# Opportunities in Green Consulting

# Reasons reality may be less combative

- The cost of renewable power has been dropping dramatically
- Major economic competitors are going “green”, particularly in Asia and Europe, which may disadvantage the US
- Fracking has helped “win” the “war on coal”
- President-elect Trump supports nuclear power and fracking
- President-elect Trump did not rely on fossil fuel donors
- The Republican Party needs millennial voters
- Facts may increase influence on policy as one party is in power
- Remember, President Nixon created the EPA

# Agenda

- Economic transformations
- Recent political events
- Insurance product development
- Emerging “risks”
- Demographics, Development, and Disasters and Rising Tides
- Opportunities for actuaries

# New exposures to develop products for

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# Risks

- New types of risk are emerging:
  - Weather
  - Human induced earthquakes
  - Political instability, often triggered by volatility in food prices
  - Investments in obsolete infrastructure or resources
  - Inflation (only “new” to people younger than your presenters...)

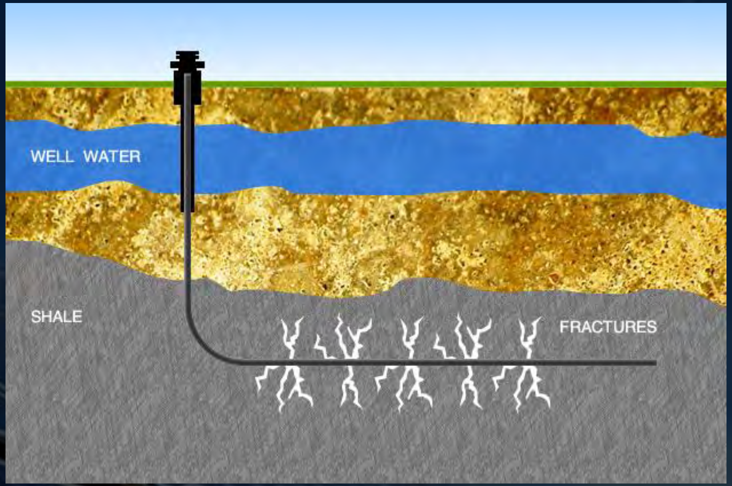
- Additional reporting requirements are appearing:
  - Climate risk statements for shareholders, regulators, rating agencies
  - SEC (may be changed by new Administration)
  - Significant requirements overseas, particularly in Europe

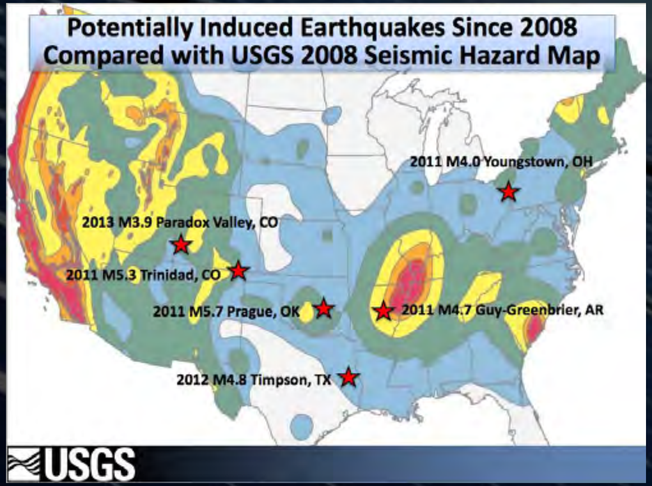
# Changing exposure from weather

- Tropical cyclones with conflicting drivers:
  - Warming seas
  - Desertification of the Sahel in Africa
  - Fresh water intrusion from river runoff
  - Possible ENSO changes
- Flood
  - Drier conditions in many areas
  - Potentially more extreme events
- Agriculture
  - Changing likelihood of drought
  - Pest infestation
  - Possible driver of political risk

# Think about fracking…

- An energy market driven process
- The natural gas it produces may play a major role in reducing global carbon emissions
- Fracking is clearly having some effect on earthquake activity
- Here is a complex example of how one issue leads to another
- Actuaries pricing earthquake covers need to understand this



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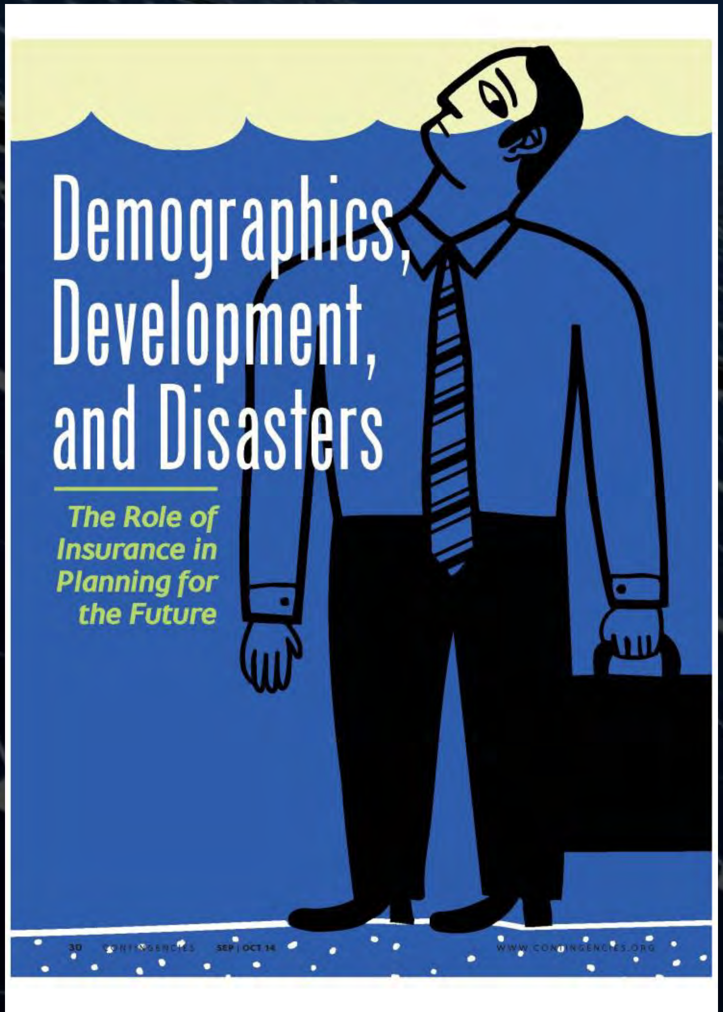
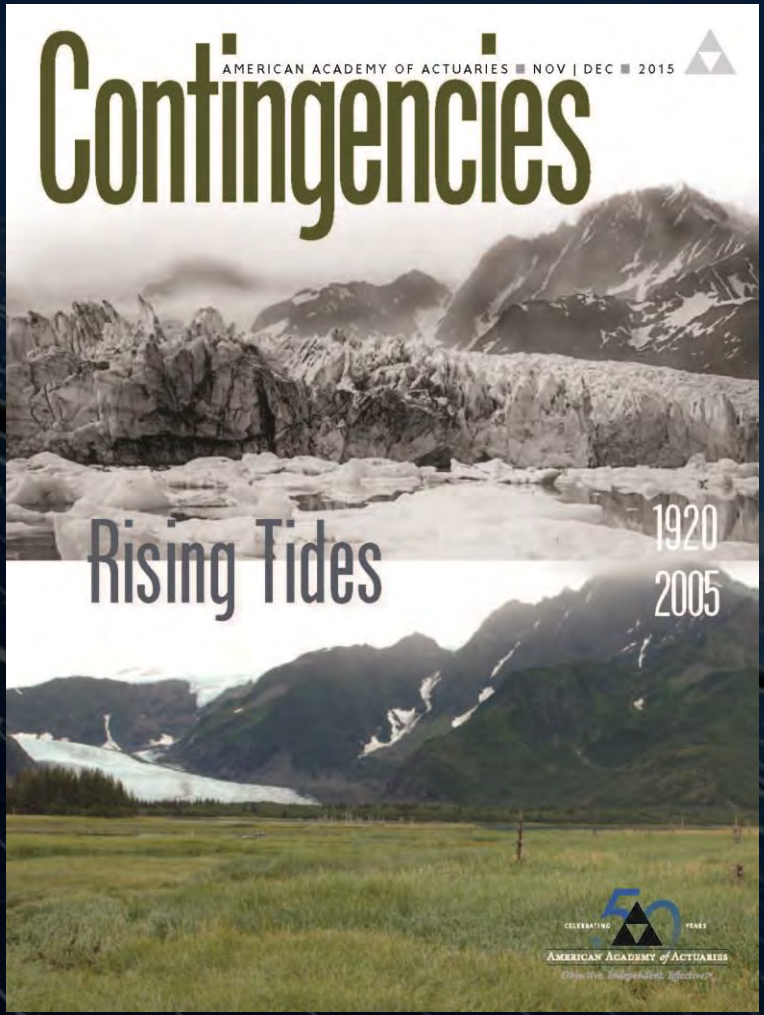


