Antitrust Notice

- The Casualty Actuarial Society is committed to adhering strictly to the letter and spirit of the antitrust laws. Seminars conducted under the auspices of the CAS are designed solely to provide a forum for the expression of various points of view on topics described in the programs or agendas for such meetings.
- Under no circumstances shall CAS seminars be used as a means for competing companies or firms to reach any understanding – expressed or implied – that restricts competition or in any way impairs the ability of members to exercise independent business judgment regarding matters affecting competition.
- It is the responsibility of all seminar participants to be aware of antitrust regulations, to prevent any written or verbal discussions that appear to violate these laws, and to adhere in every respect to the CAS antitrust compliance policy.

An Overview of Insurance Associated Emissions

May 2023

pwc

Agenda for Today's Discussion

1. How do insurance associated emissions fit into the ESG picture?
2. Overview of regulatory landscape
3. Calculation mechanics and methodology
4. Challenges and considerations of calculating insurance associated emissions
5. What does the mean for actuaries?

Our climate team members with you today

Adam Kallin
Director, Risk Modeling Services
M: 470 366-2761
adam.j.kallin@pwc.com

Neha Srivastava
Senior Associate, Risk Modeling Services
M: 203 615 8694
neha.srivastava@pwc.com

Kyle Austin
Associate, Risk Modeling Services
M: 330 815 1191
kyle.austin@pwc.com

1

How do insurance associated emissions fit into the ESG picture?

How do insurance associated emissions fit into ESG

ESG consists of a broad set of issues. Insurance associated emissions, fit under *Carbon Emissions* and are a form of GHG accounting used to support Insurers in understanding the GHG emissions associated with their activities.

Environmental			
Climate Change	Natural Resources	Pollution & Waste	Environmental 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			
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	
Corporate Governance	Corporate Behavior
Board	Business Ethics
Pay	Tax Transparency
Ownership & Control	
Accounting	

Topics synthesized from leading ESG standards:

- Material topics for Insurance sub-sectors
- Material topics across the Financial Services sector

Source: MSCI ESG Ratings Key Issue Framework

Introduction to insurance associated emissions

The Greenhouse Gas Protocol categorizes different types of emissions associated with the businesses activities

