



**GAUGING THE EXPOSURE TO
TRANSITION RISKS OF COLOMBIAN
INSURERS' INVESTMENT PORTFOLIOS
THROUGH THE USE OF CLIMATE SCENARIO
ANALYSIS**



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CLIMATE CHANGE

TRANSITION RISK



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GLOSSARY OF ACRONYMS

AUM	Assets Under Management
B2DS	Beyond the 2° Scenario; <1.75 °C
BEHGTRUU	Emerging Markets Investing Grade index
CDP	Carbon Disclosure Project
CO₂	Carbon Dioxide
CPS	Current Policy Scenario; ~3.2°C
EPM	Empresas Públicas de Medellín
EPSA	Empresa de Energía del Pacífico
ETP	Energy Technology Perspectives
EV	Electric Vehicle
GDP	Gross Domestic Product
GHG	Green House Gases
ICE	Internal Combustion Engine
IEA	International Energy Agency
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
IRENA	International Renewable Energy Agency
NGFS	Network for Greening the Financial Systems
NPS	New Policy Scenario; ~2.7°C
OECD	Organization for Economic Co-operation and Development
PACTA	Paris Agreement Capital Transition Assessment
PRI	Principles for Responsible Investment
SBT	Science Based Target
SDS	Sustainable Development Scenario; <2°C
SFC	Colombian Financial Superintendence
WRI	World Resource Institute
WWF	World Wildlife Foundation
WRI	World Resource Institute
WWF	World Wildlife Foundation

Executive Summary

With the Paris Agreement, 195 governments committed to keeping global temperature rise this century to well-below 2°C above pre-industrial levels. An increase in temperature above that goal will result in greater exposure to physical risks, which relates to changes in climate patterns and an increase in the occurrence and severity of extreme weather events; as well as transition risks, which relate to changes in policies, technologies and market prices that will materialize in the shift towards a low carbon economy. **The economic losses associated with the impact of physical risks are estimated to have a global impact of USD 23,149 billion USD for the year 2100 under a 4°C global warming.**¹ Global warming of 4°C could potentially reduce Colombia's GDP by around 9.33% in 2100.²

The achievement of the Paris Agreement is relevant to financial institutions (FIs) due to four reasons: (1) governments will define GHG emissions reduction targets that will affect company value drivers, which will be ultimately reflected in valuations and financial portfolios; (2) environmental upheavals will negatively impact the value of companies and consequently financial portfolios; (3) governments will develop policy instruments for the assessment, monitoring, and reporting on the consistency of FIs' investments and lending with the Paris Agreement goals, and (4) supervisory authorities and regulators will integrate scenarios compatible with the well-below 2°C goal as part of their mandate.

In this context, FASECOLDA, the Colombian's Insurers Federation, partnered with 2 Degrees Investing Initiative (2DII) to conduct climate scenario analysis on the insurers' investment portfolio, both at individual insurer level and at aggregate market level. The results shown in this study will allow one to understand if the insurers' financial portfolios are potentially exposed to transition risks arising from a disruptive transition³ and to identify potential avenues for risk mitigation. This is the first exercise of its kind in Latin America and the second in the world with a sector association.

In this study, we conducted two types of analysis of the corporate bonds and listed equity portfolio of Colombian insurers: (1) the quantification of the low- and high-carbon technology of the portfolio related to three high-carbon intensive sectors (power, fossil fuels and automotive) and (2) climate scenario analysis using the Paris Agreement Capital Transition Assessment ([PACTA](#)) model. These analyses were applied to the whole industry looking at differences in the geographic classification of investments (i.e. national and offshore) and in insurance categories (i.e. life, social security, and non-life) as well as the non-backing reserves portfolios. In addition, a climate risk exposure analysis was carried out in the sovereign bond portfolio of insurers.

The scenario analysis used in this study is based on the PACTA model. PACTA provides a forward looking, 5- year in the future, bottom-up analysis. It estimates the current (mis-) alignment between the portfolio and different climate scenarios, which helps users infer the potential exposure to transition risks of financial portfolios in the case of a disruptive transition for a set of key climate relevant sectors and business activities. The model covers 8 carbon-intensive sectors (oil & gas, coal mining, power utilities, automotive, aviation, shipping, cement, and steel). These sectors account on average for 70-90% of CO₂ emissions in the listed equity or corporates bonds portfolio and 10-25% of the Assets Under Management (AUM). PACTA has been used by over 1,500 financial institutions, governments, supervisory authorities, and industry

¹ Kompas, T., Pham, V.H., & Che, T.N. 2018. *The effects of climate change on GDP by country and the global economic gains from complying with the Paris Climate Accord.* <https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1029/2018EF000922>

² Idem.

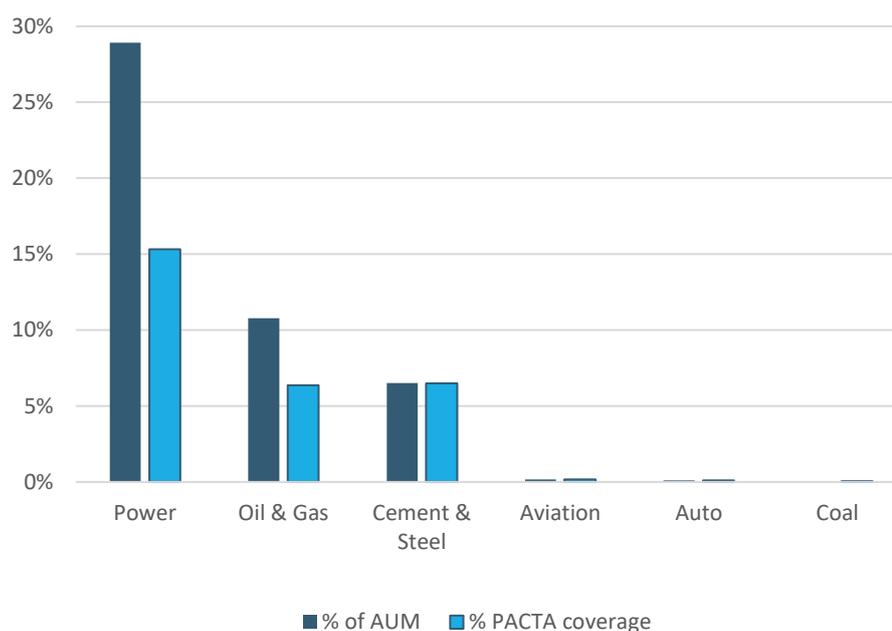
³ A disruptive transition is defined as a fast and disorderly change, from a high-carbon to a low-carbon economy.

associations such as the Swiss Federal Office for the Environment, the California Insurance Commissioner and the French Insurance Federation.

The investment portfolios analyzed in this study are from the entire insurance sector in Colombia, which accounts for approximately 14.9 billion USD as of 31 December 2018.⁴ 9.1% of the AUM are in equity of which 1.4% is in listed equity, 68.1% in debt instruments of which around 50% are in corporate bonds and the other 50% in sovereign bonds. 22.8% of the AUM are in other instruments (e.g. term disposable certificates).

The PACTA scenario analysis covered a significant part of the insurers' portfolio exposure to climate-related industries. Figure 0.1 shows the scenario analysis coverage breakdown by sector and compares it to the sectors' weight in the listed equity and corporate bond portfolios. The difference between both columns relates to issuers in other parts of the sector's value chain that are not covered by PACTA (e.g. electricity distributors, auto parts manufacturers). The scenario analysis coverage tells us that Colombian insurers have an important exposure to carbon intensive companies, as they account for more than one fourth of the total listed equity and corporate bond portfolios' AUM. These companies could be either positively or negatively affected by the transition to a low carbon economy, depending on the alignment of their long-term strategy to the objectives of the Paris Agreement goals. Figure 0.1 shows that:

Figure 0.1: Economic sector share in the insurers portfolios vs. coverage of PACTA scenario analysis
(Source: 2DII, based on Bloomberg)



- **The power sector** is the most climate-relevant sector with the highest weight in the portfolio. Around 15.3% of the investments in both portfolios are in power utilities companies. The corporate bond portfolio has a higher exposure to these companies (53%) than the listed equity portfolio (38%).
- **The oil & gas sector** is the second largest climate-relevant sector in the portfolio. Around 6.4% of the investments in both portfolios are in oil & gas producers. 100% of the listed equity portfolio investments are in oil & gas producers, while in the case of the corporate bond portfolio this share is 58%.

⁴ 7.63 billion USD comes from 19 life insurance companies, 2.33 billion USD comes from 23 non-life insurance companies and 0.21 billion USD from 2 social securities.

The cement sector⁵ is the third largest climate-relevant sector. Around 6.5% of the investments in both portfolios are in cement producers.

- The automotive, aviation and coal sectors have a very low share in the portfolios, however, on average around 97% of the total investments are in companies responsible for production.

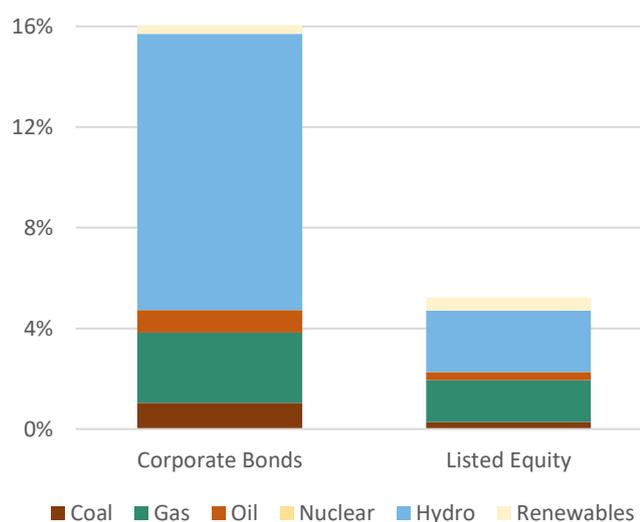
Due to the relative weight of these sectors in insurers’ investment portfolios, transition risks that materialize in the electricity, oil and gas, and cement sectors will therefore bring greater financial losses than risks that affect the automotive, aviation, and coal mining sectors.

Current exposure to low and high carbon technologies. To have an initial understanding of the potential exposure of Colombian insurers’ portfolios to transition risks, we carried out a first analysis looking at the share of low and high carbon technologies in selected sectors in the listed equity and corporate bond portfolios. However, this analysis is only available for the power utilities, fossil fuels and automotive sectors, because in the remaining sectors there are no low-carbon alternatives at commercial scale. The main results for the fossil fuels and power sector are shown below, while the results for the other sectors are found in section 3 of this document.

Power Sector. Both the listed equity and corporate bond portfolios are invested in companies with a larger share of low-carbon technologies (nuclear, hydro, renewables) than high-carbon technologies (coal, gas and oil), the ratio between low- and high-carbon technologies is 2.4 and 1.2 for the corporate bonds and listed equity, respectively (see Figure 0.2).

The large proportion of low-carbon technologies in the sector is mainly driven by the share of hydropower. 10.9% of the AUM of the corporate bond portfolio are in companies producing with this technology, while in the listed equity portfolio the proportion is 2.4%. On the other hand, the proportion of renewable energy is considerably low, less than 1% in both portfolios. The proportion of oil and coal capacity is relatively low: both technologies account for around 2% of the investment of the corporate bond portfolio and around 0.6% of the listed equity portfolio. However, in the transition to the low carbon economy, capacity in these technologies is set to decrease over time. It is therefore important to monitor if the portfolio follows this trend.

Figure 0.2 Power capacity technology breakdown in the corporate bond and listed equity portfolios, as a % of the portfolio. (Source: 2DII, based on Bloomberg and Global data)

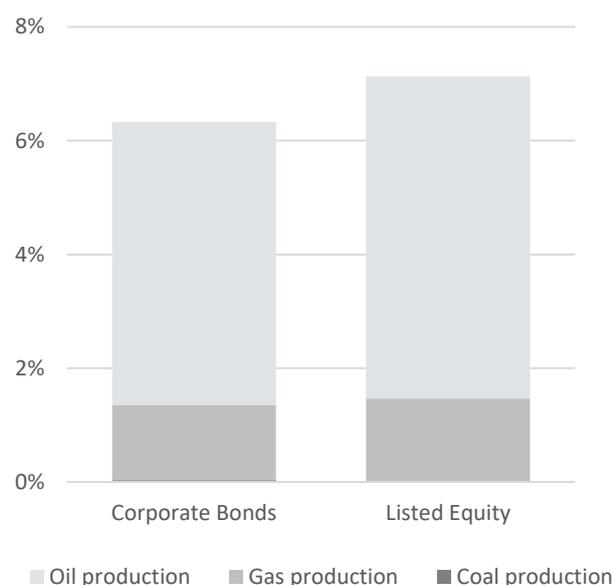


⁵ The PACTA scenario analysis clusters cement and steel in one category, however, in the case of Colombian insurers, the majority of the investments are cement.

Fossil fuel sector. Both the listed equity and corporate bond portfolio’s are exposed to oil (between 5% to 5.7%), and gas production (between 1.3% and 1.47%). This exposure is mainly related to local companies. Only the corporate bond portfolio is exposed to coal mining, although the exposure is very low (0.02%). All coal investments are in instruments issued abroad, but several coal mining companies have operations in Colombia (e.g. Glencore, BPH Billiton).

Future exposure to transition risks. To understand the insurers portfolios’ potential future exposure to transition risks, we used the PACTA model to estimate the trajectory of the portfolio in the next 5 years and compared it against four different climate scenarios, one of which is a 2°C scenario. A misalignment between the portfolio trajectory and the trajectory in a 2°C scenario indicates a potential exposure to transition risks in case a disruptive transition occurs.⁶ In other words, not preparing for the transition today, thus being misaligned, may increase future losses as valuations fail to anticipate and integrate changes associated to companies’ adaptive capacity in relation to technology and policy trends that result from the transition to a low carbon economy.

Figure 0.3: Fossil fuel production breakdown in the corporate bond and listed equity portfolios, as a % of the portfolio (Source: 2DII, based on Bloomberg and Global data)



The sectors covered by the scenario analysis are the power utilities, fossil fuels, automotive, steel, cement and aviation sectors. For the first three sectors, the scenario analysis is based on the production of companies in the portfolio by technology. For the last four sectors, the scenario analysis focuses on changes in the portfolio emission intensity given that no commercially available CO₂-neutral or low-carbon technology has yet been identified in the 2°C scenarios of the International Energy Agency (IEA). The main results for the power and fossil fuel sector are shown below, and the results for the other sectors are found in section 3 of this document.

Fossil fuel Sector. In Central & South America, the transition to the low carbon economy will require the decline of coal and oil production in the coming years. In particular, the IEA estimates that in a 2°C scenario, coal production is set to be reduced by more than 80% over the next 25 years and oil production is set to decline by around 30% relative to current levels.⁷ The IEA also estimates that gas production will increase slightly over the next 25 years under a 2°C scenario. The results of scenario analysis for this sector show:

- Currently, insurers are probably not exposed to transition risks affecting oil & gas companies, as their portfolios’ trajectories in both fuels are compatible with a <1.75°C scenario (see figure 0.4 for the case

⁶ A disruptive transition is caused by the abrupt implementation of policies in response to climate change which could have an impact on the companies’ value.

⁷ WEO 2018 – Sustainable Development Scenario

of oil production). However, the decline in the production of the companies in the portfolio is not substantiated by changes in strategies that consider the transition to a low-carbon economy, but rather due to non-climate related factors associated with new operational and production strategies. Thus, this is a sector that needs to be monitored moving forward.

- Currently, insurers are probably not exposed to transition risks affecting oil & gas companies, as their portfolios' trajectories in both fuels are compatible with a <1.75°C scenario (see figure 0.4 for the case of oil production). However, the decline in the production of the companies in the portfolio is not substantiated by changes in strategies that consider the transition to a low-carbon economy, but rather due to non-climate related factors associated with new operational and production strategies. Thus, this is a sector that needs to be monitored moving forward.
- Despite the low proportion of coal mining in the corporate bond portfolio (see Figure 0.3), insurers are potentially exposed to transition risks affecting coal mining companies they are investing in. These companies are planning to increase their coal mining production in the next five years. The portfolio is therefore compatible with a 2°C – 2.7°C scenario. This shows that information covering a single point in time provides limited understanding of the potential exposure to transition risks; hence the relevance of forward-looking methodologies such as scenario analysis.

Figure 0.4: Alignment of oil production in the corporate bond portfolio relative to the IEA transition scenarios (Source: 2DII, based on Global Data, Bloomberg, and IEA)

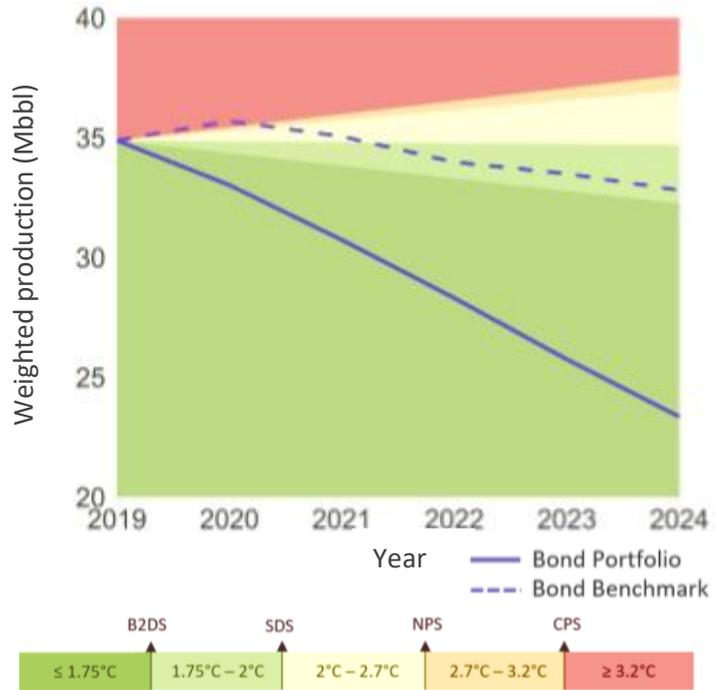
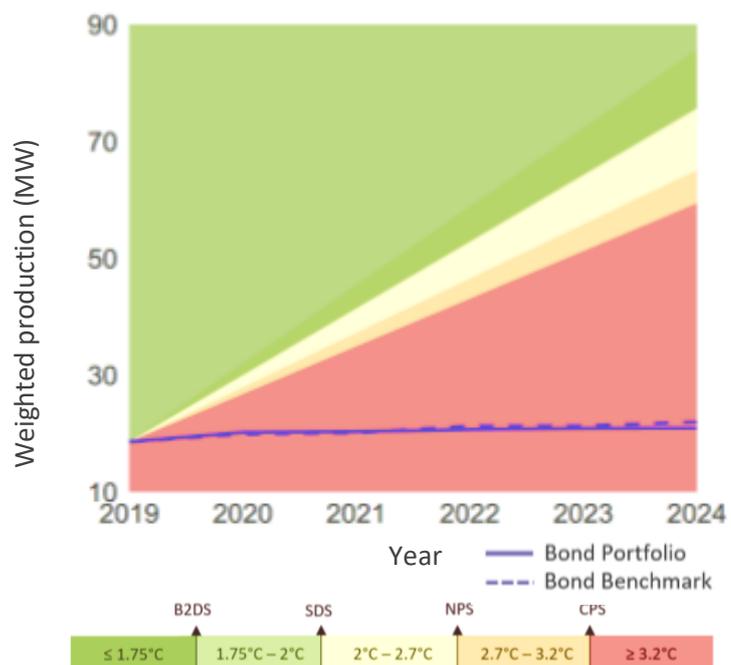


Figure 0.5: Alignment of non-conventional renewable power capacity in the corporate bond portfolios relative to the IEA scenarios. (Source: 2DII, based on Global Data, Bloomberg, and IEA)



Power Sector. The portfolio trajectory under a 2°C scenario varies depending on the technology. The capacity generation of high-carbon technologies such as coal and oil are expected to decrease, while gas power capacity is expected to increase as it is considered a transition technology. On the other hand, the capacity of low-carbon technologies such as hydroelectric and renewable energy is expected to increase in the future. The results of scenario analysis for this sector show that:

- Colombian insurers are not seizing the opportunities the low-carbon economy could bring with renewable energy sources. Both listed equity and corporate bond portfolios' trajectories are consistent with a >3.2°C scenario given that the investment plans of the companies' insurers are not as ambitious as the one required in a 2°C scenario. For the corporate bond and listed equity portfolios to be aligned with a 2°C scenario, the build-out of renewable energy capacity would also need to increase by a factor of 4.1 and 2.6, respectively, by 2024 (see Figure 0.5).
- Results for hydropower vary substantially among portfolios. The corporate bond portfolio is aligned with a <1.75°C scenario, given that the companies in the portfolios are significantly increasing their investment plans by 43% in the next 5 years, while the listed equity portfolio is following a >3.2°C scenario trajectory given that no investments in hydro power capacity are planned.
- Insurers' listed equity and corporate bond portfolios are most likely not exposed to transition risks affecting gas power utilities, as the portfolios are aligned with a <1.75°C scenario given that no investments in gas power capacity are planned.
- Both the listed equity and corporate bond portfolios are investing in companies which are not currently adding any coal or oil-fired power capacity. For the listed equity portfolio to be aligned with a 2°C scenario a decrease of 0.7% in the coal power capacity is needed, while in the corporate bond portfolio the decrease should be of 2.2%. In the case of oil power, the decrease should be higher, being of 5% in the listed equity portfolio and 6% in the sovereign bonds one. There is therefore a potential exposure to transition risks arising from companies with assets in these two technologies.

Relevance of climate-related risks for the sovereign bond portfolios. Climate-related risks may also affect the sovereign bonds portfolio of Colombian insurers, because physical and transition risks may affect ratings and yields through changes in countries' institutional, economic, and fiscal strength. Policy changes may also have an impact on ratings, as countries fail to strengthen their climate change policies. Revisions of country outlooks addressing changes in policy have already taken place (e.g. S&P on Mexico due to changes in energy policy). Changes in ratings and yields may eventually lead to a drop in sovereign bond portfolios' value and potentially default at some point in the future.

Colombian insurers' sovereign bonds portfolios might be impacted if climate-related risk affect yields and ratings of sovereign debt from countries in their portfolio. Their sovereign bonds portfolio may be particularly susceptible to any changes in the yields and ratings of Colombian sovereign bonds **given that 99.5% of the total debt is from this country.**

Research shows that the impact of transition and physical risks could cause a decrease in the rating from one to up to three notches due to the economic dependency to high-carbon sectors and the effects of extreme weather events⁸. To put this into context, we estimated that a downgrade of one or two notches would imply that 0.03% of foreign debt in the Colombian insurers' portfolio would have to be reallocated for investors to comply with the technical reserves investment requirements, which only allow for

⁸ 2DII. 2019. *Storm Ahead: A proposal for a Climate Stress-Test Scenario*. https://2degrees-investing.org/wp-content/uploads/2019/02/Stress-test-report_V2.pdf

investments in foreign sovereign debt with a higher or equal rating than Colombian external debt. As for the Colombian sovereign debt, a downgrade would not result in a default.

Measuring climate-related risks exposure of sovereign bonds. No analytics currently exist to quantify the changes in rating or yield of sovereign bonds that can occur with the materialization of physical risks and/or transition risks.⁹ However, there are some proxy metrics that can be used to understand the potential exposure to these risks. In this study, we made use of 3 proxy metrics:

- Moody's sovereign debt classification on the susceptibility of debt to climate change. The study finds that more than 99% of the sovereign debt is in "less susceptible" countries, mainly due to Colombia debt being classified as "less susceptible" to the effects of physical risks. A closer look at the susceptibility of the foreign sovereign bond investments shows that less than 10% of the investments is in sovereign debt that is susceptible to physical risks.
- GDP exposure to high-carbon sectors of sovereign bonds issuers. This metric allows us to understand the susceptibility of GDP to transition risks: the higher the weight of high-carbon sectors, the higher the risk of a downgrade. The issuers with higher exposure to these sectors are Qatar and Saudi Arabia, covering at least 50% of their GDP. These are two economies that might suffer from the effects of the transition to the low-carbon economy if no action is taken. The two countries account for less than 0.1% of the total sovereign bonds' investments. In contrast, around 12% of Colombia's GDP is exposed to high-carbon sectors. The sectors that have the highest share are fossil fuels and transport¹⁰.
- Current and future exposure to high- and low-carbon technologies of sovereign bonds issuers compared against the exposure in a 2°C scenario (Sustainable Development Scenario - SDS) (see figure 0.6). This metric allows us to understand if economies are adapting to the transition. Results show that overall, the technology mix of the issuers in the insurers' sovereign bond portfolio is not aligned with an SDS scenario in 2024. This is an indicator that current policy and the local market conditions do not suffice to foster an ambitious transition.

Managing climate-related risks. To understand how the risks and opportunities identified above can be managed is paramount for the proper integration of climate issues in investment decision making. A critical next step is therefore to identify the most relevant avenues for risk mitigation.

There is no one size fits all solution for the mitigation of climate-related risks. Depending on the investor's views, a number of different actions may be relevant, including shifting their portfolio allocation to alternative passive index funds that weight in potential transition risks (e.g. S&P 500 carbon price risk 2030 adjusted index), to engage with companies to persuade them to shift their strategy to one consistent with a low-carbon economy, or to carry out other responsible investment strategies such as exclusion or best in class selection. Insurers could equally do nothing if they believe that having a portfolio that is consistent with a <2°C is the most likely and less risky outcome.

