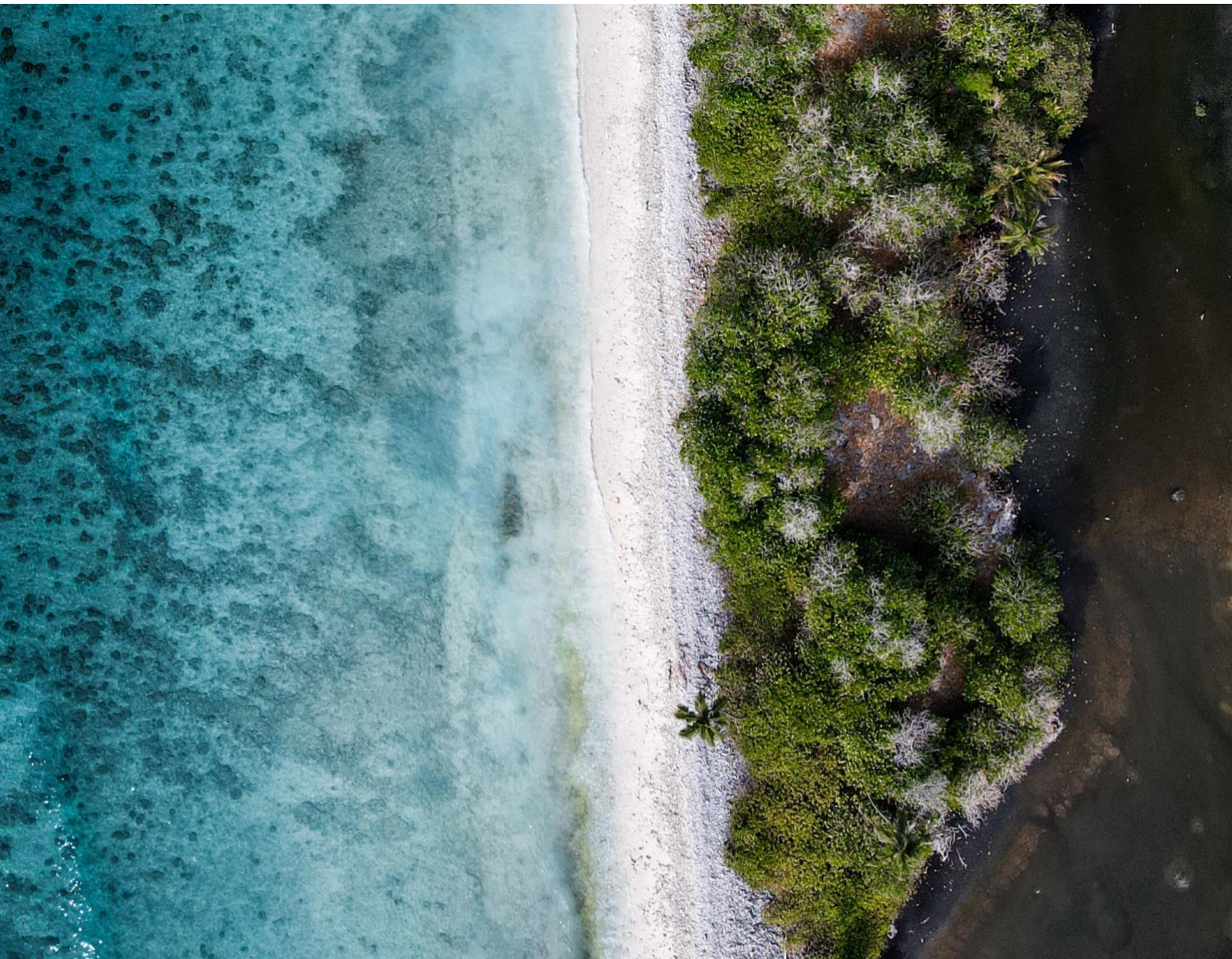
PACTA
Paris Agreement Capital Transition Assessment

2° Investing Initiative

TOWARDS THE NET ZERO TARGET

Assessing the alignment of Colombian Bank's lending portfolios to Climate Change scenarios

March 2023



Authors

Nayra Herrera, Daisy Pacheco and Antoine Lalechere.

Contributing Authors (in alphabetical order)

Nicholas Dodd, George Harris, Sarah LaMonaca, Sarah Mendelsohn.

About PACTA

Building off a vast climate-related financial database, the PACTA tool aggregates global forward-looking asset-based company data (such as the production plans of a manufacturing plant over the next five years), up to the parent company level. The tool then produces a customized, confidential output report, which allows financial institutions to assess the overall alignment of their portfolios with various climate scenarios and with the Paris Agreement. This report is part of the PACTA Coordinated Projects (PACTA COP): our dedicated program in which we work together with individuals, trade associations or groups of governments and supervisors to help them apply PACTA to the portfolios of their regulated entities.

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1. Introduction

According to the Intergovernmental Panel on Climate Change (IPCC), **human influence has warmed the climate at an unprecedented rate over the last 2000 years**.[i] **Many of the climate changes already triggered - such as increased storms, droughts, and sea level rise - are irreversible over hundreds or thousands of years. To have a reasonable probability of keeping warming to well below 2°C and ideally 1.5°C, the latest report from the UNFCCC (United Nations Framework Convention on Climate Change) shows that emissions will need to decline by 45% by 2030 compared to 2010.** Unfortunately, based on an aggregated analysis of the most recent Nationally Determined Contributions of the 191 signatories of the Paris Agreement, emissions are expected to rise by 16%.[ii] Although society and the different economic sectors are now aware of the need to take action to curb global warming, and the need to accelerate the transition, **adaptation policies and country goals are not yet sufficient to achieve the 2030 objectives**.[iii]

According to the "Departamento Nacional de Planeación (DNP)" (Colombian administrative agency responsible for defining, recommending, and promoting public and economic policy), the effects of climate change could affect Colombia's GDP by up to 4.3% of losses. To protect against this outcome, the Colombian government has been working on a National Climate Finance Strategy, which presents the Government's plans to deploy the resources required to close the gaps for financing the country's climate goals. According to the DNP, in the last 10 years, 24 trillion pesos (around 5 billion USD) have been mobilized for climate action in Colombia, and 72% of that investment between 2011 and 2021 came from public sources[iv]. Nevertheless, commitments from corporates are still needed to reduce emissions to the required levels. Furthermore, **for companies to be resilient in the face of the required changes, they need the support of financial institutions and investors who see the upside opportunities that this transition brings and who can then support companies in these initiatives, as significant capital investments will be required to move into clean energy, new forms of mobility, etc.**

A crucial component of the Paris Agreement is Article 2.1(c), which requires shifting financial flows to be consistent with a pathway towards low greenhouse gas emissions and climate-resilient development. However, progress in aligning capital flows at the global level has been difficult, mainly because of the challenges in adequately measuring climate-related financial flows. The open-source Paris Agreement Capital Transition Assessment (PACTA) tool plays a critical role in this regard. PACTA measures the alignment of investor and bank portfolios with climate goals. PACTA compares real-economy changes required to achieve sectoral decarbonization pathways against the forward-looking production plans of companies in those sectors over a five-year look-ahead. This approach allows financial institutions who lend to or invest in these corporates to measure the alignment of their corresponding climate exposure. A misaligned outcome – e.g., a power sector portfolio that produces too much electricity from fossil fuel generation and/or too little from renewables – indicates a potential exposure to transition risk in the

[i] https://www.ipcc.ch/2021/08/09/ar6-wg1-20210809-pr/
[ii] https://unfccc.int/news/full-ndc-synthesis-report-some-progress-but-still-a-big-concern
[iii] https://www.wri.org/insights/cop27-key-outcomes-un-climate-talks-sharm-el-sheikh#:~:text=The%20COP27%20climate%20summit%20in,the%20impacts%20of%20climate%20change.
[iv] https://www.dnp.gov.co/Paginas/DNP-presento-la-Estrategia-Nacional-de-Financiamiento-Climatico.aspx

event of a disruptive transition. Further information on the PACTA methodology is provided in section 2 of this document.

PACTA Coordinated Projects is a dedicated program in which RMI collaborates with governments, supervisors, or trade associations on an individual or collective basis, to support the application of PACTA to the portfolios of financial institutions. This program aims to **measure the alignment of the entire financial sector or that of a sector and the individual participating institutions**. Governments, supervisors, and participating financial institutions can use the outcome to inform climate finance strategies.

This report provides alignment results based on the financial exposures of six Colombian banks across eight sectors: oil & gas upstream, coal mining, power generation, auto manufacturing, steel manufacturing, cement manufacturing, and aviation. In addition to this aggregate sectoral-level analysis, each participating bank has internally generated their individual results with company-level information to help them better understand where their climate exposures are coming from and as a basis for engaging with companies or setting strategies to align with climate scenarios.

RMI carried out the analysis provided in this report as part of a collective initiative with the "Centro Regional de Finanzas Sostenibles" of the University of Los Andes, and in collaboration with Asobancaria, the Colombian Banking Association. It represents an important step forward in banks' efforts to identify and measure climate risks. This analysis is both a source of information and a pedagogical exercise for banks to strengthen their understanding of their climate performance based on PACTA outcomes and thus advance in the implementation of strategies for the decarbonization of their portfolios in the coming years.

