How is ESG impacting P&C insurers and what role should actuaries play?

11 May, 2021

pwc

Agenda for Today's Discussion

- What is ESG and why should insurers care?
- Key climate change Risks & types of climate change related models
- P&C insurance example
- Greenhouse gas quantification
- Life insurance example

Our ESG team members with you today

Steve Bochanski
Partner, Actuarial Services
M: 610 633 5332
steve.bochanski@pwc.com

Graham Hall
Senior Manager, Actuarial Services
M: 646 617 2453
graham.hall@pwc.com

1

ESG basics & why it matters to insurers

What is ESG and which topics are important for insurers?

Environment pillar			
Climate Change	Natural Capital	Pollution & Waste	Env. Opportunities
Carbon Emissions	Water Stress	Toxic Emissions & Waste	Opportunities in Clean Tech
Product Carbon Footprint	Biodiversity & Land Use	Packaging Material & Waste	Opportunities in Green Building
Financing Environmental Impact	Raw Material Sourcing	Electronic Waste	Opportunities in Renewable Energy
Climate Change Vulnerability			

Social pillar			
Human Capital	Product Liability	Stakeholder Opposition	Social Opportunities
Labor Management	Product Safety & Quality	Controversial Sourcing	Access to Communication
Health & Safety	Chemical Safety	Community Relations	Access to Finance
Human Capital Development	Consumer Financial Protection		Access to Health Care
Supply Chain Labor Standards	Privacy & Data Security		Opportunities in Nutrition & Health
	Responsible Investment		
	Insuring Health & Demographic Risk		

Governance pillar	
Corporate Governance	Corporate Behavior
Board	Business Ethics
Pay	Tax Transparency
Ownership	
Accounting	

Material topics for Insurance, per MSCI

Material topics for Insurance, per SASB

There is growing pressure on insurance companies to respond to ESG matters from a range of stakeholders

Customers (Employers)

- Increasing demand for **ESG-compliant insurance products, investments** and related disclosures, particularly from institutional clients
- Demand is **likely to grow across all insurance lines** (beyond investment-linked products)

Customers (Participants)

- **~73% of millennials are altering their buying habits** with the **environment** in mind
- As plan participants, these investors are increasingly including **ESG** as a **consideration** for **investment selections**

Value chain partners

- Brokers and reinsurers will increasingly assess insurers' ESG policies as part of **partnership due diligence checks**
- Insurers that do not respond to ESG adequately risk **narrower partnership opportunities** across the value chain

Internal drivers

- Corporate **vision**, **mission** and **values**
- Management **ESG 'tone from the top'**
- **Proposition** and **business model** (e.g. ESG growth opportunities)

Employees

- ESG will be a **significant lever** for **talent management** given **changing employee attitudes** towards the **purpose of work**
- Research shows that **employee satisfaction** drives **higher productivity** and is positively correlated with **shareholder returns**

