Insurance & Climate Change

Proactively and Profitably Managing The Risk

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Our atmosphere is as thin -- in proportion to the Earth's diameter -- as a film of condensation on a steel ball.

From Thunder to Underwriting

Natural Phenomenon

(e.g. temperature increase)

Variability/Uncertainty

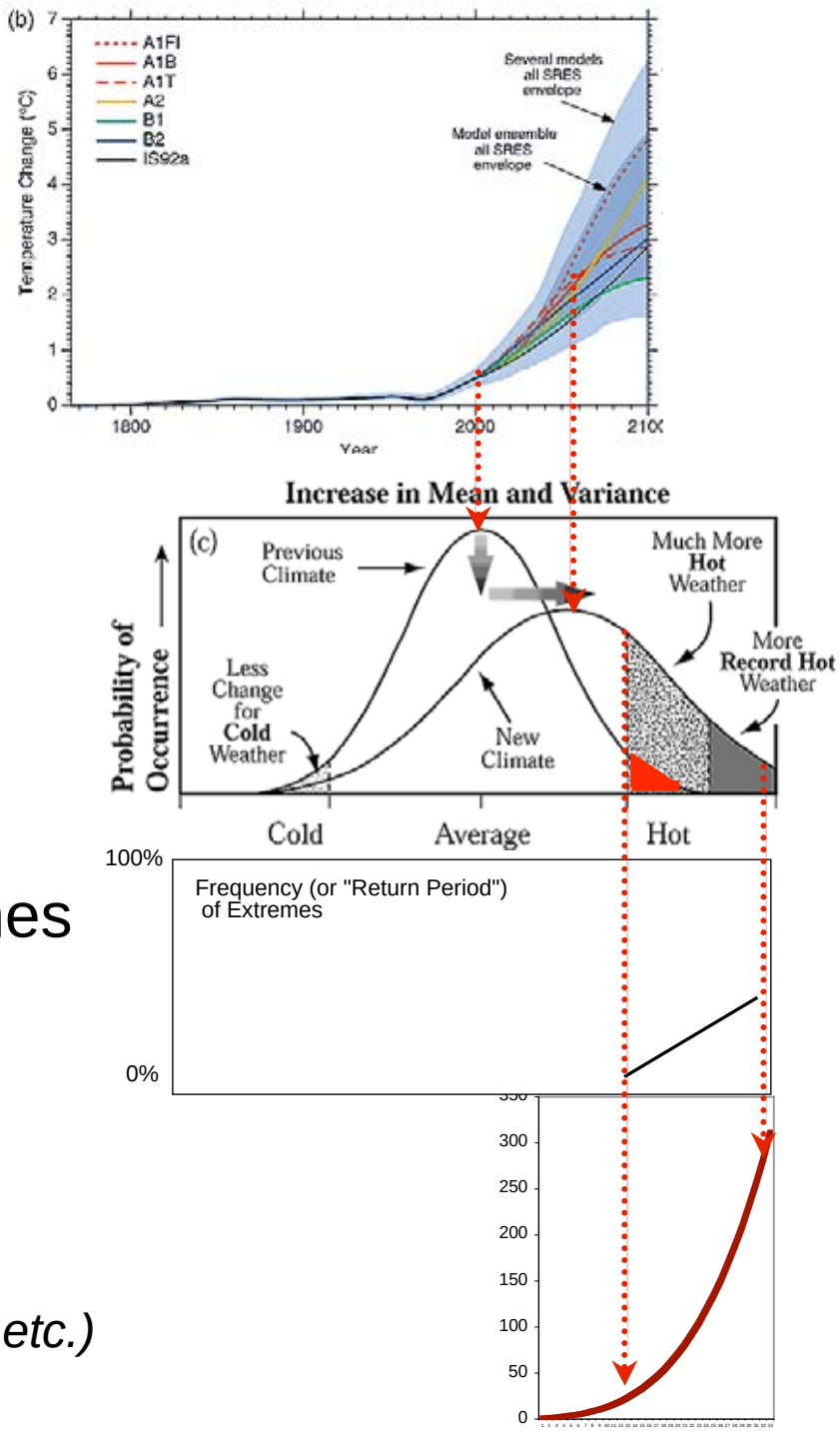
(e.g. temperature extremes)

Change in Likelihood of Extremes

(e.g. return period of heat waves)

Impact / Insured Loss

(e.g. loss of life; business interruption, etc.)



Insurance-relevant Consequences

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

- Injury
- Infectious disease
- Heat stress
- Respiratory
- Pollutant releases
- Food poisoning
- Mental health
- Nutrition/water

- General
- Product
- Environmental
- Professional
- Political Risk
- Roadway

Climate Change Liability:
A Rapidly Emerging Issue

New IPCC Report has reduced the uncertainties

Business Insurance

February 5, 2007

www.businessinsurance.com

ANOTHER APPEALS COURT RULES CASH BALANCE PLANS DON'T DISCRIMINATE / PAGE 3

FINANCIAL GUARANTEE INSURER PAYS $75 MILLION TO SETTLE FINITE CHARGES / PAGE 3

RADIO STATION RISK MANAGERS TO INCREASE ON-AIR OVERSIGHT AFTER CONTEST TRAGEDY / PAGE 3

In Brief

U.N. climate report stirs liability fears

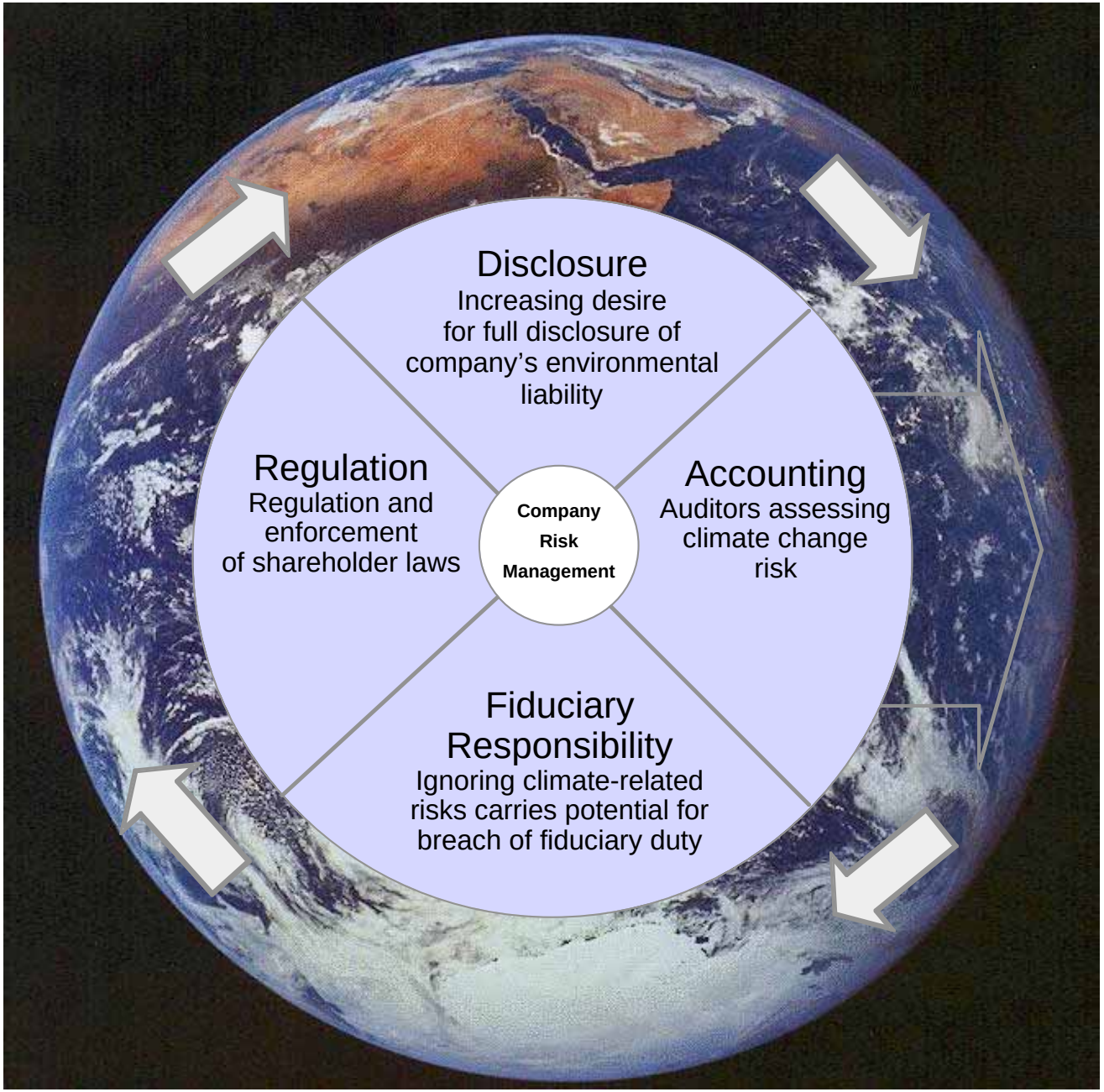
Scientific testimony may fuel lawsuits on global warming

By ROBERTO CENICEROS

Marsh reaps $3.9B with Putnam deal

By SALLY ROBERTS

The Changing (Business) Climate



Business Valuation

- Negative impacts on company value, reputation & brand caused by ignoring climate change

