Climate Change Impacts on Power
An Insurers Perspective

June 29, 2012

Lindene Patton
Zurich Insurance Group

Zurich HelpPoint

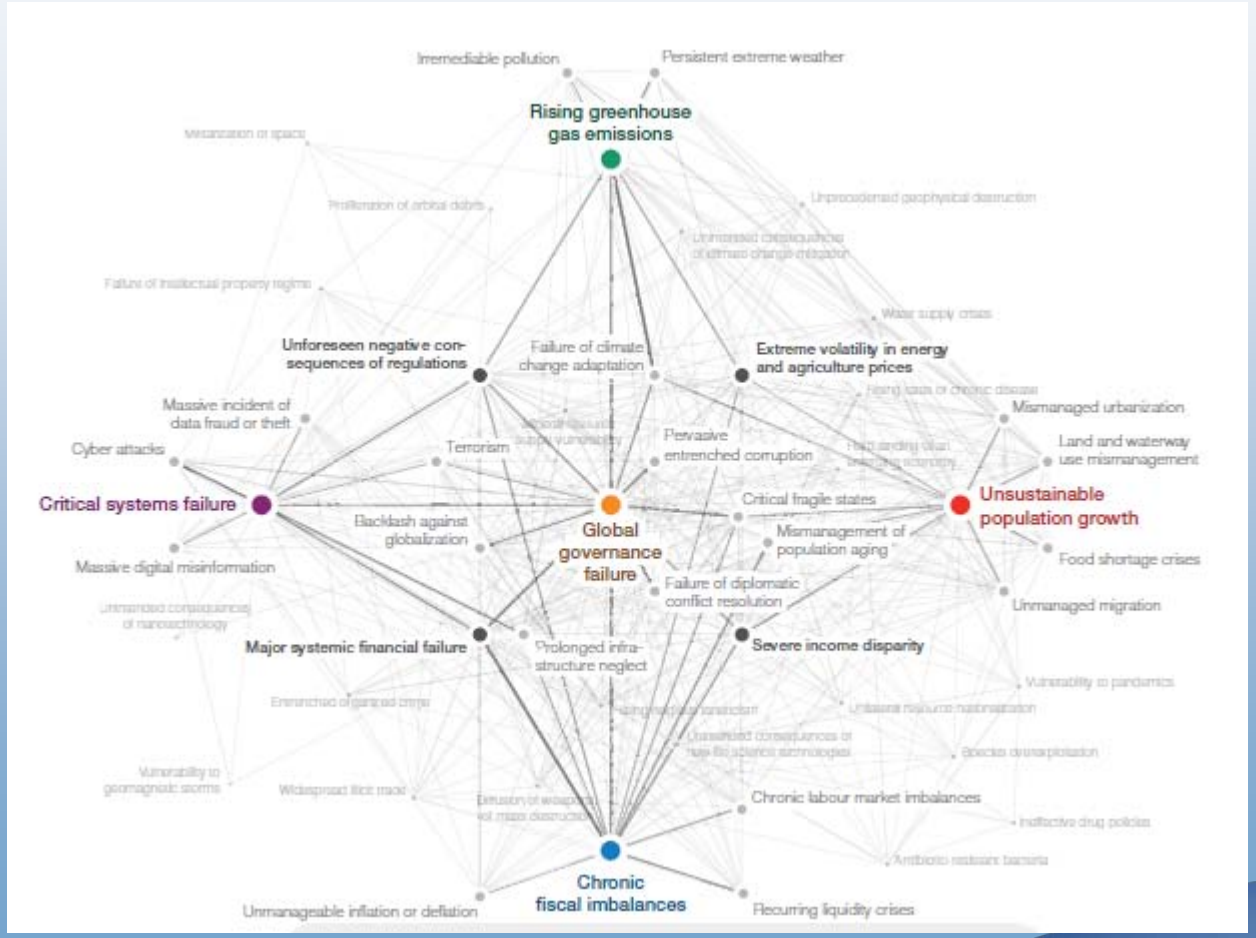
Disclaimer

The information in this publication was compiled from sources believed to be reliable for informational purposes only. All information herein should serve as a guideline which you can use at your risk. We trust that you will use this information to reflect your own operations and believe that these samples may serve as a helpful platform for this endeavor. Any and all information contained herein is not intended to constitute legal advice and accordingly, you should consult with your own attorneys when developing actions, programs or policies. We do not guarantee the accuracy of this information or any results and further assume no liability in connection with this publication and sample policies and procedures, including any information, methods or safety suggestions contained herein. Moreover, Zurich reminds you that this cannot be assumed to contain every acceptable safety and compliance procedure or that additional procedures might not be appropriate under the circumstances The subject matter of this publication is not tied to any specific insurance product nor will adopting these policies and procedures ensure coverage under any insurance policy.