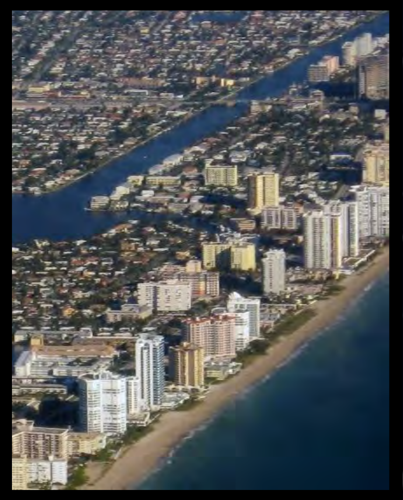



# Unrealistic environmental expectations

- Expectation:
  - The insurance system is well suited to facilitate adaptation
  - Identify risk and act (pricing, coverage, underwriting)
  - Send economic signals to consumers
  - Problems could self-correct
- Reality:
  - Effective price signals must precede building
  - One year pricing horizon precludes long term risk thinking
  - There is insufficient evidence in recent insurance loss data to support pricing for climate change
  - Political science vs. actuarial science
- Instead, insurance tools can be used to attack problem

# Traditional insurance pricing

- Price of coverage is (simplified):
  - Expected losses (which can shift over time)
  - Expenses
  - Cost of risk transfer
    - Variability in expected losses over time
    - Can be driven by risk concentration

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- If the threat assessment changes - for example, new flood maps, models, or GIS - how much burden should fall on people who had built there? On people who continue to build there?
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# Current building code thinking

- Developed largely by structural engineers
- Focused on life safety
- Consider the current state (or possibly recent past state) as to demographics (concentrations) or climate
- Little consideration of macroeconomic issues or community resilience
- Lenses through which we can view the problem:
  - Life safety
  - Protection of individual properties
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- Assume the economic value of mitigation is defined to be the present value of expected savings in insurance costs over a building’s design lifetime
- Also assume:
  - Insurance costs are a function of expected loss, expenses, and “risk load”
  - Future expected losses can be estimated by adjusting catastrophe models
- “Risk load” reflects risk concentration at each point in time, with higher concentrations carrying a larger risk load
- Then it follows that:
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  - The risk profile will change over time (risk and climate)
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# Planning for the future

- Risk concentration:
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  - A range of scenarios can be developed with associated costs of risk transfer
- Climate change:
  - Cat Models can be tweaked to reflect various states
  - Views of skeptics and “greens” can be incorporated
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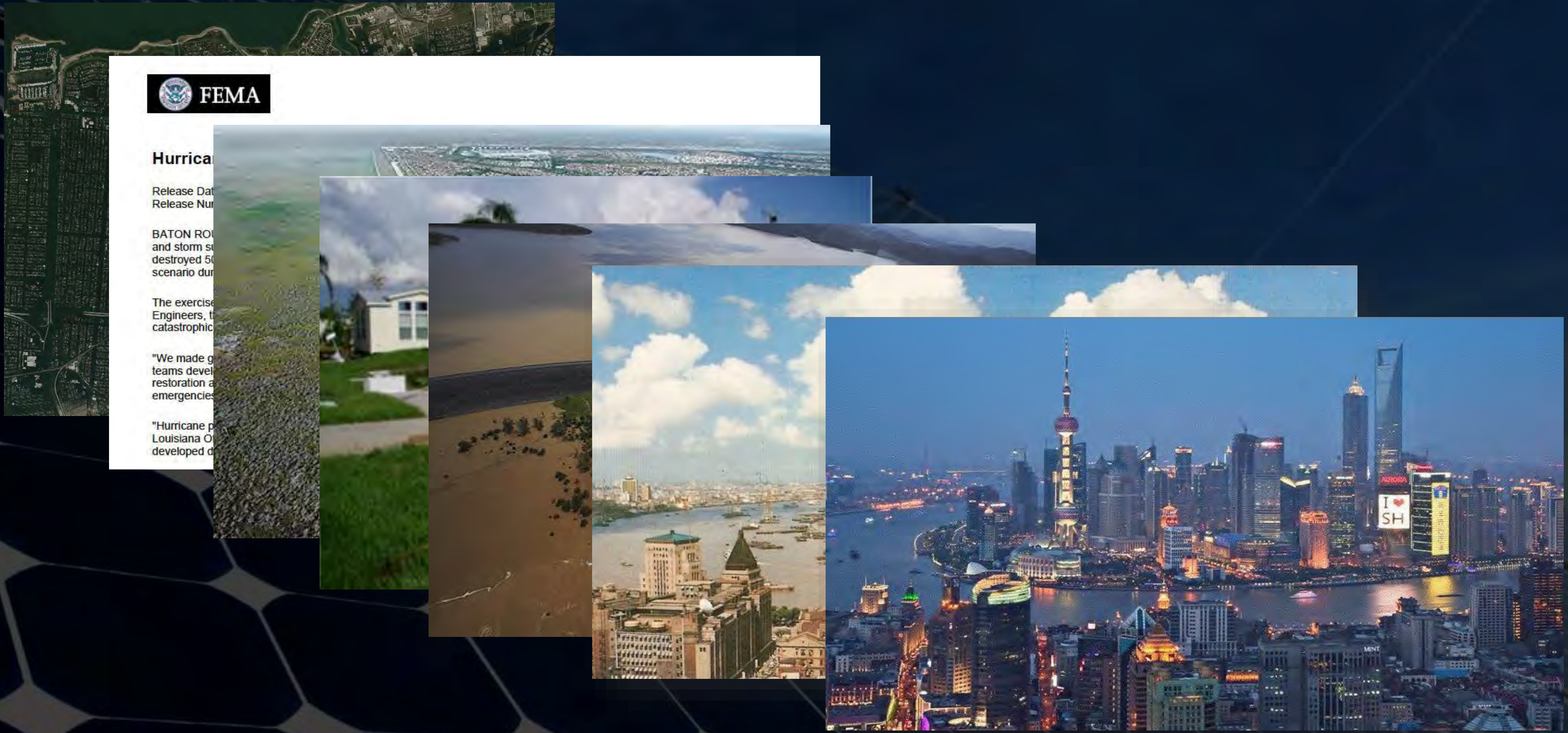

