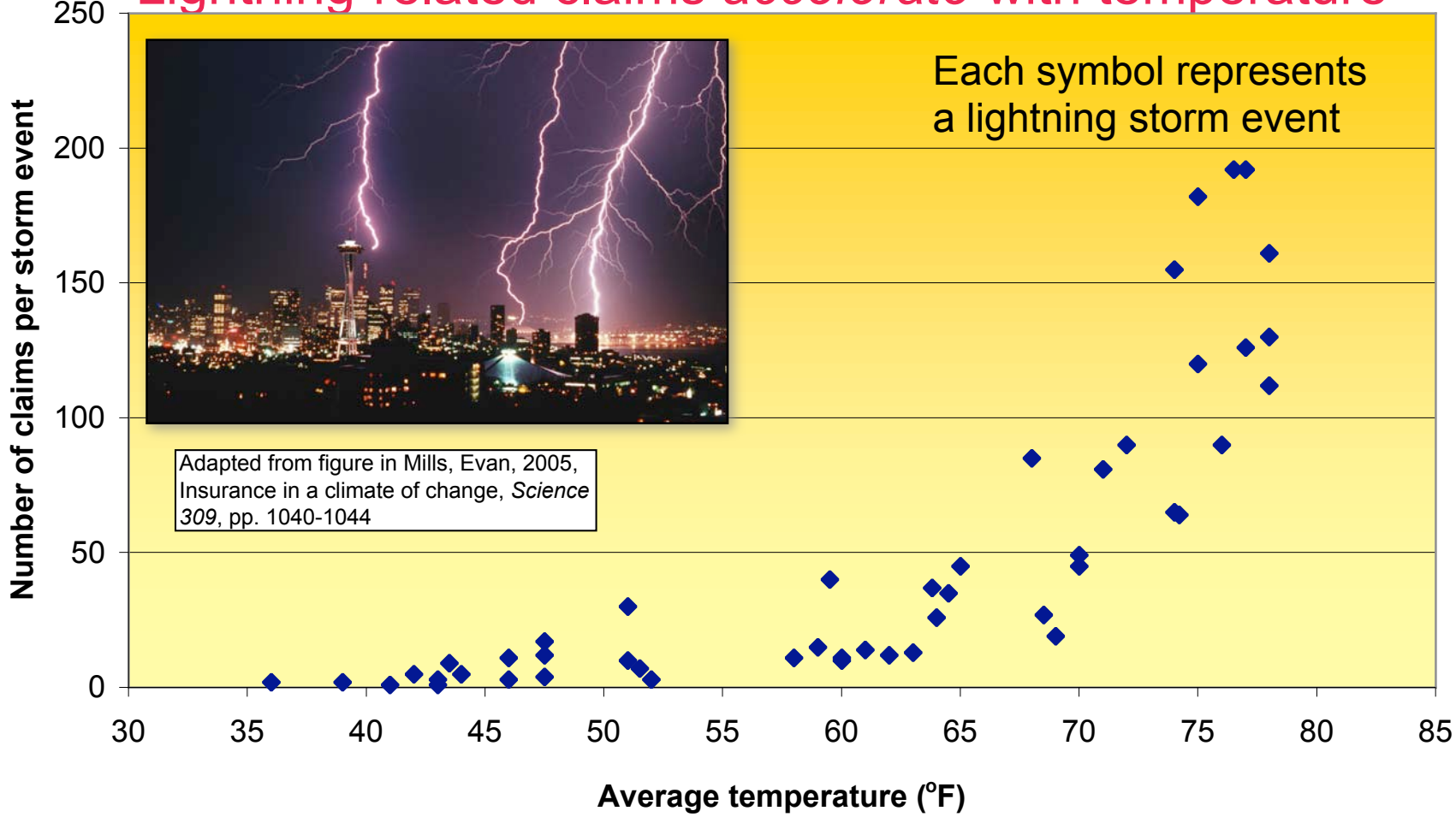
- wildfire/property
- crop
- power sales
- health/mortality

Event was "six-sigmas" outside of norm.
16ºF 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.

Small-scale Losses: Lightning

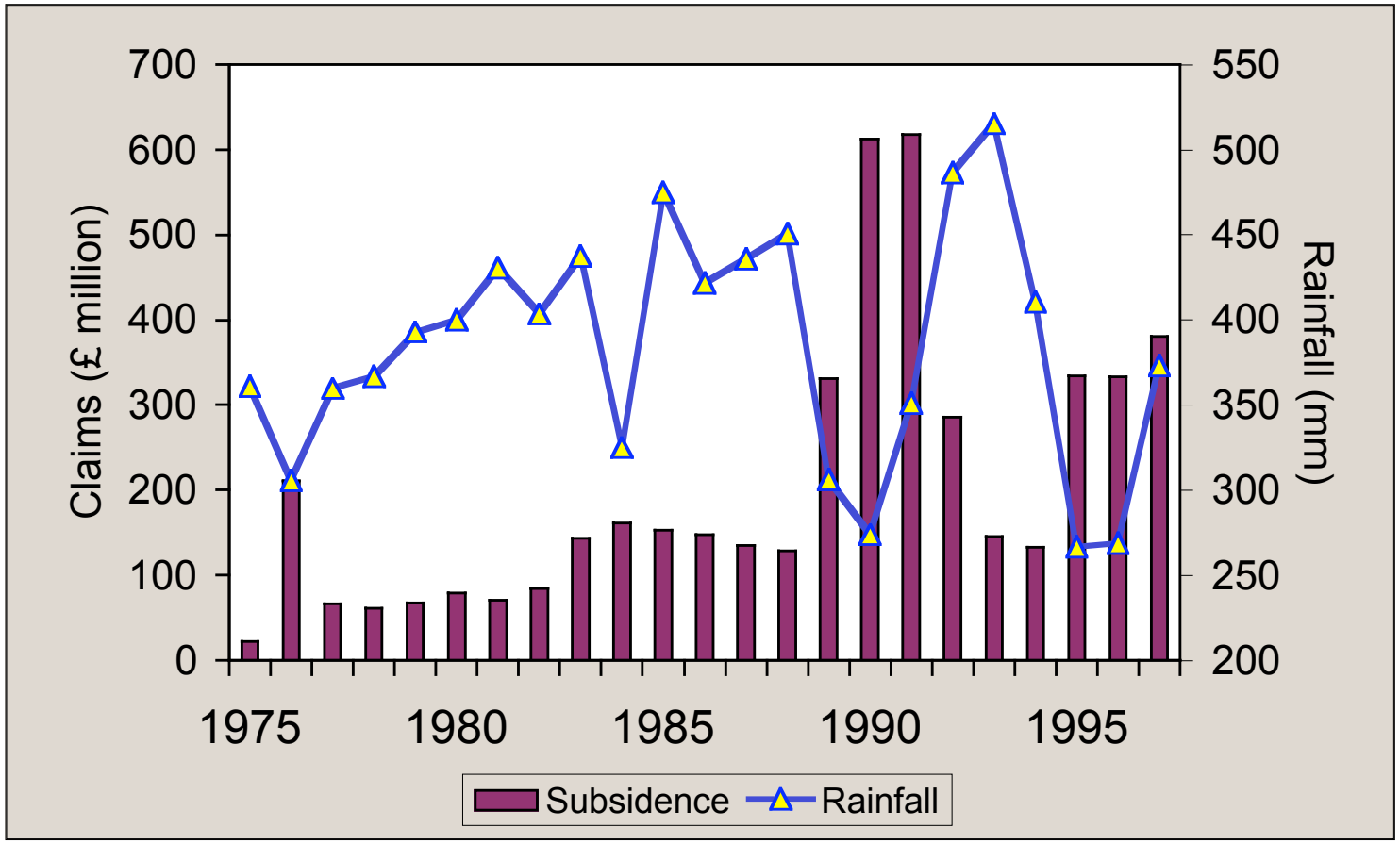
Lightning-related claims *accelerate* with temperature



Source: Hartford Steam Boiler Inspection and Insurance Co.