Insurance coverages are underwritten by individual member companies of Zurich in North America, including Zurich American Insurance Company, or by an insurer from the Farmers Insurance Group of Companies. Certain coverages are not available in all states. Some coverages may be written on a non-admitted basis through licensed surplus lines brokers.

Climate Change Impact – An Insurers Perspective
Climate Risk - Network effects...

Risks interconnection map (RIM) 2012



How to read this map

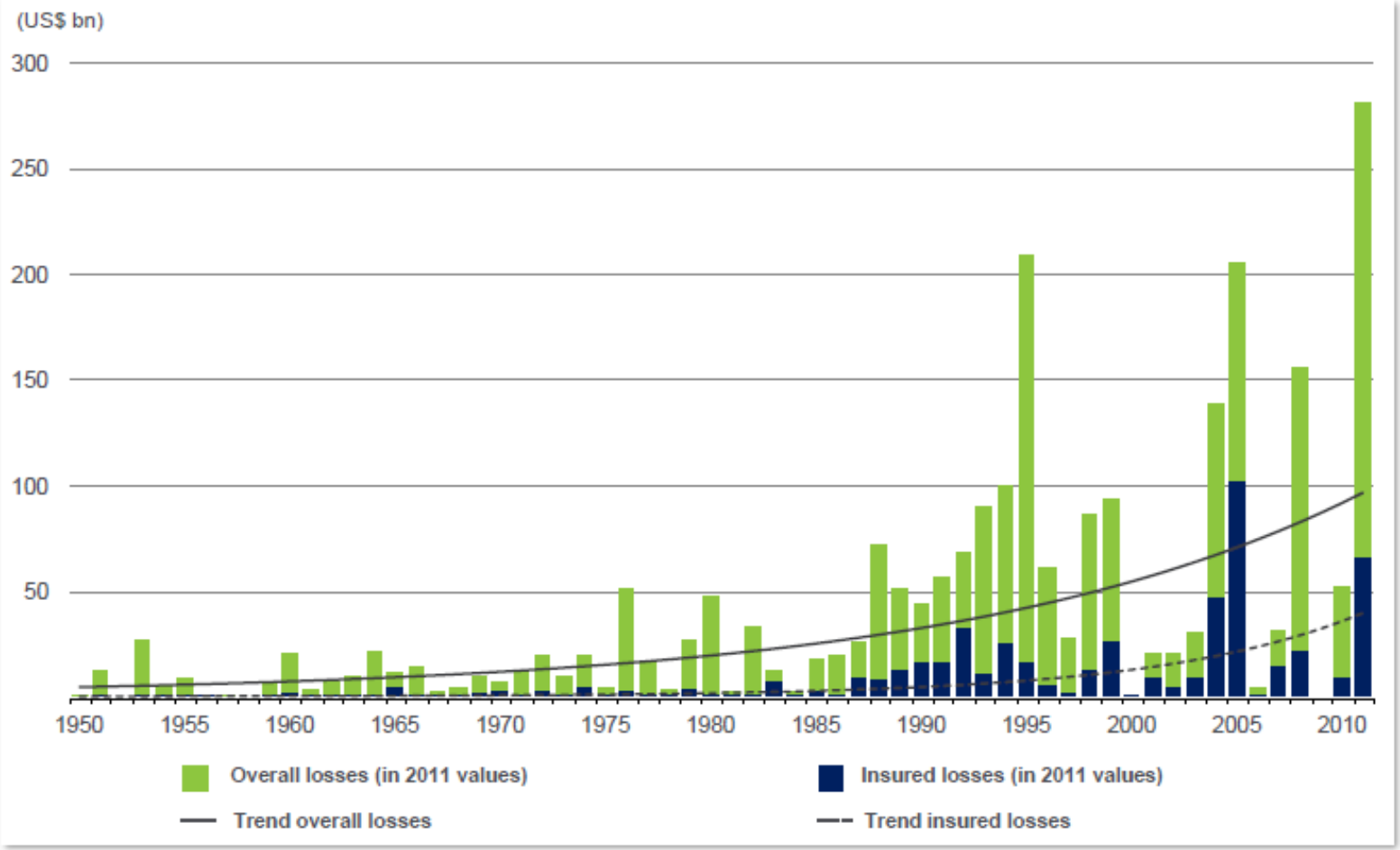
- Node size denotes severity
- Line thickness denotes strength of interaction
- Risks that are tightly inter-linked are closer to each other