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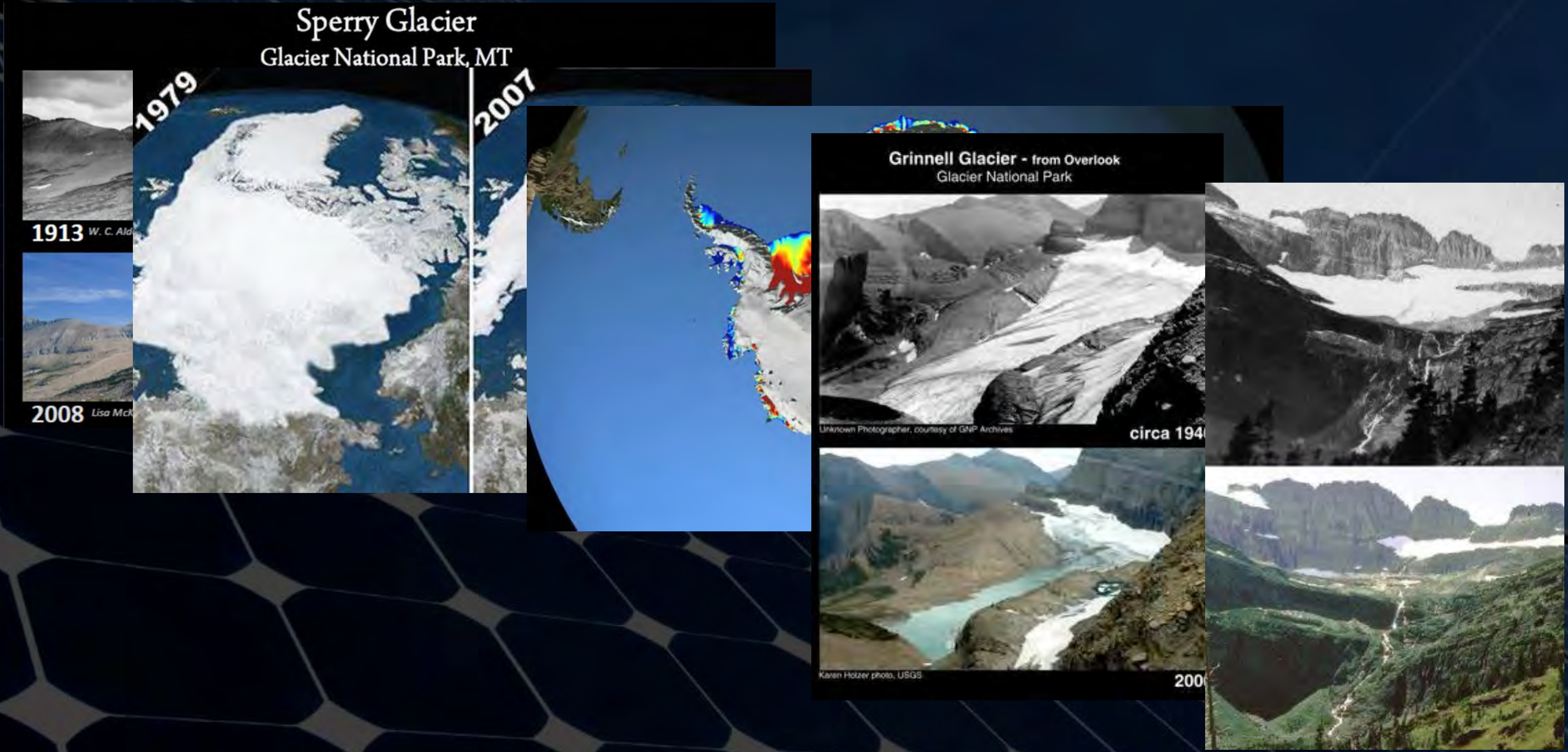