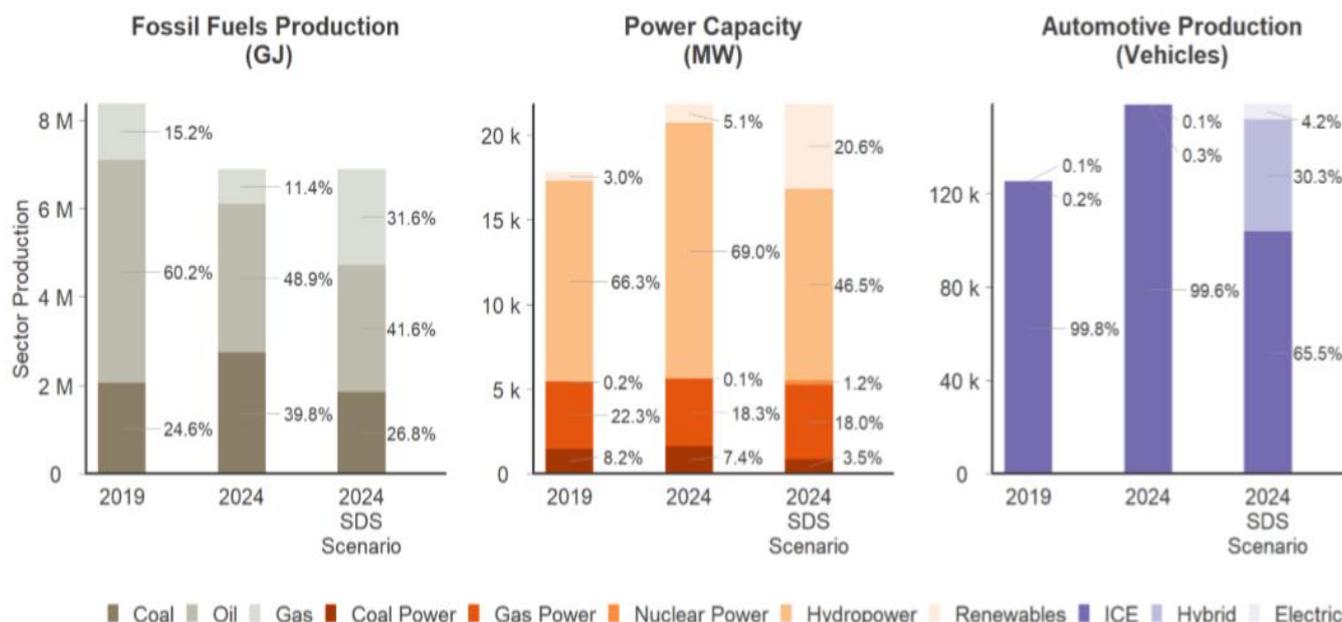
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9 Idem

10 <https://www.dane.gov.co/index.php/estadisticas-por-tema/cuentas-nacionales/cuentas-nacionales-trimestrales/historicos-producto-interno-bruto-pib>

a low-carbon economy, or to carry out other responsible investment strategies such as exclusion or best in class selection. Insurers could equally do nothing if they believe that having a portfolio that is consistent with a <2°C is the most likely and less risky outcome.

Figure 0.6: Estimated current and future production and technology mix for the fossil fuels, power, and automotive sector (Source: 2DII, based on Bloomberg, and IEA)



Before considering any action, however, the investor first needs to identify which are the investees that are contributing to a higher exposure to climate-related risks in the portfolio. The insurers should equally understand what level of influence they can exercise with these investees to induce behavioral change¹¹. In the case of sovereign bonds issuers, action inducing to behavioral change is quite limited, but in the case of companies this is possible.

PACTA allows us to identify which companies have more weight in the portfolio and therefore which insurers could potentially influence at an individual and/or collective level. More importantly, PACTA allows us to identify if these companies are contributing to the portfolio (mis)-alignment. More information on the companies driving the results of the scenario analysis can be found in section 3.

The results presented here provide evidence to insurers and other stakeholders about the potential exposure to transition risks of the insurance sector as well as the companies that are contributing to such risks. It is a starting point on the measurement of climate-related risks that enables the monitoring of the exposure to these risks over time. This study equally informs the strategy and workplan of the Colombian Financial Superintendence, which has for priority an increase in the transparency on environmental risk by financial institutions.

The results indicate a need to develop climate strategies in response to the Paris Agreement. In terms of future actions by financial market actors, it helps define the point of departure for these actors in terms of

¹¹ Influence relates to the levers that investors can action to induce behavioral change in companies. Examples include voting rights, share in the total debt of the company, share in the total equity of the company, etc.

potential strategies to align their portfolios with climate goals, should they desire to pursue this strategy individually or collectively.

The analysis could also help to move forward the discussion on reporting under Art. 2.1c of the Paris Agreement¹², creating the capacity to track progress among financial market actors over time. It can also help identify whether, ultimately, investment and production plans evolved to align with the well below 2°C climate goal – setting the basis for a global capital transition consistent with the Paris Agreement.

¹² https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf

An aerial view of Earth from space, showing a vast expanse of white clouds over a deep blue ocean. The clouds are scattered and vary in density, with some appearing as large, swirling patterns. The ocean is a deep, dark blue, with some lighter, turquoise areas visible near the coastlines. The overall scene is a high-angle, wide-area view of the planet's surface.

Introduction

1. Introduction

1.1. Context

With the Paris Agreement, 195 governments committed to keeping global temperature rise this century to well-below 2°C above pre-industrial levels. An increase in temperature above that goal will result in changes in physical and biological systems as well as associated economic losses¹³. To achieve this goal, governments defined the objective to make financial flows consistent with a pathway towards low greenhouse gas (GHG) levels in line with the well-below 2°C goal. This objective is relevant for Financial Institutions (FIs) because:

- **Governments will define GHG emissions reduction targets that will affect company value drivers.** These targets will be achieved through public policy, programs, and initiatives. Policy action will result in changes in production patterns of companies, technology, and market prices. Failure to identify those changes and integrate them in traditional financial analysis investments or financing processes will most likely result in financial losses. However, FIs factoring those changes today can seize the investment opportunities of tomorrow.
- **Environmental upheavals will negatively impact the value of companies and financial portfolios.** The non-achievement of the Paris Agreement will result in more frequent and severe physical risks events, which will negatively affect companies' physical assets, operations, and production processes. This will affect companies' balance sheet, their valuation and market prices. Timely management of the related risks, as well as the development of innovative insurance products, will mitigate potential financial and economic losses¹⁴.
- **Governments will develop policy instruments for the assessment, monitoring and reporting on the consistency of FIs' investments and lending with the Paris Agreement goals.** FIs implementing tools in line with the global policy objectives will be prepared for any upcoming regulatory requirement. Switzerland and the Netherlands, as well as other European governments, have already committed to assess and monitor the climate impact and the alignment of their financial flows with the 1.5°C temperature goal of the Paris Agreement and are calling other governments to join their pledge¹⁵.
- **Supervisory authorities and regulators will integrate scenarios compatible with the well-below 2°C goal as part of their macro-prudential mandate.** Stress-testing tools will be adjusted to address the impact of climate change in financial portfolios and understand the exposure and resilience of supervised/regulated entities to climate-related risks. Central banks like the Bank of England and the Bank of France are already in the process of doing so^{16 17}.

¹³ Intergovernmental Panel on Climate Change (IPCC). 2014. *Climate Change 2014- Synthesis Report*. https://archive.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf

¹⁴ IFC. 2016. Innovative Insurance to Manage Climate Risks. <https://www.ifc.org/wps/wcm/connect/3d92eed5-e66d-4bd6-91be-5d2d38659e8e/Note-9-EMCompass-Innovative-Insurance-to-Manage-Climate-Risks.pdf?MOD=AJPERES&CVID=lsGrrAW>

¹⁵ Paris Agreement Capital Transition Assessment (PACTA). On-line. *Climate Alignment Assessment 2020*. <https://www.transitionmonitor.com/pacta-2020/>

¹⁶ Bank of England, Prudential Regulation Authority. 2019. *General Insurance Stress Test 2019 – Scenario Specification, Guidelines and Instructions*. <https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/letter/2019/general-insurance-stress-test-2019-scenario-specification-guidelines-and-instructions.pdf>

¹⁷ Reuters. 2019. *France to stress test banks, insurers' climate risks next year*. <https://www.reuters.com/article/us-france-climate-finance/france-to-stress-test-banks-insurers-climate-risks-next-year-idUSKBN1Y30CS>

In Latin America, the integration of climate-related issues by the financial sector participants is at early stages in all fronts. From the financial institutions' side, there is little evidence of the integration of climate-related issues in their practices. Recent surveys carried out by supervisory authorities and market participants in Colombia and Chile show that few financial institutions are assessing their exposure to climate-related risks^{18 19}.

From the supervisory and regulatory side, there is an increasing interest in the topic and a handful of supervisors and regulators have started to take action on the topic, either by running surveys to understand the market practices on the integration of climate-related issues²⁰ and/or by joining international networks that share best practices such as the Network for Greening the Financial System (NGFS)²¹. There is, however, no policy or initiative in place that explicitly intends to improve practices on the identification, assessment and management of climate issues by financial institutions²².

From the government side, the interest has been focused on the management of public financial flows as a key instrument to support the Paris Agreement goals. Although new government networks such as the Coalition of Finance Ministers for Climate Action²³ are also looking at how to mobilize private financial flows for climate change mitigation and adaptation, the discussion is oriented towards their role as new capital providers, and not around aligning existing financial flows with climate goals.

1.2. Implications of climate-related risks for financial risks of Colombian insurers

The objectives defined in the Paris Agreement and those related to climate change more generally, can potentially create financial risks for Colombian insurance companies if not properly anticipated. The two main types of climate-related risks investment portfolios insurance companies might face are: **(1) physical risks**, which refers to the increase in the occurrence and severity of extreme weather events and changes in climate patterns that can impact economic actors and **(2) transition risks**, which refers to risks that will arise due to the shift towards a low carbon economy as a response to climate change.

Physical risks could account for significant economic losses in the portfolios of Colombian insurance companies if the 2°C goal is not met. Kompas, T. et al (2018) find that the potential global losses from climate change could reach 23,149 billion USD for the year 2100 for a 4°C global warming.²⁴ A global warming of 4°C can potentially reduce Colombia's GDP by around 9.33% in 2100.²⁵ These economic effects will translate to portfolios as companies are hit.

¹⁸ Superintendencia Financiera de Colombia. 2019. *Comunicados de Prensa 2019 – Superfinanciera entrega los resultados de la primera encuesta sobre los riesgos derivados del Cambio Climático y las Finanzas Verdes por parte de las entidades vigiladas.*

<https://www.superfinanciera.gov.co/jsp/10099920>

¹⁹ Ministerio de Hacienda de Chile. 2019. *Mesa Público-Privada de Finanzas Verdes en Chile.*

<https://cms.hacienda.cl/mfv/assets/documento/descargar/05e3982f3e9d5/1570651980>

²⁰ This is the case of Colombia, Chile and Mexico.

²¹ Current Latin American members are the Mexican Central Bank, one of the founding members, the Central Bank of Colombia and Costa Rica, Colombia's supervisory authority, the Mexican Banking and Securities Commission, and the Chilean Financial Market Commission.

²² Inter American Development Bank. 2019. *Climate Risk and Financial Systems of Latin America: Regulatory, Supervisory and Industry Practices in the Region and Beyond.* <https://publications.iadb.org/en/climate-risk-and-financial-systems-latin-america-regulatory-supervisory-and-industry-practices>

²³ Climate Action Peer Exchange. 2019. *Launch of the Finance Ministers Coalition for Climate Action.*

<https://www.cape4financeministry.org/events/launch-finance-ministers-coalition-climate-action>

²⁴ Kompas, T., Pham, V.H., & Che, T.N. 2018. *The effects of climate change on GDP by country and the global economic gains from complying with the Paris Climate Accord.* <https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1029/2018EF000922>

²⁵ Idem.

Mitigating physical risks by achieving the 2°C climate goal could significantly reduce potential economic losses. The avoided global GDP losses of achieving the Paris Agreement compared to a 3°C global warming are estimated to be of 3,934 billion USD a year in terms of 2100 GDP to up to 17,489 billion USD a year in the case of a 4°C global warming.²⁶ In the case of Latin America, the avoided GDP losses of achieving the Paris Agreement compared to a 4°C global warming are estimated to be of 1,112 billion USD a year in terms of 2100 GDP.

To mitigate the increase in the severity and the occurrence of physical risks, government, companies and other stakeholders will need to implement actions that seek to lower GHG emissions. These actions, and in particular, late action will result in the materialization of transition risks in the form of: (1) policies aiming at setting up a low-carbon economic model (e.g. carbon tax); (2) technological improvements or innovations supporting the transition to a low-carbon economy (e.g. electric mobility, solar energy) or (3) shifts on the supply and demand and consequently market prices.

Transition risks will therefore be particularly pronounced for those sectors that need to decarbonize, and for the FIs invested in these companies. Thus, Colombian insurance companies could equally account for relevant economic losses from transition risks. According to the Cambridge Institute for Sustainability Leadership, if global action on climate policy accelerates, several carbon-intensive reserves will become unburnable. Losses associated with stranded fossil fuel assets for Latin America could account for an approximate GDP loss of 300 billion USD up until 2035.²⁷

While the 2°C scenario analysis provided in this report is not directly a risk assessment, it can help inform the understanding of the financial transition risk exposure of Colombian insurance companies, in particular in terms of anticipating whether the transition is likely to be smooth (production & investment plans aligning with the 2°C scenario) or more disruptive (misalignment in the short-term, followed by sudden and rapid adjustment). Section 1.4. describes in detail the scenario analysis methodology applied to the insurers' portfolios.

The analysis can demonstrate the scale of the exposure should these risks materialize. From a transition risk management perspective, the following three questions should guide the analysis:

- 1.** Is my portfolio building up potential 2°C transition risks by deviating from the 2°C benchmark?
- 2.** If this is the case, what is the scale of my exposure to these risks in % of portfolio?
- 3.** Should these risks then materialize, what are potential losses?

The first and second questions are answered through the 2°C scenario analysis results presented in section 3. The results will be highly specific for each portfolio. The methodological developments required to answer question 3 are currently in progress and will be a part of future projects carried out by 2DII and Fasesolda.

²⁶ Idem.

²⁷ Idem.

1.3. Background of the study

With this study, FASECOLDA aims to help advance sustainable development of the insurance sector and contribute to the country's progress. To achieve this objective, it is therefore critical to **study the risks related to climate change to understand the possible vulnerabilities of the sector, take action by designing strategies that promote risk mitigation, and the identification of opportunities** in which the insurance sector can positively contribute to the progress of society and Colombia.

In this context, FASECOLDA partnered with 2 Degrees Investing Initiative (2DII) to conduct scenario analysis of the insurance sector investment portfolio. This is the first exercise of its kind in Latin America and the second in the world with an industry association. The study addresses the transition risks to which the insurance industry's investment portfolios are potentially exposed to. It represents a significant step forward in the integration of climate risk analysis in investment decision-making by Colombian insurers. The results of the study should be used to develop action plans that contribute to the alignment of the portfolios with the objectives outlined by the Paris Agreement.

Through this partnership, 2DII provides a free, voluntary, and confidential analysis of the listed equity and corporate bond portfolios of the Colombian insurers as well as a series of capacity building workshops. Similar analyses have been conducted in partnership with the French Insurance Association in 2019, the California Department of Insurance and Mexican Asset Managers association²⁸.

The objective of this partnership is fourfold:

- Understand the potential exposure to transition risks of Colombian insurers;
- Raise awareness of the relevance of climate issues for Colombian insurers;
- Set an example in Colombia and in Latin America of the key role that sector associations play in putting climate issues at the top of investors' agenda;
- Contribute to the work program of SFC, in particular, in terms of transparency of climate-related issues (i.e. Pillar 3 of the work program)²⁹.

This report presents the scenario analysis results of the entire insurers market in Colombia, including differences in the portfolios of three insurance categories (i.e. life, non-life and social security insurers³⁰) and the non-backing reserves investment portfolio as well as the anonymized scenario analysis results of the 34 insurers and insurance cooperatives members of FASECOLDA. These portfolios account for approximately 14.9 billion USD represented in small, medium, and large companies.

The report structure goes as follows. Section 2 provides general characteristics of the portfolio analyzed. Section 3 explains the results of the scenario analysis of corporate bonds and listed equity portfolios. Section 4 presents an analysis of the sovereign bonds' portfolio exposure to climate-related risks. Section 5

²⁸ California Department of Insurance. 2017. *Scenario Analysis: Assessing Climate Change Transition Risk in Insurer Portfolios*. https://interactive.web.insurance.ca.gov/apex_extprd/f?p=250:70

²⁹ Superintendencia Financiera de Colombia. 2019. *Comunicados de Prensa 2019 – Superfinanciera entrega los resultados de la primera encuesta sobre los riesgos derivados del Cambio Climático y las Finanzas Verdes por parte de las entidades vigiladas*. <https://www.superfinanciera.gov.co/jsp/10099920>

³⁰ See Annex 1 for more details.

discusses possible options for action to mitigate such risks. The report ends with a series of conclusions and key recommendations (Section 6).

1.4. The scenario analysis model used

The scenario analysis results shown in this study are based on the open-source Paris Agreement Capital Transition Assessment (PACTA) model. The PACTA model assesses the alignment of investors and banks portfolios with different climate scenarios. It allows us to understand if financial portfolios are potentially exposed to transition risk arising from a disruptive transition. Not preparing for the transition today, thus being misaligned, may increase future losses as valuations fail to anticipate and integrate changes associated to companies' adaptive capacity in relation to technology and policy trends that result from the transition to a low carbon economy.

This model, developed by 2° Investing Initiative, has been used by 1,500+ financial institutions, governments, supervisory authorities, and industry associations such as the Swiss Federal Office for the Environment, the California Insurance Commissioner and the French Insurance Federation. Investors can access an online version of the tool at <https://www.transitionmonitor.com/>.

PACTA provides a **forward looking**, 5-year in the future, **bottom up analysis** that builds on investment and production plans of investee companies at physical asset-level and consolidates the information to identify the energy transition profile of these companies and their related financial instruments. This information is aggregated at portfolio level and compared against the production plans projected in different climate scenarios. The current (mis-) alignment between the portfolio and these scenarios allows users to infer potential exposure to transition risks in the case of a disruptive transition (see Figure 1).

Scope. The PACTA model is available for corporate bonds and listed equity portfolios. It covers 8 of the most carbon intensive sectors in the real economy, namely, oil & gas, coal mining, power utilities, automotive, aviation, shipping, cement and steel. These sectors account between 70% to 90% of the CO₂ emissions in an average financial portfolio. In each of these sectors, PACTA focuses on the part of their value chain with the highest impact in terms of CO₂ emissions; for example, in the power sector it focuses on power generation and related sources of energy while in the oil & gas sector it focuses on upstream activities related to production³¹. This allows the PACTA tool to efficiently use data inputs while minimizing potential double counting issues (e.g. oil & gas downstream operations are not considered because part of those emissions would be considered in power generation). The sectors covered by PACTA account on average for 10 to 25% of the Assets Under Management (AUM) in an average financial portfolio.

³¹ In coal mining the focus is coal production; in the automotive sector it focuses on the technology of each vehicle produced as the most relevant emissions associated to the sector is in the use of cars; in the aviation sector it focuses on the use of the aircrafts; in the shipping sector it focuses on companies' operating fleet; and in the cement and steel sectors the focus is cement and steel production.

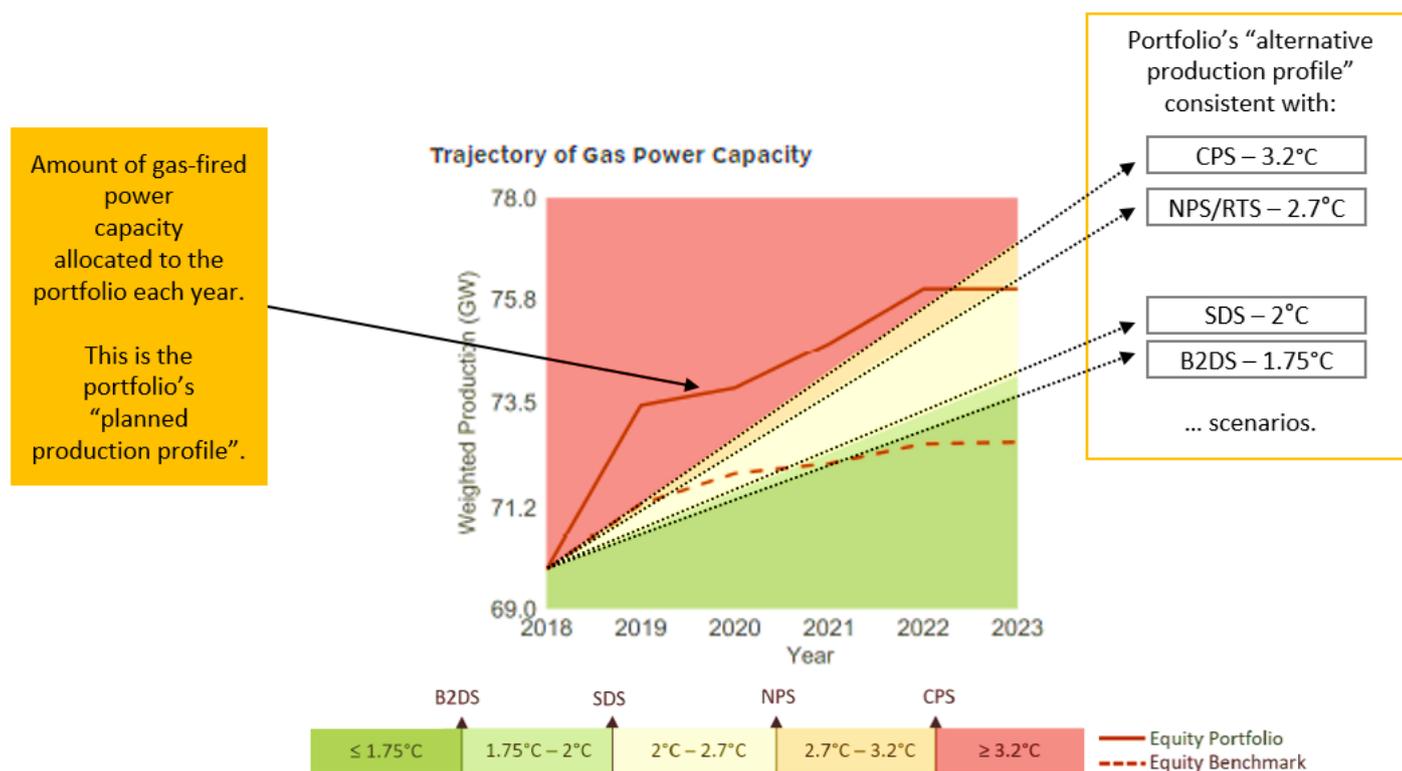
Inputs of the model. Three main types of inputs are used:

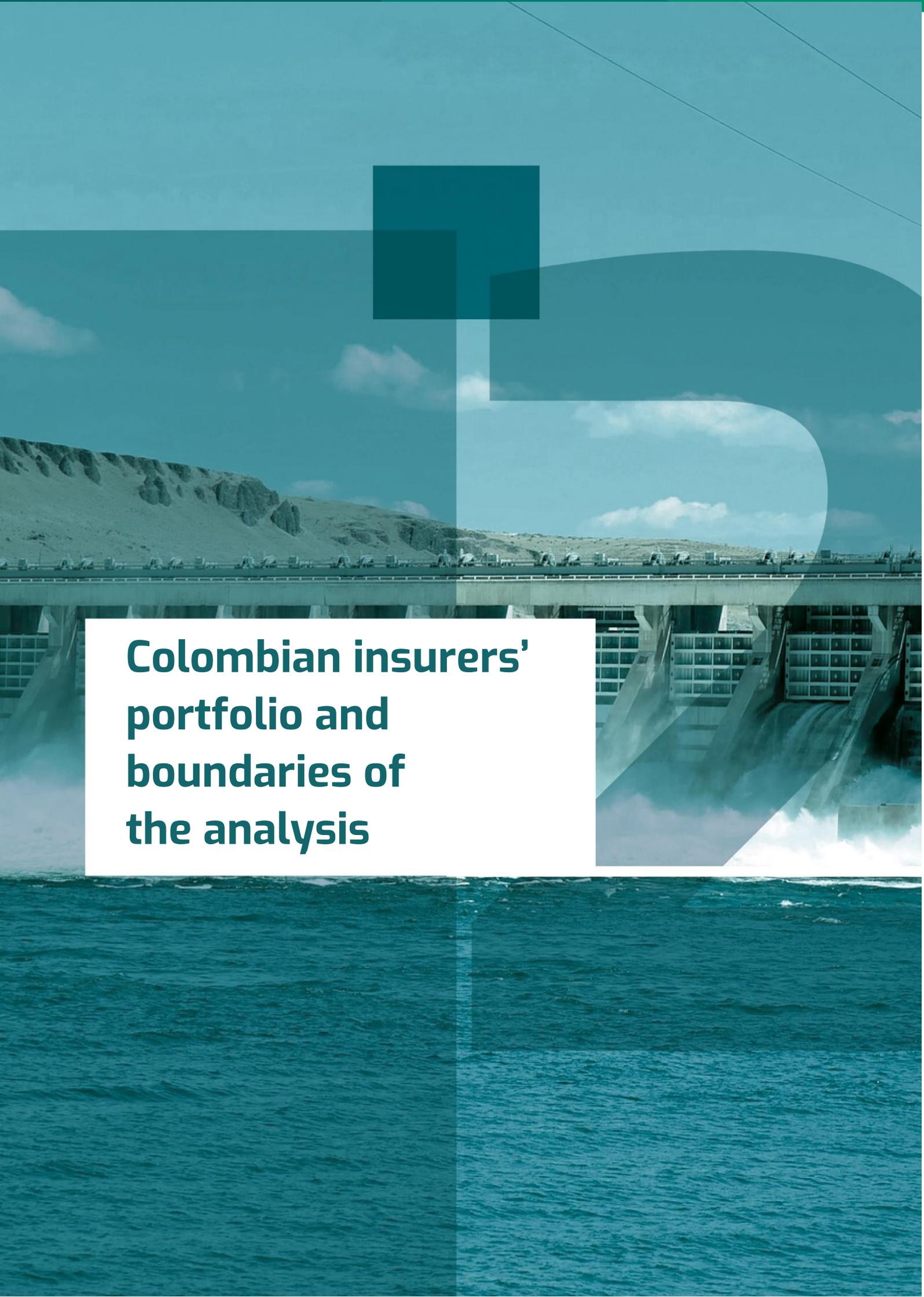
- i. Financial portfolio data, including ISINs, market value and the currency of each position;
- ii. Investee companies' physical asset level data sourced from market intelligence data providers covering 230,000+ individual assets globally, 40,000+ companies and 30,000+ securities;
- iii. Climate scenario data. The model currently uses 4 scenarios from the International Energy Agency (IEA); the Beyond 2° Scenario (B2DS – <1.75°C), the Sustainable Development Scenario (SDS - ~2°C), the New Policy Scenario (NPS – ~2.7°C) and Current Policy Scenario (~3.2°C).