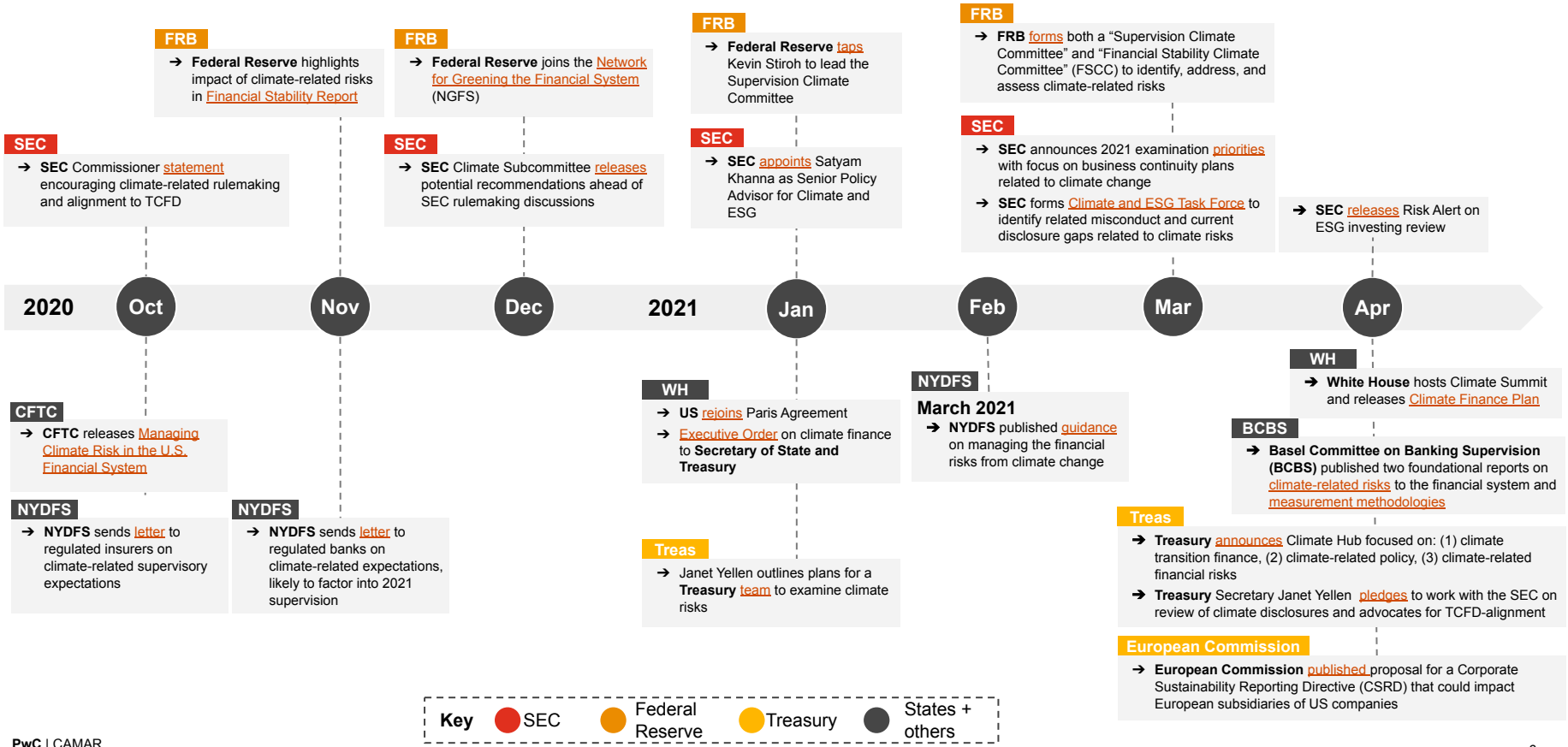
Regulators

- Regulators are requiring that insurers embed **climate-related risks** within risk management frameworks
- Increased **SEC rulemaking and enforcement** expected around human capital and climate related disclosures
- NYDFS has released new **climate-related supervisory expectations** to regulated insurers

Shareholders

- Institutional investors are **putting pressure on companies to act on climate change**
- Companies that do not meet standards risk **potential reputational** impacts, which may increase in frequency and severity

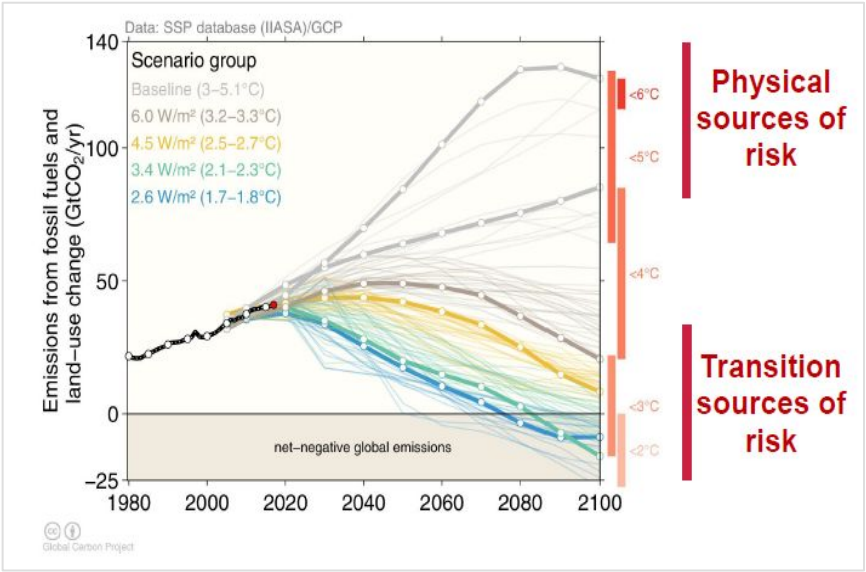
ESG and the regulatory timeline



2

What are the key Climate Change Risks and how should climate change be incorporated at a P&C insurer?

Unpacking climate change: physical & transition risks



01 More Physical Risks

If we do not contain climate change, physical risks will materialize.

- Drought
- Floods and higher sea level
- Heat
- Wind
- Extreme weather events

02 More Transition Risks

If we embark on a transition path, transition risks will materialize. An orderly transition is preferred over an abrupt and disorderly transition.

- Technological innovation
- Climate law & regulation
- Market
- Reputation

General industry approach to climate change risk management and scenario testing

Risk assessment

In the marketplace, we observe insurers conducting a **comprehensive risk assessment** of the risks to its business from climate change. This typically covers both transition risks and physical risks. Such a risk assessment may include:

a. High/Medium/Low assessment of the business across risks types, investments, products and key assumptions

b. Isolating the top 5 risks to the business and measuring their impact accordingly

This risk assessment is used to inform the scenario testing exercise.

Scenario testing

Insurers may perform scenario testing exercises after completion of the risk assessment; these typically focus on three specific areas of an insurer's business:

1. **Asset portfolio**
   – Calculate the impact of climate change on the investments held under different climate change scenarios and time horizons
2. **Underwriting portfolio**
   – Stress the key assumptions and processes used to understand and manage accumulations and exposure
3. **Operational impact**
   – Assess the operational impact of extreme/intensifying weather events on corporate locations and employee homes

Where possible, companies may seek to **leverage existing scenario testing framework** to streamline this process.

Business integration

Insurers may assess how the results of the risk assessment and scenario testing exercise integrate into the business, specifically considering:

a. Governance framework

b. Risk management processes

c. Business strategy

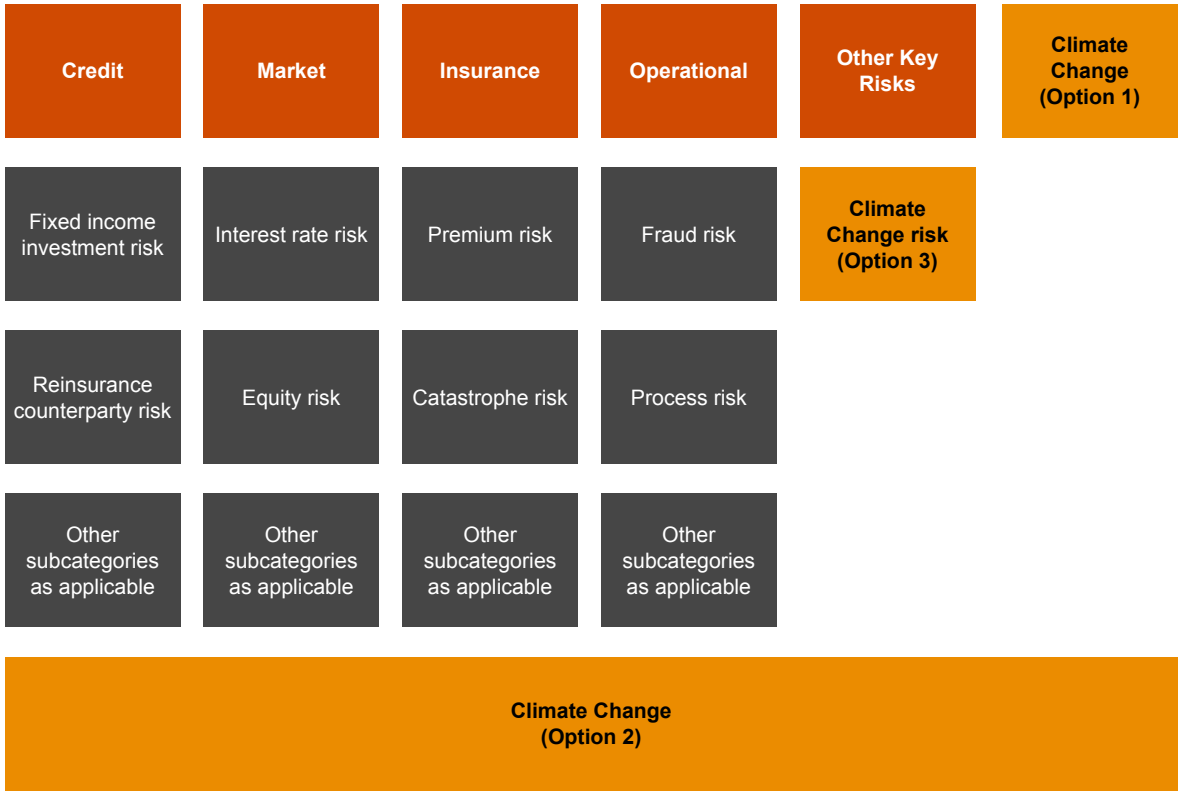
d. Integration into ESG or other disclosures

Ways to implement the risks of climate change into ERM framework

Option 1: Recognize climate change risk is a key risk similar to insurance, market and credit risks

Option 2: Recognize climate change affects financial risks as well as non financial risks such as operational risk

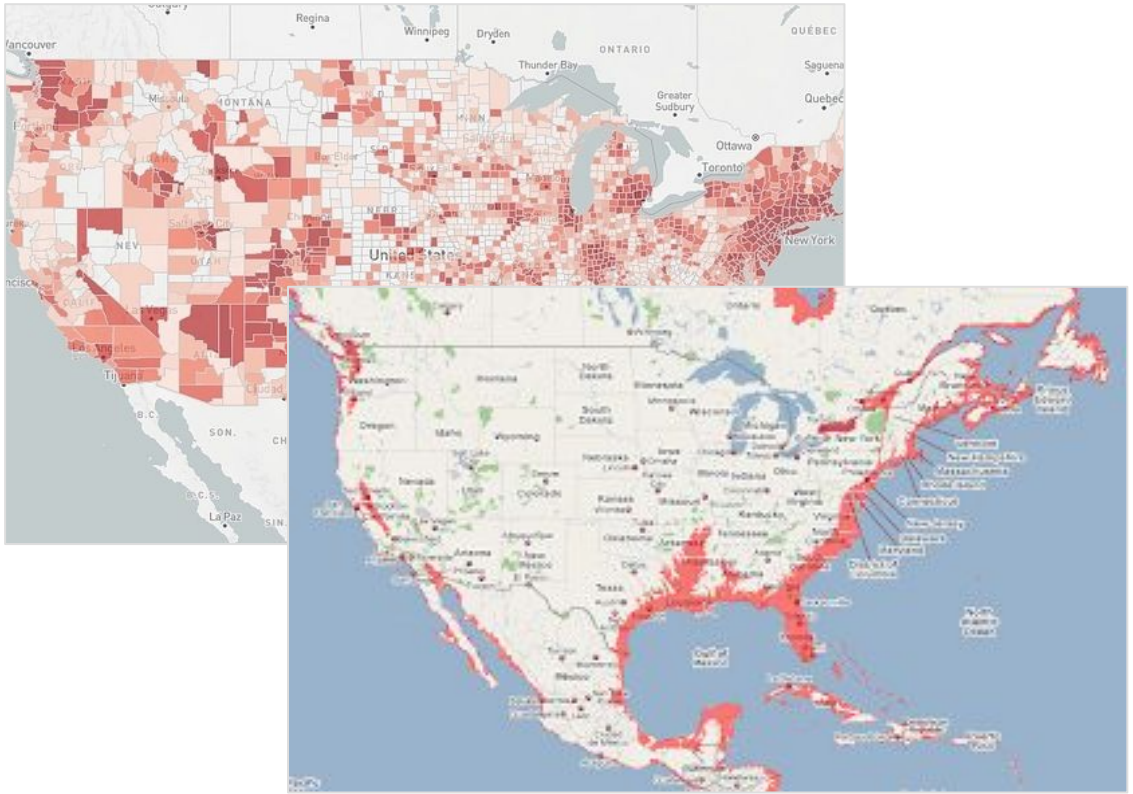
Option 3: Recognize climate change could fit into a company's risk management framework as a new sub-risk category under an existing key risk category