Scope 1 emissions

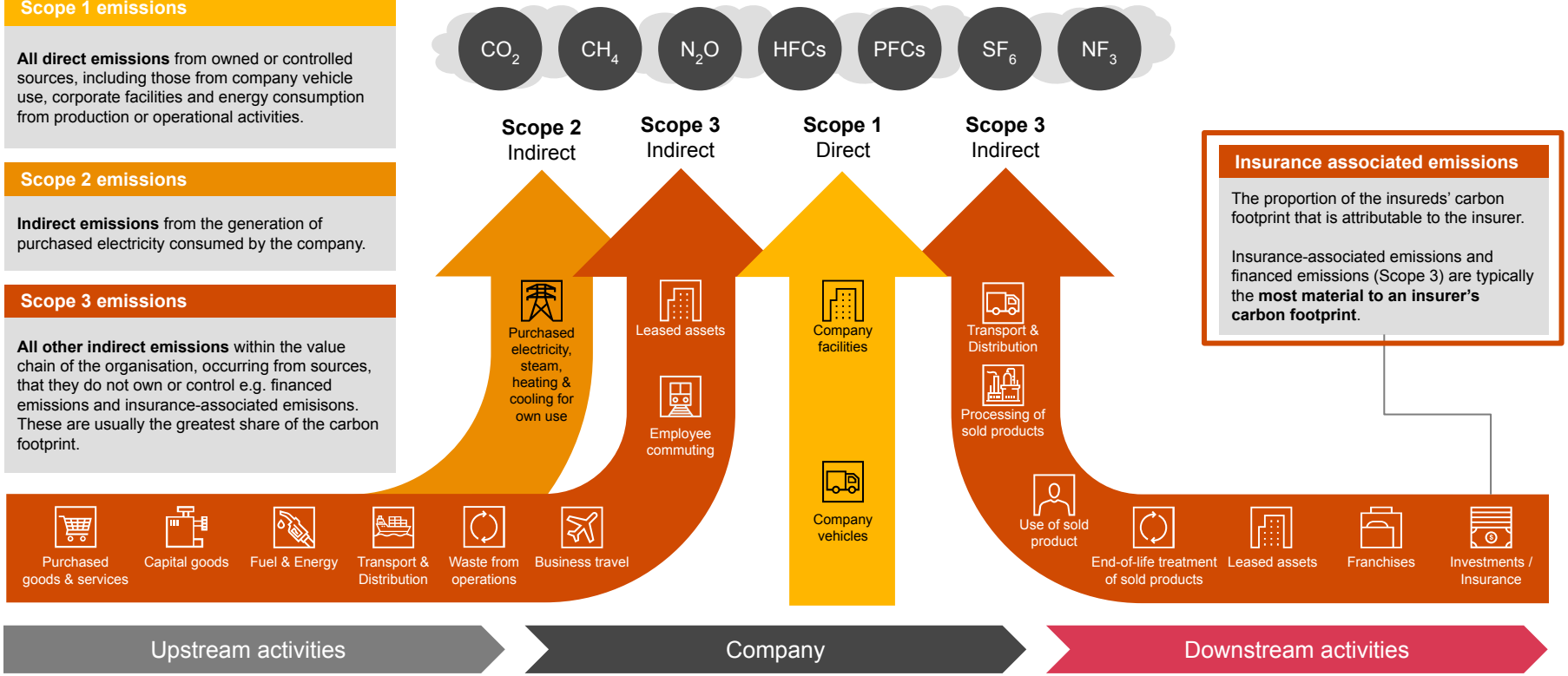
All direct emissions from owned or controlled sources, including those from company vehicle use, corporate facilities and energy consumption from production or operational activities.

Scope 2 emissions

Indirect emissions from the generation of purchased electricity consumed by the company.

Scope 3 emissions

All other indirect emissions within the value chain of the organisation, occurring from sources, that they do not own or control e.g. financed emissions and insurance-associated emisisons. These are usually the greatest share of the carbon footprint.



Insurance associated emissions

The proportion of the insureds' carbon footprint that is attributable to the insurer.

Insurance-associated emissions and financed emissions (Scope 3) are typically the **most material to an insurer's carbon footprint**.

How can insurance associated emissions lead to a competitive advantage and be integrated into an insurer's strategy

The calculation of insurance associated emissions can be an important step in supporting an insurer's net zero journey and establishing a plan to set them up for disclosure under the guidance of the relevant regulatory and advisory groups

Create transparency for stakeholders

- Measure and report insurance-associated emissions
- Gain a better understanding of an organization's impact on climate
- Define re/insurer's role and position more broadly in combating climate change

Manage climate-related transition risks

- Independently identity areas of underwriting activities that fall under carbon-intensive sectors
- Manage reputational risk by reporting climate-related impact
- Understand potential decarbonization implications of strategic underwriting decisions

Develop climate-friendly insurance products

- Independently develop innovative products and services that enable clients to decarbonize their business activities
- Identify which sectors and businesses in portfolio require the most help with decarbonization efforts

Develop and set climate targets

- Track absolute GHG emissions year over year
- Ensure re/insurance underwriting portfolios are compatible with climate targets
- Track progress against public decarbonization commitments

Measurement of insurance-associated emissions

2

Overview of insured emissions regulatory landscape

Insurance associated emissions timeline

July, 2021

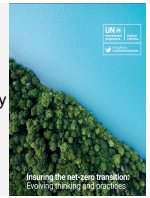
NZIA

- **Allianz, Aviva, AXA, Generali, SCOR, Swiss Re, and Zurich Insurance Group** establish the **Net-Zero Insurance Alliance (NZIA)**, which is convened by the United Nations Environment Programme's Principles for Sustainable Insurance Initiative.