Outputs of the model. The model provides sector or technology specific analysis that includes:

- i. The trajectory the portfolio is following compared to that required by different climate scenarios in terms of production (see Figure 1);
- ii. The portfolio's technology mix under or over-exposure in terms of percentage points compared to the IEA SDS scenario and different market benchmarks;
- iii. The sectoral emissions intensity trajectory, in those sectors for which low-carbon technologies are not commercially available.

Figure 1: Alignment of gas power capacity in the portfolio relative to the IEA transition scenarios.





**Colombian insurers'
portfolio and
boundaries of
the analysis**

2. Colombian insurers' portfolio and boundaries of the analysis

Investment portfolios. The investment portfolio used in this study accounts for approximately 14.9 billion USD as of 31 December 2018. 7.63 billion USD comes from 19 life insurance companies, 2.33 billion USD comes from 23 non-life insurance companies and 0.21 billion USD from 2 insurance cooperatives³². In terms of their asset class diversification 9.12% of their portfolio is invested in equity of which 1.4% is in listed equity, 68.11% in debt instruments of which around 50% are in corporate bonds and the other 50% in sovereign bonds, and 22.77% in other instruments (e.g. term deposable certificates).

Three levels of analysis were carried out, including:

1. The corporate bonds, the listed equity and the sovereign bonds portfolios of the industry so as to understand the potential exposure to climate related risks of each portfolio.
2. Investments nationally and internationally so as to understand if national investments were more exposed to transition risks compared to international ones.
3. Investment portfolios of three categories of insurances (life, non-life, social security³³) and the non-backing reserves investment portfolio to inform insurers about the potential exposure of each category type.

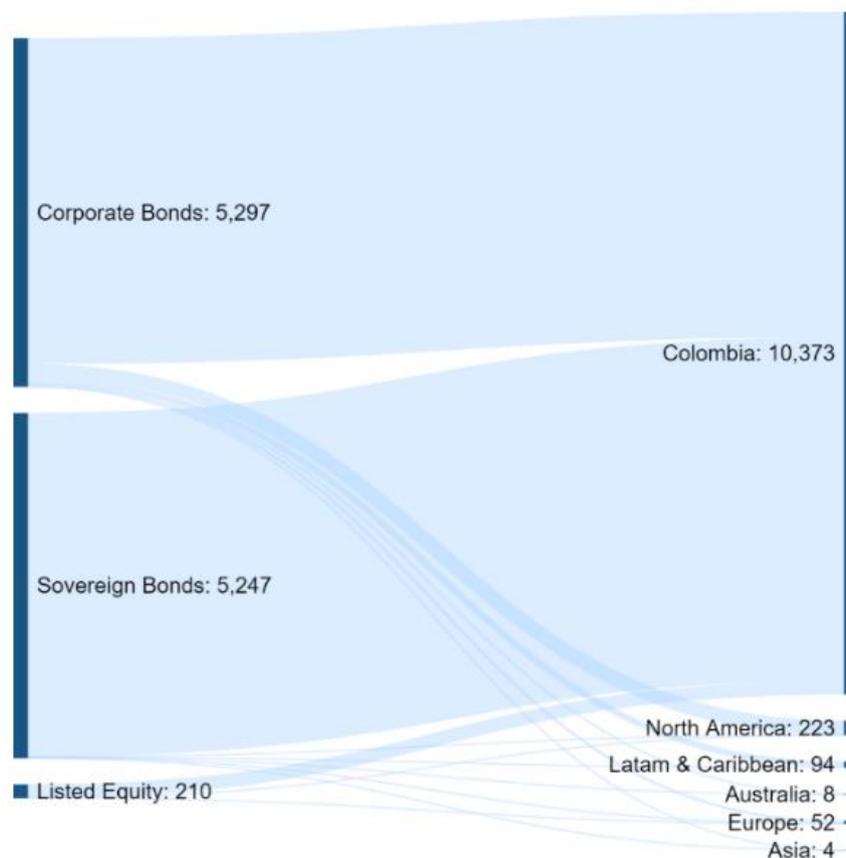
All these analyses were equally compared against two benchmarks. The MSCI ACWI for listed equity portfolios and the BEHGTRUU for corporate bonds. These benchmarks were selected due to their important exposure to emerging markets and the ability to be easily sourced through financial data platforms (e.g. Bloomberg, Reuters, etc.). The scenario analysis results presented in section 3 refer to these benchmarks. In addition, investments in instruments issued locally were compared against local indexes: the COLCAP for listed equity and the FPCOIPCC10Y index sourced from a local index provider.

Geographical coverage. The analysis coverage is global. 95.1% of the insurer's portfolio is invested in local instruments, with 4.9% in instruments issued abroad. Figure 2 shows the breakdown of the assets by region of domicile. The portfolio that has the highest proportion of investments abroad is the corporate bond portfolio, with 6.6% of investments. This means that the scenario analysis results are going to be driven by the investments and production plans of companies which have issued instruments in the Colombian capital markets.

³² Annex B provides information on the insurance companies analyzed. Note that in some cases one insurance group may have different legal entities covering life and non-life insurances.

³³ See in Annex A the types of insurances under each category.

Figure 2: Breakdown of corporate bond, sovereign bond and listed equity instruments by region of domicile (million USD).
(Source: 2DII)



The coverage of companies' operations is, however, global. For example, if the insurer is investing in the local stock of Ecopetrol, the analysis will consider all the operation of Ecopetrol (i.e. in Colombia, Peru, Brazil and the US). Likewise, if the insurer is investing in a US fund which is investing in Glencore, the analysis will consider the company's assets in Australia, Canada, Colombia, and South Africa.

Sectoral coverage. The PACTA model focuses on 8 of the most climate relevant sectors in investment portfolios: oil & gas, coal mining, power utilities, automotive, aviation, shipping, cement and steel. In the case of Colombian insurers, these sectors cover 17.1% of the total portfolio and 46.5% of both the listed equity and corporate bond portfolio. This coverage is quite important as the 8 sectors analyzed through PACTA cover between 70 to 90% of CO₂ emissions of an average portfolio.

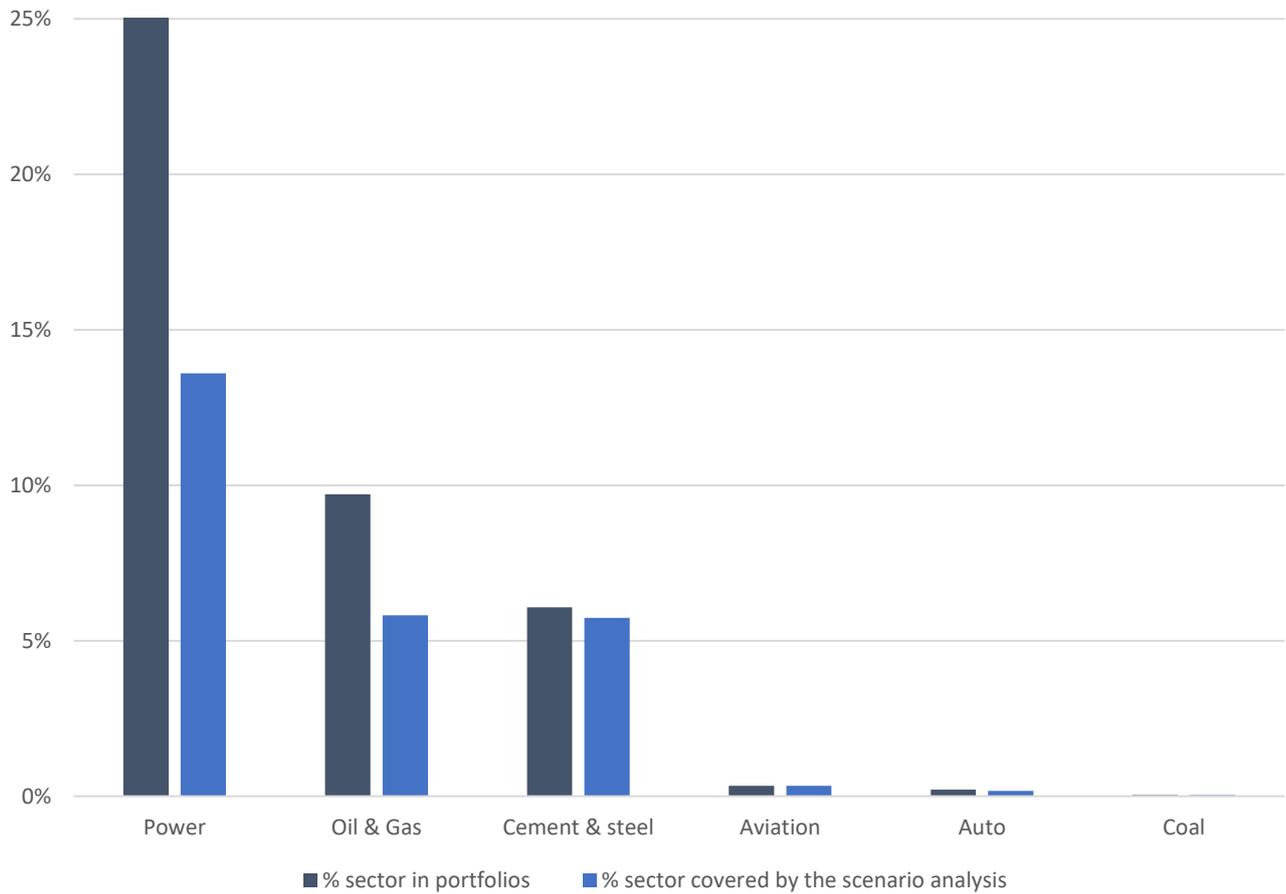
As mentioned, the PACTA scenario analysis focuses on the part of the value chain of each sector that is more relevant in terms of CO₂ emissions. Investments in companies with activities in those parts of the value chain account for 10.5%³⁴ of total portfolio and 28.8% of the listed equity and corporate bond portfolio. This means that around 60% of the companies in the portfolio are responsible for most of the CO₂ emissions of their respective sector.

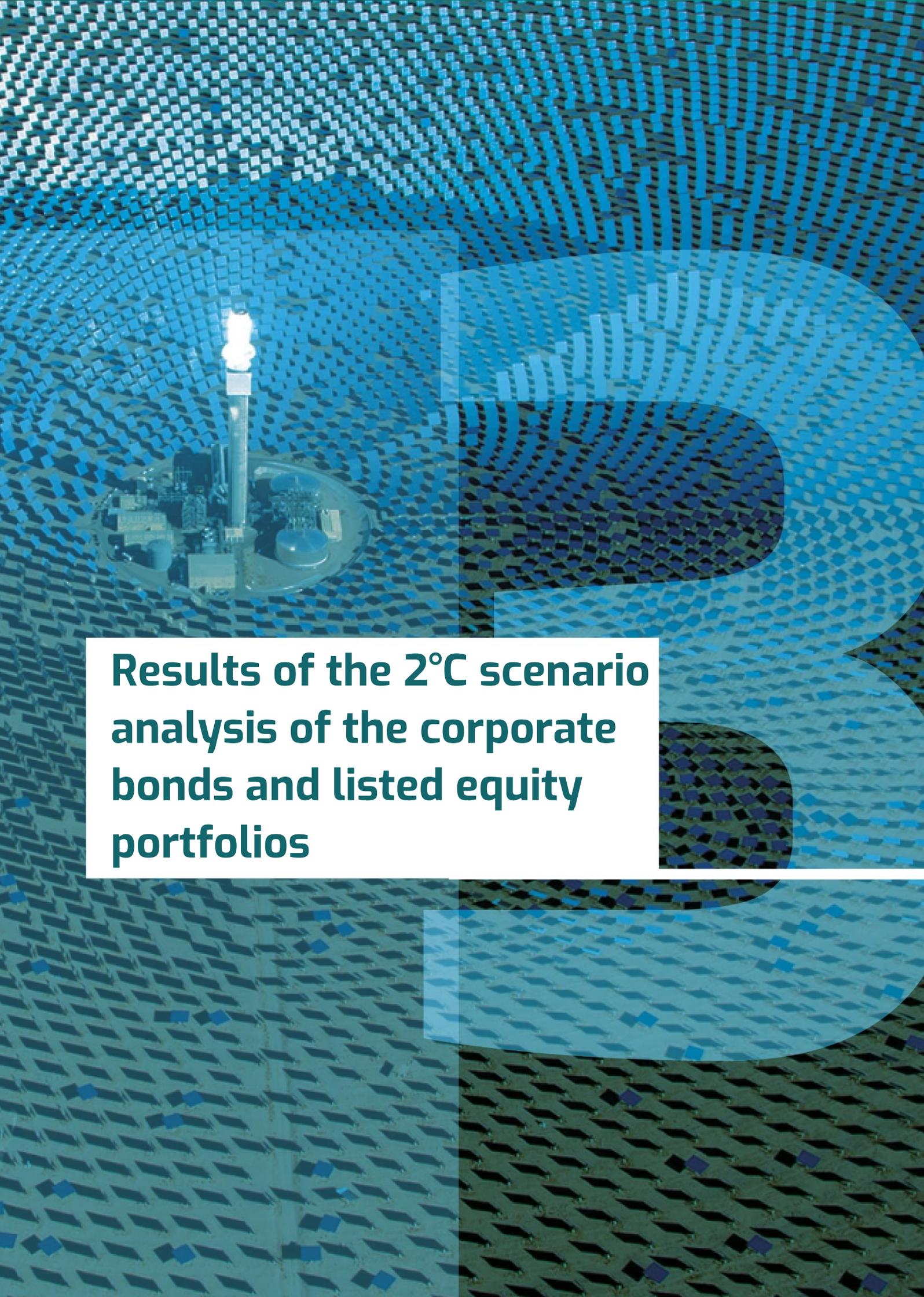
Figure 3 shows the scenario analysis coverage breakdown by sector and compares it to the sectors' weight in the listed equity and corporate bond portfolio. The difference between both relates to issuers in other parts of the sector's value chain that are not covered by PACTA (e.g. electricity distributors, auto parts manufacturers). The power, oil & gas and cement sectors have the highest weight of the climate-relevant sectors in the portfolios (around 40% of the portfolio). More than 50% of the companies in each of these sectors are responsible for production and thus are the most relevant for the climate. The coal mining,

³⁴ Which is equivalent to 7.4 times the size of the listed equity portfolio and about 1/3 of the size of the corporate bonds' portfolios.

aviation and automotive sectors have a very low weight in the portfolios, but more than 80% of the companies in those sectors are the most relevant for the climate.

Figure 3: Sector share in the portfolios vs. coverage of PACTA scenario analysis (Source: 2DII, based on Bloomberg)





**Results of the 2°C scenario
analysis of the corporate
bonds and listed equity
portfolios**

3. Results of the 2°C scenario analysis of the corporate bonds and listed equity portfolios

This section presents the results of the 2°C scenario analysis provided by the PACTA model and applied to the portfolios of the entire Colombian insurance market. The results presented in this report seek to answer three questions:

- i. **Are the financial portfolios – specifically the portfolios invested in equity and corporate bonds markets – of Colombian insurance companies consistent with the 2°C climate goal?**

This analysis was conducted for key transition sectors, including energy (oil & gas, coal), electric power, automotive, aviation, shipping, cement, and steel. The exposure and trends for this assessment rely on physical asset-level data (e.g. power plants, oil fields), updated at least quarterly, creating the capacity to cover a global universe of financial instruments independent of the quality of reporting of individual companies. This allows for regional-specific comparisons between the 2°C scenario and the portfolios and mobilize forward-looking data on investment trends and production plans.

- ii. **If a disruptive transition should occur, what is the scale of exposure (in terms of share in the portfolio) of Colombian insurance companies to potential financial risks associated with the transition to a low-carbon economy?**

A disruptive transition to a low-carbon economy can possibly create financial risks for Colombian insurance companies. This disruptive transition will most likely occur as the transition to a 2°C world continues to be delayed and will most likely force governments to act forcefully on climate change in the next years³⁵. The result of this delayed action will equally require an accelerated and abrupt response from companies, which will negatively (i.e. in case of failure to respond) or positively affect their financial assets.

Investors exposed to the most relevant sectors in the transition to a low carbon economy would therefore be the most exposed to this disruption. Through the analysis presented in this report, we demonstrate both the overall exposure to high-carbon and low-carbon technologies under review in Question 1, as well as the sectoral exposures and portfolio weights of the listed equity and corporate bond portfolios of Colombian insurance companies.

The analysis generally aggregates the results of Colombian insurance companies, although differences between insurance categories and in the results among investors are also shown for Question 2. It is important to highlight that the analysis under Question 2 is not a complete risk analysis, but rather assesses the scale of the potential exposure should risks materialize.

- iii. **What are the possible actions that can be taken to help reduce the scale of exposure to potential risk associated to the transition to a low-carbon economy?**

³⁵ Principles for Responsible Investment (PRI). *Forecast Policy Scenario: Equity Markets Impacts*. <https://www.unpri.org/inevitable-policy-response/forecast-policy-scenario-equity-markets-impacts/5191.article>

In addition to the scenario analysis presented here, 2DII provided to insurers involved in the project, company level information on the potential exposure to transition risks of companies in their portfolios. This information is intended to be used by insurers in investor climate action that leads to reduction of GHG emissions in the real economy. Section 5 of this report provides a general description of potential climate actions that can be envisaged as a result of the scenario analysis findings.

3.1. Scenario analysis results for the electric power sector.

The electric power sector accounts on average for 25% of global anthropogenic CO₂ emissions.³⁶ In Colombia it accounted for 9.7% of all GHG emitted during 2012.³⁷ ³⁸ Because of the relevance it has for climate change, the sector is changing at a quick pace. The change is mainly due to two reasons: (1) the decrease of investment costs for renewable energy projects, for example, the value of photovoltaic modules between 2006-2018 decreased ~80%³⁹; and (2) the implementation of public policies that can either incentivize the supply of renewable energy, for example, by setting renewable energy targets; or disincentivize investments in high-carbon technologies, for example, by implementing a carbon tax.

These dynamics are set to continue moving forward. IRENA estimates that between 2015 and 2025, the costs of solar energy could fall by 57%.⁴⁰ In addition, global policy ambition will have to increase, as with current mitigation targets the world will warm by 2.8°C by the end of the century. This is close to twice the limit agreed in Paris.⁴¹ In terms of low and high carbon electricity sources deployment, the IEA estimates that to reach a 2°C scenario, the renewable energy capacity in Central and South America will have to increase by a factor of 4 by 2040 with respect to 2017 levels, while coal and oil capacity generation will have to decrease by one third.⁴²

Colombian insurers' portfolios will be affected by these dynamics through the companies they invest in. These companies' value drivers, and consequently asset prices are affected by changes in technology prices and policies that will come with the transition to a low carbon economy. In Colombia as in other countries in Latin America, there are already policy instruments in place that could serve as base for more stringent policy. For example, this is the case of the carbon tax which is currently applied only to fossil fuels and whose costs are quite low (less than USD 5 per ton of CO₂).

The power sector is the climate-relevant sector with the highest share in the insurers' portfolio, it represents around 12% of the listed equity and 30% of the corporate bond portfolio. About 38% of the investments in listed equity and 53% in corporate bonds are in power utility companies. It is therefore

³⁶ IPCC. 2014. *Summary for Policymakers in Climate Change 2014: Mitigation of Climate Change*.

https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_summary-for-policymakers.pdf

³⁷ 25% also considers emissions from heat production.

³⁸ Last GHG inventory publicly available: Unidad coordinadora del Primer Informe Bial de actualización y d ela tercera comunicación Nacional de Cambio Climático. 2015. *Inventario Nacional de Gases de Efecto Invernadero (GEI) – Colombia*.

http://documentacion.ideam.gov.co/openbiblio/bvirtual/023421/cartilla_INGEI.pdf

³⁹ U.S. Energy Information Administration, 2019, *Average value of photovoltaic modules 2006-18 (dollar per peak watt)*,

https://www.eia.gov/renewable/annual/solar_photo/

⁴⁰ This is the case for utility-scale solar Photovoltaic. International Renewable Energy Agency, 2016, *The Power to Change: Solar and Wind cost Reduction Potential to 2025*, <https://www.irena.org/publications/2016/Jun/The-Power-to-Change-Solar-and-Wind-Cost-Reduction-Potential-to-2025>

⁴¹ Climate Action Tracker, 2019, *Governments still showing little sign of acting on climate crisis*, <https://climateactiontracker.org/publications/governments-still-not-acting-on-climate-crisis/>

⁴² International Energy Agency, 2018, *World Energy Outlook 2018*.

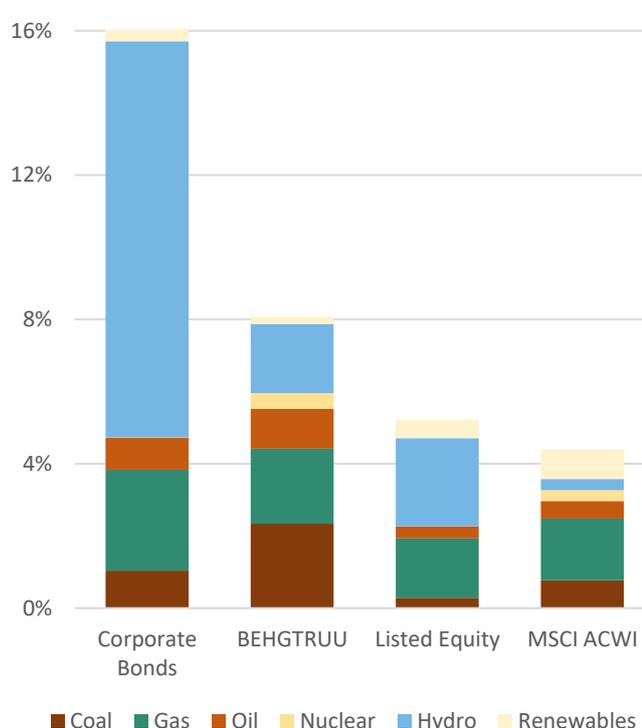
potentially the main source of transition risks for insurers. The scenario analysis results shown below intends to shed light on the sources of this potential exposure.

To gain an initial understanding of the potential exposure of insurers' portfolios to transition risks, we carried out a first analysis looking at the weight of the sector in the portfolio and the related technologies breakdown. A portfolio that is heavily exposed to high-carbon technologies is potentially exposed to transition risks arising from a disruptive transition. Equally, portfolios with a low share of renewables might not be seizing the opportunities that will come with the transition.

Figure 4 shows the technology mix of both the listed equity and corporate bond portfolios of insurers and compares them to a benchmark. There are five technologies that have a relevant weight in the portfolios: hydro, gas, coal, oil, and renewables. Both portfolios have a higher exposure to power utilities than the benchmarks, however, the higher exposure is substantiated by the significant share that hydropower has in the insurer's portfolio.

More importantly, Figure 4 shows that the proportion of low carbon technologies is higher than the proportion of high-carbon technologies. This is mainly driven by the share of hydropower, which accounts for 67% of the power capacity exposure of the corporate bond portfolio and 47% of the listed equity portfolio.

Figure 4. Power capacity technology breakdown in the corporate bond and listed equity portfolios vs. benchmarks, as a % of the portfolio. (Source: 2DII, based on Bloomberg)



However, the portfolio might be exposed to transition risk affecting production from high-carbon technologies, and particularly oil and coal capacity, as capacity in those technologies is set to decrease in the transition to a low carbon economy. Both technologies account for around 12% of the power capacity in each portfolio. Compared to their respective international benchmarks, BEHGTRUU⁴³ for the bonds portfolios and MSCI ACWI⁴⁴ for the listed equity, the insurers portfolios are more exposed to the power sector.

⁴³ Emerging markets corporate bonds investor grade USD aggregate index

⁴⁴Global equity index is designed to represent performance of the full opportunity set of large- and mid-cap stocks across 23 developed and 26 emerging markets.

Current and future technology exposure. To understand if insurers’ portfolios are adjusting to the transition to the low carbon economy, we compared the current technology mix of the portfolio to the future mix and the mix of the portfolio in a 2°C scenario in 2024. A difference between the future technology mix and the mix in a 2°C scenario indicates a potential exposure to transition risks in case a disruptive transition occurs.

While the technology share of the listed equity portfolio is essentially not changing from 2019 to 2024, the corporate bond portfolios see some positive changes. The most significant changes come from the increasing hydropower share and the decreasing gas power share.

The technology mix of both portfolios is however not compatible with the technology mix in a 2°C scenario by 2024. The most significant change needs to come from renewable energy sources, whose share needs to increase by 11% in the listed equity portfolio and 13% in the corporate bond portfolio. The proportion of low-carbon technologies of the corporate bond portfolio is however slightly higher than in the SDS (5 % difference).

Colombian insurers exposure to high-carbon technologies should change at reasonable rates for the portfolio to be compatible with a 2°C scenario. This is particularly the case with oil, gas and coal power, in which the listed equity portfolio needs to decrease by around 2%, 3% and 1%, respectively. The corporate bond portfolio does not need a substantial decrease in those technologies, on the contrary, the share of gas power should increase by 3.7%.