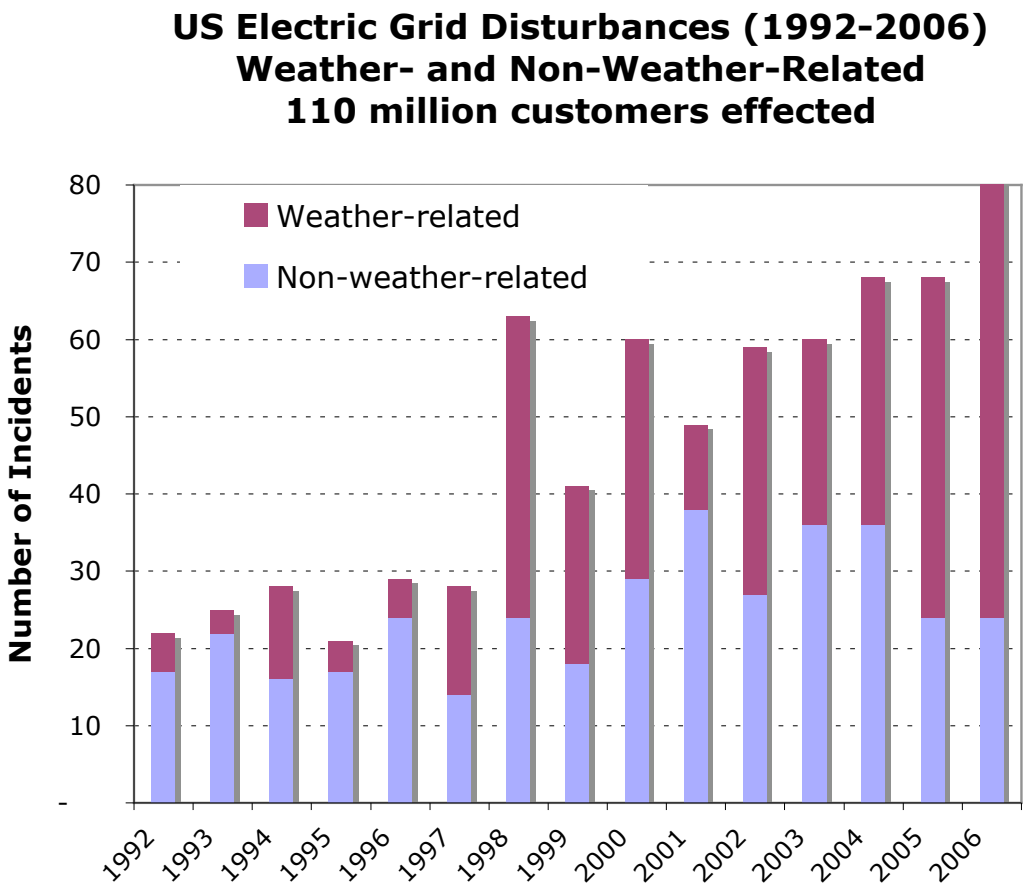
Small-scale Losses: Soil Subsidence

Subsidence claims increase with drought: UK 1975-1999



Source: Association of British Insurers

Small-scale Losses: Power Outages



Source: US Department of Energy

Power outages were a factor in slowness of draining New Orleans following Hurricane Katrina.

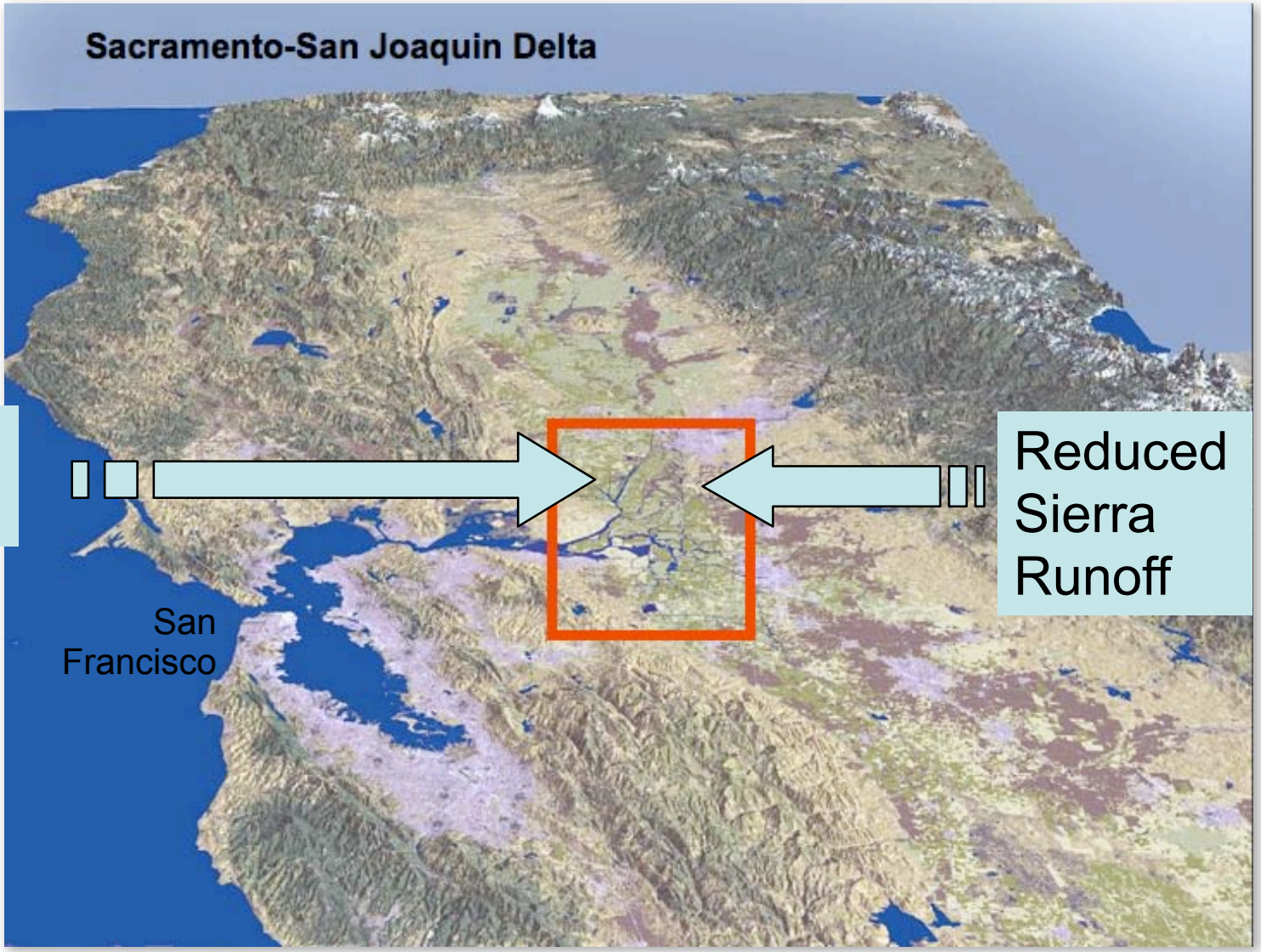
U.S. economy total cost: ~$80B/year

Average cost to utilities $49 million/ storm; max. $890 million (EEI)