2. Summary of Results by Sector

PACTA shows, where possible, alignment results per technology within specific sectors. **A sectoral approach is necessary to meet global climate targets due to the differences across sectors. Some sectors need to move faster than others, and some sectors need to switch technologies (power generation) while others need to phase down (fossil fuels).** For this analysis, the World Energy Outlook 2021 from the International Energy Agency, and the Net Zero 2020 scenario from the Institute for Sustainable Futures were used. More information about the climate change scenarios used for the analysis is available in the section 3 of this report.

Power generation:

Banks' portfolios have a high exposure to hydroelectric power capacity; this is expected given that Colombia is a country rich in water resources, with high rainfall rates and a unique topography that facilitates the development of this type of technology. However, the market share of this technology is expected to decrease within the next five years, since renewable energy capacity will increase at a larger scale. The share of energy capacity based on oil, and coal is not likely to see large changes in the upcoming five years, and energy capacity based on gas is expected to increase by 25% during the first year, and will remain constant until 2026.

Fossil Fuels:

Companies in banks' portfolios are planning to decrease their oil and gas extraction in the upcoming five years. Coal mining will slightly increase, while according to low-carbon scenarios laid out by the International Energy Agency (IEA) – specifically the SDS and NZE—it should decrease by around 15% and 30%, respectively, to meet the scenario targets.

Automotive Manufacturing:

Internal Combustion Engine (ICE) cars represent around 95% of the exposure to the automotive industry, and the companies that make up the portfolio are planning to increase the manufacture of this type of vehicle by around 10%. In contrast, the IEA's Net Zero scenario indicates production must decrease by 30%. Production of electric vehicles is projected to rise by 5%, far short of rate that is required by the scenario (30%).

Steel and cement

Technology roadmaps that can be used for alignment measurement have not yet been specified by the IEA, and some other scenario providers for steel, cement or aviation. Companies in the portfolio will still have to reduce emissions to the levels set by the ISF scenario by 2050. They will need to carry out technological research & development in order to develop and finance strategies to make steel and cement production more efficient and to reduce emissions intensity.

Aviation:

The Net Zero scenario from the Institute of Sustainable Futures requires a steep decline in the emissions intensity of aviation companies. This will require an increase in the efficiency of the aircraft used by

operators, and the use of more efficient fuels, which would allow the sector to align with the ISF Net Zero pathway.

3. Methodology and Data Sources

3.1. PACTA Climate Scenario Analysis

The Paris Agreement Capital Transition Assessment (PACTA) is a free and open-source methodology and software tool to assess the alignment of investor and bank portfolios with climate goals across a set of climate critical sectors and technologies.

At its core, **PACTA compares what needs to happen in sectoral decarbonization pathways with financial actors' exposures to companies in oil and gas, coal, power, automotive, cement, aviation, and steel (the "PACTA sectors"). PACTA provides a five-year forward-looking, bottom-up analysis.** The analysis looks at companies' investment and production plans based on physical asset-based company level data and consolidates that information to identify the energy transition profile of the companies and their related financial instruments. This information is aggregated at the portfolio level and compared to the production plans projected by the sectoral decarbonization pathways in different climate scenarios. **The current (mis) alignment between a portfolio and these scenarios allows users to infer potential exposure to transition risks and opportunities.** The information provided by the PACTA analysis can be used by financial institutions for transition risk management, identification of engagement opportunities and needs with companies, disclosure and reporting, and strategy setting and decision making.

The sectors covered by PACTA are amongst the most carbon-intensive sectors of the economy (i.e., the most exposed to transition risks). Together, they are estimated to be responsible for over 75% of all CO2 emissions. In each sector, **PACTA focuses on the part of the value chain with the largest contribution in terms of influencing CO2 emissions.**

For example, in the oil and gas sector, the focus is on upstream activities related to production, while in the power sector, the focus is on power generation and related sources of energy. For more information regarding PACTA value chain focal points, see the Annexes of this report.

The PACTA climate scenario analysis for Banks was launched in 2020, and was road tested by 17 leading global banks from Europe, North, and South America. Since then, the tool has been used by more than 120 banks worldwide.

This section provides a brief overview of the core principles behind the PACTA methodology. More information on the methodology and additional supporting documents are available on the Transition Monitor Website.

The core climate scenario analysis provides answers to the following three questions:

- What portfolio share is currently exposed to activities in sectors affected by the transition to a low carbon economy?

- How aligned are the investment and production plans of companies in the portfolio with different climate scenarios and the Paris Agreement?
- What is the portfolio's technology mix in climate-relevant sectors expected to look like in five years based on current investment plans of the companies underlying the portfolio, and how does it compare to a technology mix aligned with the Paris Agreement?

The following table provides an overview of the key components and principles underlying the PACTA methodology.

Table 1 : Overview of principles of the PACTA methodology

Asset based company level data	The analysis is based on data covering 40,000+ companies and 230,000+ energy-related physical assets obtained from third-party data providers. This alleviates the necessity to rely on companies' self-reported data that is published in a non-standardized manner and often does not account for scope 2 and 3 emissions.
Forward-Looking	PACTA provides a five-year forward-looking analysis of the production plans financed by a portfolio that are then compared to climate scenarios.
Sector-specific approach	The analysis outputs are metrics and indicators at the sector and technology level that allow for a detailed evaluation of a portfolio's alignment, rather than one aggregated indicator at portfolio level.
Allocating macroeconomic goals to microeconomic actors	The PACTA analysis uses a market-share approach to allocate macroeconomic climate targets to companies in sectors where low-carbon technologies are available thus, all market-level trends and targets are allocated to companies based on their current market share in the sector or technology for low- and high-carbon technologies, respectively. Sectors with no low-carbon technologies, the sectoral decarbonization (SDA) approach is used to benchmark portfolio production against climate scenarios. The SDA was developed by the Science-based Targets Initiative.[v]

Data Sources and Coverage

The PACTA methodology is, agnostic to the data sources used to run it. The following tables outline the three types of data input that are needed, and the data providers used for this exercise.

Table 2: Core data needed to perform the analysis

Asset based company level data	For each sector covered in the analysis, PACTA sources the data from Asset Impact. In turn, Asset Impact sources data from independent industry data providers that obtain data on individual assets in climate-relevant industries using a variety of research capabilities, including web scraping, desk research, and direct engagement with industry. The asset based company level data covers more than 230,000 individual assets (power

[v] https://sciencebasedtargets.org/

	plants, oil fields etc.) and is estimated to account for more than 75% of global carbon emissions.
Climate scenarios	Production plans are compared to the sectoral decarbonization pathways of climate scenarios published by the International Energy Agency (IEA) and DG Joint Research Centre of the European Commission. However, the analysis can be executed with other scenarios.
Portfolio Data	Basic information about the financial institution's credit portfolio, such as the name of the borrowers, the amount disbursed or the amount granted to each one of them, and the sectoral classification.

Overview of scenarios used in this report

Measuring alignment requires scenarios that explain what needs to happen in a sector to decarbonize. While climate change scenarios don't predict the future, they provide essential information to understand climate change and the pathways to reach specific goals. It is important to note that climate scenarios are built using a range of different assumptions and, therefore, can propose different courses of action to achieve climate targets. Not all scenarios cover all sectors, so different sectors might be analyzed using different scenarios. The table below shows an overview of the scenarios used in this report and for which sector they are used.

Table 3: Overview of scenarios used in this report

Scenario	Sectors used	Implied Temperature rise in 2100	Probability	Publication	Abbreviation
Net Zero Emissions by 2050	Power, Fossil Fuels, Automotive	1.5°C	50%	IEA, WEO 2021	NZE
Sustainable Development Scenario	Power, Fossil Fuels	1.65°C	50%	IEA, WEO 2021	SDS
Announced Pledges Scenario	Power, Fossil Fuels	2.1°C	50%	IEA, WEO 2021	APS
Stated Policies Scenario (STEPS)	Power, Fossil Fuels	2.6°C	50%	IEA, WEO 2021	STEPS
ISF Net Zero Scenario	Steel, Cement and Aviation	1.5°C	66%	ISF NZ 2020	ISF NZ

3.2. PACTA Metrics

PACTA has three main metrics: Technology Mix, Volume Trajectory, and Emission Intensities. The metrics used in each sector depend on the existence of clearly identified technology decarbonization pathways. For power and automotive, there are clear low- or zero-carbon technologies available. For example, power generation must transition from fossil fuels to renewables in the power sector. But there are other sectors where technology decarbonization pathways are not so well-defined, such as steel, cement, and aviation. For these last sectors, given that the climate change scenarios do not prescribe technology roadmaps but give absolute values of production and carbon dioxide emissions, the PACTA approach measures alignment using emission intensity per unit of production.

Technology Share Mix

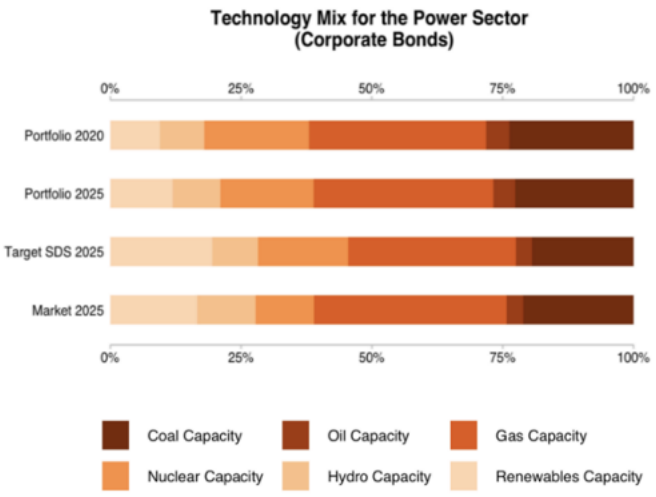
The technology share mix represents the weight of each technology in the sector as a percentage of investment therein. The portfolio's technology mix is compared to the scenario and a market benchmark (see Figure 0.1 as an example).