Portfolio alignment with different climate scenarios. To estimate the alignment of the portfolio with different climate scenarios, we compare the capacity additions the companies in the portfolio are planning to invest in, with the capacity additions required in a 2°C scenario. The capacity additions are based on data of coal power

Figure 5: Current and future technology mix of the listed equity and corporate bond portfolios compared to a portfolio aligned with the SDS scenario. (Source: 2DII, based on Bloomberg, IEA)

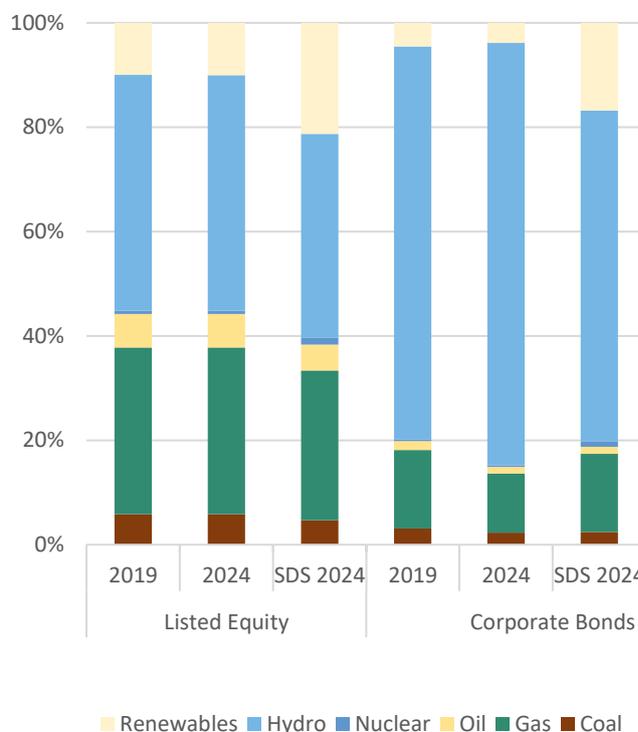
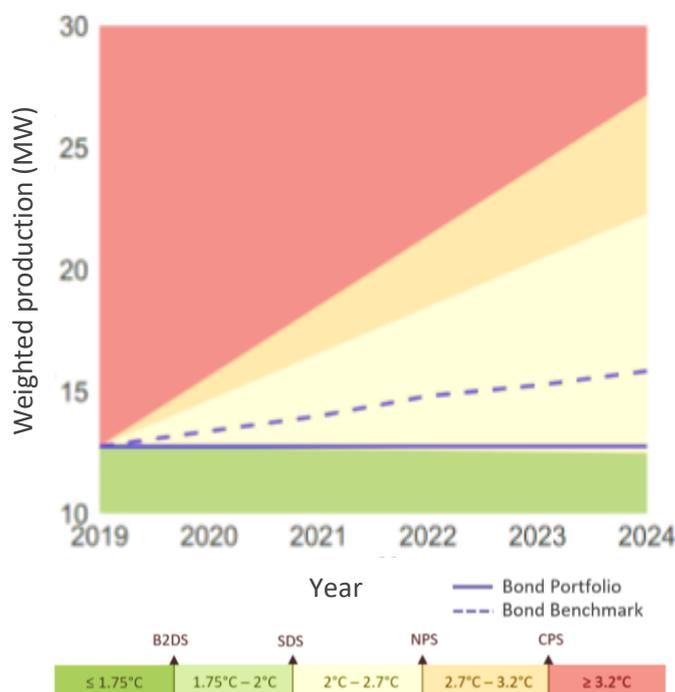


Figure 6: Alignment of coal power capacity in the corporate bond portfolio relative to the IEA scenarios. (Source: 2DII, based on Global Data, Bloomberg, and IEA)



capacity that has been announced, permit pending, financed, under construction, or under rehabilitation. The analysis presented here does not include forecasted retirements. This is done intentionally in order to demonstrate the size of the required change rather than already integrating announcements on retirements.

The companies in both the equity and corporate bond portfolios are not currently adding any coal-fired capacity. This is equally the case for oil capacity. The portfolios' trajectories are compatible with a 2°C – 2.7°C trajectory. Figure 6 shows the scenario analysis results of the corporate bond portfolio on coal power capacity.

For the corporate bond portfolio to be aligned with a 2°C scenario, a decrease in the coal capacity build out of around 2% would be needed by 2024 with respect to 2019 levels, while the listed equity portfolio requires a decrease of around 1%. The decrease required in oil capacity is more pronounced compared to coal: the listed equity portfolio needs to decrease its capacity by 5%, while the corporates bonds need to fall by 6%.

The insurers' portfolios are potentially exposed to transition risks arising from these two technologies, but the assets at risk are relatively low (0.6% or 1.3 million USD AUM in the listed equity portfolio and 1.9% or 102.4 million USD AUM in the corporate bond portfolio). Despite the required change, both portfolios are performing better than their respective benchmarks.

These results additionally show that metrics covering a single point in time such as the one in figure 4 provide limited information on the potential exposure to transition risks, and thus the need for forward-looking metrics. In this case we see that while companies with oil and coal power generation have a similar share in the portfolio, the reductions required to support a transition are higher for oil capacity than for coal capacity.

Insurers' listed equity and corporate bond (see Figure 7) portfolios are potentially not exposed to transition risks affecting gas power utilities. Both portfolios are not significantly increasing their capacity additions, while transition scenarios estimate a future increase of gas as it is seen as a transition technology. Therefore, the portfolios are compatible with a <1.75°C scenario as shown in Figure 7.

The scenario analysis results for hydro power vary substantially among portfolios. The corporate bond portfolio is aligned with a <1.75°C scenario because the companies in the portfolio are significantly

Figure 7: Alignment of gas power capacity in the listed equity portfolio relative to the IEA scenarios. (Source: 2DII, based on Global Data, Bloomberg, and IEA)

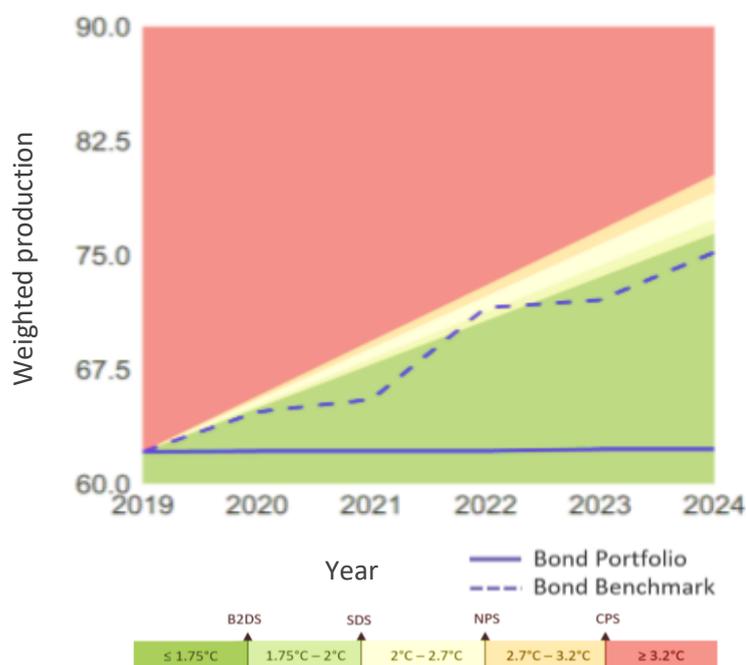
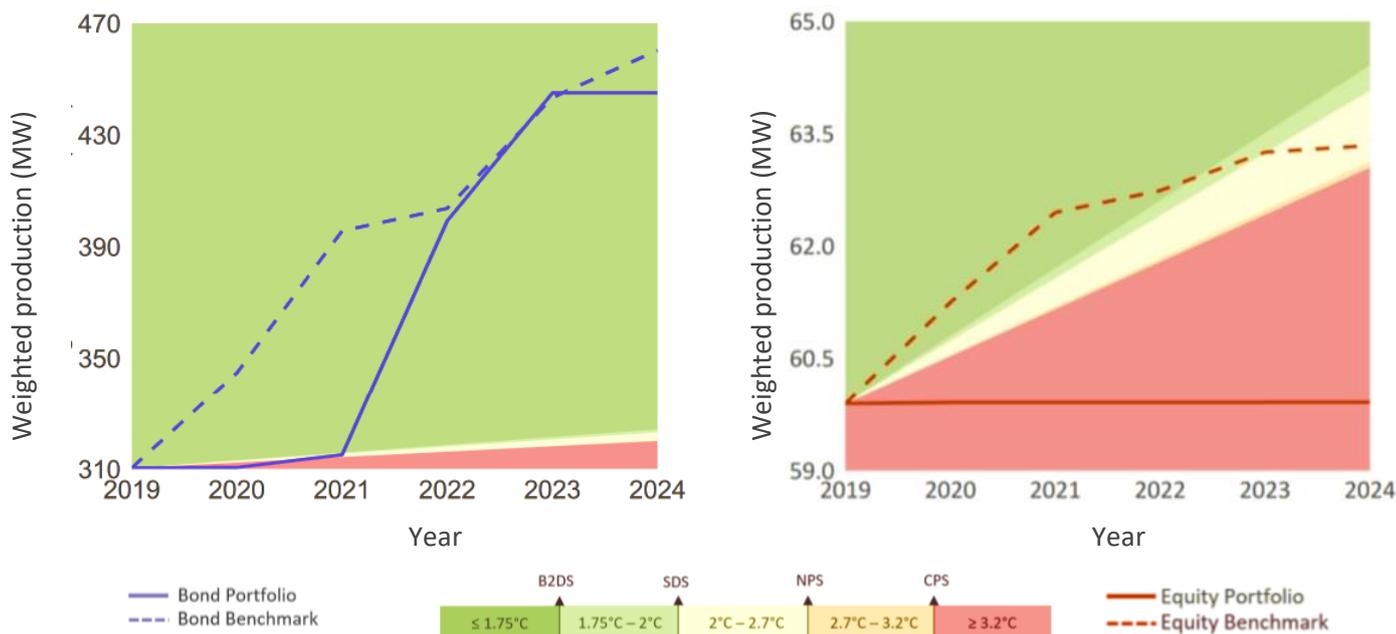


Figure 8: Alignment of hydroelectric power capacity in the corporate bonds and listed equity portfolios relative to the IEA transition scenarios. (Source: 2DII, based on Global Data, Bloomberg, and IEA)

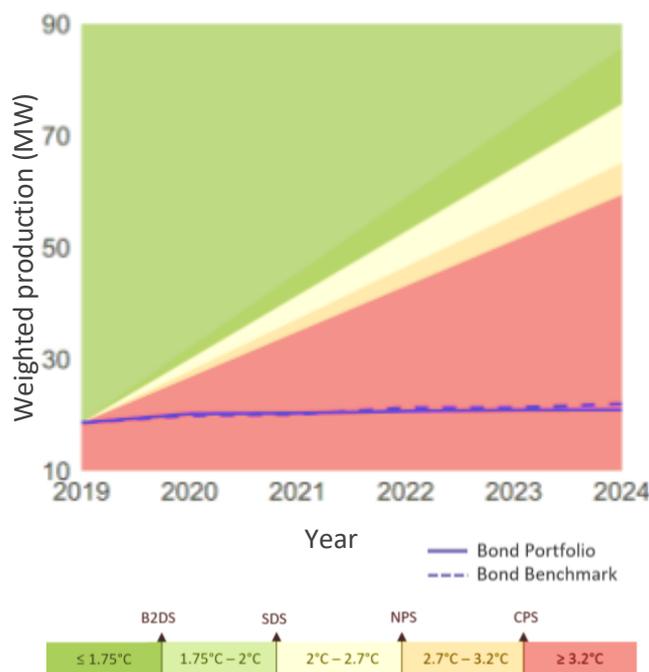


increasing their hydropower, while the listed equity portfolio the companies are not increasing the power capacity build out. Therefore, it is following a >3.2°C scenario trajectory (see Figure 8). The market benchmark is notably outperforming the portfolio. For the portfolio to be aligned with a 2°C scenario, it would need to increase its build out by 6.8% by 2024.

Colombian insurers are not seizing the opportunities the low-carbon economy could bring with renewable energy sources; both listed equity and corporate bond portfolios trajectories are consistent with a >3.2 scenario. Both portfolios are not significantly increasing their capacity additions. For the portfolios to be aligned with a 2°C scenario, the build out of renewable energy capacity would need to increase by a factor of 2.6 in the listed equity portfolio and by a factor of 4.1 in the corporate bond portfolios by 2024 (see Figure 9). This is therefore the technology that requires the most ambitious investment plans.

Differences among portfolios by insurance categories and in the non-backed reserves. The technology mix exposure and the scenario analysis results of the different insurance categories (life, non-life insurance and social security) and the non-backed reserves portfolio are, in general, very similar. Here we will discuss the major differences identified.

Figure 9: Alignment of non-conventional renewable power capacity in the corporate bond portfolios relative to the IEA scenarios. (Source: 2DII, based on Global Data, Bloomberg, and IEA)

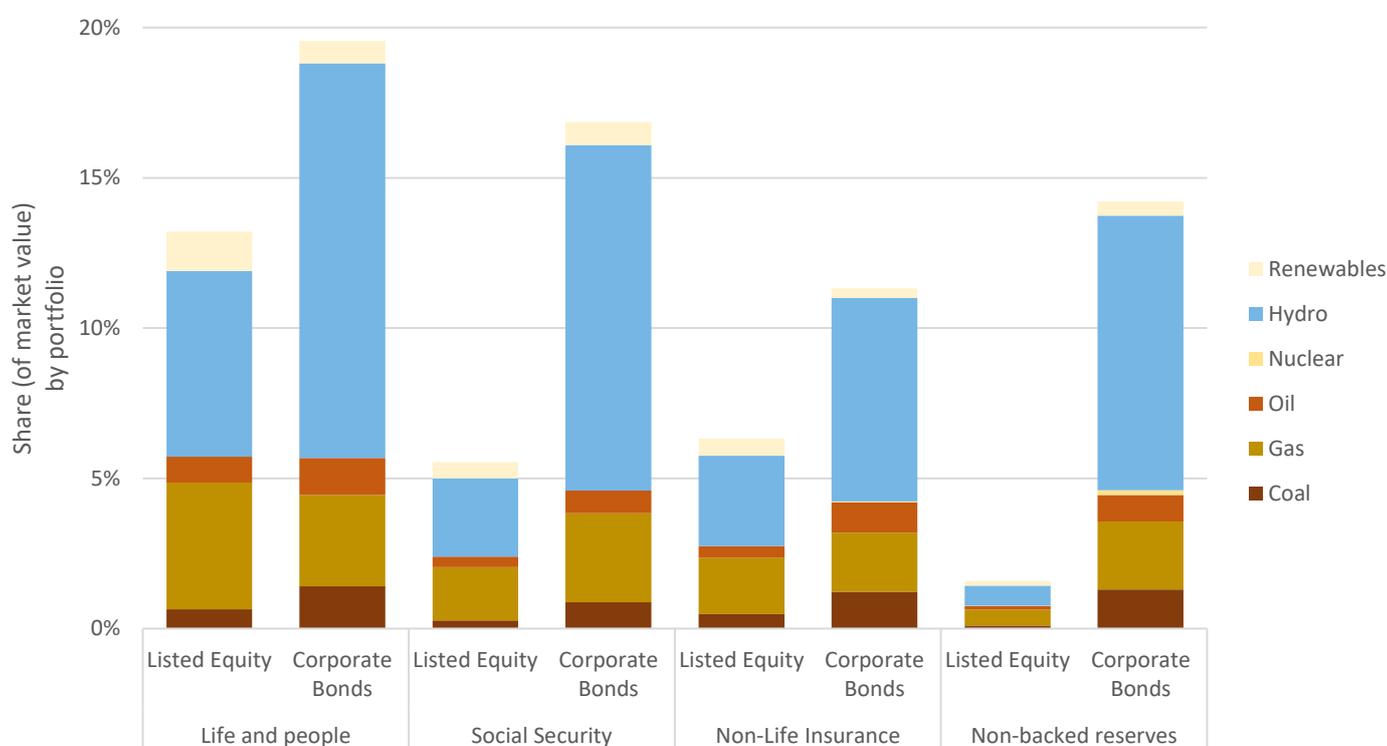


In line with the results of Figure 4, the listed equity portfolio of all insurance categories and the non-backed reserves portfolio has a higher exposure to the power sector than the corporate bond portfolio. The two insurance categories portfolios with the highest exposure are life and social security (see Figure 10).

All portfolios are more exposed to low carbon technologies than high carbon technologies. The corporate bond portfolio has a higher exposure to low carbon technologies with 6.3% to 13.9% of the AUM, which is equivalent to 63% to up to 71% of the total exposure to power production. The two portfolios with the highest exposure are life and social security.

However, results also show that a minor increase of 4% in the capacity additions will result in the portfolio following a trajectory between 2°C-2.7°C scenario, which would signal a potential exposure to transition risks in case of a disruptive transition. It is therefore very relevant to monitor these portfolios.

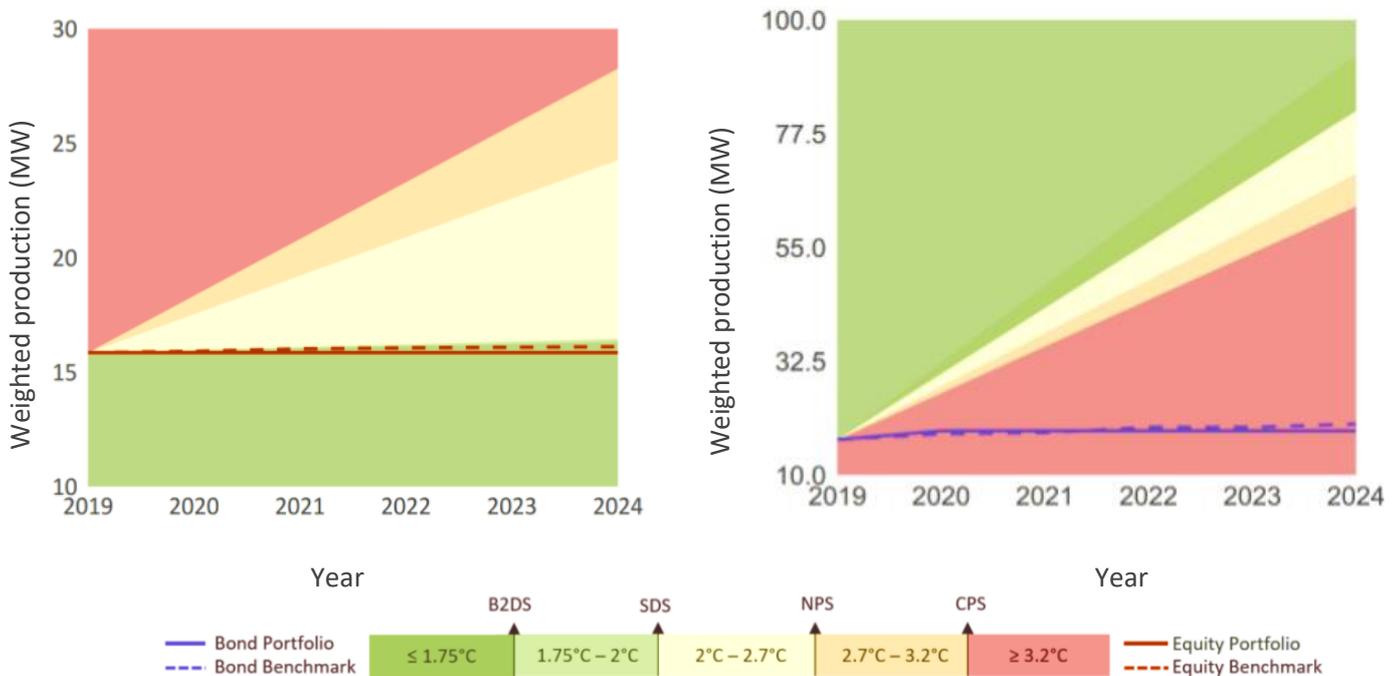
Figure 10: Technology breakdown comparison to corporate bond and listed equity by insurance category in the power sector, as a % of the portfolio. (Source: 2DII, based on Global Data, Bloomberg, and IEA)



Regarding the scenario analysis results, there is one major difference identified with respect to the aggregated portfolio results relating to the portfolios exposure to transition risk affecting coal power, in both the listed equity and corporate bond portfolio. Both the life and social security insurances portfolios trajectories are aligned with a 2°C trajectory (see Figure 11 left). An increase of more than 4% in the capacity additions will however result in the portfolio following a trajectory compatible with a >2°C scenario, which would signal a potential exposure to transition risks in case of a disruptive transition. It is therefore very relevant to monitor these portfolios.

On the other hand, the corporate bond portfolio of these insurance categories requires the highest increase in renewables capacity additions for the portfolios to be aligned with a 2°C scenario. Figure 11 (right) shows the scenario analysis results of the life insurance corporate bond portfolio. For this portfolio to be aligned with a 2°C scenario, an increase by a factor of 5 in the capacity additions is required by 2024.

Figure 11: Alignment of coal power capacity in the life insurances listed equity portfolio (left) and renewable power capacity in the corporate bond portfolio (right) relative to the IEA transition scenarios. (Source: 2DII, based on Global Data, Bloomberg, and IEA)

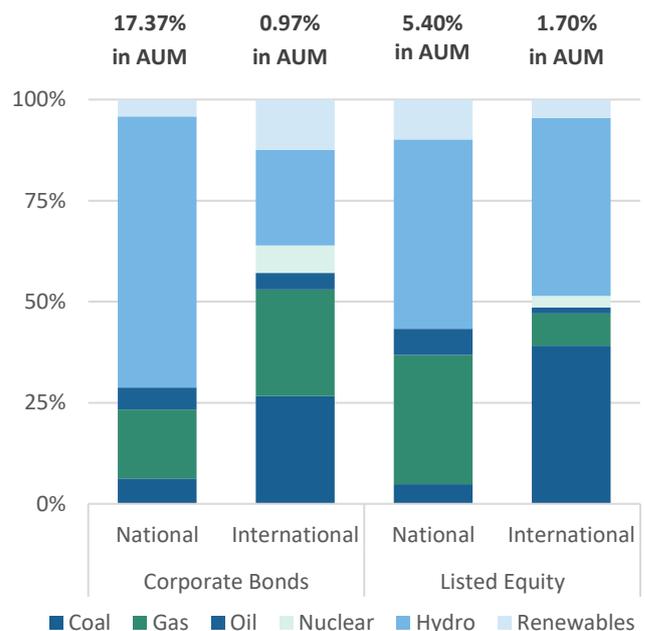


Differences between international and national investments. The technology mix exposure and scenario analysis results presented above are largely driven by investments in instruments issued in Colombia. However, to better manage the portfolios' potential exposure to transition risks, it is important to understand the differences between the aggregated portfolio results and the dynamics in the international investments.

Figure 12 compares the exposure to the power sector and the related technology breakdown of national and international investments. International investments in the power sector are significantly lower than national investments, listed equity investments are about one third of the national investments, while corporate bond investments are equivalent to approximately 6% of the national corporate bond investments.

The technology mix observed is very different. In terms of corporate bond, international investments are more exposed to coal and gas power, while in terms of listed equity,

Figure 12: National and international investments technology breakdown of corporate bond and listed equity portfolios in the power sector. (Source: 2DII, based on Global Data, Bloomberg, and IEA)



international investments are more exposed to coal. These results raise two relevant questions: (1) does the exposure to coal and gas of international investments represent a potential transition risk to the insurers portfolio?; (2) is the lower exposure to renewables contributing to the insurers' portfolio misalignment? (as per Figure 8).

The results below allow us to answer these two questions. The scenario analysis of the international investments finds that: **The corporate bond and listed equity investments trajectories in coal power are compatible with a scenario of >3.2°C.** The investments are therefore potentially more exposed to transition risks than the national investments; Figure 13 shows the results for the corporate bond portfolio. These investments are currently in companies that are not planning to increase coal power capacity in the next years; however, these companies are located in regions in which an important decrease in coal power capacity is projected by the IEA, while in the case of Latin America the IEA estimates that the peak of coal capacity will be in 2025. As an example, for the corporate bond investments to be aligned with a 2°C scenario trajectory, the capacity additions of the companies in the portfolio would need to be reduced by 10% by 2024, while the total portfolio needs a reduction of less than 1% (see figure 6).

Corporate bonds' international investments are in companies which are increasing their gas capacity in the next 5 years. The increase from 2023 onwards is so high that it places the investments in a trajectory that is compatible with a 2°C-2.7°C scenario (see Figure 14). International investments are therefore potentially more exposed to transition risks than national investments (see Figure 7).

Listed equity international investments in companies with coal power are following a trajectory that is compatible with a scenario of >3.2°C. These investments are therefore potentially more exposed to transition risk than the national investments, which are following a trajectory that is

Figure 13: Alignment of coal power capacity in the international corporate bond portfolio relative to the IEA transition scenarios. (Source: 2DII, based on Global Data, Bloomberg, and IEA)

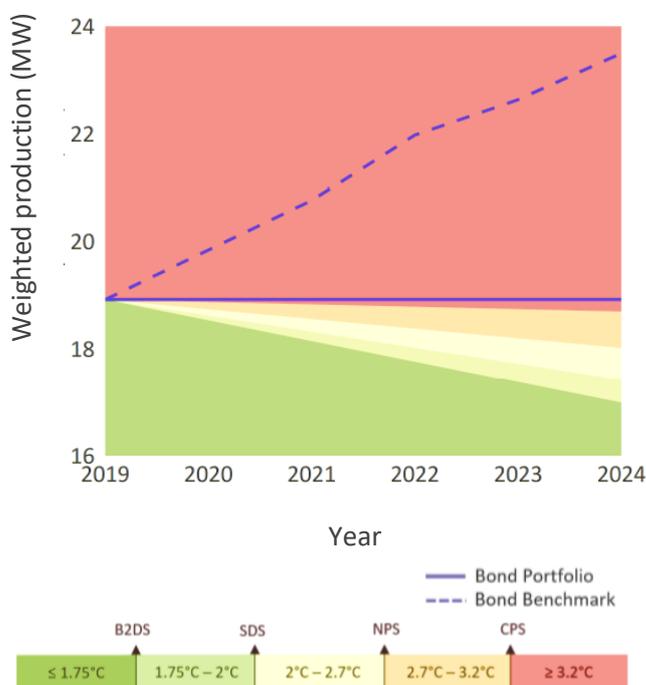
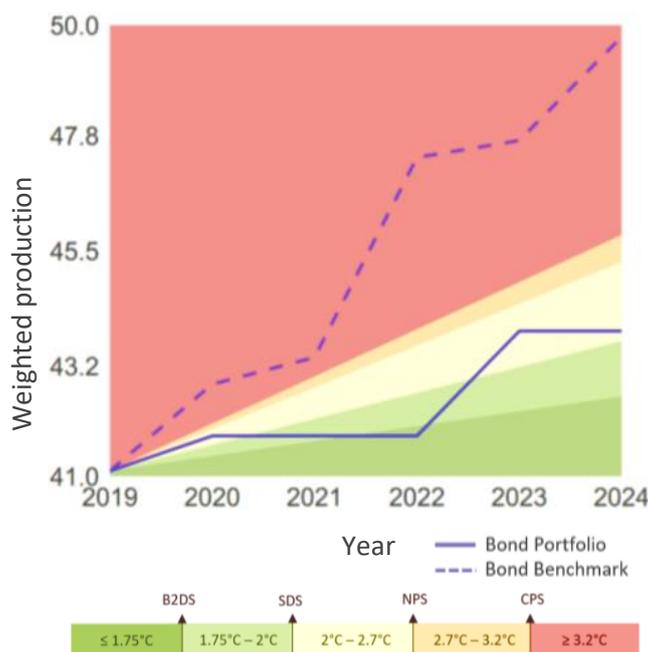


Figure 14: Alignment of gas power capacity in the international corporate bond portfolio relative to the IEA transition scenarios. (Source: 2DII, based on Global Data, Bloomberg, and IEA)



compatible with a 2°C scenario. For international investments to be aligned with a 2°C scenario trajectory, a reduction of capacity additions by 18% by 2024 is needed, while national investments would need to increase capacity additions by 4%⁴⁵.