Economic
Environmental
Geopolitical
Societal
Technological

Source: Global Risks 2012 / Zurich

Zurich HelpPoint

Climate Change Impact – An Insurers Perspective
Worldwide Natural Disasters Losses 1950 - 2012



Source: MR NatCatSERVICE 2012

Climate Change Impacts - An Insurers Perspective
Energy Production

Direct Production Impacts

- Seasonal and daily temperatures and precipitation changes affect the timing of peak electricity demands and the size of these peaks;
- Extended periods of drought lead to reduced water availability for hydropower generation;
- Changes in temperature and precipitation affect water availability for cooling power generators;
- Changes in cloud cover, temperature and pressure patterns directly affect wind and solar resources (affecting resource availability or productivity);
- And others ……

Climate Change Impacts - An Insurers Perspective
Energy Production

Cost Impacts

- Weather-related supply disruptions (hurricanes, lightning, floods) result in higher energy prices;
- Increased intensity and frequency of severe weather events impact design and safety requirements of future energy infrastructure and other capital investments;
- Increased occurrence of blackouts may be observed as a result of higher electricity demand for cooling and refrigeration caused by higher temperatures, thus causing business interruptions.
- Increased costs as a result of regulatory requirements to develop and implement renewable energy technologies;
- Phase-out costs of traditional power generation methods (coal, nuclear, etc.)
- And others ……

Climate Change Impacts - An Insurers Perspective
Energy Production

Summary of Qualitative Effects of Global Warming on Energy Consumption in the United States

Sector	National Effects	Regional Effects	Other Effects	Comments
Residential and Commercial Buildings Annual Energy Use	Slight decrease or increase in net annual delivered energy; likely net increase in primary energy	Space heating savings dominate in North; space cooling increases dominate in South	Overall increase in carbon emissions	Studies agree on the direction of regional effects; national direction varies with the study
Peak Electricity Consumption	Probable increase	Increase in summer peaking regions; probable decline in winter peaking regions	Increase in carbon emissions	Most regions are summer-peaking due to air conditioning
Market Penetration of Energy-Using Equipment	Increase in market penetration of air conditioning	Air conditioning market share increases primarily in North	—	Very few studies. Strength of the effect is not clear.

2008 U.S. Climate Change Science Program - Effects of Climate Change on Energy Production and Use in the US

Climate Change Impacts - An Insurers Perspective Responsibilities and Effects on an Insurer

- Prepare for the negative effects that climate change may have on business and on customers.
- Help mitigate the economic risks and enter the low-carbon economy by providing appropriate products and services.
- Consider more closely the increasing concentrations of exposure in highly populous areas.
- Consider the impact that unstable energy availability could have on global asset values, which may generate a mismatch against insurance liabilities.
- As blackouts become commonplace, there will be a potential for particular risks to become uninsurable (i.e., business interruption)
- And more …….

Insurance Can Be Applied to Facilitate Mitigation & Adaptation …

- Insurance focuses on risks to private assets
- Insurance is the ultimate economic shock absorber
- Insurance accounts for 7% of the global GDP (World Insurance Forum 2010)
- Climate Change is about risks to both private assets and public good