RMS Scenario: $2.7B for NY

Small-scale Losses: Floating Ice

Water Quality: California

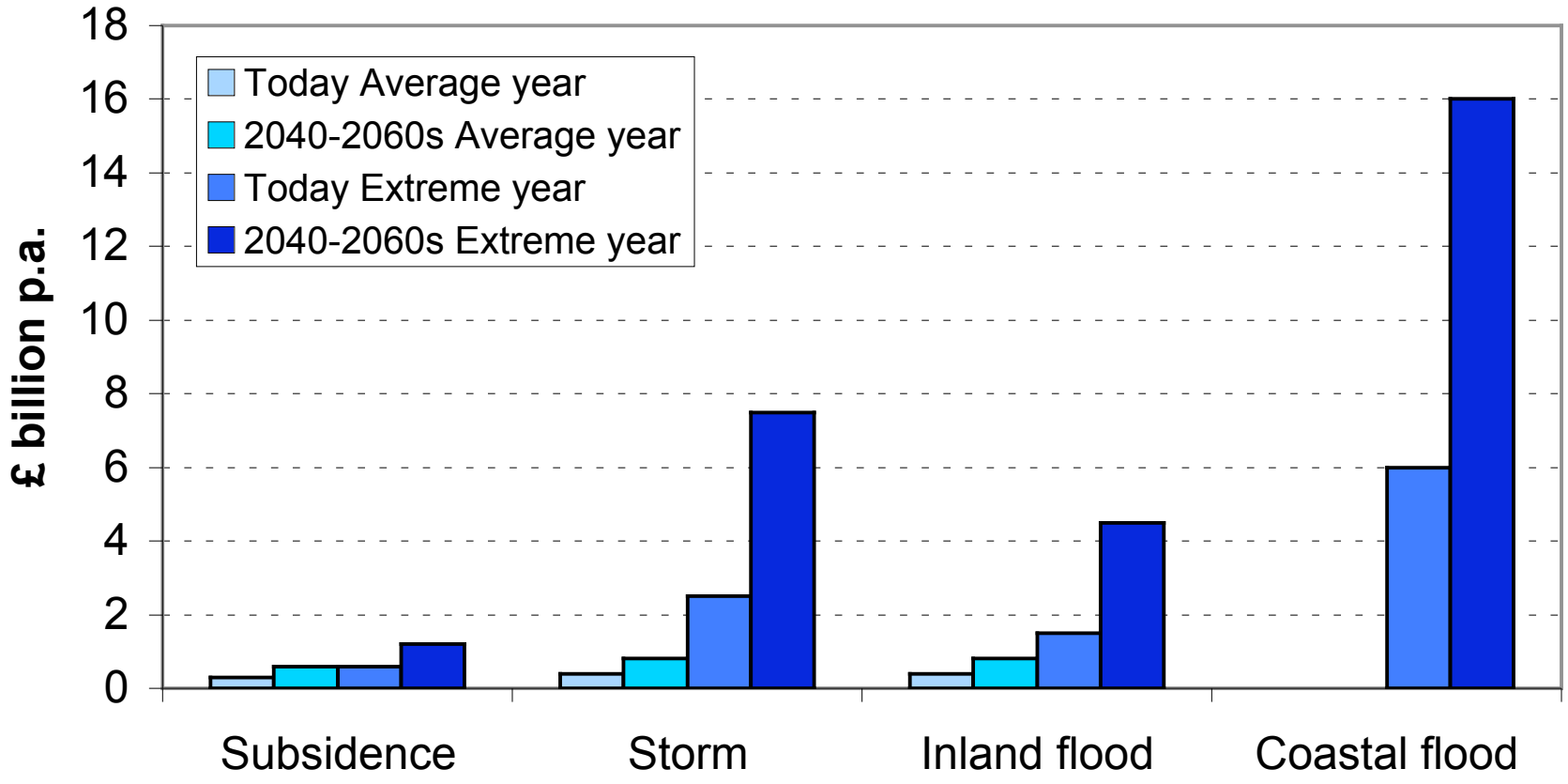


Emerging Risk: Liability

Oil spill following Hurricane Katrina

> 30 climate law suits pending as of 1/2008

Projections of UK Insured Losses



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

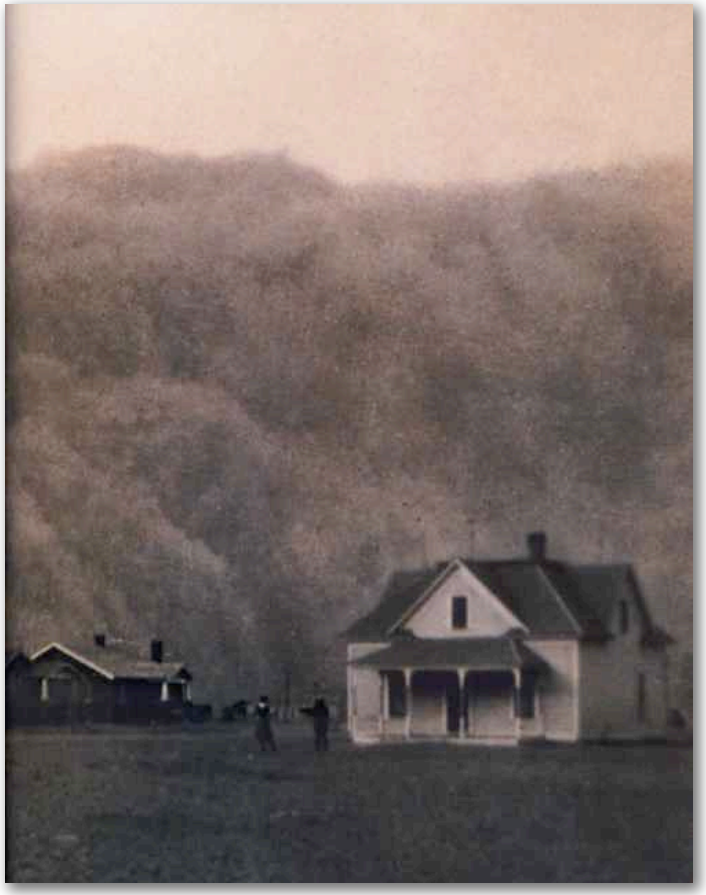
Risks Are Also Associated with Responses *to* Climate Change

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

Comparative risk assessments needed

Summary: Reasons for Concern

- Actuarial
  - variability
  - correlations
  - non-linearities
  - data “blind-spots”
  - models
- Contraction
- Competition
- Regulation
- Reputation
- Assets & share prices
- Own liability
- Macro-economy: higher energy prices, conflict ...
- ***Insurability***



“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

"Radical changes in natural catastrophe frequency and/or severity could eliminate certain of our markets through physical damage, price escalation, or regulatory activity... unpredictability could negate the use of actuarial techniques and undermine our ability to price and risk-manage product offerings."

ACE Limited response to the fifth annual Carbon Disclosure Project questionnaire

European Insurance & Reinsurance Federation

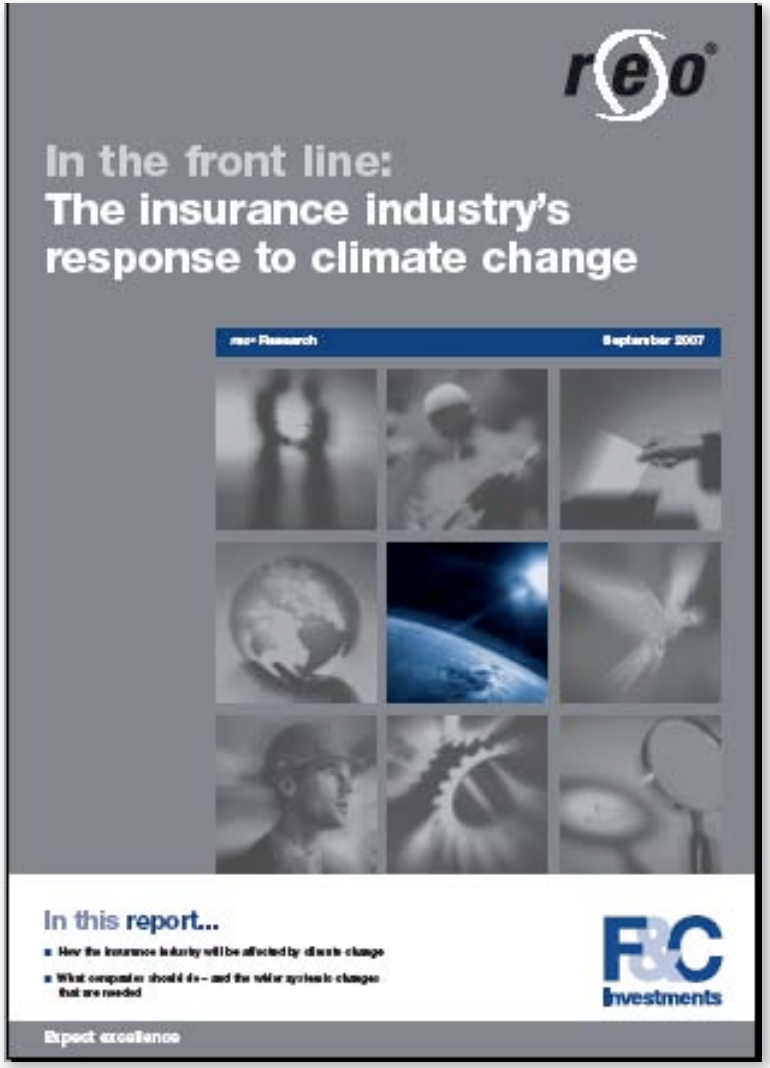
(July 2007)

- Includes 33 insurance associations, representing 94% of premiums in region

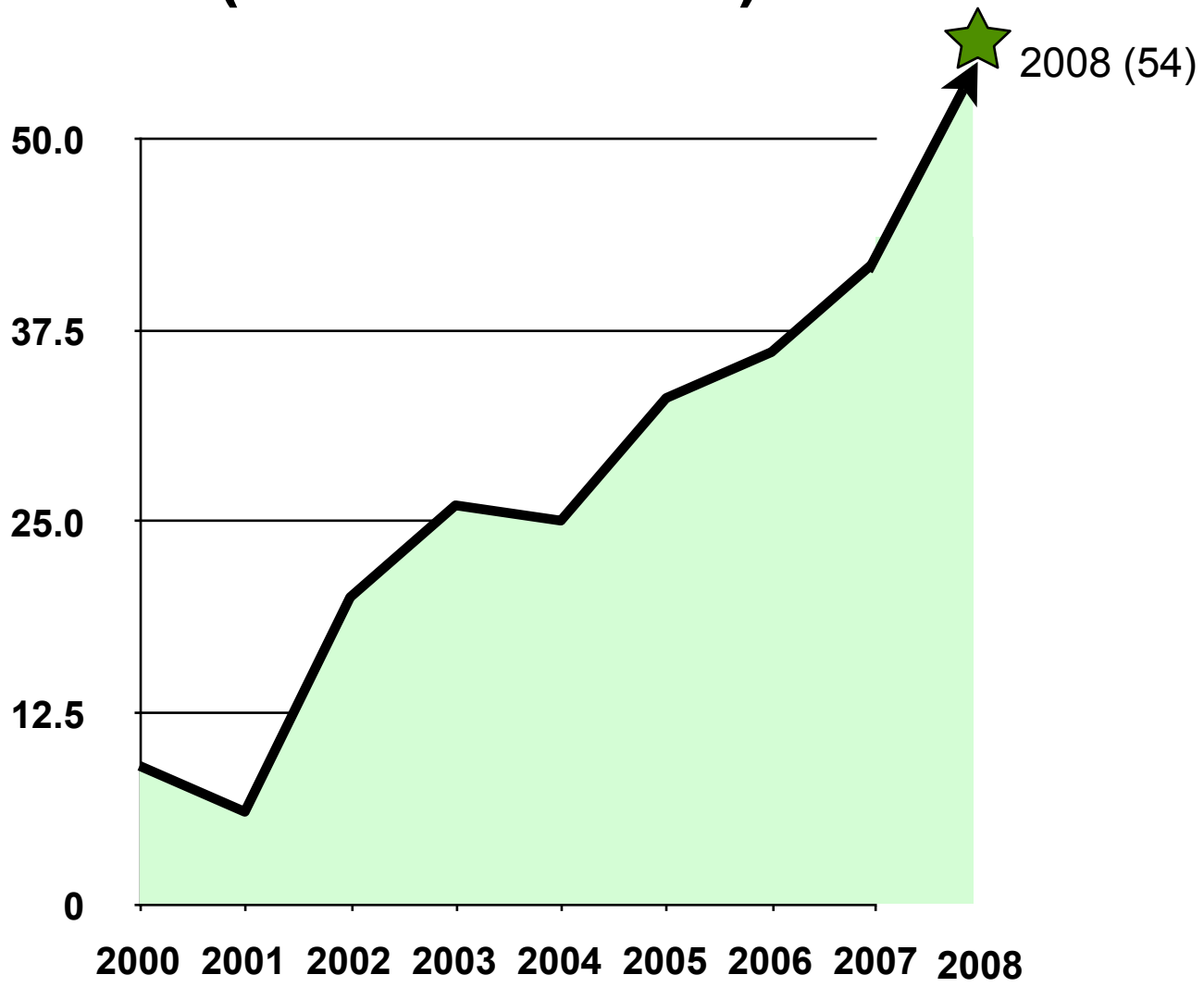
- Strong concern about climate change, and need for proactive steps

