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The Never-Ending[?] Era of Uncertainty:

Managing Global Risk in a Volatile World

Minnesota RIMS Chapter
Golden Valley, MN
May 21, 2013

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Global Risks: What in the World is Going On?

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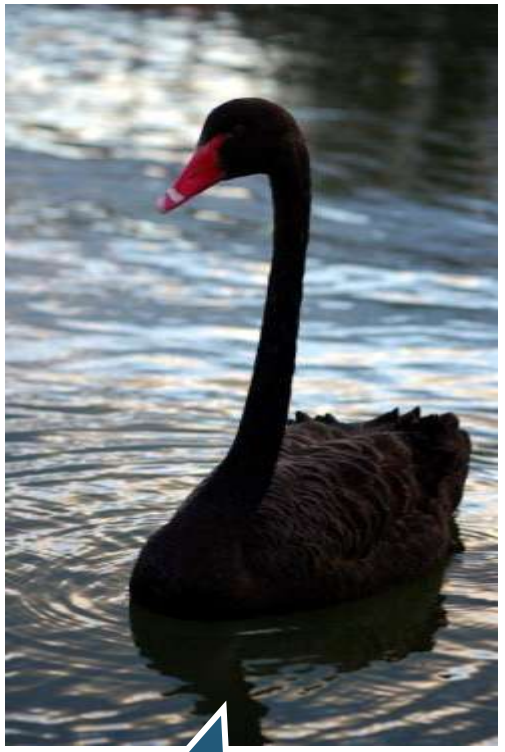
- Continuing Echoes of the Global Financial Crisis
- European Sovereign Debt & Eurozone Crises
- The US Debt and Budget Standoff
- Unintended Consequences of (Over)Regulation
- Persistent Global Austerity/ Slow Economic Growth
- Housing and Unemployment Crises
- Political Upheaval in the Middle East
- Terrorism Risk Anywhere/Everywhere
- Diffusion of Weapons of Mass Destruction
- Cyber Attacks
- Record Natural Disaster Losses
- Climate Change/Environmental Degradation
- Severe Income Disparity
- *Insomnia???*



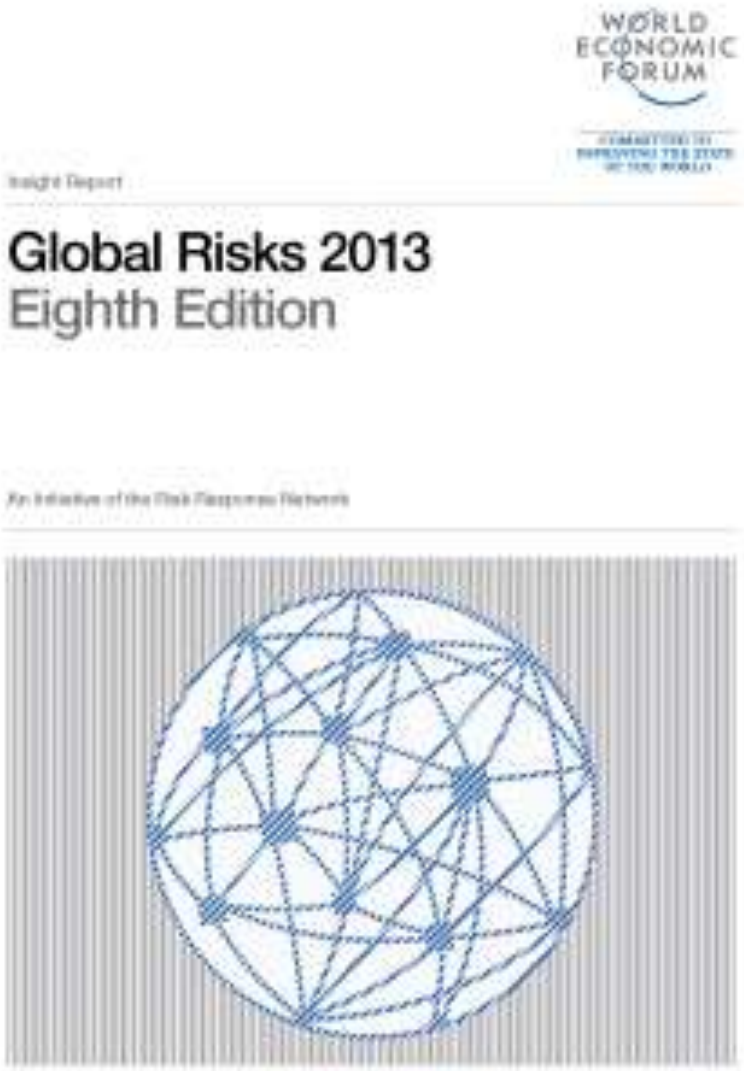
Are "Black Swans" everywhere or does it just seem that way?

Global Risks: Their Importance in Risk Management

- Global Risks are often diminished, or even ignored, in current enterprise risk management
  - They don't fit neatly into existing conceptual risk frameworks
  - Kaplan and Mikes propose a framework of 3 types of global risks
    - Natural & economic disasters with immediate impact
    - Geopolitical and environmental changes with long-term impact
    - Competitive risks (e.g., disruptive technologies) with medium-term impact
  - To manage these risks, they recommend **stress tests** and **scenario planning** for the first two, and **war gaming** for the third

Sources: Kaplan and Mikes, "Managing Risks: A New Framework," Harvard Business Review, June 2012; World Economic Forum, *Global Risks 2013*; Insurance Information Institute.

World Economic Forum: The Global Risks Sourcebook



Source: World Economic Forum, *Global Risks 2013*, at http://www3.weforum.org/docs/WEF_GlobalRisks_Report_2013.pdf .

World Economic Forum
Global Risks: 5 Major Categories

1. Economic Risks
2. Environmental Risks
3. Geopolitical Risks
4. Technological Risks
5. Societal Risks

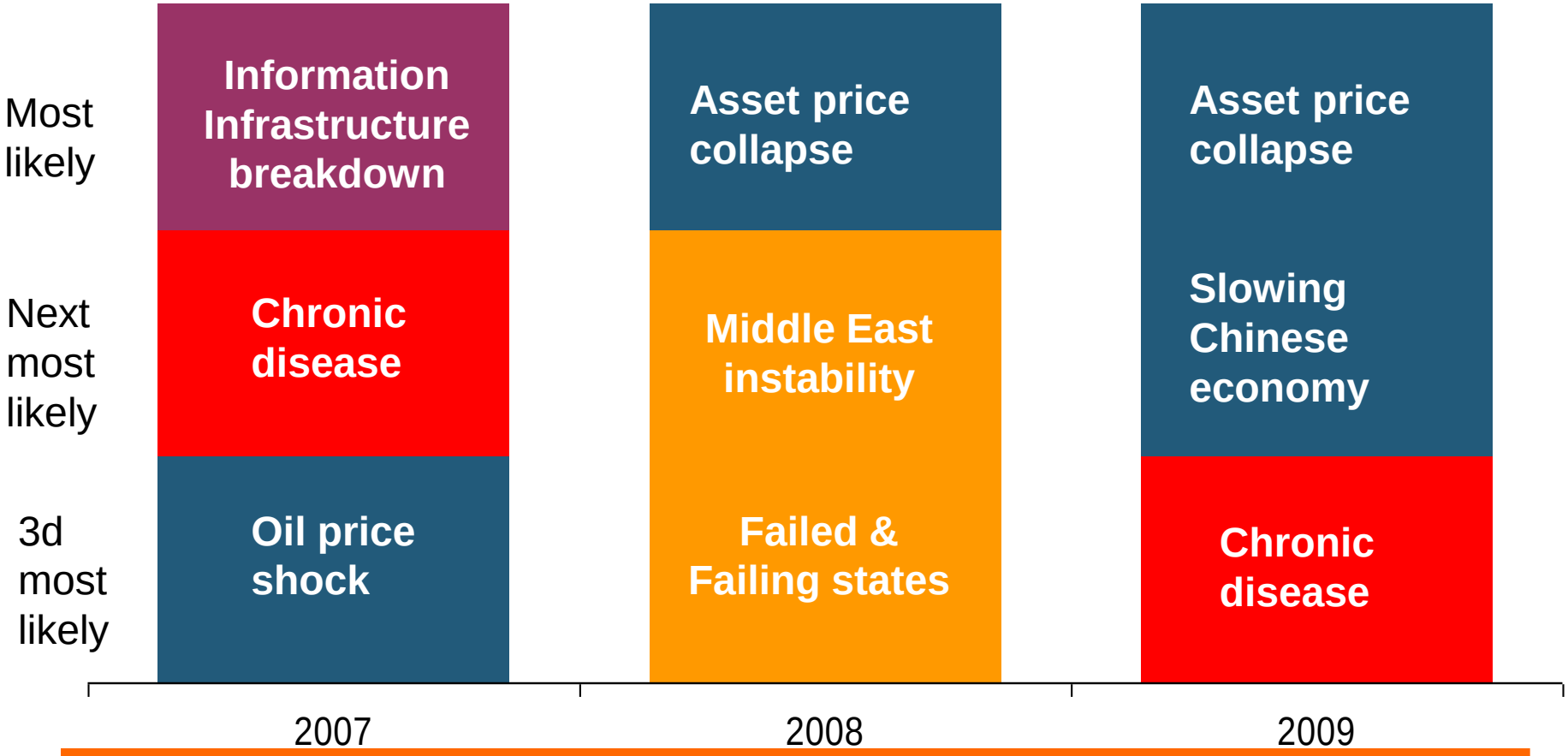
Risks can be broadly categorized, but no category is mutually exclusive

Sources: World Economic Forum, *Global Risks 2013*; Insurance Information Institute.

What Global Risks Do the "Experts" See as Most Significant Over the Next 10 Years?

The Risks Tend to be Seen in a "Rear View Mirror"

Top 3 Global Risks for the Next 10 Years, by Likelihood, 2007-2009

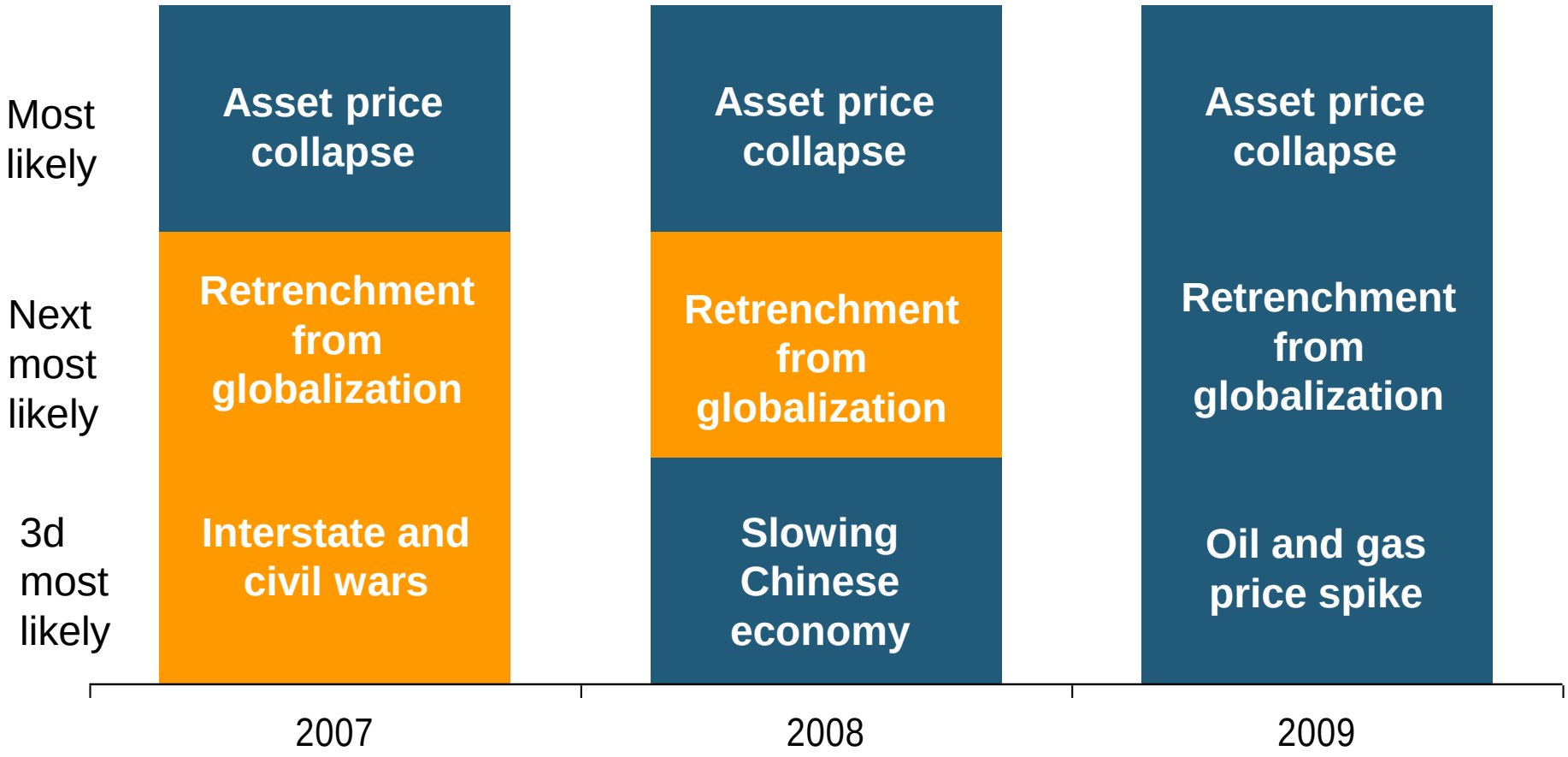


The experts seem to simply read the headlines in assessing likelihood.

Key: blue = economic risks; green = environmental risks; red = societal risks; orange = geopolitical risks; purple = technological risks

Sources: World Economic Forum, Global Risks 2013; Insurance Information Institute.

Top 3 Global Risks for the Next 10 Years, by Impact, 2007-2009



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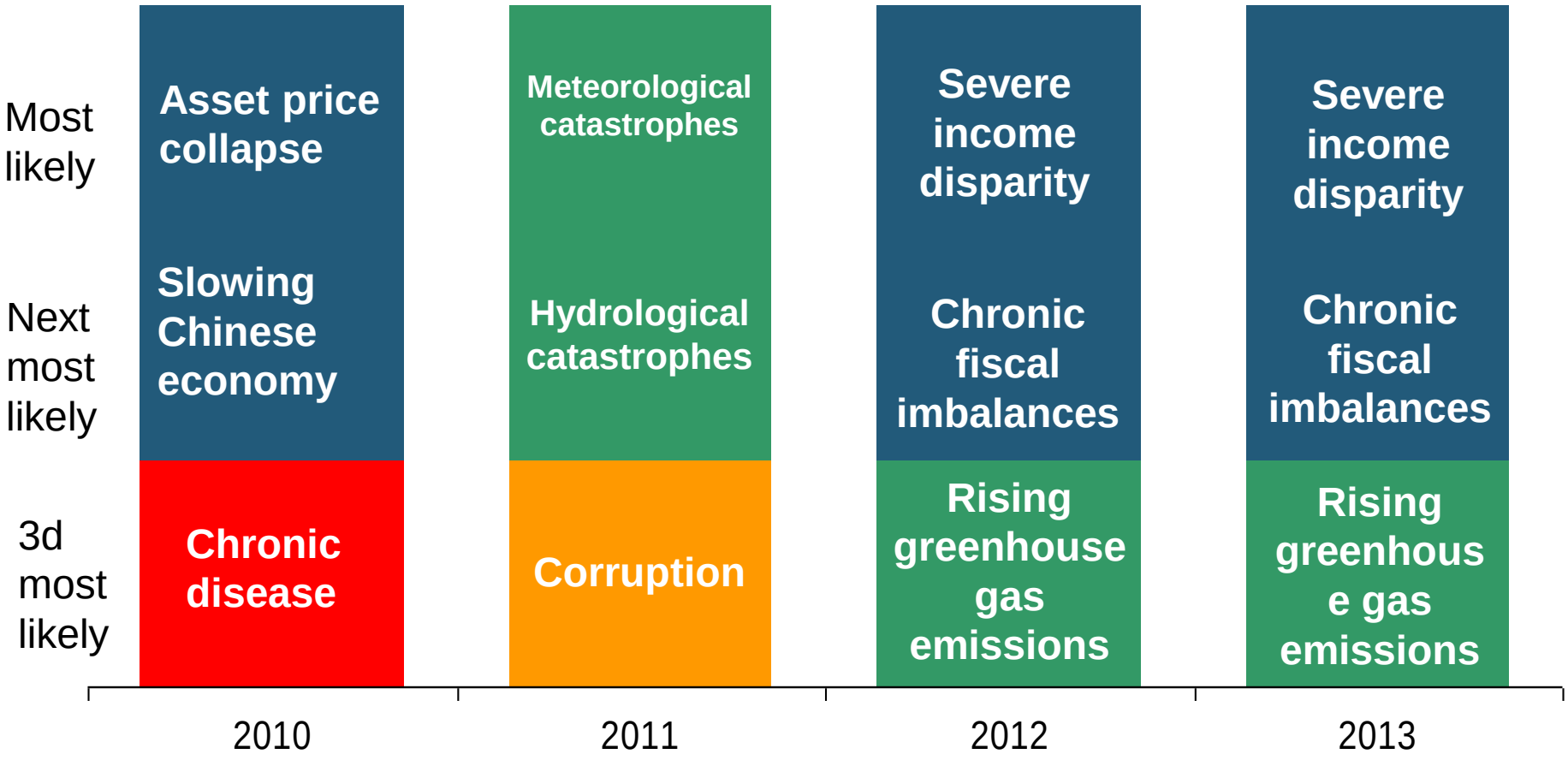
Top 3 Global Risks for the Next 10 Years, by Likelihood, 2010-2013