Shareholder & Institutional Investor Demands for Action

Shifting Regulatory Environment

- Energy prices
- Carbon caps, etc.
- Corporate governance
- Compliance cost

Insurers: Reasons for Concern

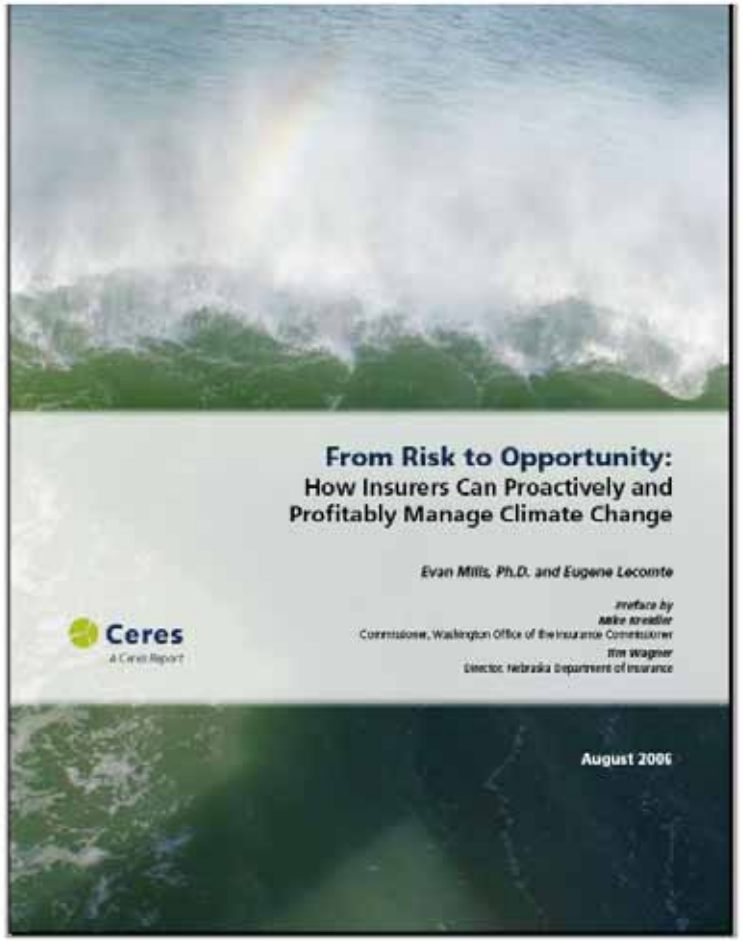
- Actuarial - losses in <u>all</u> lines (core business)
  - increased variability
  - unexpected correlation
  - affordability/availability
  - potential for abrupt change
  - CAT model deficiencies
  - difficult to function post-loss
  - data “blind-spots”
- Contraction
- Competitive risk
- Regulatory risk
- Reputation risk
- Own liability
- Assets & share prices are weather-sensitive; Ratings
- Macroeconomic downturn

From Risk … to Opportunity

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

- Marsh & McLennan

Report: 25 strategies;
~225 examples; ~130 insurers

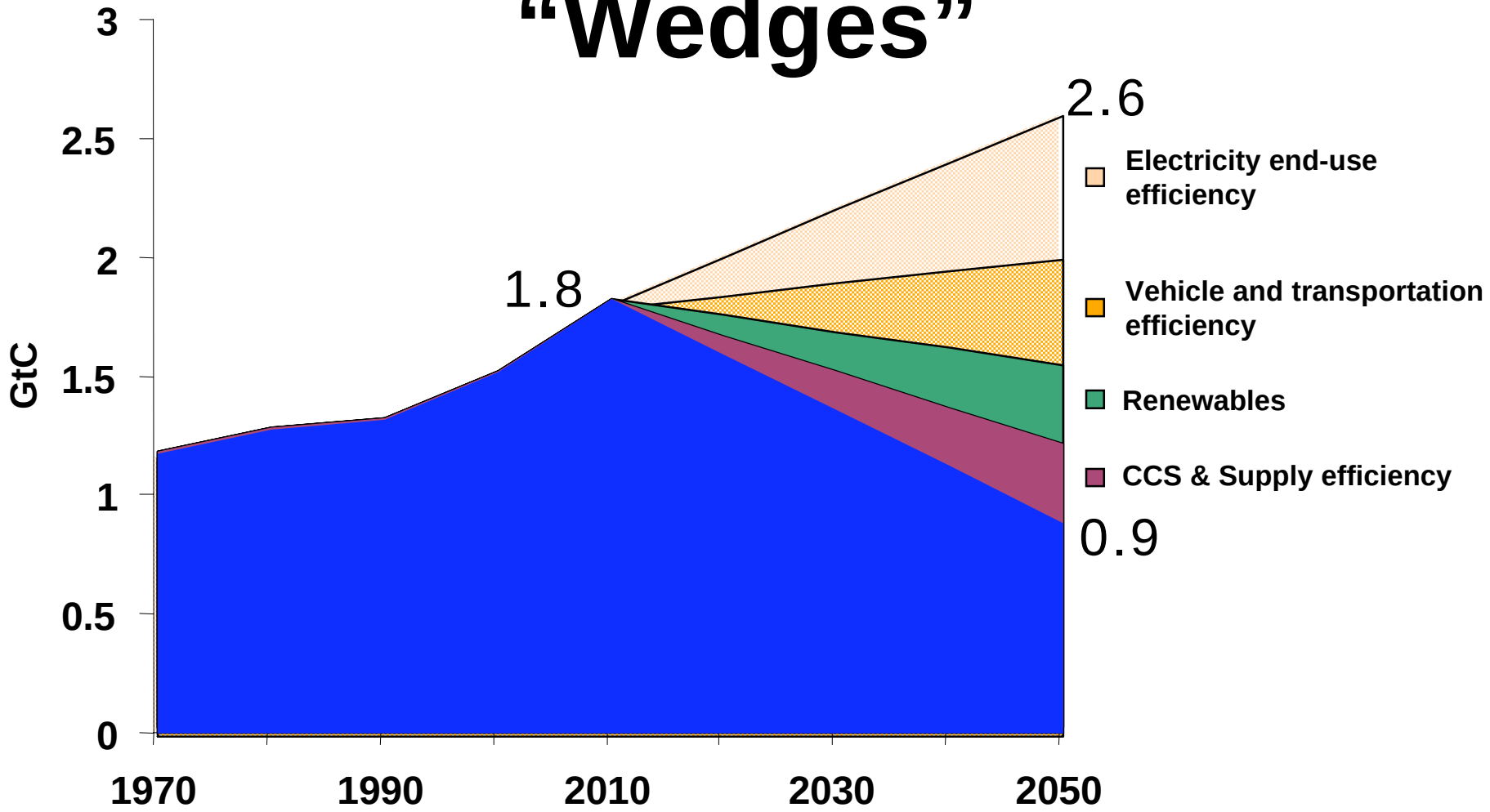


Range of Activities

- Australia
- Belgium
- Canada
- Switzerland
- China
- Germany
- France
- Italy
- Israel
- Japan
- Netherlands
- Norway
- South Africa
- Sweden
- Taiwan
- United Kingdom
- United States

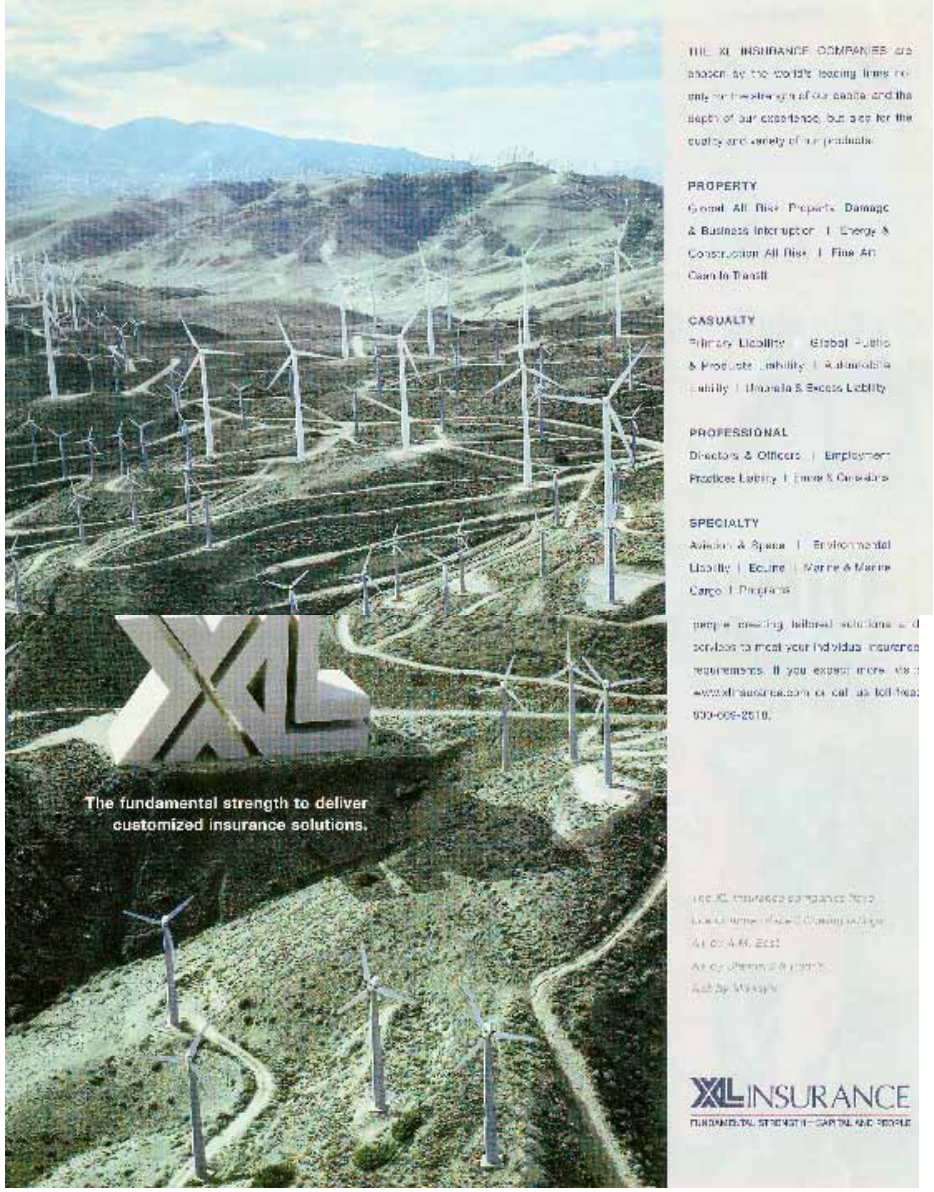
New Customers for Traditional Business

Cutting U.S. Emissions in Half with Climate-Stabilization "Wedges"