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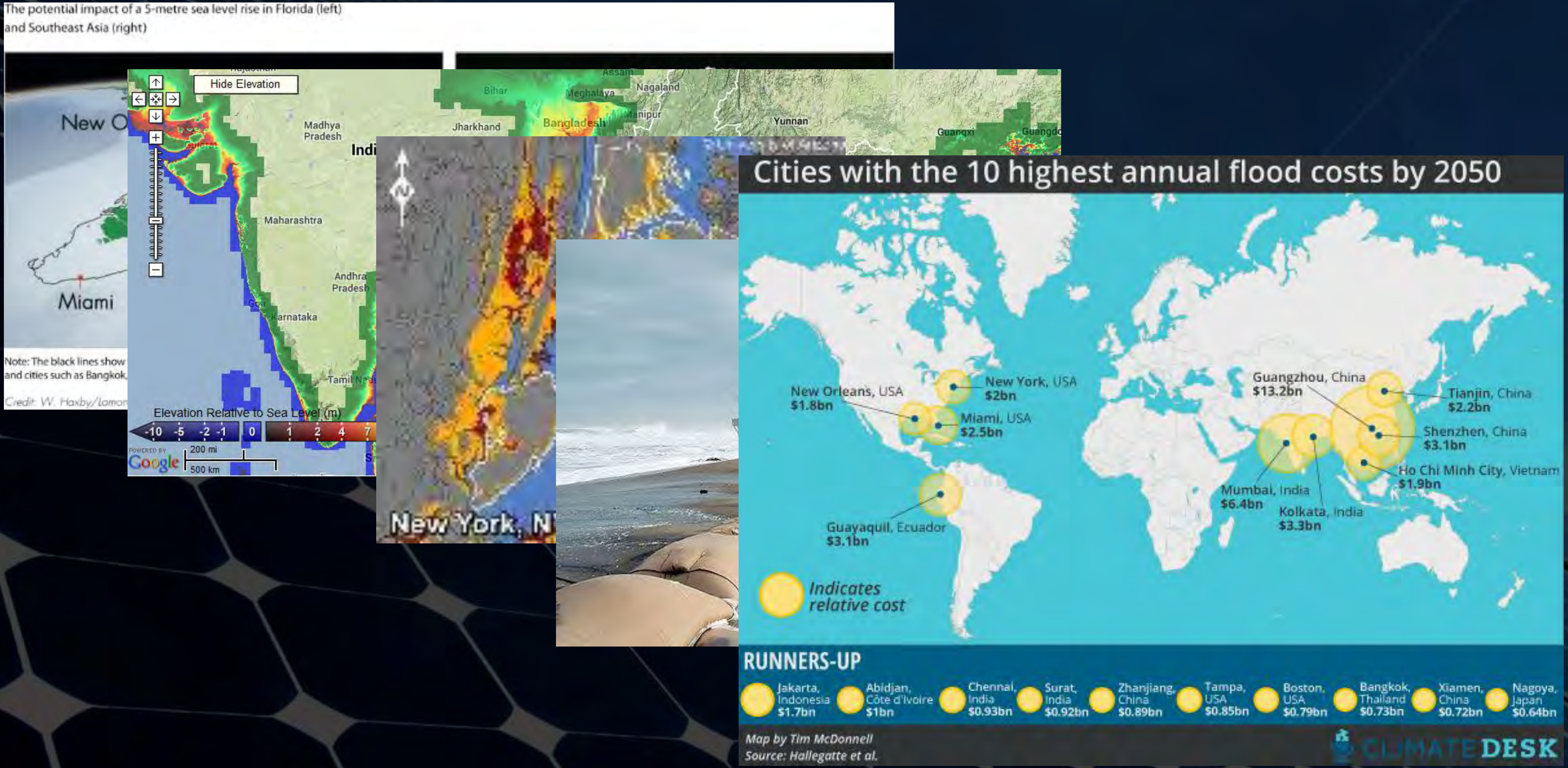
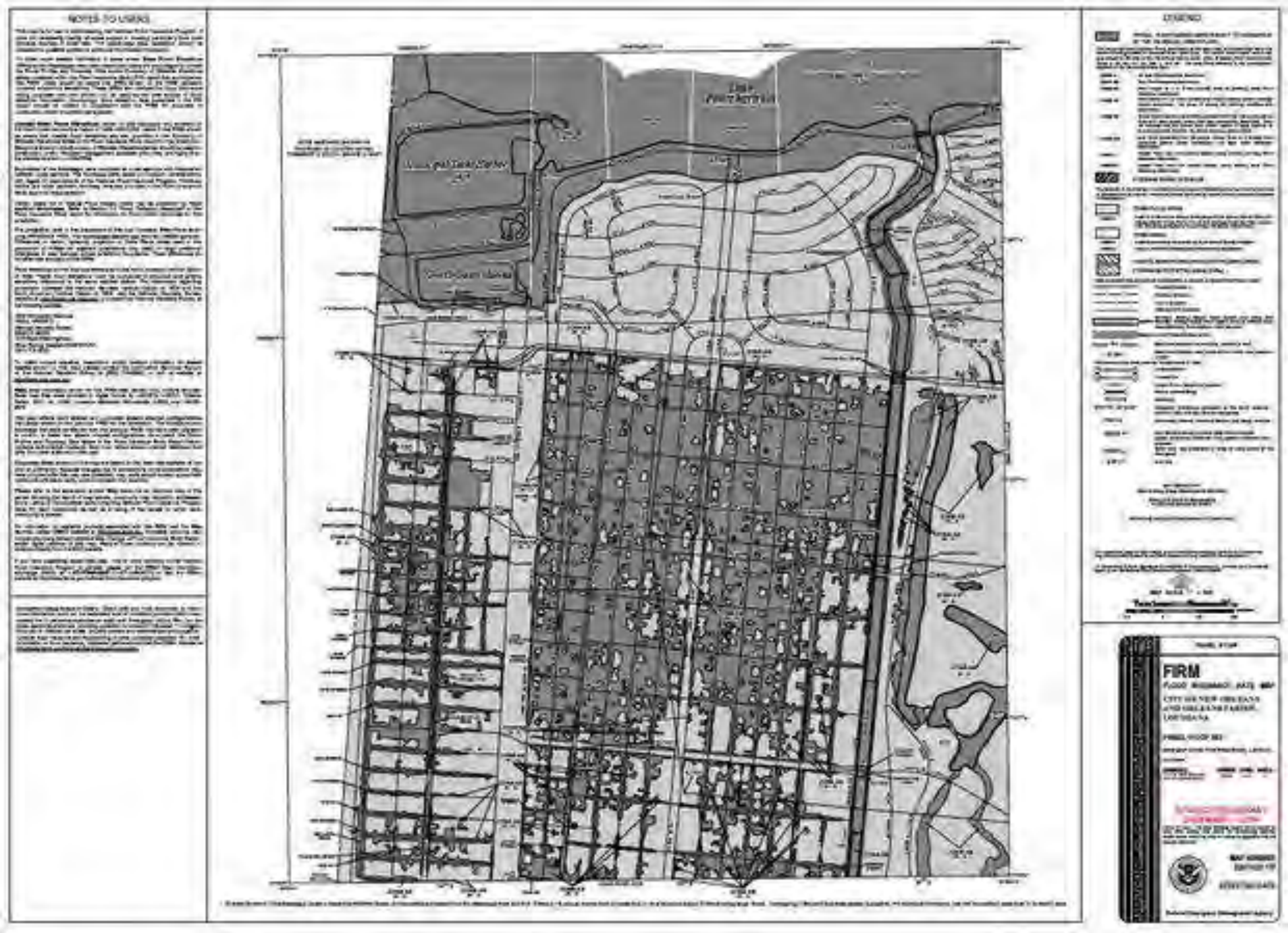