March, 2022

NZIA

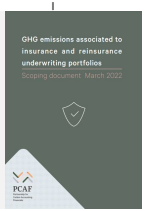
- **NZIA** publishes whitepaper describing the insurance role in the net zero transition, including how insurers can think about metrics, what type of targets they can set and how they should be reported.



April, 2022

PCAF

- **PCAF** releases initial scoping document outlining the guiding principles for developing a GHG accounting methodology for insurance and reinsurance underwriting and exploring the differences between financed emissions and Insurance-Associated Emissions.



August, 2022

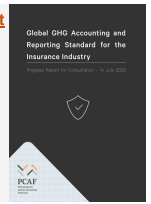
NZIA

- **NZIA** drafts its first target setting protocol, which outlines insurance associated emission reduction target setting guidance to be used by its 30 members.

October, 2022

PCAF

- **PCAF** releases progress report on global GHG accounting and reporting standard for the insurance industry.



November, 2022

NZIA

- **NZIA launches final version of target setting protocol**, which sets out NZIA's recommended approach to target setting and reporting.

January, 2023

PCAF

- **PCAF** releases the first version of the Insurance-Associated Emissions Standard, which provides detailed methodological guidance for the measurement and disclosure of GHG emissions.

July, 2023

NZIA

- **NZIA members** required to disclose at least one target type in each of the three target categories by July 31, 2024.

July, 2024

NZIA

- **NZIA members** required to disclose one of the five target types by July 31, 2023.

Key: PCAF NZIA

Net-Zero Insurance Alliance (NZIA) brings insurers together around climate goals

The NZIA was convened by the UN Environment Programme's Principles for Sustainable Insurance Initiative (PSI) and is made up of a group of nearly 30 leading insurers which have committed to transitioning their insurance and reinsurance underwriting portfolios to net-zero emissions by 2050 (in line with the Paris Agreement to keep global average temperature increase below 1.5°C).

- Collectively, NZIA members represent more than 15% of world premium volume and over $7 trillion in assets under management.
- There are several components to the NZIA's work: metrics and targets; policy and regulatory engagement; life and health insurance implications; methodology development.
- The NZIA recognized that in order to set meaningful net-zero targets and measure progress, standard (re)insurance portfolio emissions will need to have a consistent quantification methodology.
- To address this emissions quantification methodology gap, NZIA is collaborating with the Partnership for Carbon Accounting Financials (PCAF) to develop the first global standard to measure and disclose emissions attributable to insurance underwriting portfolios, or "insurance-associated emissions."

Current NZIA members as at April 2023

NZIA's Guidance for Insurers Preparing for Target Setting

- The NZIA released a white paper in April 2022 describing **how the insurance industry could play a role in the transition to net zero**, including how insurers can think about **metrics to use**, and also what **type of targets** they can set and how these should be reported on externally.
- The NZIA set out five categories of targets for insurers to consider:
    - Emission reduction targets
    - Sectoral decarbonization targets
    - Portfolio coverage targets
    - Focused engagement targets
    - "Insuring the transition" targets
- The NZIA then released a draft of it's Target Setting Protocol in October 2022 for public consultation with the final Version 1.0 released in January 2023.
- With the launch of the Protocol, **existing NZIA members are required to set and disclose their initial target(s) by 31 July 2023.**
- A high level overview of the key features of the Target Setting-Protocol includes:
    - SBTi collaboration
    - Timelines
    - Scope of targets
    - Emission reduction target categories
    - Engagement target categories

Developing PCAF emissions quantification methodology for insurance contracts

In November 2022, PCAF released the first version of the Insurance-Associated Emissions Standard in collaboration with the NZIA. This first publication comes after an initial scoping document (March 2022) and progress report (August 2022) used to facilitate public consultation with regulators, the re/insurance industry, brokers, policymakers, data providers, consultants, academia, non-governmental organizations (NGOs), and insurance associations. A working group consisting of 16 insurers and other industry players were involved in developing these documents.