The listed equity international investments trajectory for renewables power is contributing to the misalignment of the insurers' portfolio as investments are compatible with a scenario of >3.2°C. The investments are in companies which are planning to slightly increase their capacity additions in the next five years. However, for the investments to be aligned with a 2°C scenario trajectory an increase of capacity additions of 75% by 2024 is needed (see Figure 15), while in the national investments this increase should be of 168%.

Differences among peers. Two types of peer comparisons were carried out in this study. The first aimed at comparing the technology mix of insurers with the portfolio of the largest institutional investor group in Colombia (the pension funds), while the second compares various insurance companies. The analysis finds that:

There is a significant difference in the future technology mix of the insurers and pension funds in the listed equity portfolio. The pension funds' portfolio has a higher share of high-carbon technologies than the insurers' portfolio. This share is mainly explained by the higher proportion of coal power and to a minor extent of gas power. This means that the pension funds' portfolio is potentially more exposed to transition risk affecting coal power producers than the insurers. In addition, in terms of the amount of assets in high-carbon technologies, pension funds have 496 million AUM while insurers have 5 million AUM. There are no major differences observed in the technology mix of the corporate bond portfolios of both investors and the difference in the amount of assets in high-carbon technologies is less pronounced with 250

Figure 15: Alignment of renewable energy capacity in the international corporate bond portfolio relative to the IEA transition scenarios. (Source: 2DII, based on Global Data, Bloomberg, and IEA)

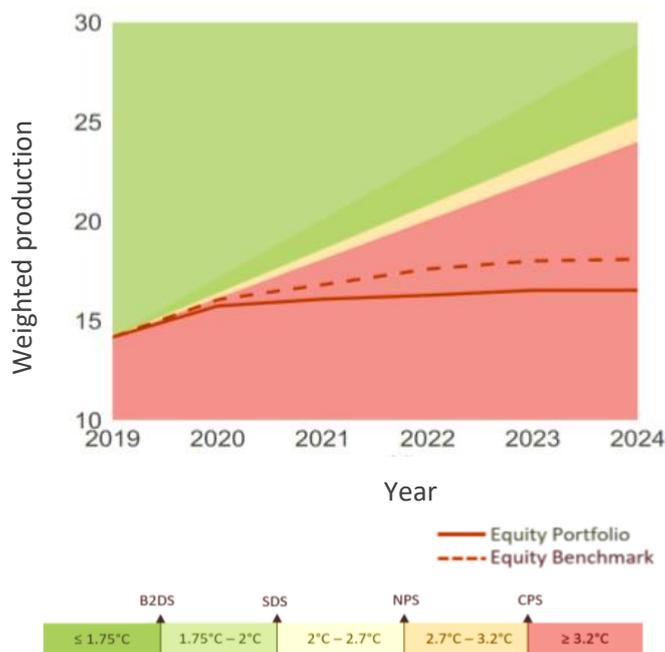
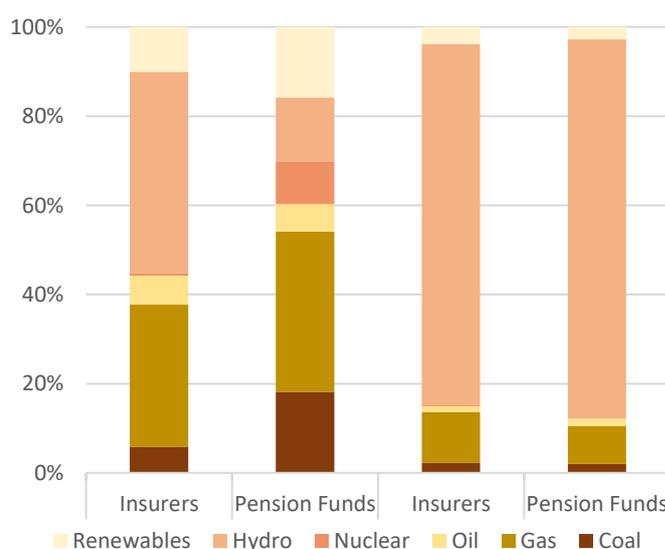


Figure 16: Insurers vs. pension funds future (2024) technology mix of listed equity and corporate bond portfolios. (Source: 2DII, based on Global Data, Bloomberg, and IEA)



⁴⁵ This is the case as the scenarios project the peak of coal capacity production in 2025.

million AUM in the insurers’ portfolio and 144 million AUM in the pension funds.

35 of the 44 insurers analyzed are exposed to the power utilities sector. The corporate bond portfolios of 34 of these insurers are exposed to the sector, while only 11 insurers are exposed to the sector in the listed equity portfolio. The technology exposure of their portfolios is very similar. All insurers’ listed equity portfolios are exposed to the five most relevant technologies identified (e.g. renewables, hydro, oil, gas, coal), while the corporate bond portfolios of only 6 insurers are not exposed to oil capacity.

As mentioned above, the insurers’ portfolios are mostly financing an increase in capacity additions for hydropower and renewables in the corporate bond portfolio. Figure 17 shows the percentage increase in capacity additions from 2019 to 2024 by insurer. It shows that 27 of the 34 insurers are increasing their renewables capacity in some form, but the increase is not as ambitious as it should be if their portfolios were to support a 2°C scenario. Additions of more than 110% would be needed to support that scenario⁴⁶.

To put into perspective the increase in renewables capacity additions: figure 17 shows the relative increase of renewable energy capacity for each insurer, while figure 18 shows the share that renewable energy capacity additions represent in the total capacity additions of the companies in each insurer portfolio. This share is quite low for most insurers (less than 10%), which is mainly driven by the significant increase in hydropower in the corporate bond portfolio (see Figure 8).

Figure 17: Renewables increase in capacity additions (2024 – 2019) by insurer (Source: 2DII, based on Global Data, Bloomberg, and IEA)

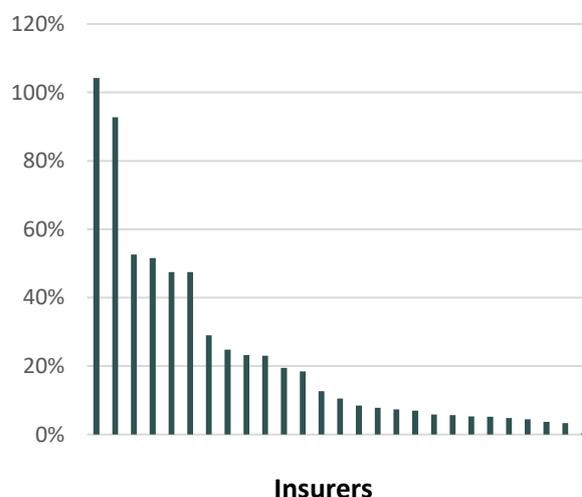
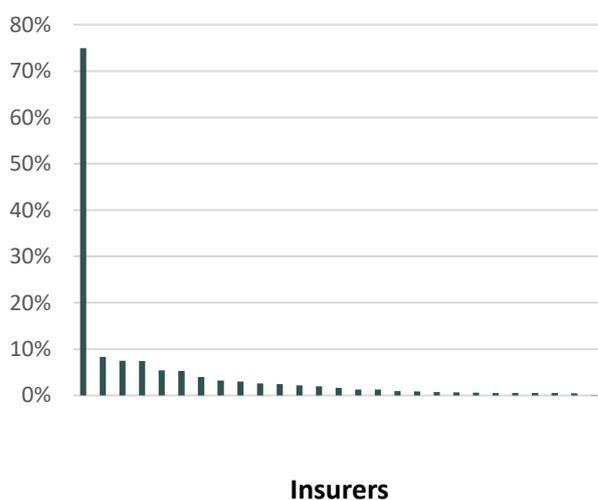


Figure 18: Renewables increase in capacity additions (2024 – 2019) as % of total additions by insurer (Source: 2DII, based on Global Data, Bloomberg, and IEA)



⁴⁶ According to IEA WEO 2018.

3.2. Scenario analysis results for the fossil fuel sector

Fossil fuels are the primary source of GHG emissions globally and thus play a critical role in the transition to a low carbon economy. Fossil fuels account for around two-thirds of anthropogenic GHG-emissions⁴⁷ and four-fifths of primary energy supply⁴⁸. The three critical fuels in this context are coal, oil, and natural gas (solid, liquid, gas).

Unlike for the power sector, there is no direct ‘ratio’ between high-carbon and low-carbon technologies possible for upstream fossil fuels. In Central & South America, the transition to the low carbon economy will require the decline of coal and oil production in the coming years. In particular, the IEA estimates that in a 2°C scenario, coal production is set to be reduced by more than 80% over the next 25 years and oil production is set to decline by around 30%.⁴⁹ The IEA, however, assumes that gas production increases slightly over the next 25 years under the 2°C scenario, given differences in GHG intensity with coal. While globally coal makes up around 10% of total final consumption, it accounts for 25% of GHG emissions from the three fuels.^{50 51}

For the transition to happen, several policy changes would need to take place, including fossil fuels subsidies phased out in both net-importing and net-exporting countries and the staggered introduction of CO₂ prices. Evidence of this is already present in Latin America. For example, Argentina, a net-exporter of oil, phased out its oil production subsidies in 2017, while Mexico phased out the gasoline consumption subsidies for manufacturing and transport activities, which indirectly benefited the production of fossil fuels.^{52 53 54}

Countries in Latin America will continue to phase out fossil fuel subsidies as international organizations such as the International Monetary Fund (IMF) and the Organization for Economic Co-operation and Development (OECD) actively promote this strategy to mitigate climate change and to promote energy efficiency.^{55 56}

The fossil fuel sector is the second largest climate-relevant sector in the insurers portfolio: it represents 7% of the listed equity and around 11% of the corporate bond portfolio. 100% of listed equity investments and 58% of the corporate bond investments are in fossil fuel producers. It is therefore one of the main sources of transition risks for insurers. The scenario analysis results shown below intend to shed light onto the sources of this potential exposure.

⁴⁷ Ecofys. 2012. *World GHG Emissions Flow Chart 2010*.

https://za.twosides.info/includes/files/upload/files/UK/Myths_and_Facts_2016_Sources/8-9/ECOFYS_2013-world-ghg-emissions-flow-chart-2010.pdf

⁴⁸ Maridi, Hasan. 2019. *Environmental Impacts of Energy*. https://www.researchgate.net/figure/Global-primary-energy-supply-by-fuel-Mtoe-1965-2015_fig1_334000991

⁴⁹ International Energy Agency, *World Energy Outlook 2018*, 2018.

⁵⁰ Total Final Consumption (TFC) is the consumption by the various end-use sectors. The TFC includes energy demand in the following sectors: industry (including manufacturing and mining), transport, buildings (including residential and services) and other (including agriculture and non-energy use). It excludes international marine and aviation bunkers, except at world level where it is included in the transport sector.

⁵¹ International Energy Agency, *World Energy Outlook 2018*, 2018.

⁵² IISD, *Quita de subsidios a la producción de petróleo en Argentina*, <https://www.iisd.org/sites/default/files/publications/stories-g20-argentina-es.pdf>

⁵³ El País. 2017. *OCDE: “Mexico tardo demasiado en retirar el subsidio a la gasolina3*.

https://elpais.com/economia/2017/01/10/actualidad/1484068918_876908.html

⁵⁴ OECD. 2017. *Mexico’s efforts to phase out and rationalize its fossil-fuel subsidies*. <http://www.oecd.org/fossil-fuels/Mexico-Peer-Review.pdf>

⁵⁵ International Monetary Fund (IMF). 2015. *Energy subsidies in Latin America and the Caribbean: Stocktaking and Policy Challenges*.

<https://www.imf.org/external/pubs/ft/wp/2015/wp1530.pdf>

⁵⁶ OECD. 2018. *OECD-IEA Fossil Fuel Support and Other Analysis*. <http://www.oecd.org/fossil-fuels/>

To have an initial understanding of the potential exposure to transition risks of insurers’ portfolios, we carried out a first analysis looking at the weight of the sector and the related technologies in the portfolios. A portfolio that is heavily exposed to coal and oil production is potentially exposed to transition risks arising from a disruptive transition as these technologies are set to decrease in the future.

Figure 19 shows the technology mix of both the listed equity and corporate bond portfolios of insurers and compares them to a benchmark. Insurers’ portfolios have an important exposure to oil production, and gas production to a minor extent. Only the corporate bond portfolio is exposed to coal mining, although exposure is very low (0.02%). In addition, the corporate bond portfolio has a significantly lower exposure to oil and coal than the benchmark. This means that transition risks affecting these technologies might potentially bring more financial losses to investors that are following the benchmark. The relationship is, however, the opposite in the listed equity portfolio.

Current and future exposure. To understand if insurers’ portfolios were adjusting to the transition to the low carbon economy, we compared the current technology mix of the portfolio to the future mix and the mix in a 2°C scenario in 2024 (see figure 20). A portfolio that is adjusting to the transition would show a decrease in the shares of oil and coal in the portfolio.

Both the listed equity and the corporate bond portfolios are slightly decreasing the share of oil production. However, the decrease is not in line with the one required in a 2°C scenario, because the oil share would need to decrease by roughly an additional 5% in both portfolios. The corporate bond portfolio is slightly increasing the share of coal mining (about 0.5%), but for the share to be aligned with a 2°C scenario, it should decrease by 0.6%.

Portfolio alignment with different climate scenarios. To estimate the alignment of the portfolio with different climate scenarios, we compare the production that companies in the portfolio are planning to invest in over the next

Figure 19: Fossil fuel production breakdown in the corporate bonds and listed equity portfolios vs. benchmarks, as a % of the portfolio. (Source: 2DII, based on Global Data, Bloomberg, and IEA)

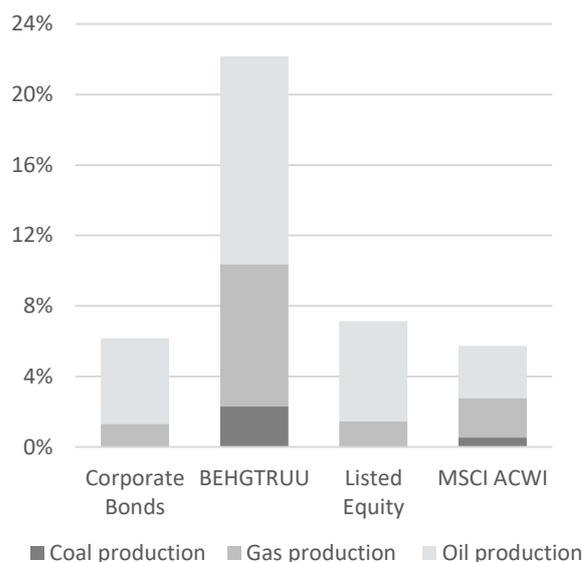
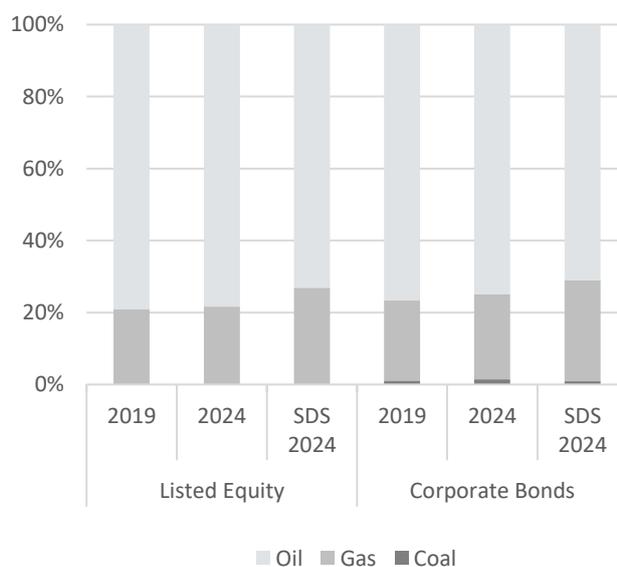


Figure 20: Current and future technology mix of the listed equity and corporate bond portfolios compared to a portfolio aligned with the SDS scenario. (Source: 2DII, based on Global Data, Bloomberg, and IEA)



five years with the production required in a 2°C scenario. The scenario analysis results find the following.

Insurers are potentially not exposed to transition risks affecting oil & gas companies as their portfolios' trajectories are compatible with a <1.75°C scenario due to a significantly decreasing production of both oil and gas in the next five years. This is the case in both the listed equity and corporate bond portfolio. Figure 21 shows the results for corporate bond portfolio alignment in oil production relative to the IEA scenarios.

The decreasing production implies that the high exposure of the portfolios to the oil & gas sector does not necessarily represent a risk in the future as the companies in the portfolios are adjusting their production in line with the lower supply that is foreseen in a <1.75°C scenario.

It however raises questions around other alternative businesses the companies could be developing to compensate the revenue loss due to the decreasing production.

However, results should be put into context and help identify if the drivers of this decreasing production result from changing strategies that consider the transition to a low-carbon economy or relate to other non-climate related factors. In this case, the driver is the latter.

The decreasing production plans result from operational and production strategies that have negatively impacted the production profiles of the companies in the portfolio, even considering a context in which the oil industry was recovering (as of 2018). Therefore, this raises questions around future changes in the alignment of the portfolio, as a consequence of a better macro-economic context and improvements in operations and calls for its close monitoring.

Figure 21 additionally shows that the portfolio is outperforming the benchmark, which is currently in a 1.75°C – 2°C trajectory. This is equally the case in the listed equity portfolio.

Figure 21: Alignment of oil production in the corporate bonds' portfolio relative to the IEA transition scenarios. (Source: 2DII, based on Global Data, Bloomberg, and IEA)

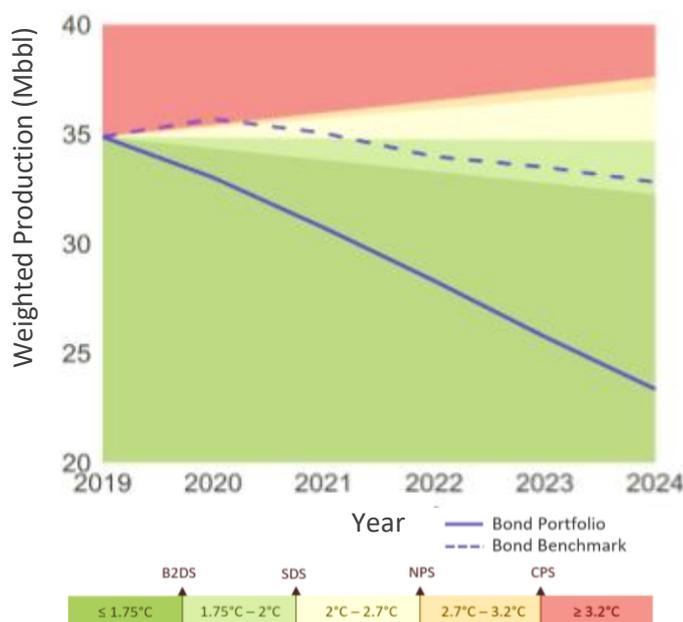
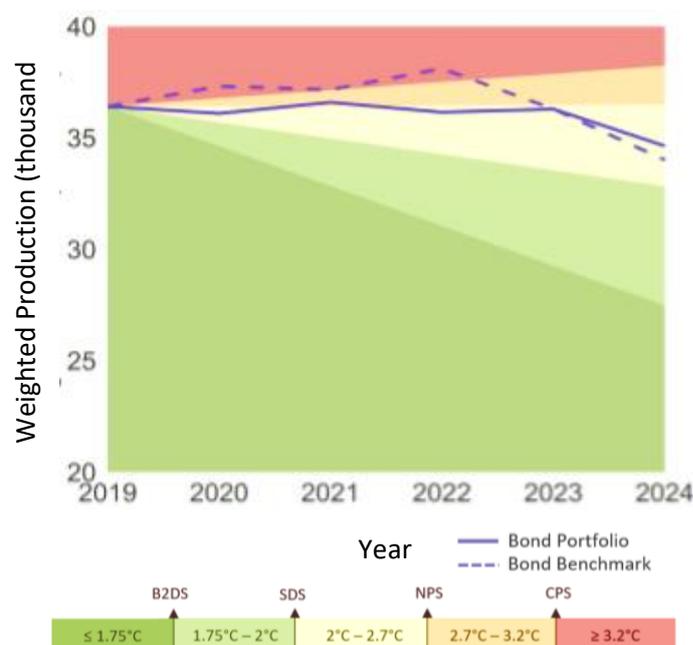


Figure 22: Alignment of coal mining in the corporate bonds' portfolio relative to the IEA transition scenarios. (Source: 2DII, based on Global Data, Bloomberg, and IEA)



Despite the low proportion of coal mining in the corporate bond portfolio, insurers are potentially exposed to transition risks affecting coal mining companies. The potential exposition arises from companies in the portfolio that are decreasing their coal production in the next five years. However, this decrease is not as ambitious as it should be for the portfolio to be aligned with a 2°C scenario (Figure 22). The portfolio is therefore compatible with a 2°C – 2.7°C trajectory. An additional decrease of 5% is needed for the portfolio to be aligned with a 2°C scenario.

This confirms that information covering a single point as seen in Figure 19 provides limited understanding of the potential exposure to transition risks and thus the relevance of forward-looking methodologies such as scenario analysis.

Differences among portfolios by insurance category and in the non-backed reserves. There are significant differences in the exposure to fossil fuels of the different insurance categories and the non-backed reserves portfolio, while the scenario analysis results are, in general, very similar.

The categories with higher exposure to the fossil fuel sector are social security and non-life insurances. In both insurance categories, the listed equity portfolio shows the higher exposure. Insurance companies offering products in those categories should therefore monitor their portfolios. The case is the opposite in the life insurances and the non-backed reserves portfolio, in which most (if not all) of the exposure is in the corporate bond portfolios.

The analysis finds that most of the insurers’ coal exposure is in the corporate bond portfolios of the non-backed reserves and in that of the non-life insurances to a minor extent. Following the results of Figure 22, both portfolios might be potentially exposed to transition risk.

Figure 23: Technology breakdown comparison to corporate bonds and listed equity by insurance category in the fossil fuel sectors, as a % of the portfolio. (Source: 2DII, based on Global Data, Bloomberg, and IEA)



The scenario analysis results for both the listed equity and corporate bond portfolios of the three insurance categories and the non-backed reserves follow similar trajectories in the case of oil and gas production. This is due to the significant weight that Ecopetrol has in all portfolios.

The corporate bond portfolio trajectories in coal mining of both the non-backed reserves and the non-life insurances are compatible with a 2°C – 2.7°C scenario trajectory. Non-life insurance companies and the non-backed reserves of insurers are therefore potentially exposed to transition risks in the case of a disruptive transition. For both portfolios to be aligned with a 2°C scenario, an additional decrease in coal mining production of 3% in the non-backed reserves portfolio is needed in 2024, while in the case of non-life insurances the decrease should be of 7%. Figure 24 shows the results for the non-backed reserves portfolio. It additionally shows that the portfolio is outperforming the benchmark.

Differences between the international and national investments. The technology mix exposure and scenario analysis results presented above are largely driven by investments in instruments issued in Colombia. However, to better manage the potential exposure to transition risks of the portfolios, it is relevant to understand the differences between the international and national investments in terms of both the degree of exposure to the fossil fuel and the scenario analysis results.

Figure 25 shows the exposure of national and international investments to the fossil fuel sector. The magnitude of the exposure of the corporate bonds international and national investments to the fossil fuels sector is very similar, while in the case of listed equity, international investments have a very small share in fossil fuels. However, the proportion of oil is lower in the international investments (around 60%) compared to the national investments (around 80%). All coal

Figure 24: Alignment of coal mining in the non-backed reserves corporate bond portfolio relative to the IEA transition scenarios. (Source: 2DII, based on Global Data, Bloomberg, and IEA)

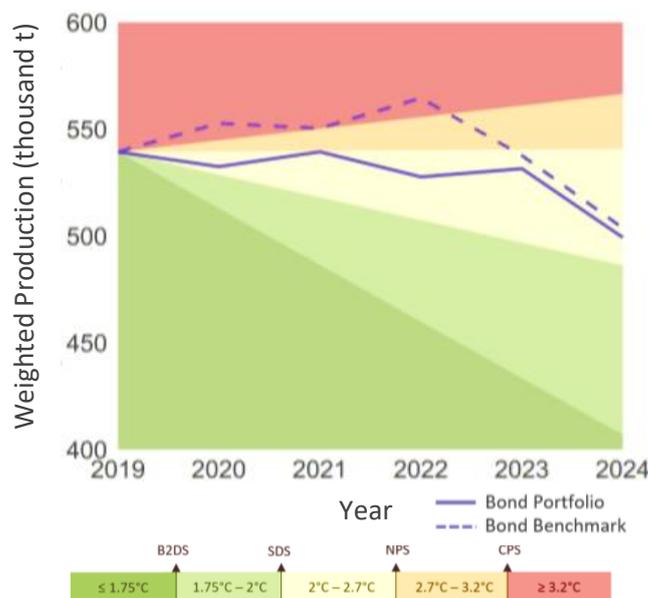


Figure 25: Fuel breakdown comparison of corporate bonds and listed equity investments by location, as a % of the portfolio. (Source: 2DII, based on Global Data, Bloomberg, and IEA)



investments are in instruments issued abroad, and as such, the scenario analysis results of Figure 22 are driven by these investments.