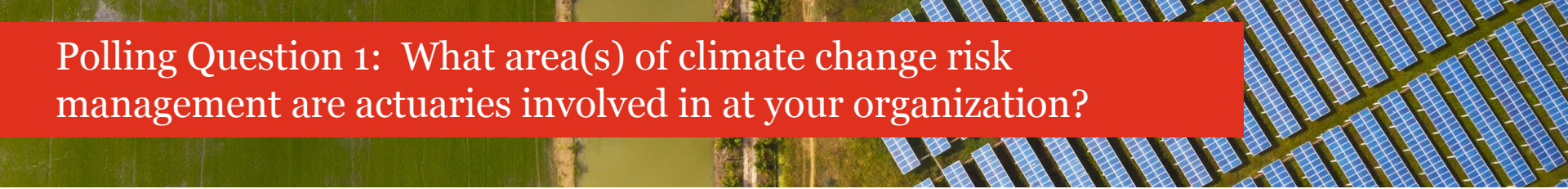


Key considerations for the integration of climate change into underwriting operations and scenario testing

Companies should consider the following questions:

- How do I expect climate change to **affect my key risk metrics in different locations** and what calculation mechanism should I use to assess this?
- What would my **current exposures look like when adjusted** to take into account the effect of climate change in a 2C or 4C global warming scenario at different time horizons?
- How should I **adjust my underwriting/ pricing today** to allow me to transition to my target portfolio incorporating climate change factors?
- How should I incorporate expected climate related change into my **reinsurance strategy** and reinsurance credit risk analysis?





Polling Question 1: What area(s) of climate change risk management are actuaries involved in at your organization?

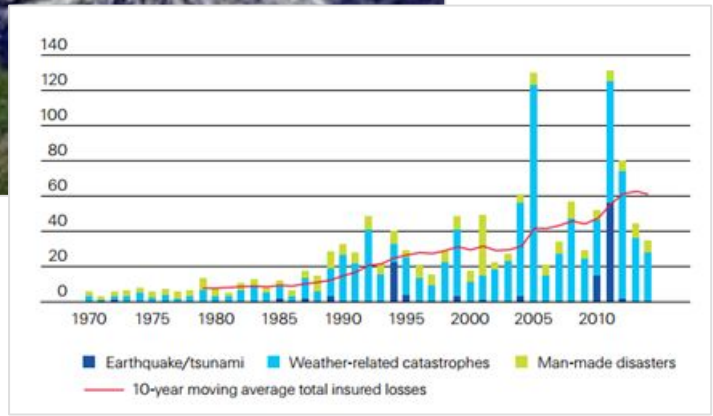
1. Assessment and quantification
2. Management
3. Strategy
4. Reporting
5. Other
6. My company is not involving actuaries

3

Case Study - integration of climate change into natural catastrophe modeling

Physical risk example: Deep dive on changes to hurricane manifestations due to climate change

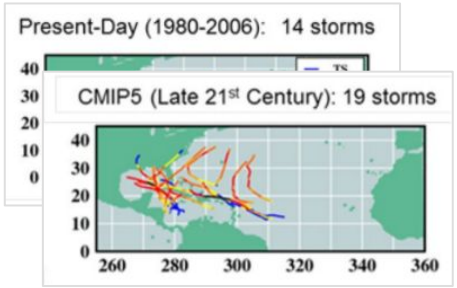
- Catastrophe models used by most insurers today are calibrated to generate losses expected over a 1-5 year time horizon (depending on the model/peril) and do not allow for the effect of climate change on the frequency and severity of weather events
- Hurricanes are subject to three primary climate change related influences:
  1. Warmer sea surface temperatures could intensify tropical storm wind speeds, potentially delivering more damage if they make landfall. This could result in more category 4 and 5 landfalling storms,
     and lead to hurricane windspeeds increasing by up to 10%.
  2. Sea level rise is likely to make future coastal storms more damaging, as storm surge events occur more frequently as hurricanes push sea water inland.
  3. Hurricane are expected to track north more frequently due to expanding tropics because of higher global average temperatures.



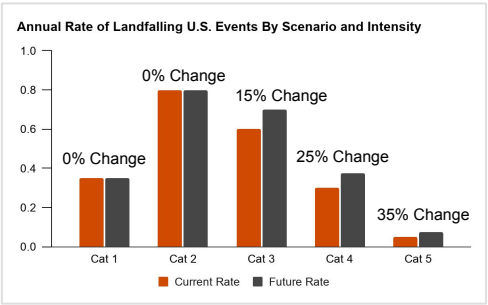
How can the results of catastrophe models be adjusted to allow for climate change impacts: “Bottom up adjustment” (1 of 2)

AIR has used a subsampling method to adjust the frequency of landfalling **hurricanes** and create a new collection of simulated hurricane seasons to reflect a future climate.

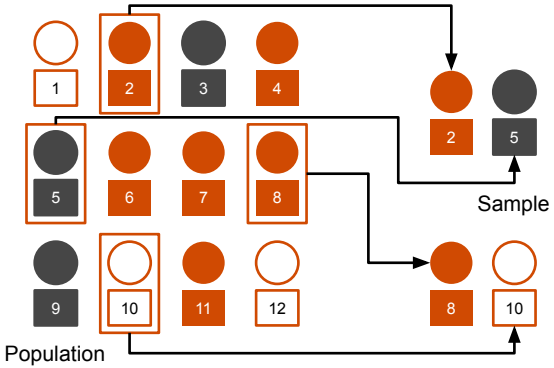
1 Analyze literature to understand climate impacts on frequency and severity of landfalling events under different climate scenarios



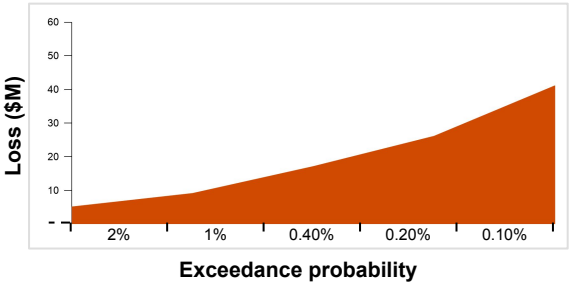
2 Use literature review to create landfalling event frequency targets