F&C Investments Statement: September 2007

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



Shareholder Climate Resolutions
(United States)



2000-2006 Data: ISS 2007
2007 Data (as of 02.06.07): Ceres 2007& 2008

Insurance Regulators (via NAIC Task Force) 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

Energy Industry Responds

"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

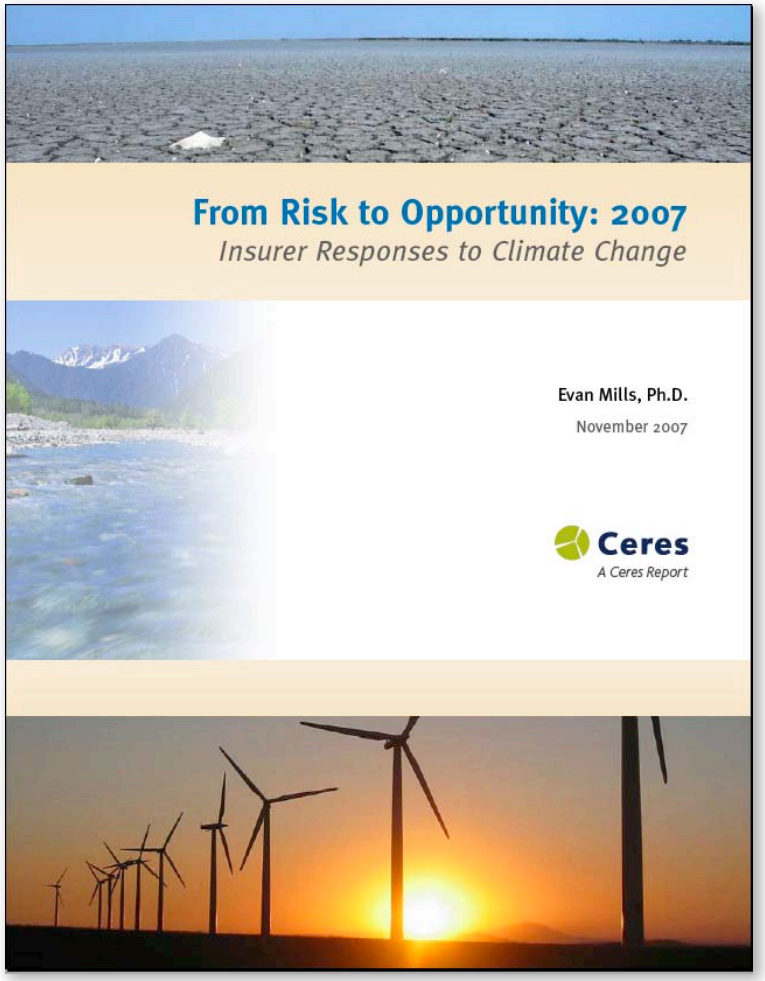
Insurance Paradigm Shift

"AIG sees opportunities to improve the environment, protect customers and reward shareholders by developing products and investing in technologies that can mitigate the risk and effect of climate change."

Martin Sullivan, CEO, AIG
2007 Annual Letter to Shareholders

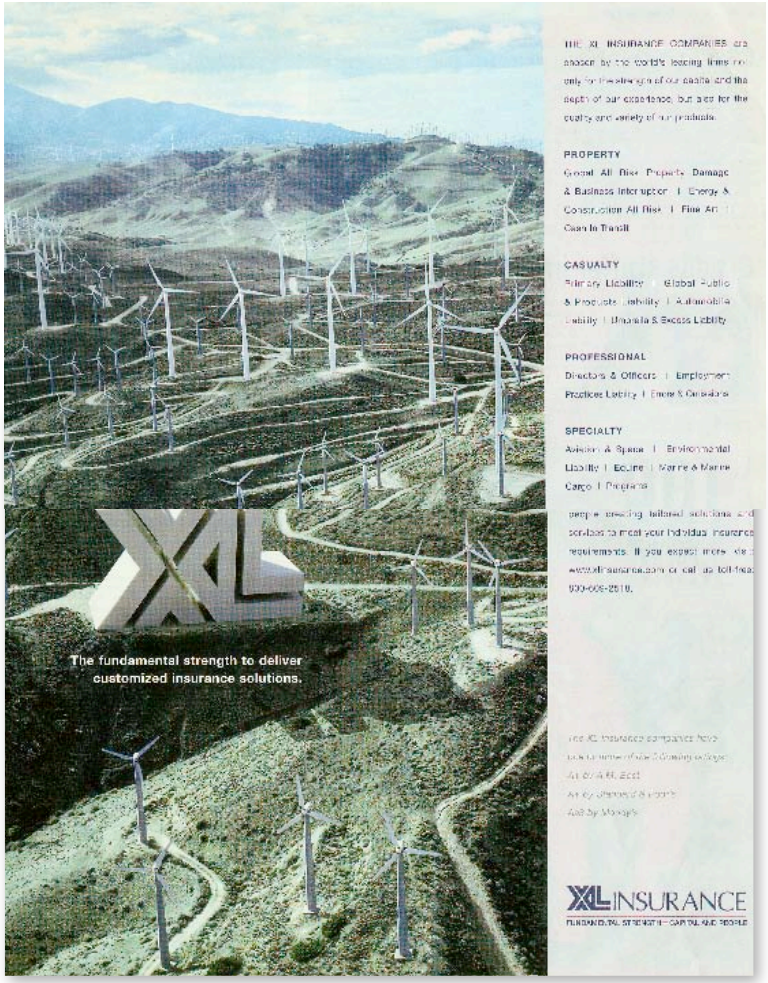
From Risk … to Opportunity

30 strategies; 422 examples
~190 parties; 26 countries ... and counting



More Business!

Global Renewable Energy Investments: $85 *Billion* in 2007



New Insurer Business Units

AIG — "Office of Environment & Climate Change"; "Advanced Energy Solutions"

Allianz — "Climate Solutions"

AON — "Agri-Fuels Group"

CHUBB — "Green Energy Team"

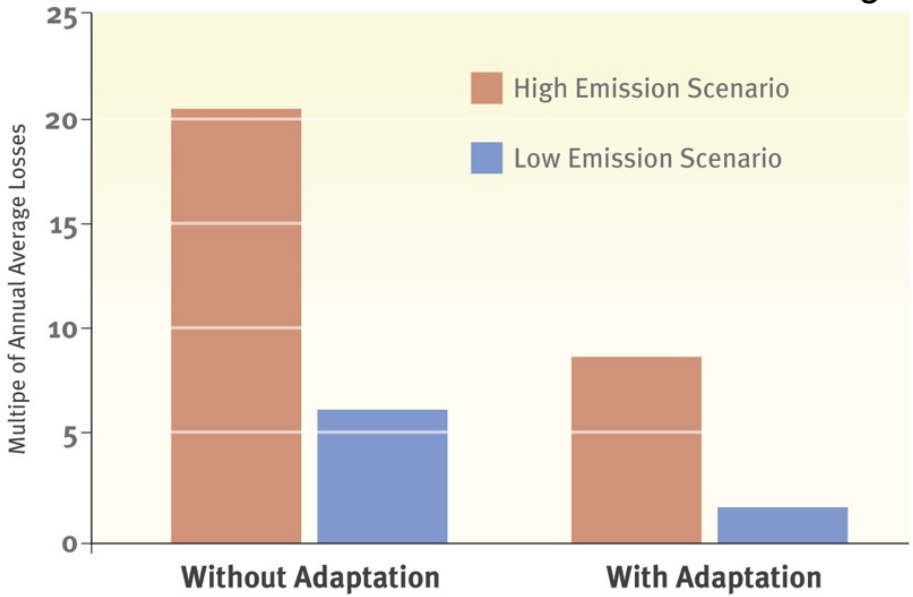
TRAVELERS — "Core Business Climate Change Project"

ZURICH — "Climate Change Advisory Council"

Understanding Climate Change: Land-use Planning

Association of British Insurers - modeling studies

UK Urban Flood Losses under Climate Change



CEA Report: 13 of 18 countries have >10% penetration of commercial flood insurance

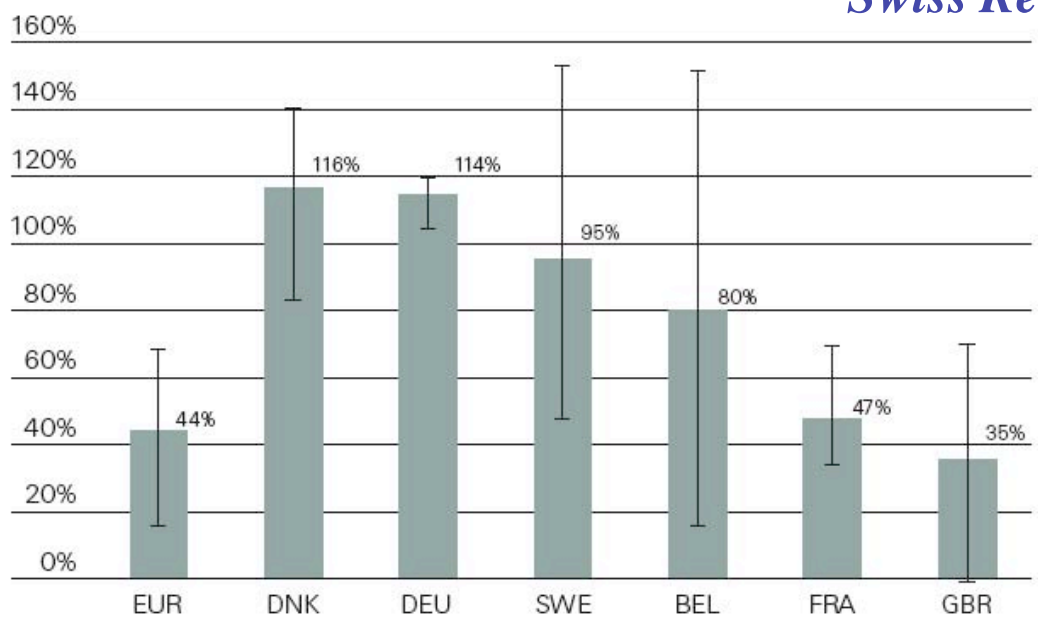
Source: Modeling results for London. Adapted from Association of British Insurers, "Financial Risks of Climate Change" c: 2080s