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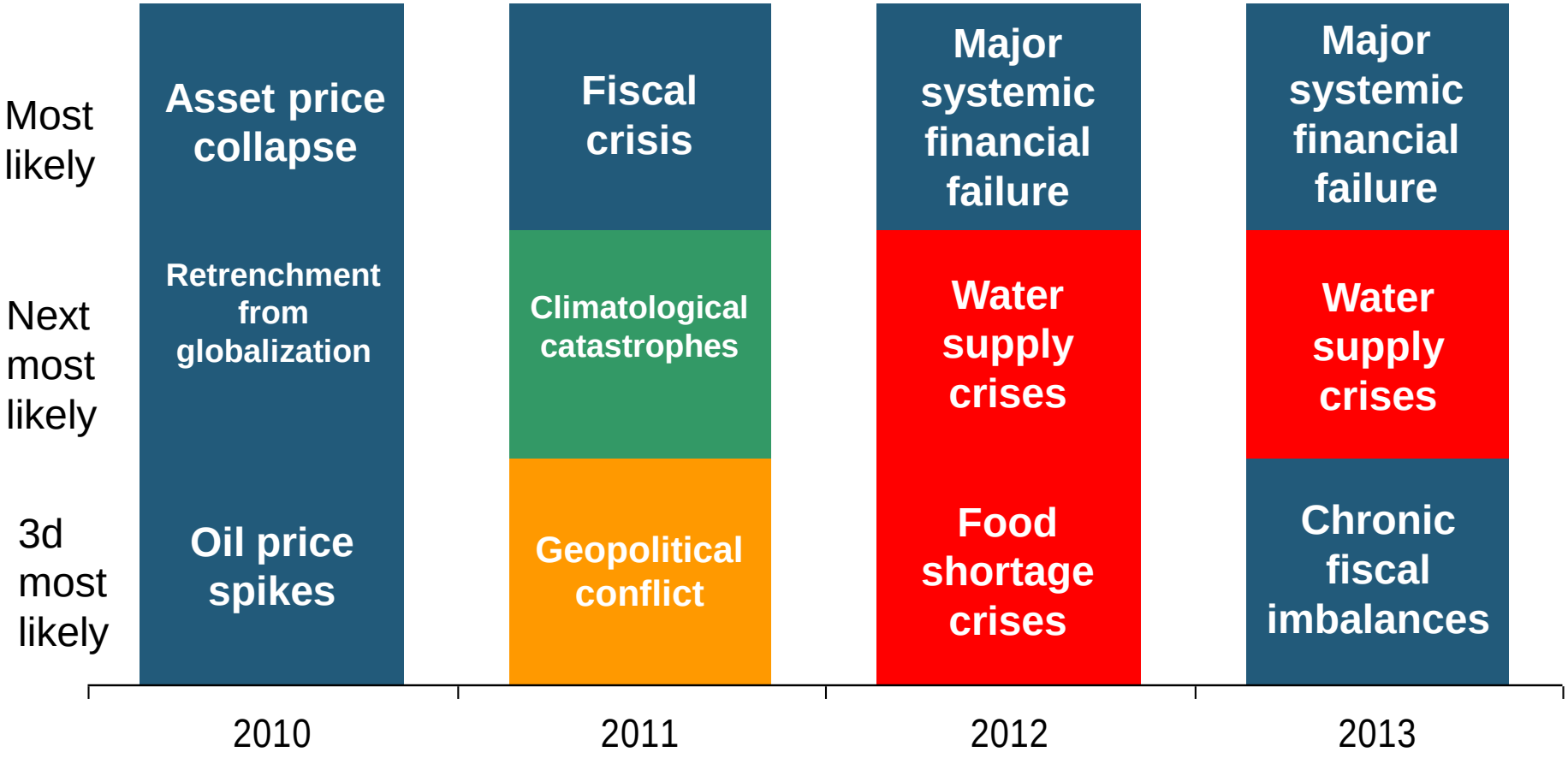
Top 3 Global Risks for the Next 10 Years, by Impact, 2010-2013



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Key: blue = economic risks; green = environmental risks; red = societal risks; orange = geopolitical risks

Sources: World Economic Forum, Global Risks 2013; Insurance Information Institute.

Global Economic Risks

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Near Term: We Won't Solve "Chronic Fiscal Imbalances" Through Strong Economic Growth

We Won't Solve "Severe Income Disparity" Through Strong Growth, Either

Economic Risk: Foremost on the Minds in "Advanced" Economies

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- **Economic Risks**
  - Chronic fiscal imbalances
  - Severe income disparity
  - Extreme volatility in energy and food prices
  - Recurring liquidity crises
  - Major systemic failure
  - Adverse unintended consequences of regulation
  - Unmanageable inflation/deflation
  - Chronic labor market imbalances
  - Hard landing of emerging economy

Sources: World Economic Forum, *Global Risks 2013*; Insurance Information Institute.

Changes in Assessment of Global Economic Risks, 2013 vs. 2012

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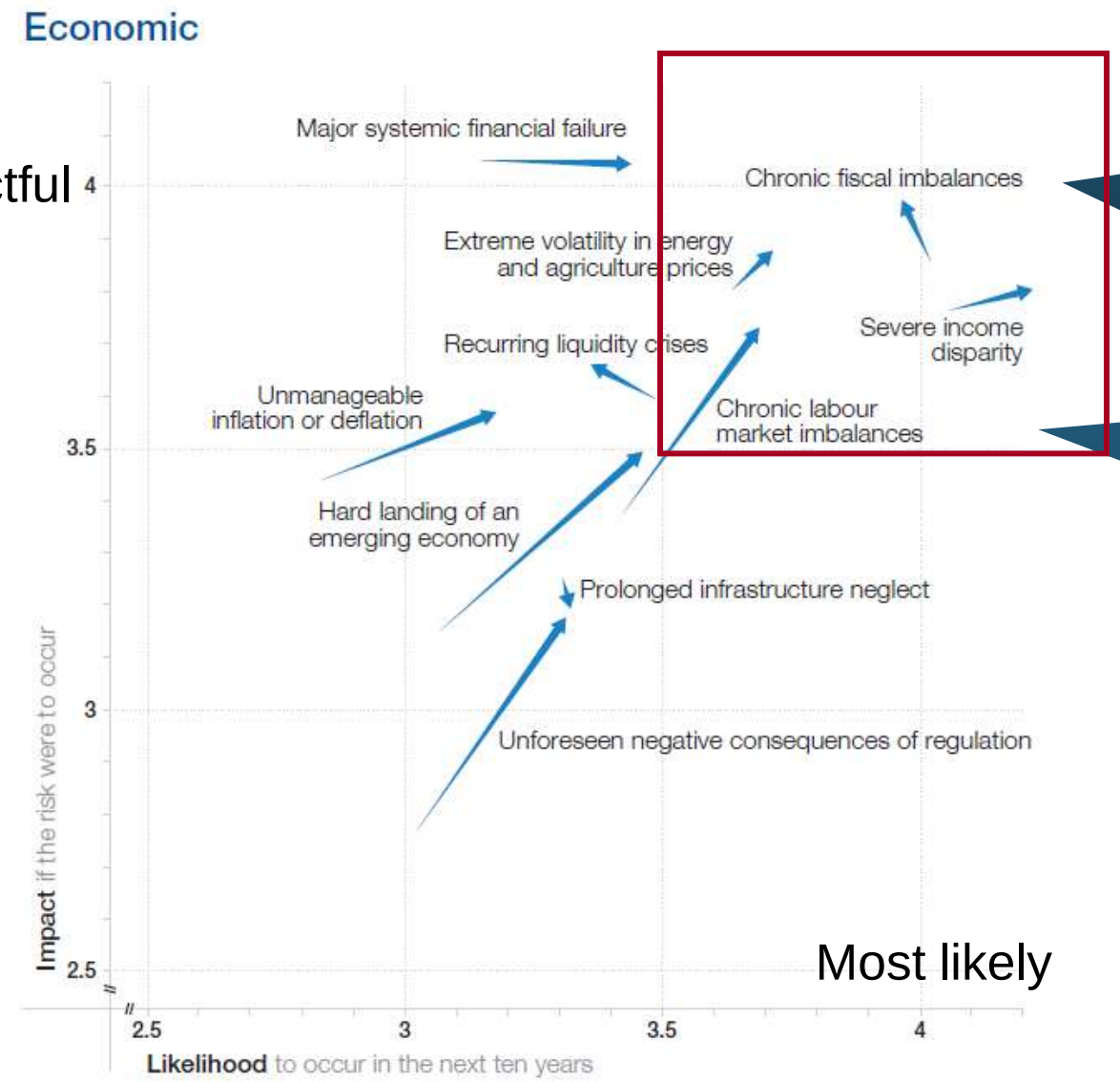
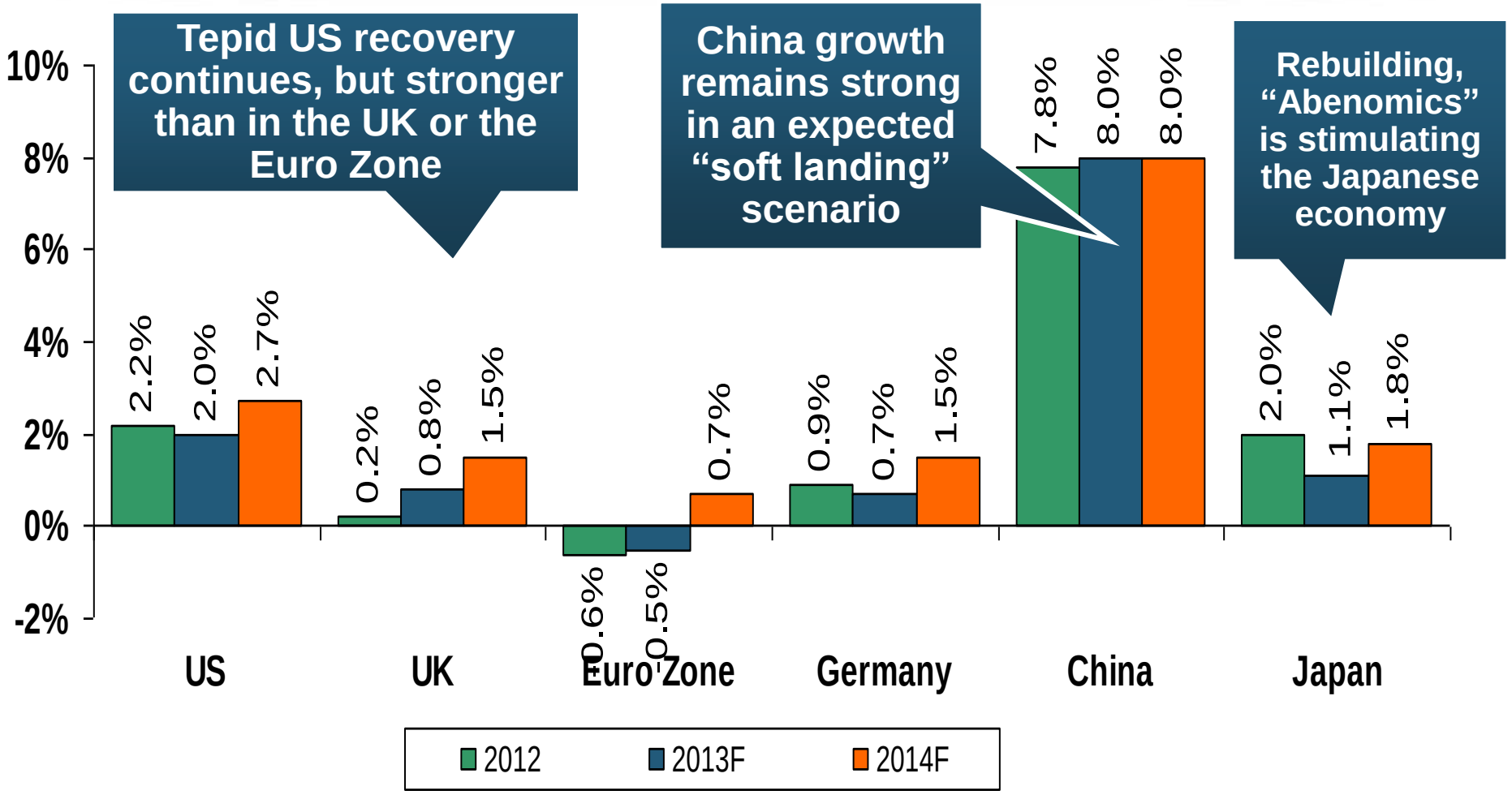


Pressure to cut government spending?

Pressure to boost government spending?

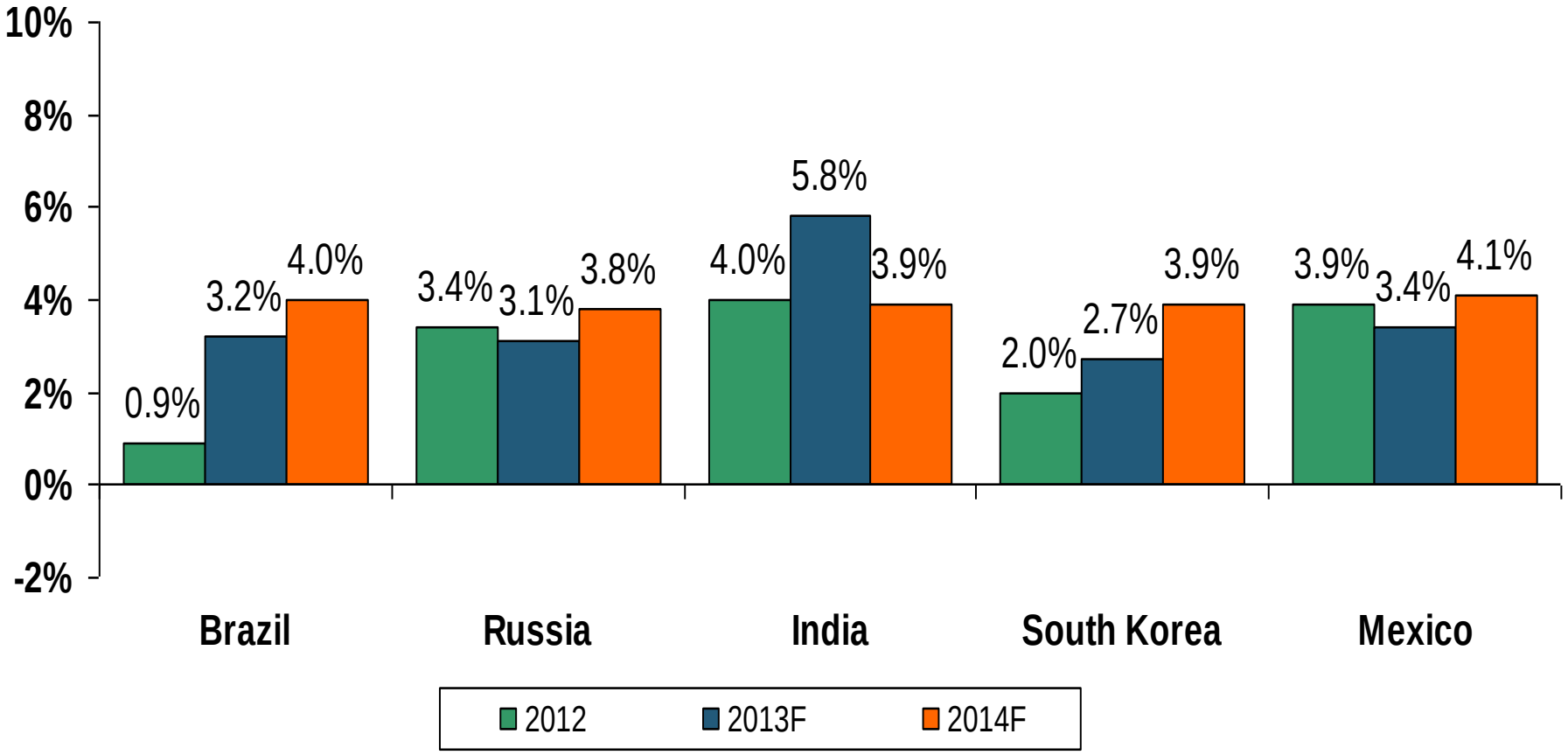
Real GDP Growth Forecasts, Major Economies: 2012 vs. 2013F & 2014F



Except for China, growth forecasts for the largest economies are modest.