- The 2022 PCAF documents highlight the important role the insurance industry has to play in the transition to a low carbon economy, by first helping (re)insurers understand the climate impact of their underwriting decisions, laying the foundation to support the independent decarbonize insurance and reinsurance portfolios.
- The focus for the first methodology is on commercial lines insurance and personal motor lines covered by the (re)insurance business.
- Methodology outlined in the 2022 documents draws heavily on the better-established methodology for calculation “financed emissions,” or the emissions associated with an investment portfolio, and takes on key challenges specific to quantifying insurance-associated emissions. One challenge is the issue of attribution, or the amount of insured emissions the insurance company should account for.

Which target setting frameworks are currently available in the market?

Climate Action 100+
Global Investors Driving Business Transition

ClimateWise
Insuring a sustainable future

PRI Principles for Responsible Investment

ShareAction»

CDP INVESTOR SIGNATORY

Ceres

US SIF
The Forum for Sustainable and Responsible Investment

SCIENCE BASED TARGETS
DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

AMERICA IS ALL IN

25%

Approximate share of frameworks with a **US focus**

75%

Approximate share of frameworks with a **global focus**

75%

Approximate share of frameworks with an **emphasis on climate change**

15%

Approximate share of frameworks with an **emphasis on broader ESG considerations**

What is the Science Based Targets initiative (“SBTi”)?

A validated science based target is **a prerequisite for a credible climate ambition**, both internally and from a broader market perspective. The objective is to ensure that the targets will achieve their stated ambition as well as position the company strongly in the market.

It is clear that climate expectations are moving rapidly - governments are moving quickly to set ambitious goals and expectations of businesses are increasing. It is already clear that even participation in leading events (including COP26 and the WEF’s Climate Leaders Group) will only continue to be available to those with ambitious science-based targets validated by the SBTi.

About the SBTi

The SBTi defines and promotes best practice in science-based target setting. The SBTi is a partnership between CDP, the United Nations Global Compact, World Resources Institute (WRI) and the World Wide Fund for Nature (WWF). It independently assesses and approves company targets in line with strict criteria that evolve in line with emerging climate science.

Having an SBTi validated and approved target is widely considered best practice in setting a credible Net Zero commitment.

How are the scopes of emissions defined?

The SBTi framework requires companies to set a SBT across each of the emissions scopes. These scopes relate to the different sources of emissions from our business assets and activities.

Scopes 1 and 2

- Scope 1 emissions arise directly from sources that are owned or controlled by the insurer e.g. from car fleets, generators and boilers.
- Scope 2 emissions arise indirectly from purchased energy, namely the emissions associated with the production of heat and electricity for your buildings from assets not owned by the insurer.

Scope 3

- Scope 3 emissions are those that arise indirectly as a result of activities from assets that are not owned or controlled by the insurer as part of your value chain including e.g. air travel and commuting.

3

Calculation mechanics and methodology

Illustrative methodology to calculate insurance associated emissions

1. Baseline Emissions

Corporate emissions

1. Leverage **reported emissions databases** from external sources
2. Where reported data does not exist, leverage **consumption or economic proxy data and methodologies to fill gaps**, prioritizing methodologies with highest PCAF data quality score

Automobile emissions

1. Leverage **actual vehicle-specific emissions data** from reported data provided by policyholders and external emission factors
2. Where actual data is not available, leverage **estimated vehicle-specific emissions and local distance driven averages**

2. Emissions Projections

Leverage **publicly available climate change scenarios** (including NGFS, IEA etc) to model the impact of **emissions pathways on the decarbonization rate of different sectors**

→ Apply decarbonization rates to baseline emissions calculations in order to **proxy the future emissions of the insurance portfolio**

→ For corporate emissions, incorporate **specific company decarbonization commitments** within emissions projections, as applicable.