The scenario analysis results of the international portfolio follow closely the results of the aggregated portfolio. The only substantial difference found is in the oil results of the listed equity investments. The investee companies are increasing their oil production plans in the next five years, in a magnitude is compatible with a 2°C – 2.7°C scenario trajectory (see Figure 26). Any additional increase in the production plans will set the investments in a 2.7°C - 3.2°C trajectory. The investments are supporting companies that are planning an increase in production by 8% in the next five years of analysis, but a decrease of 1% is needed in order for the portfolio to be aligned with a 2°C scenario.

Differences among peers. Two types of peer comparisons were carried out for this sector; the first one comparing the future fuel mix of insurers and Colombian pension funds, and the second one that compares insurance companies’ exposure to oil and coal as these are the most critical technologies in the transition. The analysis finds that:

There are slight differences in the future fuel mix of insurers and pension funds’ portfolios (see Figure 27). The pension funds listed equity portfolio has a lower proportion of oil (9%), but USD 1 590 million of AUM are invested in that fuel, while insurers’ investments total USD 11 million. The difference between corporate bond portfolios is less pronounced, however: insurers have USD 334 million AUM investment in oil & gas, while pension funds have USD 158 million. In terms of the coal mining investments, pensions funds have USD 16 million AUM in their listed equity portfolio, which is 12.47 times the coal investments in the insurer’s corporate bond portfolio. This means that transitions risks materializing in the fossil fuel sector could bring higher absolute losses to pension funds.

Figure 26: Alignment of oil production of international investments in listed equity relative to the IEA transition scenarios. (Source: 2DII, based on Global Data, Bloomberg, and IEA)

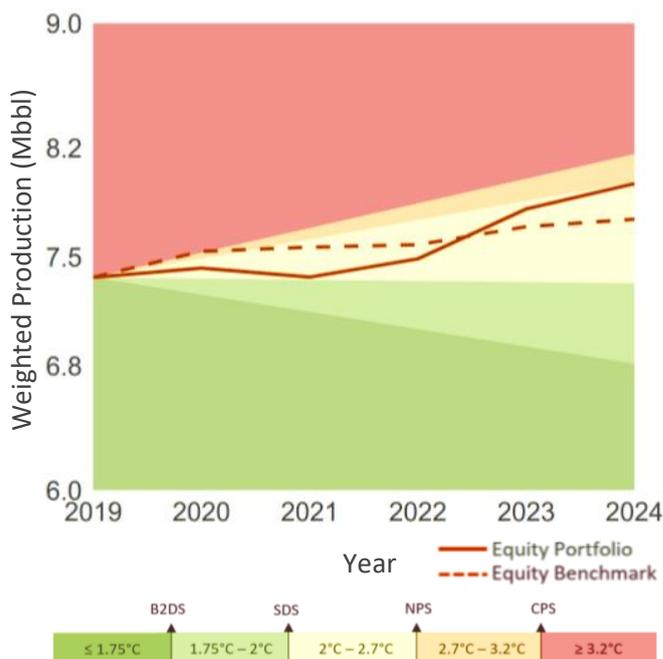
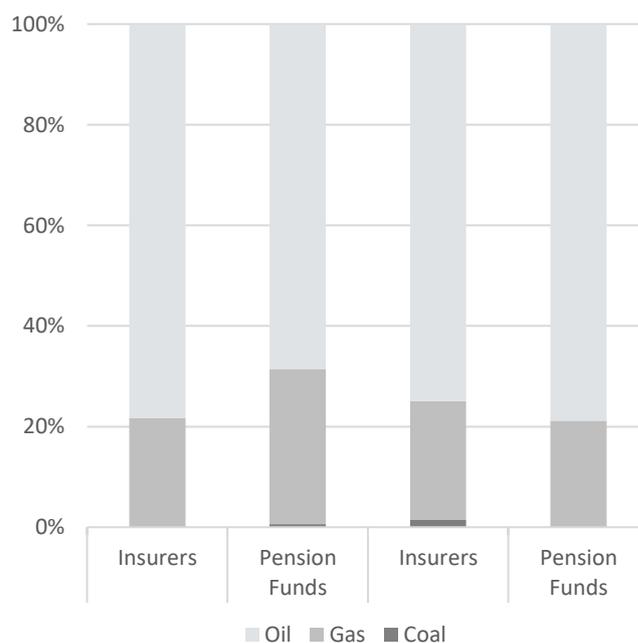


Figure 27: Insurers vs. pension funds future (2024) fuel mix of listed equity and corporate bond portfolios. (Source: 2DII, based on Global Data, Bloomberg)



29 of the 44 insurers analyzed are exposed to the fossil fuel sector. The dynamics among insurers are quite similar because most of them are mainly invested in Ecopetrol. Of the 29 insurers, only three are exposed to coal mining.

3.3. Scenario analysis results for the automotive sector

The automobile sector is dominated by petrol and diesel vehicles. Hybrid and electric alternatives make up around 6% of global auto production⁵⁷. However, the automotive sector faces a fundamental technological revolution in the transition away from Internal Combustion Engines (i.e. diesel and petrol cars) to alternative drivetrains e.g. hybrid and electric vehicles (EVs), as well as potentially in the medium-term fuel cells. This revolution is driven by an increase in the competitiveness of electric vehicles. Bloomberg New Energy Finances (BNEF) estimates that by 2024, electric vehicles will become cheaper than their combustion engine equivalent.⁵⁸

While it is clear from the IEA scenarios that electric and hybrid vehicles will dominate under a 2°C transition in the long run (20-30 years), the exact scale of change is not clear. Thus, the IEA World Energy Outlook (WEO) 2018 forecasts 1.039 billion EVs on the road by 2040.⁵⁹ The IEA Energy Technology Perspectives (ETP) 2017 scenario however only assumes around 422 million EVs on the road. While these aspects create challenges, they are not fundamental barriers to the analysis.

The automotive sector is one of the climate-relevant sectors with the lowest share in the insurers' portfolio: it represents around 0.01% of the listed equity and 0.12% of the corporate bond portfolio. However, this low proportion is not an indicator of no exposure to transition risks that might hit the sector. The scenario analysis results shown below intends to shed light onto the sources of this potential exposure.

The scenario analysis for this sector considers global scenario estimates, while a global analysis may be less precise. Local production is more globally integrated than for power, where sales are primarily domestic or at best regional i.e. Colombia does not buy electric power from China, but they buy cars manufactured in China.

To have an initial understanding of the potential exposure of insurers' portfolios to transition risks affecting this sector, we carried out a first analysis looking at the weight of the sector in the portfolio and the related technologies breakdown. A portfolio that is heavily exposed to Internal Combustion Engines (ICEs) is potentially exposed to transition risks arising from a disruptive transition. Equally, portfolios with a low share of Electric and Hybrid vehicles might not be seizing the opportunities that will come with the transition.

⁵⁷ Source: 2DII, based on Autoforecast Solutions data

⁵⁸ Bloomberg. 2019. *Electric car price tag shrinks along with battery cost*. <https://www.bloomberg.com/opinion/articles/2019-04-12/electric-vehicle-battery-shrinks-and-so-does-the-total-cost>

⁵⁹ International Energy Agency, *World Energy Outlook: 2018*, 2018.

Figure 28 shows the technology mix of both the listed equity and corporate bond portfolios of insurers and compares them to a benchmark. The corporate bond portfolio has a higher exposure to the auto sector than the benchmark but a similar exposure to ICEs. This means that transition risks affecting ICE manufacturers might potentially bring more financial losses to investors that are following the benchmark.

However, the relationship is the opposite in the listed equity portfolio, even considering that in relative terms the benchmark has a lower exposure to ICEs.

Current and future exposure. To understand if insurers’ portfolios are adjusting to the transition to the low carbon economy, we compared the current technology mix of the portfolio to the future mix and the mix of the portfolio in a 2°C scenario in 2024 (see Figure 29).

The difference between the future technology mix and the mix in a 2°C scenario indicates a potential exposure to transition risks in case a disruptive transition occurs.

Both the listed equity and the corporate bond portfolios are slightly decreasing the share of ICEs and increasing the share of both Hybrids and EVs. However, the decrease in the ICE share is not in line with the one required in a 2°C scenario. The ICE share would need an additional decrease of around 13% in the listed equity portfolio and 10% in the corporate bond portfolio. That share will be compensated mainly by an increase in the share of hybrid vehicles of around 12% in the listed equity portfolio and 10% in the corporate bond portfolio.

Portfolio alignment with different climate scenarios. To estimate the alignment of the portfolio with different climate scenarios, we compare the production that companies in the portfolio are planning in the next five years, with the production required in a 2°C scenario. The scenario analysis results find the following.

Figure 28: Technology breakdown comparison in the corporate bonds and listed equity portfolios vs. benchmarks and % of the automotive sector in the portfolio. (Source: 2DII, based on AFS, Bloomberg)

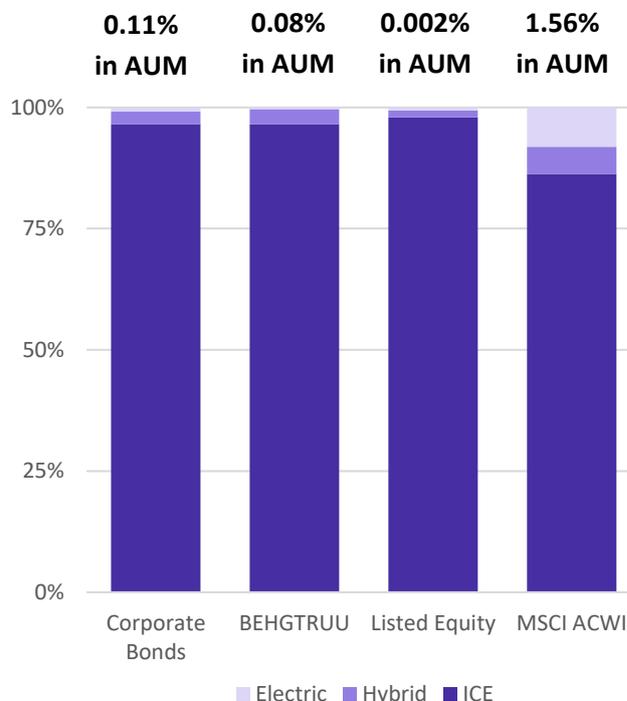
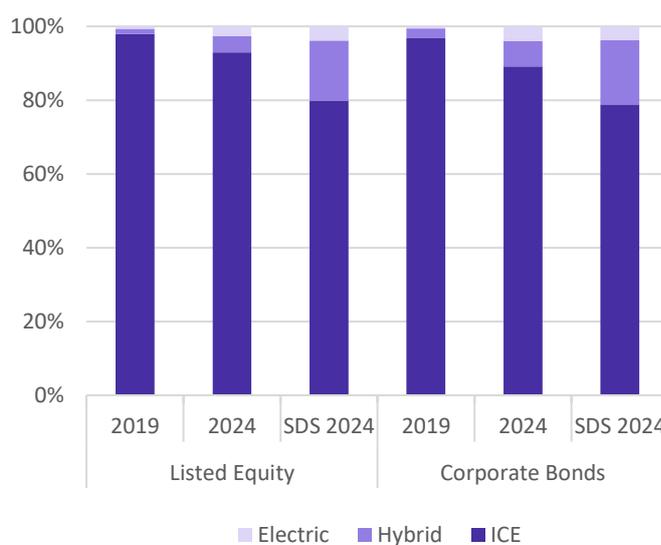


Figure 29: Current and future technology mix of the listed equity and corporate bond portfolios compared to a portfolio aligned with the SDS scenario. (Source: 2DII, based on AFS, Bloomberg)



The trajectory of ICEs in both the listed equity and corporate bond portfolios is currently compatible with a 2°C-2.7°C scenario. Both portfolios are investing in companies which plan to decrease their ICE production; however, the decrease is not as ambitious as the one required in a 2°C scenario. The portfolio is therefore potentially exposed to transition risk affecting ICE producers. For the portfolios to be aligned with a 2°C scenario trajectory, an additional decrease of 16% by 2024 would be needed in the corporate bonds and listed equity portfolio (see Figure 30 for listed equity results).

Insurers' portfolios are significantly mis-aligned with a 2°C scenario in the case of hybrid vehicles: the portfolios are following a trajectory of 2.7°C - 3.2°C. Both the listed equity and corporate bond portfolios are currently not adequately increasing the production of hybrid vehicles. For the portfolios to be aligned, an additional increase of 276% is needed in the listed equity portfolio by 2024 and of 138% in the corporate bond portfolio (see Figure 31).

Figure 30: Alignment of ICE's production in the listed equity portfolio relative to the IEA transition scenarios. (Source: 2DII, based on AFS, Bloomberg and IEA)

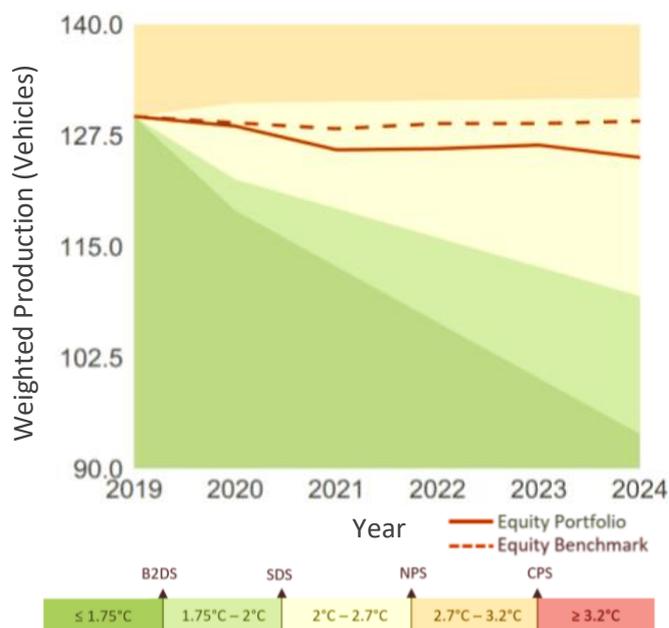


Figure 31: Alignment of hybrid vehicles production in the corporate bond portfolio relative to the IEA transition scenarios. (Source: 2DII, based on AFS, Bloomberg and IEA)

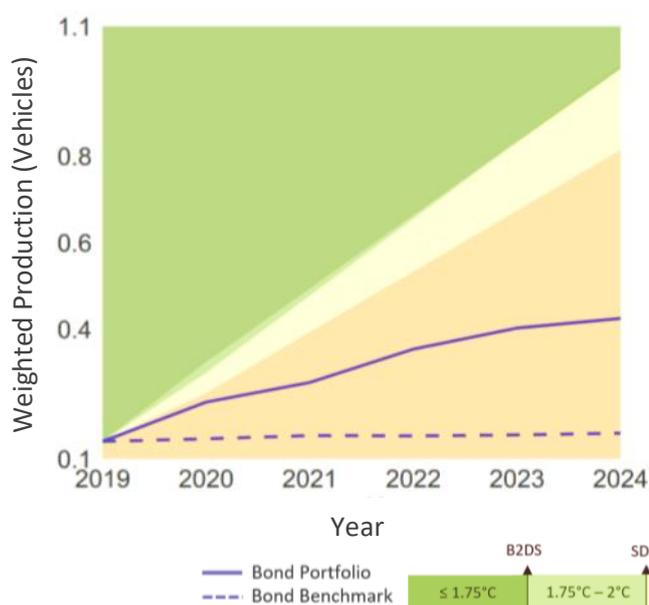
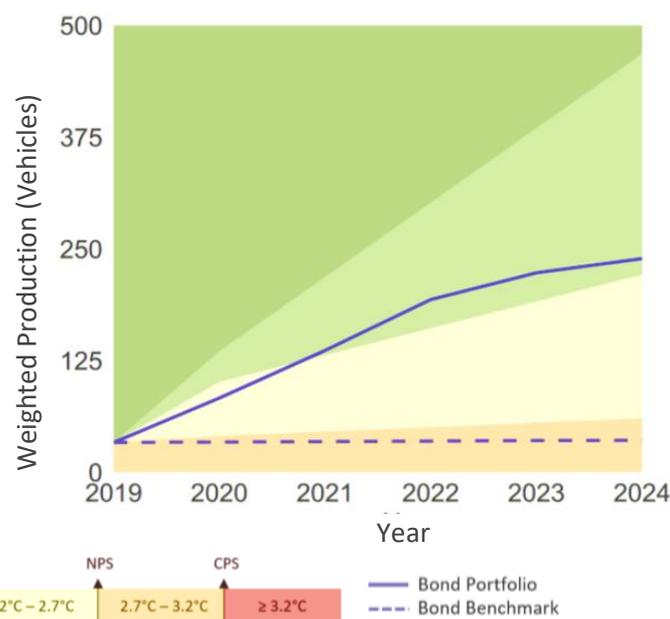


Figure 32: Alignment of electric vehicles production in the corporate bond portfolio relative to the IEA transition scenarios. (Source: 2DII, based on AFS, Bloomberg and IEA)



Insurers are, however, potentially seizing the opportunities that the low carbon economy will bring through electric vehicles. Both portfolios are investing in companies that are planning an increase in electric vehicles production, but only the corporate bond portfolio increase is as ambitious as the one required in a 2°C scenario (see Figure 32). The listed equity portfolio would need to additionally increase its production by 46%.

Differences among portfolios by insurance category and in the non-backed reserves. There is only one insurance category exposed to the auto sector, the non-life insurance. The exposure is however only present in the corporate bond portfolio. The non-backed reserves portfolio is also exposed to this sector. (see figure 33). The portfolios potential exposure to transition risk is therefore explained in the section above.

Differences between the international and national investments. The technology exposure and scenario analysis results presented above are driven by investments in instruments issued internationally (see Figure 34).

Differences among peers. Two types of peers' comparisons were carried out for this sector; a first one comparing the future exposure of insurers and Colombian pension funds, and a second one that compares insurance companies' exposure to the three technologies. The analysis finds that:

The future technology mix of insurers and pension funds in both the listed equity and corporate bond portfolios is very similar (see Figure 35). The share of ICEs ranges from 1-2% among investor portfolios, while the share of electric vehicles ranges from 2-3%. The main difference found is in the hybrid vehicles share of the corporate bond portfolios, where the insurers' portfolio has a slightly higher share (7%) than the pension fund (3%).

5 of the 44 insurers analyzed are exposed to the automotive sector. The dynamics among insurers are quite similar, as most of them are mainly invested in the same companies (see section 5 for more details). Of the 5 insurers, 4 are exposed to the sector through their corporate bond portfolio and 1 in its listed equity portfolio.

Figure 33: Technology breakdown comparison to corporate bonds and listed equity by insurers portfolios in the automotive sector, as a % of the portfolio. (Source: 2DII, based on AFS, Bloomberg)

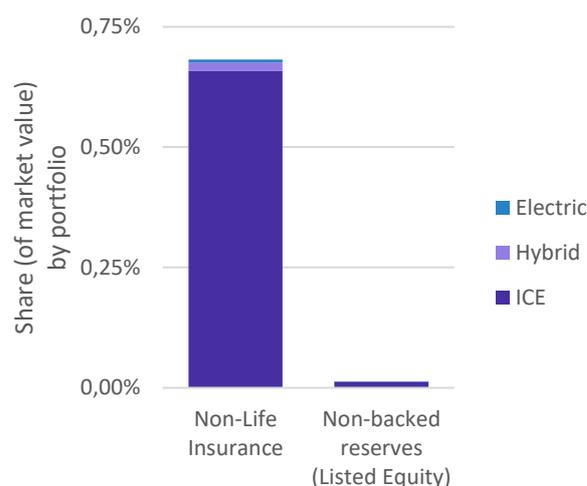


Figure 34: Technology breakdown comparison of corporate bonds and listed equity investments by location, as a % of the portfolio. (Source: 2DII, based on AFS, Bloomberg)

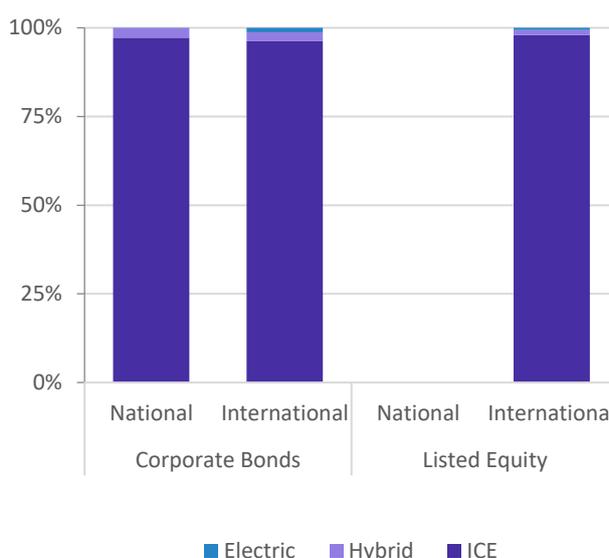
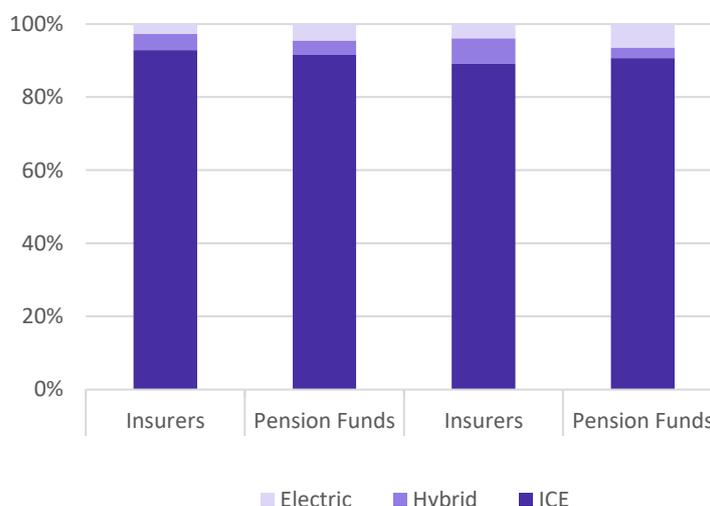


Figure 36 shows the increase in electric and hybrid vehicle production between 2024 and 2019, as a percentage of the net increase of vehicle production of investors' portfolios. Two insurers stand out as their portfolios' increase in production is over 200%, while the increase of the other insurers is below 100%. The percentage increase shown can be higher than 100% due to a decrease in the production of ICE vehicles which is higher than the increase of electric and hybrid vehicles production.

Figure 35: Insurers vs. pension funds future (2024) technology mix of listed equity and corporate bond portfolios. (Source: 2DII, based on AFS, Bloomberg)



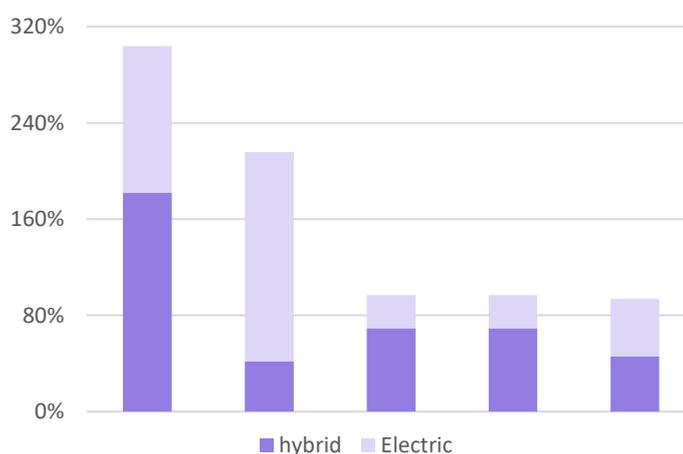
3.4. Scenario analysis results for non-road transport and industry.

There are a number of sectors where no commercially available CO₂-neutral or low-carbon technology has yet been identified in the 2°C scenarios of the IEA (not taking into account partial substitutes, such as wood for cement).

The focus in this section are three of these sectors: steel, cement, and aviation. Although PACTA also analyses the shipping sector, Colombian insurers portfolios are not exposed to this sector.

For these sectors, decarbonization efforts will be confined to the increasing efficiency in production and use, as well as investment in research and development in the next 5-10 years, in order to bring CO₂-neutral alternatives to market maturity in the medium term. As a result, both the scenarios and the data situation are relatively imprecise.

Figure 36: Electric and Hybrid Vehicles increase in production (2024 – 2019) as % of net increase in vehicles production by insurer. (Source: 2DII, based on AFS, Bloomberg)



These three sectors represent around 12% of the listed equity and 6% of the corporate bond portfolio. This section presents the benchmarking of the required portfolio reductions in real economic units, e.g. tons of CO₂ emissions divided by tons of cement. The required decarbonization trajectories are based on the Science-Based Targets (SBT) Initiative Sectoral Decarbonization Pathways, developed by WWF, WRI, and CDP and the IEA ETP 2017 B2DS scenarios.

The starting points of the figures presented here are based on bottom up CO₂ intensity estimates based on a publicly available emission estimation model developed by the 2° Investing Initiative together with the consulting company EY. Company level average intensities (by sector) are then calculated by simply weighting the asset intensities by their capacity/production or use, i.e. in the case of aircraft fleets. Company exposures then allow us to calculate sectoral emission intensity averages that reflect the investor's portfolio. The models combine information about each asset (such as technology, sub technology, age, location) with external literature on emission intensities. It should be noted that in the absence of better data, the models use regional or even global average data, which is associated with some uncertainties. The results should therefore be regarded as estimates. 2DII is currently working with banks and industry experts to improve the models.