Sources: Blue Chip Economic Indicators (5/2013 issue); Insurance Information Institute.

Real GDP Growth Forecasts, Emerging Economies: 2012 vs. 2013F & 2014F

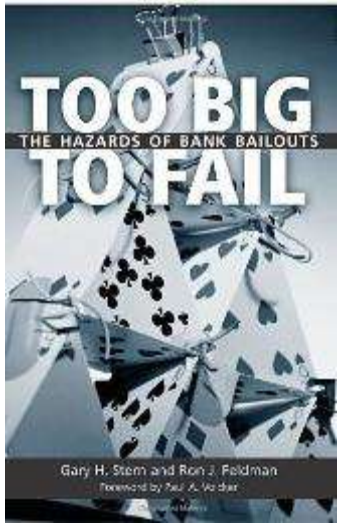


Growth prospects in the major emerging economies are expected to improve through 2014.

Sources: Blue Chip Economic Indicators (5/2013 issue); Insurance Information Institute.

Regulatory Risk: Financial Sector in Consumed with Post-Crisis Concerns

- **Capital Adequacy, Quality, Liquidity, Leverage, Prudential Oversight**
- **Dodd-Frank**
- **Basel III**
- **Solvency II**
- **Systemic Importance**
  - **US**
  - **Global**



Source: Insurance Information Institute.

Global Environmental Risks

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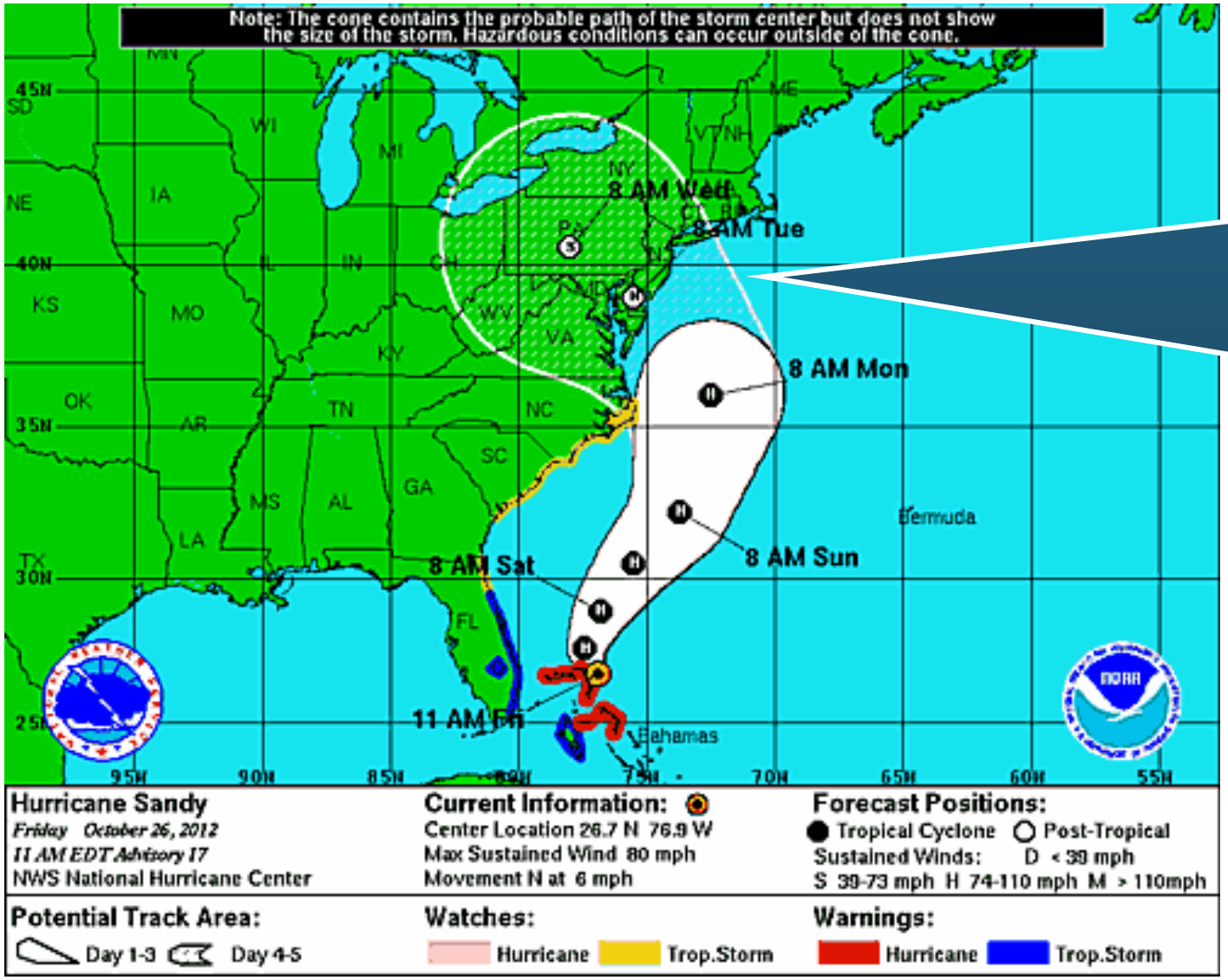
Near Term: Can We Marshall the Resources (and the Determination) to Deal with the Coming Changes?

We Won't Solve "Severe Income Disparity" Through Strong Growth, Either

SuperStorm Sandy: Can other non-hurricanes do this much damage?



SuperStorm Sandy is just the latest in a long list of unusual and severe weather events. Can the risk of events like Sandy be managed?

Source: NOAA (as of 11 AM Oct. 26, 2012); Insurance Information Institute.

Environmental Risk: Vulnerability and Susceptibility Vary Across the Globe

- **Environmental Risks**
  - **Rising greenhouse gas emissions**
  - **Failure of climate change adaptation**
  - **Land/water use mismanagement**
  - **Mismanaged urbanization**
  - **Antibiotic-resistant bacteria**
  - **Persistent extreme weather**
  - **Species overexploitation**
  - **Irremediable pollution**
  - **Vulnerability to geomagnetic storms**

Source: World Economic Forum, *Global Risks 2013*; Insurance Information Institute.

Changes in Assessment of Global Environmental Risks, 2013 vs. 2012

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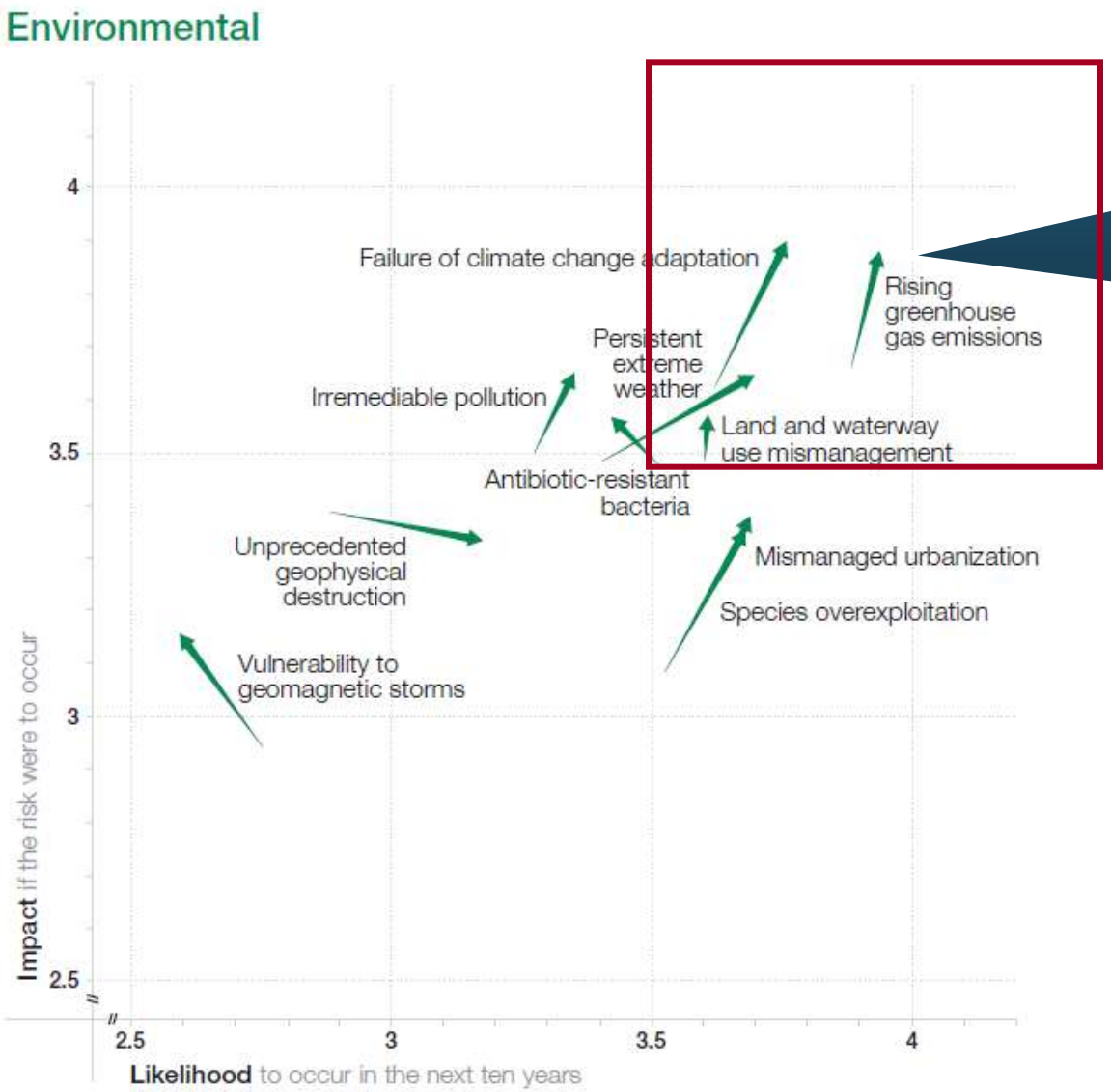

Pressure to boost government spending, regulation

Natural Catastrophes Worldwide 2011

Insured losses US$ 105bn - Percentage distribution per continent

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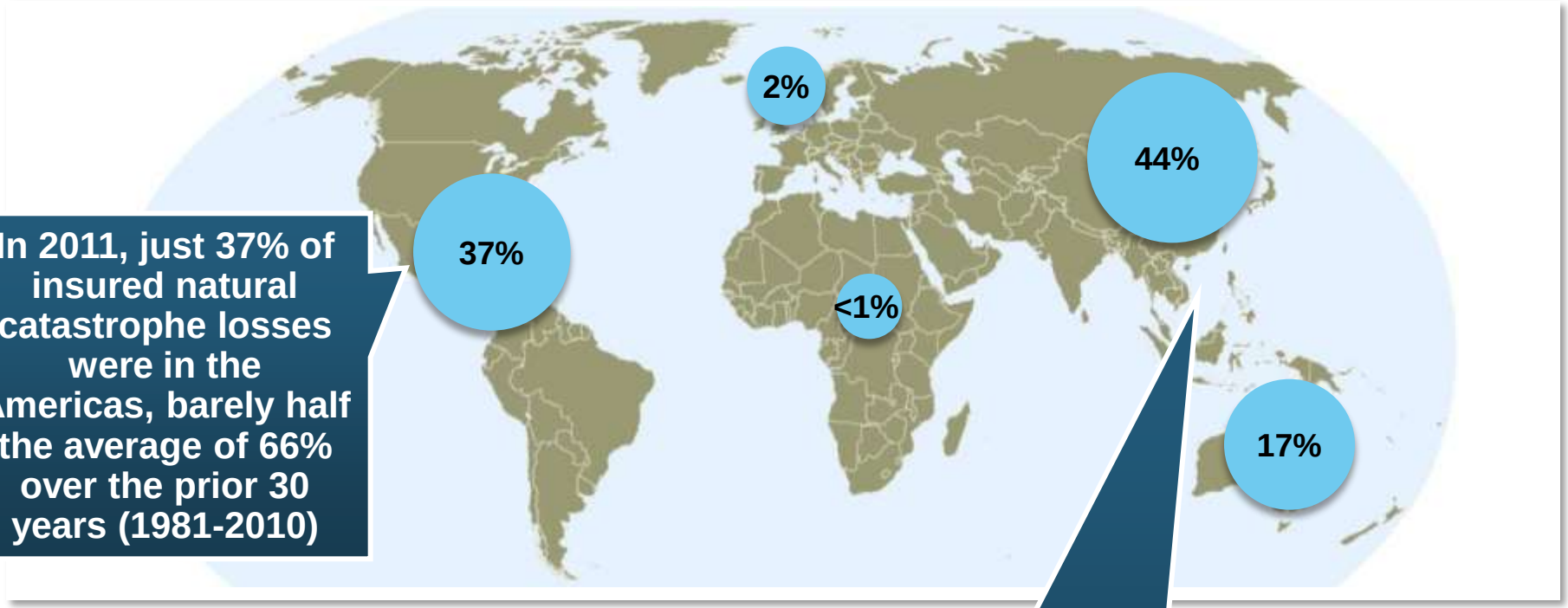

In 2011, just 37% of insured natural catastrophe losses were in the Americas, barely half the average of 66% over the prior 30 years (1981-2010)

Continent	Insured losses US$ m
America (North and South America)	40,000
Europe	2,000
Africa	Minor damages
Asia	45,000
Australia/Oceania	18,000

In 2011, 61% of insured natural catastrophe losses were in the Asia/Pacific region, nearly 3.5 times the average of 13% over the prior 30 years (1981-2010)

Source: MR NatCat*SERVICE*

Natural Catastrophes Worldwide 1980 – 2011
Insured losses US$ 870bn - Percentage distribution per continent

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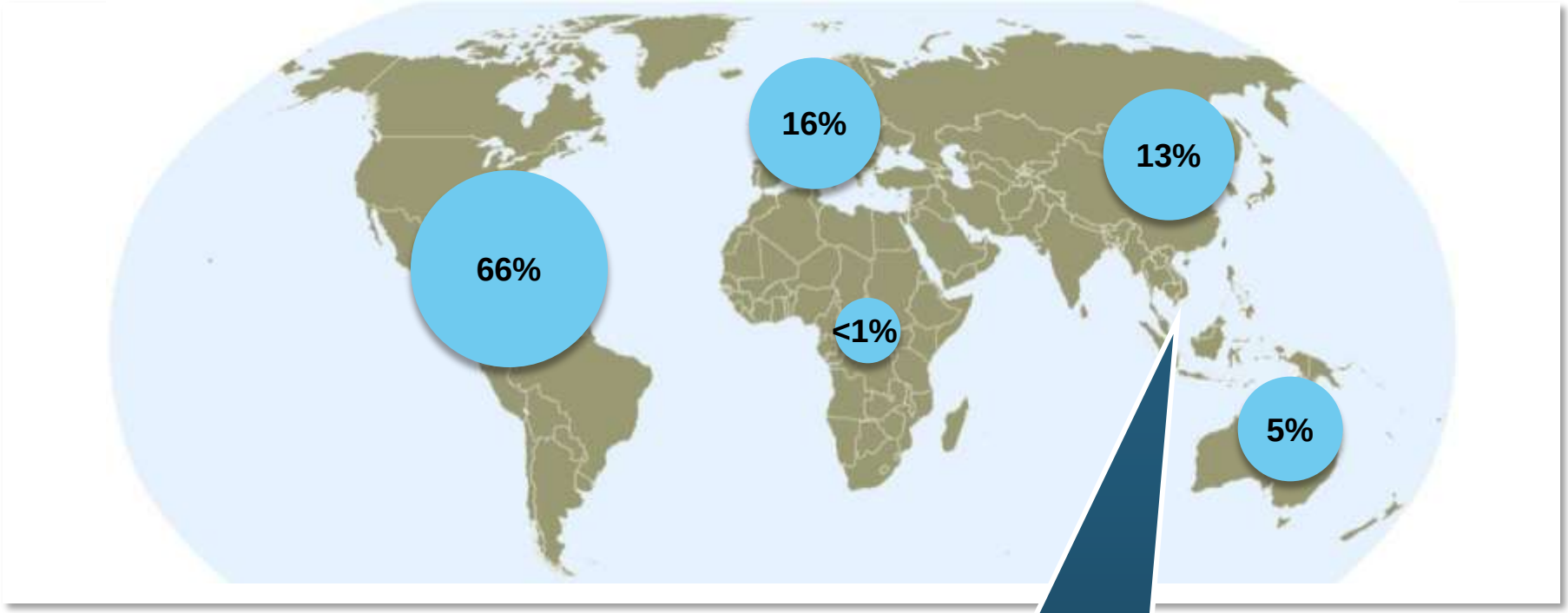