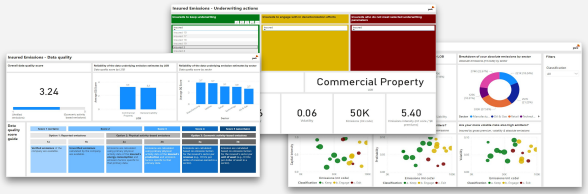
3. Emissions Attribution

Apply ratio of insurance premium to **total revenue for corporate emissions** or **total cost of ownership for automobile emissions**, in alignment with PCAF guidance

4. Visualization and scenario analysis

Model interface and visualization layer which can be used to:

- **Monitor portfolio** results
- View and assess **metrics for disclosure**
- Carry out emissions **scenario analysis** considering portfolio runoff, lapse, and growth characteristics
- Test the impact of implementing differing **underwriting or investment strategies**



Emissions Attribution

An attribution factor serves to determine the share of the absolute emissions of the insured customer or asset associated with the (re)insurance underwriting portfolio. There are different considerations for both Commercial Lines and Personal Lines attribution factor calculations.

Commercial Lines Data Requirements

- **(Re)insurance Premium** - Insurer provided data
- **Customer Revenue** - Customer or third-party provider data.
  - When customer revenue is not available the insurer can use the **customer revenue of the broader insured entity/parent company**
  - If no customer revenue is available then the insurer can use **average sector revenue**

(Individual) Attribution factor $_p$ =

$$\frac{\text{Re/Insurance premium}_i}{\text{Customer revenue}_i}$$

Personal Lines Data Requirements

- **(Re)insurance Premium** - Insurer provided data
- **Total Cost of Ownership** - PCAF guidance states that the following costs should be included:
  - Depreciation
  - Fuel Costs
  - Insurance Premiums
  - Maintenance
  - Registration/taxes
  - Others - parking fees, tolls, etc.

The share premium volume is expected to be 10% to 26% of total costs associated with vehicle ownership.

(Industry) Attribution factor $_p$ =

$$\frac{\text{Insurance Industry's } \textbf{total premium} \text{ from the motor line of business}}{\textbf{Total costs associated with vehicle ownership} \text{ of all vehicles}}$$

**Information displayed is from the PCAF Insurance Associated Emissions Standard*

Emissions Projections and Target Setting

Once baseline emissions have been established, insured emissions need to be projected to indicate how they may change under different climate scenarios. Specific targets can then be established, and the resulting implications for strategy adjustments assessed and implemented.

1. Climate Scenarios

Select publicly available well established climate change scenarios to project how emissions may change over different time horizons

The *Network for Greening the Financial System* (NGFS) scenarios **help companies understand how the world will decarbonize under different climate scenarios**. There are 6 NGFS scenarios across 3 categories:

1. Orderly Transition Scenarios
2. Disorderly Transition Scenarios
3. Hot House World Scenarios

Alternative scenarios include those developed by the *International Energy Agency* (IEA) and *Intergovernmental Panel on Climate Change* (IPCC).

2. Projection Methodology

Model how the underwriting emissions will change over time under different climate scenarios given expected changes in the portfolio

The emissions and emissions intensity of a portfolio should be modelled over time. Inputs to consider for this projection exercise include:

1. The companies decarbonization scenario
2. Policy renewal intensity
3. Portfolio growth, by sector

3. Target Setting

Establish and disclose decarbonization targets consistent with an established target setting framework

Target Setting Frameworks define a structured approach to specifying and achieving specific emissions reduction goals relative to a target. **The targets set should be ambitious but achievable, and progress against the targets should be reported on a regular basis**.

Popular frameworks leveraged by insurers include:

1. Net-Zero Insurance Alliance
2. Science Based Targets Initiative for Financial Services

4. Strategy Implications

Explore potential changes to underwriting and business strategy which can be made to influence insured emissions to ensure targets are met

Once understanding the current and projected emissions of underwriting portfolios relative to the set target; **insurers must define the strategy for achieving goals within the specified time horizons**.