The technology mix metric focuses on technology shifts within the power, fossil fuels, and automotive sectors, namely in terms of:

the changes in the technological processes by which outputs are produced (e.g., shift from coal-fueled to renewable-fueled power capacity), and

changes in the nature of the output itself (e.g., shift from internal combustion engines to electric vehicles).

Figure 0.1: Example of the Technology mix metric



This metric measures the portfolio's relative exposure to the economic activities that are likely to be impacted by the transition to a low-carbon economy. It is a function of how diversified the investments' portfolios are across the companies they invest in and how diversified these companies' activities are across technologies or output types.

Figure 0.1 shows the high and low carbon technology mix for the power sector in a bond portfolio:

- Portfolio 2020: reflects the current technology mix of the power sector in the analyzed portfolio.
- Portfolio 2025: reflects the projected future technology mix of the power sector in the analyzed portfolio.
- Target SDS 2025: shows the anticipated technology mix of the portfolio in 2025 based on the SDS scenario.

- Market 2025: reflects the projected technology mix in 2025 based on the companies' capital plans for the next five years at a global level.

PACTA assumes a static balance sheet. As such, the difference in the technology mix between Portfolio 2020 and Portfolio 2025 is solely a result of the production plans of the companies the investor is currently invested in and not a result of any change in the portfolio composition.

Production Volume Trajectory

The production volume trajectory metric aims to measure the alignment of a portfolio's projected production volume change, based on the five-year capital investment plans of companies, to those given in climate scenarios at a sectoral level.

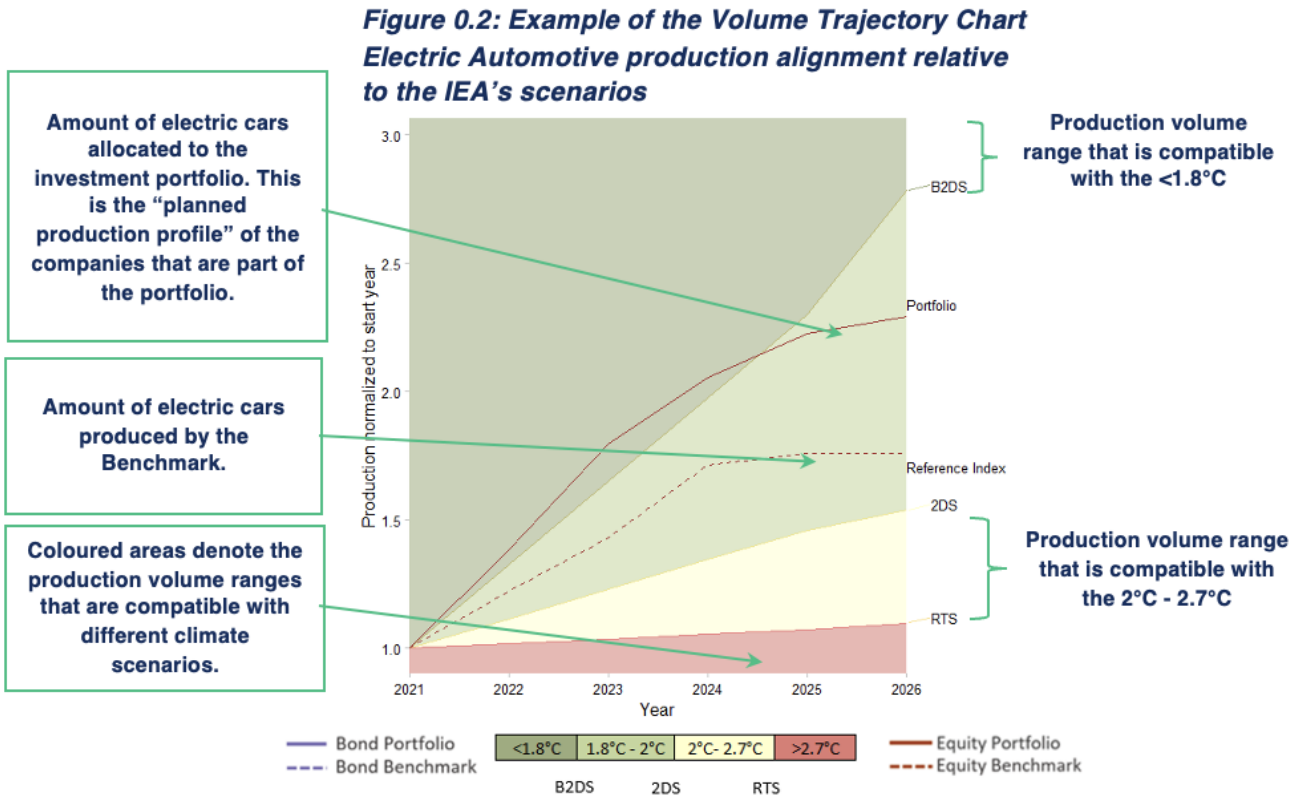


Figure 0.2 shows the production volume trajectory metric for electric vehicles as an example. This metric measures the alignment of a portfolio's projected production volume over the next five years with the ranges of change in production volumes derived as targets from different climate scenarios. Changes in production volume result either from the transfer of production from one technology to another (e.g., internal combustion engines to electric vehicles) or from the expansion or contraction in production related to the technology/fuel (e.g., a company brings a new coal-fired power plant online). The Y-axis shows the normalized production change planned for the next five years, with the current capacity represented as 1.

In Figure 0.2, the portfolios' electric vehicle production trajectory falls within the light green area and increases between 2021 and 2026. This means that portfolio companies' production plans for electric vehicles for the next five years are compatible with the 2 Degrees scenario (2DS), but production is not increasing enough to be aligned with the Beyond 2 Degrees (B2DS) scenario. In this example, the portfolio is outperforming the results obtained for the benchmark.

The technology mix metric and the production volume trajectory metric both indicate how aligned the companies within the portfolio are with the Paris Agreement goals. However, they differ in that the technology mix metric is a measure of the relative amounts invested in different climate relevant technologies within the portfolio. In contrast, the production volume trajectory measures whether the rate of change in the production amount is sufficient to meet target derived from the benchmark scenario that is in line with Paris Agreement goals. For example, it is possible that renewable power generation makes up a large portion of a portfolio relative to carbon intensive power generation, resulting in a portfolio that is aligned with the Sustainable Development Scenario (Paris Agreement aligned) from a technology mix perspective. Yet the rate of renewable power generation increase may not be sufficient to meet the same scenario from a production volume trajectory perspective.

Emissions Intensity

Emissions intensity metrics are used to measure the average CO2 intensity of a portfolio in the steel, cement, and aviation sectors. The emissions intensity is measured in terms of CO2/economic output unit (for example, CO2/per ton of steel produced) and then compared to a climate scenario's emissions intensity reference point.

The emissions intensity of the activities financed by the portfolio is the main PACTA metric in sectors for which no clear technology pathways have been established (namely, steel, cement, and aviation). Put differently, for these sectors, no zero-carbon alternative yet exists. As such, it is not possible to use the technology mix metric or the volume production volume trajectory metric to measure alignment. However, it is still imperative to steer capital in a way that aims to decrease carbon emissions in these sectors – hence the emissions intensity metric is used.

To calculate the emissions intensity metric, the current portfolio’s weighted average emission intensity is calculated, and a portfolio's target is determined using the Sectoral Decarbonization Approach (SDA). Then, a convergence approach is used to calculate a yearly target, so all portfolios’ targets will equal the emission intensity level expected by the scenario at the end point of it.

3.3. Climate Strategies that can be Implemented with the PACTA Results

PACTA's tool for banks provides granular, company-level information that can be used by financial institutions to implement several climate strategies. Table 4 summarizes a number of actions to transition to a low-carbon economy, which climate strategies can be adopted, and how PACTA can help measure the impact.

Table 4:1 Summary table of what needs to happen for a low carbon transition, potential climate strategies and PACTA's use cases

What needs to happen to make a low carbon transition?	Potential climate strategies that can be adopted to achieve the transition.	How can PACTA be used to measure their impact?
High carbon technologies need to decline in line with sectoral trajectories. ***Example technologies: coal power generation, oil production, ICE vehicle production***	Avoidance or exclusion of some types of companies based on their underlying economic activity, sector, or technology. Targeted underweighting of assets from specific sectors, such as fossil fuels, to reduce exposure and financing provided to high emission fuels and technologies and/or activities that pose transition risks.	User can measure the exposure of their portfolios to high-carbon technologies. This information can be calculated with the outputs provided when applying the PACTA for Banks code. If negative screening is applied, it would be expected to see this reflected in lower overall exposures to high-carbon technologies.
The production capacity for low carbon technologies needs to be ramped up significantly. ***Example technologies: renewable power generation, electric vehicles, electric arc furnace steel production***	Positive screening as part of a thematic investing strategy in order to target companies that are contributing to the transition to a low-carbon economy, amongst other sustainability objectives. This screening may be used to target investment into specific low carbon technologies that are identified in scenarios as being important to the transition (also referred to as climate solutions).	Users can measure the exposure and alignment of their portfolios to low-carbon technologies, by analyzing the future technology mix of their portfolio. Additionally, banks can perform this analysis at a company level, with the data provided for the analysis. If positive screening and thematic investment is applied, it would be expected to see this reflected in higher overall exposures and improved alignment for low-carbon technologies.
An overall technology transition from high to low carbon technologies, as well as a reduction in emissions intensities. ***Example sectors: power and automotive (technology transition), steel and cement (emissions intensity reduction)***	Banks can influence via bilateral engagement – to influence borrowers to seek improvements in their climate performance. Financial institutions commit sufficient human resources to engagement in order to target companies in the portfolio that need to improve.	Users can make use of PACTA quantitative results to identify sectors, and technologies where improvement is needed. They also have access to technology information at a company level. If engagement is effective this can lead to a change in companies' climate strategies and commitments, with the potential to improve their forward-looking results.