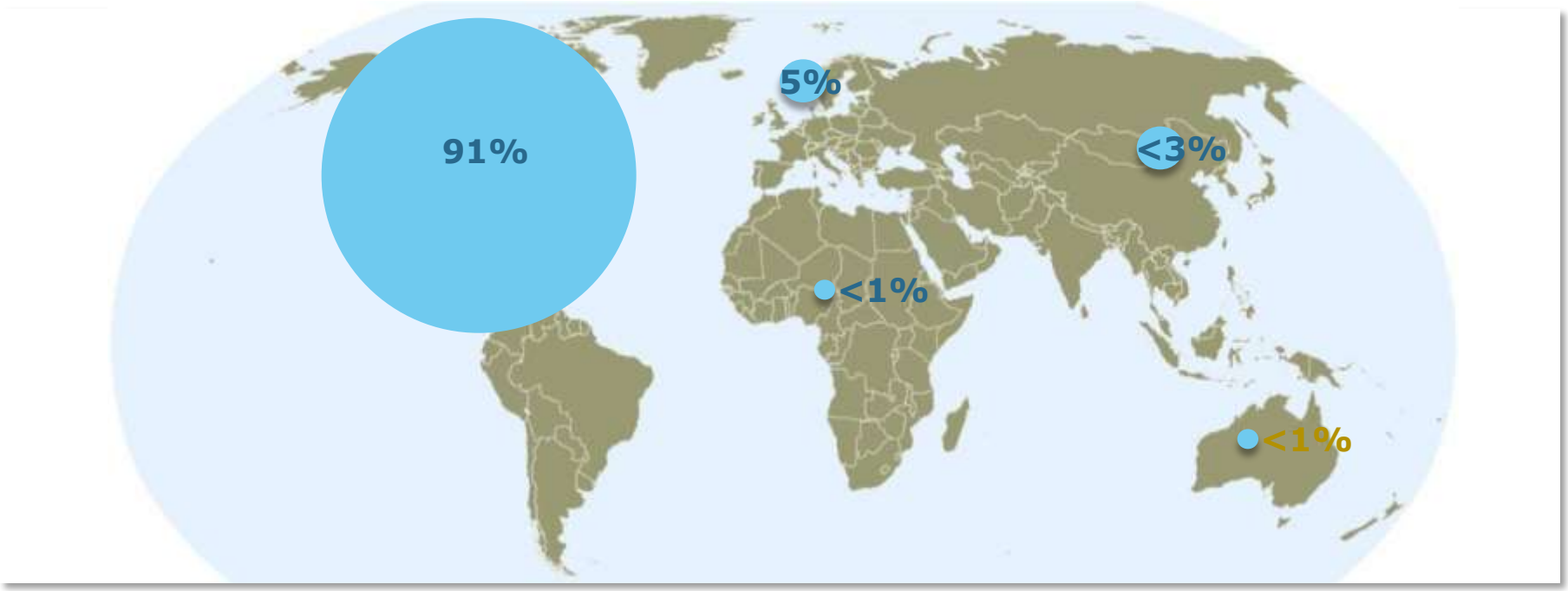
Continent	Insured losses US$ m
America (North and South America)	566,000
Europe	146,000
Africa	2,000
Asia	115,000
Australia/Oceania	41,000

In 2011, 61% of natural catastrophe losses were in the Asia/Pacific region, nearly 3.5 times the average of 13% over the prior 30 years (1981-2010)

Source: MR NatCat*SERVICE*

22

Natural catastrophes worldwide 2012
Insured losses US$ 65bn - Percentage distribution per continent



Continent	Insured losses US$ m
America (North and South America)	60,000
Europe	3,200
Africa	200
Asia	1,700
Australia/Oceania	300

Source: Geo Risks Research, NatCatSERVICE – As at January 2013 © 2013 Munich Re

Natural Catastrophes 2012

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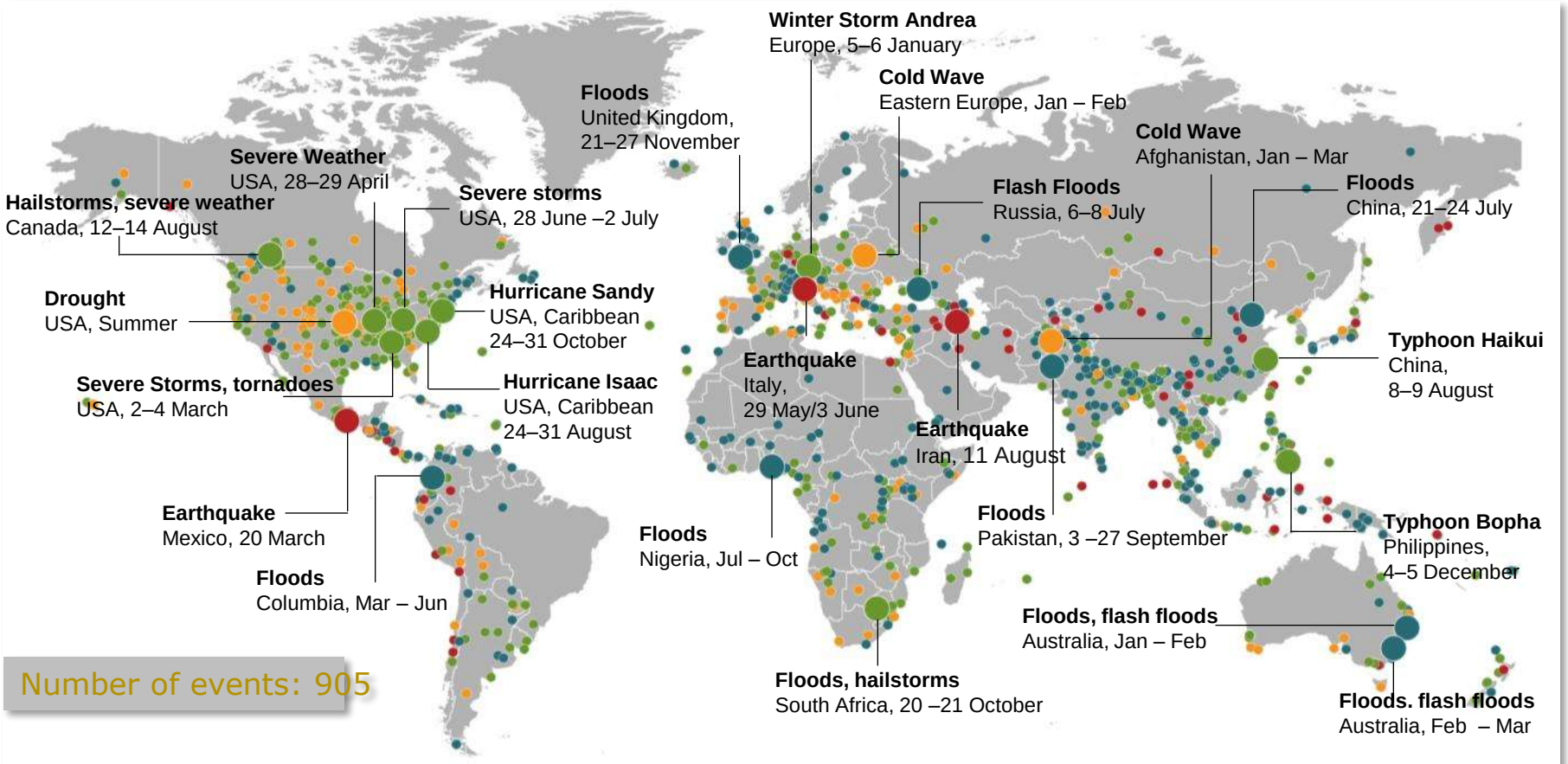

- ○ **Natural catastrophes**
- ◯ **Selection of significant Natural catastrophes**
- **Geophysical events** (earthquake, tsunami, volcanic activity)
- **Meteorological events** (storm)
- **Hydrological events** (flood, mass movement)
- **Climatological events** (extreme temperature, drought, wildfire)

Source: Geo Risks Research, NatCatSERVICE – As at January 2013 © 2013 Munich Re

Number of natural catastrophes worldwide, 1980 – 2012

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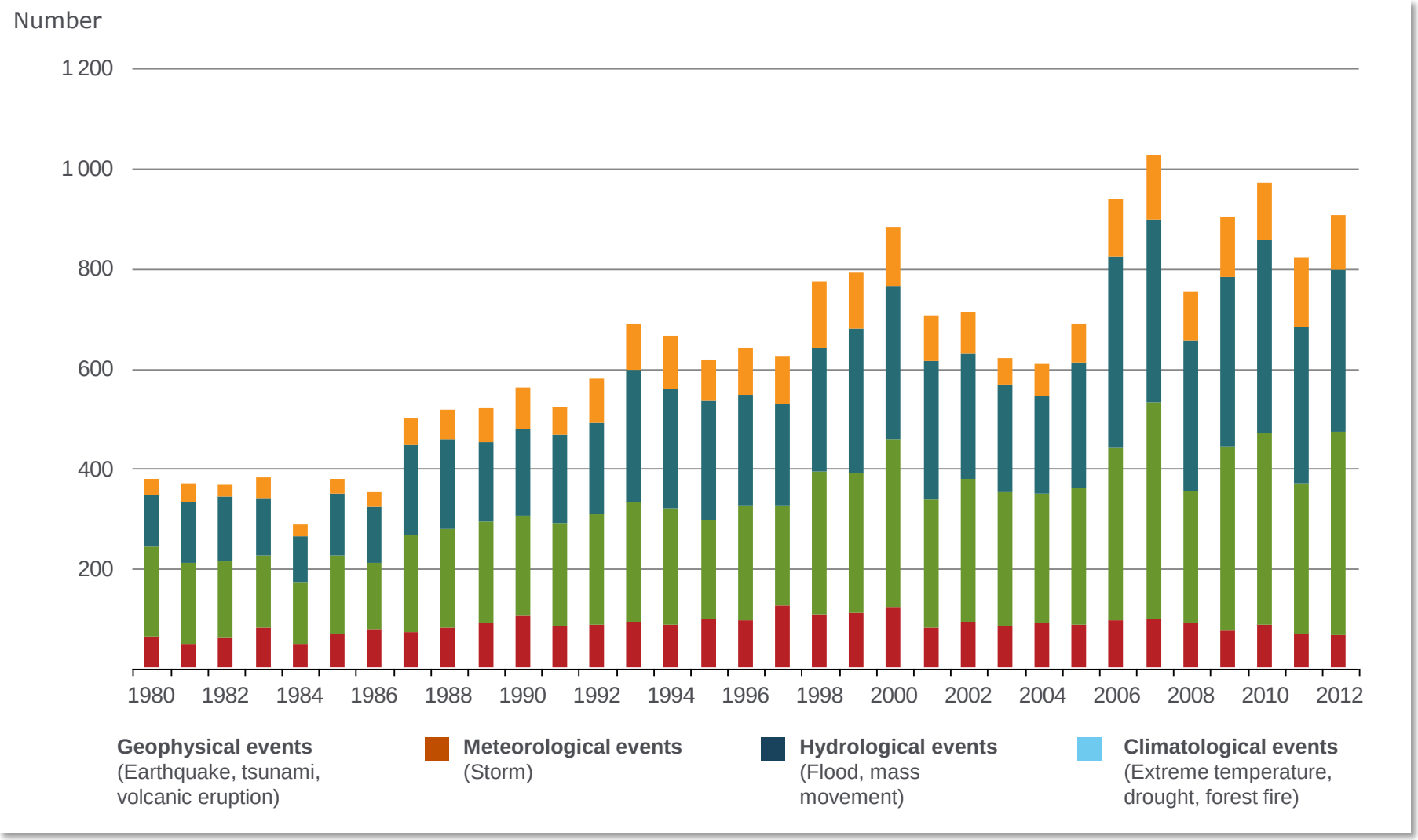
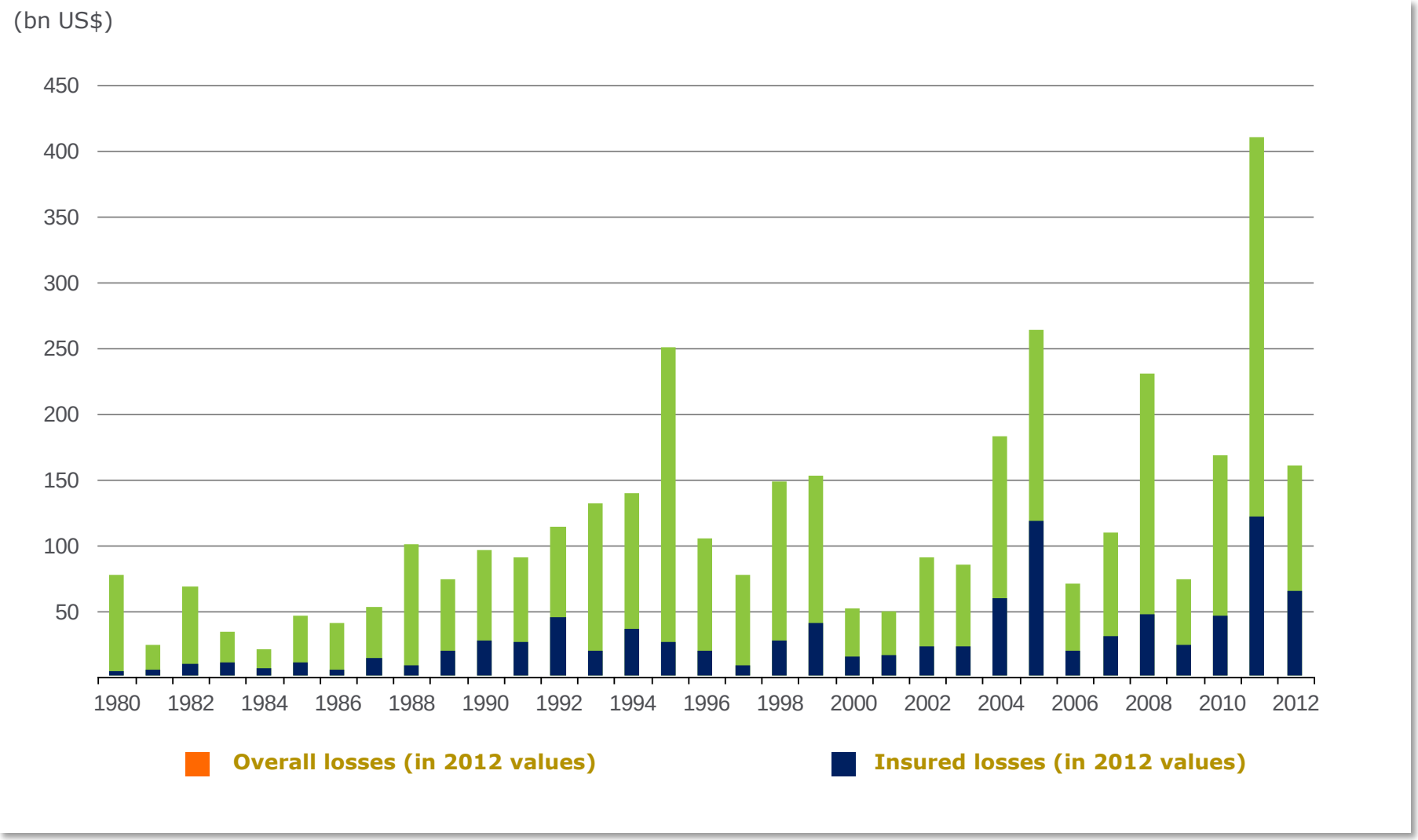