Understanding the Climate Change Problem: Modeling

- *Modeling efforts underway:*
  - ***III***
  - ***AIG***
  - ***Lloyds***
  - ***Munich Re***
  - ***Swiss Re***
  - ***Willis***
  - ***RMS***

Expected increase in annual windstorm 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

Promoting Loss Prevention: Building Design

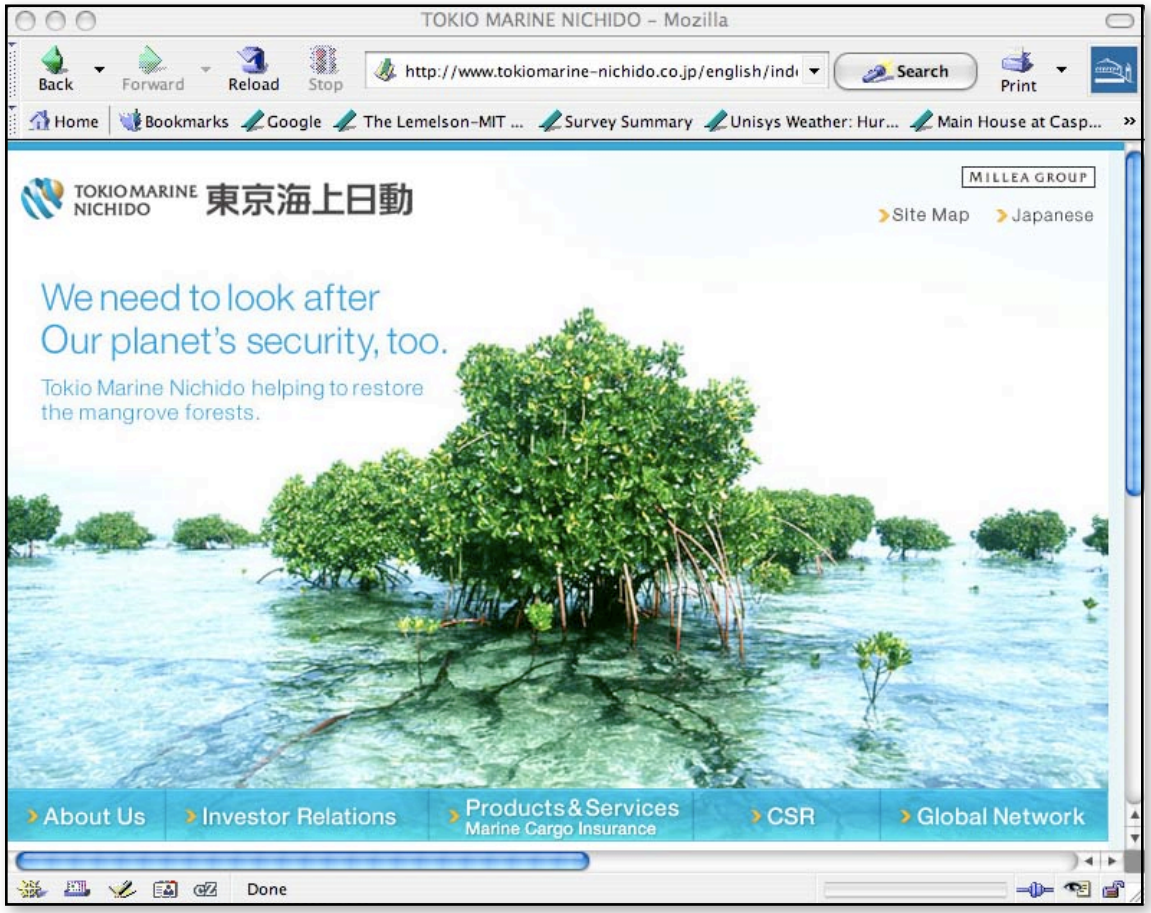
- ***Institute for Business and Home Safety's*** "Fortified… for safer living" stds.
  - Wind-resistant rigid foam panel walls and multi-glazed windows
  - Ice-dam resistant
  - Mold resistant
  - Water-resistant insulation

BASF Home - Patterson NJ

Some insurers giving premium credits for compliant homes

Promoting Loss Prevention: Wetlands Restoration

- ***Tokio Marine Nichido:*** has reforested 12,200 acres of mangroves in Indonesia, Thailand, Philippines, Myanmar and Vietnam



Company states that 2005 Tsunami did less damage in these areas

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

Aligning Terms & Conditions with Risk-reducing Behavior

- Insurance discounts of up to 40%
  - ***GMAC***
  - ***Progressive***
  - ***Norwich Union***
  - ***Polis Direct***
  - ***Rheinland***
  - ***Versicherungen***
  - ***Aioi***
  - ***Axa***
  - ***Hollard***
  - ***Gerling***
  - ***Unigard***
  - ***Sompo* and *Tokio Marine & Nichido***

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

General Motors Acceptance Corporation (GMAC) PAYD discount schedule.

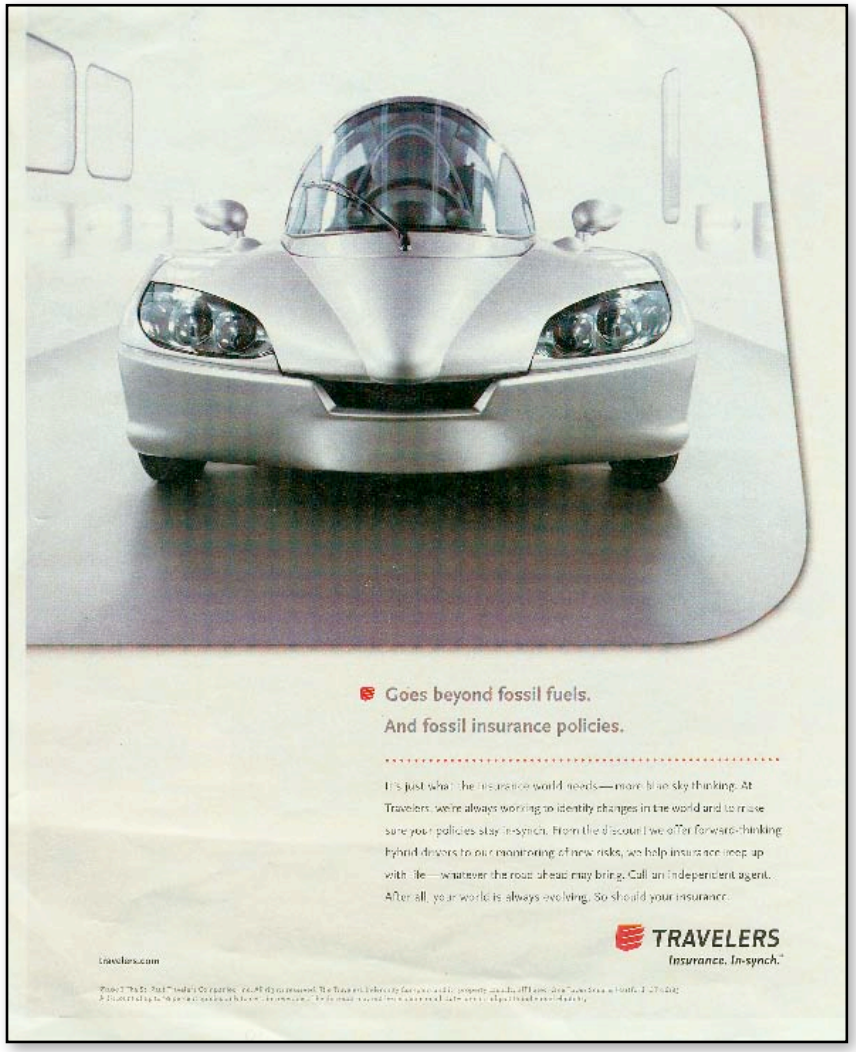
Miles/year	Discount offered
1 – 2,500 miles	40%
2,501 – 5,000	33%
5,001 – 7,500	28%
7,501 – 10,000	20%
10,001 – 12,500	11%
12,501 – 15,000	5%
15,001 – 99,999	0%

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

Aligning Terms & Conditions with Risk-reducing Behavior

- ***Travelers, Farmers, Berkshire/GEICO, AXA, Cooperative, Desjardins General:*** offer 5-10% premium discounts to drivers of hybrids