The decarbonization trajectories are mapped specifically to each starting point of the respective portfolios. It should be noted that while all analysis presented in this section focuses on intensities, another driver of decarbonization is the actual volume of production. While this is not an explicit driver in the IEA scenario for cement, production of steel is around 27% lower in the B2DS (<1.75°C) scenario of the IEA relative to the baseline (RTS scenario) by 2060.⁶⁰ In aviation, the energy intensity by passenger km is expected to reduce by 36% by 2060.⁶¹

The results of the analysis find that:

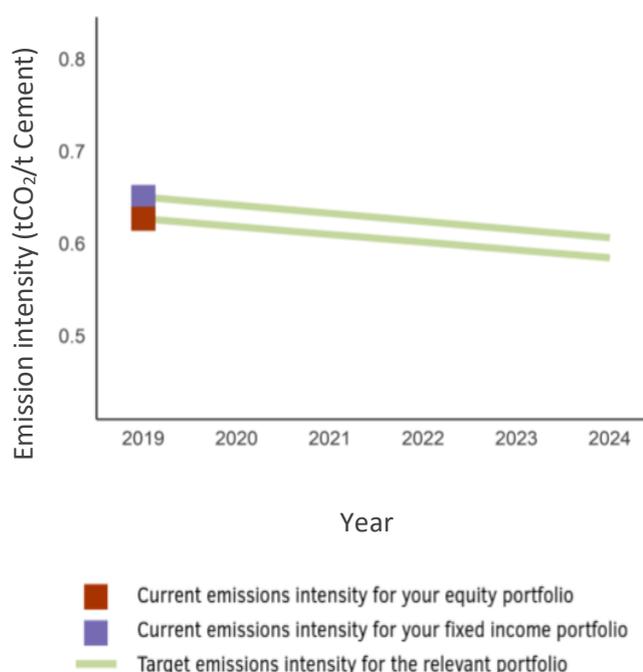
Relatively lower emissions intensity reductions are needed in the **cement sector**. Insurers need to decrease the emissions intensity of both their listed equity and corporate bond portfolio by around 7% by 2024 for their portfolios to be aligned with a <1.75°C scenario (Figure 37). The difference between the intensity of both portfolios are quite small.

31 of the 44 insurers are exposed to cement producers in either their listed equity or corporate bond portfolios.

Steel. Only the listed equity portfolio is exposed to companies in the steel sector. A decrease of 23% in the emissions intensity of this sector is required for the insurers' portfolio to be aligned with a <1.75°C scenario by 2024 (Figure 38).

Only one investor is exposed to steel producers.

Figure 37: Cement emissions intensity of the listed equity and corporate bond portfolios under a B2DS (<1.75°C) scenario. (Source: 2DII, based on Global Cement Directory, Bloomberg, and IEA)



⁶⁰ International Energy Agency, *Energy Technology Perspectives 2017*, 2017.

⁶¹ International Energy Agency, *Energy Technology Perspectives 2017*, 2017.

Aviation. Insurers need to decrease the emissions intensity of both their listed equity and corporate bond portfolio by around 15% by 2024 for their portfolios to be aligned with a <1.75°C scenario (Figure 38). The fixed income portfolio has a higher emissions intensity than the listed equity one.

15 of the 44 insurers are exposed to commercial aviation companies in either their listed equity or corporate bond portfolios.

As can be seen, the sectoral decarbonization pathways show limited action over a 5-year time horizon, with limited overall CO₂ reductions by 2024. Indeed, this shows the need for exploring other elements in the analysis, notably the deployment of R&D in the service of developing zero-carbon alternatives

Figure 38: Steel emissions intensity of the listed equity portfolio under a B2DS (<1.75°C) scenario. (Source: 2DII, based on Global Cement Directory, Bloomberg, and IEA)

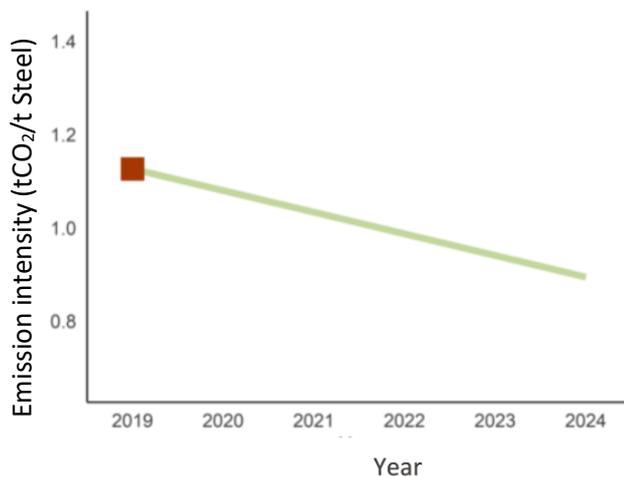
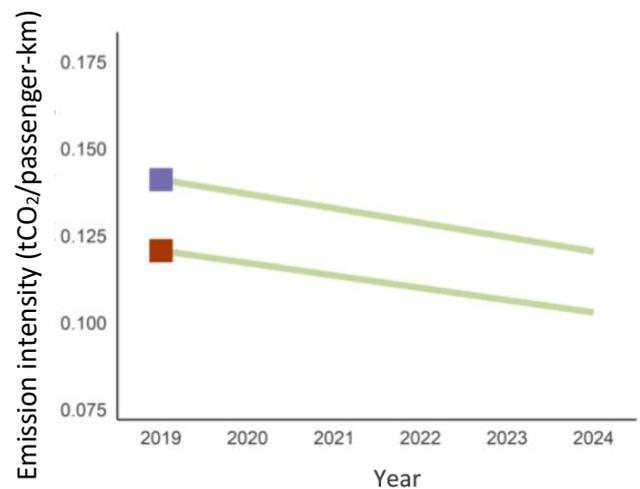


Figure 39: Aviation emissions intensity of the listed equity and corporate bond portfolios under a B2DS (<1.75°C) scenario. (Source: 2DII, based on Global Cement Directory, Bloomberg, and IEA)



- Current emissions intensity for your equity portfolio
- Current emissions intensity for your fixed income portfolio
- Target emissions intensity for the relevant portfolio

An aerial photograph of a city, likely Bogotá, Colombia, showing a dense urban area with various buildings and a prominent mountain in the background. A large, semi-transparent, stylized number '7' is overlaid on the right side of the image. The sky is blue with scattered white clouds.

Sovereign bonds exposure to climate- related risks

4. Sovereign bonds' exposure to climate-related risks

Physical and transition risk may affect sovereign bonds ratings and yields through changes in countries' institutional, economic and fiscal strength. Policy changes may also have an impact on ratings if countries fail to strengthen their climate change policies. Revisions of country outlooks addressing changes in policy have already taken place (e.g. S&P on Mexico due to changes in energy policy). Changes in ratings and yields may eventually lead to a drop in sovereign bond portfolios' value, or even a potential default at some point in the future.

Physical risk can impact sovereign bonds' value through a broad set of factors that influence sovereign bonds' ratings and thus yield, including:

- Institutional strength through government's capacity to deal with infrastructure damages, displaced population, etc. affected by extreme weather events, as well as their planning capacity in the light of climate-related incremental changes such as sea-level rise.
- Economic strength through decreased economic activity in sectors impacted by acute and incremental effects of climate change, which consequently has an impact on GDP.
- Fiscal strength through increased expenditures (social programs, reconstruction & mitigation costs, costs of displacement), decreased fiscal revenues due to lower economic activity, and increased cost of borrowing.

Transition risk can equally impact sovereign bonds value. A low carbon transition, if it isn't well designed and/or initiated early enough, can have severe implications for a country's economy – although less severe in the long run than taking no action to mitigate climate change.

The credit implications can be captured in a broad set of factors that influence sovereign bonds' ratings and thus yield, including:

- Institutional strength through the capacity of governments to build effective and predictable policies. A delayed transition would face higher challenges in design and implementation.
- Economic strength through lower revenues from high-carbon economic sectors having an impact on GDP. High GDP concentration in exposed sectors increases the sovereign bonds' susceptibility to transition risks.
- Fiscal strength through increased expenditures (green investments, social policies, etc.), decreased fiscal revenues due to lower economic activity of high-carbon sectors, and increased cost of borrowing.

4.1. Analysis of the exposure to physical and transition risks

This section presents the exposure to physical and energy transition risks of the issuers in the Colombian insurers' sovereign bond portfolio. For physical risk, it uses as proxy the Moody's country classification⁶² and for transition risks it uses as proxy the GDP dependency to high-carbon intensive industries and the related

⁶² Moody's Investors Service. 2016. Climate Change & Sovereign Credit Risk.

https://www.moodys.com/sites/products/ProductAttachments/Climate_trends_infographic_moodys.pdf

physical asset base for the different issuers in the portfolio. To contextualize the analysis, it considers the local regulatory limits in international sovereign bonds investments.

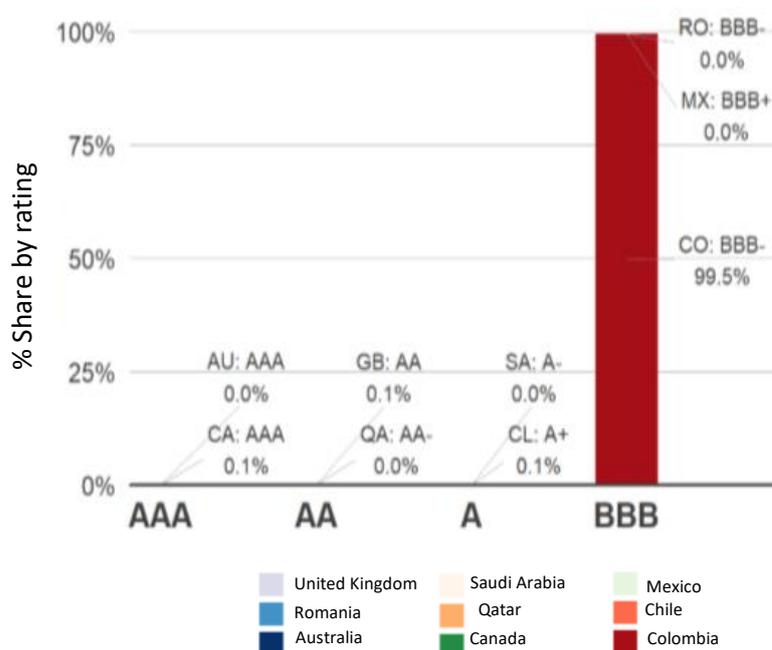
There are two channels through which physical and transition risks could impact sovereign bonds portfolios of Colombian insurers:

- i. changes in portfolio composition to comply with investment limits in case of a downgrade; and/or
- ii. changes in the sovereign bonds' portfolio value as a consequence of a market misprice of climate-related risks.

Figure 40 shows the breakdown of the sovereign bonds' portfolio by country and credit rating. Results show that insurers have almost all (99.5%) of their sovereign bonds investments in Colombian instruments.

Research shows that the impact of transition and physical risks could cause a decrease in the rating from 1-3 notches due to the economic dependency on high-carbon sectors and the effects of extreme weather events. To put this into context, we estimate that a downgrade of one or two notches would imply that 0.03% of foreign debt in the Colombian insurers' portfolio would have to be reallocated to comply with the investment requirements of the technical reserves, given that the Colombian regulation only allows for investments in foreign sovereign debt with a higher or equal rating than Colombian external debt.

Figure 40: Breakdown of the insurers' sovereign bonds portfolio by country and rating. (Source: 2DII, based on Global data)



The downgrade would therefore not have a major impact in the portfolio. A downgrade of three notches of the Colombian debt would mean that the debt rating would fall to non-investment grade or 'junk' debt, increasing the public borrowing costs and the default risk exposure of Colombian insurers' sovereign bond portfolio⁶³.

The materialization of physical and transition risks might therefore have a higher impact in terms of changes in the sovereign bond's portfolio 'value'. The analysis below shows the exposure of the issuers in the Colombian insurers' portfolio to both physical and transition risks.

Physical risks. No analytics currently exist to quantify the changes in ratings or yield that can be expected from climate change for the countries in the portfolio, but the susceptibility of these countries to being

⁶³ World Bank Group. 2016. *The ghost of a Rating Downgrade: What happens to borrowing costs when a governments loses its Investment grade credit rating?*. documents.worldbank.org/curated/en/241491467703596379/pdf/106667-NWP-MFM-Discussion-Paper-13-SARB-CreditRating-28-Jun-2016-PUBLIC.pdf

affected by climate change can be assessed using Moody’s heatmap. In 2016, Moody’s assessed the physical effects of climate change on sovereign issuers considering four primary channels:

- i. the potential economic impact (e.g. weaker activity due to a loss of agricultural production);
- ii. damage to infrastructure as result of the destruction incurred from climate shocks;
- iii. rising social costs (e.g. by food security concerns); and
- iv. 1population shifts due to forced migration resulting from climate change.

Figure 41: Susceptibility to being impacted by climate change of Colombia’s insurers sovereign bonds portfolio. (Source: 2DII, based on Moody’s)

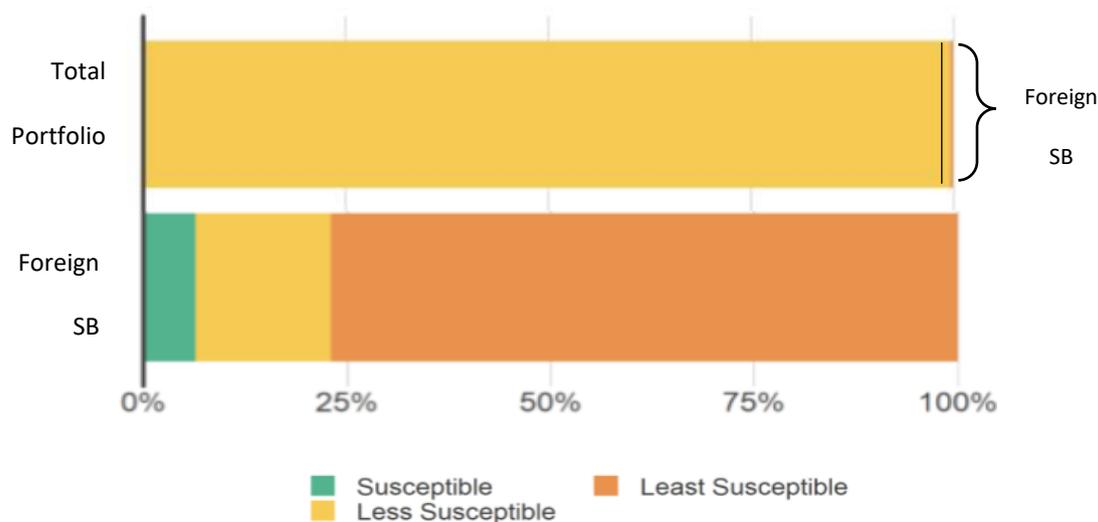


Figure 41 shows the physical risk exposure of the insurers’ sovereign bonds portfolio and the breakdown of foreign sovereign bonds following Moody’s classification. The analysis considers each country’s debt degree of susceptibility to climate change trends (e.g. temperature warming) and shocks (e.g. droughts, wildfires), and the AUM held in sovereign bonds of each country. The sovereign debt of Colombia is classified by Moody’s as less susceptible to the effects of physical risks, reason why the total portfolio is less susceptible. A closer look at the susceptibility of the foreign sovereign bond investments show that less than 10% of the investments are in sovereign debt that is susceptible to physical risks. These are investments in bonds issued by the government of Romania.

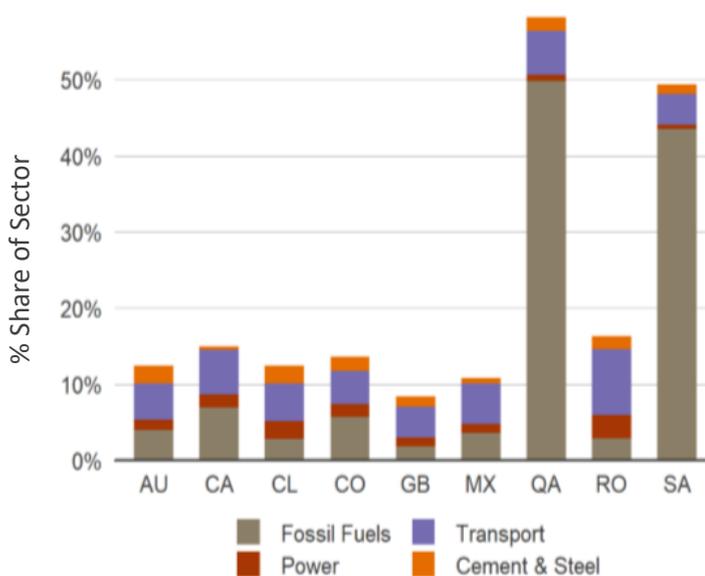
Transition risks. No analytics currently exist to quantify the changes in rating or yield that can be expected from a low carbon transition for the countries in the portfolio⁶⁴. However, the susceptibility of these countries to being downgraded due to a low-carbon transition can be gauged by looking at the dependency of the GDP on high-carbon intensive industries of the issuers in the portfolio.

⁶⁴ 2DII. 2019. *Storm Ahead: A proposal for a Climate Stress-Test Scenario*. https://2degrees-investing.org/wp-content/uploads/2019/02/Stress-test-report_V2.pdf

Countries with a higher share of carbon intensive industries would probably suffer from an energy transition. Indeed, a transition would impact levels of production (e.g. less oil will be produced, less gasoline vehicles constructed, etc.), the prices at which products are sold, and the expenditures that companies have to bear (e.g. high levels of carbon tax, high raw materials prices, etc.).

Figure 42 shows the GDP exposure to high-carbon sectors of the countries for which debt is held. Qatar and Saudi Arabia have by far the largest exposure to high-carbon sectors with at least 50% of their GDP. These are two economies that will suffer from the effects of the transition to the low carbon economy. Research done by 2DII finds that delayed climate action by countries in the Middle East could cause a 6.2% decrease in their GDP growth rate one year after action has been taken⁶⁵.

Figure 42: GDP exposure to high-carbon sectors (Source: 2DII, based on Global data)



AU-Australia, CA-Canada, CL-Chile, CO-Colombia, GB-Great Britain, MX-Mexico, QA-Qatar, RO-Romania, SA-Saudi Arabia

On the other hand, around 12% of Colombia’s GDP is exposed to high-carbon sectors. The sectors that have the highest share are fossil fuels and transport. The exposure might seem low in aggregate; however, the sectoral losses can be quite significant. Research done by 2DII shows that the South American oil sector could lose 74% of its value added by 2040⁶⁶.

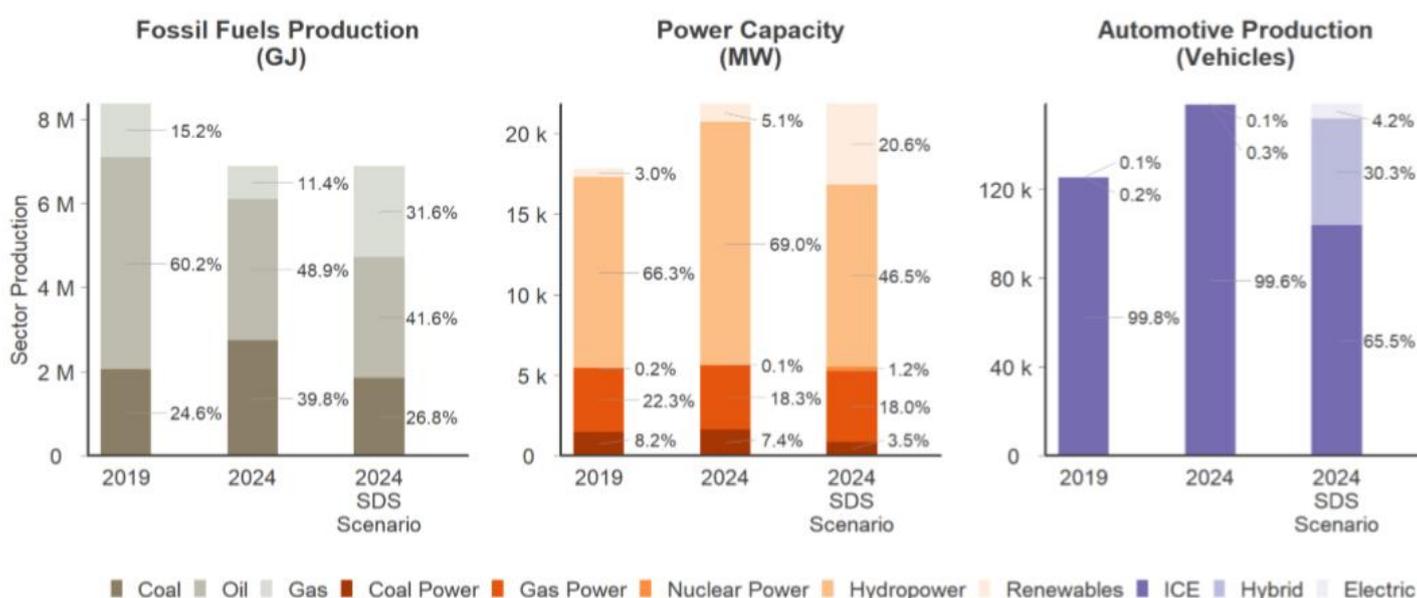
A technology exposure and technology production growth analysis can provide further insights on the susceptibility of countries to transition risks. It allows us to understand if economies are adapting their technology mix to the transition to a low carbon economy by looking at the decrease/increase in production of high carbon/low carbon technologies. Figure 43 shows the estimated current and future production and the related technology mix for the fossil fuels, power, and automotive sector of the Colombian insurers’ sovereign bond portfolio. The results are a function of the weight of each issuing country in the portfolio and the current revealed investment and production plans of the companies in each country. Since 99.5% of investments are in Colombian debt, the results below are driven by the changes in the production and investment plans of the companies operating in the country. The results are equally compared to a regional scenario under an SDS (2°C) transition in 2024.

⁶⁵ Idem.

⁶⁶ Idem.

Figure 43 shows that companies' operating in the countries for which insurers held sovereign bonds are not necessarily changing their investments plans in a way that is consistent with a 2°C scenario (SDS). In the case of fossil fuels, there is an important decrease in oil and gas production plans in 2024. However, there is an equally important increase of coal mining. In addition, the technology mix is not in line with the one required in a 2°C by 2024. For the portfolio to be aligned with a 2°C scenario, the countries would need to reduce the share of coal mining by 13%. Therefore, this means that the portfolio is potentially exposed to transition risks affecting the fossil fuel sector that may have implications in sovereign debt ratings and yields.

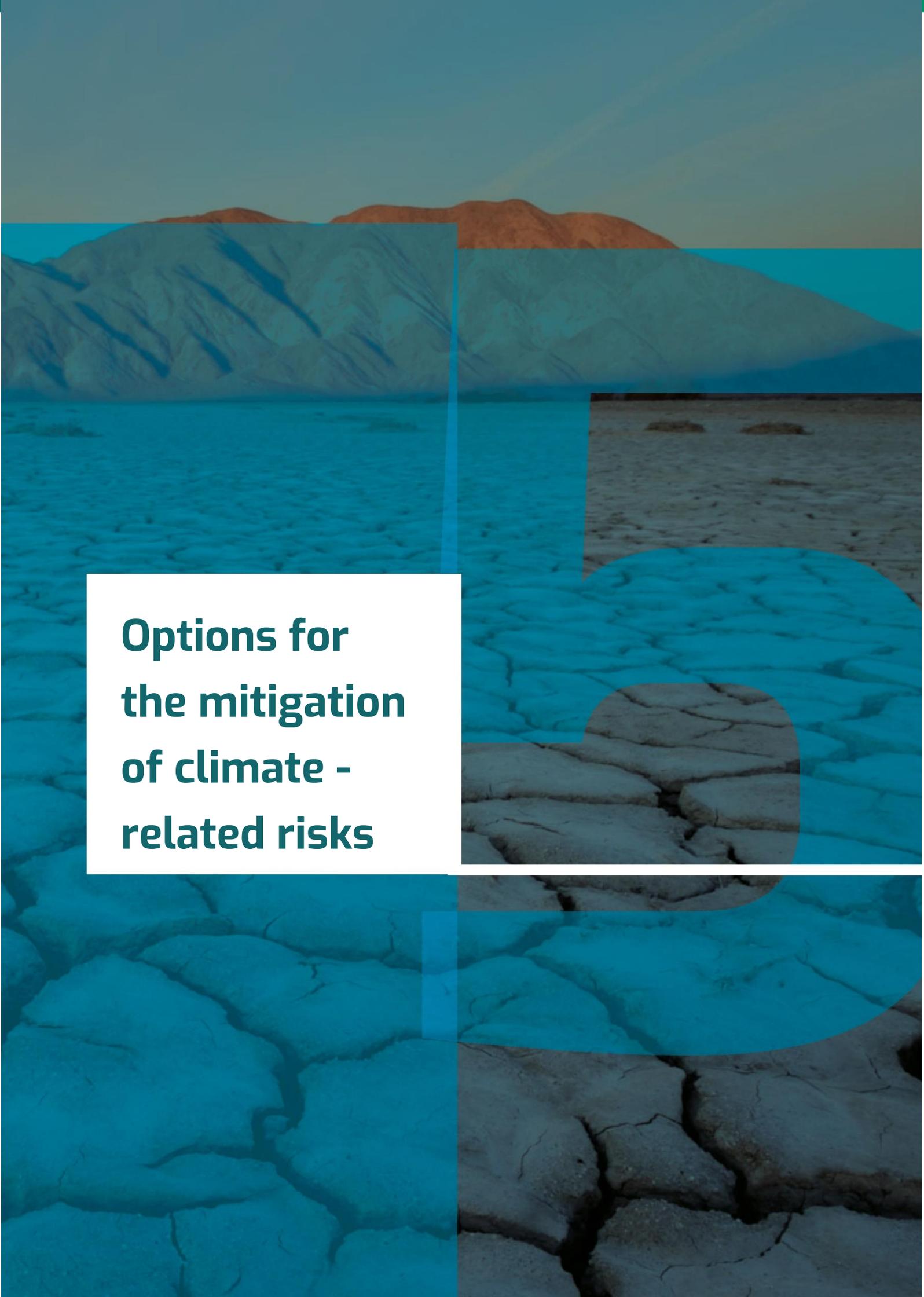
Figure 43: Estimated current and future production and technology mix for the fossil fuels, power and automotive sector in the sovereign bonds portfolio (Source: 2DII, based on Global Data, Bloomberg, and IEA)



In the case of the power sector, there is an increase in the capacity from low carbon technologies, namely hydro and renewables, while the capacity from high-carbon technologies remains constant. However, the portfolio is not aligned with a 2°C scenario in 2024, especially due to the lower share of renewables and the need to reduce the share of coal capacity by nearly 4%.