3.4. A Preliminary Approach to Target-Setting

The financial sector plays a key role in the process of decarbonizing the real economy, as it is responsible for ensuring the correct allocation of financial resources required to support companies in the climate transition.

An increasing number of financial institutions have committed to initiatives aimed at reducing their financed emissions. Notably, one of the initiatives that have been widely adopted by banks is the NZBA, which started with 43 signatories in April 2021 and got over 120 signatories by March 2023, representing around 40% of global banking assets [vi]. By joining these types of initiatives, banks commit to comply with the Principles for Responsible Banking and to be Net Zero by 2050.

One characteristic that climate initiatives have in common is the emphasis on promoting transparency of financial institutions with respect to their climate commitments. This is why target setting and disclosure have become two increasingly intertwined topics of discussion and have gained great relevance within the financial sector and civil society. Some of the initiatives that provide guidance on how to set targets or recommend doing it, are the Task Force for Climate-related Financial Disclosure (TCFD), Principals for Responsible investments (PRI), the Net Zero Banking Alliance, the Partnership for Carbon Accounting Financials (PCAF), between others. Although all of them recognize that the approach to be used will depend on the degree of progress made by the financial institution in these matters, this still leaves financial institutions with the task of developing a transition plan to integrate climate considerations in their internal processes and set their own climate objectives.

But target setting requires a climate strategy where banks can balance, on one hand, the reduction of their financed emissions, and on the other hand, the financing of companies required reductions of emissions, so they can financially support companies in their transition to a low-carbon economy.

As an alternative to find the balance between these two objectives, Figure 3 outlines the steps that financial institutions could take into consideration when defining their climate objectives and assessing their progress.

Figure 0.3: Steps to define and track climate objectives.

1. Assess portfolio's current performance

This step is essential, as it defines the starting point of the financial institution's climate strategy and is the basis against which progress will be compared in the next evaluations. At this step, it is recommended to analyze the portfolio through the various methodologies, to understand the different outcomes, and

[vi] https://www.unepfi.org/net-zero-banking/members/

differences between them, and to identify which metrics will be best suited to define KPIs that can be tracked going forward.

Moreover, this first analysis should allow the identification of the sectors to which the portfolio is most exposed and main hotspots of (mis) alignment that will require more attention in the development of the strategy in the next steps.

2. Select the scenario to which they want to align their portfolio and source forward looking data

There are two main factors that are relevant in this second phase. One is the forward-looking information on how the sectors and companies to which the portfolio is exposed will evolve in the years to come, and the second factor is the selection of the scenario with which the portfolio and the companies forward looking data will be compared.

Companies' forward looking data will allow financial institutions to understand companies' climate strategies and assess their vulnerability against climate risks. Given that climate events are expected to increase in the upcoming years, companies' future plans and adaptation strategy will be more relevant than their backward performance, and under those circumstances, businesses can benefit and minimize their risks, if they plan for decarbonization in advance, notably attempting to transform production processes and their business models.

Climate change scenarios are the outcome and descriptions of possible futures that arise from research and analysis. They propose different pathways per sector and help in understanding what can happen in the future under specific assumptions. They constitute a powerful tool that allows society to understand the challenges of climate change and the consequences of not taking action today.

The scenarios reflect different levels of ambition, and sectoral decarbonization pathways differ according to the various assumptions made by the scenario providers about what might happen in each industry and how technological changes should evolve over time for each industry to limit global warming. Some of the factors to bear in mind that can differ from the modelling of one scenario to the other can include:

- The speed at which decarbonization occurs;
- Availability and maturity of technologies, their scalability, and cost;
- Favouring or ruling out different technologies (e.g., reduce role for nuclear in the OECM scenario, more prominent use of CCUS in the SDS and B2DS scenarios);
- Level of ambition for decarbonization (resulting in varying probabilities of limiting the global average global rise in temperature to <2°C);
- Levels of granularity (time, geography, etc.).

It is therefore relevant for financial institutions to conduct an in-depth review of the climate change scenario assumptions and to identify which of these scenarios best suits their own understanding of the evolution of technologies for different sectors and future policies.

3. Identify opportunities of the transition in the analyzed sectors

Climate change creates new risks but also new opportunities for financial institutions. For this reason, understanding the evolution of the sectors to which the portfolio is exposed, as well as knowing the production plans of the companies that make up the portfolio is very valuable at this stage.

The understanding of which companies have already started the transition or are investing in R&D to innovate or improve their production methods with the aim of reducing their CO2 emissions will allow the financial institution to understand how its portfolio will evolve in the years to come, but also to categorize companies of their portfolio that are more advanced in the transition and those who need more support, to define the climate actions to take with each of them. This process should also provide information about which companies will need more financial support to advance in the transition and estimate the impact that financial support will have in each sector and company in the real economy.

4. Set short, medium and long-term targets

Although most climate objectives are defined for the long term, it is highly recommended to have interim targets, where the progress of the implemented measures can be evaluated, as well as adjusted, if necessary, in order to achieve the long-term objective.

For effective climate objectives to be set, clear objectives should be established across the organization in the different areas involved. These objectives should be precise, with established dates for review, and actions needed to achieve the goals should be defined, and, above all, these objectives should be realistic.

Targets can be set at different levels, e.g., portfolio, company, sector, technology, asset, etc, and each bank should determine its climate objectives' level(s), depending on its degree of progress on climate issues and the information to which it has access. Nevertheless, the United Nations Environment Program Finance Initiative (UNEPFI) indicates in the Guidelines for Climate Target Setting for Banks that signatories to the Net Zero Banking Alliance (NZBA) shall provide sector-level targets for a substantial majority of the carbon-intensive sectors.[vii] However, it is useful to be aware of the technological changes that should occur for each analyzed sector, since it is the technological changes that will likely have the greatest impact in a decrease in future CO2 emissions.

5. Track interim targets and company progress

Periodically a review of the progress of the portfolio companies should be performed with the help of the metrics that were defined in step 1. It is likely that additional information will also be required from the client to supplement the information.

In parallel to the voluntary initiatives, on the regulatory side, there's also progress on climate matters; for example, in the European Union a classification system that establishes a list of environmentally sustainable economic activities was put in place. This system is the EU Taxonomy. Along with it, the European Central Bank will require banks to incorporate climate-related and environmental risks in their risk management and disclosure practices by the end of 2024[viii]. While the progress on the policy side is relevant, as is the progress made by financial institutions to identify their exposure to sectors relevant to climate change and implement measures towards the net zero target; there is still skepticism about the metrics used to define climate targets and the ambition of financial institutions in relation to the targets[ix]. This raises the need for further guidance and actions designed by regulators to influence financial

[vii] https://www.unepfi.org/wordpress/wp-content/uploads/2021/04/UNEP-FI-Guidelines-for-Climate-Change-Target-Setting.pdf

[viii] https://www.bankingsupervision.europa.eu/press/pr/date/2022/html/ssm.pr221102~2f7070c567.en.html#:~:text=In%20a%20first%20step%2C%20the,March%202023%20at%20the%20latest.

[ix] https://esgclarity.com/banks-net-zero-targets-fail-to-include-most-fossil-fuel-funding/

institutions to not only define a climate target but also provide guidance on how to assess the progress made in achieving these commitments.

4. Participation and Coverage of the Analysis

This study analyses the results of the implementation of the PACTA for Banks methodology on the loan book portfolios of 6 Colombian credit institutions (formally known as "establecimientos de crédito"). They represent 36.1% of the assets of all credit institutions in Colombia, as of 31 of December 2021[x].

The results have been aggregated to preserve the anonymity of the individual participating institutions. In this sense, any reference to "portfolio" refers to a weighted average of the individual results and is indicative of the average (mis-)alignment of credit institutions in Colombia, based on the sample set of institutions.

5. Exposure and Alignment Results

The exposure of the portfolios to the PACTA sectors accounts for approximately USD 2.3 billion, as of 31 of December 2021, which refers to the reported value of the loans given to companies in the seven PACTA analyzed sectors. This exposure represents around 7.3% of the commercial loan book portfolio, i.e. loans to companies in the real sector, and 3.8% of the total loan book portfolio of the six credit institutions. 62% of this exposure is associated with power companies, which makes this sector the most climate relevant for the analyzed sample of credit institutions. A smaller proportion of the exposure corresponds to cement, oil & gas, and aviation companies, 16%, 12%, and 7%, respectively. Coal, automotive and steel companies make up only 4% of the exposure of the portfolios.