# Are flood maps valid for the future?



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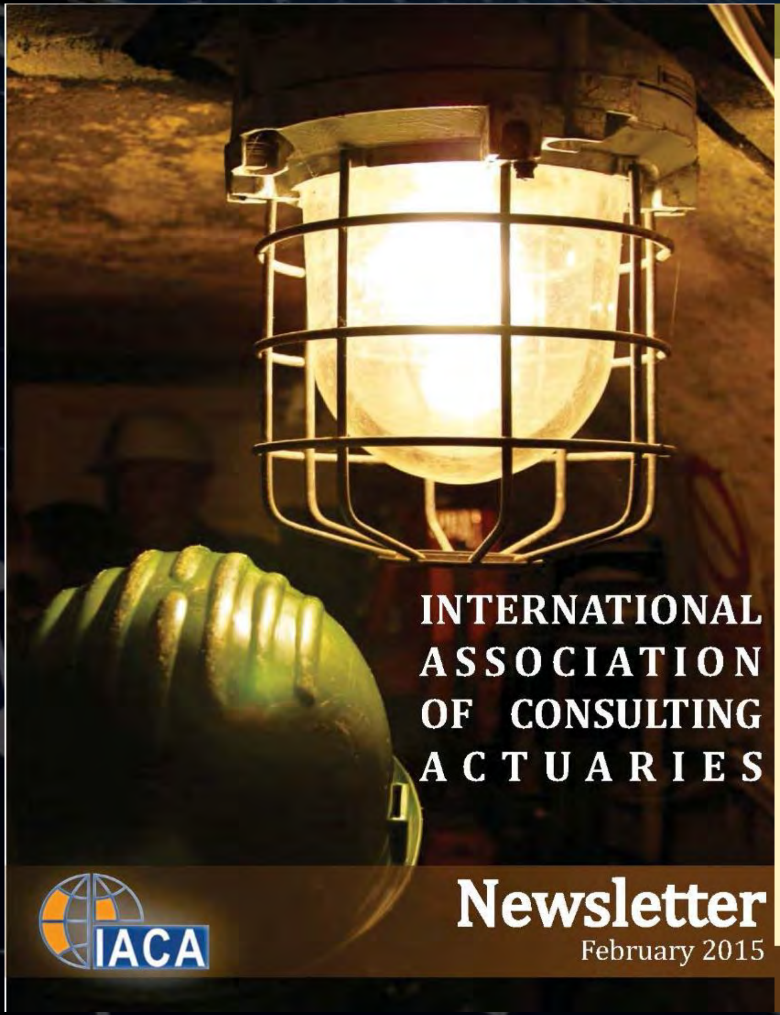
# Actuarial perspectives

# Survival Skills for actuaries





IACA February 2015

**Survival Skills**
*Rade Musulin (Australia)*

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I entitled the lecture "Survival Skills for Actuaries" and used examples from my own career to illustrate the skills that have helped me over the years. I identified seven things students should have:

- Strong technical background, plus...
- Big Data competence (manage, handle, analyze large data sets).
- Multidisciplinary focus, particularly history and economics.
- "Big Picture" mindset.
- Master of communications techniques.
- Attributes of flexibility and adaptability.
- Global thinking.

I reminded them that very few of us who have been fortunate enough to make it to our late fifties had any idea at their age what we would be doing forty years later. In today's world that is an eternity, long enough for me to have started working before there was widespread use of laptops, spreadsheets, mobile phones, ATM cards, or the internet. In order to survive the introduction of so many potential disruptions I had to continually learn new skills and be flexible in how I applied those I had.

If you get the opportunity to mentor a young student, help them understand the value of skills like those I have listed above. Having worked with many of them in recent years I have been struck by ones who assume that getting a 4.0 in university and passing some exams will lead them directly to a great career, or who think they can confidently predict what they will be doing in ten years.

As you consider how to accumulate your Continuing Education (CE) points, think about broadening your own learning outside your immediate practice area. Education is a lifetime activity, and as actuaries we are fortunate to have many options for CE. I try to allocate a portion of my CE time to things well outside the scope of my current role, as one never knows when circumstances will change and knowledge of a new area can help. That is particularly true for people in consulting.

Page 7 International Association of Consulting Actuaries

- Strong technical skills
- Big data competence
- Multidisciplinary focus
- "Big Picture" mindset
- Communication skills
- Flexibility and adaptability
- Global thinking

# A real life example of a new product

- The EU offers carbon offset under its Emissions Trading System (ETS)
- An EU manufacturer seeks a carbon offset by planting a forest on remote islands in northern Australia (Tiwi Islands)
- Several risk management and “actuarial” opportunities:
  - Pricing the carbon offset
  - Insuring the trees on the Tiwi Islands, subject to tropical cyclones
  - Building (or modifying) a catastrophe model to model trees
  - Analyzing pro/con of parametric vs. indemnity coverage
  - Pricing, structuring, and placing (re)insurance on the trees

# Global actuarial initiatives

- IAA:
  - Resource and Environmental Working Group
  - Participation in IPCC projects (now Warsaw round)
  - Formed working groups on carbon pricing, EU required environmental statements, excess mortality, etc.
- Actuaries Climate Index
- UK Institute practice area
- Australian Institute issued “Economic Implications of Climate Change: Public Policy Statement” and has formed a climate change working group

# Adapting actuarial skills

- Recognize key truths:
  - The energy system underpinning our economy is changing
  - Short term political shifts cannot stop long term trends
  - “Green” initiatives open up major opportunities for our profession
  - Our global partners are moving more quickly than we are
- Look for ways to leverage our skills:
  - Climate change is about risk and risk management, our strengths
  - Models used by actuaries (catastrophe, economic capital) can be repurposed to inform a range of decisions
- Think about climate change like Medicare and Social Security
- Be aware of competitors; other professions may fill the demand

# Summary

- Fundamental economic transformation is already underway
- Recent political events are not likely to change long term trends
- Many (most?) insurance products will be affected
- Key risk metrics will increasingly reflect climate related issues
- "Actuarial Survival Skills" in flexibility and adaptability are key
- Actuarial organizations in other countries are moving
- Our skills are highly relevant, if we choose to adapt them
- There are many opportunities in "green consulting", but today's message is not focused on just consulting

# Opportunities in Green Consulting

# Financial disclosures on climate change

- TCFD
  - Bloomberg-Carney
  - Effective financial disclosure
  - Physical, liability & transition risks
  - Report next month
  - Fsb-tcfd.org
- SASB
  - Standards by industry
  - FSA credential
  - ESG agenda
  - Sasb.org
- Investors
- SEC
- Regulators

# Sustainability

- ESG
  - Environmental
  - Social
  - Governance

- CAS Working Group on Sustainable ERM

# Other issues

- Actuarial Aspects
  - Distribution functions
  - Time horizons
  - Data sources