After Pacala and Socolow (*Science*)

Renewable Energy Projects



Renewable Energy Project Insurance

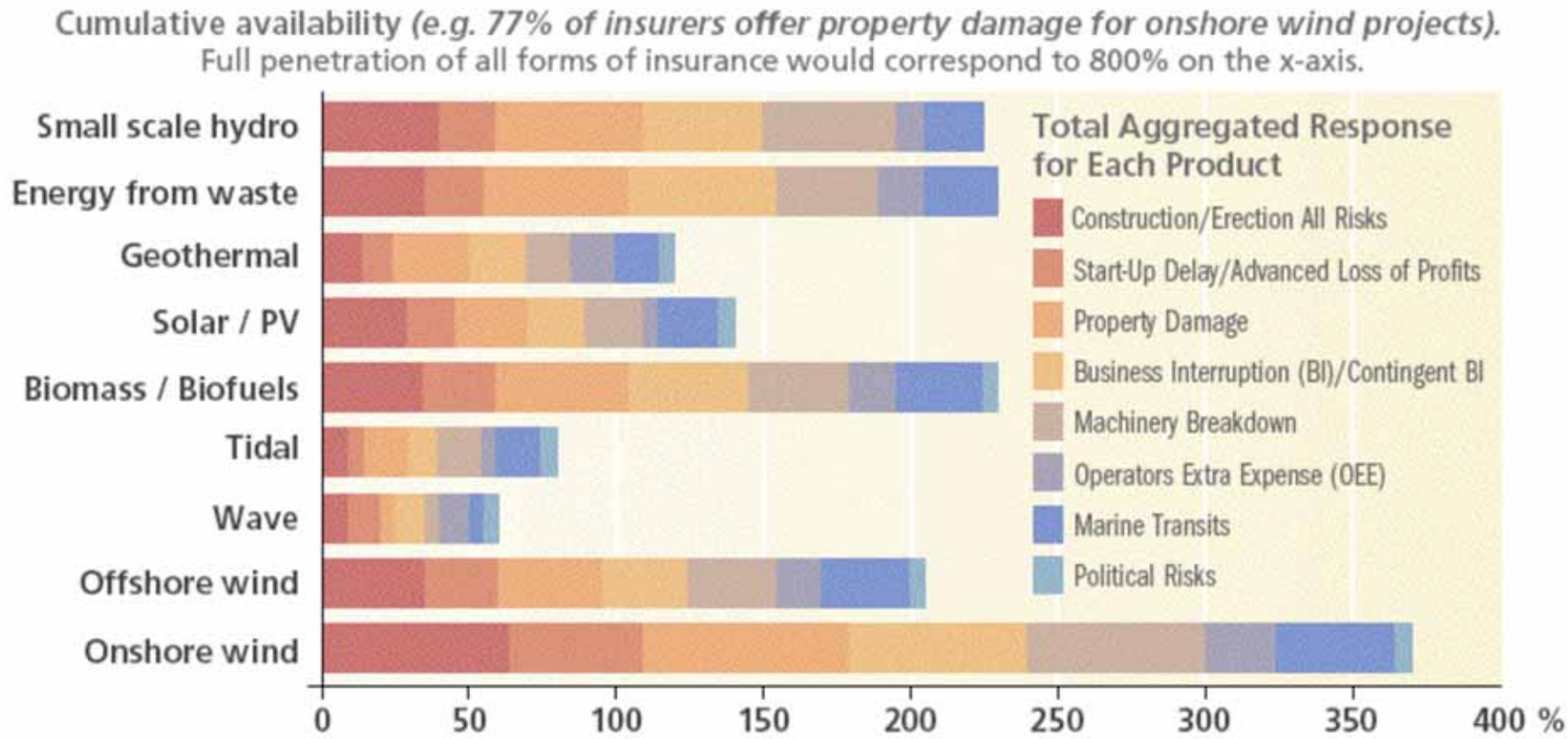


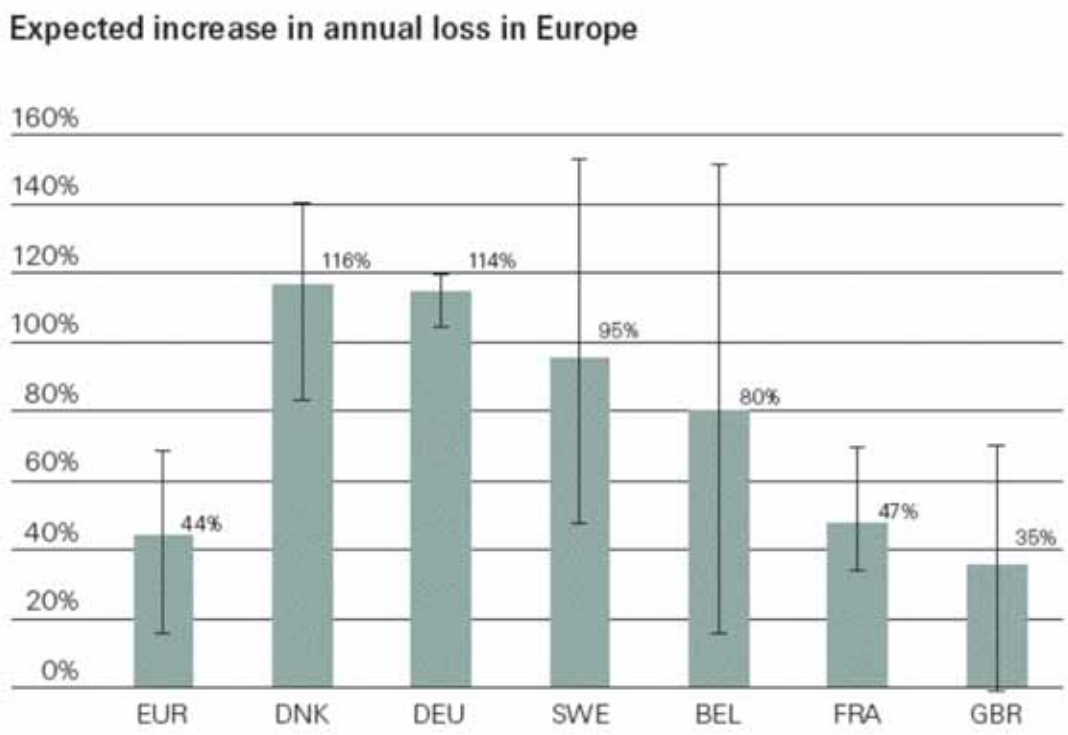
Figure 6. Availability of insurance products for different renewable energy technologies

Source: Marsh. 2006. "Survey of Insurance Availability for Renewable Energy Projects." March, 15pp.

Conducting Research, Development, & Demonstration

Catastrophe Modeling & Climate Research for Risk Management

- *Efforts underway:*
  - ***AIG***
  - ***Lloyds***
  - ***Munich Re***
  - ***Swiss Re***
  - ***Willis***
  - ***RMS***



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

Disaster-relief Technology

- *IBHS & USDOE* - collaborated in development of energy-efficient, UV water disinfection for emergency relief situations

Promoting Loss Prevention

Traditional Risk Management

- Meets ***Institute for Business and Home Safety:*** "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 are giving premium credits….

Integrating Energy Management & Risk Management

Munich Re Brochure circa 1995 on Infrared Cameras

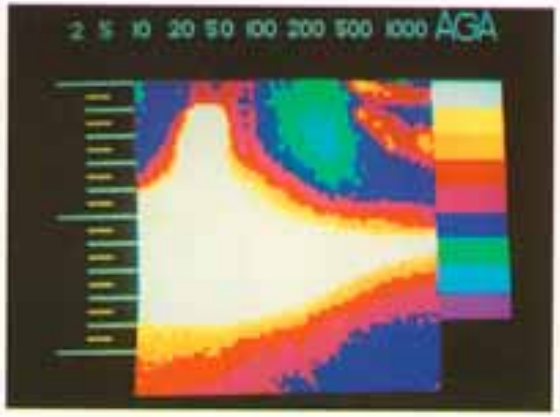
3 Thermographic inspections in the construction trade and water installations

Insulation faults, heat build-up, and excessive moisture in masonry and roof structures can be identified by means of a special application and this can contribute to energy savings.

Leakages in heating installations, water systems, and sanitary installations can be located quickly and accurately.

● A leak in the warm water system in the sanitary area of a commercial firm would have necessitated opening up large areas of the floor in order to find the leak if had not been for thermography. An infrared inspection showed up the leak as a "warm spot" in a bend. All that had to be done was open up a floor slab measuring 60 by 60 cm in order to gain access to the place where the water was coming out and repair the leak.