For each sector, the PACTA for Banks assessment considers only the companies that fall within the specific segment of a value chain, e.g. power generation companies in the power sector, instead of power distribution companies. The information of the production values of these companies is sourced from the Asset-Based Company-level Data (ABCD) and serves as the basis for the analysis of forward-looking production alignment of companies within a portfolio.

Although the ABCD has global coverage, not all companies within a specific portfolio are found in the database. To give a sense of the number of companies that are found and matched to the company production values of the ABCD, the matching rate shows the percentage of companies within the aggregated portfolio of the six credit institutions that are successfully matched to companies in the ABCD database. The following table shows the average matching rate by sector of the companies that are part of the 6 credit institutions portfolios. All analysis presented in the following sections refers to the companies that were successfully matched to ABCD data.

[x] https://www.superfinanciera.gov.co/jsp/60767

Sector	Power	Oil&Gas	Coal	Auto	Cement	Steel	Aviation
Match rate (by number of companies)	47%	25%	5%	4%	48%	13%	36%

5.1. Power Sector

The transformation of the power sector is key to the transition to a low-carbon energy system. In order to meet the Paris Agreement's goal of limiting the global average temperature rise to well below 2°C above pre-industrial levels, a greater share of total primary energy must be converted to (low-carbon) electricity, and an increasing number of industrial sectors must switch from fossil fuels to clean power. According to the International Energy Agency, Latin America has a projected average growth of global electricity demand of 2% per year from present day to 2040[xi], following the expected growth trends of the region. Nevertheless, as energy demand is expected to increase, so are the challenges for countries in implementing and developing energy-efficient technologies and practices that ensure that these services (i.e., heating, cooling, lighting, etc.) are delivered efficiently without further detriment to the environment. In 2021, 72% of the electricity produced in Colombia was generated with hydropower, 13% with Gas, 6% with Coal, 5 with Oil, and the remaining 4% with other renewable sources. This is due to the country's abundant water resources and its topography[xii]. However, in terms of primary energy demand[xiii], oil is the most consumed source, accounting for 36.45%, followed by hydroelectric energy (29.31%), gas (23.63%), coal (6,9%), and other sources (1,88%)[xiv].

The power sector can be broken down into up-, mid- and downstream. The upstream segment covers power generation and accounts for the majority of emissions in the value chain, the midstream segment refers to the distribution and transmission of power, and the downstream segment relates to energy consumption.

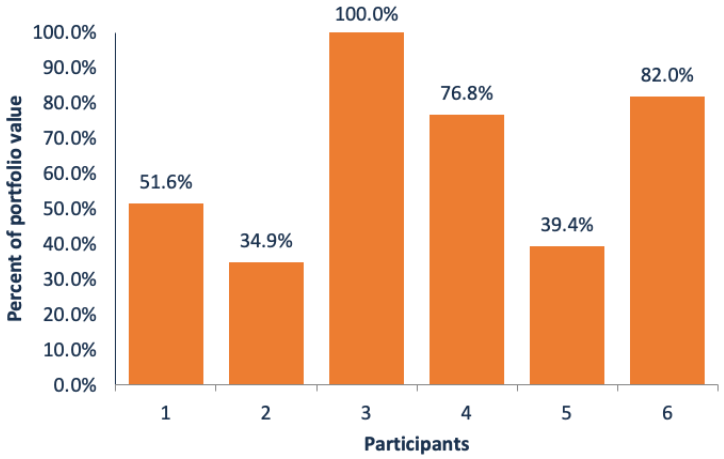
In the PACTA methodology, the alignment of the sector is studied via an analysis of power generation, as (i) it is the most carbon-intensive segment of the sector, (ii) supply-side emissions are the most relevant in terms of steering capital, and (iii) asset base company-level data in this sector covers individual power plants, while comparable datasets on transmission or distribution assets have not yet been developed.

The assessment of the portfolios' exposure to the power sector (which corresponds to the reported value of loans given to power companies) shows that the 6 institutions are exposed to power utility companies. The exposure to power companies, as percentage of the reported exposure to PACTA sectors varies from

[xi] https://www.iea.org/data-and-statistics/charts/electricity-demand-growth-in-latin-america-2021-2040
[xii] https://ourworldindata.org/grapher/share-elec-by-source?country=~COL
[xiii] Primary energy demand is the total primary energy required by the end use sectors of an economy.
[xiv] https://ourworldindata.org/grapher/share-energy-source-sub?country=~COL

35% to 100% (Figure 1). To understand if this exposure is adjusting to the transition to a low carbon economy, PACTA estimates the current and future technology mix for this sector and compares the latter to the technology mix of the portfolio in a <2° scenario. For this sector, a comparison is made at global and regional levels, using global and Central and South America (CSA) scenarios.

Figure 1. Peer comparison of power sector exposure, as a % of total portfolio exposure



The comparison of the results for the two benchmarks shows that assets in the analyzed portfolios are mostly located in the CSA region (this is demonstrated by the similarities between the 2021 portfolio technology shares in the two plots) (Figures 2 and 3). Both global and CSA figures show that companies in the portfolios are planning an increase in renewables and a decrease in hydro between 2021 and 2026; for brown technologies, companies are not planning significant changes between the two years. To align with an SDS scenario, global scenarios require the portfolios to increase their share of renewables and

Figure 2. Current and future technology mix of power capacity production of the portfolio as a % of the sector, global targets

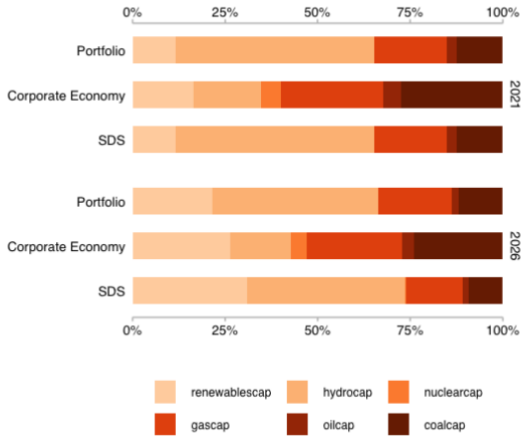
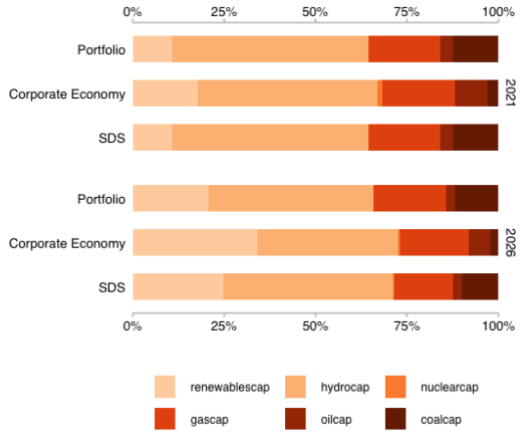


Figure 3. Current and future technology mix of power capacity production of the portfolio as a % of the sector, CSA targets



decrease their share of brown technologies. Similarly, the CSA scenarios require an increase of the share of renewables, although in a lower proportion than the global target.

There are two noticeable differences between the global corporate economy and the CSA corporate economy. The first relates to the absence of nuclear power capacity in the technology mix of the CSA benchmark, which is due to the fact that the region does not have nuclear capacity. The second difference relates to the exposure to coal-fired power generation, which is significantly lower in the region than in the global benchmark. The comparison between the regional benchmark and the portfolio shows that the share of coal power capacity of companies in the portfolio is higher than the regional benchmark.

The volume trajectory alignment metric for power technologies is consistent for all technologies across scenarios, except for renewables power capacity (Figures 4 and 5). The required build out of renewables prescribed by the SDS scenario is more stringent at the global level than at the regional level, requiring companies in the portfolio to make additions in renewables capacity to be aligned with a global scenario. At the regional level, the increase of renewables capacity of the portfolio is already consistent with a <2°C. The global corporate economy is not aligned with the required buildout of global scenarios, while the regional corporate economy is.

Figure 4. Volume production trajectory of renewable power capacity in the portfolio, global targets

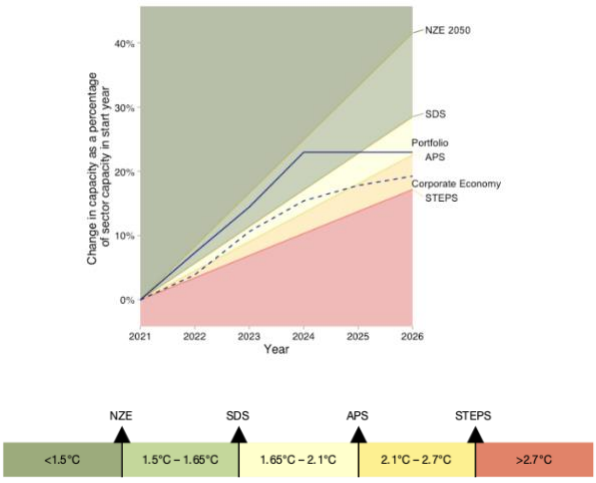
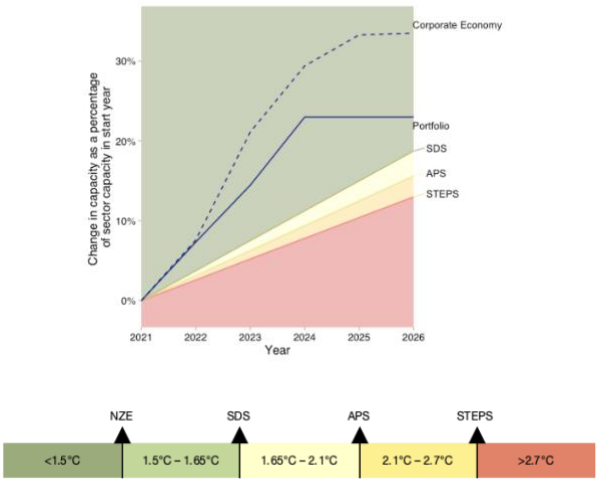


Figure 5. Volume production trajectory of renewable power capacity in the portfolio, CSA targets



Hydroelectric power companies in the aggregated portfolio are planning to increase their hydro capacity in 2025, compared with 2021 levels, in a magnitude that is compatible with SDS and NZ scenarios (Figure 6). The decrease in hydro capacity between 2023 and 2024 is associated with the planned reductions in hydro power capacity of companies in the portfolio of one of the financial institutions analyzed, which is reflected on the aggregated portfolio.