- Other Sources
  - IAA REWG
  - IFoA Resource and Environment Practice Area
  - ACI/ACRI
  - Australian Institute Climate Change Working Group

# Your speakers' contact information

Rade Musulin

Chief Executive Officer, FBAlliance Insurance

Vice President - Casualty, American Academy of Actuaries

rmusulin@sprynet.com and www.ozgator.com

W. James (Jim) MacGinnitie

Senior Property/Casualty Fellow, American Academy of Actuaries

macginnitie@actuary.org and www.actuary.org

# Opportunities in Green Consulting

Rade Musulin

CAS Annual Meeting 2016

## Agenda

- Economic transformations
- Recent political events
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# Today's main message




# Agenda

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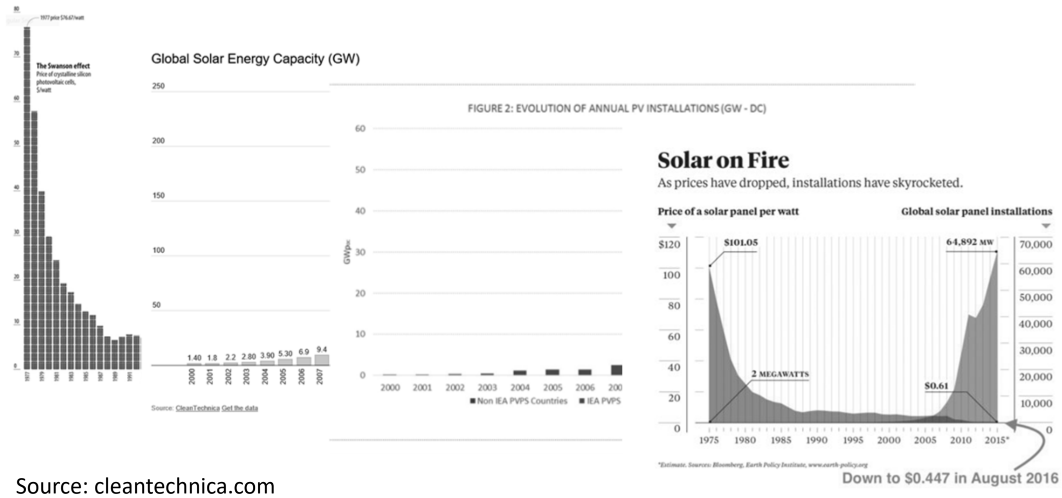
# Cost and growth of solar energy



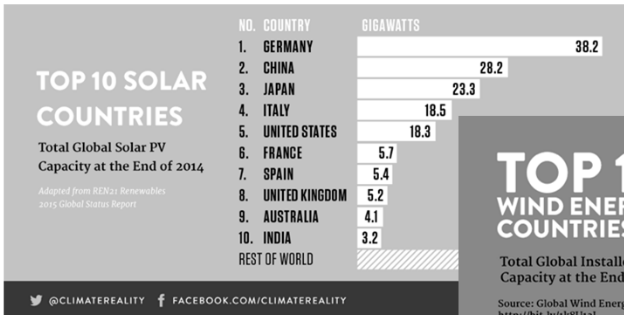

Source: cleantechnica.com

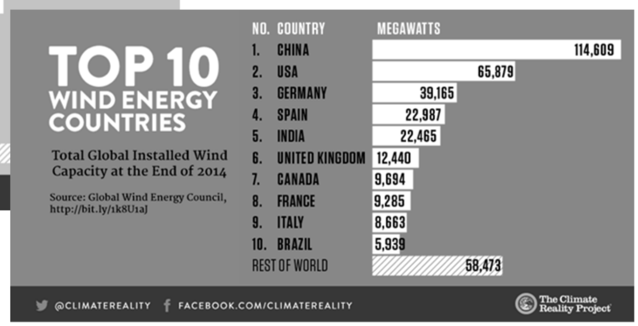


# My own home is solar in Australia

- Australia has implemented “smart grids” that can buy surplus power back from homeowners; generally government policy has driven significant change
- Through better insulation, LED lighting, solar panels, and solar pool heat we have reduced our electric bill by 75% or more since 2012, despite higher electric rates

# Solar and wind capacity

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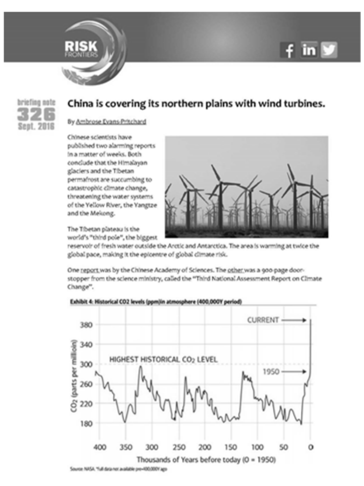
# China


RISK FRONTIERS

briefing note 326 Sept. 2016

**China is covering its northern plains with wind turbines.**

By Ambrose Evans-Pritchard

Chinese scientists have published two alarming reports in a matter of weeks. Both conclude that the Himalayan glaciers and the Tibetan permafrost are succumbing to catastrophic climate change, threatening the water systems of the Yellow River, the Yangtze and the Mekong.

The Tibetan plateau is the world's "third pole", the biggest reservoir of fresh water outside the Arctic and Antarctica. The area is warming at twice the global pace, making it the epicentre of global climate risk.

One report was by the Chinese Academy of Sciences. The other was a 900-page door-stopper from the science ministry, called the "Third National Assessment Report on Climate Change".

Exhibit 4: Historical CO2 levels (ppm)in atmosphere (400,000Y period)