- ***Swiss Re:*** seeking D&O disclosure from insureds



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

Innovative Products

- ***Fireman's Fund***: first-ever U.S. *commercial* "Green-Buildings Insurance"
  - 5% premium credits for existing green features
  - Rebuild to LEED after loss
    - ~500 policies sold in first year (2007)
    - Premiums > $35M in '07; Doubling quarterly
- ***AIG (Lexington):*** Commercial, and first-ever U.S. *residential* "Green-Buildings" insurance being launched this year
  - Rebuilding to LEED (or next-higher LEED level) after loss; LEED design and registration fees
  - Rewards use of EnergyStar-labeled equipment
  - Low-emission materials; IAQ testing
  - Solar "revenue loss" if downtime
- ***AIG Environmental:*** Sustain-a-Build *environmental liability* premium credit for green commercial buildings

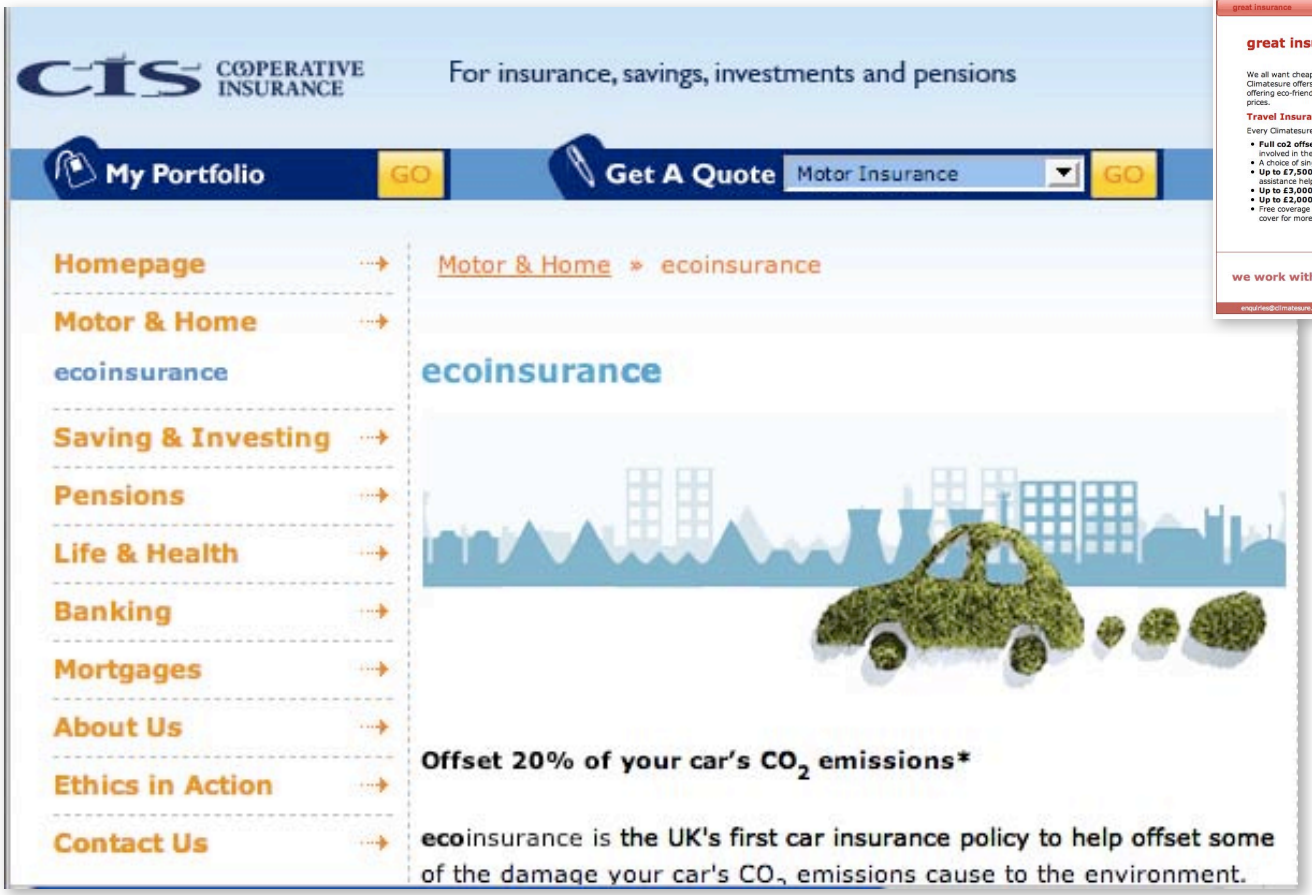
Innovative Products

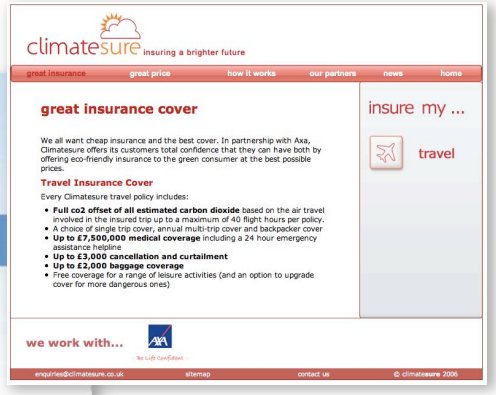
- ***Energy Production:***
  Munich Re - geothermal, Sompo - wind, others....

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

Innovative Products

- ***Allianz, AXA, Cooperative:***
  Car and travel insurance bundled with carbon offsets





Coverage for Under-served Market Segments

- ***Lockton Risk Services:***
  - group liability coverage for home energy auditors, if members of RESNET

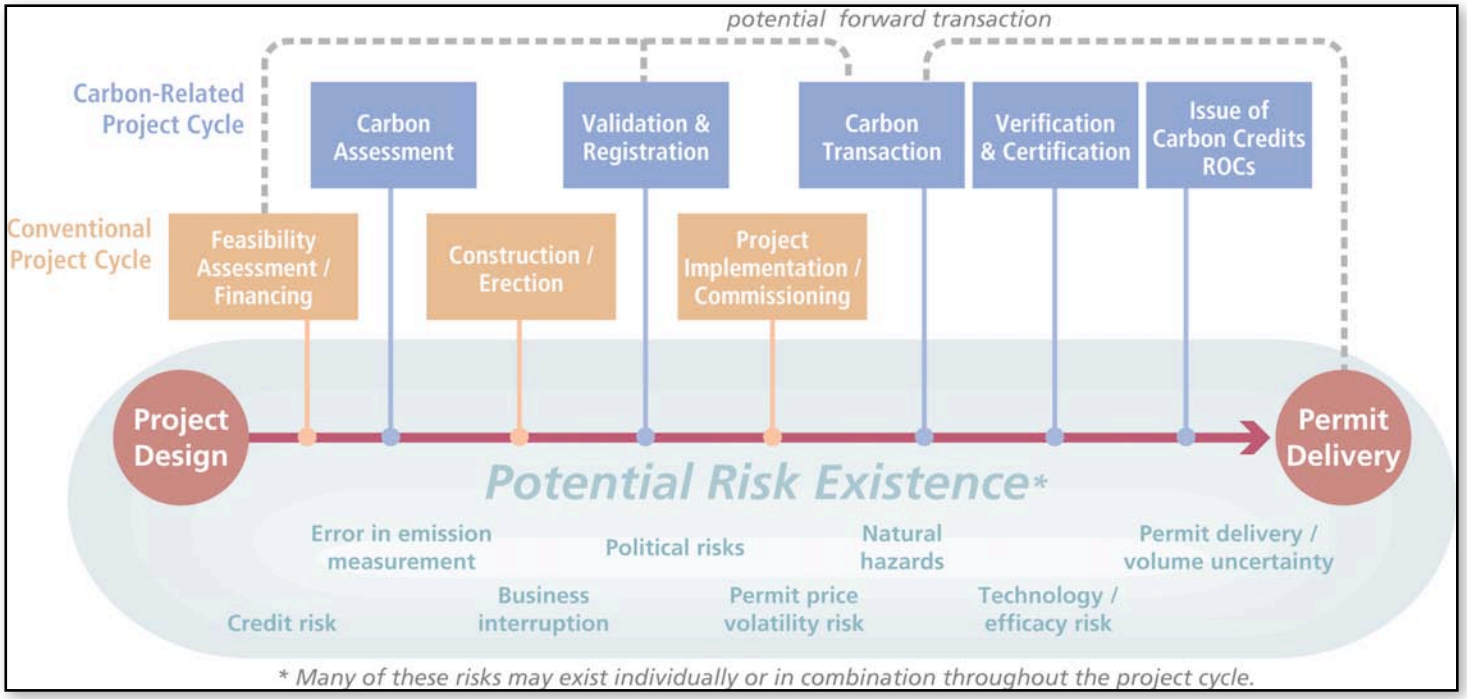
Source: http://www.locktonaffinity.com/RESNET/