Regarding investments in high-carbon technologies, companies in the portfolios of credit institutions are not following a NZ scenario. Rather, companies are keeping their coal-fired and oil capacity constant, making the trajectory of the aggregated portfolio compatible with a >3.2°C scenario (Figures 7 and 8).

Both global and CSA scenarios require coal and oil capacity to decrease constantly; in order to be aligned with a <2°C global scenario the portfolio will need a decrease of 17% in coal generation and 25% in oil generation. The global corporate economy shows a similar behavior for oil companies; on the contrary, the corporate economy for coal power capacity shows an increasing trend in the next five years.

For the case of gas power capacity, global scenarios allow for a slight increase in capacity, but the observed build out of companies in the portfolio is greater than that required by the scenarios, which results in a misalignment of the production volume trajectory for this technology (Figure 9).

Figure 6. Volume production trajectory of hydroelectric power capacity in the portfolio, global targets

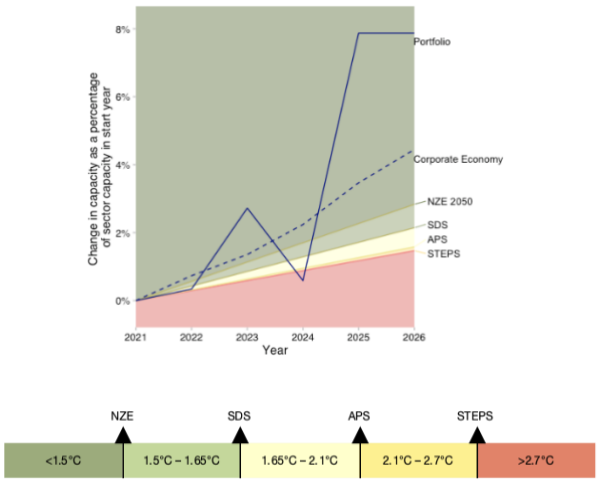


Figure 7. Volume production trajectory of oil power capacity in the portfolio, global targets

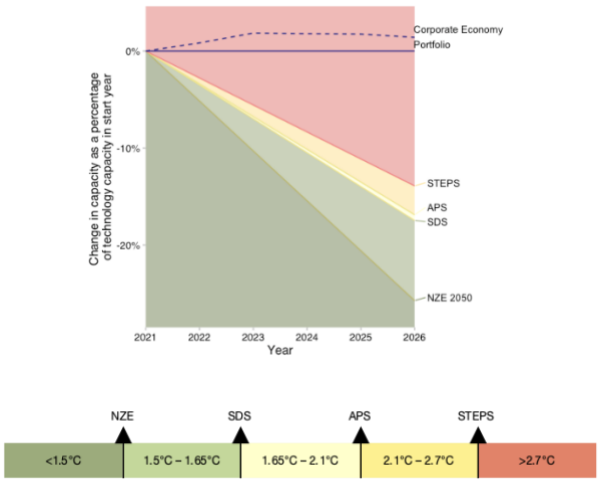


Figure 8. Volume production trajectory of coal power capacity in the portfolio, global targets

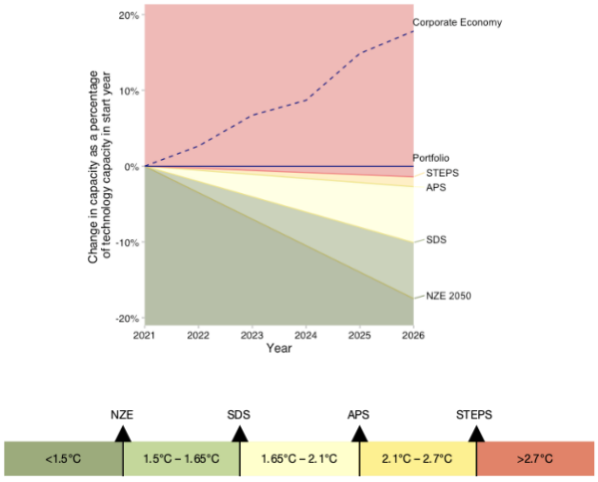
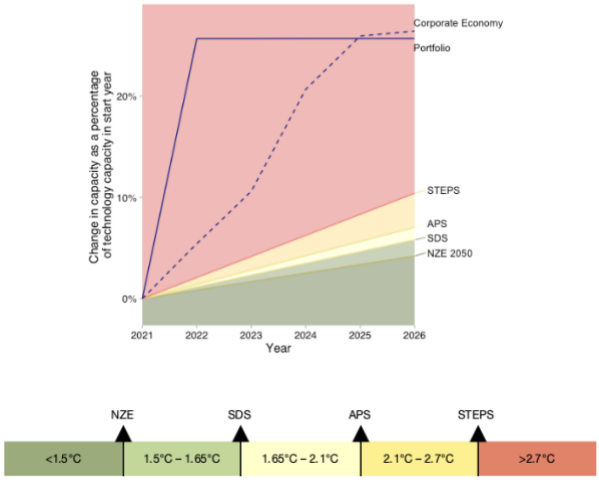


Figure 9. Volume production trajectory of gas power capacity in the portfolio, global targets



5.2. Fossil Fuels: Oil, Gas and Coal

The fossil fuels industry has been the largest contributor to global emissions historically. Even today, fossil fuels, such as coal, oil and gas, account for around 80% of the world's energy consumption.

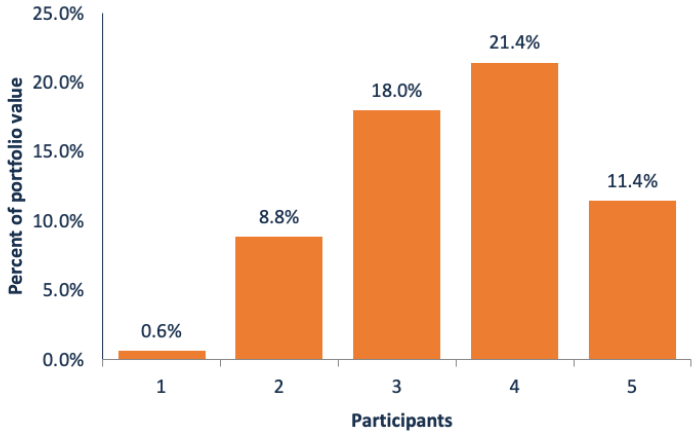
CO2 emissions from coal and oil followed an upward trend in 2022. Oil emissions increased by 2.5%, where around half of the increase was driven by aviation following air travel's rebound after the pandemic, while emissions from coal exceeded the last decade's average growth rate, growing by 1.6% (243 Mt). On the other hand, world emissions from gas decreased by the same rate of 1,6% (118 Mt), as a consequence of Russia's invasion of Ukraine.

The fossil fuels sector can be broken down into three streams: The upstream segment, which covers the actual extraction of fossil fuels out of the ground. The midstream segment refers to the refining, processing, and transportation, and the downstream segment which relates to the consumption of the final products.

The PACTA methodology focuses on the alignment of the fossil fuels upstream segment, as alignment here will have a knock-on effect throughout the rest of the value chain. It is relevant to note that this segment is highly vulnerable to transition risk. With the ever-looming risk of stranded assets, it is important that financial institutions understand their climate scenario alignment in this part of the value chain.

Out of the 6 credit institutions that are part of this analysis, 5 reported exposure to oil and gas. The percentage of this exposure varies considerably from one institution to another, although it is consistently lower than the exposure presented to the power sector (Figure 10). The technology mix metric is not given for this sector, as there are no low carbon options that companies could transition to, therefore, both technologies are required to decrease. Nevertheless, it is important to note that the aggregated portfolio has associated a higher proportion of gas than oil production.