This example shows that once leaks have been located using thermography, pinpointed repairs can be carried out, thus avoiding the high cost of tearing open and replacing expensive floor coverings.



Thermogram of a leak in a warm water pipe laid in the floor.

Leak after opening up the floor.

4 Closing remarks

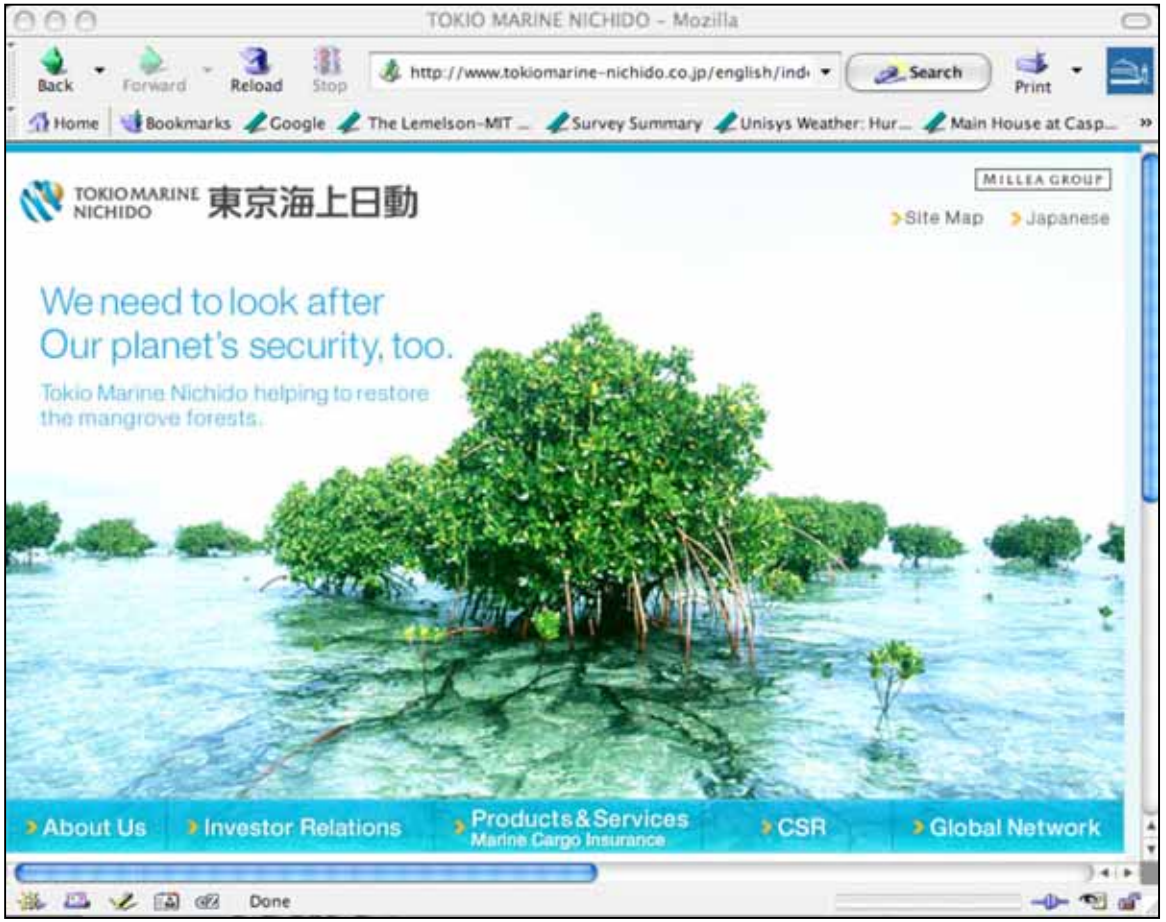
Thermography can be used to draw the thermal profile of technical objects while they are in service. Proper analysis of the data gathered in the inspection reveals thermal faults before they can cause a loss. Infrared thermography should therefore be viewed both by insurers and by their clients as a valuable part of the toolkit for non-destructive loss prevention.

Energy-Efficiency --> Fire Safety

- ***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

Better Management of Forestry, Agriculture, and Wetlands

- ***Tokio Marine & Nichido***: reforested 7,500 acres of mangroves in Indonesia, Thailand, Philippines, Myanmar and Vietnam. 5,000 more in progress



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

“Rebuilding Right” Following Losses

- ***Fireman’s Fund***: first-ever “Green-Buildings Insurance”
  - Rebuild green after loss

Very popular:

> $5,000,000 of new business in first 6 months;

> Instrumental in renewals;

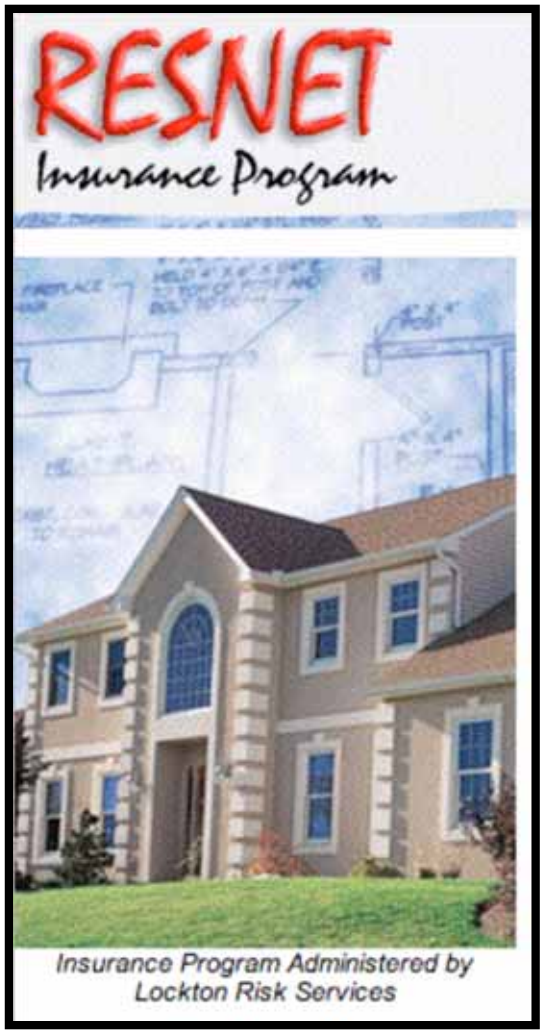
> Wall Street Journal

http://www.firemansfund.com/servlet/dcms?c=business&rkey=437

Crafting Innovative Insurance Products and Services

New Products for Energy Service Providers

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

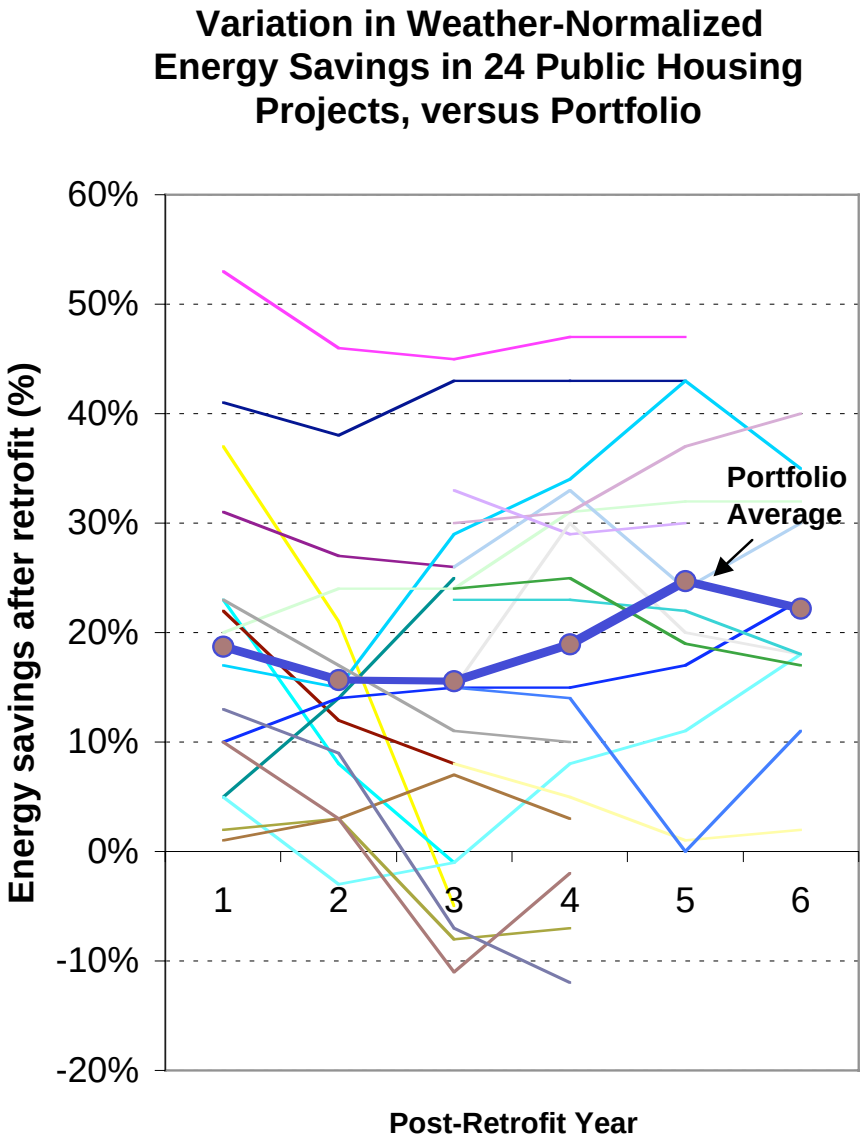


Source: http://www.locktonaffinity.com/RESNET/

Energy Savings Insurance

- ***Lloyds***, and various others....