Coverage for Under-served Market Segments

- ***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: Project Risk

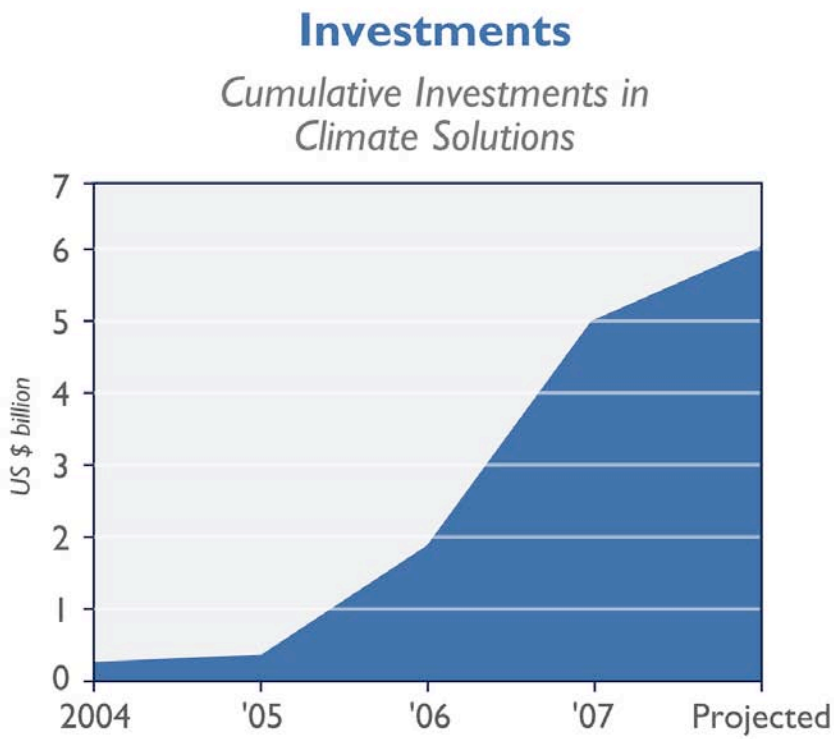
- ***AIG***, ***Marsh***, ***others:*** offering carbon project risk-management consulting services; insurance



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

Direct Investment

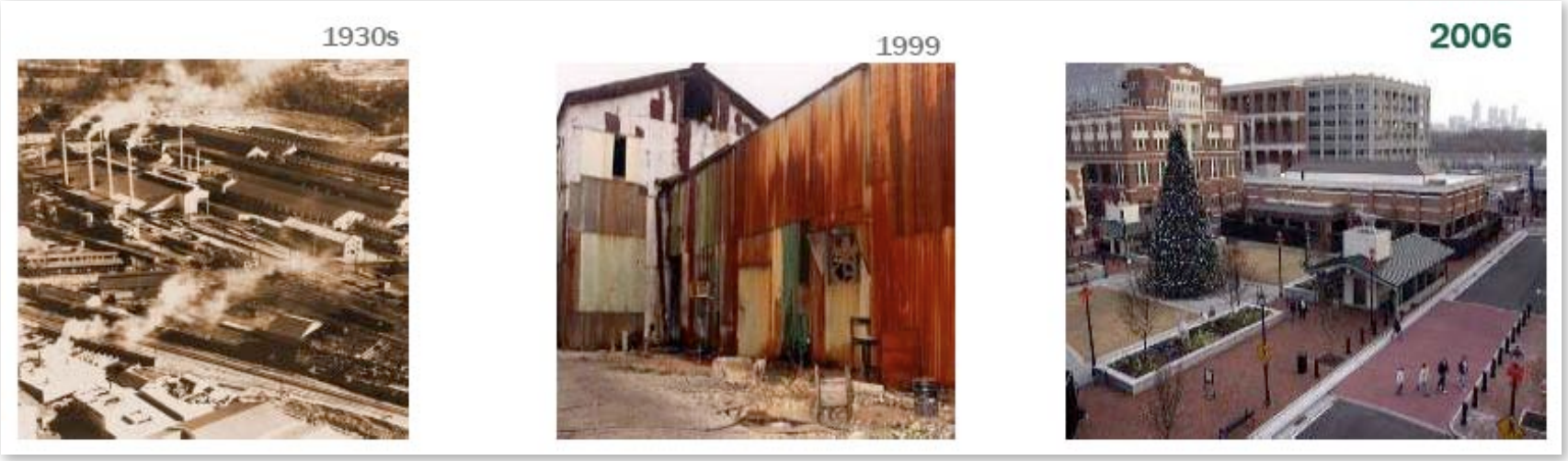
- ***Allianz:*** $15 million in the European Carbon Fund; plans to invest between $400 and $650 million in renewable energy
- ***Gerling:*** Sustainable Development Project operates a $100 million venture capital fund
- ***ING:*** Green finance - $1.16 billion
- ***Sompo Japan:*** $100 million green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

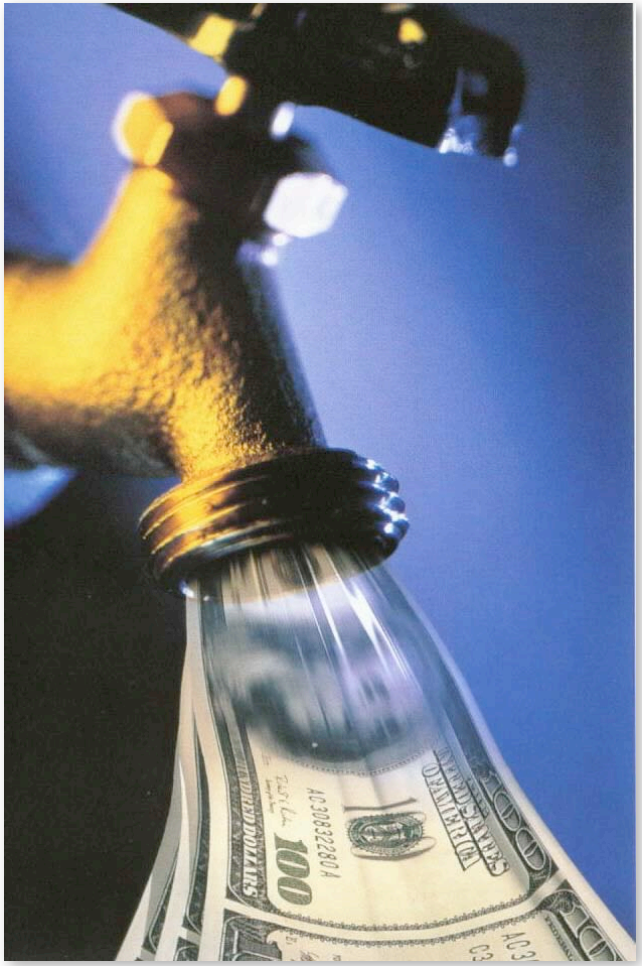
- ***AIG:*** Atlantic Station
  - Brownfields redevelopment
  - 8 million square feet LEED registered



Among institutional investors, U.S. life insurers hold 22% of all commercial real estate

Financing Emissions-reduction Projects

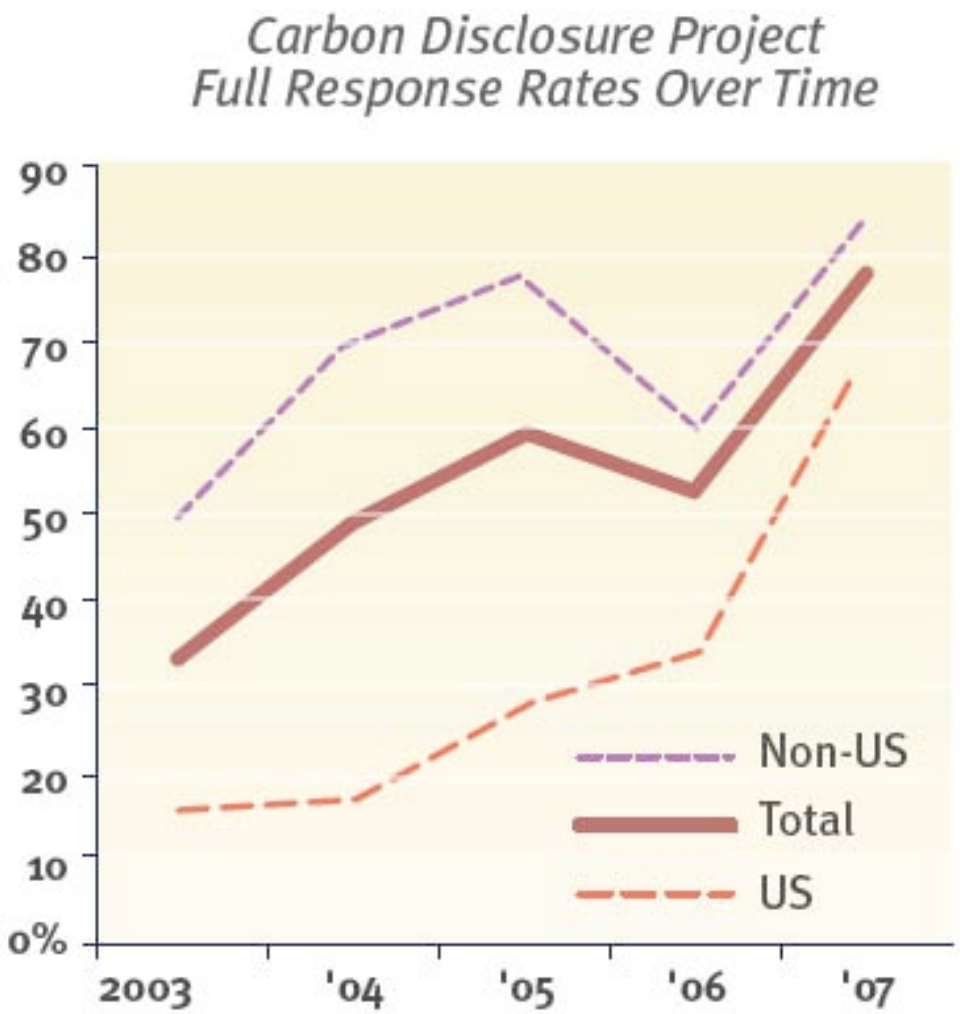
- ***AIG:*** $300 million lending facility for efficiency and clean energy
- ***Fortis:***
  - Preferential lending rate for energy-efficiency upgrades +10% premium discount
  - $106 million “Green Bank” loans
- ***HSBC:*** $45 million for wind projects in India
- ***Mitsui Sumitomo:*** Loans for building-integrated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