Figure 10. Peer comparison of oil and gas sector exposure, as a % of total portfolio exposure



In terms of the required production changes for oil production and gas extraction, a global NZ scenario prescribes a decrease for these fossil fuels. The aggregated portfolio shows a declining trend of production of these fuels during the next five years, making the trajectory aligned with the scenario (Figures 11 and

Figure 11. Volume production trajectory of oil production in the portfolio, global targets

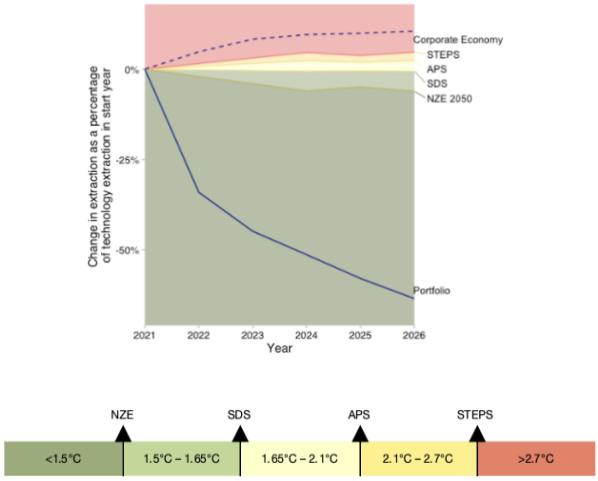
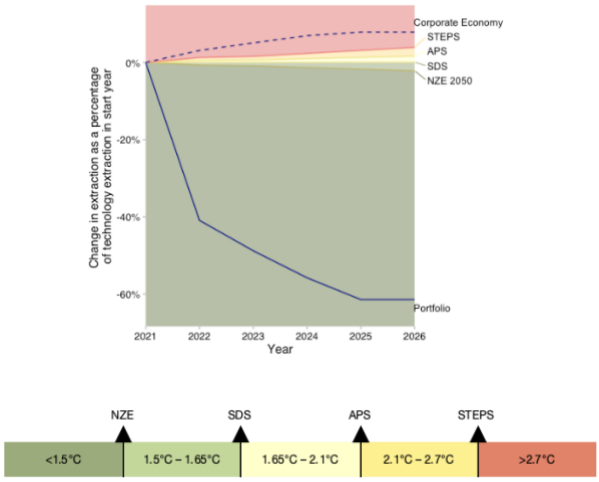


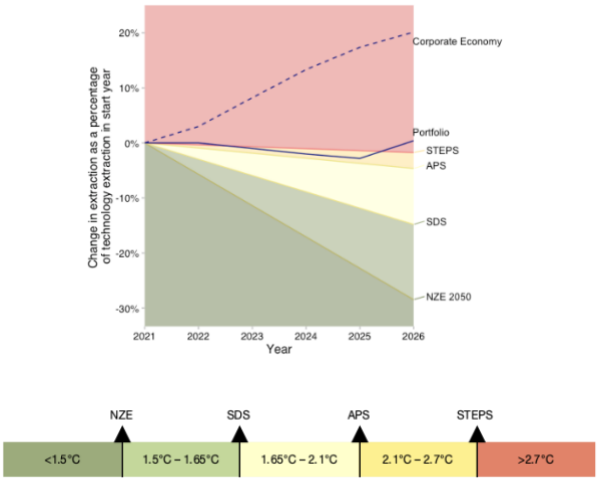
Figure 12. Volume production trajectory of gas production in the portfolio, global targets



12). On the contrary, the global corporate economy shows a steady increase in the rate of production throughout the five years of analysis.

The assessment of the exposure to coal mining shows that 2 out of the 6 credit institutions analyzed are exposed to coal companies. Despite the low proportion of investments in this sector (between 1 and 6% of the total portfolio), the aggregated portfolio could be potentially affected by transition risks, specifically affecting coal mining companies in the next five years, given a relatively constant level of coal production between 2021 and 2025, and a slight increase in 2026. This trend puts the portfolio in a trajectory compatible with a >3.2°C scenario (Figure 13). The global corporate economy shows an increasing trend in coal production in a magnitude that is compatible with a >3.2°C.

Figure 13. Volume production trajectory of coal mining in the portfolio, global targets



5.3. Automotive

The transportation sector accounts for over 15% of total energy-related CO2 emissions, with most emissions produced by light-duty vehicles.[xv]

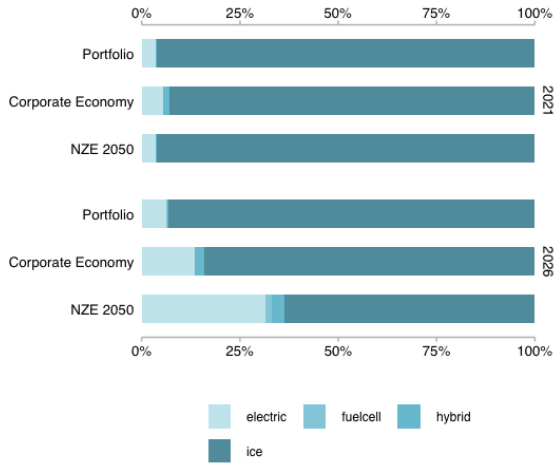
As expected, according to the NZE scenario, CO2 emissions in road transport should decline over the upcoming years, and electric vehicles play a central role in the decarbonization of the automotive sector. IEA NZE scenario estimates that transport clean energy investments need to increase by around eightfold by 2030, specially for electrification in emerging markets and developing economies.[xvi] In this process, government and private sector support is key for new business innovations for charging solutions and catalyzing infrastructure developments.

Although Colombia is moving ahead in the commercialization of electric vehicles in the region, it is necessary that the required infrastructure is developed in parallel so that more people consider the use of an electric vehicle as a viable, efficient option for mobility in the country.

For measuring climate scenario alignment, the manufacturing segment of the automotive value chain is considered. This component is deemed the most climate critical as it is at the root of decarbonization efforts in the sector. Furthermore, it is directly linked to the rest of the value chain, so any changes in production will have a knock-on effect both up and down the value chain.

Exposure to the automotive sector is reported by 2 out of the 6 credit institutions. Despite the low representation of this sector, automotive loans represent approximately 50% of the loan book exposure for one of the credit institutions.

Figure 14. Current and future technology mix of automotive production of the portfolio as a % of the sector, global targets



xv EIA (2021)
xvi IEA (2021)

The technology mix metric for this sector shows a significant exposure to brown technologies in the portfolio, which is heavily dominated by internal combustion engines (ICE) (Figure 14). Between 2021 and 2026, the portfolio's exposure to this technology shows a very slight decrease, which is not enough to meet the requirements of a NZ scenario. To be aligned with a <2°C scenario, the share of electric vehicles needs to increase substantially.

In terms of production volume, none of the automotive production trajectories are aligned with a NZ scenario. The portfolio is required to increase their production of electric (Figure 15) and hybrid vehicles by 30% and more than 3%, respectively. However, companies in the aggregated portfolio are not planning

Figure 15. Volume production trajectory of electric vehicles production in the portfolio, global targets

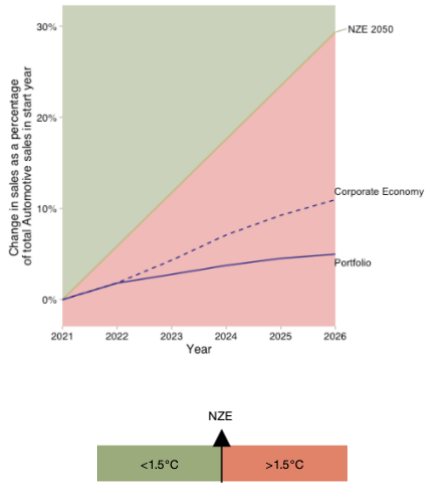
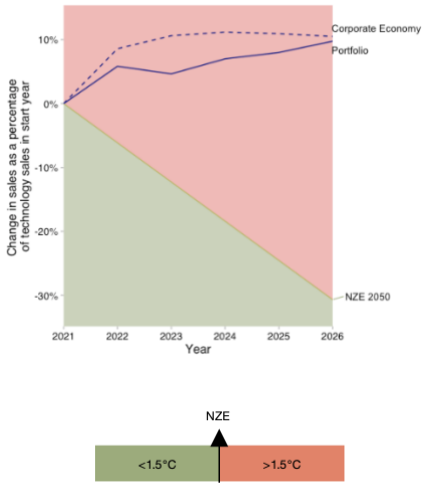


Figure 16. Volume production trajectory of ICEs vehicles production in the portfolio, global targets



significant increases in their production of these types of vehicles. As for the production of ICE vehicles, the scenario requires a reduction of 30% approximately in the next five years, but the portfolio is showing the opposite trend (Figure 16).

5.4. Cement, Steel and Aviation

The exposure of the portfolio to cement, steel, and aviation represents around one fourth of the total exposure reported by the credit institutions. Only 3 out of the 4 institutions have exposure to cement and aviation, while only one shows exposure to steel.

For these sectors, where no commercially available CO2-neutral or low-carbon technology has yet been identified in the scenarios, PACTA calculates an emission intensity metric that estimates the required portfolio reductions in real economic units, e.g., tons of CO2 emissions divided by tons of cement. The emission intensity metrics associated to the aggregated portfolio remains constant for the three sectors during the next five years. The ISF NZ scenario requires that this level of emission intensity declines, although at different rates for each sector. The aggregated portfolio performs better than the corporate

economy, for the cases of cement (Figure 17) and steel, while for aviation (Figure 18) it presents a higher level of emission intensity.