- Owner-advocate
- Enhances "bankability"
- Small step to extend from energy to carbon warranty



Mills, E., S. Kromer, G. Weiss, and P.A. Mathew. 2006. "From Volatility to Value: Analysing and Managing Financial and Performance Risk in Energy Savings Projects." *Energy Policy*, 34:188-199.

Renewable Energy Performance Insurance

- ***Munich Re:*** Piloting geothermal energy exploration risk insurance

Green Buildings Insurance

- ***Lloyds of London (Naturesave)***: personal lines; commercial lines
  - 10 percent of premiums donated to environmental projects
  - environmental performance surveys offered to policyholders

- ***Fireman's Fund:*** commercial lines - premium credits for "LEED-certified" buildings

Pay-As-You-Drive Insurance

- Insurance discounts of up to 40% for low mileage:
  - ***GMAC***
  - ***Progressive***
  - ***Norwich Union***
  - ***Polis Direct***
  - ***Rheinland Versicherungen***
  - ***Aioi***
  - ***Pay-per-K***
  - ***Hollard***
  - ***Gerling***
  - ***Unigard***

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 --> avoids reporting fraud

Climate Change Insurance

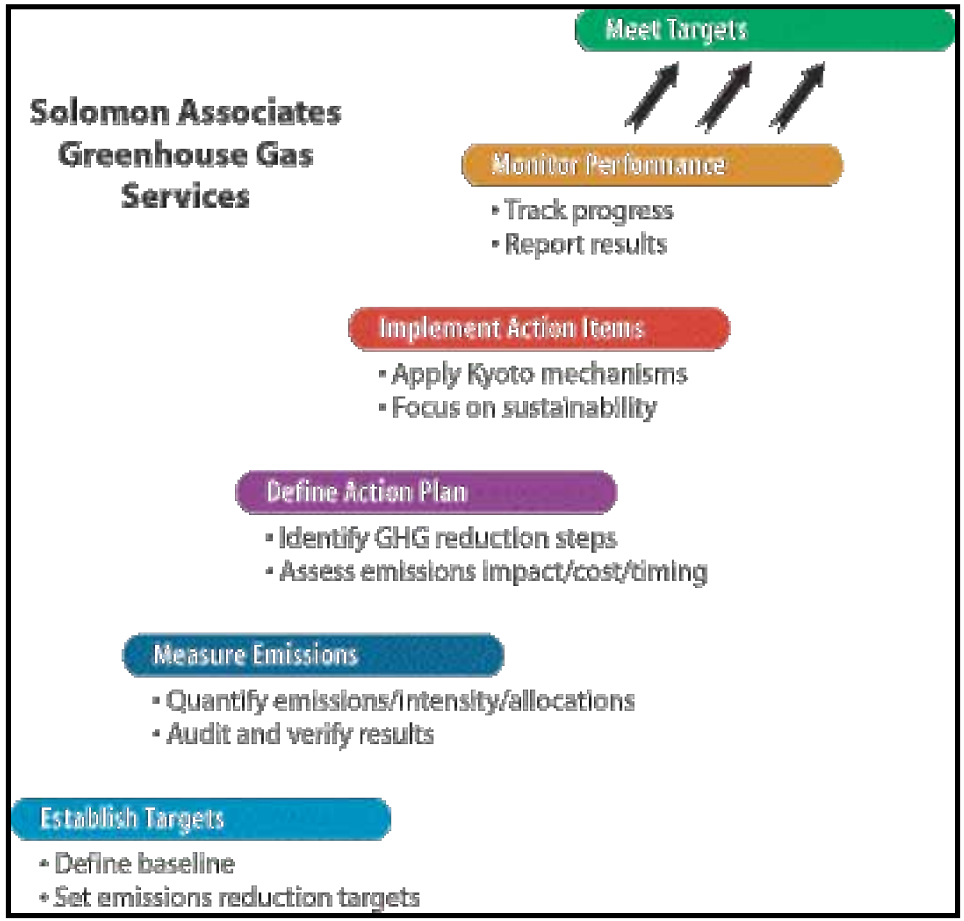
- ***Munich Re***: Climate insurance Initiative (MCII) for under-served markets in developing countries
  - New products
  - Loss reduction measures

Offering Transactional and Risk-Management Services for Carbon Markets

Climate Risk-management Services

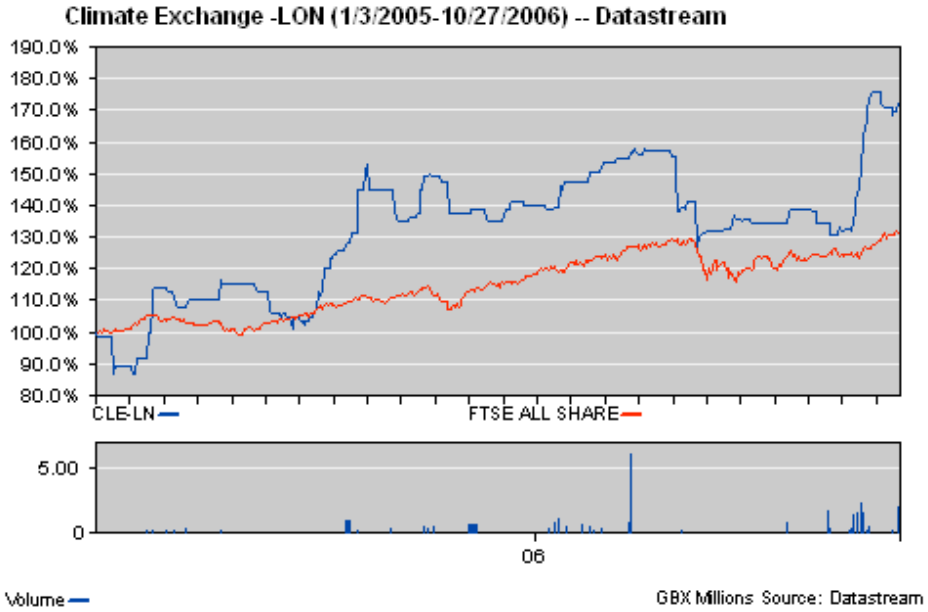
- ***Solomon Associates, subsidiary of HSB* (AIG):** Greenhouse Gas Services

- ***AON:*** Climate Change Solutions Group



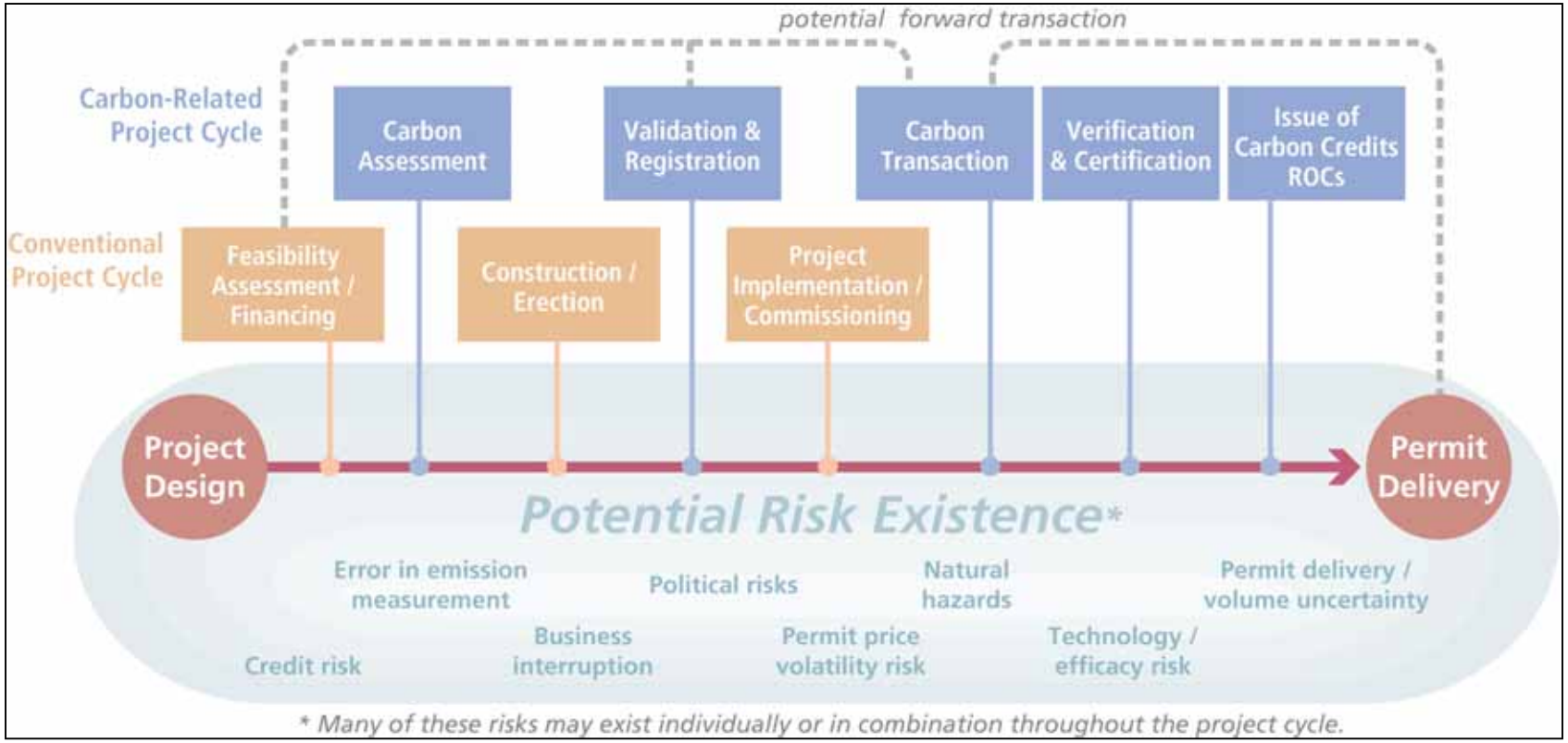
Facilitating Carbon Trading

- ***Swiss Re:***
  - Contingent-Cap Forward for Emissions Reduction Trades (cost risk hedge)
  - Carbon credit price volatility product
  - Carbon-delivery insurance