Potential strategy considerations include:

1. Policy renewal
2. Portfolio growth, including sectors to target / reduce
3. Product or product feature development

The impact and feasibility of different strategies can be explored using the predefined model. Other considerations which must also be incorporated into the assessment include brand implications, profitability and ESG regulatory compliance.

4

Challenges and considerations of calculating insurance associated emissions

What are the challenges you may face as you think about insurance-associated emissions?

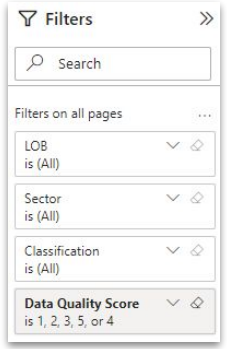
Select technical questions to consider when developing your approach

Should negative and/or avoided emissions be incorporated?	Which emission intensity metric is relevant and valuable for each sector and line of business?	What attribution factor(s) should we apply to insureds' emissions that would be fit to drive underwriting strategy?
Should the calculation approach differ by sector and/or line of business to make better underwriting decisions?	Which sector and/or line of business is optimal to pilot the baselining approach?	Should we calculate emissions for primary insurance and reinsurance differently?

Designing an approach to serve internal and external reporting needs

Aligning on goals up front will help determine whether your internal goals required different reporting. In discussions with clients, we have found that PCAF- aligned reporting does not always serve internal goals. It is important to understand internal stakeholder goals up front, and whether the attribution factors, methodology, or reporting used for internal purposes need to differ from PCAF. An up front understanding will enable a more efficient approach to data collection, emissions model development, and reporting.

For example, the ability to view emissions based on data quality score enable you to assess emissions for (a) the full portfolio, including private companies for internal reporting, and (b) only public information for external reporting, within the same tool.

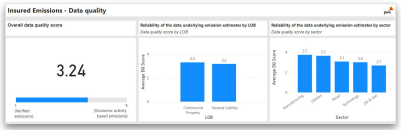


Preparing for your data journey to set up for success

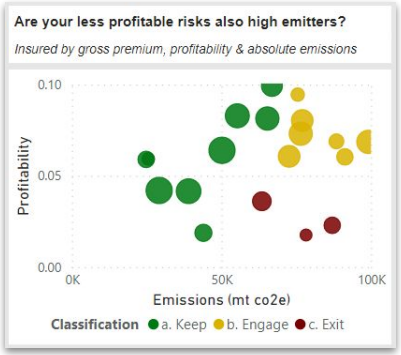
Required data are often not readily available and rely on external sources. Emissions calculations require data that are often not collected by insurers, or not readily available. You may need to aggregate data from different internal sources, purchase external data, and/or allocate existing data down to the insured level.

The quality of your data may impact reporting. PCAF provides a framework for assessing the quality of your data. This can help guide investments in better data, and decide which emission estimates are fit to include in your reporting and decision making.

Data and methodology are part of an iterative process. While your methodology informs data required for calculations, an understanding of data limitations and a roadmap for data improvements will help to determine your methodology now and going forward.



Effectively engaging leadership and UW by illustrating critical decision points



It is important to integrate emissions estimates into your underwriting strategy. As you engage leadership and management in shaping your net zero underwriting strategy, it is important to go beyond reporting on baseline emissions and to illustrate how emissions data can be integrated into your underwriting strategy.

Reporting can be an effective tool to focus on critical decision points. Including this within your reporting process will enable management to quickly ingest results, and maximise time spent on debating critical decisions points around your underwriting strategy to achieve net zero goals.

Many insurers are struggling with emissions data - some ideas on how to get started

01 Sourcing emissions data

- Consider existing emissions data sources utilised across your company
- Assess different data sources for available data fields, portfolio coverage, emission estimation methodology, frequency of updates, cost, etc.