3 Subsample by extracting seasons from the existing catalog that are likely to occur in a warmer climate, to hit landfalling frequency targets



4 Recalculate aggregate loss statistics using pre simulated parent loss catalogue

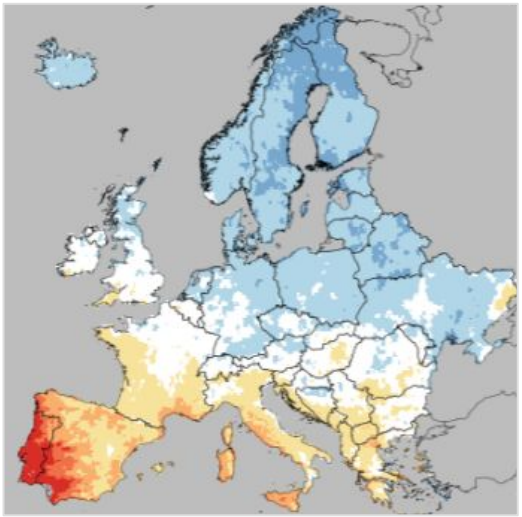


Lead to an aggregate increase in modeled losses by 20% by 2050

How can the results of catastrophe models be adjusted to allow for climate change impacts: “Bottom up adjustment” (2 of 2)

RMS reweights the simulated years in its Year Loss Table (“YLT”) for **European Flood** based on the seasonal change in the 95th percentile of daily maximum precipitation under climate change scenarios

1 Derive projections of changes in the annual seasonal 95th percentiles of daily maximum precipitation under different climate scenarios and time horizons



2 Reweight the years in the YLT such that the projected future distribution of precipitation for the scenario is suitably matched by the modeled distribution across the corresponding reweighted set of simulated years

Event ID	Rate	Mean	Sdi	Sdc	Exposure
1	.10	500	500	500	10,000
2	.10	300	400	800	5,000
3	.50	200	300	400	4,000

3 Recalculate aggregate loss statistics using pre simulated parent loss catalogue

	2050		2090	
	AAL	RP 200	AAL	RP 200
Lower Bound (RCP2.6)	+34%	+31%	+33%	+31%
Upper Bound (RCP8.5)	+75%	+66%	+264%	+161%

How can the results of catastrophe models be adjusted to allow for climate change impacts: “Top down adjustment”

UNEP FI calculates scaling factors based on available scientific data to scale the AEP curve at different return periods

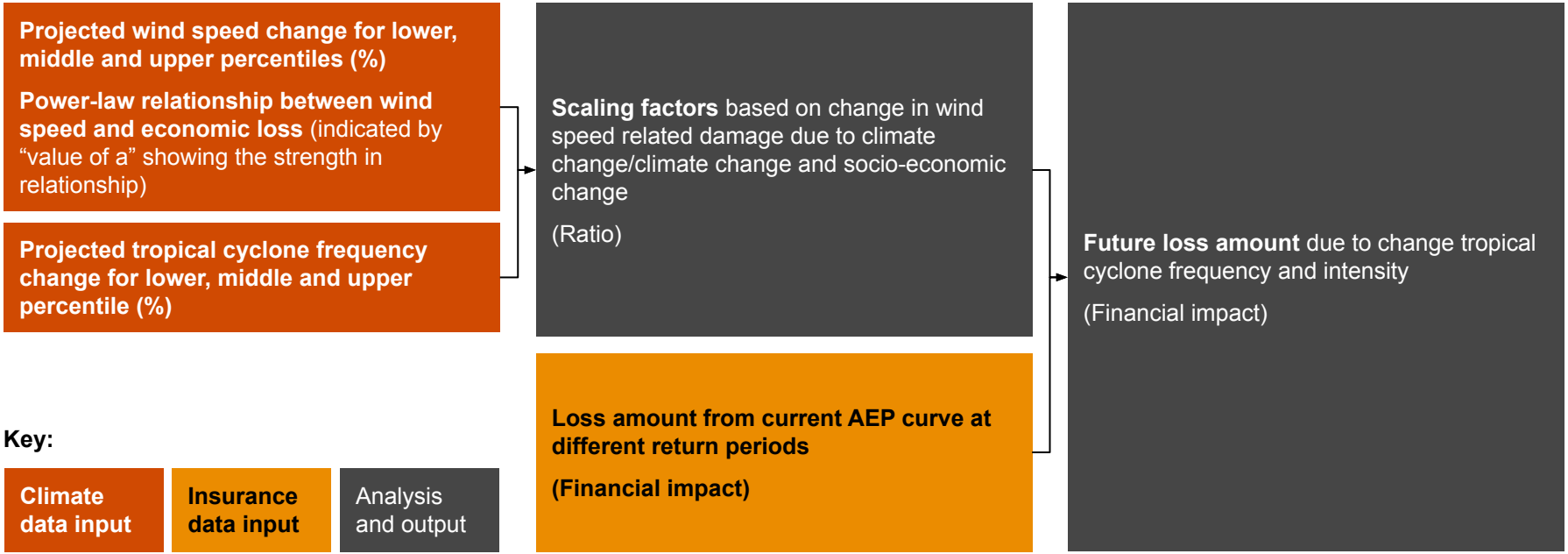


Diagram shows illustrative calculation logic based on frequency/intensity only, for tropical cyclones

4

Greenhouse Gas quantification

Greenhouse gas emissions: What are they? Let's decode GHG

Greenhouse gases, such as carbon dioxide (**CO2**), methane (**CH4),** nitrous oxide (**N2O**), **and others**, are gases in Earth's atmosphere that trap heat. They let sunlight pass through the atmosphere, but they prevent the heat that the sunlight brings from leaving the atmosphere.