Managing Risk for Clean-Development Mechanism (CDM) & Carbon-Trading Projects

- ***Marsh*** risk management service



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

Enabling Customers to Purchase Carbon Offsets

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

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

Aligning Terms and Conditions with Risk-Reducing Behavior

Assigning Directors & Officers Liability

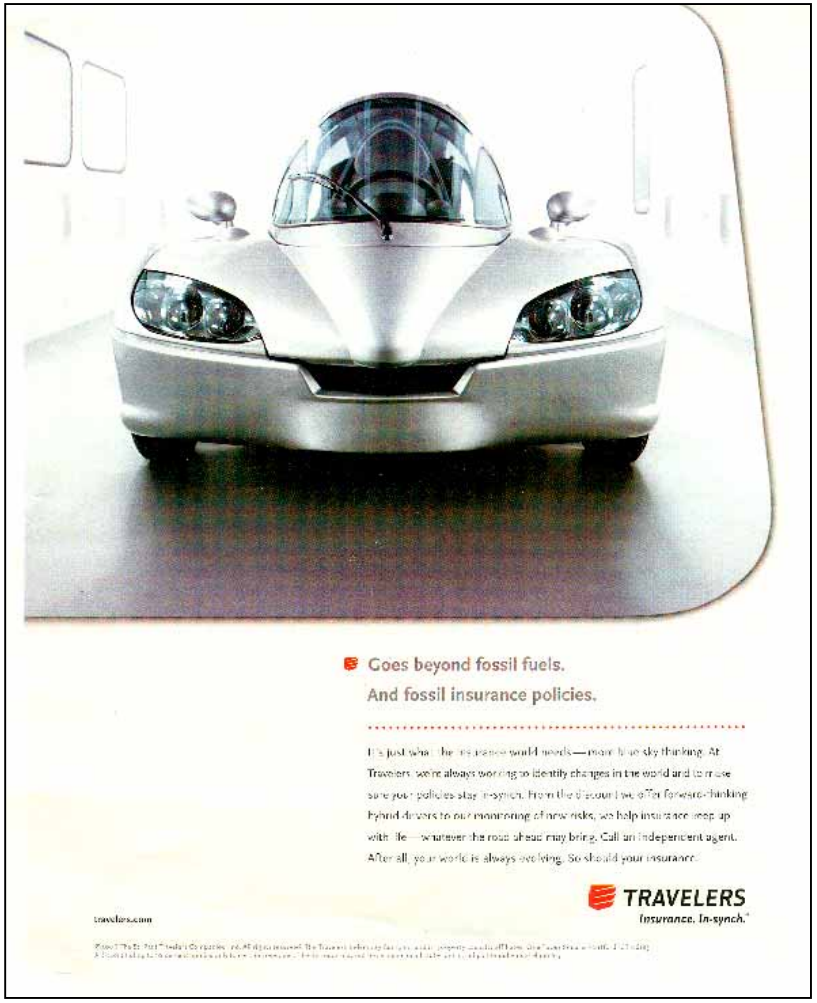
- ***Swiss Re:*** added climate change to its primary insurance D&O underwriting process
  - Reviews CDP response (if available)
  - May request completion of questionnaire

Questionnaire

- Countries/jurisdiction of company operations
- GHG accounting/reporting system
- Gases assessed
- Outline of company intentions to address regulation-related potential liabilities
- If available, report of data: (1) Gross emissions; (2) GHGs/$ gross revenues; (3) GHGs/$ EBITDA; (4) GHGs/$ current assets; (5) GHGs/$ long-term debt; and (6) GHGs/$ market cap

Recognizing and rewarding correlations between sustainable practices and a low risk profile

- ***Travelers***: 10% auto premium discount to drivers of hybrids



Investing in Climate Change Solutions

Equity Investments

- ***Swiss Re:*** participated in an $18.4 million round of financing in Evergreen Solar
- ***Gerling:*** Sustainable Development Project operates a $100 million initiative including venture capital for new technologies to help address climate change risks
- ***Allianz:*** plans to increase investments in renewable energy by 300 to 500 million euros

Sustainable Asset Management

- ***Munich Re:*** membership in sustainable investment indices; screens its own investments
- ***Allianz:*** invested 10 million euros in the European Carbon Fund
- ***Gerling:*** Select 21 Fund includes energy and environmental criteria in the selection of securities

Ethical Index Constituent Certificate

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Milan, 04-01-2005

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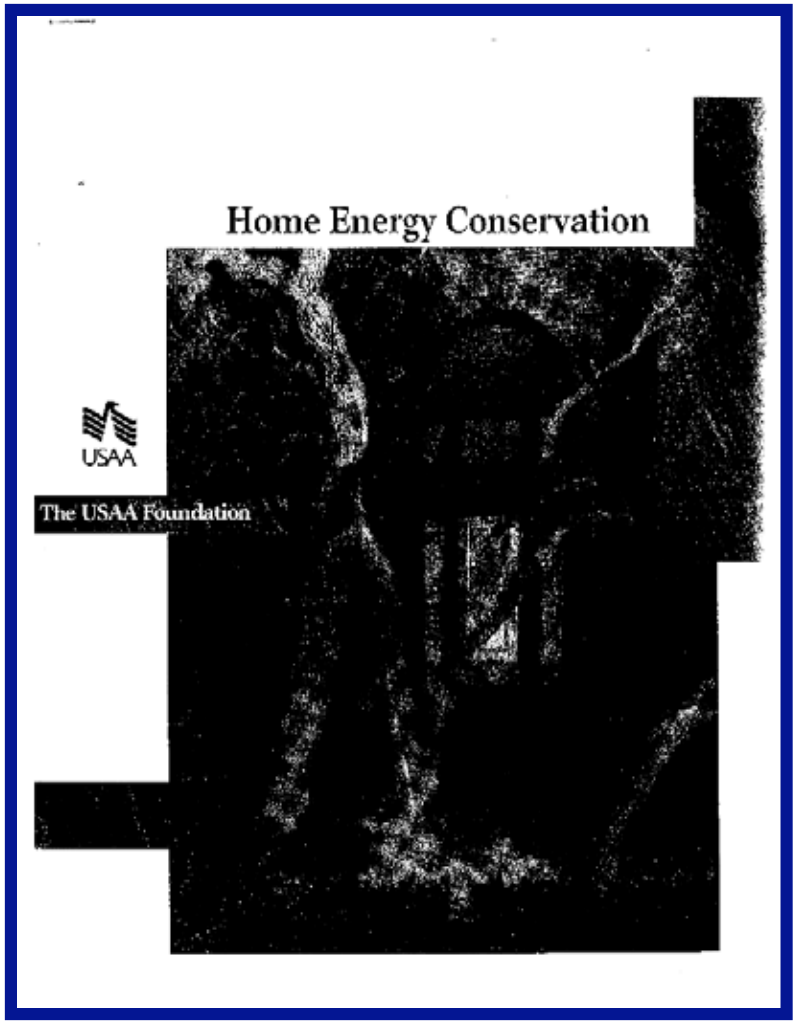
Building Awareness