02 Proxying missing data

- Conduct high level analysis on missing data to identify key trends
- Determine whether external proxy data is sufficient or an internal proxy approach is required

03 Prioritizing improvements in data quality

- Carry out a materiality assessment to identify key focus areas for data quality improvement
- Assess effort required to improve data quality and likelihood of results

04 Quantifying data-driven changes in emissions

- Consider changes due to reliance on more direct sources of insured's emissions
- Consider changes due to insured's improving the quality of data underlying their emissions calculations

There are various sources[1] for company-level emissions data

MSCI

esgbook

REFINITIV

S&P Global

CDP

Moody's

Bloomberg®

[1] Non-exhaustive list

Approaches to GHG emissions baselining - **Commercial Lines**

Accuracy and Level of Effort

Estimation Method	Key Considerations	Data Requirements
Reported Emissions **PCAF Data Quality Score 1 or 2**	+ Data is disclosed by the company and can be verified + Most accurate calculation methodology - Data at this granular level is not available for all assets - Can be difficult to collect for an expansive portfolio	✓ Reported verified or unverified Scope 1 emissions ✓ Reported verified or unverified market based Scope 2 emissions ✓ Reported verified or unverified location based Scope 2 emissions
Reported or physical activity-based emissions **PCAF Data Quality Score 2 or 3**	+ Data along with additional assumptions are disclosed by companies and can be verified + Reduced granularity level required - Can require significant resources to verify data - Input data used in calculation may be less accurate	✓ Energy consumption ✓ Production output ✓ Emissions intensity factor based on MWh electricity or average sector emissions intensity ✓ Access to CDP or similar databases for relevant company records
Economic-activity based emissions **PCAF Data Quality Score 4 or 5**	+ Good for identifying hotspots across the portfolio + Relatively reduced level of effort required - Limited accuracy and reliability - Difficult to use results to guide decision making	✓ Reported emissions, energy consumption, or production output data not aligned with the insured entities ✓ Average sector revenue and emissions intensity metrics using environmentally-extended input-output model (EEIO)

Approaches to GHG emissions baselining - **Personal Motor**

Accuracy and Level of Effort

Estimation Method	Key Considerations	Data Requirements
Actual vehicle-specific emissions data **PCAF Data Quality Score 1**	+ Most accurate way of calculating a vehicle's emissions + Data capabilities continue to expand, improving accuracy - Data at this granular level is not available for all vehicles - Can be difficult to collect for an expansive portfolio	✓ Actual fuel consumption by vehicle ✓ Actual distance traveled by vehicle ✓ Actual vehicle's emissions intensity ✓ Emissions intensity for vehicle's fuel type or based on make and model
Estimated vehicle-specifics emissions and local distance driven averages **PCAF Data Quality Score 2 or 3**	+ Data can be specific to a vehicle make model and year + Reduced granularity level required - Regional estimates can be hard to find - Input data used in calculation may be less accurate	✓ Estimated distance traveled of an average vehicle type or average vehicle for the state/country ✓ Emissions intensity for vehicle's fuel type or based on make and model
Estimated vehicle-unspecific emissions and continental distance driven averages **PCAF Data Quality Score 4 or 5**	+ Emissions can be easily calculated using averages + Relatively reduced level of effort required - Limited accuracy and reliability - Difficult to use results to guide decision making	✓ Estimated distance traveled of an average vehicle for the continent ✓ Emissions intensity for vehicle based on average for vehicle type or average vehicle

5

What does this mean for actuaries?

What is the Actuary's role in Insurance Associated Emissions?

As actuaries, we possess strong modeling, quantification, and risk assessment skills, while also understanding the ins and outs of the insurance business. This makes us uniquely positioned to take ownership of many components of the insurance associated emissions calculation. These new challenges present an exciting opportunity for all actuaries to put our analytical mindsets to work and broaden traditional actuarial horizons. Some examples of how actuaries can be involved are included below. How are you helping your organization address its climate-related challenges and calculate its insurance associated emissions?

- **Emissions Baselining and Data Validation**
- **Target Setting and SBTi**
- **Proxy Data Modeling**
- **Underwriting Integration**
- **Emissions Projections**
- **Scenario Testing**

Thank you

pwc.com