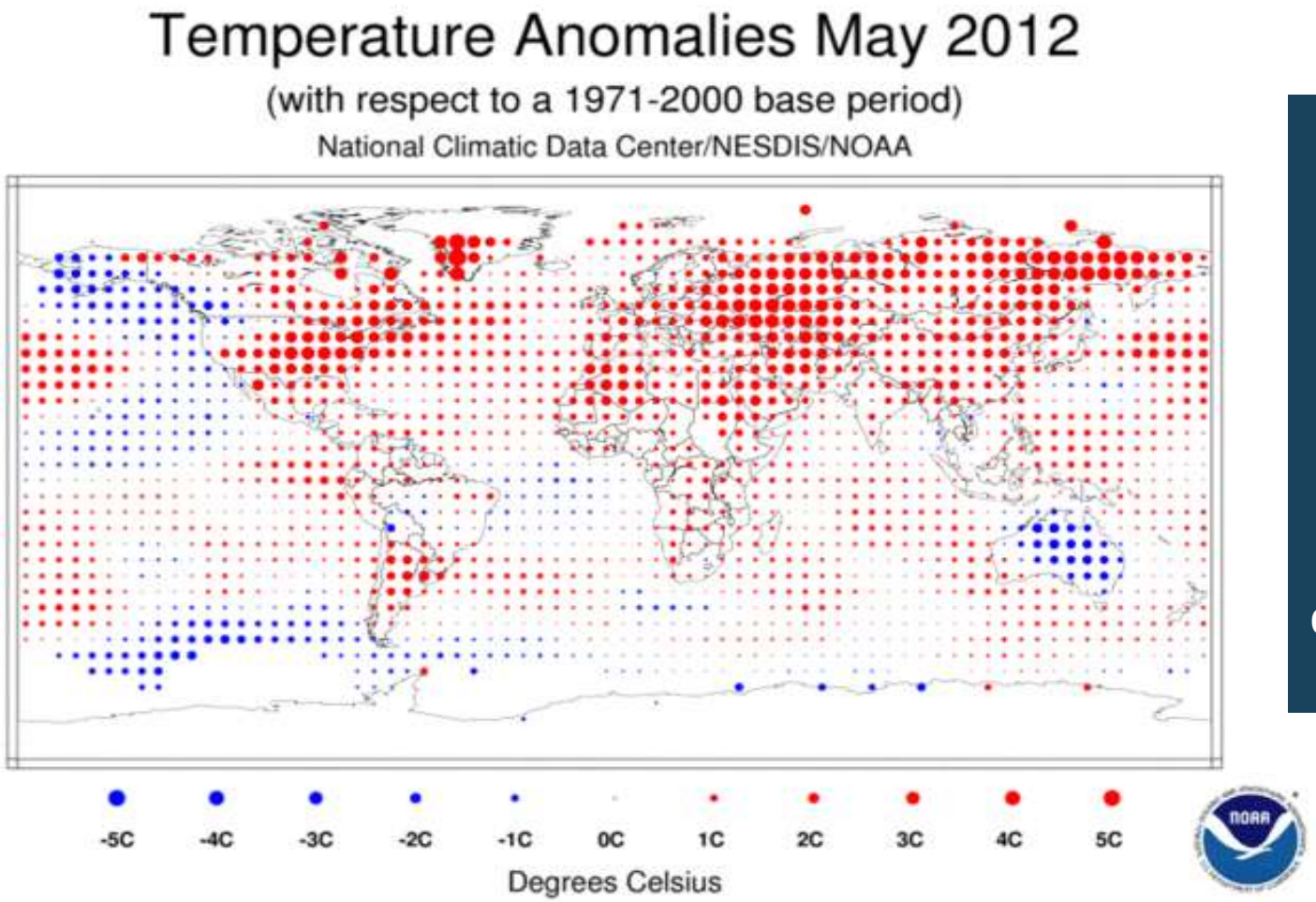
Source: Geo Risks Research, NatCatSERVICE – As at January 2013 © 2013 Munich Re

Economic and Insured Losses, Natural Catastrophes worldwide 1980 – 2012



Source: Geo Risks Research, NatCatSERVICE – As at January 2013 © 2013 Munich Re

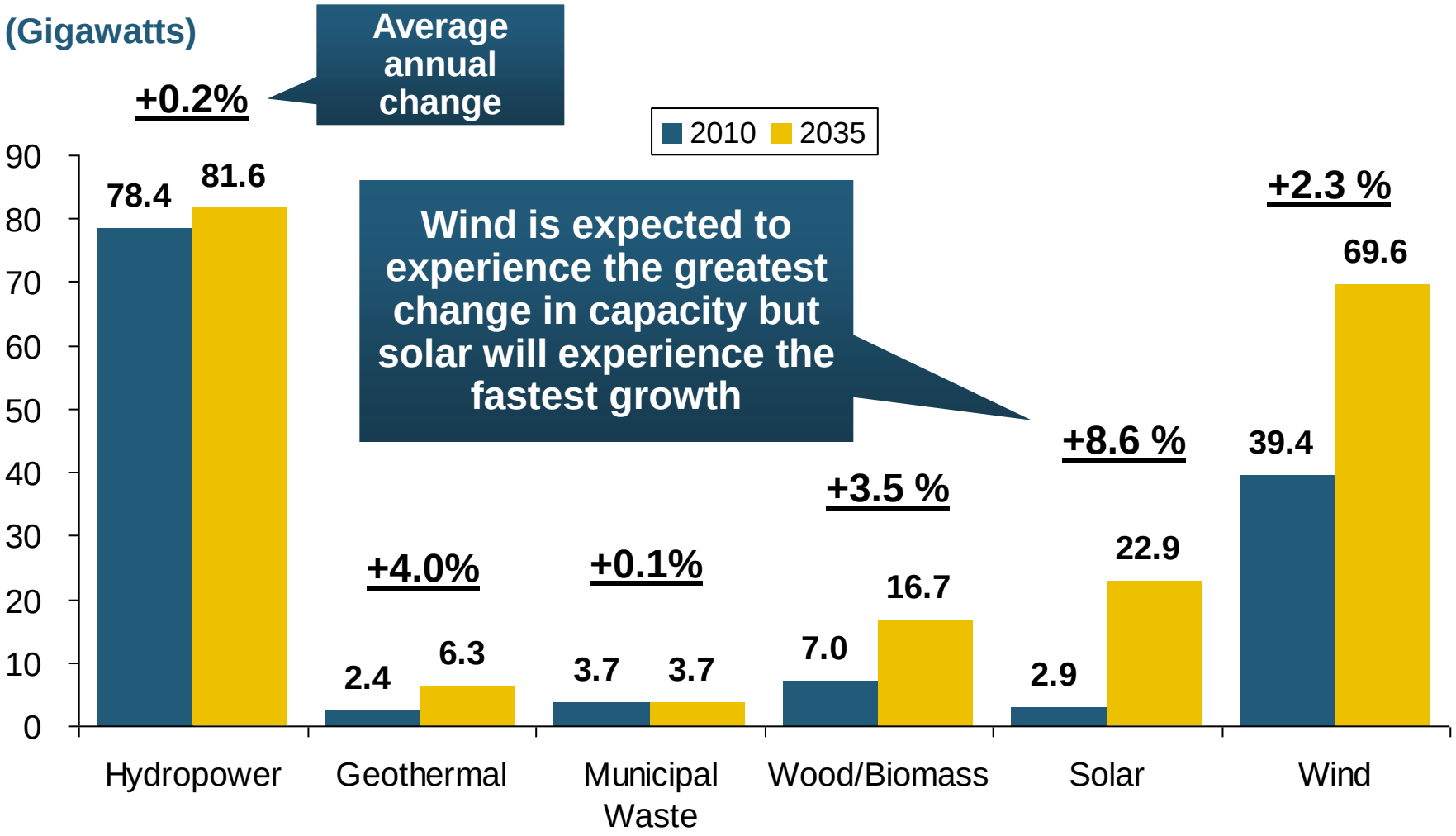
Global Temperature Anomolies, May 2012



Northern hemisphere land and ocean temperature for May 2012 was the all-time warmest on record, at 0.85 degrees C (1.53 degrees F) above average

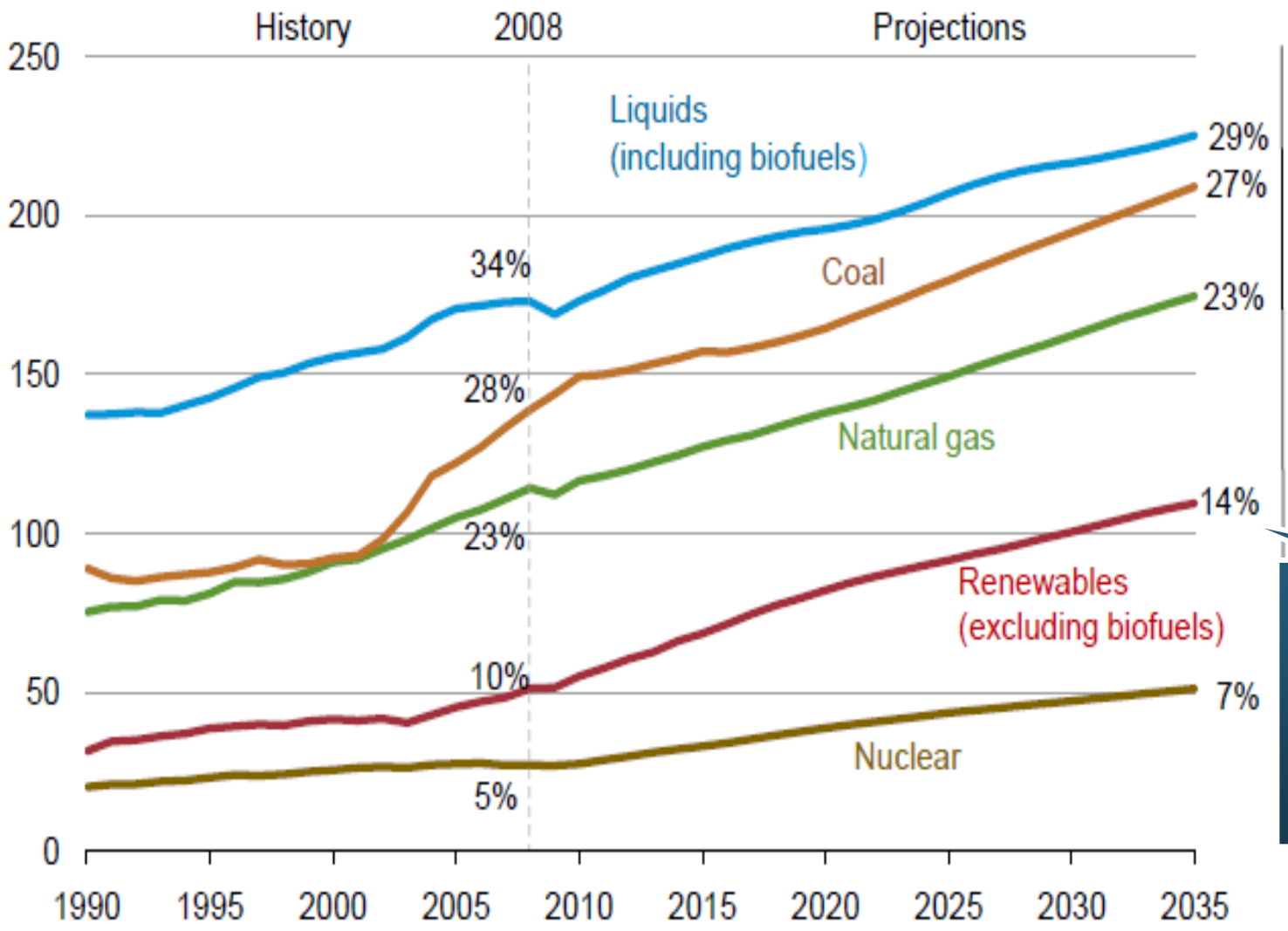
Source: NOAA

U.S. Renewable Energy Net Summer Capacity & Avg. Ann. Change, by Source, 2010 – 2035P



Source: US Energy Information Administration, *Annual Energy Outlook 2012,* Appendix A16; Insurance Information Institute.

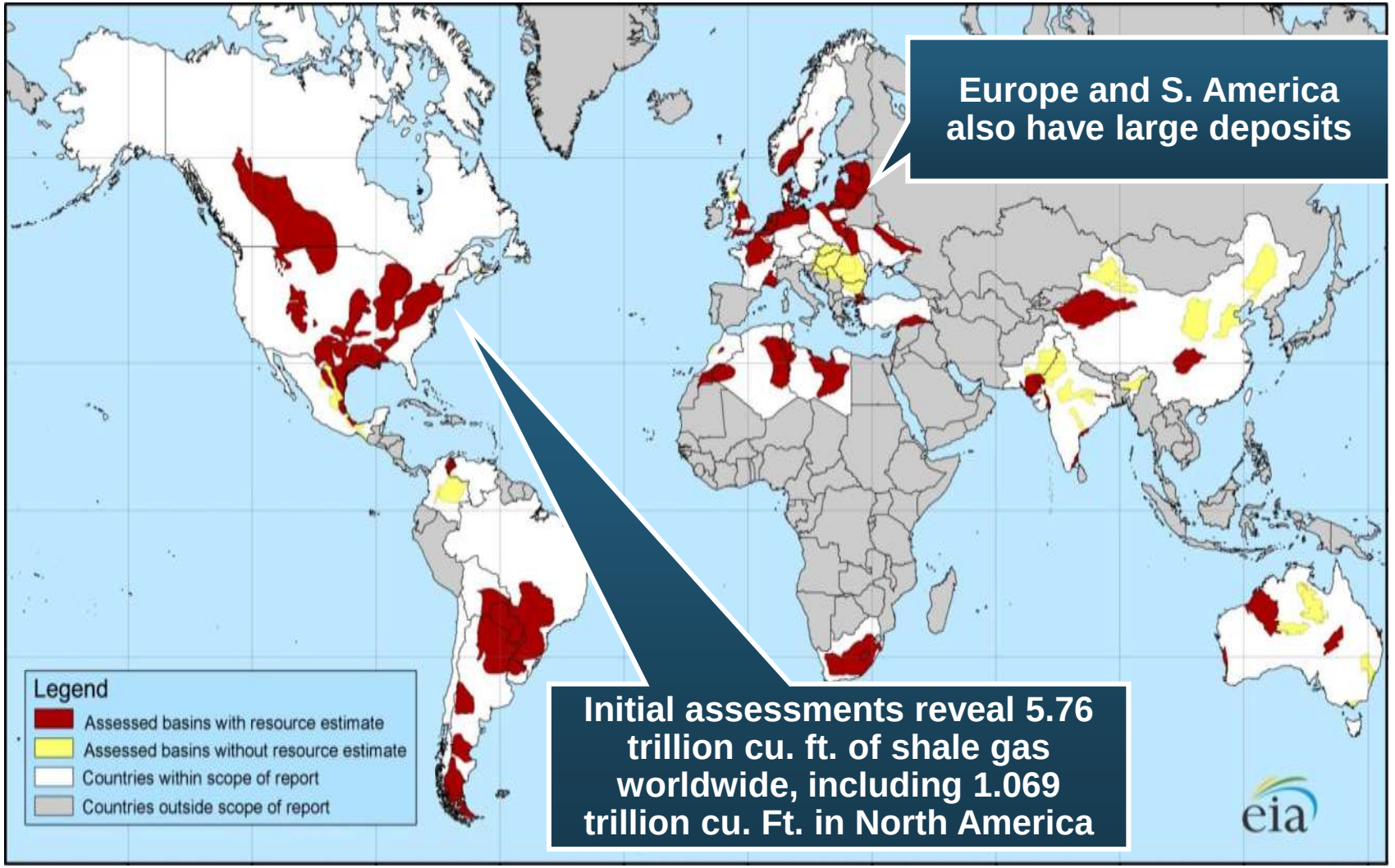
World Energy Consumption by Fuel, 1990—2035F



Renewables will account for 14% of global energy consumption by 2035, up from 10% in 2008