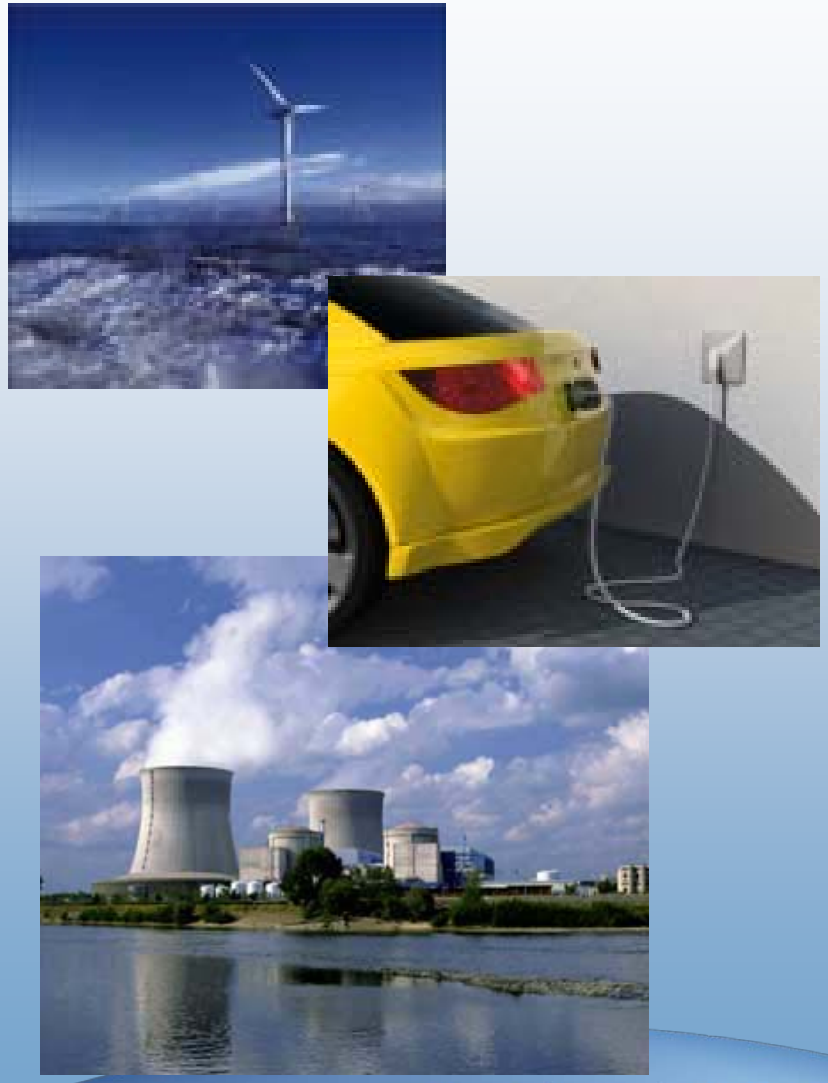
- The Key : Find the Intersections
  - Land use
  - Power
  - Water
  - Transportation
- Focus on public / private partnership
- Insurers are creating products today to facilitate adaptation and mitigation to climate change risk …

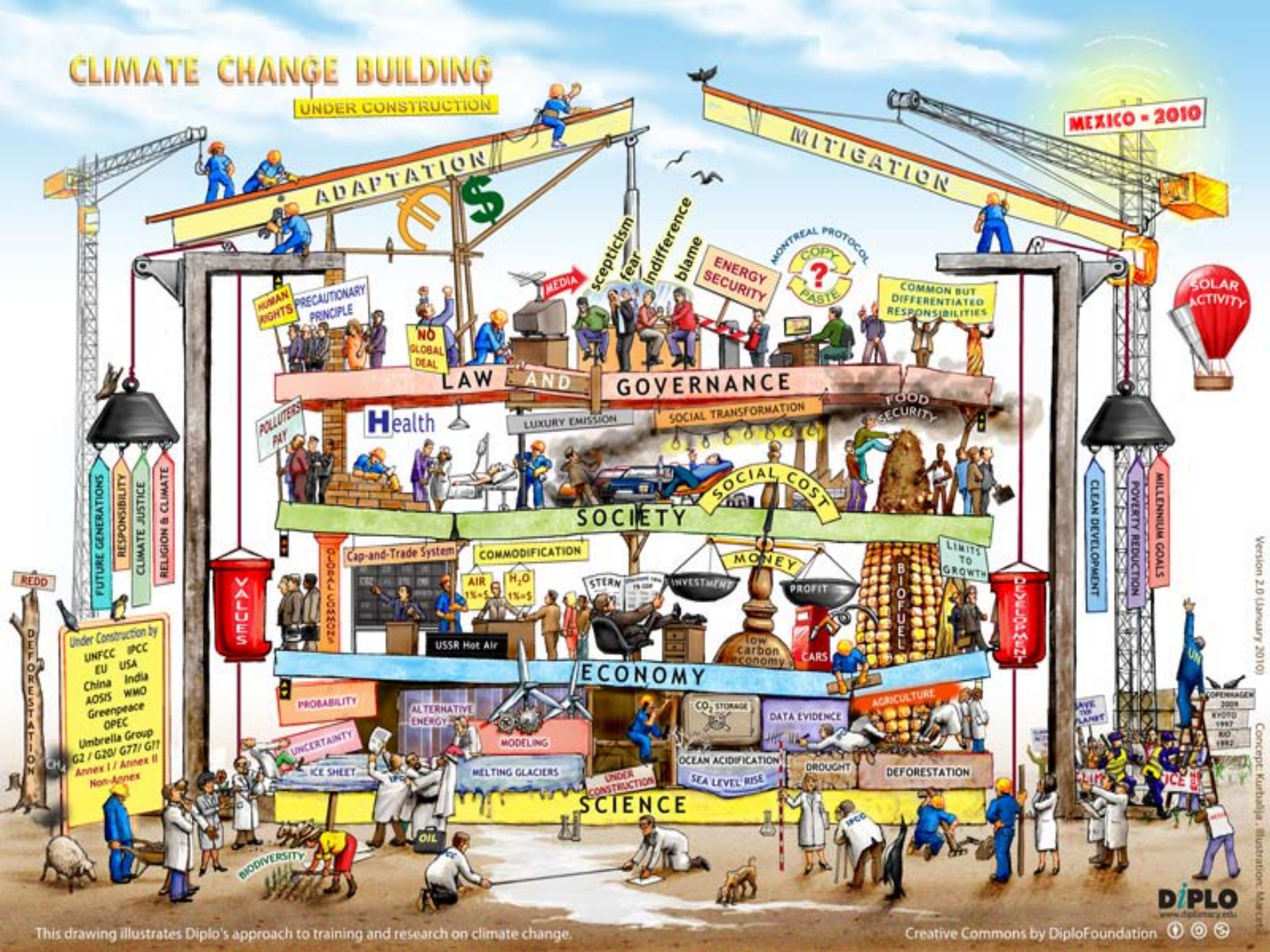
What Do Insurers Need to Assist Stakeholders to Adapt to and Mitigate Risk of Climate Change ?