Excessive GHG emissions lead to unnatural warming

Base energy consumption data x EF x GWP = GHG emissions (CO2e)

Energy consumption / Activity data

Production and consumption of energy

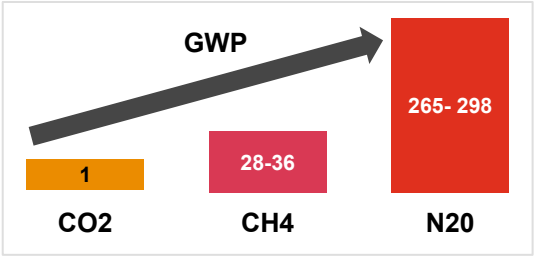
- An activity that generates GHG emissions, such as gallons of gasoline consumed from company cars
- Data collected as physical units (gallons) or energy units (kWh)

Emission factor (EF)

An EF is used to calculate the GHG emissions for a given source, relative to units of activity

For example, eGRID EF for electricity use in the NPCC New England sub region indicate that for every MWh of electricity consumed, 563.7 lbs. of CO2e are emitted.

Global Warming Potential (GWP)

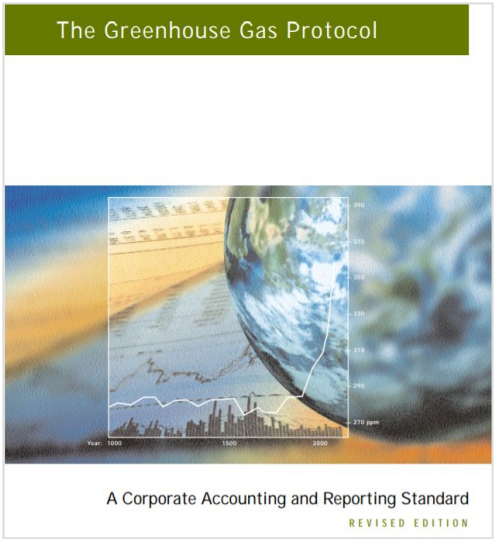


- Developed to allow comparisons of the global warming impacts of different gases
- The **larger the GWP** the **more** that a given **gas warms the Earth**

Source: WRI GHG protocol & EPA

The GHG Protocol

Companies reporting on GHG emissions typically follow the guidance set forth in the **GHG Protocol**, which was developed by World Resources Institute (WRI) with the vision to harmonize GHG accounting and reporting standards internationally to drive consistent approaches to GHG accounting globally. The GHG Protocol accomplished this by establishing comprehensive global standardized frameworks to measure and manage GHG emissions from private and public sector operations, value chains and mitigation actions



Source: WRI GHG protocol

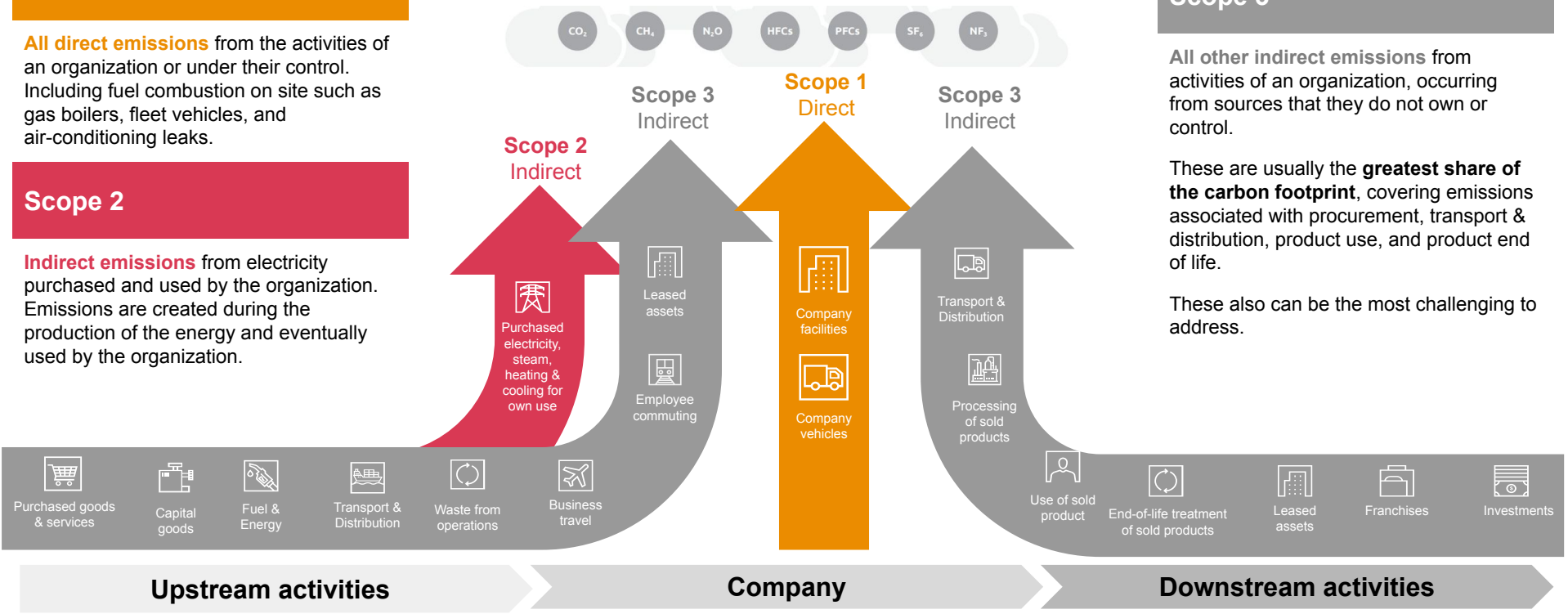
An overview of GHG emissions

Scope 1

All direct emissions from the activities of an organization or under their control. Including fuel combustion on site such as gas boilers, fleet vehicles, and air-conditioning leaks.