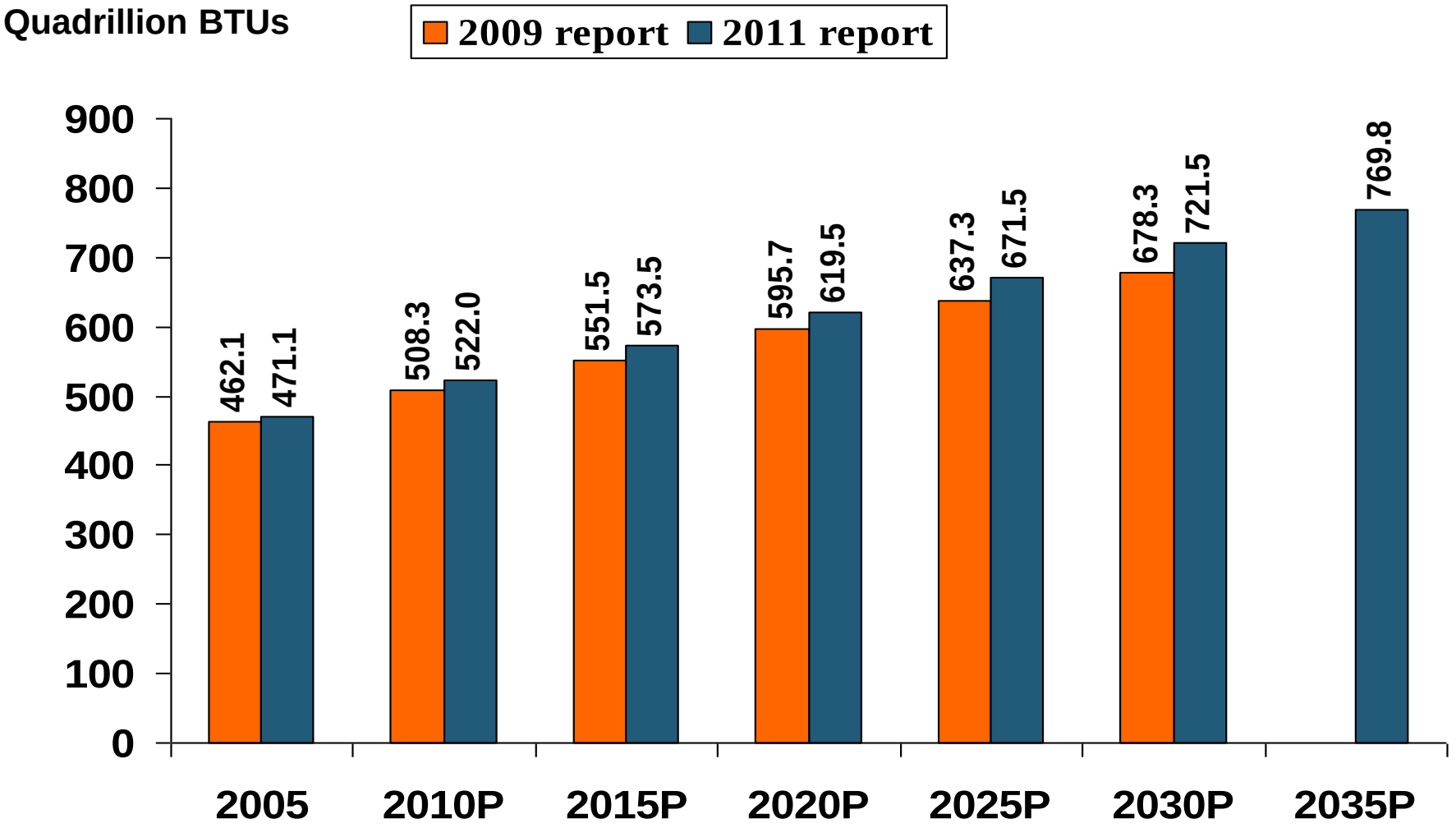
Source: US Energy Information Administration, *International Energy Outlook 2011;* Insurance Information Institute.

Distribution of Major Shale Deposits: 5.76 Tr. Cu. Ft. in 48 Shale Basins in 32 Countries



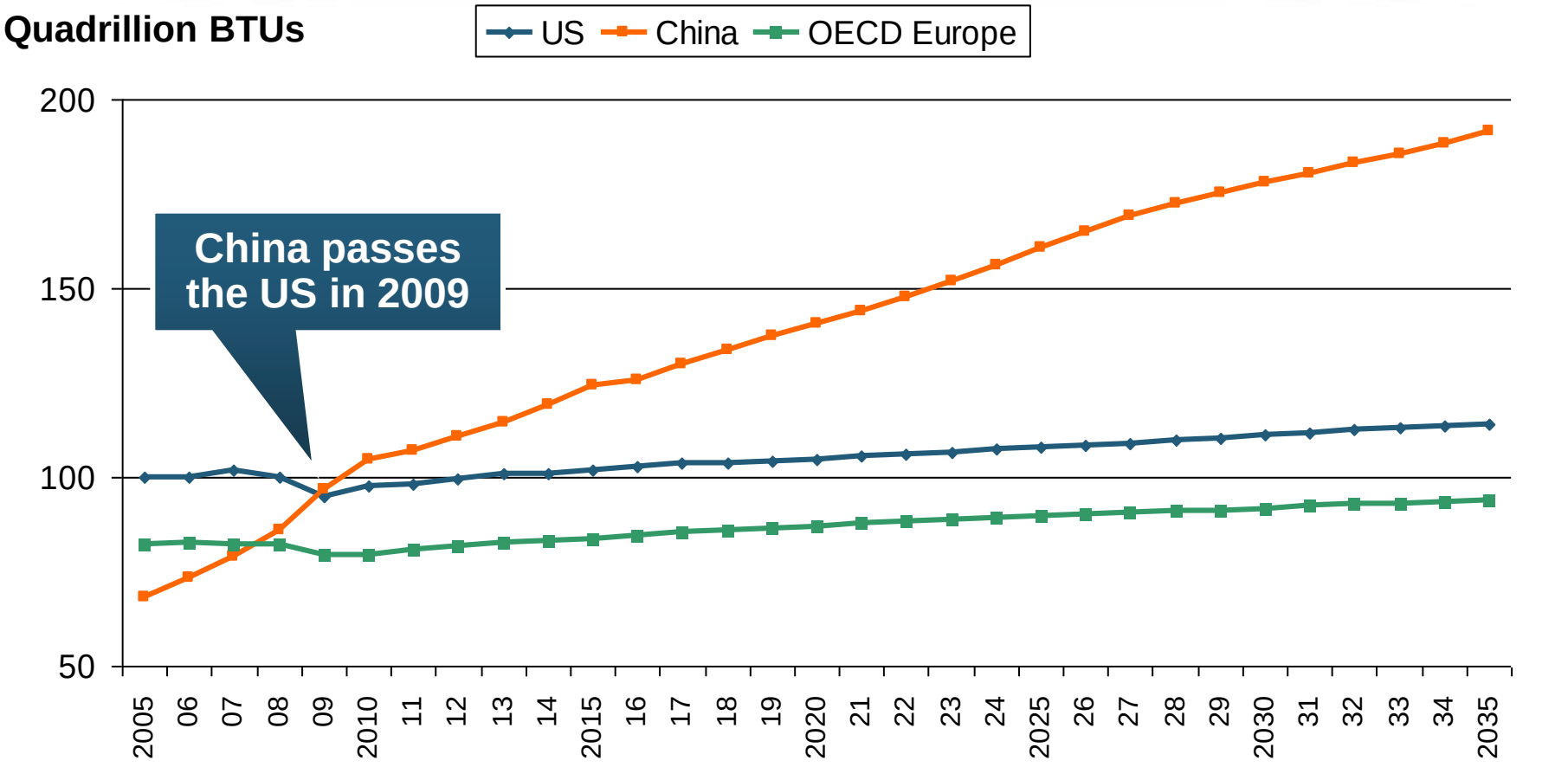
Source: US Energy Information Administration; Insurance Information Institute.

World Primary Energy Consumption, 2005-2035P



Sources: Energy Information Administration, *2011 International Energy Outlook*, at http://www.eia.gov/oiaf/aeo/tablebrowser/#release=IEO2011&subject=0-IEO2011&table=1-IEO2011&region=0-0&cases=Reference-0504a_1630 Insurance Information Institute.
The next report is due June 10, 2013.

Primary Energy Consumption, by Country, 2005–2035



Already, China uses more energy than any other country. By 2035, China's use (191.4) is projected to be only slightly less than the combined use of the US and the OECD-Europe countries (208.0).

Sources: Energy Information Administration, *2011 International Energy Outlook*, at http://www.eia.gov/oiaf/aeo/tablebrowser/#release=IEO2011&subject=0-IEO2011&table=1-IEO2011&region=0-0&cases=Reference-0504a_1630 Insurance Information Institute.

Global Warming Effects: The Next 70 Years

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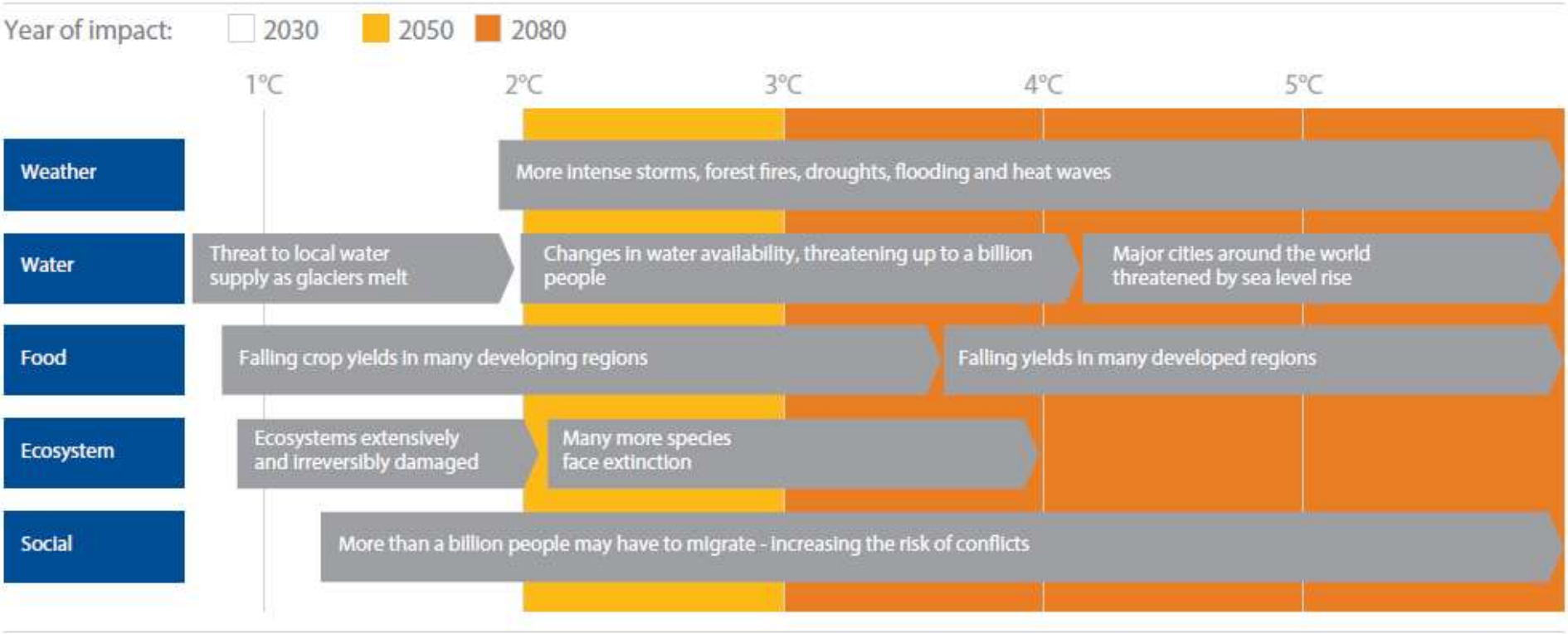
Figure 9: Possible Impact of Global Warming on Different Sectors

Temperature above preindustrial - IPCC scenario A1B



Source: Adapted from *Shaping Climate-Resilient Development: A Framework for Decision-Making*. 2009. Economics of Climate Adaptation Working Group.

Sources: World Economic Forum, Global Risks 2013; Insurance Information Institute.

Global Geopolitical Risks

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Do We Have to Learn to Live With These Risks?

Geopolitical Risk: Foremost on the Minds in "Emerging" Economies

- Pervasive entrenched corruption
- Critical fragile states
- Terrorism
- Failure of diplomatic conflict resolution
- Global governance failure
- Entrenched organized crime
- Widespread illicit trade
- Diffusion of WMD
- Unilateral resource nationalization
- Militarization of space

Source: World Economic Forum, *Global Risks 2013*; Insurance Information Institute.

Changes in Assessment of Global Geopolitical Risks, 2013 vs. 2012

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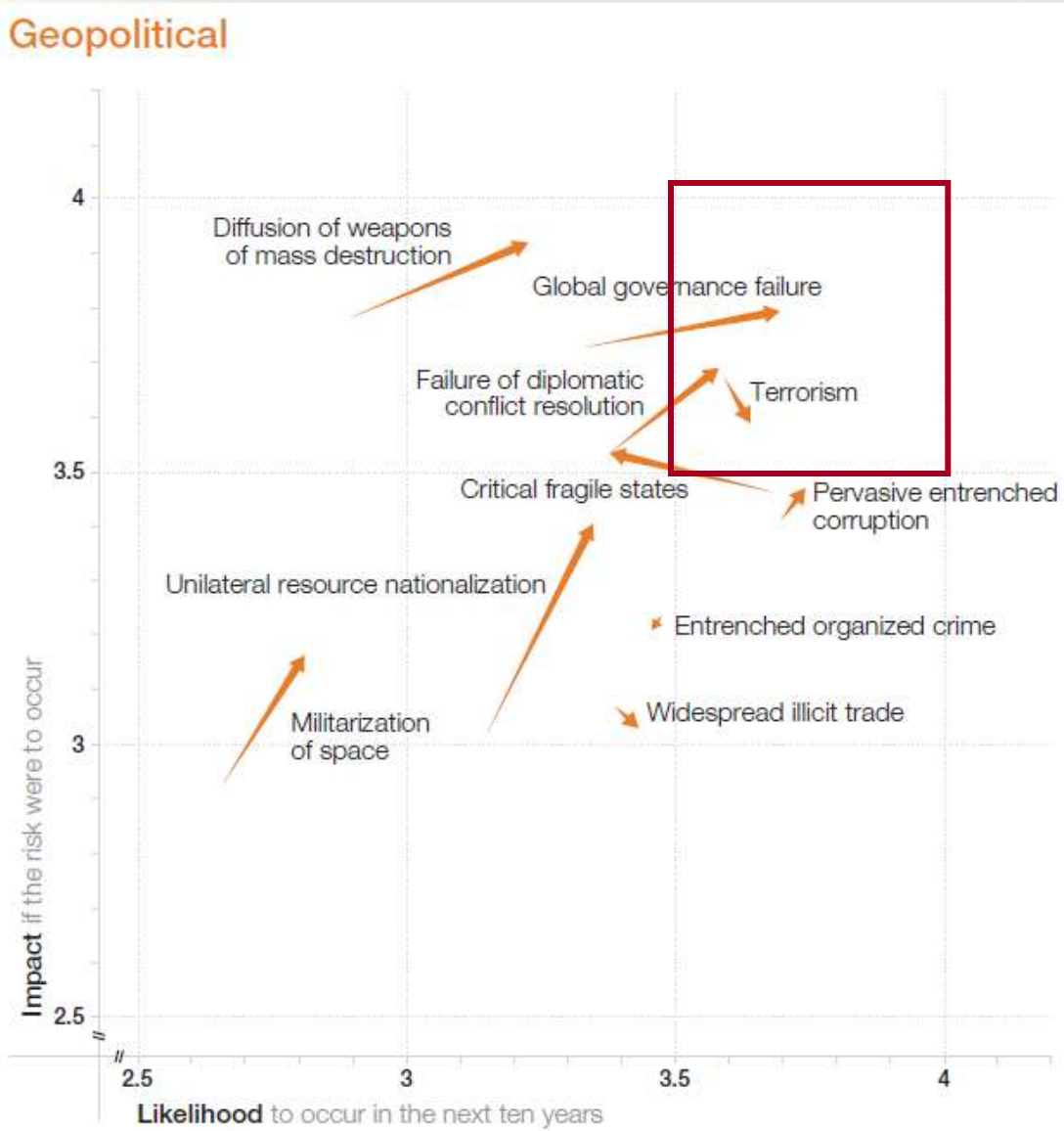