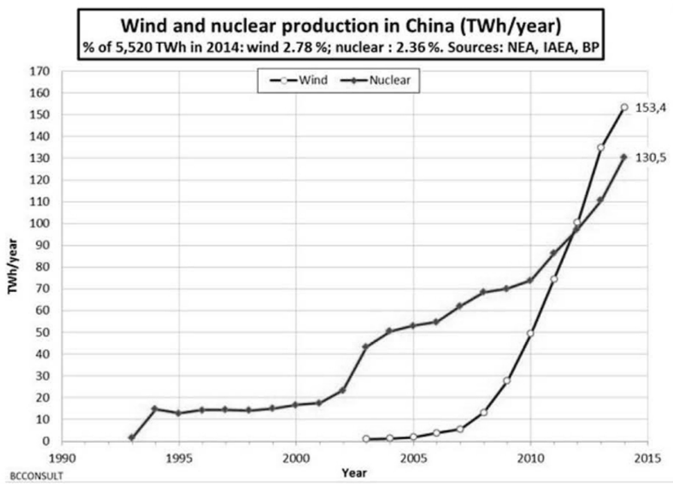


Source: NASA. *Full data not available pre-400,000Y ago

Briefing Note 326 - Page 1

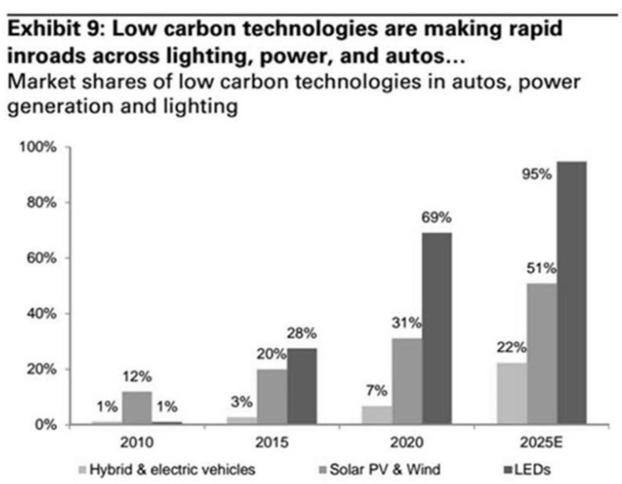
- The Tibetan Plateau is the epicenter of global climate change
- China faces massive disruption
- Pollution may lead to civil unrest
- 8 of the world's largest solar companies are Chinese
- Home grown energy is a security issue
- Construction of coal power plants down
- Massive investment in "clean" technology

# Wind and nuclear production in China






# Low carbon technology growth (global)



# Escaping liquidity traps (RF Report)

- The Second World War lifted the global economy out of a low-growth liquidity trap by flattening excess industrial capacity and harnessing a glut of static savings. This was the launch-pad for the rebuilding boom of the 1950s and 1960s.

- We are in a similar 1930s low-growth trap today. The world savings rate is a record 25pc of GDP. It is the root cause of our malaise. So even if global warming were a hoax, we would need it to make our great economic escape.



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# President-elect Trump's past statements

- "The concept of global warming was created by and for the Chinese in order to make U.S. manufacturing non-competitive."
- "This very expensive GLOBAL WARMING [expletive] has got to stop. Our planet is freezing, record low temps, and our GW scientists are stuck in ice."
- "If I am elected President I will immediately approve the Keystone XL pipeline."



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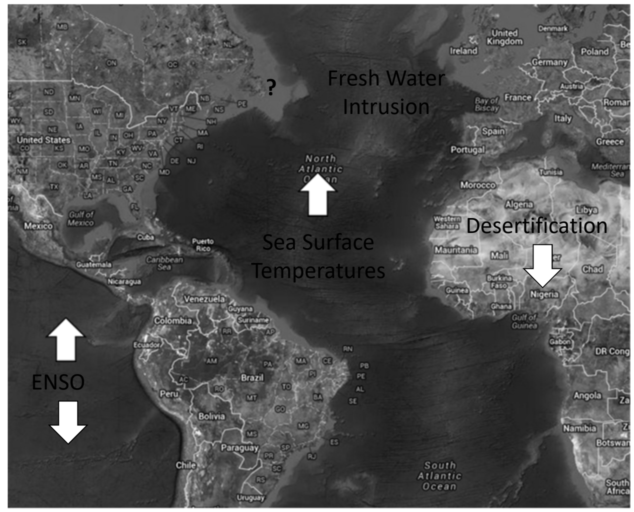




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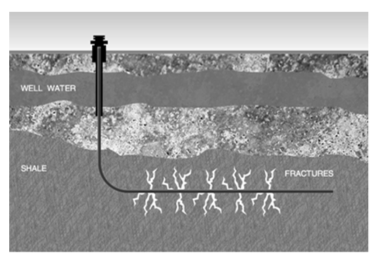


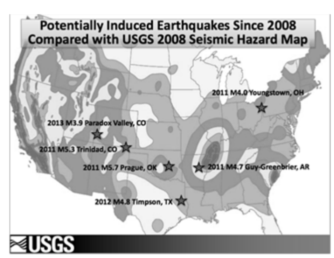

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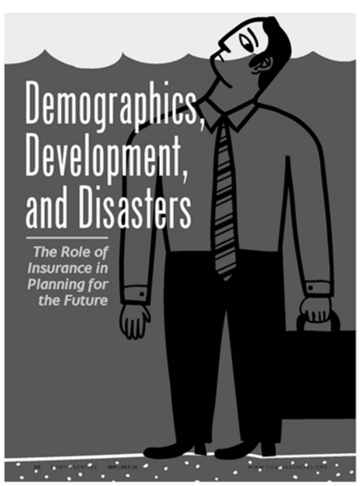


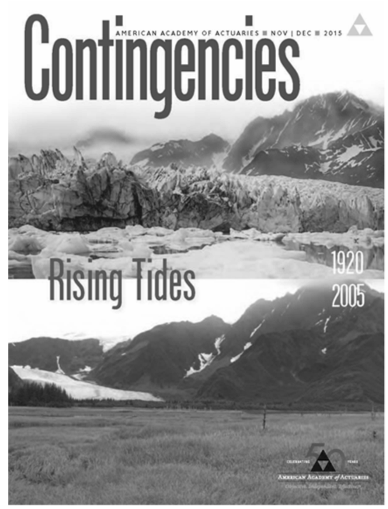

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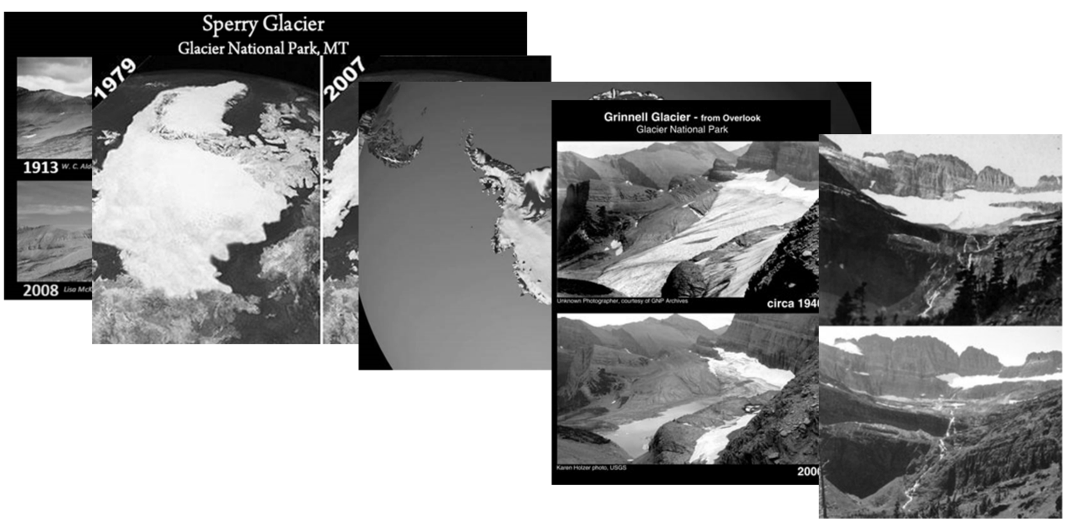