Lastly, the automotive sector is increasing its ICE production, while in the transition to a low carbon economy a decrease should be seen. The related technology mix is not compatible with a 2°C scenario in 2024 as companies in countries in which debt is held are not planning to increase the share of hybrid and electric vehicle production. An increase of around 34% in the share of both technologies is needed for the mix to be aligned with a 2°C scenario. There is therefore a potential exposure to transition risks.

The previous results should be taken as an indicator that current policy and the local market conditions do not suffice to foster an ambitious transition. A lower share of low carbon technologies in 2024 compared to the share in the SDS implies that current policy and market conditions are not favorable enough to push the industry to align with a 2°C.



**Options for
the mitigation
of climate -
related risks**

5. Options for the mitigation of climate-related risks

5.1. Mitigating climate-related risks in the listed equity and corporate bond portfolios

The results demonstrate that the listed equity and corporate bond portfolios exposure to transition risks of the Colombian insurance sector varies by insurance category type and according to the location of the instruments they are investing in. This notably has implications in the exposure of the different insurance companies.

Portfolio results differ both in terms of their aggregate exposure and misalignment to the 2°C benchmark. Some portfolios are already consistent with the Paris Agreement (e.g. oil & gas production in the listed equity portfolio, and hydro and gas power capacity in the corporate bond portfolio), whereas others are far from this benchmark (e.g. renewable power capacity in the listed and corporate bond portfolio and coal production in the corporate bond portfolio). Failure to align can potentially result in financial risks as discussed in section one of this report.

There is no one size fits all solution for the mitigation of climate-related risks. Depending on the investor's views, a number of different actions may be relevant:

- Investors may find that their portfolio appears to be consistent with the Paris Agreement for the asset class and technologies analyzed and are happy with this outcome, thus no specific action may be required.
- Investors may find that their portfolio is consistent with a high carbon, '2.7-3.2°C scenario' or more but see this as the most likely and least-risk outcome and thus choose to do nothing.
- Investors may find that their portfolio is consistent with a high carbon scenario but believe that the global economy will not shift. In this case, strategies may involve either switching to alternative passive index funds that weight in potential transition risks (e.g. S&P 500 carbon price risk 2030 adjusted index), to engage with companies to persuade them to shift their strategy with one consistent with a low-carbon economy, or to carry out other responsible investment strategies such as exclusion or best in class selection.
- Investors may find that their portfolio appears to be consistent with the Paris Agreement for the asset class and technologies analyzed but are also looking to have a concrete impact on the achievement of climate goals. Thus, further actions may be required. These actions may be also driven by the desire to limit long-term risks to their assets under management associated with a 3.2°C global warming and associated physical risks.

However, before considering any action, the investor first needs to identify which companies are contributing to a higher exposure to climate-related risks. In order to do this, relevant company-level data is needed.

As part of the scenario analysis exercise, 2DII provided to the Colombian insurance companies, issuer by issuer information that helped to identify which issuers were contributing the most to the portfolio (mis)alignment in the power, fossil fuels and automotive sector. At the aggregate macro level, the analysis showed that in climate-related sectors in which there is significant exposure, the results are driven by the

investment and production plans of a few local companies, while in sectors with a low exposure, the results are explained by a set of companies in which insurers invest in through open-end or exchange-traded funds.

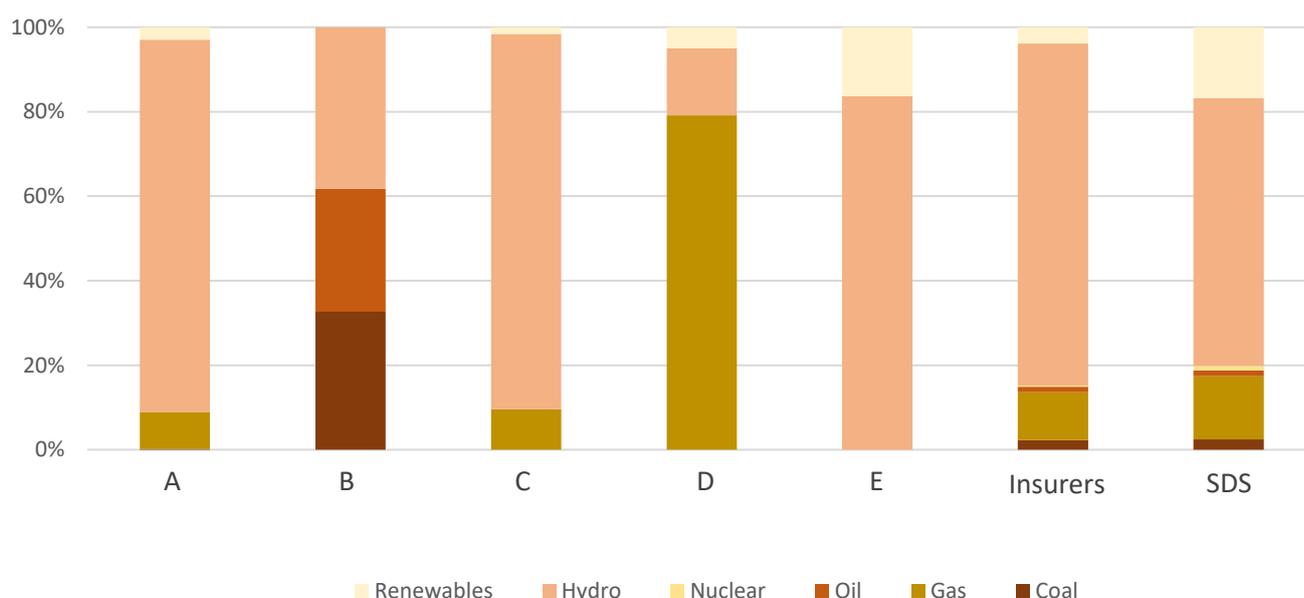
Oil & Gas sector. Ecopetrol represents around 5.9% of the corporate bonds’ portfolios and 7.1% of the listed equity investments. Insurers are exposed to other oil & gas companies however their weight in the portfolios is negligible (<0.5%) when compared to Ecopetrol.

The scenario results for this sector are therefore largely driven by the production plans of Ecopetrol, which by the end of 2018 were in line with the production levels required under a 2°C scenario. However, these plans are not substantiated on factors related to climate change. Analysis made by the Carbon Tracker Initiative in 2019 showed that 10% to 20% of Ecopetrol’s upstream capital expenditures might be outside of the SDS scenario⁶⁷. This is therefore an important point to insurers as it means that some of Ecopetrol’s assets might become stranded in the long-term. This becomes even more relevant as Ecopetrol announces that its 2020 investment plans will involve capital expenditures between \$3.3 billion and \$4.3 billion⁶⁸.

Coal mining. Investments in coal mining companies are mainly done through funds. Part of the exposure in coal mining comes from investments in companies that are not listed in Colombia, but which have production in the country (e.g. Glencore, BHP Billiton), as no coal company operating in Colombia has issued financial instruments.

Power utilities. Investments in this sector are concentrated mainly in five companies: Empresas Públicas de Medellín (EPM), Celsia Sa, Isagen, Emgesa and Empresa de Energía del Pacífico (EPSA). All five companies are in the corporate bond portfolio and make up for around 16% of the portfolio. EPM is the company with the highest weight with 7.5% of the portfolio. Investments of the listed equity portfolio are mainly in Celsia Sa with 5.1% of the total listed equity portfolio.

Figure 44: Technology mix (2024) of selected Colombian utility companies compared to the corporate bond portfolio and a portfolio aligned with the SDS scenario. (Source: 2DII, based on Global Data, Bloomberg, and IEA)



⁶⁷ <https://carbontracker.org/reports/2-degrees-of-separation-transition-risk-for-oil-and-gas-in-a-low-carbon-world-2/>

⁶⁸ <https://af.reuters.com/article/idINL1N2CU1H8>

Due to the concentration of investments in these five companies, any changes in their investment plans will therefore have a potential impact on the alignment of insurers portfolios. As of end 2018, EPM was the only company planning to increase its capacity generation in the next five years, focusing on hydro generation. This therefore means that at that point in time none of these companies were supporting the renewables capacity additions the portfolio requires for it to be aligned with a 2°C scenario (see Figure 8 for the case of corporate bonds).

Figure 44 compares the technology mix the of five companies with the technology mix of the corporate bond portfolio and an SDS aligned portfolio. Results show that the only company that has a significant share of renewables is company E, while company B is the main company that is contributing to the portfolios coal and oil exposure. Company B could potentially be exposed to transition risk as coal and oil capacity is set to decrease in the transition to a low carbon economy.

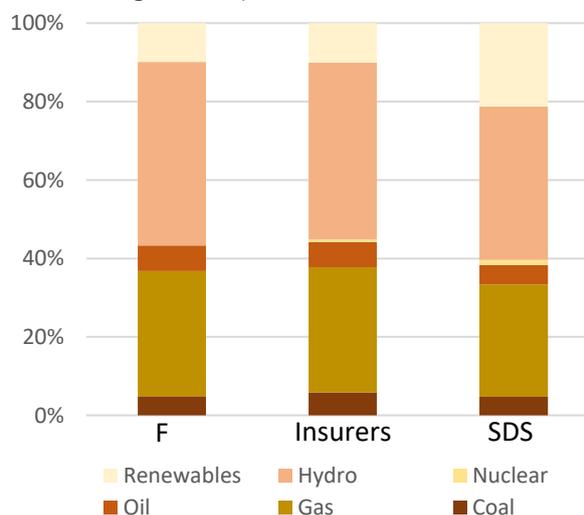
For the portfolio to be aligned with a 2°C scenario, all companies but EPSA should increase their renewables share (considering there is not a change in portfolio allocation).

Likewise, figure 45 does the same comparison but for listed equity. Celsia accounts for around 98% of the total investments in power generation producers, thus the portfolio results are driven by this company’s investment plans. Figure 45 shows that for the portfolio to be in line with the energy mix of a 2°C scenario, Celsia would need to increase the share of renewables by 11%, decrease the share of gas by 3% and that of oil by 1%.

Cement. Cement producer Argos and its parent company Grupo Argos make up 100% of the investments in cement producers of the corporate bonds’ portfolios and around 90% of the listed equity portfolio. Any reduction or increase in the emissions intensity of their manufacturing process will therefore have a significant impact in both portfolios’ alignment

Automotive. Investments in this sector are concentrated in five multinational companies, namely, Ford Motors Co, Daimler AG (DAIGR), BMW, Volkswagen (VW) and General Motors. General Motors is the only company that is only present in the listed equity portfolio, while the other four are present in both the corporate bonds and listed equity portfolios. There are listed equity investments in other companies, but these are mainly through funds.

Figure 45: Technology mix (2024) of selected Colombian utility companies compared to the listed equity portfolio and a portfolio aligned with the SDS scenario. (Source: 2DII, based on Global Data, Bloomberg, and IEA)



Even though investments in these companies represent around 0.01% of the listed equity and 0.12% of the corporate bonds’ portfolio, any changes in the production plans of these five companies will have a potential impact on the alignment of the insurers’ portfolios with the 2°C scenario.

Figure 46 compares the technology mix in 2024 of the companies in the corporate bond portfolio with the technology mix of the portfolio and an SDS aligned portfolio. Companies alignment with the technology mix of an SDS scenario portfolio is different; for example, company G and I need to increase their share of electric vehicles, while H and G need to increase their share of hybrid vehicles. However, all companies have a higher share of ICEs than the SDS which means that all might be potentially exposed to transition risks.

Figure 47 shows that for the insurers portfolio to be aligned with a 2°C scenario, the share of hybrid vehicle would need to increase by 10% and decrease its ICE share by the same percentage. If we consider no changes in the portfolio allocation, this means that all these companies would need to increase their hybrid vehicles share by at least 10% by 2024.

Likewise, figure 47 does the same comparison but for listed equity, it only shows the technology mix of General Motors as the technology mix of the other four companies remains largely unchanged. General Motors would need to increase its share of hybrid vehicles by 14% and that of electric vehicles by 1% for its technology mix to be consistent with that of the portfolio in a 2°C scenario.

Once investors have identified the companies that contribute the most to the (mis) alignment results. The next logical step is to understand which climate-risk mitigation action is more relevant to take considering its levers of influence on the company’s actions and strategy. There are several levers of influence. The most commonly used ones are the voting power and the amount of capital provided to the company. However, there are also options for investors which do not have significant levers of influence. These investors can join collaborative engagement initiatives,

Figure 46: Technology mix (2024) of selected automotive companies compared to the corporate bond portfolio and a portfolio aligned with the SDS scenario. (Source: 2DII, based on AFS, Bloomberg, and IEA)

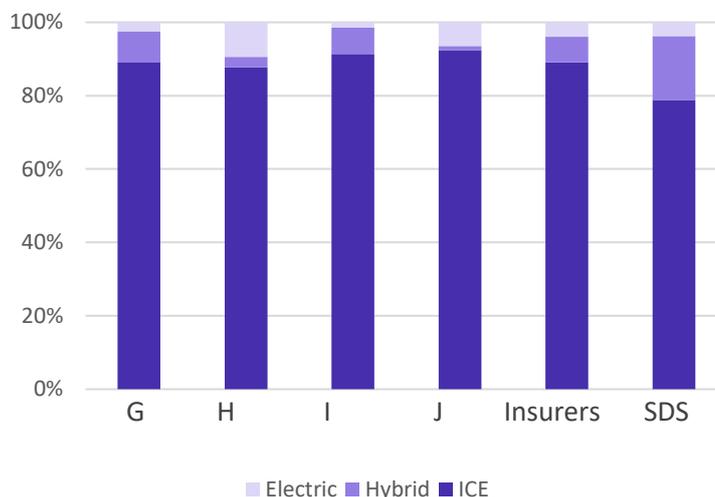
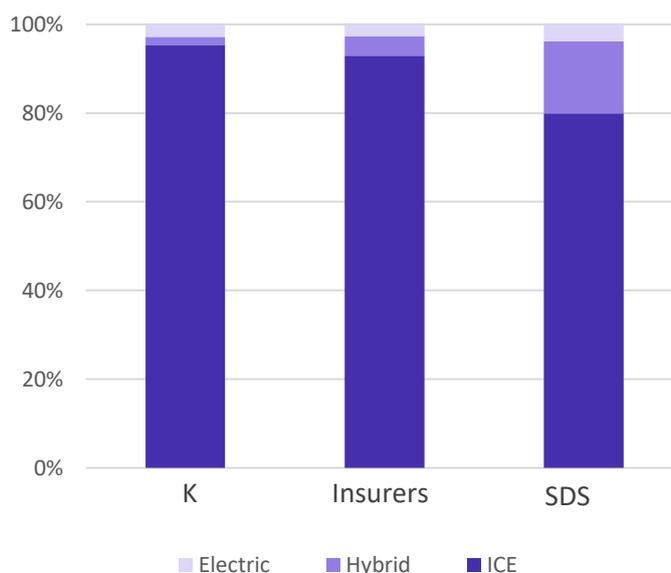


Figure 47: Technology mix (2024) of automotive companies compared to the listed equity portfolio and a portfolio aligned with the SDS scenario. (Source: 2DII, based on AFS, Bloomberg, and IEA)



such as Climate Action 100+⁶⁹, that represent a group of investors working towards a same objective that incentives behavioral change from companies.

The general recommendation to insurers participating in the study is therefore to start thinking about potential climate actions they can take and to reach out to network coalitions such as Principle for Responsible Investment (PRI) to learn more about what can be done at individual and collective level.

5.2. Mitigating climate-related risks in the sovereign bond portfolio

The management of climate-related risks in sovereign bond portfolios is rather limited. The main climate actions considered in these portfolios are generally engagement or divestment. Engagement in sovereign bonds on climate topics (or other sustainability topics) generally consists of establishing a dialogue with the issuer. This action is associated with high burdens in terms of coordination and resources engaged due to the number of parties involved (e.g. different local ministries) and diverging priorities, and with very little impact. This dynamic notably diminishes the risk mitigation potential in this asset class and often pushes investors towards the divestment of risky assets leading to a risk transfer rather than de-risking an economy. To our knowledge, there is no public evidence on results (e.g. change in policies) of government engagement on climate-related topics other than specific engagement on green bonds issuance.

⁶⁹ Climate Action 100+ is [an investor initiative focusing on shareholder engagement requesting world's largest corporate greenhouse gas emitters to take necessary action on climate change.](#)



Conclusions and Recommendations

6. Conclusion and Recommendations

The results presented here represent the first effort made in Latin America to systematically measure the potential exposure to transition risks of the financial sector in the region. They provide evidence to Colombian insurers about their potential exposure to these risks as well as the companies that are contributing to them. It is a starting point on the measurement of climate-related risks that enables the monitoring of the exposure to these risks over time. In particular, the analysis shows that:

The power sector is the climate-relevant sector with the highest share in the insurers' portfolio, representing around 12% of the listed equity and 30% of the corporate bond portfolio. The power sector exposure shows a larger proportion of low-carbon technologies than high-carbon technologies. This is mainly driven by the share of hydropower.

However, insurers' portfolios might be exposed to transition risks as companies in the portfolio are failing to reduce oil and coal power capacity plans over the next 5 years. Capacity plans of those technologies is set to decrease in the transition to a low carbon economy. The portfolios for these technologies are compatible with a >2°C scenario. On the other hand, the failure to increase the capacity of renewable energy sources shows that at the moment the portfolio is not seizing the opportunities that arise from the transition, as both listed equity and corporate bond portfolios' trajectories are consistent with a >3.2°C scenario. This means that, for the moment, the potential loss in returns that carbon-intensive energy could bring, will not necessarily be offset by the potential increase in returns that renewable energy can bring.

The fact that the trajectory of the corporate bond portfolio in the case of hydroelectric power is aligned with a <1.75°C scenario and that this technology has a large weight in the portfolio, may compensate for possible losses. However, this is not the case of the listed equity portfolio.

The fossil fuel sector is the second largest climate-relevant sector in the insurers' portfolio. Insurers are potentially not exposed to transition risks affecting oil & gas companies as their portfolio trajectories are compatible with a <1.75°C scenario due to a significant decrease in the production of oil & gas in the next five years.

Nevertheless, insurers are potentially exposed to transition risks in coal mining, despite the low proportion of their weight in the corporate bond portfolio, as companies in the portfolio, are planning to increase their production in the next 5 years, while in a 2°C scenario production should increase. This exposure comes from investments abroad from the non-backed reserves and the non-life insurers' corporate bond portfolios.

The automotive sector is one of the climate-relevant sectors with the lowest share in the insurers' portfolio. The results show that insurers are potentially seizing the opportunities that the low carbon economy will bring through electric vehicles as they are investing in companies which are planning to increase their electric vehicle production in a magnitude that is compatible with a 2°C scenario. Nevertheless, this is not the case for hybrid vehicles. On the other hand, insurers are potentially exposed to transition risks affecting the production of ICEs vehicles of their investee companies, as both their listed equity and corporate bond portfolios are currently not compatible with a 2°C scenario. Investment in this sector are mainly in international companies in the non-backed reserves and the non-life insurance portfolios.

For the steel, cement and aviation sectors, where there is no commercially available CO₂-neutral or low-carbon technology, there is a potential exposure to transition risks from all three sectors as the emissions intensity of the sectors today differ significantly from the emission intensity required in a <1.75°C scenario.

Cement is the sector where less effort is needed to decrease its emissions as both their listed equity and corporate bond portfolio need a decrease of 7% by 2024 to achieve a <1.75°C scenario. The steel and aviation sectors require a decrease in their emissions intensity of 15% and 27%, respectively. Nevertheless, as both the scenarios and the data situation are relatively imprecise, due to data uncertainties, results for these sectors should be taken as indicative.

More importantly, the results of the study demonstrate the need to develop climate strategies to help mitigate potential exposure to climate-related risks. This study sheds light on the different avenues and identifies the companies with which investors could exercise their influence. In terms of future actions by financial market actors, it helps define the point of departure for these actors in terms of potential strategies to align their portfolios with climate goals, should they desire to pursue this strategy either individually or collectively. In terms of practical next steps, the study calls for insurers to:

1. Build capacities on how to integrate climate change in investment practices.
2. Identify the potential climate-related risks (both physical and transitional) they might be exposed to. The results presented here shed light into their possible exposure to transition risks.
3. Assess their exposure to climate-related risks. As part of the scenario analysis project between FASECOLDA and 2DII, insurers received their individual PACTA scenario analysis results. We however recommend testing other tools available to further inform decision making⁷⁰. In 2021 FASECOLDA and 2DII will continue its partnership to monitor the changes in the scenario analysis as well as measure the resilience of insurers portfolios to climate change through the application of a stress test.
4. Mitigate and monitor their exposure to climate-related risks. The results indicate a need to develop climate strategies to mitigate these risks. In terms of future actions, the information provided at both portfolio and company level, helps define the point of departure for these actors in terms of potential strategies, should they desire to pursue strategies individually or collectively.
5. Join national or international initiatives that seek to improve current practices on the identification, assessment, mitigation, and disclosure of climate related risks, such as the Task Force on Climate-related Disclosures or Climate Action 100+^{71 72}.

This study equally informs the strategy and workplan of the Colombian Financial Superintendence, which has prioritized transparency about environmental risk by financial institutions.

The analysis provided here could also help to move forward the discussion on reporting under Art. 2.1c of the Paris Agreement, creating the capacity to track progress among financial market actors over time. It

⁷⁰ Principles for Responsible Investment. <https://www.unpri.org/climate-change/directory-of-climate-scenario-tools/3606.article>

⁷¹ Task force on climate-related disclosure. <https://www.fsb-tcfd.org/>

⁷²Climate action 100+. <http://www.climateaction100.org/>

can also help identify whether, ultimately, investment and production plans evolved to align with the well below 2°C climate goal – setting the basis for a global capital transition consistent with the Paris Agreement.

Annex 1: Insurance categories classification

Category	Line of business
LIFE INSURANCE	Group Life
	Individual Life
	Unemployment
	Collective Life
	Personal accident
	Health
	Education
	Funeral
	Critical Illness
SOCIAL SECURITY INSURANCE	Workers' compensation
	Social Security
	Pension insurance (Act No. 100 - 1993)
	Additional Voluntary Contributions (AVCs)
	Periodic Economic Benefits (BEPS in Spanish)
	Annuities
	Trust property
	Pension risk transfer
NON- LIFE INSURANCE	Vehicle
	Marine hull
	Compulsory Traffic Accident Insurance (SOAT in Spanish)
	Aviation
	Cargo
	Fire
	Earthquake
	Glass breakage
	Theft
	Loss of income
	Fidelity
	Loan protection
	Export credit
	Surety bonds
	Liability
	Contractors all risk
	Electronic equipment
	Mining and oil
	Home
	Crop and livestock
Machinery breakdown	

Annex 2: Companies covered in the study

Group Name		Companies		
		General	Life	Cooperative
1	Allianz	Allianz Seguros S.A.	Allianz Seguros de Vida S.A.	
2	Aurora		Compañía de Seguros de Vida Aurora S.A.	
3	AXA Colpatría	AXA Colpatría Seguros S.A.	AXA Colpatría Seguros de Vida S.A.	
4	BBVA	BBVA Seguros Colombia S.A.	BBVA Seguros de Vida Colombia S.A.	
5	Berkley	Berkley International Seguros Colombia S.A.		
6	BMI		BMI Colombia Compañía De Seguros De Vida S.A.	
7	Bolívar	Seguros Comerciales Bolívar S.A.	Compañía de Seguros Bolívar S.A.	
8	Cardif	Cardif Colombia Seguros Generales S.A.		
9	CHUBB	Chubb Seguros Colombia S.A.		
10	COFACE	Coface Colombia Seguros de Crédito S.A.		
11	Colmena		Compañía De Seguros De Vida Colmena S.A.	
12	Confianza	Confianza Compañía Aseguradora de Fianzas S.A.		
13	Global		Global Seguros de Vida S.A.	
14	Equidad		La Equidad Seguros de Vida Organismo Cooperativo	La Equidad Seguros Generales Organismo Cooperativo
15	HDI	HDI Seguros S.A.	HDI Seguros De Vida S.A.	
16	JMALUCELLI	Jmalucelli Travelers Seguros S.A.		
17	Liberty	Liberty Seguros S.A.		
18	Mapfre	Mapfre Seguros Generales De Colombia S.A.	Mapfre Colombia Vida Seguros S.A.	
19	Metlife		Metlife Colombia Seguros De Vida S.A.	
20	Mundial	Compañía Mundial de Seguros S.A.		
21	Nacional	Nacional de Seguros S.A.		
22	Pan American		Pan American Life de Colombia Compañía de Seguros S.A.	
23	Positiva		Positiva Compañía de Seguros S.A.	
24	Previsora	La Previsora S.A. Compañía de Seguros		
25	SBS	SBS Seguros Colombia S.A.		
26	Segurexpo	Segurexpo de Colombia S.A.		

27	Solidaria			Aseguradora Solidaria de Colombia Ltda. Entidad Cooperativa
28	Alfa	Seguros Alfa S.A.	Seguros de Vida Alfa S.A. Vidalfa S.A.	
29	Estado	Seguros del Estado S.A.	Seguros de Vida del Estado S.A.	
30	Suramericana	Seguros Generales Suramericana S.A.	Seguros De Vida Suramericana S.A.	
31	Skandia		Skandia Compañía de Seguros de Vida S.A.	
32	Solunion	Solunion Colombia Seguros De Crédito S.A.		
33	QBE	Qbe Seguros Colombia		
34	Zurich	Zurich Colombia Seguros S.A.		