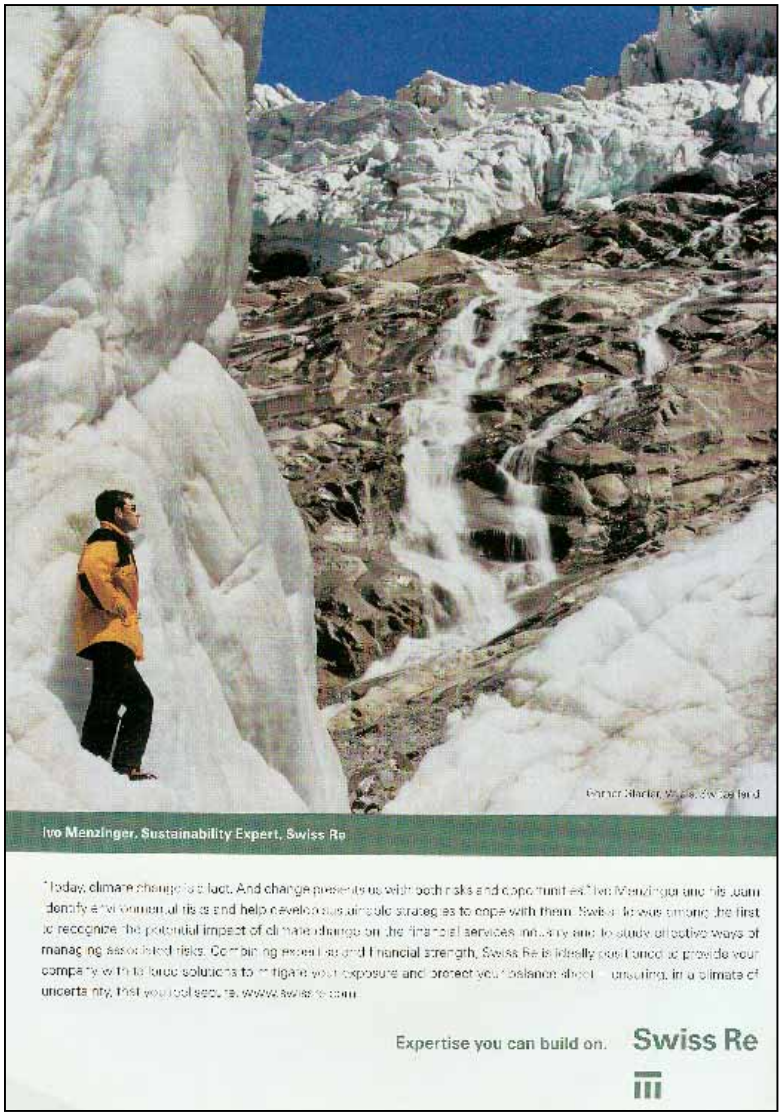
Consumer Information & Education

- ***USAA:*** Energy-efficiency information to homeowners



Educating Fellow Insurers

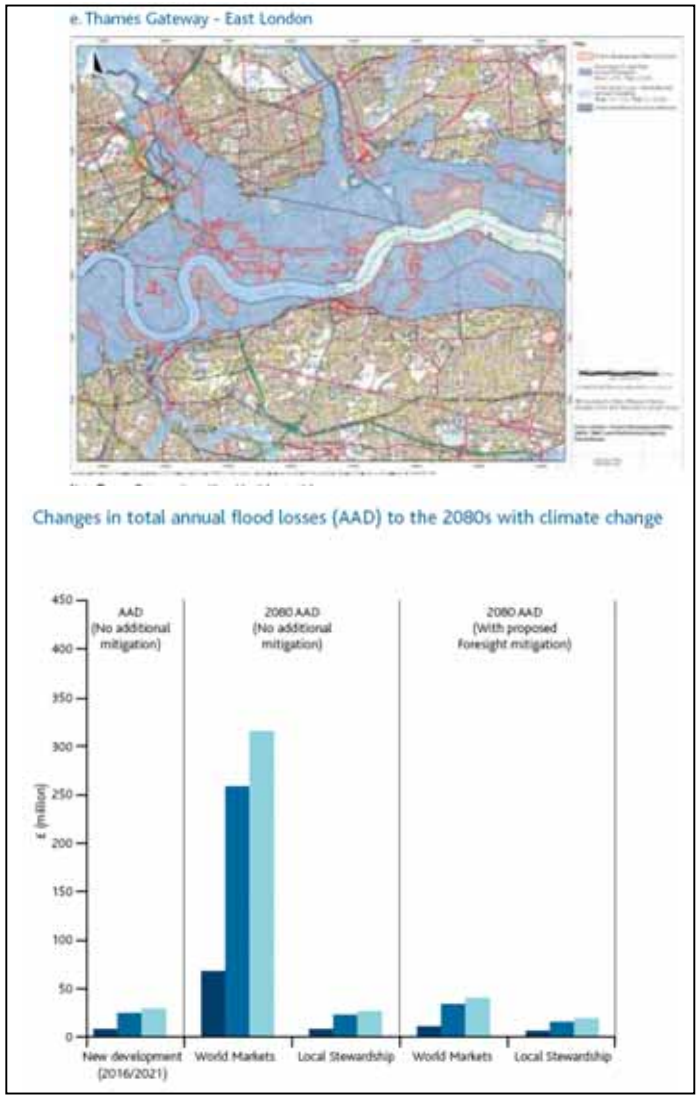
- ***Swiss Re:*** has run *regular* full-page adds on climate change in major U.S. insurance trade journals for several years



Participating in the Formulation of Public Policy

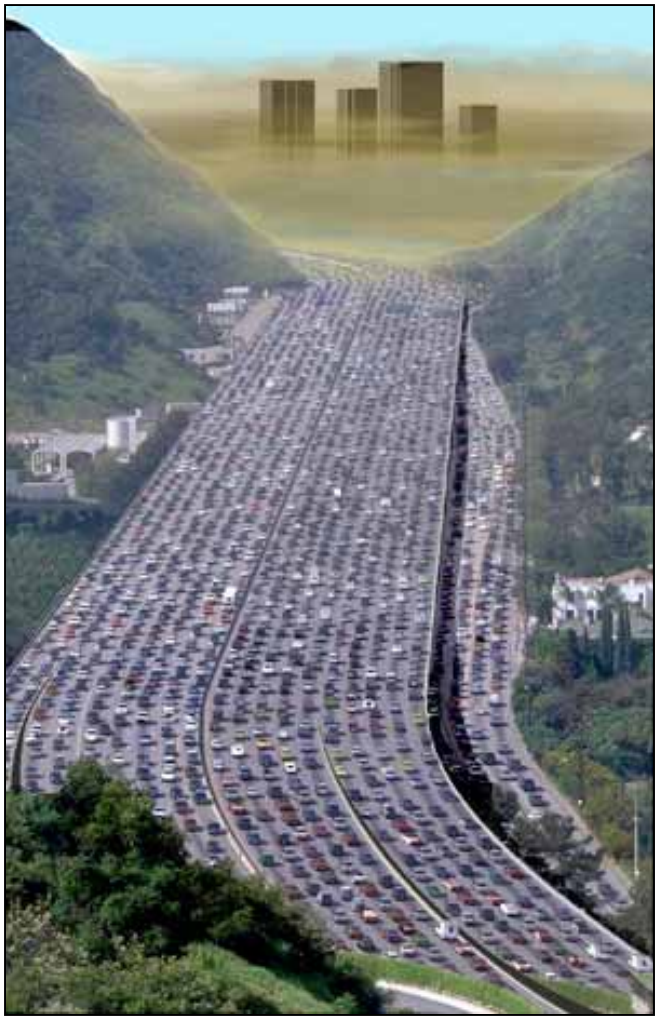
Having a Voice in Public Policy Discussions on Climate Change

- ***Association of British Insurers:*** advising City of London on land-use planning and flood defenses
- ***Allianz:*** endorsed the CERES/INCR "Call to Action" 50 companies; $4T invested
- ***UNEP Initiative***



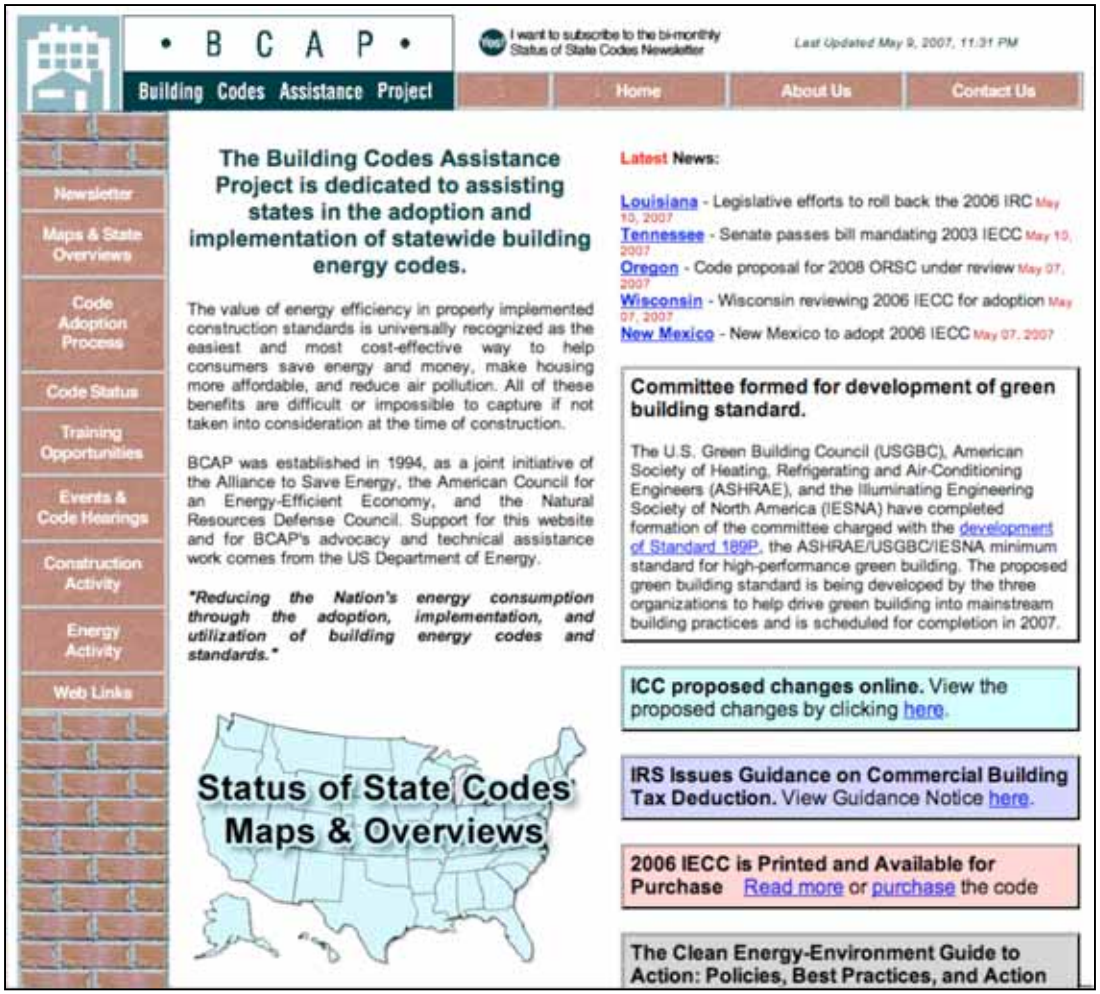
Endorsing Voluntary Energy-Saving Policies