Carbon Risk Disclosure

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

113 Insurer responses: 2003-2007 - ***AIG, Allstate, Aon, Chubb, Marsh, MBIA, Safeco, St. Paul Travelers, Unum Provident, Munich Re, others...***



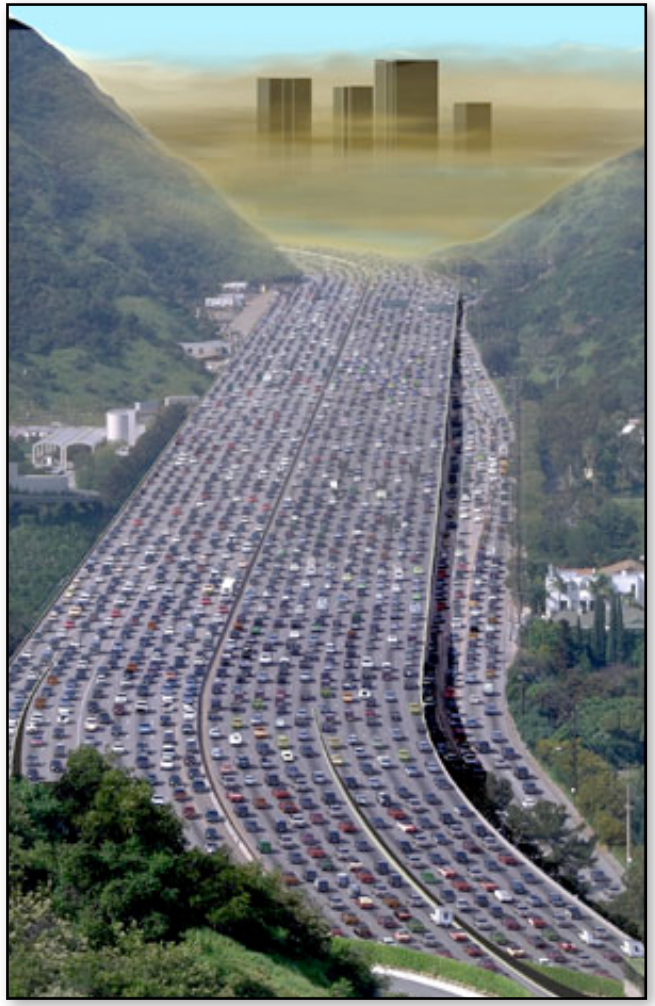
Source: http://www.cdproject.net/

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

Additional signatories as of 17 Sept 2007: ACE, Amlin, ARK, Beazley, BIBA, Chaucer, Diagonal Underwriting, Equity Group, Hardy's Underwriting, Hiscox, Legal & General, Marketform, Navigators, NFU Mutual, Prudential, QBE European Operations, RJ Kiln, RMS, Standard Life,UNUM, XL

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

***ClimateWise* announced Sept 17, 2007. 38 insurers and trade allies:**

"We will 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."

Contact USCAP

USCAP
United States Climate Action Partnership

"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.

AIG

MARSH

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

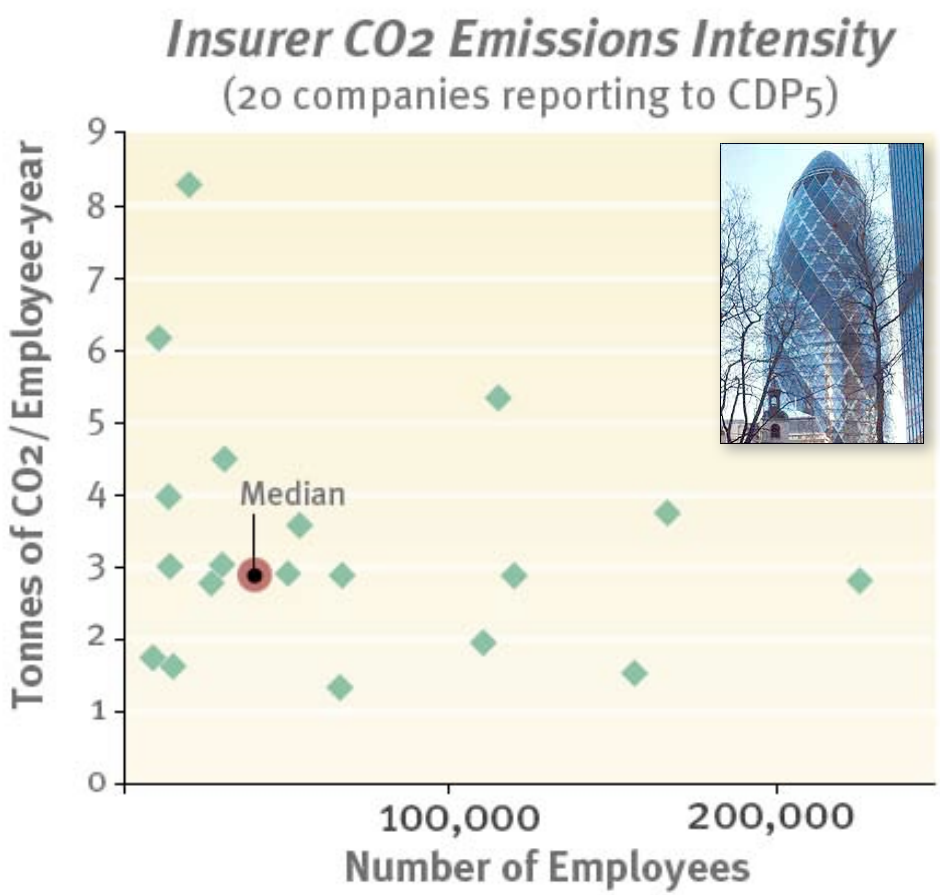
January 8, 2008 - Top Five Socially Responsible Investing News Stories of 2007 - Socialfunds.com reports that USCAP was a key catalyst in the business community in pushing climate change to the forefront in 2007.

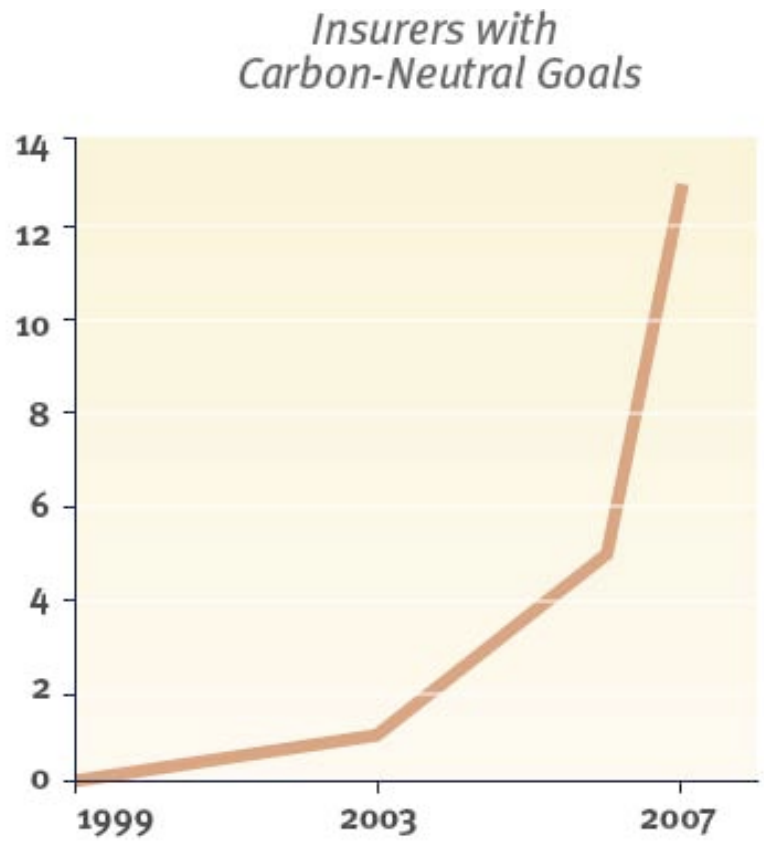
January 2, 2008 - Top Corporate Social Responsibility News of 2007 - CSRWire reports about USCAP's role as a leader in the business community on this issue.

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

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

Leading by Example





Engaged UK Entities

ACE
Admiral Group
Amlin
Aviva
CGNU
Chaucer Insurance
Cooperative Insurance
Friends Provident
Gerling
Groupma Insurances
HBOS
Hiscox
HSBC
Independent Insurance
Legal & General Group
Lloyds of London
- Beazley
- Diagonal Underwriting
- Hardy Underwriting
- Kiln

Lloyd's TSB
Marketform
NFU Mutual
Norwich Union
Premier Underwriting
Prudential Assurance
RBS Insurance
Resolution
Royal & Sun Alliance
Standard Life
XL Insurance

Others
- ABI
- Benfield
- British Ins. Brokers Assoc.
- FSA

Roles for Insurers & Regulators

- Link insurance *principles* to practice & regulation
- Follow the science (and educate one another)
- Communicate climate-insurance realities to governments
- Improve stress-testing & risk-based pricing
- Re-emphasize “industry’s roots” in loss prevention
- Collect better data & reduce blind-spots
- Elevate the practice of catastrophe modeling
- Promote and *validate* climate-friendly products & services
- Assess risks associated with climate-change *responses*
- Identify and address coverage gaps
- Integrate climate considerations into asset management
- Identify and disclose climate risks and responses
- Minimize own carbon footprints

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

- Chinese Proverb

http://insurance.lbl.gov
emills@lbl.gov