Some Great Business Opportunities Are in Politically Risky Nations

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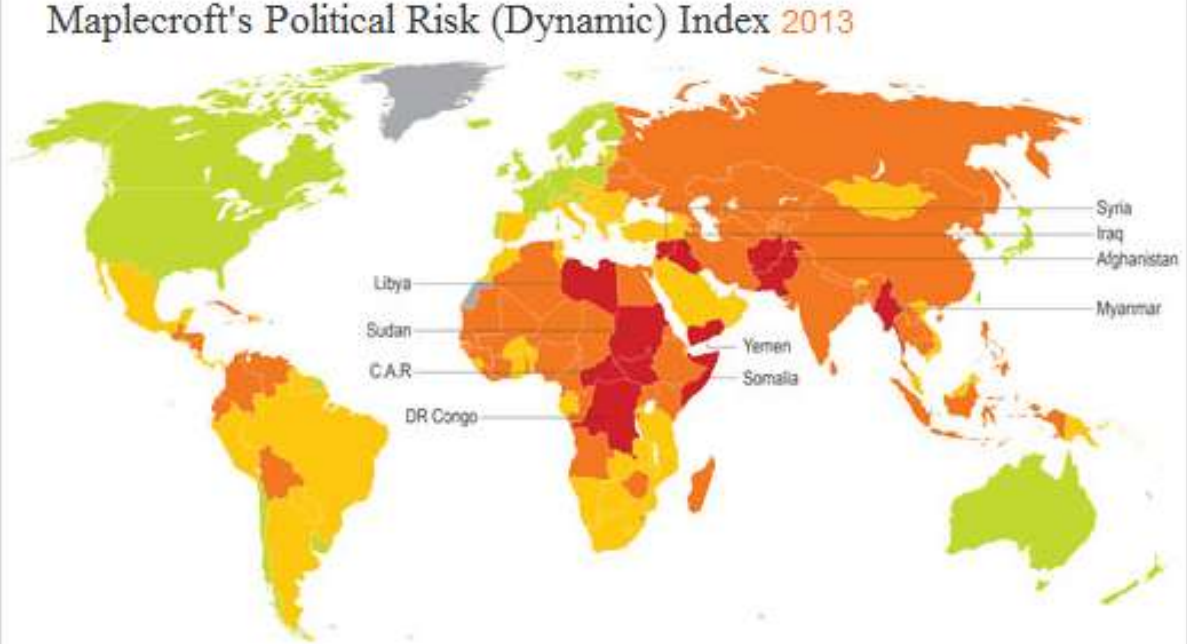

Legend	
Extreme risk	
High risk	
Medium risk	
Low risk	
No Data	

Rank	Country	Rating
1	Somalia	Extreme
2	DR Congo	Extreme
3	Sudan	Extreme
4	Afghanistan	Extreme
5	Myanmar	Extreme

Rank	Country	Rating
6	Iraq	Extreme
7	Libya	Extreme
8	C.A.R	Extreme
9	Syria	Extreme
10	Yemen	Extreme

Source: Maplecroft Terrorism Risk Index at http://maplecroft.com/about/news/pra_2013.html

The Greatest Business Opportunities Are Often in Politically Risky Nations

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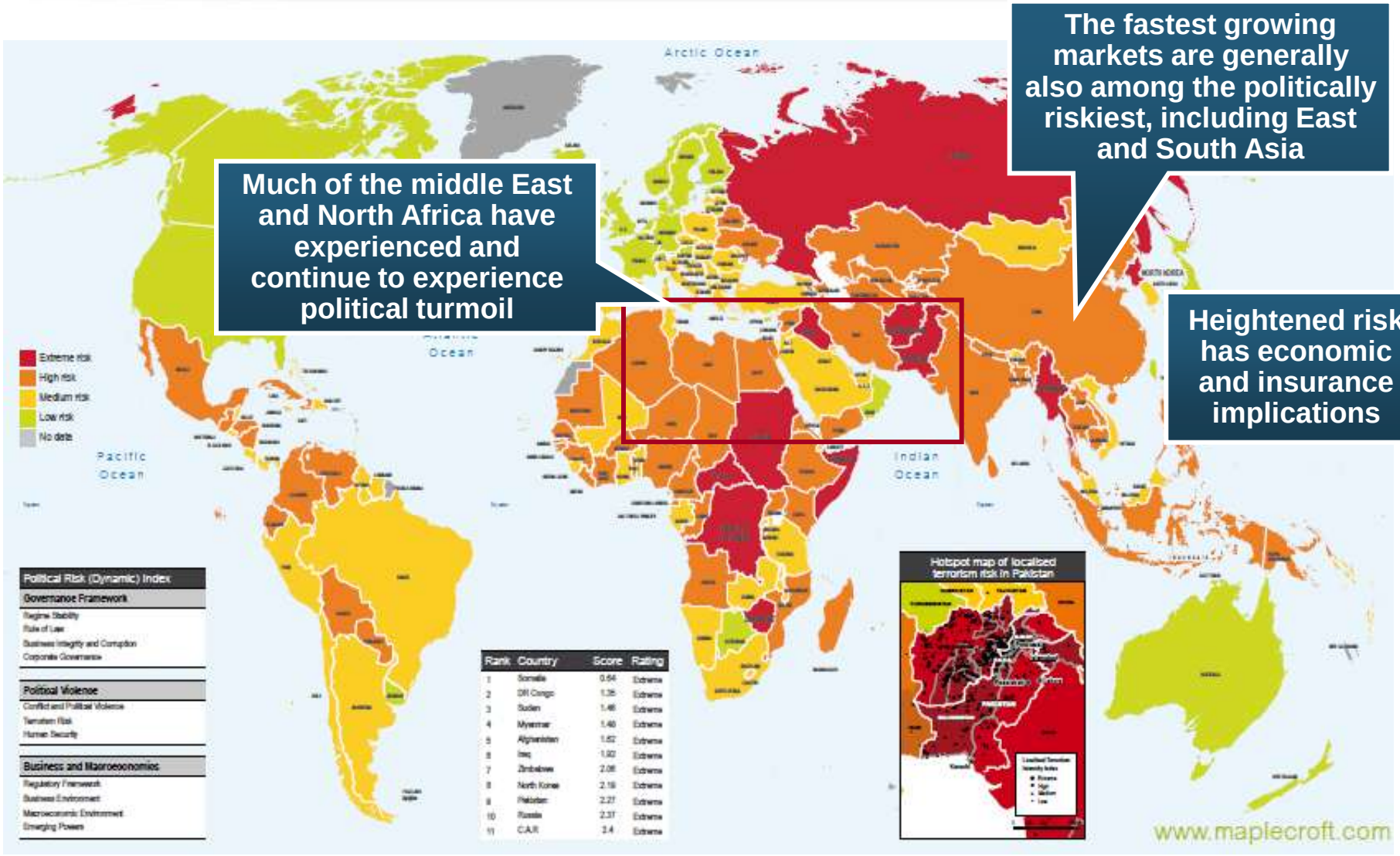

Source: Maplecroft

Top 20 Most At-Risk Countries, 2012

Rank	Country	Rating	Rank	Country	Rating
1	Somalia	extreme	11	Nigeria	high
2	Myanmar	extreme	12	Iran	high
3	DR Congo	extreme	13	North Korea	high
4	Afghanistan	extreme	14	Libya	high
5	Sudan	extreme	15	Cote d'Ivoire	high
6	South Sudan	extreme	16	Russia	high
7	Iraq	extreme	17	Zimbabwe	high
8	Yemen	extreme	18	P.O.T.	high
9	Pakistan	extreme	19	Chad	high
10	Central African Republic	extreme	20	Syria	high

Terrorism Risk Around the Globe, 2013

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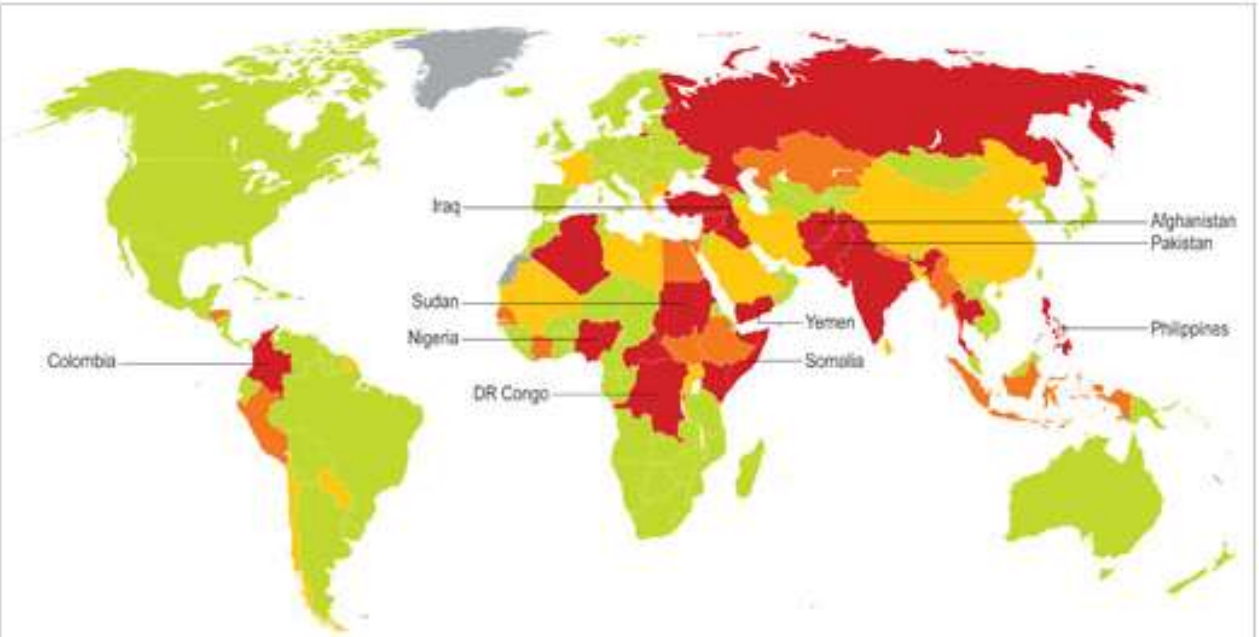
Terrorism Risk Index 2013



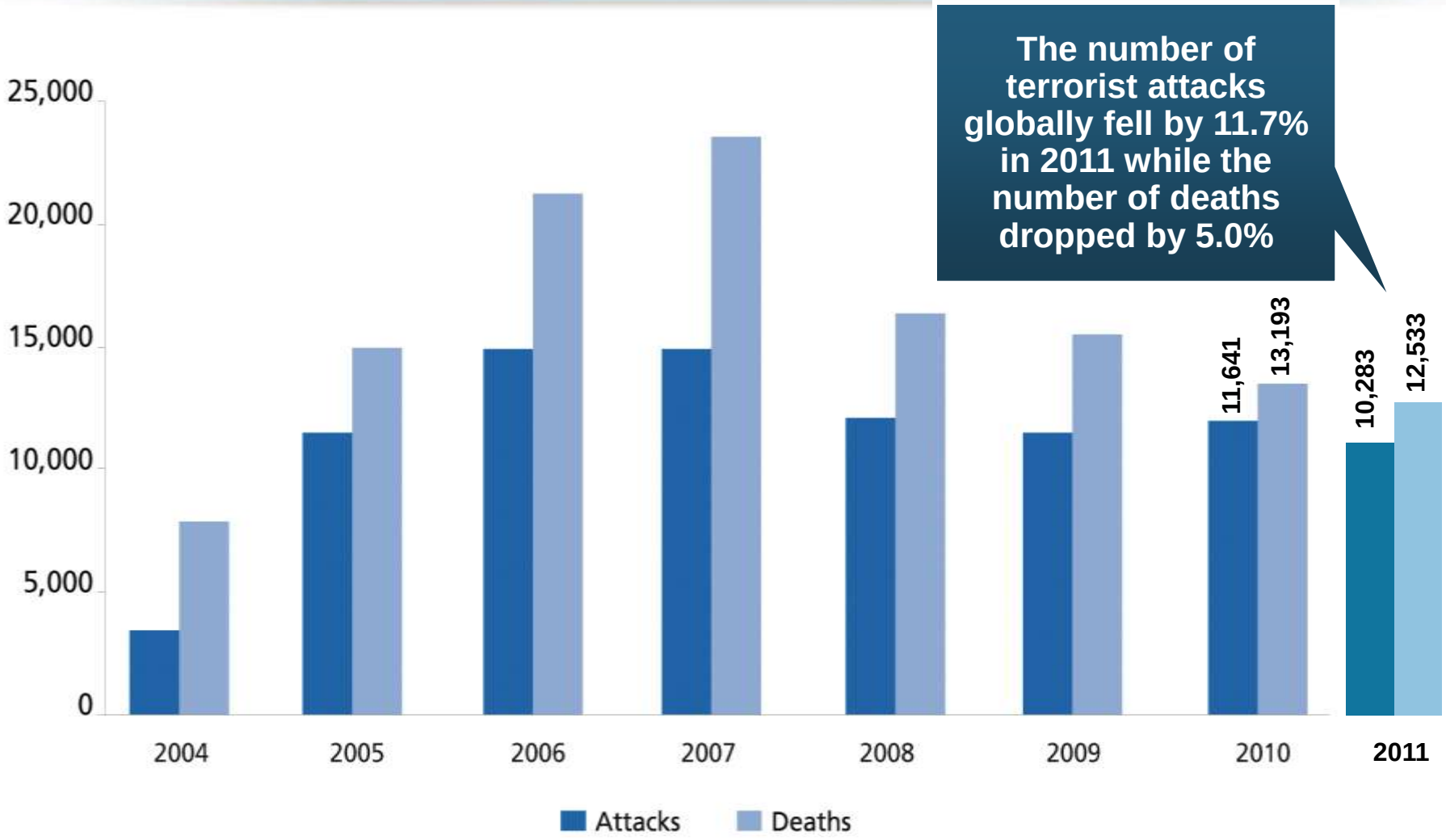
Legend
Extreme risk
High risk
Medium risk
Low risk
No Data

Rank	Country	Rating
1	Yemen	Extreme
2	Somalia	Extreme
3	Afghanistan	Extreme
4	Pakistan	Extreme
5	Iraq	Extreme

Rank	Country	Rating
6	DR Congo	Extreme
7	Nigeria	Extreme
8	Philippines	Extreme
9	Colombia	Extreme
10	Sudan	Extreme

Source: Maplecroft Terrorism Risk Index at http://maplecroft.com/about/news/pra_2013.html

Global Terrorist Attacks and Deaths, 2004-2011



Sources: National Counterterrorism Center, *2011 Report on Terrorism*, released in June 2012; Guy Carpenter; Insurance Information Institute.