Scope 2

Indirect emissions from electricity purchased and used by the organization. Emissions are created during the production of the energy and eventually used by the organization.



Scope 3

All other indirect emissions from activities of an organization, occurring from sources that they do not own or control.

These are usually the **greatest share of the carbon footprint**, covering emissions associated with procurement, transport & distribution, product use, and product end of life.

These also can be the most challenging to address.

GHG risks

Typical risks and challenges clients face when calculating GHG metrics include:

- Completeness and accuracy of sources of emissions (e.g., fugitives, back-up generators)
- Cutoff (12 months of data)
- Estimations/extrapolations and gap filling methodologies
- Emission/conversion factors
- Calculation errors
- Appropriate application of RECs and offsets
- Lack of key controls around GHG data
- Reports and systems used for data collection and consolidation

Recommended risk mitigation upgrades (non-exhaustive list):

- Data governance
- Automated vs manual calculations
- Trending of data year-over-year
- Reviewing emission factors annually
- Assumption log
- Metric protocols & established quality assurance procedures

Polling Question 2: What activities do you think are most important for P&C insurers as they think about ESG integration?

1. Climate change risk assessment
2. Climate change investment scenario analysis
3. Climate change underwriting scenario analysis
4. “Green” product design / strategy
5. GHG quantification

5

Case Study - risk assessment and scenario testing at a life insurer

We worked with a life insurer to support their climate change integration journey, starting with a TCFD gap assessment

Client's challenge	A US based life insurance client wanted to release their first TCFD report including a robust scenario analysis of their underwriting and investment portfolio to show stakeholders their commitment to ESG. This was their first TCFD report, and they wanted guidance on how to write the report, where their gaps were, and what risks they faced due to climate change.
PwC solution	• We completed a TCFD gap analysis and risk assessment, to support the client in identifying gaps against the TCFD framework which needed to be remediated prior to their first TCFD report • We laid out the PRA expectations and highlighted what would need to be done outside of the TCFD to comply with the PRA • Our risk assessment laid out impact pathways for both high and low risk GHG scenarios, showing what assumptions in material products would be impacted due to climate change • Our scenario analyses supported the client's understanding of the potential impact of climate change on their investments and underwriting portfolio under different climate change scenarios
Outcome / impact	The client was able to use our deliverables to guide them in drafting their first TCFD report and complying with PRA expectations. They gained valuable insights on areas of their business that were vulnerable to climate change and thought through mitigation strategies that would protect their business.

We performed a gap assessment to understand the current state and gaps to prioritize against the TCFD recommendations

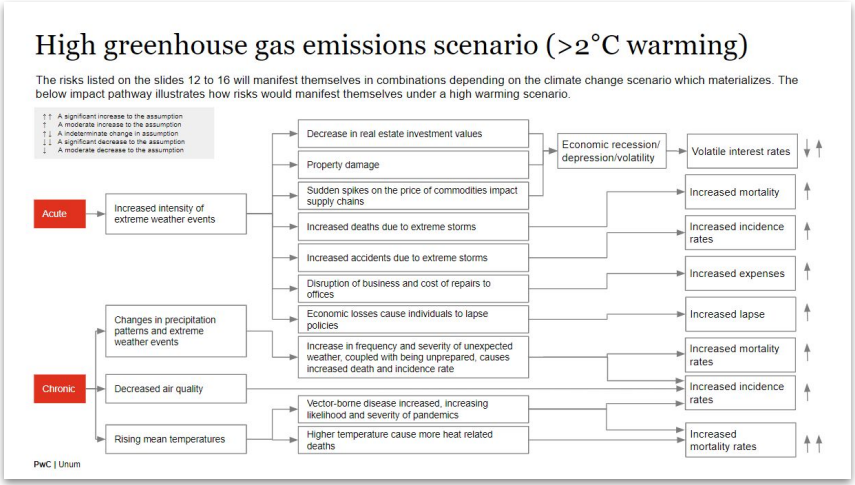
1. Assessment of current state and conduct gap assessment | 2. Qualitative risk assessment across all of business functions | 3. Scenario analysis exercise of priority components of investments/UW portfolio | 4. Recommendations for next steps and review of draft TCFD report

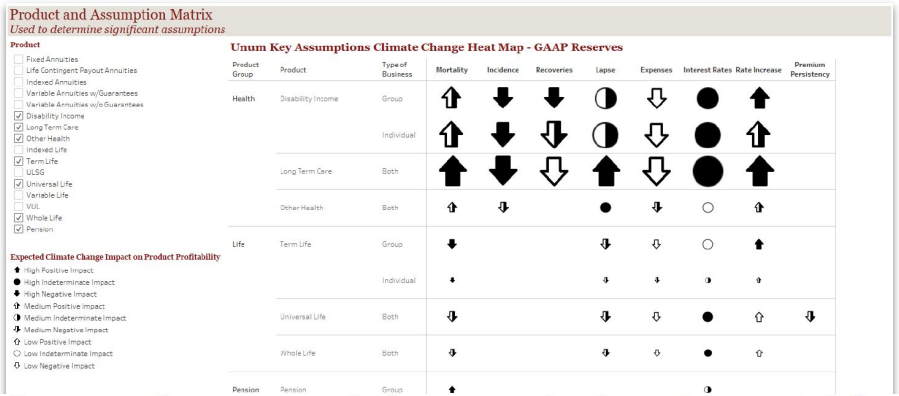
Sample conclusions from our gap assessment:

- While disclosure gaps existed within all TCFD categories, there is a **solid foundation for a robust** 2021 TCFD Disclosure
- There are **many narratives from across the business which were discussed through the interview process** that can be used to showcase the current response to climate-related risks and opportunities
- There are **5 recommended actions** that should be prioritized within the upcoming months to be prepared for the initial TCFD Report, including a risk assessment and a scenario analysis that will be performed in the future

Our risk assessment helped the Company to identify the key risks they were subject to from climate change over time

1. Assessment of current state and conduct gap assessment
2. **Qualitative risk assessment across all business functions**
3. Scenario analysis exercise of priority components of investments/UW portfolio
4. Recommendations for next steps and review of draft TCFD report





Low greenhouse gas emissions scenario - impact on material products

Product	Mortality	Incidence	Interest	Lapse*	Expenses
LTC	↓	↑	↓↓	↓↑	↓
DI	↓	↑↑	↓↓	↓↑	↓
Other Health	↓	↑	↓↓	↓↑	↓
Universal Life	↑	NA	↓	↓	↓
Term Life	↑	NA	↓	↓	↓
Whole Life	↑	NA	↓↓	↓	↓

We carried out a detailed scenario testing exercise across both their investments and underwriting portfolio

1. Assessment of current state and conduct gap assessment
2. Qualitative risk assessment across all business functions
3. Scenario analysis exercise of priority components of investments/UW portfolio
4. Recommendations for next steps and review of draft TCFD report

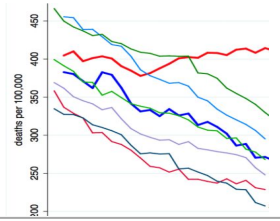
Investment portfolio analysis:

SECTOR_LV1	2020-2025	2025-2030	2030-2040	2040-2050
11 - AGRICULTURE, FORESTRY, FISHING AND HUNTING	-0,60%	-0,20%	1,09%	1,00%
21 - MINING	-5,07%	3,40%	-1,65%	-0,22%
22 - UTILITIES	-2,28%	2,78%	-0,01%	1,85%
23 - CONSTRUCTION	0,97%	1,26%	1,30%	1,24%
31-33 MANUFACTURING	-0,43%	-0,15%	0,03%	0,13%
42 - WHOLESALE TRADE	-0,56%	-0,68%	-0,59%	-0,33%
44-45 RETAIL TRADE	0,00%	0,00%	0,00%	0,00%
48-49 TRANSPORTATION AND WAREHOUSING	-0,94%	-0,89%	-0,53%	0,01%
51 - INFORMATION	0,00%	0,00%	0,00%	0,00%
52 - FINANCE AND INSURANCE	-0,03%	0,02%	0,06%	0,03%
53 - REAL ESTATE RENTAL AND LEASING	-0,66%	-0,26%	0,05%	-0,01%
54 - PROFESSIONAL, SCIENTIFIC, AND TECHNICAL SERVICES	0,00%	0,00%	0,00%	0,00%
55 - MANAGEMENT OF COMPANIES AND ENTERPRISES	0,00%	0,00%	0,00%	0,00%
56 - ADMINISTRATIVE AND SUPPORT AND WASTE MANAGEMENT AND REMEDIATION SERVICES	0,00%	0,00%	0,00%	0,00%
61 - EDUCATIONAL SERVICES	0,00%	0,00%	0,00%	0,00%
62 - HEALTH CARE AND SOCIAL ASSISTANCE	0,00%	0,00%	0,00%	0,00%
71 - ARTS, ENTERTAINMENT AND RECREATION	0,00%	0,00%	0,00%	0,00%
72 - ACCOMODACTION AND FOOD SERVICES	0,00%	0,00%	0,00%	0,00%
81 - OTHER SERVICES (EXCEPT PUBLIC ADMINISTRATION)	0,00%	0,00%	0,00%	0,00%
99_GRANDTOTAL	-0,86%	0,56%	-0,07%	0,43%

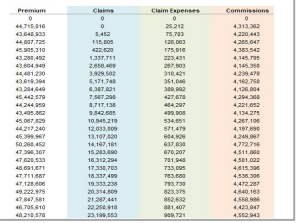
Underwriting portfolio analysis:

Analyze key driving assumptions

Create realistic climate scenarios



Stress cashflows and recalculate metrics



Impact of Assumption Changes - Mortality, Incidence, Lapse, Discount Rate ($M)

Products	Baseline PVCF @ 1.45%	Low GHG Optimistic	Low GHG Conservative	High GHG Optimistic	High GHG Conservative
LTC	$29,192	$60	$8,737	($6,439)	$7,096
IDI - CDB	$10,408	$73	$1,199	($1,019)	$846
IDI - RIB	$848	($59)	$188	($166)	$361
CLA/VB - Cancer	$792	($48)	$96	($101)	$235
CLA/VB - CI	($72)	($21)	$19	($16)	$91
CLA/VB - DI	($440)	($13)	($27)	$25	$25
CLA/VB - Life	$2,321	($25)	$469	($384)	$574
Life	$737	($1)	$33	($22)	$70
Total	$43,785	($35)	$10,713	($8,756)	$9,298
	Impact of Expense Increase	$421	$823	$655	$1,647
	Total PVCF Impact	**$386**	**$11,537**	**($8,101)**	**$10,945**

The analysis of assumptions underlying both the investment and underwriting portfolios is an exercise that is actuarial in nature!

Thank you

pwc.com