- **Insurers must be allowed to use their core skills to send risk based price signals**
  - Higher cost should incentivize risk reduction
  - Government indemnity or pools which spread or mask risk may inadvertently increase moral hazard and overall risk
- **Climate Policy that addresses governance gaps**
  - Government should consider regulation / law changes that recognize the costs of mitigation must be passed on to users IF we are to truly incorporate this EXTERNALITY
  - Policy makers must consider new / emergent resource / rights conflicts that present in a non-fossil fuel paradigm
- **Climate Policy that enables markets to function properly**
  - Incentives should be constructed carefully to avoid moral hazard increase and market instability
  - Consider whether finance subsidies “undo” incorporation of the EXTERNALITY
  - Transition from subsidy to independence must be mapped
- **Climate policy that recognizes the regional nature of climate change**
  - One size does not fit all impact risks – especially with respect to CCS (Carbon capture and sequestration)
  - Solutions should be regionally tailored but globally aligned / compatible

Climate Change Impact – An Insurers Perspective Capabilities and Effects Insurers

- Climate change impacts different insurers differently
- Share expertise to mitigate the economic risks.
- Consider more closely the increasing concentrations of exposure in populous areas.
- Consider new risks presented by changing technologies and regulatory requirements.
- Consider the impact that an unstable climate could have on global asset values, which may generate a mismatch against insurance liabilities.




CLIMATE CHANGE BUILDING
UNDER CONSTRUCTION
ADAPTATION
MITIGATION
MEXICO - 2010
SOLAR ACTIVITY
MEDIA
scepticism
fear
indifference
blame
ENERGY SECURITY
MONTREAL PROTOCOL
COPY
?
PASTE
COMMON BUT DIFFERENTIATED RESPONSIBILITIES
HUMAN RIGHTS
PRECAUTIONARY PRINCIPLE
NO GLOBAL DEAL
LAW AND GOVERNANCE
POLLUTERS PAY
Health
LUXURY EMISSION
SOCIAL TRANSFORMATION
FOOD SECURITY
SOCIAL COST
SOCIETY
FUTURE GENERATIONS
RESPONSIBILITY
CLIMATE JUSTICE
RELIGION & CLIMATE
VALUES
GLOBAL COMMONS
Cap-and-Trade System
COMMODIFICATION
AIR 1%=$
H2O 1%=$
STERN
INVESTMENT
MONEY
PROFIT
LIMITS TO GROWTH
BIOFUEL
CARS
low carbon economy
USSR Hot Air
ECONOMY
CLEAN DEVELOPMENT
POVERTY REDUCTION
MILLENNIUM GOALS
REDD
DEFORESTATION
Under Construction by
UNFCC IPCC
EU USA
China India
AOSIS WMO
Greenpeace
OPEC
Umbrella Group
G2 / G20/ G77/ G77
Annex I / Annex II
Non-Annex
PROBABILITY
ALTERNATIVE ENERGY
CO2 STORAGE
DATA EVIDENCE
AGRICULTURE
UNCERTAINTY
MODELING
ICE SHEET
MELTING GLACIERS
OCEAN ACIDIFICATION
SEA LEVEL RISE
DROUGHT
DEFORESTATION
UNDER CONSTRUCTION
SCIENCE
BIODIVERSITY
OIL
COPENHAGEN 2009
KYOTO 1997
RIO 1992
Version 2.0 (January 2010)
Concept: Kurbalija . Illustration: Marcel
DiPLO
www.diplomacy.edu
This drawing illustrates Diplo's approach to training and research on climate change.
Creative Commons by DiploFoundation