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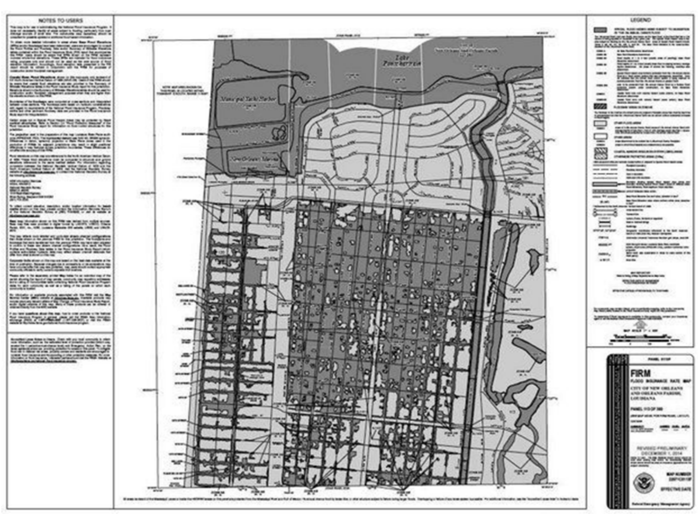

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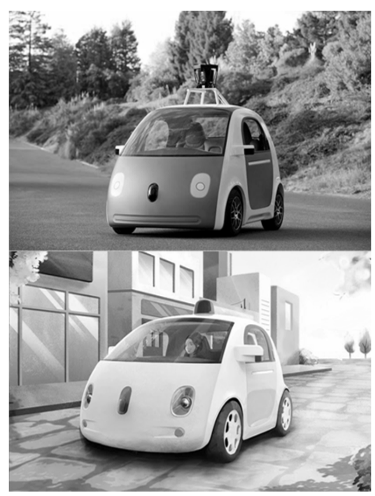
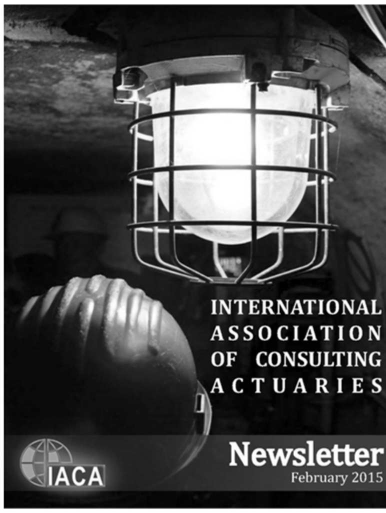


# Survival Skills for actuaries

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If you get the opportunity to mentor a young student, help them understand the value of skills like those I have listed above. Having worked with many of them in recent years I have been struck by ones who assume that getting a 4.0 in university and passing some exams will lead them directly to a great career, or who think they can confidently predict what they will be doing in ten years.

As you consider how to accumulate your Continuing Education (CE) points, think about broadening your own learning outside your immediate practice area. Education is a lifetime activity, and as actuaries we are fortunate to have many options for CE. I try to allocate a portion of my CE time to things well outside the scope of my current role, as one never knows when circumstances will change and knowledge of a new area can help. That is particularly true for people in consulting.

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- Strong technical skills
- Big data competence
- Multidisciplinary focus
- "Big Picture" mindset
- Communication skills
- Flexibility and adaptability
- Global thinking



# A real life example of a new product

- The EU offers carbon offset under its Emissions Trading System (ETS)
- An EU manufacturer seeks a carbon offset by planting a forest on remote islands in northern Australia (Tiwi Islands)
- Several risk management and "actuarial" opportunities:
  - Pricing the carbon offset
  - Insuring the trees on the Tiwi Islands, subject to tropical cyclones
  - Building (or modifying) a catastrophe model to model trees
  - Analyzing pro/con of parametric vs. indemnity coverage
  - Pricing, structuring, and placing (re)insurance on the trees

## Global actuarial initiatives

- IAA:
  - Resource and Environmental Working Group
  - Participation in IPCC projects (now Warsaw round)
  - Formed working groups on carbon pricing, EU required environmental statements, excess mortality, etc.
- Actuaries Climate Index
- UK Institute practice area
- Australian Institute issued “Economic Implications of Climate Change: Public Policy Statement” and has formed a climate change working group



## Adapting actuarial skills

- Recognize key truths:
  - The energy system underpinning our economy is changing
  - Short term political shifts cannot stop long term trends
  - “Green” initiatives open up major opportunities for our profession
  - Our global partners are moving more quickly than we are
- Look for ways to leverage our skills:
  - Climate change is about risk and risk management, our strengths
  - Models used by actuaries (catastrophe, economic capital) can be repurposed to inform a range of decisions
- Think about climate change like Medicare and Social Security
- Be aware of competitors; other professions may fill the demand

## Summary

- Fundamental economic transformation is already underway
- Recent political events are not likely to change long term trends
- Many (most?) insurance products will be affected
- Key risk metrics will increasingly reflect climate related issues
- "Actuarial Survival Skills" in flexibility and adaptability are key
- Actuarial organizations in other countries are moving
- Our skills are highly relevant, if we choose to adapt them
- There are many opportunities in "green consulting", but today's message is not focused on just consulting



# Opportunities in Green Consulting

Jim MacGinnitie

CAS Annual Meeting 2016

# Financial disclosures on climate change

- TCFD
  - Bloomberg-Carney
  - Effective financial disclosure
  - Physical, liability & transition risks
  - Report next month
  - Fsb-tcfd.org
- SASB
  - Standards by industry
  - FSA credential
  - ESG agenda
  - Sasb.org
- Investors
- SEC
- Regulators



# Sustainability

- ESG
  - Environmental
  - Social
  - Governance

- CAS Working Group on Sustainable ERM

# Other issues

- Actuarial Aspects
  - Distribution functions
  - Time horizons
  - Data sources

- Other Sources
  - IAA REWG
  - IFoA Resource and Environment Practice Area
  - ACI/ACRI
  - Australian Institute Climate Change Working Group



# Your speakers' contact information

Rade Musulin

Chief Executive Officer, FBAlliance Insurance

Vice President – Casualty, American Academy of Actuaries

rmusulin@sprynet.com and www.ozgator.com

W. James (Jim) MacGinnitie

Senior Property/Casualty Fellow, American Academy of Actuaries

macginnitie@actuary.org and www.actuary.org