Terrorism Risk Insurance Program

- Boston Marathon bombing should help focus attention in Congress on TRIA
  - Act expires 12/31/14
  - Numerous headwinds
- Exclusionary language will be inserted for renewals occurring after 1/1/14

- Boston Marathon Issues
  - Property and BI losses not large but could breach $5 mill threshold for certification under TRIPRA
  - Certification issue is generating press; No deadline to certify
  - Disincentive to certify?
  - Few of the impacted business had terror coverage
  - Longer-term: Litigation issues (e.g., race organizers)

Loss Distribution by Type of Insurance from Sept. 11 Terrorist Attack ($ 2011)

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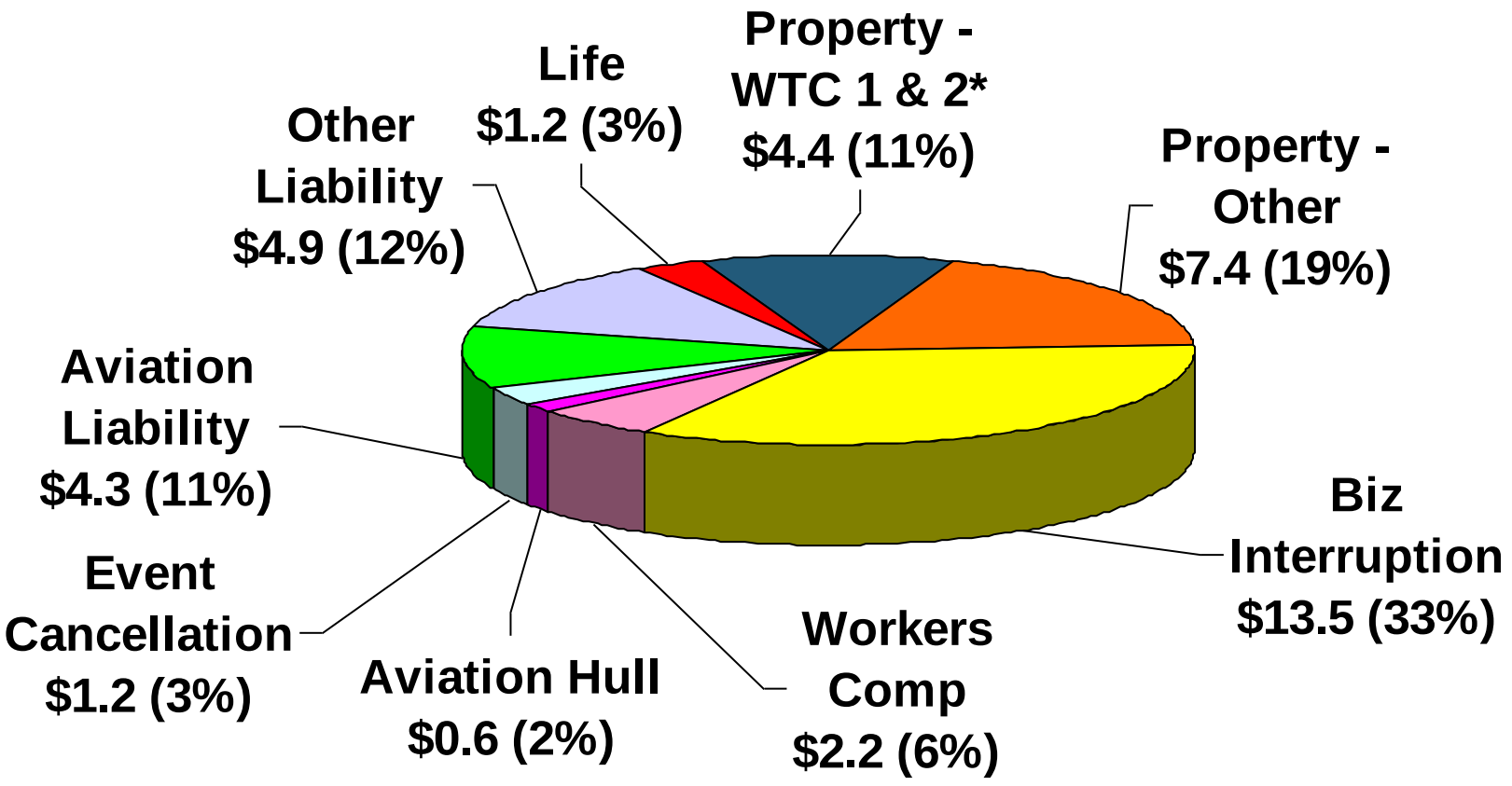
($ Billions)



Total Insured Losses Estimate: $40.0B**

*Loss total does not include March 2010 New York City settlement of up to $657.5 million to compensate approximately 10,000 Ground Zero workers or any subsequent settlements.

**$32.5 billion in 2001 dollars.

Source: Insurance Information Institute.

Terrorism Violates Traditional Requirements for Insurability

Requirement	Definition	Violation
Estimable Frequency	•Insurance requires large number of observations to develop predictive rate-making models (an actuarial concept known as credibility)	•Very few data points •Terror modeling still in infancy, untested. •Inconsistent assessment of threat
Estimable Severity	•Maximum possible/ probable loss must be at least estimable in order to minimize "risk of ruin" (insurer cannot run an unreasonable risk of insolvency though assumption of the risk)	•Potential loss is virtually unbounded. •Losses can easily exceed insurer capital resources for paying claims. •Extreme risk in workers compensation and statute forbids exclusions.

Source: Insurance Information Institute

Terrorism Violates Traditional Requirements for Insurability (cont'd)

Requirement	Definition	Violation
Diversifiable Risk	•Must be able to spread/distribute risk across large number of risks •"Law of Large Numbers" helps makes losses manageable and less volatile	•Losses likely highly concentrated geographically or by industry (e.g., WTC, power plants)
Random Loss Distribution/ Fortuity	•Probability of loss occurring must be purely random and fortuitous •Events are individually unpredictable in terms of time, location and magnitude	•Terrorism attacks are planned, coordinated and deliberate acts of destruction •Dynamic target shifting from "hardened targets" to "soft targets" •Terrorist adjust tactics to circumvent new security measures •Actions of US and foreign govts. may affect likelihood, nature and timing of attack

Source: Insurance Information Institute

Global Technological Risks

Increasingly, Technology is What Makes Our Lives, Businesses, and Risks Global

Technological Risks: Vulnerability and Susceptibility Vary Across the Globe

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- **Technological Risks**
  - **Cyber attacks**
  - **Massive data fraud/theft**
  - **Mineral resource supply vulnerability**
  - **Massive digital misinformation**
  - **Critical systems failure**
  - **Unintended consequences of**
    - **new life sciences technologies**
    - **climate change mitigation**
    - **nanotechnology**
  - **Failure of intellectual property regime**
  - **Proliferation of orbital debris**

Sources: World Economic Forum, *Global Risks 2013*; Insurance Information Institute.

Changes in Assessment of Global Technological Risks, 2013 vs. 2012

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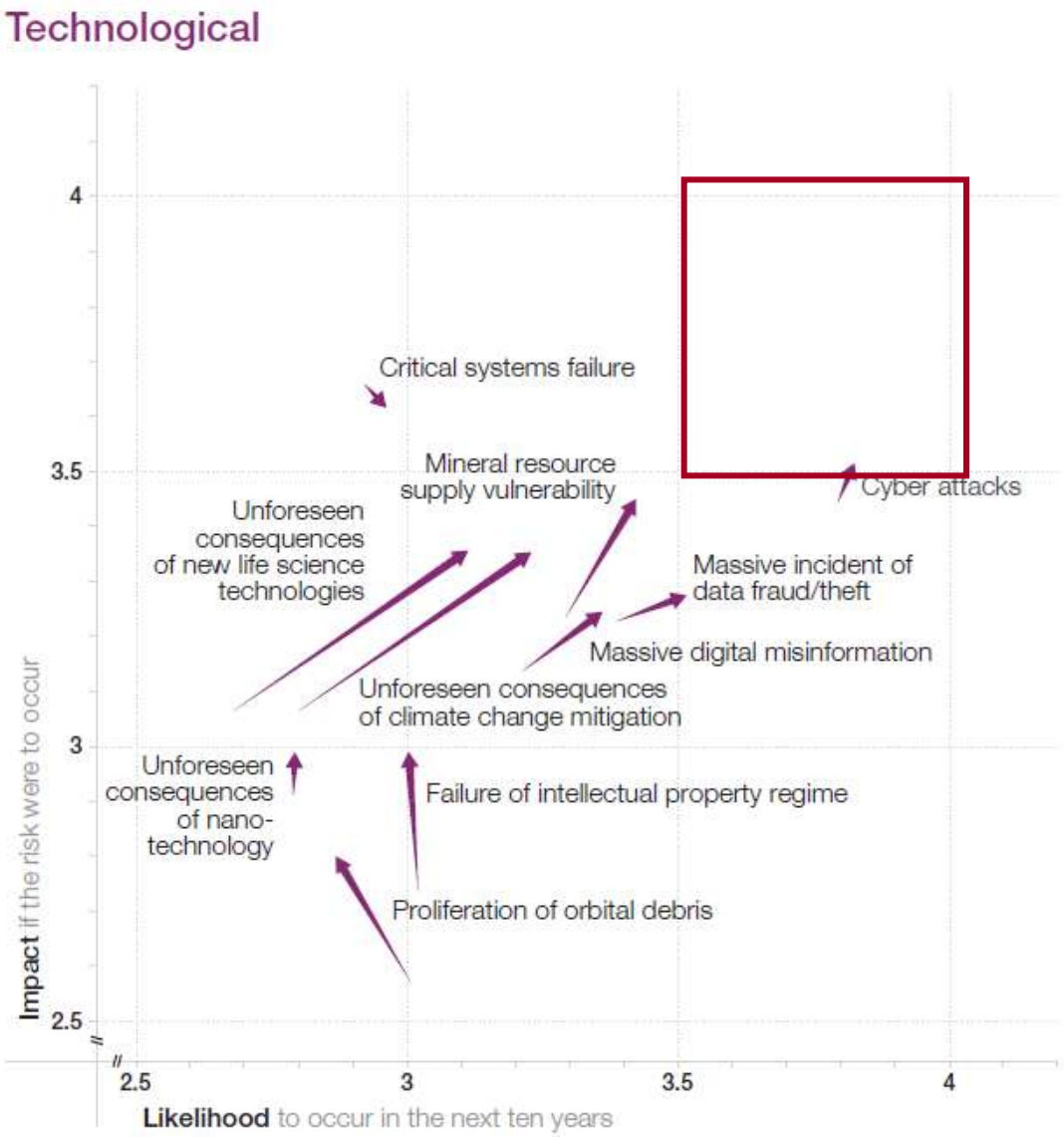

Cyber Risk Threat Spectrum: Terrorism is a Concern

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Threat	Resources	Methods	Objectives	Examples
Nation-state, sleeper insiders	High	Highly targeted	Strategic sabotage	Stuxnet
Advanced persistent threat	High	Targeted, manual remote control	IP theft	Aurora, Ghostnet
Persistent threat	Medium	Targeted, manual remote control	IP theft, defacement	Night Dragon, "Anonymous"
Disgruntled insider with access to ICS	Low	Targeted: social engineering	Sabotage	Maroochy
Insider with access to IT network	Low	Targeted: social engineering	Sabotage	IT examples
Organized crime	Medium	Highly volume, automated	Identity theft	Zeus, Conflicker

Combination of cyber attack with inside access

Highly targeted (low volume) attacks; Dedicated afford to do harm

- **Stuxnet: Autonomous Attack Sabotaging Iranian Uranium Enrichment Facilities**
  - **Likely created by US and Israeli intelligence services**
  - **Based on deep insider intelligence, planted deep inside perimeter using USB sticks**
- **Advanced Persistent Threats (APT) = Manual Control**
  - **Human-powered, but demonstrated ability to penetrate almost any defense**

Sources: Waterfall Security Solutions.

Global Societal Risks

To Manage These Risks, We Need Better Global Cooperation/Coordination

Societal Risks: Vulnerability and Susceptibility Vary Across the Globe

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- **Societal Risks**
  - **Water supply crisis**
  - **Food shortage crisis**
  - **Rising religious fanaticism**
  - **Vulnerability to pandemics**
  - **Unmanaged migration**
  - **Mismanagement of population aging**
  - **Unsustainable population growth**
  - **Backlash against globalization**
  - **Ineffective drug policies**

Sources: World Economic Forum, *Global Risks 2013*; Insurance Information Institute.

Changes in Assessment of Global Socetal Risks, 2013 vs. 2012

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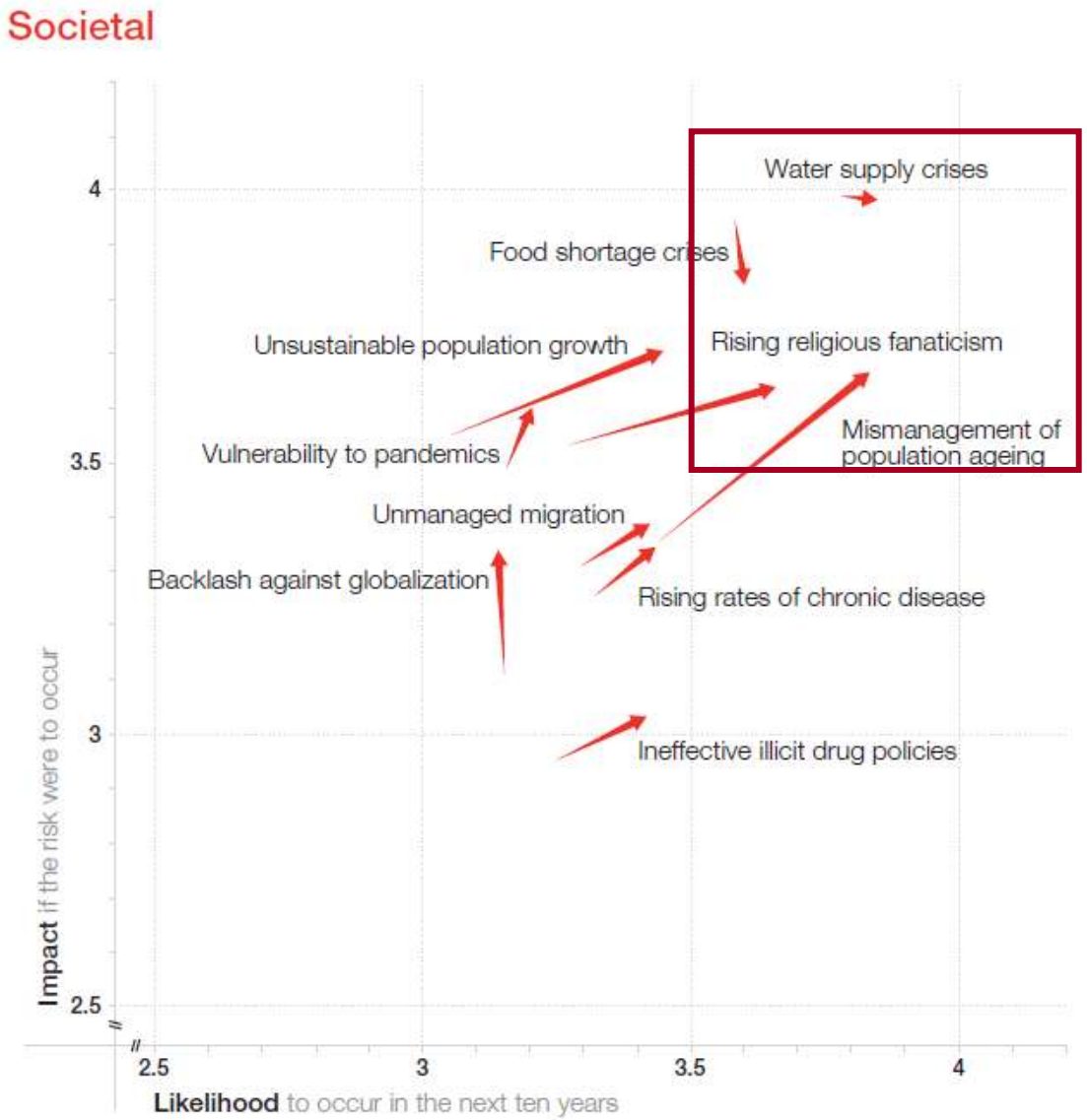

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Summary & Conclusions

SO…

Is the World Really a Riskier Place?

Reasons for Optimism, Causes for Concern in the Insurance Industry

- **No Shortage of Local & Global Threats—Same Throughout Human History and the "Human Struggle" Will Never End**
  - Economic insecurity
  - Geopolitical instability
  - Natural and manmade disasters
- **But by Many Objective Measures Humans Are Much Better Off than at any Time in History**
  - Lifespan
  - Standard of living
  - Education
- **But Many of These Advances Are Fragile**
  - Many historical examples of societal collapses
- **Good News: World Will Likely Avoid Falling into Another Global Recession**
- **But…It Is Still Unclear if Humans Can Successfully Manage Global Threats in a Cooperative Manner**
  - Interconnectedness through trade, finance, technology, intellectual exchange, natural resources and climate is unparalleled in human history

Strategies for Risk Managers in Dealing with Global Risks

- **In others who need to buy in, plan to recognize, and overcome, cognitive biases**
  - **Complex systems such as global climate are non-linear: reactions throughout the system are unpredictable and not proportional to the triggers**
  - **Limited data and computing power are strong impediments to clarity and granular forecasts**
  - **Given uncertainty about future effects, is there anything we can/should do?**

Sources: World Economic Forum, Global Risks 2013, p.20; Insurance Information Institute.

Will Attacking Environmental Problems Result in Slower Economic Growth?

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"The narrative emerging from the [global risk] survey is clear: like a super storm, two major systems are on a collision course. The resulting interplay between stresses on the economic and environmental systems will present unprecedented challenges to global and national resilience."

"Today's massive socio-economic challenges demand immediate attention, yet availability of public resources is limited."

Sources: World Economic Forum, *Global Risks 2013*; Insurance Information Institute.

Insurance Information Institute Online:

www.iii.org

Thank you for your time and your attention!