Figure 17. Cement emissions intensity of the portfolio

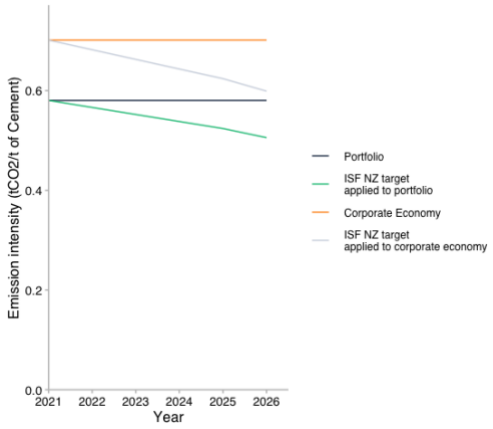
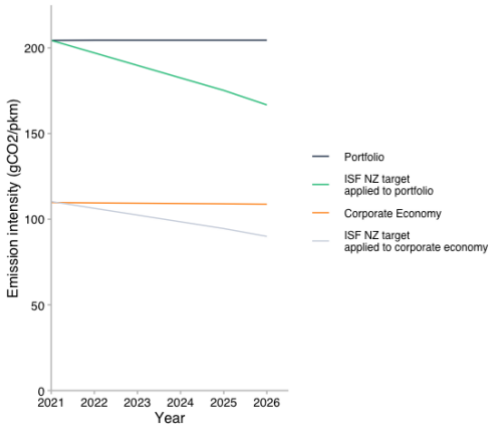


Figure 18. Aviation emissions intensity of the portfolio

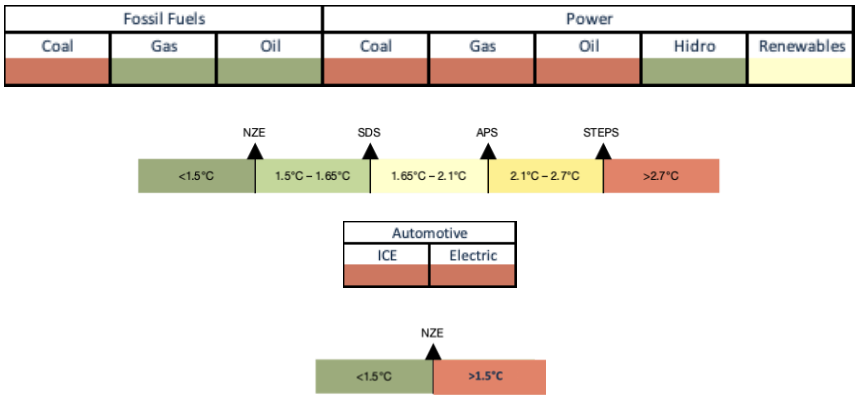


6. Conclusions and Recommendations

The analysis presented in this report provides a first assessment of the alignment of Colombian credit institutions' portfolios with decarbonization pathways that could limit the global average temperature increase in 2100 to below 2°C, and reaffirms the interest and commitment of these institutions in their efforts to fight climate change.

It is important to note that the results of this analysis should be interpreted with consideration of the regional context or country-specific factors, which are not necessarily included in the assumptions of the climate change scenarios. These scenarios are global for all sectors and regional for some instances in the power sector. This methodological limitation could be overcome in the future with the development of more granular scenarios.

The table below provides an overview of the alignment results for different sectors and technologies in 2026. The table reflects the alignment of the 2026 production plans of portfolio companies to different climate scenarios. Power and Fossil Fuel sectors were analyzed with the IEA World Energy Outlook 2021 scenarios, therefore, technologies aligned with scenarios highlighted: in green are on a trajectory consistent with an average global temperature rise of < 1.5°C; in yellow on a trajectory consistent with a temperature rise of between 1.65°C – 2.1°C; and in red > 2.7°C. For the analysis of the automotive sector, the Net Zero Scenario from the IEA was used as a reference, so in this case, red highlighting implies a misalignment with the NZ 2050 scenario.



Risk and opportunities in Banks portfolios will differ according to the individual exposure to each of the critical sectors, but at an aggregated level:

Risks.

Power: Around 30% of the power capacity of the portfolio is using brown technologies, like oil, gas and coal. Portfolio companies are not reducing energy capacity from these technologies at the required rate. And this is putting the portfolio in these technologies on a trajectory compatible with a temperature of >2.7°C and thus could potentially be exposed to transition risks.

Automotive: It is important that issuers in this sector decrease the production of ICE vehicles and transition to green technologies in order to align with the Net Zero scenario. Although there is an increase in the production of electric cars, it is not enough to meet the targets of the scenario. It is relevant to note that to comply with the carbon budget proposed by the scenario, this increase in the production of electric vehicles must be accompanied by a decrease in the production of internal combustion vehicles. Otherwise, the remaining carbon budget would not be met, and alignment with the scenario would not be possible.

Opportunities.

Power: There is a high exposure to hydropower capacity in the sector, indicating that issuers are taking advantage of the transition opportunities in this technology. Given the current hydropower capacity and the progress being made in the country in terms of renewable energy, there are opportunities in these two areas to have a positive influence on companies through impactful engagement in this sector. Banks should promote an increase of investment in renewable energy generation capacity through engagement.

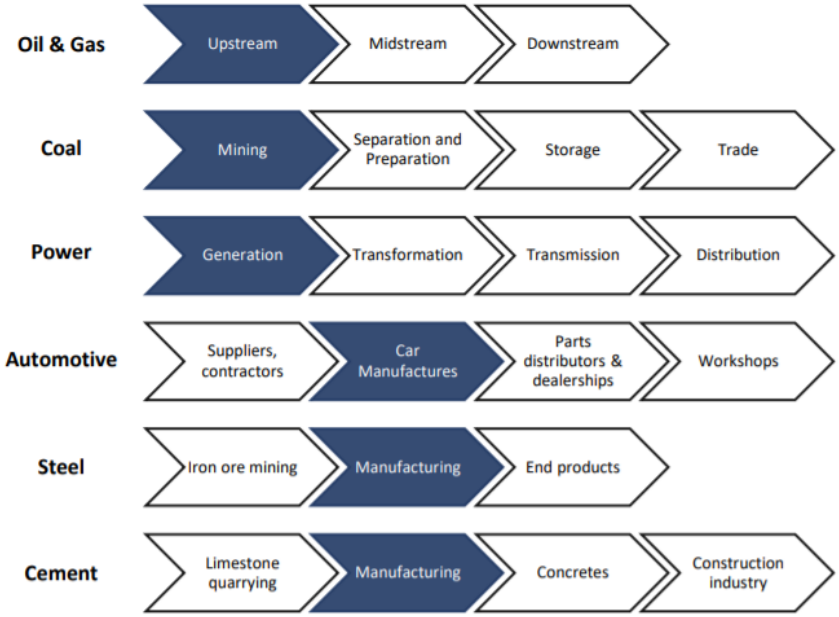
Recommendations.

Capacity Building. Continued trainings that promote financial institutions' understanding of climate change and associated risks are critical. Although the popularity of these topics has increased the availability of information, sustainable finance is a rapidly evolving topic and, in many ways, we are in the early stages of understanding financial institutions' role in the climate transition. Therefore, continuous trainings, knowledge sharing, and industry-wide assessments across a wide variety of stakeholders: policymakers, regulators, academia, and NGOs is recommended.

Banks should define climate metrics that best suit their business model. For this, financial institutions could test different metrics and approaches and identify which enable them to track the climate actions of their clients. It is highly likely that as a result of this process, financial institutions will select a mix of metrics that will provide them with a holistic view of the sector and the companies that make up the portfolio. Furthermore, the selected metrics should allow them to continuously monitor the climate strategies of the clients, the technological evolution of the sectors, and new developments. This information will highlight the opportunities arising from the climate transition.

Measure and track impact in real economy. Although some strategies, such as negative screening, improve the climate performance of portfolios, financial institutions should strive for impact and start measuring the effects of actions taken as part of their climate strategies on the real economy. The first phase of portfolio measurement is just the starting point, but it is relevant to think about where the climate performance of the portfolio is going in the years to come, and, more importantly, what is the contribution of the financial institution to the climate transition.

Annex I: Segments of the Value Chain Covered by the PACTA Methodology (Shaded in blue)



Annex II: Limitations of the Analysis

As in any other model, there are a number of limitations to the PACTA climate scenario analysis for banks conducted in this report.

1. Data analyzed by financial institutions: To perform the exercise, banks were asked to execute the R code to their credit portfolios. However, RMI does not perform any validation or audit of the data, so we rely on the commitment of the entities to run the code and include all the information of their credit portfolios for the pacta results to accurate.
2. Climate scenario assumptions: The climate scenarios used present one possible manifestation of how the energy transition aligned with the Paris climate agreement could look like. Even though the necessary actions are not controversial (expansion of renewables, retirement of high-carbon technologies), the precise way in which a remaining carbon budget is distributed across sectors will be achieved in different ways by different scenarios. Furthermore, different models will include different assumptions about the future development and potential of certain technologies. This analysis therefore focuses on those technologies that are proven and available to the market. As a result, this analysis does not consider investments in R&D or early-stage private equity, which represent an important way for financial institutions to help bring new solutions to the market. Additionally, while scenarios are expected to incorporate all socioeconomic considerations, they don't take into account regionally specific policies or

regulation. For this reason, it is expected that in some technologies alignment may be more difficult or even unfeasible.

3. Asset based company level data used: Although the data is sourced from reliable, third-party data providers, errors are possible, either in the production plans themselves, or in mapping the ownership structure of a companies. Furthermore, planned production plans do not necessarily materialize and production forecasts should be interpreted baring this in mind.
4. Scope of the analysis. PACTA does not cover certain sectors, such as agriculture and forestry, even though they are highly relevant for limiting future GHG emissions, due to lack of available data.