- ***American Insurance Association***: Endorsing public transportation; reduced speed limits; telecommuting based on win-win benefits



Promoting Energy-Efficiency Codes and Standards

- *IBHS*
- *Building Code Assistance Project*



Leading by Example

In-House Energy/Carbon Management

- ***Swiss Re:*** "Gherkin" building (London)

- ***Rutherfoord:*** first insurance broker to go "carbon neutral"

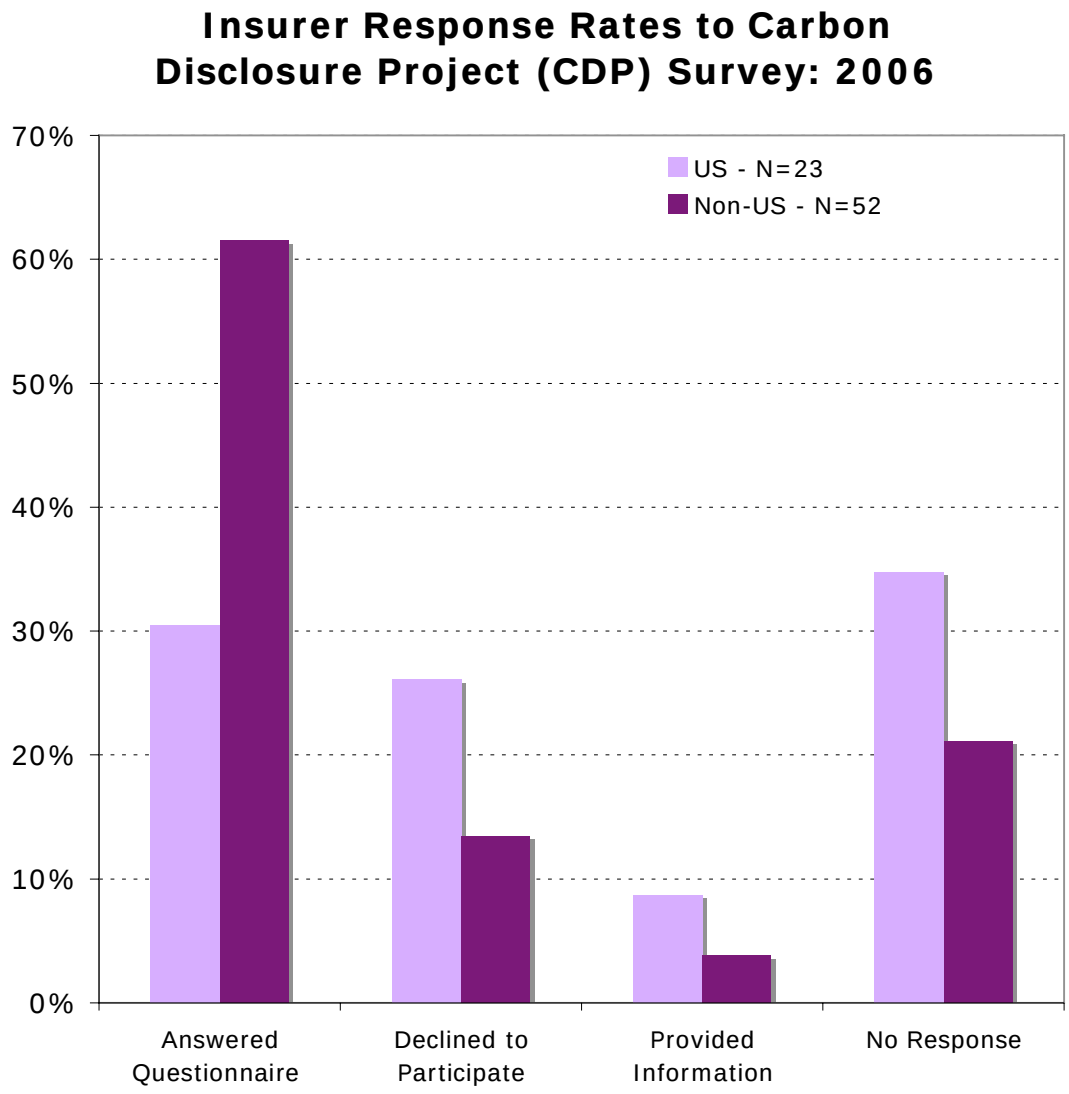
- ***West Bend Mutual Insurance Company:*** reported a 7% increase in productivity following energy-efficiency upgrades

Reducing Insurers' Carbon Footprint Through Improved Operations

- ***American Modern Insurance Group:*** using PV-powered portable offices for post-disaster claims handling

Disclosing Climate Vulnerabilities & Liabilities

Insurers responding to CDP ($41 T under management): ***AIG, Aon, Marsh & McLennan, MBIA, Safeco, St. Paul Travelers, Unum Provident, Munich Re, others...***



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

Closing Thoughts:

Risks Profiles of Responses to Climate Change

Risks are also associated with responses *to* climate change

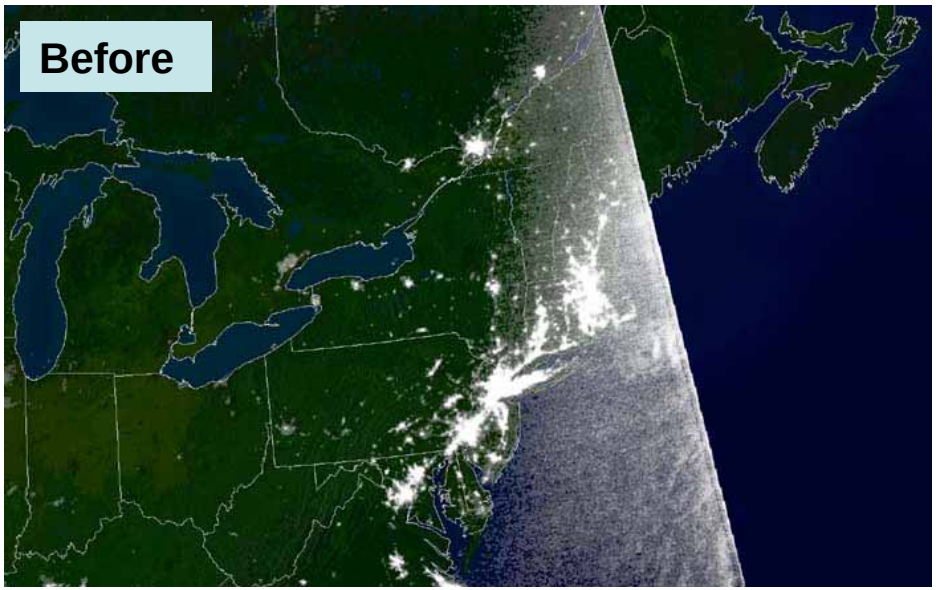
- **Emissions reduction**: supply- and demand-side
  - Green buildings
  - Nuclear power
  - Hydrogen energy
  - Renewable energy
  - Carbon capture & storage

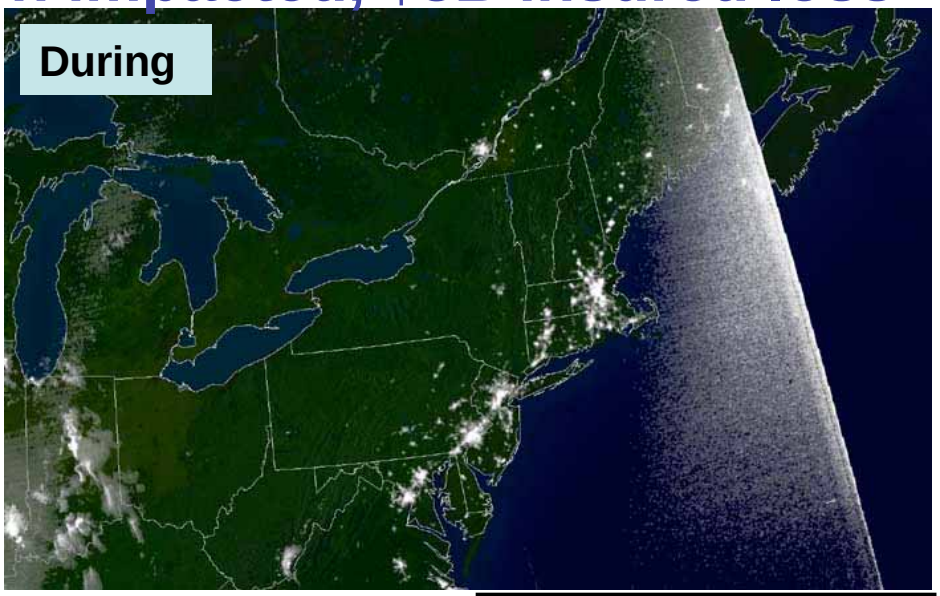
Carbon Capture and Storage (CCS)

- Lake Nyos - 1986 (Cameroon): Natural CO_2 leak killed 1800 people, 3500 farm animals

Co-Benefits: Insurance Loss Reduction + Lower Emissions

2003 NE US blackout: 50 million impacted, $3B insured loss





Sources: Imagery NOAA/DMSP; Losses Munich Re - “Failure of Public Utilities”

- Energy efficiency avoided up to 155 hours of blackout in California in 2000 (worth $20B)
- Distributed renewable generation can reduce business interruptions

Thank You

http://insurance.lbl.gov

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